



**\*\*AMENDED 6/15/2020\*\***  
**City of St. Helena**  
**Planning Commission**  
**Regular Meeting**  
**Tuesday, June 16, 2020 @ 6:00 PM**

In accordance with Executive Orders N-25-20, N-29-20, and guidance from the California Department of Public Health on gatherings, remote public participation is allowed. We will address the Order in the following ways: Members of the public may not physically attend meetings. The Planning Commission meeting will be live-streamed on Comcast Channel 28 and on the City's website, barring technical difficulties. Those members of the public wishing to participate must do so remotely via Zoom electronic meetings in the following ways; by either logging onto the Zoom link located on the meeting agenda (please download the app to your computer or mobile device) and enter the meeting ID or by calling a listed number and enter the meeting ID. Public comment for Planning Commission meetings will be accepted via email to [publiccomment@cityofstheleena.org](mailto:publiccomment@cityofstheleena.org).

Please see the end of the agenda for detailed PUBLIC PARTICIPATION instructions.

Please click the link below to join the meeting:

<https://us02web.zoom.us/j/89052729633>

Or iPhone one-tap :

US: +16699006833,,89052729633# or +13462487799,,89052729633#

Or Telephone:

Dial(for higher quality, dial a number based on your current location):

US: +1 669 900 6833 or +1 346 248 7799 or +1 253 215 8782 or +1 301 715 8592 or +1 312 626 6799 or +1 929 205 6099

**Meeting ID: 890 5272 9633**

International numbers available: <https://us02web.zoom.us/j/89052729633>

**PLEASE NOTE: Any person who wishes to speak regarding an item on the agenda or make a comment under the "Oral Communication" portion of the agenda may do so, but please observe the time limit of four minutes.**

Page

1. PLEDGE OF ALLEGIANCE
2. CALL TO ORDER AND ROLL CALL  
Chairperson: Lester Hardy  
Vice Chair: John Ponte  
Commissioners: Autumn Anderson, Daniel Hale and Bobbi Monnette  
City staff present at the meeting will be noted in the minutes.
3. PUBLIC FORUM:  
This is an opportunity for the public to address the Commission on items of interest to the public that are NOT listed on the agenda. Because of restrictions imposed by the Brown Act, the Commission may not engage in discussion nor

take action on matters not described on the agenda. **Please observe the time limit of four minutes.**

4. CONSENT ITEMS

Members of the Commission or the public may ask that any items be considered individually for purposes of considering alternative action, for extended discussion, or for public comment. Unless that is done, one motion may be used to adopt all recommended actions. (Roll Call Vote)

4.1. Approval of Minutes: May 19, 2020

7 - 10

[Commission Minutes 5.19.2020](#)

5. PUBLIC HEARINGS

5.1. Request by Richard Salvestrin for Design Review and Use Permit Amendment approval to add 1,500 sq. ft. of building area to accommodate 1,300 sq. ft. of additional tank room space and 200 sq. ft. of lab area to the existing Salvestrin Winery located at 397 Main Street in the A-20: Twenty Acre Agricultural District. The applicant also wishes to increase the number of employees and the annual number of visitations and events at this location (APN 009-350-047). The project is exempt from the requirements of CEQA pursuant to CEQA Guidelines Section 15303.

11 - 190

CEQA Determination: Exempt pursuant to CEQA Guidelines Section 15303, Class 3(c), New Construction of Small Structures.

Prepared By: Chris Gustin, Contract Planner

Recommendation:

The Planning Department recommends that the Planning Commission adopt a Resolution finding that:

1. The construction of an additional winery building is exempt under Section 15303, Class 3(c) New Construction or Conversion of Small Structures, which exempts construction and location of limited numbers of new, small facilities or structures in urbanized areas, including commercial buildings not exceeding 10,000 square feet in floor area; and
2. Accept or reject the required findings and approve or deny a Use Permit Amendment for expanding the operation of a small winery including additional square footage, an increase in production gallons, additional employees, and an increase in events; and Design Review for the construction of a new winery building on the property at 397 Main Street, APN 009-350-047.

[397 Main St. - Staff Report](#)

6. SCHEDULED MATTERS

7. DEPARTMENT REPORTS

This is an opportunity for staff to report on or update the Commission on any relevant matters.

8. AGENDA FORCAST

Below is a link to a list of pending and upcoming projects which may be of interest to the community.

This is also an opportunity for the Commission as a whole to request items be placed on future agendas for discussion. These items should be consistent with, and work to implement adopted Council Goals.

A list of all current planning projects is available on our city website in the link below:

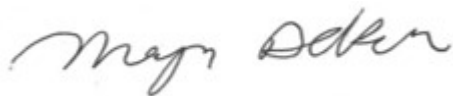
[http://www.cityofsthelena.org/projects?term\\_node\\_tid\\_depth=21](http://www.cityofsthelena.org/projects?term_node_tid_depth=21)

Please contact the assigned project Planner for additional questions.

## 9. ADJOURNMENT

The next Regular Planning Commission meeting is scheduled for July 7, 2020, at 6:00 p.m.

I do hereby certify that a copy of the foregoing agenda was posted on the City website on Tuesday, June 2, 2020.



Maya DeRosa, Planning & Building Director

**Appeal.** A person who is dissatisfied with a decision of the Planning Commission may appeal that decision to the City Council pursuant to Municipal Code Section 17.08.180, Appeal procedure. Actions of the Planning Commission will be listed on the City Council agenda the following Tuesday to give the City Council opportunity to review the Planning Commission's decision. Absent of an appeal by the City Council or by a citizen, the appeal period will terminate two weeks after the Planning Commission hearing.

**Special Assistance for the Disabled.** In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please call the City Clerk's Office (707) 967-2792. Notification 48 hours prior to the meeting will enable City to make reasonable arrangements to ensure accessibility to this meeting (28 CFR35.102-35.104 ADA Title II). However, City staff will attempt to assist at any time with accessibility. The City Clerk has equipment to assist those with a hearing impairment.

## PUBLIC TESTIMONY PROCEDURES

Pursuant to the Government Code Section 54954.3, the public may address the Commission on each agenda item during the Commission's consideration of that item. Each speaker has the option to state his or her name for the record before testifying. Depending on the number of speakers or the interest of the item, the Planning Commission Chairman may also restrict, at his/her discretion, the speaker's time to three minutes. The Chairman may also restrict public comments if they become irrelevant to the agenda item or repetitious of prior comments. All persons interested may appear and be heard or submit written statements prior to the Planning Commission meeting. Please note that

if you challenge the City's decision on any of these matters in court, you may be limited to raising only those issues you or someone else raised at the meeting or in written correspondence delivered to the City at, or prior to, the meeting.

#### CHALLENGING DECISIONS OF CITY ENTITIES

The time limit within which to commence any lawsuit or legal challenge to any quasi-adjudicative decision made by the City of St. Helena is governed by Section 1094.6 of the Code of Civil Procedure, unless a shorter limitation period is specified by any other provision, including without limitation Government Code section 65009 applicable to many land use and zoning decisions, Government Code section 66499.37 applicable to the Subdivision Map Act, and Public Resources Code section 21167 applicable to the California Environmental Quality Act (CEQA). Under Section 1094.6, any lawsuit or legal challenge to any quasi-adjudicative decision made by the City must be filed no later than the 90th day following the date on which such decision becomes final. Any lawsuit or legal challenge, which is not filed within that 90-day period, will be barred. Government Code section 65009 and 66499.37, and Public Resources Code section 21167, impose shorter limitations periods and requirements, including timely service in addition to filing.

If a person wishes to challenge the above actions in court, they may be limited to raising only those issues they or someone else raised at the meeting described in this notice, or in written correspondence delivered to the City of St. Helena, at or prior to the meeting. In addition, judicial challenge may be limited or barred where the interested party has not sought and exhausted all available administrative remedies.

#### SUPPLEMENTAL MATERIAL RECEIVED AFTER THE POSTING OF THE AGENDA

Any supplemental writings or documents distributed to a majority of the Planning Commission regarding any item on this Agenda, after the posting of the Agenda, will be available for public review in the Planning Department's Office located at 1480 Main Street, St. Helena, California, during normal business hours. In addition, such writings or documents will be made available on the City's web site at <http://cityofstheleena.org> and will be available for public review at the respective meeting.

#### **THE CITY OF ST. HELENA ENCOURAGES ONLINE PUBLIC PARTICIPATION IN VIRTUAL PLANNING COMMISSION MEETINGS**

St. Helena, CA— The City of St. Helena is committed to public participation in City government in a manner that is consistent with guidance provided by the Napa County Public Health Official and Governor Newsom's Executive Order N-25-20. These guidelines relate to social distancing, and are intended to protect everyone by limiting the spread of COVID-19 in our community. In adherence to these guidelines, the St. Helena Planning Commission will host a Virtual Commission Meeting on Zoom; a free teleconferencing tool that enables users to watch and/or call into the meeting from their computers or phones. This meeting will be open to public and allows for live public comment. The meeting will also be recorded, livestreamed, and posted on the City's website after the adjournment of the meeting if technical difficulties occur: <https://stheleena.civicweb.net/Portal/>

**The ZOOM web link, meeting ID, and phone number will be listed at the top of the Planning Commission Meeting Agenda. You will be required to enter the meeting ID, but there will be no password or participant ID.**

**How to Watch or Listen to Planning Commission Meetings:**

1. Watch on Comcast Channel 28
2. Watch the livestreaming video on the City's website
3. Watch and Listen on Zoom.us by clicking on the link in the Planning Commission Agenda
4. Listen only by calling the Zoom number listed on the Planning Commission Agenda

**Watch Planning Commission Meeting by Joining the Zoom Meeting:**

1. **By Computer, Tablet, or Smart Phone:**
  - a. Before joining the virtual Planning Commission Meeting, it is highly encouraged that you download the Zoom App. To sign up for your own free account, visit [zoom.us/signup](https://zoom.us/signup) and enter your email address. You will receive an email from Zoom (no-reply@zoom.us). In this email, click Activate Account.
  - b. If you are logged into your account, Enter the **Meeting ID** listed on the Planning Commission Agenda. If you have not created an account go to: <https://zoom.us/join> and enter the **Meeting ID**
  - c. Select if you would like to connect audio and/or video and tap **Join Meeting**.
  - d. For specific instructions for your device, go to: <https://support.zoom.us/hc/en-us/articles/201362193-Joining-a-Meeting>
2. **Listen Only by Telephone:**
  - a. **Dial** the number listed on the Planning Commission Agenda.
  - b. At the prompt, enter the **Meeting ID** provided on the top of the Planning Commission Meeting Agenda and **Press #. A participate ID is not required.**
  - c. To disconnect from the meeting, hang up the phone.

**Ways to Provide Public Comment:**

While attending the virtual Planning Commission Meeting, the public will have the opportunity to provide live public comment during Public Forum and after each agenda item. When it is the appropriate time for public comment the Mayor will verbally open public comment. At this time each individual is permitted 4 minutes to speak.

1. **Send a Public Comment in Advance to**  
[publiccomment@cityofsthelena.org](mailto:publiccomment@cityofsthelena.org)

The easiest way to provide public comment is to email your public comment. Public comments may be emailed to [publiccomment@cityofsthelena.org](mailto:publiccomment@cityofsthelena.org). Please include in the subject line "COMMENT TO PLANNING COMMISSION and the AGENDA ITEM". Any public comment is required to be submitted no later than 1 hour before the scheduled meeting and will be included as an attachment to the agenda.

2. **Provide Comment through Zoom meeting from a computer, tablet, or smart phone**  
This option allows the public to virtually attend the meeting as a muted

'attendee' with no video or screen sharing capabilities. You will be able to see and hear those participating in the meeting, but they will not be able to hear you until the host unmutes you.

If you wish to provide public comment during a specific agenda item or during public forum, you can use the **"raise hand"** feature located in the control panel at the bottom of your screen. The icon is a small blue hand. In Windows you can also use the Alt+Y keyboard shortcut to raise or lower your hand. In Mac you can also use the Option+Y keyboard shortcut to raise or lower your hand. The host will be notified that you've raised your hand and you will be placed in a queue with all incoming requests.

When it is your turn to speak, you will be notified that the host has unmuted you. To be removed from the queue, just click the **'raise hand'** button again.

### 3. **Call in to the ZOOM meeting from a cell phone or landline phone only**

This option allows the member of the public with the opportunity to verbally participate in public comment.

If you wish to speak during public comment time dial **\*9** on your telephone.

The host will be notified that you would like to speak and you will be placed in a queue with all incoming requests.

When it is your turn to speak, you will be notified that the host has unmuted you. You may press **\*9** again if you wish to be removed from the queue.

You will be notified at the end of your statement that you have been muted.

**MINUTES**  
**City of St. Helena**  
**Planning Commission Meeting**  
**Tuesday, May 19, 2020 @ 6:00 PM**

In accordance with Executive Orders N-25-20, N-29-20, and guidance from the California Department of Public Health on gatherings, remote public participation is allowed. We will address the Order in the following ways: Members of the public may not physically attend meetings. The Planning Commission meeting will be live-streamed on Comcast Channel 28 and on the City's website, barring technical difficulties. Those members of the public wishing to participate must do so remotely via Zoom electronic meetings in the following ways; by either logging onto the Zoom link located on the meeting agenda (please download the app to your computer or mobile device) and enter the meeting ID or by calling a listed number and enter the meeting ID. Public comment for Planning Commission meetings will be accepted via email to [publiccomment@cityofsthenela.org](mailto:publiccomment@cityofsthenela.org).

A complete video recording of this meeting, except for closed session, can be found at <https://sthenela.civicweb.net/Portal/> or by calling the City Clerk at (707) 967-2792. The City Council video is the official record of the Council meeting.

**Present:** Chair Lester Hardy, Vice-Chair John Ponte, Commissioner Bobbi Monnette and Commissioner Daniel Hale

**Absent:** Commissioner Autumn Anderson

**Staff Present:** Maya DeRosa, Planning & Building Director, Erica Ahmann Smithies, Public Works Director and City Engineer, Amanda Charne, City Attorney, Aaron Hecock, Senior Planner, and Xinia Gamero, Permit Technician II

- 1. PLEDGE OF ALLEGIANCE**
- 2. CALL TO ORDER AND ROLL CALL**

Chair Hardy requested that Scheduled Matters item 6.1 be heard prior to Public Hearing item 5.1.

- 3. PUBLIC FORUM:**

No public comment was received.

**4. CONSENT ITEMS**

Commissioner Monnette pulled the minutes from the May 5, 2020 Joint City Council and Planning Commission meeting.

**4.1 Approval of Minutes: January 21, 2020, February 4, 2020 and May 5, 2020.**

Vice-Chair John Ponte moved to approve the Minutes of the May 5, 2020 meeting as amended. The motion was seconded by Commissioner Bobbi Monnette and on roll call carried by the following vote:

AYES: Lester Hardy, Daniel Hale, Bobbi Monnette, and John Ponte

NOES: None

ABSENT: Autumn Anderson

ABSTAIN: None

RECUSE: None

Commissioner Daniel Hale moved to approve the Minutes of January 21, 2020 and February 4, 2020 as presented. The motion was seconded by Vice-Chair John Ponte and on roll call carried by the following vote:

AYES: Lester Hardy, Daniel Hale, Bobbi Monnette, and John Ponte

NOES: None

ABSENT: Autumn Anderson

ABSTAIN: None

RECUSE: None

**6. SCHEDULED MATTERS**

**6.1 Consideration and proposed approval of a resolution determining that the FY 2020/21 Capital Improvement Program (CIP) is in conformance with the General Plan**

CEQA Determination: Categorically Exempt Sections 15301, 15302, 15303. Each project proposes to modify or improve to existing facilities, replace or reconstruct existing facilities and/or construct or convert small facilities or structures. Individual projects will have separate CEQA action.

Prepared By: Erica Ahmann Smithies, Public Works Director and City Engineer

**Recommendation:**

Adopt the attached resolution determining that Fiscal Year 2020/21 Capital Improvement Program is in conformance with the General Plan.

Erica Ahmann-Smithies, Public Works Director and City Engineer showed presentation and reported on the item.

No public comment was received.

Vice-Chair John Ponte moved to approve the item as presented.

The motion was seconded by Commissioner Daniel Hale and on roll call carried by the following vote:

AYES: Lester Hardy, Daniel Hale, Bobbi Monnette, and John Ponte

NOES: None

ABSENT: Autumn Anderson

ABSTAIN: None

RECUSE: None

## 5. PUBLIC HEARINGS

- 5.1 Recommendation that the City Council adopt an Ordinance amending Chapter 17.116, Section 17.116.030 of the St. Helena Municipal Code relating to accessory dwelling units.

CEQA Determination: Exempt pursuant to CEQA Guidelines Section 15303.

Prepared By: Aaron Hecock, Senior Planner

**Recommendation:**

Staff recommends that the Planning Commission:

1. Recommend that the City Council adopt an ordinance amending Chapter 17.116, Section 17.116.030 of the St. Helena Municipal Code relating to accessory dwelling units and junior accessory dwelling units; and
2. Determine that the ordinance is exempt from the requirements of CEQA pursuant to CEQA Guidelines Section 15303.

Aaron Hecock, Senior Planner reported on the item.

Maya DeRosa, Planning and Building Director and Amanda Charne, City Attorney addressed the Planning Commission.

No public comment was received.

Vice-Chair John Ponte moved to approve the item as amended. The motion was seconded by Commissioner Daniel Hale and on roll call carried by the following vote:

AYES: Lester Hardy, Daniel Hale, Bobbi Monnette, and John Ponte

NOES: None

ABSENT: Autumn Anderson

ABSTAIN: None

RECUSE: None

**6. DEPARTMENT REPORTS**

Maya DeRosa, Planning and Building Director reported on the following:

- Update on Farmstead project

**7. AGENDA FORCAST**

**8. ADJOURNMENT**

Chair Hardy adjourned the meeting at **7:19 P.M.**

The May 19, 2020 minutes were approved at the \_\_\_\_\_ Planning Commission meeting.

**APPROVED:**

**ATTEST:**

\_\_\_\_\_  
Lester Hardy, Chair

\_\_\_\_\_  
Maya DeRosa, Planning and Building Director



## PLANNING COMMISSION REPORT

Planning Commission Meeting of June 16, 2020

**FILE NUMBER:** PL2018-002

**SUBJECT:** Request by Richard Salvestrin for Design Review and Use Permit Amendment approval to add 1,500 sq. ft. of building area to accommodate 1,300 sq. ft. of additional tank room space and 200 sq. ft. of lab area to the existing Salvestrin Winery located at 397 Main Street in the A-20: Twenty Acre Agricultural District. The applicant also wishes to increase the number of employees and the annual number of visitations and events at this location (APN 009-350-047). The project is exempt from the requirements of CEQA pursuant to CEQA Guidelines Section 15303.

**PREPARED BY:** Chris Gustin, Contract Planner

**REVIEWED BY:** Aaron Hecock, Senior Planner

**APPROVED BY:** Maya DeRosa, Planning & Building Director

**APPLICATION FILED:** 01/08/18

**ACCEPTED AS COMPLETE:** 01/11/19

**LOCATION OF PROPERTY:** 397 Main Street, St. Helena

**APN:** 009-350-047

**GENERAL PLAN/ZONING:** Agriculture/A-20 Twenty Acre Agriculture

**APPLICANT:** Richard Salvestrin

**PHONE:** (707) 963-8851

### **BACKGROUND**

Use Permit 96-102 and associated Design Review were approved by the Planning Commission at its meeting of December 3, 1996, to establish a family winery at 357 Main Street. Maximum annual production of the winery was limited to a capacity of 5,000 gallons. Tasting and sale of wine was limited to appointment only with no public tours or tasting permitted. Appointments for visits to the winery, including marketing events but not including Bed and Breakfast guests or family members, were limited to

two hours per day, two days per week, with no more than ten persons visiting on one day. No public events were permitted.

At its meeting of January 16, 2001, the Planning Commission approved Use Permit Amendment 2000-82 to allow the expansion of the production capacity of the existing winery and approved a Design Review for the construction of a 4,300 square foot winery building on the same property. The applicant had requested an increase in annual capacity to a maximum production of 15,000 gallons. However, based upon Condition of Approval No. 15, maximum production was limited to 11,500 gallons to correspond with the amount of acreage available for vineyards on the parcel on which the winery buildings were to be located. The same conditions limiting sales and tasting and public events established by Use Permit 96-102 were retained as noted above.

In order to support the expanded wine production, the applicant proposed to build a new winery building. The main portion of the building was to provide a 2,400 square foot production area which would house barrels and tanks and have a space for processing and for storing equipment. A two-story portion of the building consisting of 400 square feet of lab/office, bathroom, and storage downstairs, and a 400 square foot tasting room upstairs was constructed. Also, an 1,100 square foot covered crush pad located on the west side of the new building was approved.

In 2011, the Planning Commission approved Design Review 2011-45 to construct a 792 sq. ft. barn at the subject property.

### **PROJECT DESCRIPTION**

The applicant, Richard Salvestrin, is now requesting approval of a Use Permit Amendment and Design Review that consists of three separate components: the construction of a tank room and lab; an increase in annual production of wine; and an increase in the number of employees, visitations, and guests. Each of these components are described below.

#### **Construction of a Tank Room and Lab:**

The applicant is proposing to construct a 1,300 sq. ft. tank room and 200 sq. ft. laboratory. The roof elevation of the tank room and lab will be 23'-3" above natural grade, compared to the height of the existing winery of 29'-0".

Lot coverage in the A-20 Agriculture District is established in Section 17.20.060, Development Standards, Section (c), Standards for Lots Two Acres or Greater in Area. Non-agricultural coverage is limited to no more than one acre for any one parcel. Based upon the Staff Reports prepared for the previous approvals, the total existing lot coverage is approximately 20,800 sq. ft.

Based upon information submitted by the applicant, the total land area covered by this application is 18.57 acres; 12.05 acres for the "winery parcel" at 397 Main Street and

6.52 acres for the “contiguous parcel” at 347 Main Street. On 397 Main Street the applicant states that the existing area defined as “non-agricultural coverage” totals 32,998 sq. ft. The addition of the tank room and lab totaling 1,500 sq. ft. brings the total lot coverage to approximately 34,498 sq. ft. (.79 acres). This is less than the maximum non-agricultural coverage allowed of 43,560 sq. ft. (one acre).

Requested Increase in Annual Wine Production:

The applicant is requesting an increase in annual wine production to 20,000 gallons, as set forth in the information submitted with this application. Zoning Code Section 17.180.080, Development and Use Standards, Section F. states:

“F. There shall be a direct correlation between the yearly production limit of the Small Winery and the anticipated tonnage of grapes. A general guideline for establishing the production limit is 1,000 gallons per acre of vineyard planted on the property where the Small Winery is located; however, the general guideline can vary depending upon the crop yield of the particular vineyard.”

As noted, previous approvals limited the annual production of wine to 11,500 gallons. According to the Staff Report prepared for Use Permit 2000-82, the parcel at 397 Main Street contained a total of 11.5 acres, which served as the basis for limiting production to 11,500 gallons, apparently based upon the “general guidelines” standard set forth in Section F above. It should be noted that different varietals and the vagaries of weather can result in higher or lower per acre annual yields.

Based upon the applicant’s calculations, the subject parcel and the contiguous parcel contain a total of 18.57 acres, which under a strict interpretation of the “general guideline” provision annual production could be limited to 18,570 gallons. That said, because this is a “general guideline” and not a definite standard, Staff is of the opinion that it is within the discretion of the Planning Commission to approve the 20,000 gallons of annual production as requested by the applicant.

Increase in the number of employees:

In the Staff Report prepared for Use Permit 2000-82, it is stated that the applicant had one full-time winery employee, approximately seven seasonal employees, and were proposing to hire one part-time consultant. Condition no. 17 states:

“17. Winery employees, exclusive of vineyard workers, are limited to two employees who are not family members living on the premises. Any seasonal vineyard workers are not included in this limit.”

The applicant is now requesting four full-time employees where the current operation uses one full-time and one part-time employee.

As shown on the plans submitted, the applicant is proposing seven parking spaces – six standard spaces and one ADA compliant accessible space. Section 17.180.080 Development and Use Standards, H. states:

- “H. A minimum of three parking spaces (two standard parking spaces and one accessible parking space) shall be provided with the winery use. Additional parking spaces may be required depending upon the number of employees employed at the winery. All employees shall be required to park on-site.”

This would require the four full-time employees to park on-site, leaving three spaces (two standard and one ADA compliant accessible space available for the winery guests.

Requested Increases in Visitor Activities:

As required by Use Permits 96-102 and 2000-82, tasting and the sale of wine were limited to appointment only with no public tours or tasting permitted. Appointments for visits to the winery, including marketing events but not including Bed and Breakfast guests or family members, were limited to two hours per day, two days per week, with no more than ten persons visiting on one day. No public events were permitted as provided for in Section 18.180.070 A: “No public events shall be permitted”.

As noted, the applicant is requesting an increase in the number of appointments allowed from two-days per week to six days per week; an increase in the number of visitors from ten persons per day to 28 people per day; approval for private events with four annual events with a maximum of 25 guests; two annual events with 125 persons; four annual events with 50 persons; and two annual events with 40 visitors associated with the Napa Valley Wine Auction. To address the potential parking and traffic impacts, the Applicant commissioned a Focused Traffic Analysis.

The requested daily increase from 10 to 28 visitors per day and from two-days per week to six days per week would result in an increase in both parking demand as well as vehicle trips in and out of the property.

Because the City of St. Helena does not have an established standard for vehicle passenger occupancy, the Traffic Analysis utilized the Napa County standard of 2.8 persons per vehicle. The Traffic Analysis concludes that 28 guests per day would result in 10 vehicles per day. The Traffic Analysis assumes that during the 8-hour tasting period of 10:00 AM to 6:00 pm, these ten vehicles would be spread out so that on average only two vehicles would be on the premises at any one time. Allowing for some overlap would result in a maximum of four vehicles at any one time. The Traffic Analysis also assumes that there would be a negligible impact on traffic on Main Street from this component of the applicant's request.

The Focused Traffic Analysis addressed the parking demand and traffic generation for the largest proposed event, two annual events with 125 guests. The Traffic Analysis assumes that for the peak events of 125 guests, approximately 109 trips would be generated (55 inbound; 54 outbound). Because these events take place over a long period of time, the inbound and outbound trips occur at different times. Also, the Traffic Analysis is based upon the assumption that the events will be held outside of typical peak traffic periods – during the middle of the day or after 6:00 PM, thereby reducing impacts to traffic on Main Street.

The applicant is proposing several strategies to minimize both the number of cars coming and going from these events and the amount of on-site parking spaces needed to accommodate their guests.

The larger marketing events, ranging from 25 to 125 guests, would not start or end during the weekday PM peak traffic period of 4:00 PM to 6:00 PM or the weekend mid-day peak period of 2:00 PM to 4:00 PM.

The Traffic Analysis anticipates that 10-20% of the guests will use “hire cars” such as Uber, Lyft, or limousines rather than personal vehicles. Valet parking will be provided on-site. Vehicles will not be allowed to park along the driveway. Vehicles will be parked on-site along the Main Street frontage between the walnut trees and the vineyard.

Guests will be hosted at the on-site bed and breakfast or the applicant will assist guests in staying at the nearby Vineyard Country Inn.

## **ANALYSIS**

### **CEQA**

The project is exempt from the requirements of CEQA pursuant to Section 15303, Class 3(c) New Construction or Conversion of Small Structures, which exempts construction and location of limited numbers of new, small facilities or structures in urbanized areas, including commercial buildings not exceeding 10,000 square feet in floor area. The proposed project is not subject to any of the exceptions to the use of a categorical exemption as outlined in CEQA Section 15300.2. The project site is not located on or near an environmentally sensitive area, is not visible from a scenic highway, is not included on a hazardous waste site, and will not impact historic resources or otherwise generate or contribute to any potentially significant impacts.

### **GENERAL PLAN**

The General Plan designation of Agriculture provides for agricultural uses, wineries, single-family residences, and public and quasi-public uses. The existing and proposed uses on the site are consistent with and permitted in this General Plan designation.

### **ZONING**

The project site is located in the A-20: Twenty Acre Agriculture district. Permitted uses include cultivated agriculture, including but not limited to viticulture. Uses permitted by

Use Permit include facilities for the processing of agricultural products primarily produced on the premises. Development Standards are set forth in Section 17.20.060.

Section 17.20.060 C, Standards for Lots Two Acres or Greater in Area, limits the total non-agricultural coverage to a maximum of one (1) acre on parcels larger than two (2) acres in the A-20: Twenty Acre Agriculture district. With the additional proposed coverage, there will be approximately 35,790 sq. ft. (0.822 acres) of non-agricultural coverage on this parcel. There is no regulation of the floor area in this district.

A front setback of 50 feet is required, measured from the centerline of abutting streets, in this case Main Street. The nearest existing structure is over 400 feet from the centerline, and the proposed new construction is another 160 feet from the centerline.

Similarly, a side setback of 50 feet is required, also measured from the centerline of abutting streets. The north side property line does not abut a street. The proposed new construction is over 120 feet from the north side property line. Several hundred feet of setback exists on the south side. A rear yard setback of 20 feet is required, and the proposed new construction is a minimum of 48 feet from the rear property line.

The maximum building height permitted is 30 feet. The new construction is proposed to be 22'-11".

The proposed new winery building complies with all height and setback requirements in the A-20: Twenty Acre Agriculture district.

#### **PARKING**

Section 17.124.030 F, of the Zoning Ordinance states that parking for wineries shall be determined by the Planning Commission dependent upon winery capacity, number of employees (including seasonal employees) and accessory uses (visitors, assembly and entertainment areas, and retail sales area).

The applicant is proposing to add three standard on-site parking spaces, one of which will be a designated handicap space, for a total of seven parking spaces. The applicant is now requesting four full-time employees.

#### **DESIGN REVIEW**

The purpose of design review is to, among other things, promote the qualities that bring value to the community and foster attractiveness and functional utility of the community as a place to live and work. The Planning Commission must find that the project takes reasonable account of the design criteria prescribed by Section 17.164.030 (detailed below) and exhibit a quality of design that is compatible with adjacent development, features a siting, scale, massing and architectural style that is generally consistent with the predominant development patterns, and that does not otherwise detract or negatively affect the established character of the surrounding neighborhood. Consistency findings related to the Design Review Criteria are enumerated, below.

*Design Review Criteria*

1. Consistency and compatibility with applicable elements of the general plan.

*The proposed project would be appropriate in the context of the greater neighborhood and would be consistent with the intent of applicable General Plan policies pertaining to historic preservation (as noted, there are no historic preservation issues), design, compatibility, and continuity of defining features of the neighborhood. All new construction is of similar design and materials as existing development on the site.*

2. Compatibility of design with the immediate environment of the site;

*The immediate neighborhood consists of developed commercial uses and an educational site. As proposed, the project would retain the character and design of the existing development on the property. There is no component of the project that would be incompatible with the immediate environment of the site or that of the greater neighborhood.*

3. Relationship of the design to the site.

*The proposed project maintains an appropriate relationship to the site and all existing and proposed development on the site remains under the one-acre limitation.*

4. Determination that the design is compatible in areas considered by the board as having a unified design or historical character;

*The project is consistent and compatible with the surrounding properties and neighborhood as it relates to design and use.*

5. Whether the design promotes harmonious transition in scale and character in areas between different designated land uses;

*The proposed new construction would not alter the scale or transition between different land uses in the vicinity.*

6. Compatibility with future construction both on and off the site;

*The proposed winery buildings will blend in with the existing and future construction in the immediate neighborhood.*

7. Whether the architectural design of structures and their materials and colors are appropriate to the function of the project;

*The proposed design and materials are of a quality and type that are appropriate for the agricultural and winery use and would be consistent with the site and its surroundings.*

8. Whether the planning and siting of the various functions and buildings on the site create an internal sense of order and provide a desirable environment for occupants, visitors and the general community;

*The proposed siting of the new structures will create an internal sense of order and provide a desirable environment for occupants and visitors, and will be consistent with the general community.*

9. Whether the amount and arrangement of open space and landscaping are appropriate to the design and the function of the structures;

*The landscaping proposed is consistent with the agricultural and commercial character of the project and sufficient open space will be provided.*

10. Whether access to the property and circulation systems are safe and convenient for pedestrians, cyclists and vehicles;

*No changes to access are proposed as part of the project, and no sidewalks exist along the frontage of Main Street for safe and convenient pedestrian and bicycle access. No changes are proposed to the width of the street that would impact vehicular access. As set forth in the Traffic Study prepared for this project, adequate site distance exists from both directions along Main Street.*

11. Whether natural features are appropriately preserved and integrated with the project;

*The site is essentially flat and does not have any significant natural features.*

12. Whether the materials, textures, colors and details of construction are an appropriate expression of its design concept and function and whether they are compatible with the adjacent and neighboring structure and functions;

*The proposed siding, colors, and roofing materials are consistent with agricultural architecture and compatible with surrounding commercial design employed throughout the City of St. Helena.*

13. Whether the landscape design concept for the site, as shown by the relationship of plant masses, open space, scale, plant forms and foliage textures and colors create a desirable and functional environment and whether the landscape concept depicts an appropriate unity with the various buildings on the site;

*Based on the proposed development plan received, there is no new landscaping proposed.*

14. Whether sustainability and climate protection are promoted through the use of green building practices such as appropriate site/architectural design, use of green building materials, energy efficient systems and water efficient landscape plant materials.

*The project will be conditioned to comply with all current applicable Title 24 building standards for energy efficiency and conservation and would achieve required energy metrics.*

*Staff has no concerns about the design of the proposed winery buildings.*

#### **USE PERMIT**

As a winery seeking to expand on their currently permitted uses, this application requires a Use Permit Amendment. Pursuant to Section 27.439, the Planning Commission must make the following findings to support the motion to approve the Use Permit Amendment:

1. That the proposed use would not generate odors, fumes, dust, light, glare, radiation or refuse that would be injurious to surrounding uses or to the community.

*The addition of the tank room space and lab will no generate any odors, fumes light, glare radiation or refuse that would be injurious to surrounding uses or the community.*

2. That the proposed use would not generate levels of noise that adversely affect the health, safety, or welfare of neighboring properties or uses.

*No increase in noise levels will be generated by the addition of tank storage or lab areas.*

3. That the proposed use would not generate traffic noise in excess of the "normally acceptable" range identified in the General Plan.

*Based upon the Focused Traffic Analysis submitted with this application, there will not be a significant increase in the traffic volumes and therefore no increase in traffic noise.*

4. That the proposed use would not make excessive demands on the provision of public services including water supply, sewer capacity, energy supply, communication facilities, police protection, and fire protection.

*The proposed tank room and lab and the increase in visitation and events will not make excessive demands on the City's ability to provide public services including water*

*supply, sewer capacity, energy supply, communication facilities or police and fire protection.*

5. That the proposed use would provide adequate ingress and egress to and from the proposed location.

*The existing driveway provides adequate ingress and egress as well as site distance at the property.*

6. That allowing the proposed use would not conflict with the City's goal of maintaining the economic viability of a local serving economy.

*That approval of the proposed expanded winery facilities and increase in visitation and events will not conflict with the City's goal of maintaining the economic viability of a local serving economy.*

7. That the proposed use would be compatible with surrounding land uses and would not conflict with the purpose established for the district within which it would be located.

*The proposed expanded winery operation and increase in visitation and events will be compatible with the adjacent high school and nearby commercial businesses in the A-20 District SC: Service Commercial District.*

8. That the proposed use would not be in conflict with the City's General Plan.

*The proposed expanded winery operation and increase in visitation and events is consistent with the City General Plan policies pertaining to permitting wineries and agriculture related industries in the City.*

9. That the proposed use would not be injurious to public health, safety, or welfare.

*The proposed expanded winery operation and increase in visitation and events, as conditioned, will not be injurious to public health, safety, and welfare.*

10. That granting the use permit would not set a precedent for the approval of similar uses whose incremental effect would be detrimental to the City or would be in conflict with the General Plan.

*That due to the unique nature and location of the existing winery, vineyards, and bed and breakfast inn on the property, the increase in visitation and events and the tank room and lab will not set a precedent that would be detrimental to the City or conflict with the General Plan inasmuch as there are no similar uses in the vicinity.*

11. That, as demonstrated on a detailed plan submitted by the applicant, adequate off-street parking to accommodate the long term parking needs of employees and business owners and customers is available.

*That, based upon the plans submitted and the analysis in the Focused Traffic Study prepared for this application adequate off-street parking is available to accommodate existing and future employees and invitees to the site.*

12. That the capacity of surrounding streets is adequate to serve the automobile and delivery truck traffic generated by the proposed use.

*That adequate capacity exists in Main Street to serve the anticipated automobile and truck traffic generated by the expanded barrel room, lab, and increase in visitation and events.*

### **ISSUES**

There are no known or un-resolved issues pertaining to the construction of the tank room and lab or an increase in the number of employees, as requested. There are issues related to water use and on-site wastewater treatment (septic system) on the premises pertaining to the increase in annual production of wine and the requested increase in visitation and events that warrant additional discussion.

### **Water Use**

In conjunction with previous Use Permits and subsequent Amendments thereto, the applicant was required to use water from the on-site well for all winery and vineyard irrigation, and use City water for all other domestic purposes. Various Conditions of Approval were imposed to memorialize these requirements, including requiring the applicant to enter into a Water Use Agreement with the City acknowledging that there is no guarantee of future use of municipal water if the well fails.

As more fully detailed in the Staff Report prepared for Use Permit Amendment and Design Review 2000-82, total water use, including municipal and well water, for the parcel was to be limited to one acre-foot of water per acre of land. A well water analysis was required to determine if the well was adequate for the proposed capacity. A report with estimations of all water use on the parcel, including residential, winery, and irrigation, was required to be submitted with the use permit application. The combined municipal and well water was limited to 12.05 acre feet of water per year for the property on which the winery is located. Municipal water use for this property was estimated to be 0.27 acre feet/year.

It is suggested that if the existing well on the property cannot support the requested increase in production capacity, an expanded well shall be approved by the Napa County Environmental Management and the City Engineer and shall be installed to supply all winery and vineyard irrigation prior to issuance of Building Permits. A meter shall be installed on the well to measure all groundwater used on the parcel. Meter

readings shall be recorded monthly and reported to the Director of Public Works at the beginning of May and November of each year.

It is also suggested that the applicant continue to use only City water for all non-winery and/or vineyard use and, as required by the Public Works Department, prior to the issuance of any building permits, install any necessary infrastructure on-site to provide sufficient City water for all non-winery and/or vineyard use.

#### On-site Treatment of Winery Waste Water

The applicant is required to treat all winery waste through the on-site septic system. Attached is correspondence from the Napa County Department of Planning, Building, and Environmental Services. This memorandum outlines the specific requirements set forth by the Environmental Health Supervisor pertaining to the domestic, water, well water, and the on-site wastewater treatment systems.

Staff is suggesting that this memorandum from Napa County be incorporated by reference into the Conditions of Approval to ensure compliance with all applicable well and on-site waste water treatment standards of Napa County prior to the issuance of Building Permits. The Public Works Director/City Engineer is the responsible party in the City to ensure compliance with these requirements.

#### Increase in Visitation and Events

Regarding the requested increase in the number of visitations and guests, the primary supporting document submitted by the applicant is the Focused Traffic Analysis. Several assumptions are made in this Focused Traffic Analysis to support the proposed increase in visitation and events. The assumptions are based upon the prior experiences of both the applicant holding similar events and the Traffic Consultant in other related projects.

Should the Planning Commission determine that these assumptions are valid the various operational aspects suggested by the applicant and Traffic Consultant will adequately address the potential impacts of the increase in visitation and events, Staff has included in the Resolution Conditions of Approval that require compliance with these measures.

#### **CORRESPONDENCE**

No correspondence has been received as of the preparation of this staff report.

#### **STAFF RECOMMENDATION**

The Planning Department recommends that the Planning Commission adopt a Resolution finding that:

1. The construction of an additional winery building is exempt under Section 15303, Class 3(c) New Construction or Conversion of Small Structures, which exempts

construction and location of limited numbers of new, small facilities or structures in urbanized areas, including commercial buildings not exceeding 10,000 square feet in floor area; and

2. Accept or reject the required findings and approve or deny a Use Permit Amendment for expanding the operation of a small winery including additional square footage, an increase in production gallons, additional employees, and an increase in events; and Design Review for the construction of a new winery building on the property at 397 Main Street, APN 009-350-047.

### **ATTACHMENTS**

[Resolution](#)

[Salvestrin Letter](#)

[Salvestrin Written Statement](#)

[Traffic Impact Analysis - Final May 2018](#)

[Site Plan](#)

[Elevations](#)

[EXH Salvestrin Winery E & P Site Plan 08-15-18](#)

[EXH Salvestrin Winery Overall Site Utility 08-15-18](#)

[EXH Salvestrin Winery Prelim Grading & Drainage 08-15-18](#)

[SUB-Water Use Analysis Salvestrin Winery UP Mod Rev0](#)

[Napa County Conditions](#)

[User Permit & Design Rev. No. 96-102 - 12.03.1996](#)

[Use Permit Amend & Design Rev. No. - 2000-82 - 01.26.2001](#)

**CITY OF ST. HELENA PLANNING COMMISSION**

**RESOLUTION NO.**

**RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF ST. HELENA  
GRANTING APPROVAL OF A DESIGN REVIEW AND USE PERMIT AMENDMENT  
AT 397 MAIN STREET**

**PROPERTY OWNER:** G3 Land Company LLC      **APN:** 009-350-047

**Recitals**

1. On January 8, 2018, Richard Salvestrin submitted an application for Design Review and a Use Permit Amendment to construct a 1,500 sq. ft. addition to accommodate 1,300 sq. ft of additional tank room space and 200 sq. ft. of lab area, and to increase the number of employees and the annual number of visitations and events at 397 Main Street in the A-20 Twenty Acre Agricultural District; and
2. A public notice was published in the Napa Valley Register and mailed to residents and occupants within 300 feet of the project site in compliance with state and local law;
3. The Planning Commission of the City of St. Helena, State of California, considered the project, staff report, and all testimony, written and spoken, at a duly noticed public hearing on June 16, 2020; and
4. Now, therefore let it be found that, the Planning Commission approves the Design Review and Use Permit Amendment contained in said plans based on the findings below and subject to the conditions of approval enumerated herein.

**Resolution**

**A. CEQA**

That the construction of an additional winery building is exempt under Section 15303, Class 3(c) New Construction or Conversion of Small Structures, which exempts construction and location of limited numbers of new, small facilities or structures in urbanized areas, including commercial buildings not exceeding 10,000 square feet in floor area; and

- (a) The project is consistent with the applicable general plan designation and related policies and the applicable zoning designation and regulations.
- (b)..... The site is within the city limits and is surrounded by urban uses.
- (c) The site has no value as habitat for endangered, rare, or threatened species.
- (d) Approval of the project would not result in any significant effects relating to traffic, noise, air quality, or water quality.

(e) The site can be adequately served by all required utilities and public services.

The proposed project is not subject to any of the exceptions to the use of a categorical exemption as outlined in CEQA Section 15300.2. The project site is not located on or near an environmentally sensitive area, is not visible from a scenic highway, is not included on a hazardous waste site, and will not impact historic resources or otherwise generate or contribute to any potentially significant impacts

## **B. Design Review**

The Planning Commission has considered the Design Review design criteria identified in Municipal Code Section 17.164.030 to support the motion to approve the Design Review given that the project has been found to demonstrate:

1. The proposed project would be appropriate in the context of the greater neighborhood and would be consistent with the intent of applicable General Plan policies pertaining to historic preservation (as noted, there are no historic preservation issues), design, compatibility, and continuity of defining features of the neighborhood. All new construction is of similar design and materials as existing development on the site.
2. The immediate neighborhood consists of developed commercial uses and an educational site. As proposed, the project would retain the character and design of the existing development on the property. There is no component of the project that would be incompatible with the immediate environment of the site or that of the greater neighborhood.
3. The proposed project maintains an appropriate relationship to the site and all existing and proposed development on the site remains under the one-acre limitation.
4. The project is consistent and compatible with the surrounding properties and neighborhood as it relates to design and use.
5. The proposed work would not alter the scale or transition between different land uses in the vicinity.
6. The proposed winery buildings will blend in with the existing and future construction in the immediate neighborhood.
7. The proposed design and materials are of a quality and type that are appropriate for the agricultural and winery use and would be consistent with the site and its surroundings.
8. The proposed siting of the new structures will create an internal sense of order and provide a desirable environment for occupants and visitors, and will be consistent with the general community.

9. Existing landscaping is consistent with the agricultural and commercial character of the project and sufficient open space is provided.

10. No changes to access are proposed as part of the project, and no sidewalks exist along the frontage of Main Street for safe and convenient pedestrian and bicycle access. No changes are proposed to the width of the street that would impact vehicular access. As set forth in the Traffic Study prepared for this project, adequate site distance exists from both directions along Main Street.

11. The site is essentially flat and does not have any significant natural features.

12. The proposed siding, colors, and roofing materials are consistent with agricultural architecture and compatible with surrounding commercial design employed throughout the City of St. Helena.

13. No new landscaping is proposed. Existing landscaping is consistent with that seen throughout St. Helena.

14. Landscaping is consistent with the applicable low-water landscaping ordinances and is irrigated by a drip system. The project will be conditioned to comply with all current applicable Title 24 building standards for energy efficiency and conservation and would achieve required energy metrics.

### **C. Use Permit**

Pursuant to Section 27.439, the Planning Commission makes the following findings to support the motion to approve the Use Permit Amendment:

1. The addition of the tank room/ lab space, increased production capacity, addition of employees, increased visitation and events will not generate any odors, fumes light, glare radiation or refuse that would be injurious to surrounding uses or the community.

2. The increase in noise associated with the addition of the tank room/ lab space, increased production capacity, addition of employees, increased visitation and events will not be significant.

3. Based upon the Focused Traffic Analysis submitted with this application, there will not be a significant increase in the traffic volumes and therefore no increase in traffic noise.

4. The proposed tank room and lab, additional production, additional employees, and the increase in visitation and events will not make excessive demands on the City's ability to provide public services including water supply, sewer capacity, energy supply, communication facilities or police and fire protection.

5. The existing driveway provides adequate ingress and egress as well as site distance at the property.

6. That approval of the proposed expanded winery facilities and increase in visitation and events will not conflict with the City's goal of maintaining the economic viability of a local serving economy.
7. The proposed expanded winery operation and increase in visitation and events will be compatible with the adjacent high school and nearby commercial businesses in the A-20 District SC: Service Commercial District.
8. The proposed expanded winery operation and increase in visitation and events is consistent with the City General Plan policies pertaining to permitting wineries and agriculture related industries in the City.
9. The proposed expanded winery operation and increase in visitation and events, as conditioned, will not be injurious to public health, safety, and welfare.
10. That due to the unique nature and location of the existing winery, vineyards, and bed and breakfast inn on the property, the increase in visitation and events and the tank room and lab will not set a precedent that would be detrimental to the City or conflict with the General Plan inasmuch as there are no similar uses in the vicinity.
11. That, based upon the plans submitted and the analysis in the Focused Traffic Study prepared for this application adequate off-street parking is available to accommodate existing and future employees and invitees to the site.
12. That adequate capacity exists in Main Street to serve the anticipated automobile and truck traffic generated by the expanded barrel room, lab, and increase in visitation and events.

#### **Conditions of Approval**

1. This permit shall be in conformance with all City ordinances, rules, regulations and policies in effect at the time of issuance of a building permit. All limitations and conditions contained in approvals #96-02 and #2000-82 still apply unless superseded by conditions in this resolution.
2. The approvals shall be vested within one (1) year from the date of the decision. A building permit for the project allowed under this approval shall have been applied for within one (1) year from the effective date of the Design Review decision or these approvals shall expire; provided however that the approved Design Review may be extended for up to two (2) one-year periods pursuant to the St. Helena Municipal Code, Section 17.08.030, Extension of Permits and Approvals.
3. This Design Review and Use Permit is valid for this design only. New permits must be applied for any change in use. These permits will expire if the use is discontinued pursuant to then existing ordinances and regulations.
4. The Design Review shall not become effective until fourteen (14) calendar days after approval, providing that the action is not appealed by the City Council or any other interested party within that 14 day period.

5. Any request for an extension of the Design Review must be justified in writing and received by the Planning Department at least thirty (30) days prior to expiration.

6. All required fees, including planning fees, development impact fees, building fees, retrofit fees, and St. Helena Unified School District fees shall be paid prior to issuance of building permit.

7. Pursuant to City Council Resolution 2003-65, the owner and applicant are informed of the following:

*In recognition of the need for additional affordable housing, and to mitigate the effects of this development on the supply and demand of affordable housing, the permittee shall be subject to a Housing Impact Fee, an inclusionary requirement, an in-lieu fee, and/or similar fair and appropriate mechanisms, to provide funds for or to develop additional affordable housing.*

8. Compliance with all permit conditions shall be clearly identified on all plans submitted for building permit approval, shall occur in accordance with specific regulations but in all cases no later than prior to occupancy or initiation of use unless another time is set by law or by this approval. Occupancy or final inspection of a project may be withheld if all conditions, including payment of fees for services rendered by the City, are not met.

9. The applicant will defend and indemnify and hold the City, its agents, officers, and employees harmless of any claim, action or proceedings to attack, set aside, void or annul an approval so long as the City promptly notifies the applicant of any such claim, action, or proceedings and the City cooperates fully in the defense of the action or proceedings.

10. Provided they are in general compliance with the approved Design Review, minor modifications found to be in substantial conformance with the approved design may be approved by the Planning Director.

11. This Design Review shall run with the land and shall be binding upon all parties having any right, title or interest in the real property or any part thereof, their heirs, successors and assigns, and shall inure to their benefit and benefit of the City of St. Helena.

12. The primary purpose of this review is for compliance with the General Plan and Zoning Ordinance. The owner/applicant is responsible for meeting with the Building Official / Fire Inspector to review compliance with Building and Fire Codes, including fire protection systems and the accessibility standards of Title 24.

13. Construction documents shall be in compliance with approved plans and exhibits. All conditions of approval shall be clearly identified and included on all plans submitted for building permit review and issuance.

14. Where the A:20 Agriculture District adjoins agricultural districts, there exists a right-to-farm the adjoining property. There is a good faith expectation that no complaints will occur regarding legal, normal agricultural activities on the adjacent land. Such activities may include day or night disbursement of chemicals, and creation of dust, noise, or fumes.

15. Developer is required to incorporate street trees into the frontage improvements of the proposed project and/or to replace any dead or dying trees currently within the existing planting strip or tree wells (per General Plan Policy 6.4.13) The size, species and location of these trees shall be identified on all plans submitted for building permit review and issuance.

16. No events open to the public shall be permitted. All attendees at visitations and events authorized by this Use Permit and Design Review shall be specifically invited by the Applicant or his representatives.

17. Except as may be provided for in subsequent Conditions of Approval set forth herein, on a daily basis there shall be no more than 28 visitors per day, no more than six days per week. Such visitations shall be limited to 10:00 AM to 6:00 PM.

18. Notwithstanding the provisions for limitations on visitors on a daily basis, there shall be no more than four annual events with a maximum of 25 guests.

19. Notwithstanding the provisions for limitations on visitors on a daily basis, there shall be no more than four annual events with a maximum of 50 persons.

20. Notwithstanding the provisions for limitations on visitors on a daily basis, there shall be no more than two annual events with a maximum of 40 visitors associated with the Napa Valley Wine Auction.

21. Notwithstanding the provisions for limitations on visitors on a daily basis, events of up to 125 people shall be limited to two per year.

22. All large marketing events, ranging from 25 to 125 guests shall not start or end during the weekday PM peak traffic period of 4:00 PM to 6:00 PM or the weekend mid-day peak period of 2:00 PM to 4:00 PM.

23. For all large marketing events ranging from 25 to 125 guests, all vehicles shall be parked on the site. Valet parking will be provided on-site for all vehicles. Vehicles shall not be allowed to park along the driveway. Vehicles will be parked on-site by valets along the Main Street frontage between the walnut trees and the vineyard.

24. Whenever a large marketing event with between 25 and 125 guests are scheduled, the winery will suspend winetasting activities in the tasting room during afternoon events.

Public Works Department Conditions of Approval

25. Approval of this project shall be subject to the requirements of, and all improvements shall be designed and constructed in accordance with, the most current version at the time of improvement plan submittal, Caltrans Standards and Specifications, the City of St. Helena Municipal Code, the St. Helena Water and Sewer Standards, the St. Helena Street, Storm Drain and Sidewalk Standards, and all current federal, state and county codes governing such improvements.

26. For any improvements outside the existing building envelope, a grading and drainage plan showing topographic data, all easements, infrastructure onsite and directly adjoining, and an erosion control plan shall be submitted for review and approval by the City Engineer prior to the issuance of a building permit. If the project entails more than 50 cubic yards of soil disturbance, 10,000 square feet of disturbance area, a cut or fill of 3 feet or more, or alteration of any drainage pattern, a grading permit shall be required.

27. Drainage needs to be routed to prevent inundation of neighboring properties. Grading and/or site improvement plans shall show how 2-year and 10-year storm flows shall be infiltrated on site and/or diverted at the property lines to prevent inundation of neighboring properties.

28. Erosion and sediment control plans shall conform to the latest State and City codes at a minimum.

29. Provide details of any and all proposed fencing, gates, and/or walls on all plans submitted for building permit review.

30. The applicant shall install an approved backflow device behind the existing water meter prior to Certificate of Occupancy. If a current approved backflow device exists, then please provide current test certifications. Any new and modified existing water laterals, meters and backflow prevention devices shall be required and constructed in accordance with the current requirements of the City of St. Helena's Water Standards and the California Department of Health Standards. Existing meter boxes located within a driveway shall be retrofitted with a traffic-rated box. New laterals shall be located perpendicular to the water main and outside any driveway/drive aisle.

31. Remodels or new construction which require fire sprinklers shall install an appropriately-sized water service with appropriate backflow and meter devices prior to Certificate of Occupancy. Fire system calculations shall be submitted with the Grading and Drainage Plan to verify fire service lateral and meter sizing. Deferred submittals are not accepted.

32. The applicant shall incorporate water conservation practices into the proposed project to offset the additional demand calculated in the Water Neutrality Analysis prepared by Delta Consulting & Engineering, dated January 24 2020. Any and all non-conforming appliances and plumbing fixtures shall be removed from the premises. The water analysis shall be replicated on the building plans prior to building permit approval. All onsite retrofits shall be completed prior to issuance of final occupancy.

33. If the project includes 500 square feet or more of new landscaping and/or 2,500 square feet or more of rehabilitated landscape, the proposed landscaping shall comply with the State's Model Water Efficient Landscape Ordinance (MWELO).

34. Prepare and implement a Stormwater Control Plan as required by the Bay Area Stormwater Management Agencies Association (BASMAA) Post-Construction Manual, dated January 2019.

35. The applicant shall conform to the conditions of the Napa County Planning, Building and Environmental Services as set forth in the Memorandum dated January 31, 2020 and shall be fulfilled prior to the issuance of any building permits or final occupancy for the winery expansion and increase in visitors. The Napa County conditions are as follows:

Prior to building permit issuance:

A. Plans for the proposed process wastewater treatment and reuse system shall be designed by a licensed Civil Engineer or Registered Environmental Health Specialist and be accompanied by complete design criteria based upon local conditions and current fee. No building clearance (or issuance of a building permit) for any structure that generates wastewater to be disposed of by this system will be approved until such plans are approved by this Division. Adequate reserve area for all uses on the parcel must be identified in this application.

Please be advised-requirements for process wastewater treatment systems in Napa County are being reviewed and may be modified to comply with State Water Quality Control Board (SWQCB) minimum standards.

B. A permit to construct the proposed process wastewater treatment and reuse system must be secured from this Division prior to approval of a building clearance (or issuance of a building permit) for any structure that generates wastewater to be disposed of by this system.

C. Prior to the approval of a building permit, an inspection of the existing sewage disposal system must be performed by a licensed sewage contractor and a report submitted to this Division for review and approval. Any deficiencies noted must be corrected under permit issued by this Division if necessary.

D. The applicant has indicated City of St. Helena will provide water for domestic uses on the parcel. Additionally, the onsite wells will be used for winery process water and irrigation. The water supply is not required to be regulated by this Division as a small public water system, but proof the City is providing water will be required prior to this Division approving building permits for the winery expansion. The separate plumbing systems (process water and domestic water) shall be permitted by the Building Department, comply with California Building Standards and remain completely separate systems. All domestic water serving drinking fountains, hand wash sinks, eyewash stations, restrooms and other similar fixtures shall be provided from City of St. Helena.

E. The applicant shall maintain regular monitoring of the above ground waste water treatment system as required by this Division which includes submitting quarterly monitoring reports. An annual operating permit is required for the waste water system.

Upon final occupancy and thereafter:

F. A commercial food facility was not included in this project. As indicated in the septic feasibility report, all food service for events will be catered. Therefore, all food must be prepared and served by a Napa County permitted caterer. If the caterer selected does not possess a valid Napa County Permit to operate, refer the business to this Division for assistance in obtaining the required permit prior to providing any food service.

G. Within 30 (thirty) days of initiation of the use or change of tenants, an updated Hazardous Materials Business shall be submitted to <http://cers.calepa.ca.gov/> and approved by this Division.

H. The use of the absorption field/drain field area shall be restricted to activities which will not contribute to compaction of the soil with consequent reduction in soil aeration. Activities which must be avoided in the area of the septic system include equipment storage, traffic, parking, pavement, livestock, etc.

I. All solid waste shall be stored and disposed of in a manner to prevent nuisances or health threats from insects, vectors and odors.

J. During the construction, demolition, or renovation period of the project the applicant must use the franchised garbage hauler for the service area in which they are located for all wastes generated during project development, unless applicant transports their own waste. If the applicant transports their own waste, they must use the appropriate landfill or solid waste transfer station for the service area in which the project is located.

K. All diatomaceous earth/bentonite must be disposed of in an approved manner. If the proposed septic system is an alternative sewage treatment system the plan submitted for review and approval must address bentonite disposal.

36. Any missing or broken curb and gutter along the project frontage shall be constructed and/or replaced prior to Certificate of Occupancy, extent to be determined by the Public Works Department.

37. The applicant shall repair all public improvements that are damaged by the construction process in accordance with the City Water/Sewer/Street/Storm Drain/Sidewalk Standards prior to Certificate of Occupancy.

38. Existing streets being cut by new utility services will require edge grinding and an A.C. overlay per City standards, extent to be determined by the Public Works Department.

39. An encroachment permit shall be required for any work performed in the public right of way.

40. The applicant shall contribute a "fair share" contribution in the amount of 2% for the construction of a traffic signal at the Highway 29/Dowdell Lane intersection or as otherwise decided by the Director of Public Works.

Fire Department Conditions of Approval

41. Plans submitted for building permit shall exhibit compliance with the current St. Helena Fire Code, as adopted and codified in St. Helena Municipal Code Chapter 15.36.

42. Installation of approved interior fire sprinkler system is required, unless waived by the Fire Chief.

43. One hour minimum fire resistant construction on all exterior walls within 10' of property boundary is required. Fire resistant construction of interior walls shall be determined by type of occupancy.

44. Any gates installed to control vehicular access to a property are required to be setback 30-feet from the property line and/or edge of pavement, whichever is greater. No vehicle gates may be installed without Fire Department and Public Works Department review and explicit approval.

Building Department Conditions of Approval

45. A building permit is required for all onsite demolition, construction and/or change of occupancy.

46. The applicant will be required to comply with the codes adopted at the time the applicant applies for a building permit. At this time the City of St. Helena utilizes the 2019 Title 24 codes.

47. When submitting plans for a building permit, the plans shall include all documentation listed on the building permit application checklist.

48. The applicant shall provide a construction waste management plan with the building permit application.

49. The plans for construction shall include a checklist for compliance with the California Green Buildings Standards Code, mandatory measures. Provide a reference on the checklist indicating where the mandatory measures can be found on the plans.

50. When submitting plans, the title page shall include all information referenced on the building permit application checklist Title Page requirements.

51. Building Permit application materials and plans shall include any documentation pertaining to special loads applicable to the design and the specified section of the code that addresses the condition; special inspections for any systems or components requiring special inspection; requirements for seismic resistance; and a complete list of

deferred submittals at time of application. Any deferral of the required submittal items shall have prior approval of the Building Official however deferral of fire sprinkler design is not allowed.

52. Properties which are on septic systems and proposing substantial renovations may require approval from the Napa County Environmental Health Department. Applicants are encouraged to engage with the County early in the building permit review process to reduce the potential for delay.

53. Building Permit application materials and plans shall include any documentation pertaining to special loads applicable to the design and the specified section of the code that addresses the condition; special inspections for any systems or components requiring special inspection; requirements for seismic resistance; and a complete list of deferred submittals at time of application. Any deferral of the required submittal items shall have prior approval of the Building Official however deferral of fire sprinkler design is not allowed.

I HEREBY CERTIFY that the foregoing Use Permit Amendment and Design Review was duly and regularly approved by the Planning Commission of the City of St. Helena at a regular meeting of said Planning Commission held on June 16, 2020 by the following roll call vote:

AYES:  
NOES:  
ABSENT:  
ABSTAIN:

APPROVED:

ATTEST:

---

Lester Hardy  
Chair, Planning Commission

---

Maya DeRosa, AICP  
Planning and Building Director

# SALVESTRIN



City of St Helena, City Hall  
Received

JAN 08 2018

1480 Main St.  
St Helena, CA 94574

Jan 4, 2018

To: City of St. Helena

From: Richard Salvestrin

Re: Water supply for Salvestrin Winery

Salvestrin Winery located at 397 Main St is supplied with well water from a well located on said parcel. Our use permit states that city water is not available for use in the winery operation.

Salvestrin winery participates in the voluntary well monitoring program through the Napa County Water Conservation District. We have also had our water tested recently by Cal Test for applicable NELAC standards.

Salvestrin Winery is certified Napa Green in both Land and Winery operations and continually monitors our water conservation efforts.

397 MAIN STREET, SAINT HELENA, CALIFORNIA 94574 • TEL: (707) 963-5105 • FAX: (707) 963-1382  
[www.salvestrinwinery.com](http://www.salvestrinwinery.com)

## Salvestrin Winery

### Use Permit Amendment Statement

This is an application for a Use Permit Amendment at 397 Main Street in St. Helena to include a tank room and lab addition, an increase in production gallons, additional employees and an increase in visitation and events. The current Use Permit was originally issued in 1996 and amended in 2000 to allow for construction of the current winery building. This occurred prior to the current small-winery ordinance.

#### **The Building Addition:**

Currently the wine tanks and barrels are housed in one room. The space is too small and often the barrels have to be removed to the crush pad for regular winery work to be performed. The Tank Room addition will give the tanks and barrels separate spaces and allow for a much more efficient working environment. The Lab Addition will create a new working lab isolated from the other functions of the winery.

The proposed building addition footprint is 1,500 square feet with a gross floor area of 1,500 square feet. The highest roof elevation of the proposed addition is 23'-3" above natural grade. The highest roof elevation of the existing winery is 29'-0". The winery will continue to be accessed via the existing driveway located off of Main Street.

|                                      |                 |
|--------------------------------------|-----------------|
| Existing Winery                      | = 4300 SF       |
| Tank Room addition                   | = 1300 SF       |
| <u>Lab addition</u>                  | <u>= 200 SF</u> |
| Total Resulting Floor Area: 5,800 SF |                 |

|                                    |                                      |             |                  |                  |                                            |
|------------------------------------|--------------------------------------|-------------|------------------|------------------|--------------------------------------------|
| Premises:                          | 397 Main St<br>acres                 | 12.05       | Winery parcel    |                  |                                            |
|                                    | 347 Main St<br>acres                 | 6.52        | contiguous       |                  |                                            |
|                                    | Total                                | 18.57 acres |                  |                  |                                            |
| Zoning:                            | A-20 Agriculture                     |             |                  |                  |                                            |
| <b>Matrix of Proposed Changes:</b> |                                      |             |                  |                  |                                            |
| <b>Sec 3<br/>Item #</b>            |                                      |             | <b>Current</b>   | <b>Proposed</b>  | <b>Allowed-<br/>Current Ord<br/>17.180</b> |
| 14                                 | Parking spaces                       |             | 3 + 1 Accessible | 6 + 1 Accessible | 2 + 1 Accessible                           |
| 16                                 | Production Gallons                   |             | 11,500           | 20,000           | 18,000                                     |
| 18                                 | Employees                            |             | 1FT - 1PT        | 4 FT             | Use permit<br>review                       |
| 19                                 | Tasting/sale of wine by<br>appt only |             | yes              | yes              | yes                                        |

|    |                  |                          |               |                   |
|----|------------------|--------------------------|---------------|-------------------|
| 19 | Appointments     | 2 days/wk                | 6 days/wk     | use permit review |
| 19 | Visitation       | 10 people/day            | 28 people/day | use permit review |
| 19 | Private events   | Included in visitation # | 2@ 125, 4@ 50 | 1 per month       |
|    |                  |                          | 4 @ 25        |                   |
|    | NVV Wine Auction |                          | 2@40          |                   |
| 20 | Public events    | none                     | none          | none              |

**Changes to Production Gallons:**

The current permit allows for fruit to be used from owned, adjacent parcels; however total production gallons are limited to just the winery parcel. Under the current small-winery ordinance total production gallons allowed includes adjacent parcels. This proposed change asks for total gallons allowed to include the adjacent parcel, bringing the production in line with the current small-winery ordinance.

**Changes to Visitation and Events:**

As a small winery under the current ordinance we are limited to producing wine from our estate parcels. The total volume of wine we produce is relatively insignificant in the national wholesale market making it challenging to sustain our business within that sales model. The ability to sell direct to consumer is critical to the success of our small, authentic St. Helena winery.

Focused Traffic Analysis for the  
**SALVESTRIN WINERY**  
**USE MODIFICATION PROJECT**  
**City of St. Helena**

Prepared for:

**City of St. Helena**

At the Request of:

**Salvestrin Winery**

Final Report

May 2018

Prepared by:



**FOCUSED TRAFFIC ANALYSIS  
PROPOSED SALVESTRIN WINERY USE MODIFICATION PROJECT**

**Prepared For:  
CITY OF ST. HELENA  
At the request of:  
Salvestrin Winery**

**Prepared By:  
Omni-Means/GHD.  
2300 Clayton Road, Suite 920  
CONCORD, CA 94520  
925.849.1000**

**Final Report  
MAY 4, 2018**

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## 1. Executive Summary

The proposed Salvestrin Winery Use Modification project's weekday peak hour trip generation would not significantly affect intersection LOS on Main Street (SR-29). The proposed project is estimated to generate 4 AM weekday peak hour trips and 13 PM weekday peak hour trips. During the weekend (Saturday) mid-day peak hour, the proposed project would generate 18 trips (9 in, 9 out). All four project study intersections would operate at acceptable levels (LOS D or better) under existing and near-term "with project" conditions. With cumulative year 2035 (no project) conditions, the SR-29/Dowdell Lane and SR-29/Vintage Avenue unsignalized intersections would operate at LOS E for the outbound (westbound) left-turn movements during the weekday AM and PM peak periods. The proposed project would add to these unacceptable conditions at the two study intersections. However, project traffic would add less than five (5) seconds of overall vehicle delay to the intersections and would make up less than one (1) percent of overall cumulative peak hour volumes consistent with City of St. Helena significance thresholds for unsignalized intersections on Main Street (SR-29). Additional mitigation at the SR-29/Dowdell Lane and SR-29/Vintage Avenue intersections is not recommended at this time due to the following circulation improvements:

1. The completion of the St. Helena SR-29 Channelization Project; It is understood that the SR-29/Dowdell Lane and SR-29/Vintage Avenue intersections currently meet the peak hour signal warrant under existing conditions. However, the installation of a two-way-left-turn-lane on SR-29 at Dowdell Lane and Vintage Avenue has improved vehicle access to Dowdell Lane and Vintage Avenue to/from SR-29 and overall vehicle delays. The new two-way-left-turn-lane allows 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 allows southbound motorists on SR-29 to make a left-turn (inbound) to Dowdell Lane and Vintage Avenue without delaying through-traffic on the highway. Indirectly, the signal at the SR-29/Grayson Avenue intersection just south of Mills Lane would also benefit traffic at Dowdell Lane (at times) by providing more "gaps" in southbound traffic;

The remaining study intersections of SR-29/Grayson Avenue and SR-29/Salvestrin Driveway would operate at acceptable levels (LOS D or better) under all analyzed scenarios and time periods.

Based on the Caltrans design standards, the Salvestrin Winery project driveway requires a sight distance of approximately 360 feet. Visibility on Main Street at the Salvestrin project driveway is excellent with approximately 600 feet in the northerly direction and approximately 900 feet in the southerly direction. Therefore, the sight distance is adequate.

Using the County's auto occupancy rate of 2.8 persons per vehicle and maximum daily visitation of 28 guests (Saturday) would yield a total daily count of 10 vehicles (28 guests / 2.8 person per vehicle = 10 vehicles). Over the course of the 8-hour tasting period (10:00 a.m.-6:00 p.m.) this would yield an average parking demand of 2.0 parking spaces. Allowing for the peak overlapping parking demand for a two-hour period; it is reasonable to suggest the maximum parking demand would be four (4) parking spaces (2.0 space demand x 2 hours = 4 spaces). Discussions with the project applicant indicate that they employ transit use (hire car, limousine, and shuttle services) to reduce overall trip generation and parking demand.

Based on standard County auto occupancy rates, the largest annual event of 125 guests would be expected to generate approximately 109 daily trips (55 in, 54 out) including visitors, staff, and delivery trucks (unless shuttle buses/TDM are used). These events are typically of sufficient duration in length that the inbound and outbound trips occur in separate hours, thus the number of trips on the street network at one time are half of the total volumes. These events are usually held outside of typical peak traffic periods (during the middle of the day or later than 6:00 p.m.) and therefore generally do not impact peak hour operations and no other visitation or events would occur during the annual events.

As a proposed project requirement, large marketing events (50-125 guests) should not start/end during the weekday PM peak period (4:00-6:00 p.m.) nor weekend mid-day peak period (2:00-4:00 p.m.). In addition, the tasting room should suspend visitation related to wine tasting on the days when the facility hosts large marketing events that are held during the afternoon period. These measures would reduce any traffic impacts related to large marketing events to *less-than-significant* levels.

The Highway 29 Specific Plan recommends the potential funding mechanisms for remaining circulation improvements in the study as follows:

**Highway 29/Dowdell Lane Traffic Signal:** Although this signal location is outside of the Specific Plan area, it will serve existing and new development on the east side of Highway 29 and is planned to operate in synchronization with the Highway 29/Grayson Avenue/Mills Lane intersection. The City of St. Helena collected fees specifically for the installation of this signal from development that occurred on the east side of Highway 29 in the 1980's. These funds may be supplemented by City of St. Helena traffic mitigation funds. New development elsewhere in the community may be required to pay their fair share of the traffic signal costs based on their contribution of traffic to this intersection in addition to City-wide traffic impact fees.

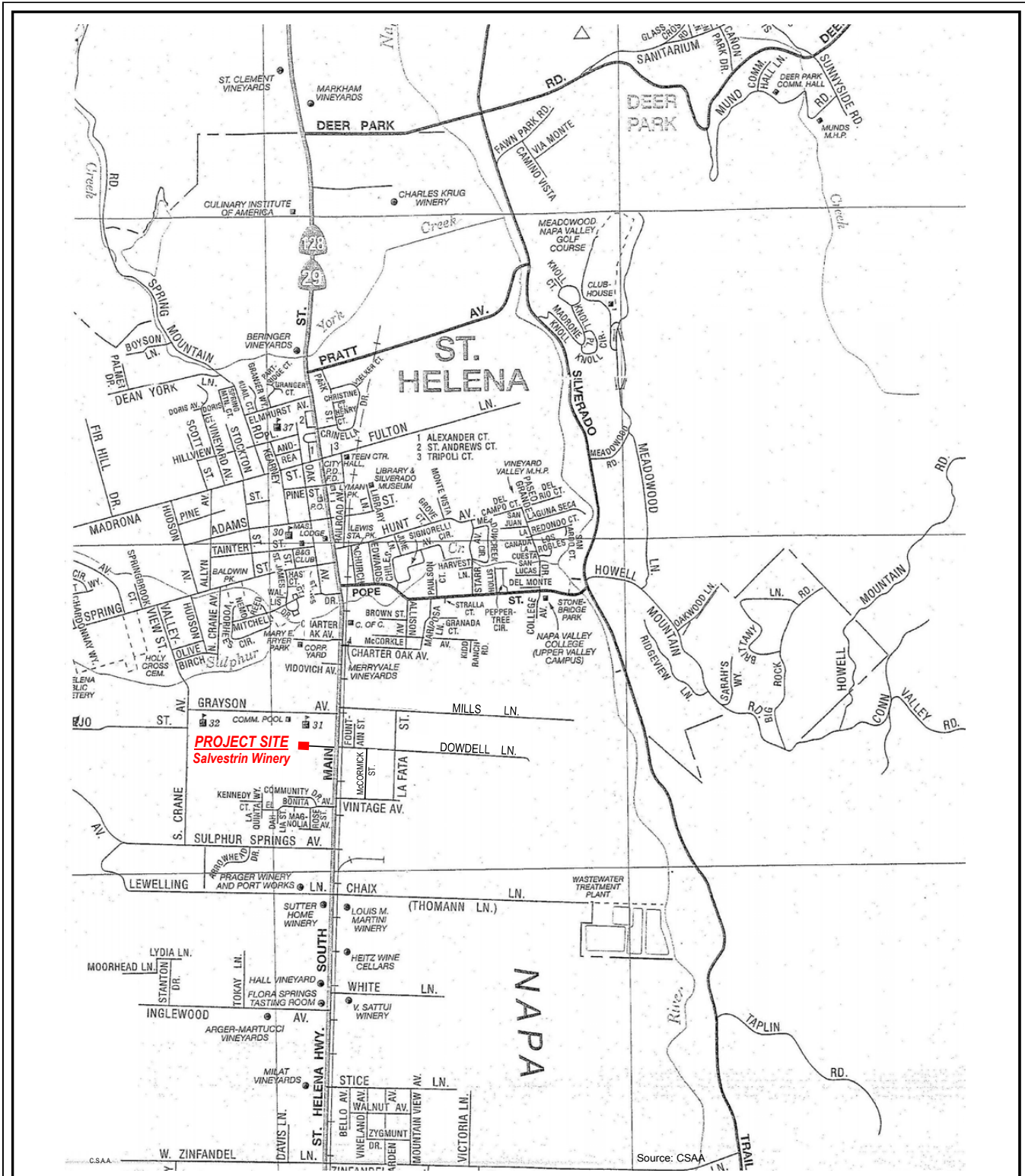
- Given that the Highway 29 Specific Plan circulation improvements for signalization of the Highway 29/Dowdell Lane intersection have yet to be completed (or funded); it is recommended that the proposed project contribute a "fair share" contribution to these Highway 29 Specific Plan circulation improvements based on their contribution to cumulative year 2035 volumes at this roadway/intersection. Using the weekday PM peak hour proposed project trip generation (worst case), the project would contribute 13 PM peak hour trips to the roadway and intersection network at Highway 29. Based on a net increase between existing and cumulative year 2035 PM peak hour volumes at the Highway 29/Dowdell Lane intersection; the proposed project contribution would represent 2.0% of cumulative traffic volumes (13 project trips / 632 net cumulative traffic increase). At such time in the future the City determines that the signalization of the Highway 29/Dowdell Lane is necessary; the proposed project would have contributed their fair share towards overall circulation improvements in the Highway 29 Specific Plan area.

## 2. Introduction

The following report provides a focused traffic analysis for the proposed Salvestrin Winery Use Modification project located at 397 Main Street in the City of St. Helena (see Figure 1—Project Vicinity Map). The proposed project would consist of small increases in winery activities including wine production, employment, and guest visitation. There would also be an incremental change in the parking spaces on-site to accommodate additional winery-related activities. Marketing events would be modified from one (1) event per month (currently permitted) to the same number (12 events) with maximum attendances of 25 to 125 guests. The proposed project area would be located south of the Highway 29 Specific Plan Area on the west side of Main Street and south of Grayson Avenue. The proposed project would gain access directly from Main Street via an existing full-access project driveway.

Proposed project analysis is based on our discussions with the project applicant, the Salvestrin Winery Use Permit Amendment Statement, and our familiarity with the study area in and around Grayson Avenue, Dowdell Lane, Vintage Avenue, 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 Main Street at Grayson Avenue, Dowdell Lane, and Vintage Avenue;
- Unique characteristics of proposed winery activities related to production, visitation, employment, and marketing events;
- Proposed project daily and peak hour trip generation associated with proposed winery uses using accepted trip generation ratios established by Napa County Winery Research;
- Project access and circulation from the existing driveways off Main Street;
- Future traffic projections and/or circulation improvements based on the Updated St. Helena General Plan Circulation Element and recent approved/pending projects supplied by City of St. Helena Planning staff.



Project Vicinity Map



### 3. Existing Conditions

#### Proposed Project Site

The proposed Salvestrin Winery Use Modification project would be located at 397 Main Street on the west side of the roadway approximately 50-feet south of Dowdell Lane. As noted, an existing driveway extends directly west from Main Street approximately 400 feet to the winery grounds, Inn, residence, and production building(s). The project driveway is stop-sign controlled at Main Street. The building and site modifications proposed by the applicant would occur at the existing winery building in the southwest portion of the project 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 a two-way-left-turn lane, small striped shoulder areas (2-4 feet) and no street parking. The speed limit on Main Street is 35 mph in the project area.

**Grayson Avenue** extends in an east-west between SR-29 and South Crane Avenue approximately 600 feet north of the existing project driveway. Grayson Avenue provides access to commercial, institutional (schools), and residential areas west of SR-29. A two-lane street, Grayson Avenue has on-street parking along its south side with some limited area parking (where curb and gutter exist) on its north side. The speed limit is 15 mph consistent with school-area proximity. (It is noted that a new traffic signal was activated at Grayson Avenue/SR-29 intersection in November, 2016).

**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 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. East of La Fata Street, the roadway narrows significantly (10-20 feet) and is unimproved. This segment provides access to agricultural and residential areas. The speed limit on Dowdell Lane is 25 mph. As noted, Dowdell Lane is located on the east side of Main Street about 50-feet north of the project driveway. The project driveway eastbound and Dowdell Lane westbound approaches off-set enough to act as separate approach intersections but share the two-way-left-turn-lane on Main Street.

**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.

#### Rail Activity

Railroad tracks currently parallel SR-29 approximately 25 feet east of the highway crossing over Dowdell Lane and Mills Lane in the project study area. The rail crossing at Dowdell Lane is controlled by automated gates and flashing red lights. The Mills Lane crossing has recently

been improved with new concrete paving with flashing red lights and warning signs. 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.

**Completed Construction Activity on State Route 29**

Caltrans has completed the Highway 29 St. Helena Lane Channelization project in the study area. The project limits extended between Mee Lane and Charter Oak Avenue. In coordination with the City of St. Helena, a traffic signal was activated at the Grayson Avenue/SR-29 as part of this overall lane channelization project on SR-29 in November (2016). Field observations indicate that during peak commute periods, north-south through-traffic on SR-29 does queue past Mills Lane and Dowdell Lane dependent on the amount of outbound (eastbound) traffic from Grayson Avenue.

**Existing Volumes**

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

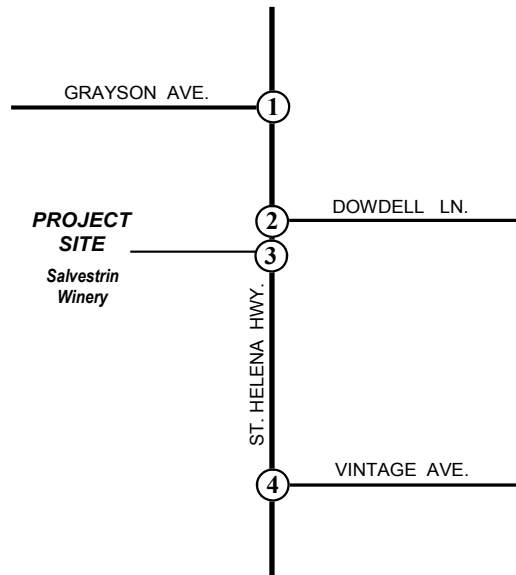
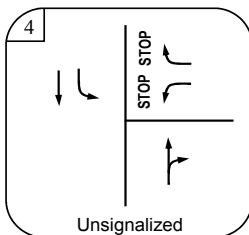
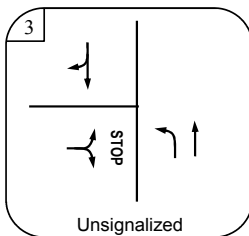
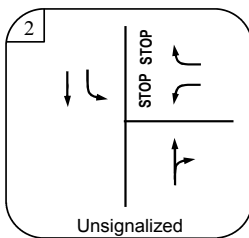
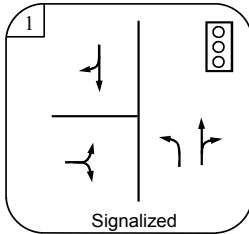
| <u>Intersection</u>          | <u>Control</u>               |
|------------------------------|------------------------------|
| 1. SR-29/Grayson Avenue      | Signal                       |
| 2. SR-29/Dowdell Lane        | Stop-Sign (Dowdell Ln.)      |
| 3. SR-29/Salvestrin Driveway | Stop-Sign (Project Driveway) |
| 4. SR-29/Vintage Lane        | Stop-Sign (Vintage Ln.)      |

The study intersection counts (conducted in February 2017, 2018 and April 2018) 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 of activity would occur during the weekday AM commute period (7:00-9:00 am) and PM commute period (4:00-6:00 pm) and the Saturday mid-day peak period (1:00-3:00 p.m.). From these peak period counts, the highest peak hour volumes were utilized for analysis that included the AM peak hour of 7:45-8:45 a.m., PM peak hour of 4:30-5:30 p.m., and Saturday mid-day peak hour of 1:15-2:15 p.m. Similarly, the highest peak hour of project trips generated during the same periods were applied to the “plus project” conditions.

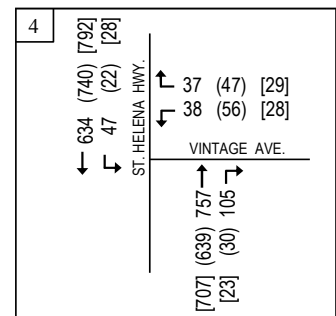
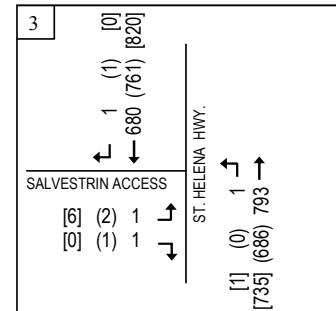
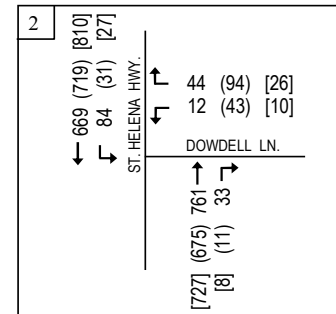
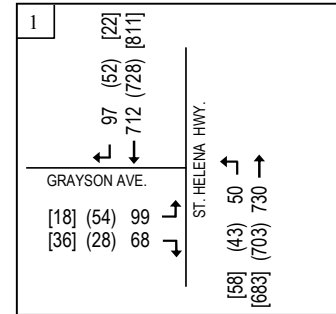
Traffic conditions along SR-29 (particularly south of Pope Street) are also influenced by northbound vehicle queues, which can extend from Pope Street beyond Grayson Avenue, Dowdell Lane and Vintage Avenue. During these times, traffic flows reflect “stop-and-go” conditions with vehicle speeds below 25 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 the day (weekday or weekend) and time period. Traffic flow conditions on SR-29 at Vintage Lane are more favorable with acceptable vehicle progression with little no observed vehicle queuing. The construction of the two-way-left-turn lane on SR-29 allows motorists from stop-sign controlled minor streets to access to/from the highway in a safer manor causing less delay for through-traffic.

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

GEOMETRIES / CONTROLS:



PEAK HOUR VOLUMES:



XX = Weekday A.M. Peak Hour  
 (XX) = Weekday P.M. Peak Hour  
 [XX] = Weekend Afternoon Peak Hour

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



## 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 signalized and 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 unsignalized intersections of SR-29/Dowdell Lane, Salvestrin Driveway/SR-29, and SR-29/Vintage Lane are operating at LOS C (23-24 seconds of delay) during both peak hour periods. The calculated LOS of C for the SR-29/Dowdell Lane, SR-29/Salvestrin Driveway, and SR-29/Vintage Avenue intersections represents vehicle delay for the stop-sign controlled outbound left-turn movements from the minor streets onto SR-29. The Grayson Avenue intersection at SR-29 is operating at LOS B or better during both peak hour periods. It is noted that the signal operation at the Grayson Avenue/SR-29 intersection has improved overall vehicle delays at this location. The signal helps to provide additional "gaps" in SR-29 north-south traffic that allows the adjacent intersections of Dowdell Lane and Vintage Avenue to operate more efficiently. However, some north-south vehicle queuing on SR-29 still occurs during peak weekday and weekend periods. For this reason, it is likely that calculated vehicle delays at project study intersections along SR-29 may be longer than calculated.

## Signal Warrants

Based on the California Manual on Uniform Traffic Control Devices (CAMUTCD) for peak hour signal warrant criteria, the SR-29/Dowdell Lane and SR-29/Vintage Avenue intersections were evaluated for signalization.<sup>1</sup> 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. Both the SR-29/Dowdell Lane and SR-29/Vintage Avenue intersections qualify for signalization under the peak hour warrant using existing PM peak hour volumes. As previously noted, the construction of the Highway 29 Channelization project has improved vehicle access to/from SR-29 and Dowdell Lane-Vintage Avenue in addition to the new signal at Grayson Avenue. For these reasons, it is not recommended that a signals be installed at the SR-29-/Dowdell Lane and SR-29/Vintage Avenue intersections at this time.

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<sup>1</sup> California Manual on Uniform Traffic Control Devices (CAMUTCD), Chapter 4C, Peak hour signal warrant (#3), 2014.

**TABLE 1  
INTERSECTION LEVEL-OF-SERVICE DEFINITIONS**

| Level of Service | Type of Flow              | Delay                                                                                                                                                                                                                                                                                                      | Maneuverability                                                                                                                                                     | Stopped Delay/Vehicle (sec) |                               |
|------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------|
|                  |                           |                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                     | Signalized/<br>Roundabouts  | Unsignalized/<br>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<br>and<br>< 20.0      | >10.0<br>and<br>< 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<br>and<br>< 35.0      | >15.0<br>and<br>< 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<br>and<br>< 55.0      | >25.0<br>and<br>< 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<br>and<br>< 80.0      | >35.0<br>and<br>< 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 M-D |       |
|---|-----------------------------|--------------|----------|-------|----------|-------|--------------|-------|
|   |                             |              | LOS      | Delay | LOS      | Delay | LOS          | Delay |
| 1 | SR-29 / Grayson Avenue      | Signal       | B        | 12.4  | A        | 8.6   | A            | 8.4   |
| 2 | SR-29 / Dowdell Lane        | TWSC         | C        | 23.2  | C        | 22.7  | C            | 21.7  |
| 3 | SR-29 / Salvestrin Driveway | TWSC         | C        | 20.2  | C        | 18.9  | C            | 20.6  |
| 4 | SR-29 / Vintage Avenue      | TWSC         | C        | 23.8  | C        | 23.3  | C            | 23.0  |

*Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for signalized and unsignalized intersections and yields a vehicle delay in seconds. M-D = Mid-Day*

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

### Near-Term Methodology/Projects

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.<sup>2</sup> 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:

- **Redmon Winery:** This winery is located on Dowdell Lane east of La Fata Street and (like the proposed project) would be a production-only winery. The winery would produce 24,000 gallons per year with 2 full-time and 2 part-time employees (4 part-time during crush). An associated commercial kitchen would employ 2 full-time and 1 part-time employees (approved but not constructed);
- **Komes Custom Crush Winery:** This custom crush winery would be located at 420 La Fata Street immediately north of Dowdell Lane. The winery would process 120,000 gallons per year with 4 full-time and 8 part-time employees. It is estimated to generate approximately 40 truck trips over the course of the crush period. Like Redmon Winery the Komes Custom Crush Winery would be production only—there would no visitation or marketing events (approved but not constructed);
- **Hunter Residential Subdivision:** This residential subdivision would consist of 51 single-family units and 25 multi-family units located on an unaddressed 16.9-acre parcel north of Hunt Avenue. The residential development would include an extension of Adams Street (east) and Star Avenue (north) (pending);

<sup>2</sup>Omni-Means Engineering Solutions, *Traffic Impact Analysis for the Proposed Davies Vineyards Winery Use Permit Modification*, City of St. Helena, August 19, 2014.

- St. Helena Estates and Winery: The combination residential/winery development would be located at 567 Pope Street and include 51 residential units and a 15,000 gallon per year production winery (pending);
- OK Tire: An industrial building totaling 4,700 square feet at 1025 Dowdell Lane providing tire services (pending);
- Fulton Office Buildings: This office project would be located at 1030 Fulton Lane and would consist of 11,000 square feet of office development (pending);
- Montessori School: The school campus is located at 880 College Avenue and is constructing the final approved element of their Master Plan that includes 10,000 square feet of new buildings for toddler and junior high programs. Not expanding beyond current approved uses (approved but not constructed);
- Farmstead Hotel: This hotel project would be located at 1000 Mills Lane and include a 65-room hotel, barn, and fitness center. Ten new building structures totaling approximately 50,000 square feet (pending);
- Vineland Station Hotel: Approximately 123,000 square feet of commercial development that includes a 60-room hotel, 50-seat restaurant, tasting rooms, and café/bakery located at 633 Main Street (approved but not constructed);
- Herdell Commercial Building: Approximately 12,988 net new square feet of light industrial uses and 3,610 square feet of office uses. The project site would be located at 340 McCormick Street between Dowdell Lane and Vintage Avenue in the City's industrial zone (pending).

Larger development projects located outside of St. Helena and other infill project traffic are contained within the General Plan update volume projections. The weekday 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 (no project) traffic volumes are shown in Figure 3.

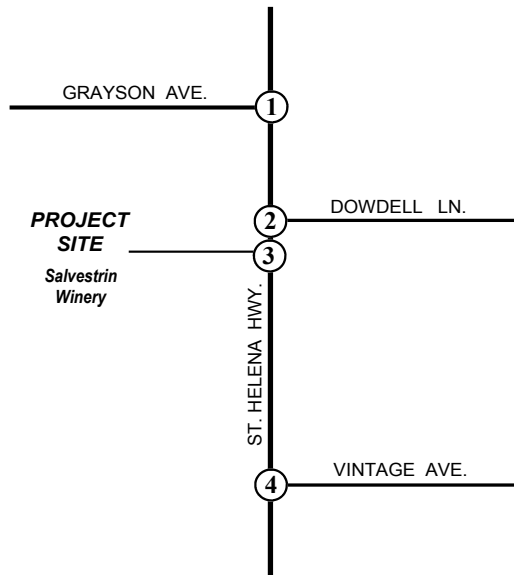
### **Near-Term Roadway Improvements**

There are no planned circulation improvements along SR-29 or the Industrial Area east of the highway on Dowdell Lane or Vintage Avenue. As noted previously, Caltrans has completed constructing the Highway 29 St. Helena Lane Channelization project in the study area. Specifically, the project goal was to “rehabilitate the pavement, widen the shoulders, construct a two-way-left-turn-lane, and improve the bicycle/railroad crossing at Whitehall Lane.”

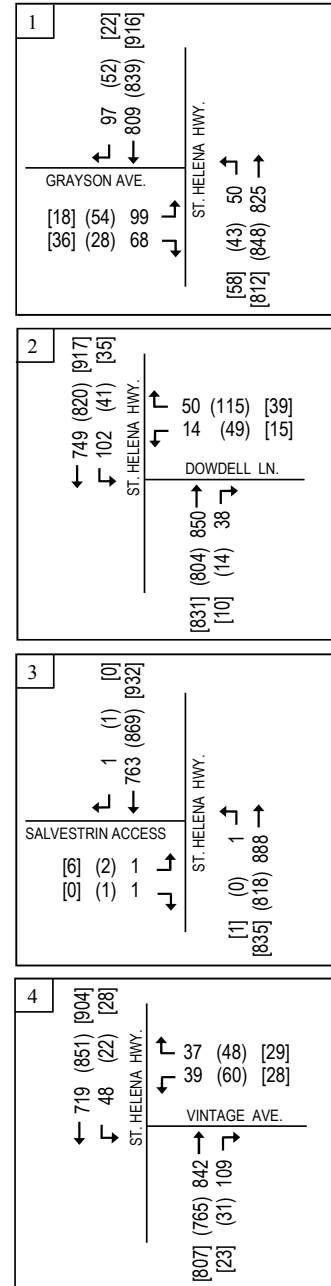
The traffic signal at the Main Street/Grayson Avenue intersection was installed in conjunction with the Highway 29 Channelization project and was activated in November, 2016. No other roadway/intersection improvements are scheduled for the project study area at this time.

### **Near-Term (No Project) Intersection Operation**

With near-term (no project) volumes, study intersection LOS have been calculated and are shown in Table 3. The minor street stop-sign controlled intersections of SR-29/Dowdell Lane and SR-29/Vintage Avenue Lane would change from LOS C to LOS D during both the AM and



PEAK HOUR VOLUMES:



XX = Weekday A.M. Peak Hour  
(XX) = Weekday P.M. Peak Hour  
[XX] = Weekend Afternoon Peak Hour

Near Term Without Project Volumes  
Weekday AM, (PM), and Weekend Peak Hours



PM peak hours for the outbound left-turn movements onto SR-29. However, calculated intersection operation of LOS D would be acceptable based on significance criteria for SR-29 intersections (LOS D or better). Again, the creation of two-way-left-turn lane on SR-29 allows outbound vehicles from Dowdell Lane and Vintage Avenue (turning left) to merge into through-traffic in a safer manor by allowing a “refuge” area. The remaining two study intersections of SR-29/Grayson Avenue and SR-29/Salvestrin Winery Driveway would continue to operate at LOS A and LOS C (respectively) during the three time periods with near-term (no project) traffic.

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

|   | Intersection                | Control Type | Wkdy. AM |        | Wkdy. PM |        | Saturday M-D |        |
|---|-----------------------------|--------------|----------|--------|----------|--------|--------------|--------|
|   |                             |              | Exist    | N-T    | Exist    | N-T    | Exist        | N-T    |
| 1 | SR-29 / Grayson Avenue      | Signal       | B 12.4   | B 12.9 | A 8.6    | A 9.0  | A 8.4        | A 9.0  |
| 2 | SR-29 / Dowdell Lane        | TWSC         | C 23.2   | D 27.5 | C 22.7   | D 28.9 | C 21.7       | D 26.0 |
| 3 | SR-29 / Salvestrin Driveway | TWSC         | C 20.2   | C 21.5 | C 18.9   | C 21.9 | C 20.6       | C 23.3 |
| 3 | SR-29 / Vintage Avenue      | TWSC         | C 23.8   | D 27.4 | C 23.3   | D 29.2 | C 23.0       | D 26.7 |

*Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for signalized and unsignalized intersections and yields a vehicle delay in seconds. Exist = Existing, N-T = Near-Term (No Project) M-D = Mid-Day*

## Signal Warrants

The SR-29/Dowdell Lane and SR-29/Vintage Avenue intersections 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) 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, the signal at the SR-29/Grayson Avenue intersection helps to provide “gaps” in through-traffic on SR-29 allowing greater opportunity for outbound left-turning vehicles to merge into traffic.

## 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:

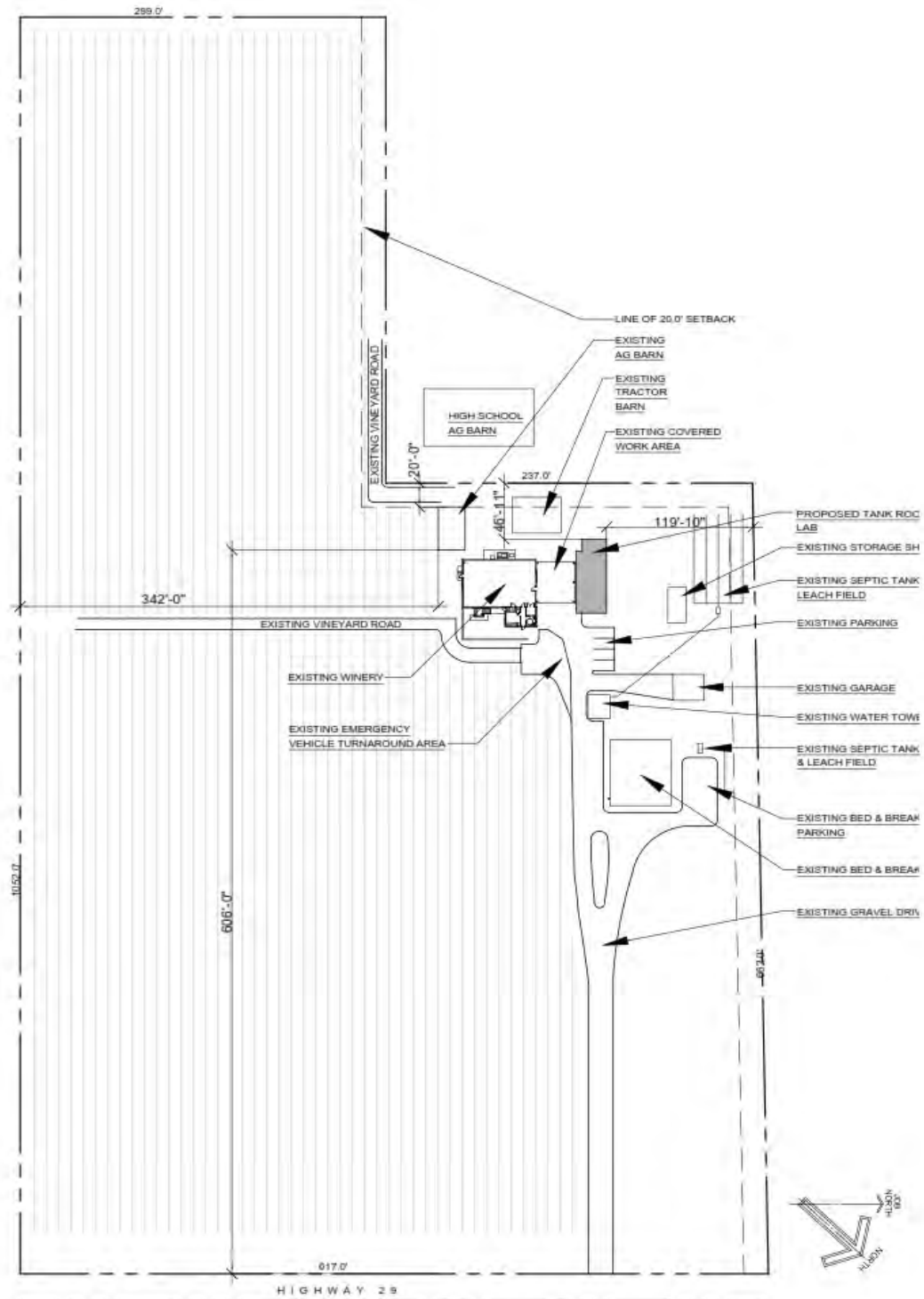
The City's current LOS standard is LOS D for signalized intersections on Main Street (SR 29/128) and LOS C elsewhere. Based on City of St. Helena and CEQA standards, a project's impact would be considered significant if any of the following conditions occur:

- 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 Salvestrin Winery Use Modification project would consist of small increases in winery activities including wine production, employment, and guest visitation. The existing project site is located at 397 Main Street south of the Downtown Area and Grayson Avenue (see Figure 4—Project Site Plan). Based on discussions with the project applicant, there would be an increase in annual wine production from 11,500 gallons to 20,000 gallons. Employment would increase slightly from one (1) full-time and one (1) part-time employee to four (4) full-time employees. Winery tasting and tours are by appointment and currently allow just 10 guests per day—two days per week. The project proposes to increase tours and tastings to six (6) days per week with 28 guests per day. The weekday and weekend (Saturday) project components can be summarized as follows:



## Project Site Plan



**omni · means**  
A GHD Company

**figure 4**

Project Components (Winery Operations)

- Wine Production: 20,000 gallons
- Employment: 4 full-time employees (weekday and weekend)
- Visitation: 28 guests/day—six days per week (maximum)

In addition to the day-to-day winery activities listed above, there would also be a small increase in marketing events held during the year. Currently, all marketing events are contained within the existing permitted levels of 10 guests per day--two days per week. The project description indicates that proposed marketing event would total 12 per year as follows:

Project Components (Marketing Plan):

- Four (4) events annually: maximum of 25 guests;
- Two (2) events annually: maximum of 40 guests (Napa Valley Vintners Wine Auction);
- Four (4) events annually: maximum of 50 guests;
- Two (2) events annually: maximum of 125 guests;

There would also be an incremental change in the parking spaces on-site to accommodate additional winery-related activities. Finally, modifications would be made to the existing Winery building(s) to create a Tank Room and a working Lab Addition totaling 1,500 square feet.

**Project Trip Generation/Trip Assignment**

The proposed Salvestrin Winery Use Modification project's total increase in weekday and weekend daily and peak hour trip generation have been calculated and is shown in Table 4. Daily and peak hour trip generation has been based on accepted winery production, employee peaking factors, and auto occupancy rates for visitors using recent winery research conducted by the Napa County Planning, Building, and Environmental Services Department.<sup>3</sup> Based on maximum wine production, employee, and visitation/guest data; the proposed project would generate 35 weekday daily trips with four (4) AM peak hour trips (3 in, 1 out) and 13 PM peak hour trips (3 in, 10 out). During a harvest weekend (Saturday), the proposed project would generate 34 daily trips with 18 mid-day peak hour trips (9 in, 9 out).

Based on the largest marketing event of 125 guests (twice per year), there would be a total trip generation of 109 event trips (unless shuttle buses/TDM is used).

To determine traffic conditions with the proposed project, the calculated project trips were added to existing volumes. Based on observed travel patterns on SR-29 at the Salvestrin driveway intersection counts, and previous studies conducted in the area, the weekday AM, PM and weekend mid-day peak hour project trips were distributed 60% to/from the south and 40% to/from the north on SR-29 (Main Street). Proposed AM and PM peak hour project trips (only) and distribution have been shown in Figure 5. Existing plus project and near-term plus project volumes have been shown in Figures 6 and 7.

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<sup>3</sup> County of Napa, Conservation, Development, and Planning Department, "Use Permit Application Package," Napa County Winery Traffic Generation Characteristics, 2012.

**TABLE 4**  
**PROPOSED BENESSERE VINEYARDS WINERY PROJECT: DAILY AND PEAK HOUR TRIP GENERATION**

---

Weekday Daily Traffic:

|                                                        |   |                       |
|--------------------------------------------------------|---|-----------------------|
| 28 visitors/2.6 persons per vehicle x 2 one-way trips  | = | 22 daily trips        |
| 4 full-time employees x 3.05 one-way trips             | = | 12 daily trips        |
| 0 part-time employees x 1.90 one-way trips             | = | 0 daily trips         |
| 44,000 gallons/1,000 x .009 daily trucks x 2 o-w trips | = | <u>1 daily trips</u>  |
| <b>Total Weekday Daily Trips</b>                       | = | <b>35 daily trips</b> |

Weekday AM & PM Peak Hour Traffic:

|                                           |   |                                |
|-------------------------------------------|---|--------------------------------|
| AM: 35 daily trips x 0.114 trips AM Peak: | = | 4 peak hour trips              |
| <b>Total Weekday AM Peak Hour Trips:</b>  | = | <b>4 trips (3 in, 1 out)</b>   |
| PM: 35 daily trips x 0.38 trips PM Peak:  | = | 13 peak hour trips             |
| <b>Total Weekday PM Peak Hour Trips</b>   | = | <b>13 trips (3 in, 10 out)</b> |

Maximum Weekend (Saturday) Daily Traffic:

|                                                       |   |                       |
|-------------------------------------------------------|---|-----------------------|
| 28 visitors/2.8 persons per vehicle x 2 one-way trips | = | 20 daily trips        |
| 4 full-time employees x 3.05 one-way trips            | = | 12 daily trips        |
| 0 part-time employees x 1.90 one-way trips            | = | <u>0 daily trips</u>  |
| <b>Total Weekend (Saturday) Daily Trips</b>           | = | <b>32 daily trips</b> |

Maximum Weekend (Saturday) Peak Hour Traffic:

|                                                         |   |                               |
|---------------------------------------------------------|---|-------------------------------|
| 32 daily trips x 0.57 trips MD Saturday Peak:           | = | <u>18 peak hour trips</u>     |
| <b>Total Weekend (Saturday) Mid-Day Peak Hour Trips</b> | = | <b>18 trips (9 in, 9 out)</b> |

Maximum Weekend (Saturday) Daily Harvest/Crush Traffic:

|                                                           |   |                       |
|-----------------------------------------------------------|---|-----------------------|
| 28 visitors/2.8 persons per vehicle x 2 one-way trips     | = | 20 daily trips        |
| 4 full time employees x 3.05 one-way trips                | = | 12 daily trips        |
| 0 part-time employees x 1.90 one-way trips                | = | 0 daily trips         |
| 20,000 gallons/1,000 x .009 daily trucks x 2 o-w trips    | = | 1 daily trips         |
| 0 annual ton grapes (o-h)/144 daily trucks x 2 o-w trips  | = | <u>0 daily trips</u>  |
| <b>Total Weekend (Saturday) Daily Harvest/Crush Trips</b> | = | <b>33 daily trips</b> |

Maximum Weekend (Saturday) Daily Harvest/Crush Peak Hour Traffic:

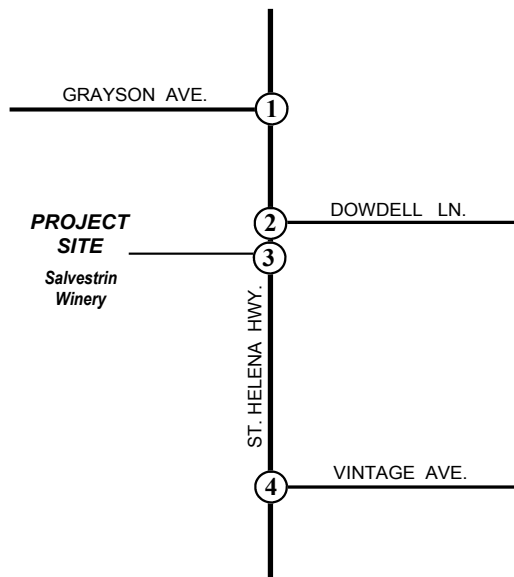
|                                                         |   |                               |
|---------------------------------------------------------|---|-------------------------------|
| 34 daily trips x 0.57 trips MD Saturday Peak:           | = | <u>36 peak hour trips</u>     |
| <b>Total Weekend (Saturday) Mid-Day Peak Hour Trips</b> | = | <b>18 trips (9 in, 9 out)</b> |

Largest Marketing Event – Additional Traffic

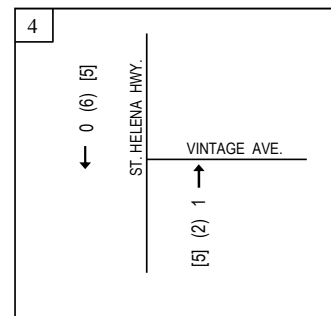
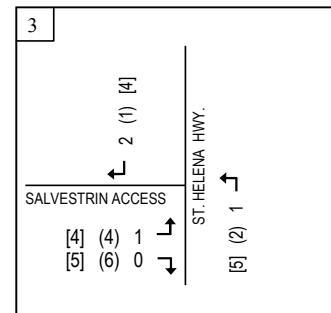
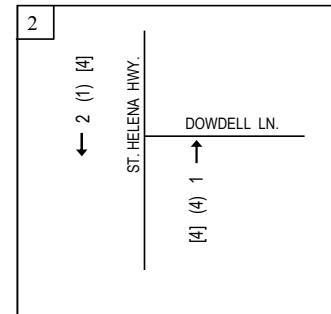
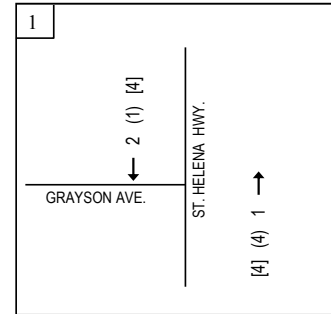
|                                                       |   |                        |
|-------------------------------------------------------|---|------------------------|
| 6 event staff x 2 one-way trips per person            | = | 12 event trips         |
| 125 visitors / 2.8 visitors per vehicle x 2 o-w trips | = | 89 event trips         |
| 4 trucks x 2 one-way trips                            | = | <u>8 event trips</u>   |
| <b>Total Largest Event Marketing Trips:</b>           | = | <b>109 event trips</b> |

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Source: Production, employee, and visitor data provided by Mr. Richard Salvestrin (project applicant), Use Permit Application, Benessere Vineyards Winery, 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, 2015



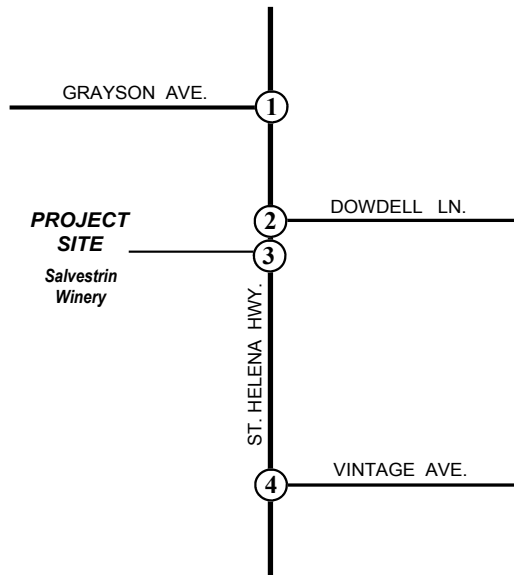
PEAK HOUR VOLUMES:



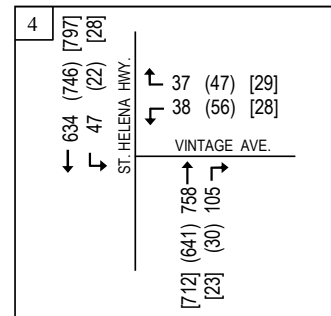
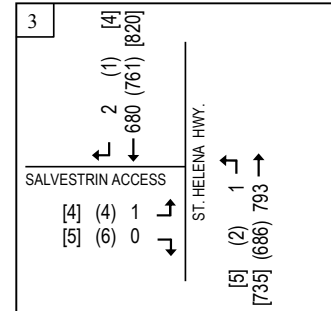
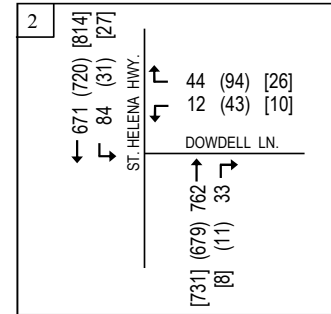
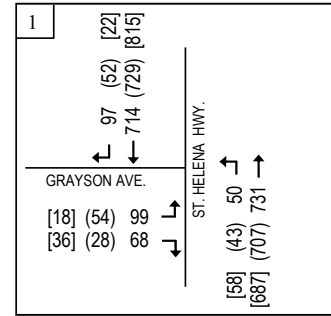
XX = Weekday A.M. Peak Hour  
 (XX) = Weekday P.M. Peak Hour  
 [XX] = Weekend Afternoon Peak Hour

Project Trips  
 Weekday AM, (PM), and [Weekend] Peak Hours





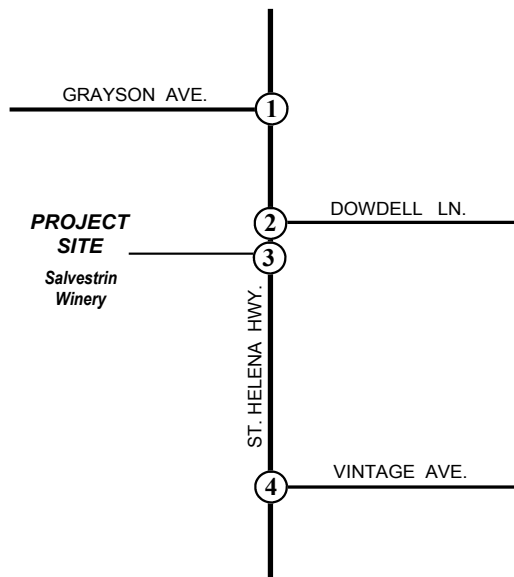
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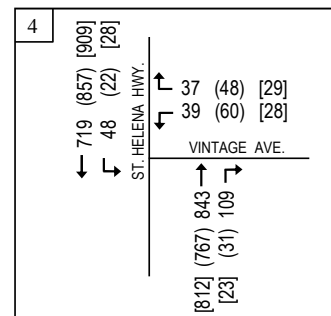
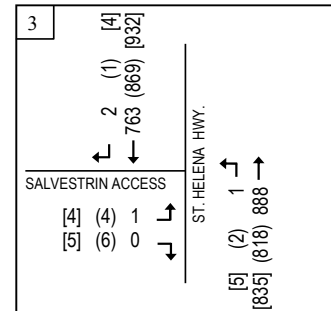
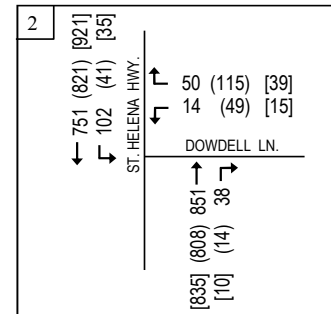
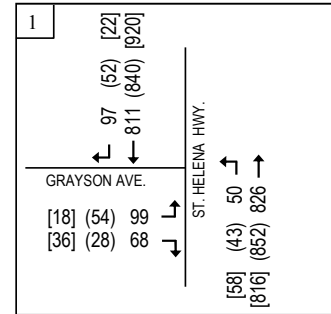
XX = Weekday A.M. Peak Hour  
 (XX) = Weekday P.M. Peak Hour  
 [XX] = Weekend Afternoon Peak Hour

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





PEAK HOUR VOLUMES:



XX = Weekday A.M. Peak Hour  
 (XX) = Weekday P.M. Peak Hour  
 [XX] = Weekend Afternoon Peak Hour

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



## 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 four study intersections would continue to operate at acceptable conditions (LOS C or better) with very slight increases in vehicle delay. In addition, proposed project trips would represent less than one (1) percent of the overall peak hour volumes at the SR-29/Dowdell Lane and SR-29/Vintage Avenue unsignalized intersections during the weekday AM, PM and weekend mid-day peak hours.

The SR-29/Dowdell Lane and SR-29/Vintage Avenue intersections would continue to meet the peak hour signal warrant. With recent circulation improvements on SR-29 signals are not recommended for the intersection at this time.

**TABLE 5**  
**EXIST PLUS PROJECT HARVEST CONDITIONS: PEAK HOUR INTERSECTION LOS**

|   | Intersection                | Control Type | Wkdy. AM |        | Wkdy. PM |        | Saturday M-D |        |
|---|-----------------------------|--------------|----------|--------|----------|--------|--------------|--------|
|   |                             |              | Exist    | E+Prj  | Exist    | E+Prj  | Exist        | E+Prj  |
| 1 | SR-29 / Grayson Avenue      | Signal       | B 12.4   | B 12.4 | A 8.6    | A 8.6  | A 8.4        | A 8.4  |
| 2 | SR-29 / Dowdell Lane        | TWSC         | C 23.2   | C 23.3 | C 22.7   | C 22.8 | C 21.7       | C 21.9 |
| 3 | SR-29 / Salvestrin Driveway | TWSC         | C 20.2   | C 20.2 | C 18.9   | C 19.1 | C 20.6       | C 20.6 |
| 3 | SR-29 / Vintage Avenue      | TWSC         | C 23.8   | C 23.8 | C 23.3   | C 23.5 | C 23.0       | C 23.2 |

*Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for signalized and unsignalized intersections and yields a vehicle delay in seconds. Exist = Existing, M-D = Mid-Day*

## Near-Term plus Project Conditions

With near-term plus project volumes, study intersection LOS has been calculated and are shown in Table 6. During the three peak periods overall intersection operations at the SR-29/Dowdell Lane and SR-29/Vintage Avenue would continue at LOS D 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) and Vintage Avenue to merge into through-traffic in a safer manor by allowing a "refuge" area. The remaining intersection of SR-29/Grayson Avenue would continue to operate at LOS A-B during peak time periods with near-term plus project traffic. The SR-29/Salvestrin Driveway would operate at LOS C during all three time periods. Proposed project trips would make up less than one (1) percent of overall traffic volumes at the SR-29/Dowdell Lane and SR-29/Vintage Avenue unsignalized intersections.

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

|   | Intersection                | Control Type | Wkdy. AM |         | Wkdy. PM |         | Saturday M-D |         |
|---|-----------------------------|--------------|----------|---------|----------|---------|--------------|---------|
|   |                             |              | NT       | NT +Prj | NT       | NT +Prj | NT           | NT +Prj |
| 1 | SR-29 / Grayson Avenue      | Signal       | B 12.9   | B 12.9  | A 9.0    | A 9.0   | A 9.0        | A 9.0   |
| 2 | SR-29 / Dowdell Lane        | TWSC         | D 27.5   | D 27.7  | D 28.9   | D 28.9  | D 26.0       | D 26.1  |
| 3 | SR-29 / Salvestrin Driveway | TWSC         | C 21.5   | C 21.5  | C 21.9   | C 21.9  | C 23.3       | C 23.4  |
| 3 | SR-29 / Vintage Avenue      | TWSC         | D 27.4   | D 27.5  | D 29.2   | D 29.4  | D 26.7       | D 27.0  |

*Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for signalized and unsignalized intersections and yields a vehicle delay in seconds. Exist = Existing, N-T = Near-Term (No Project)*

## 6. Cumulative Conditions

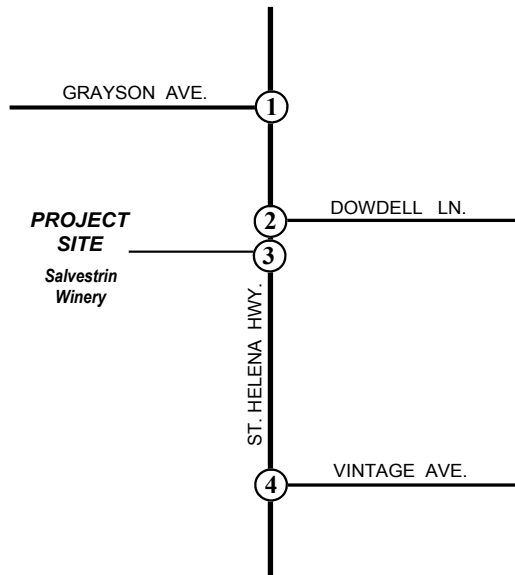
### Cumulative Year 2035 Projections

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 Grayson Avenue, Dowdell Lane, and Vintage Avenue was generated from local approved/pending project-specific volumes.

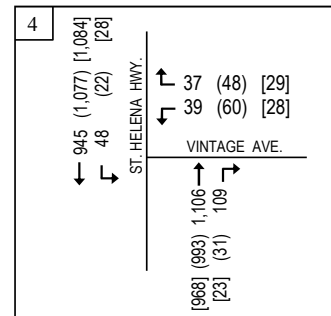
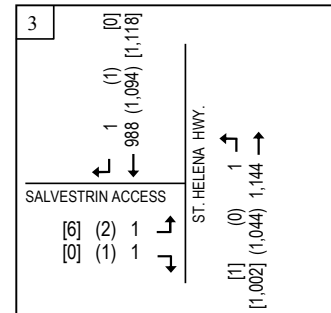
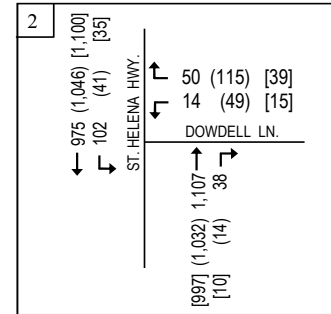
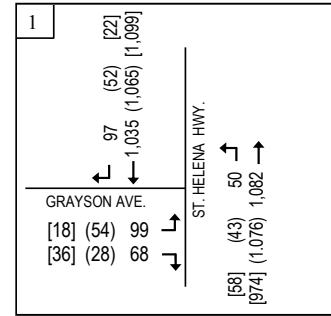
### Cumulative Year 2035 (No Project) Conditions

The cumulative Year 2035 (no project) peak hour volumes are shown in Figure 8 and the intersection LOS are shown in Table 7. As calculated, the SR-29/Dowdell Lane and SR-29/Vintage Avenue intersections would operate at LOS E during the weekday AM and PM peak hour study periods for the Dowdell Lane and Vintage Avenue outbound (westbound) left-turn lane approaches at SR-29. The two-way-left-turn lane on SR-29 would continue to allow outbound vehicles from Dowdell Lane and Vintage Avenue (turning left) to merge into through-traffic in a safer manor by allowing a "refuge" area. During the weekend mid-day peak hour, these latter two intersections would operate at LOS D. The SR-29/Grayson Avenue would operate at LOS B during all three time periods. Finally, the SR-29/Salvestrin Driveway intersection would operate at LOS D during the weekday AM and PM peak hours as well as the weekend mid-day peak hour with cumulative (no project) traffic.

It is noted that both the Dowdell Lane and Vintage Avenue intersections at SR-29 are calculated to operate at LOS E for the outbound (stop-sign controlled) left-turn movements under cumulative year 2035 (no project) conditions. Given the conservative cumulative volume projections for SR-29; most minor street stop-sign controlled intersections up and down the highway would likely be operating at LOS E-F. Both study intersections would continue to meet the minimum volume warrant for peak hour signalization without proposed project traffic. As previously noted, the signalized intersection at Grayson Avenue does provide more "gaps" in north-south through-traffic on SR-29 in the project vicinity. This allows outbound motorists at Dowdell Lane and Vintage Avenue more opportunities to access/merge onto SR-29. The irony for outbound motorists from minor-street stop-sign controlled intersections is that when through-



PEAK HOUR VOLUMES:



XX = Weekday A.M. Peak Hour  
 (XX) = Weekday P.M. Peak Hour  
 [XX] = Weekend Afternoon Peak Hour

Cumulative Year 2035 Without Project Volumes  
 Weekday AM, (PM), and [Weekend] Peak Hours



**TABLE 7**  
**CUMULATIVE NEAR-TERM PLUS PROJECT HARVEST CONDITIONS: PEAK HOUR INTERSECTION LOS**

|   | Intersection                | Control Type | Wkdy. AM |        | Wkdy. PM |        | Saturday M-D |        |
|---|-----------------------------|--------------|----------|--------|----------|--------|--------------|--------|
|   |                             |              | C(NP)    | C +Prj | C(NP)    | C +Prj | C(NP)        | C +Prj |
| 1 | SR-29 / Grayson Avenue      | Signal       | B 17.5   | B 17.6 | B 12.2   | B 12.2 | B 11.6       | B 11.7 |
| 2 | SR-29 / Dowdell Lane        | TWSC         | E 39.3   | E 39.9 | E 44.0   | E 44.0 | D 33.2       | D 33.4 |
| 3 | SR-29 / Salvestrin Driveway | TWSC         | D 28.5   | D 28.5 | D 28.6   | D 29.1 | D 29.1       | D 29.1 |
| 3 | SR-29 / Vintage Avenue      | TWSC         | E 41.9   | E 41.9 | E 45.8   | E 46.3 | D 34.5       | D 34.8 |

*Intersection LOS based on Highway Capacity Manual (HCM 2010) operations methodology for signalized and unsignalized intersections and yields a vehicle delay in seconds. Exist = Existing, C(NP) = Cumulative (No Project)*

volumes on SR-29 become this congested (particularly in the commute direction) vehicle speeds are reduced and traffic progression can be significantly slowed. It is during these congested time periods where slowed traffic on SR-29 actually allows a safer egress for motorists from the minor streets.

### Cumulative Year 2035 plus Project Conditions

The Year 2035 plus project volumes are presented in Figure 9 and the calculated intersection LOS are listed in Table 7. The SR-29/Dowdell Lane and SR-29/Vintage Avenue unsignalized intersections would continue to operate at LOS E during the weekday AM and PM peak hours, with vehicle delay increases of less than one (1) second. The proposed project trips would not constitute a significant impact, as the increases in delay would be less than the significance criteria threshold of five (5) seconds at the SR-29 (Main Street) intersections. In addition, proposed project trips would make up less than one percent of overall cumulative volumes at the subject intersections. Proposed project trips would continue to add to the existing peak hour signal warrant at the SR-29/Dowdell Lane and SR-29/Vintage Avenue intersections. The remaining study intersections of SR-29/Grayson Avenue and SR-29/Salvestrin Driveway would continue to operate at LOS B and LOS D (respectively) during all three peak periods with cumulative plus project volumes.

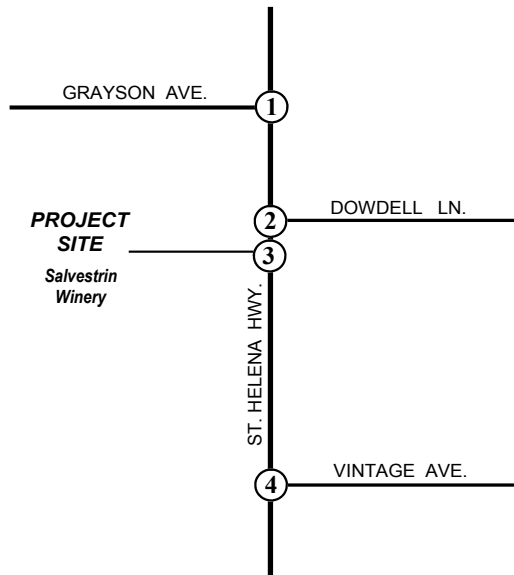
## 7. Highway 29 Specific Plan

The Highway 29 Specific Plan area is located north and west of the project site extending from Dowdell Lane north through Mills Lane and west across Highway 29 immediately north of Grayson Avenue. Though not specifically in the Plan area, the proposed project would be adding traffic volumes to Highway 29 in the Specific Plan area. Therefore, a discussion of the Plan's objectives, circulation improvements, and suggested project contributions is discussed in the following sections.

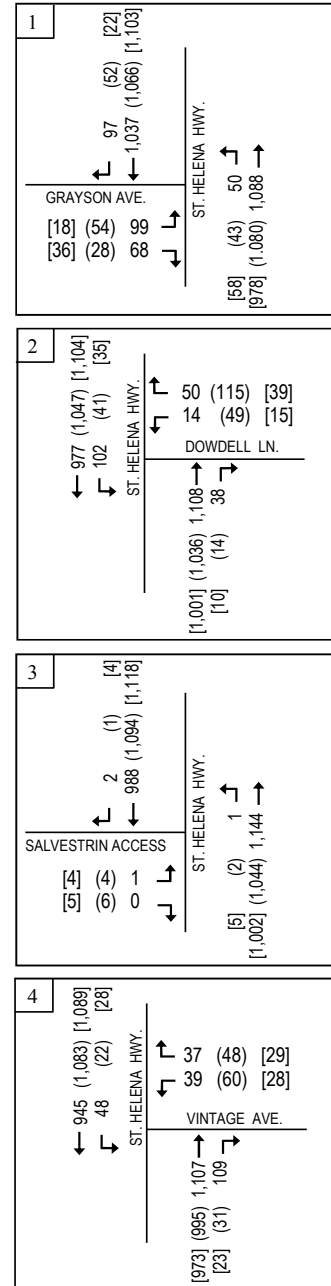
### Planned SR-29 Specific Plan Circulation Improvements

In addition to cumulative highway operation on State Route 29 (Main Street); The City of St. Helena's Highway 29 Specific Plan has been reviewed for planned circulation improvements in the project study area.<sup>4</sup> As noted, the proposed project site would be located immediately south

<sup>4</sup> City of St. Helena, Highway 29 Specific Plan, Jerry Haag & TJKM Associates, February 22, 2005.



PEAK HOUR VOLUMES:



XX = Weekday A.M. Peak Hour  
(XX) = Weekday P.M. Peak Hour  
[XX] = Weekend Afternoon Peak Hour

Cumulative Year 2035 Plus Project Volumes  
Weekday AM, (PM), and [Weekend] Peak Hours



of the Specific Plan area on the west side of Main Street (SR-29). Specifically, the east side of the plan area encompasses Dowdell Lane from Main Street extending east of La Fata Street.

The plan area then extends north past Mills Lane before extending west back to Main Street. On the west side of Main Street, the plan area extends along Grayson Avenue from Main Street west to Crane Avenue before extending north along Sulphur Creek and back to Main Street. One of the prime circulation objectives of the Plan is to "Improve circulation and access for the easterly portion of the Specific Plan area through upgrading existing roads and providing for the installation of new traffic signals at the intersection of Highway 29/Grayson Avenue/Mills Lane and the intersection of Highway 29/Dowdell Lane." Specific components of Plan include the following:

- A traffic signal at Highway 29 and Grayson Avenue for any new development on both the east and west sides of Highway 29 (completed);
- A traffic signal at Highway 29 and Dowdell Lane for any new development on the east side of Highway 29;
- Realignment of Mills Lane (south to Grayson Avenue), for any new development on the east side of Highway 29.

As part of the above circulation improvements, additional ROW and turn lanes would be required as follows:

- Installation of a traffic signal at the reconfigured intersection (Highway 29/Grayson Avenue/Mills Lane) constructed to Caltrans standards that will include a westbound (northbound) left-turn lane onto Grayson Avenue (partially completed);
- Installation of an northbound right-turn lane from Highway 29 onto realigned Mills Lane to minimize back-up of turning vehicle on Highway 29;
- Installation of acceleration and deceleration lanes at the intersection of Highway 29 and Mills Lane. This will require acquisition of additional ROW at the intersection to accommodate these new lanes.

### **SR-29 Specific Plan Circulation Improvements Completed-to-Date**

As previously noted, Caltrans has completed the Highway 29 St. Helena Lane Channelization project in the study area. The project limits extended between Mee Lane and Charter Oak Avenue. In coordination with the City of St. Helena, a traffic signal was activated at the Grayson Avenue/SR-29 as part of this overall lane channelization project on SR-29 in November (2016). This project includes a separate northbound left-turn lane on Highway 29 at Grayson Avenue. In addition, a separate southbound left-turn has been installed on Highway 29 at Mills Lane (these northbound/southbound left-turns lanes at Grayson Avenue and Mills Lane were designed as part of the overall Highway 29 Lane Channelization project).

Circulation improvements in the project study area related to Highway 29 Specific Plan that have not been completed include the following:

- Realignment of Mills Lane south to Grayson Avenue;
- Signalization of the Highway 29/Dowdell Lane intersection.

## Potential Funding Mechanisms

The Highway 29 Specific Plan recommends the potential funding mechanisms for remaining circulation improvements in the study as follows:

**Mills Lane Realignment:** For that portion of the Specific Plan area lying east of Highway 29 and adjacent to Mills Lane, new and upgraded improvement costs are estimated at \$1,926,000, which does not include ROW costs. These improvements shall be borne by benefitting development north and south of Mills Lane. Anticipated improvements include realignment of Mills Lane, the extension of Fountain Street and relocation of the existing Napa Valley Wine Train railroad crossing at Mills Lane and Highway 29;

**Highway 29/Dowdell Lane Traffic Signal:** Although this signal location is outside of the Specific Plan area, it will serve existing and new development on the east side of Highway 29 and is planned to operate in synchronization with the Highway 29/Grayson Avenue/Mills Lane intersection. The City of St. Helena collected fees specifically for the installation of this signal from development that occurred on the east side of Highway 29 in the 1980's. These funds may be supplemented by City of St. Helena traffic mitigation funds. New development elsewhere in the community may be required to pay their fair share of the traffic signal costs based on their contribution of traffic to this intersection in addition to City-wide traffic impact fees.

Given that the Highway 29 Specific Plan circulation improvements for the Mills Lane realignment and signalization of the Highway 29/Dowdell Lane intersection have yet to completed (or funded); it is recommended that the propose project contribute a "fair share" contribution to these Highway 29 Specific Plan circulation improvements based on their contribution to cumulative year 2035 volumes at this roadway/intersection. Using the weekday PM peak hour proposed project trip generation, the project would contribute 13 PM peak hour trips to the roadway and intersection network at Highway 29. Based on a net increase between existing and cumulative year 2035 PM peak hour volumes at the Highway 29/Dowdell Lane intersection; the proposed project contribution would represent 2.0% of cumulative traffic volumes (13 project trips / 645 net cumulative traffic increase). At such time in the future the City determines that signalization of the Highway 29/Dowdell Lane is necessary; the proposed project would have contributed their fair share towards overall circulation improvements in the Highway 29 Specific Plan area.

## 8. Project Site Access, Circulation, and Design Parameters

### Access/Onsite Circulation

The project site plan is illustrated in Figure 4. The main project driveway is located approximately 50-feet south of Dowdell Lane extending west from Main Street approximately 500 feet to the main (existing) Salvestrin Winery building. The winery driveway is about 12-13 feet in width. However, there is ample turn-out shoulder areas on both sides of the driveway to allow for two-way vehicle travel and the driveway widens considerably at Main Street with a large turning radius. Guests would access parking areas located to the north adjacent to the Bed and Breakfast building or continue west towards the winery building to access perpendicular parking spaces. An emergency vehicle turnaround areas is located just east of the existing winery building.

Delivery trucks would use the main driveway to deliver goods to the project site. Trucks would be able to circulate through the site to the rear winery buildings and proposed lab and use the vehicle turnaround area (or existing vineyard road) to maneuver and exit the site dependent on which building requires deliveries.

Currently, there is a pedestrian/bicycle path that extends along the west side of Main Street (just outside the Salvestrin Winery entrance wall/gate) in a north-south direction between the Salvestrin Winery property and Main Street. This path allows access between Grayson Avenue and El Bonita Avenue and removes pedestrians/bicyclists from Main Street. A pedestrian sidewalk is also located along Main Street north of the project driveway that extends along the west side of Main Street through Grayson Avenue and beyond.

## Site Distance

Sight distances for vehicles turning in/out of the project driveway was 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 driver of an approaching vehicle in the right lane of the main highway."<sup>5</sup> The speed limit on Main Street is 45 mph (25 mph School Zone when children are present). However, traffic flows are generally lower than 45 mph based on field observations, traffic flows, and the traffic signal at Grayson Avenue.

Based on the Caltrans design standards, the Salvestrin Winery project driveway requires a sight distance of approximately 360 feet. Visibility on Main Street at the Salvestrin project driveway is excellent with approximately 600 feet in the northerly direction and approximately 900 feet in the southerly direction. Therefore, the sight distance is adequate.

## Marketing Events

As noted in the project description, in addition to normal tastings the project proposes to host 12 annual marketing events that would range between 25-150 guests. These marketing events would include the following:

### Project Components (Marketing Plan):

- Four (4) events annually: maximum of 25 guests;
- Two (2) events annually: maximum of 40 guests (Napa Valley Vintners Wine Auction);
- Four (4) events annually: maximum of 50 guests;
- Two (2) events annually: maximum of 125 guests;

Based on standard County auto occupancy rates, the largest annual event of 125 guests would be expected to generate approximately 109 daily trips (55 in, 54 out) including visitors, staff, and delivery trucks (unless shuttle buses/TDM are used). These events are typically of sufficient duration in length that the inbound and outbound trips occur in separate hours, thus the number of trips on the street network at one time are half of the total volumes. These events are usually held outside of typical peak traffic periods (during the middle of the day or later than 6:00 p.m.) and

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<sup>5</sup> Caltrans, *Highway Design Manual, Sixth Edition, July 1, 2014.*

therefore generally do not impact peak hour operations and no other visitation or events would occur during the annual events.

- As a proposed project requirement, large marketing events (50-125 guests) should not start/end during the weekday PM peak period (4:00-6:00 p.m.) nor weekend mid-day peak period (2:00-4:00 p.m.). In addition, the tasting room should suspend visitation related to wine tasting on the days when the facility hosts large marketing events that are held during the afternoon period. These measures would reduce any traffic impacts related to large marketing events to **less-than-significant** levels.

## Parking

The Salvestrin Winery project description indicates that there would be a total of seven (7) parking spaces with proposed project improvements. This would include six standard spaces and one ADA parking space.

Using the County's auto occupancy rate of 2.8 persons per vehicle and maximum daily visitation of 28 guests (Saturday) would yield a total daily count of 10 vehicles (28 guests / 2.8 person per vehicle = 10 vehicles). Over the course of the 8-hour tasting period (10:00 a.m.-6:00 p.m.) this would yield an average parking demand of 2.0 parking spaces. Allowing for the peak overlapping parking demand for a two-hour period; it is reasonable to suggest the maximum parking demand would be four (4) parking spaces (2.0 space demand x 2 hours = 4 spaces). Discussions with the project applicant indicate that they employ transit use (hire car, limousine, and shuttle services) to reduce overall trip generation and parking demand.

## 9. Conclusions/Recommendations

The proposed Salvestrin Winery Use Modification project's weekday peak hour trip generation would not significantly affect intersection LOS on Main Street (SR-29). The proposed project is estimated to generate 4 AM weekday peak hour trips and 13 PM weekday peak hour trips. During the weekend (Saturday) mid-day peak hour, the proposed project would generate 18 trips (9 in, 9 out). All four project study intersections would operate at acceptable levels (LOS D or better) under existing and near-term "with project" conditions. With cumulative year 2035 (no project) conditions, the SR-29/Dowdell Lane and SR-29/Vintage Avenue unsignalized intersections would operate at LOS E for the outbound (westbound) left-turn movements during the weekday AM and PM peak periods. The proposed project would add to these unacceptable conditions at the two study intersections. However, project traffic would add less than five (5) seconds of overall vehicle delay to the intersections and would make up less than one (1) percent of overall cumulative peak hour volumes consistent with City of St. Helena significance thresholds for unsignalized intersections on Main Street (SR-29). Additional mitigation at the SR-29/Dowdell Lane and SR-29/Vintage Avenue intersections is not recommended at this time due to the following circulation improvements:

- The completion of the St. Helena SR-29 Channelization Project; It is understood that the SR-29/Dowdell Lane and SR-29/Vintage Avenue intersections currently meet the peak hour signal warrant under existing conditions. However, the installation of a two-way-left-turn-lane on SR-29 at Dowdell Lane and Vintage Avenue has improved vehicle access to Dowdell Lane and Vintage Avenue to/from SR-29 and overall vehicle delays. The new two-way-left-turn-lane allows 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 allows southbound motorists on SR-29

to make a left-turn (inbound) to Dowdell Lane and Vintage Avenue without delaying through-traffic on the highway. Indirectly, the signal at the SR-29/Grayson Avenue intersection just south of Mills Lane would also benefit traffic at Dowdell Lane (at times) by providing more “gaps” in southbound traffic;

The remaining study intersections of SR-29/Grayson Avenue and SR-29/Salvestrin Driveway would operate at acceptable levels (LOS D or better) under all analyzed scenarios and time periods.

Based on the Caltrans design standards, the Salvestrin Winery project driveway requires a sight distance of approximately 360 feet. Visibility on Main Street at the Salvestrin project driveway is excellent with approximately 600 feet in the northerly direction and approximately 900 feet in the southerly direction. Therefore, the sight distance is adequate.

Using the County's auto occupancy rate of 2.8 persons per vehicle and maximum daily visitation of 28 guests (Saturday) would yield a total daily count of 10 vehicles (28 guests / 2.8 person per vehicle = 10 vehicles). Over the course of the 8-hour tasting period (10:00 a.m.-6:00 p.m.) this would yield an average parking demand of 2.0 parking spaces. Allowing for the peak overlapping parking demand for a two-hour period; it is reasonable to suggest the maximum parking demand would be four (4) parking spaces (2.0 space demand x 2 hours = 4 spaces). Discussions with the project applicant indicate that they employ transit use (hire car, limousine, and shuttle services) to reduce overall trip generation and parking demand.

Based on standard County auto occupancy rates, the largest annual event of 125 guests would be expected to generate approximately 109 daily trips (55 in, 54 out) including visitors, staff, and delivery trucks (unless shuttle buses/TDM are used). These events are typically of sufficient duration in length that the inbound and outbound trips occur in separate hours, thus the number of trips on the street network at one time are half of the total volumes. These events are usually held outside of typical peak traffic periods (during the middle of the day or later than 6:00 p.m.) and therefore generally do not impact peak hour operations and no other visitation or events would occur during the annual events.

As a proposed project requirement, large marketing events (50-125 guests) should not start/end during the weekday PM peak period (4:00-6:00 p.m.) nor weekend mid-day peak period (2:00-4:00 p.m.). In addition, the tasting room should suspend visitation related to wine tasting on the days when the facility hosts large marketing events that are held during the afternoon period. These measures would reduce any traffic impacts related to large marketing events to *less-than-significant* levels.

The Highway 29 Specific Plan recommends the potential funding mechanisms for remaining circulation improvements in the study as follows:

**Highway 29/Dowdell Lane Traffic Signal:** Although this signal location is outside of the Specific Plan area, it will serve existing and new development on the east side of Highway 29 and is planned to operate in synchronization with the Highway 29/Grayson Avenue/Mills Lane intersection. The City of St. Helena collected fees specifically for the installation of this signal from development that occurred on the east side of Highway 29 in the 1980's. These funds may be supplemented by City of St. Helena traffic mitigation funds. New development elsewhere in the community may be required to pay their fair share of the traffic signal costs based on their contribution of traffic to this intersection in addition to City-wide traffic impact fees.

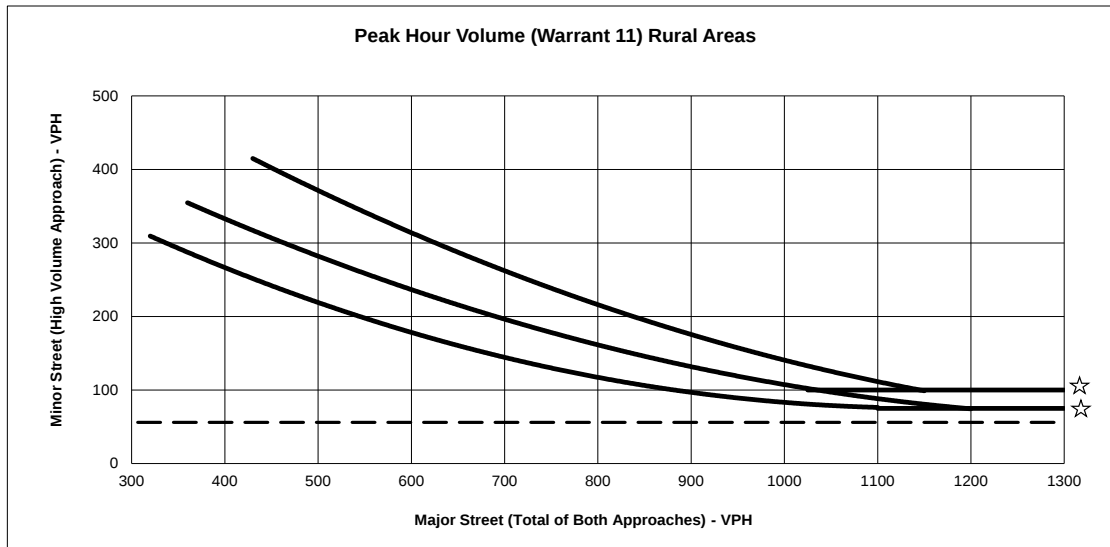
- Given that the Highway 29 Specific Plan circulation improvements for signalization of the Highway 29/Dowdell Lane intersection have yet to be completed (or funded); it is recommended that the proposed project contribute a “fair share” contribution to these Highway 29 Specific Plan circulation improvements based on their contribution to cumulative year 2035 volumes at this roadway/intersection. Using the weekday PM peak hour proposed project trip generation (worst case), the project would contribute 13 PM peak hour trips to the roadway and intersection network at Highway 29. Based on a net increase between existing and cumulative year 2035 PM peak hour volumes at the Highway 29/Dowdell Lane intersection; the proposed project contribution would represent 2.0% of cumulative traffic volumes (13 project trips / 632 net cumulative traffic increase). At such time in the future the City determines that the signalization of the Highway 29/Dowdell Lane is necessary; the proposed project would have contributed their fair share towards overall circulation improvements in the Highway 29 Specific Plan area.

**Technical Appendices: Proposed Salvestrin Winery Use Modification Project**

- Peak Hour Signal Warrant Sheets
- Intersection Level-of-Service (LOS) Calculation Sheets

| 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

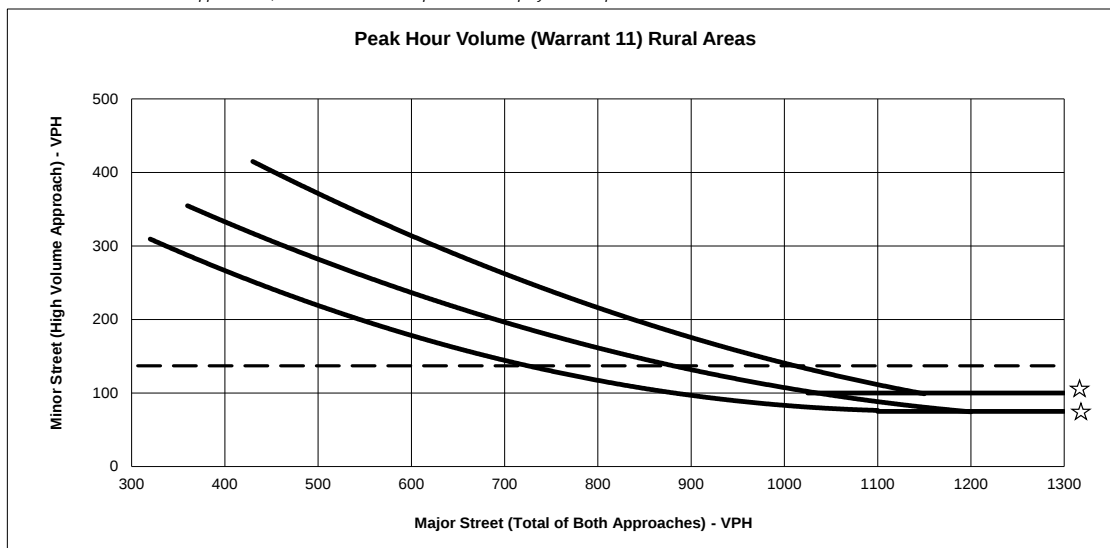


☆ NOTE:  
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection: SR-29 / Dowdell Lane  
 Scenario: Existing AM Peak Hour Conditions  
 Minor St. Volume: 56  
 Major St. Volume: 1547  
 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

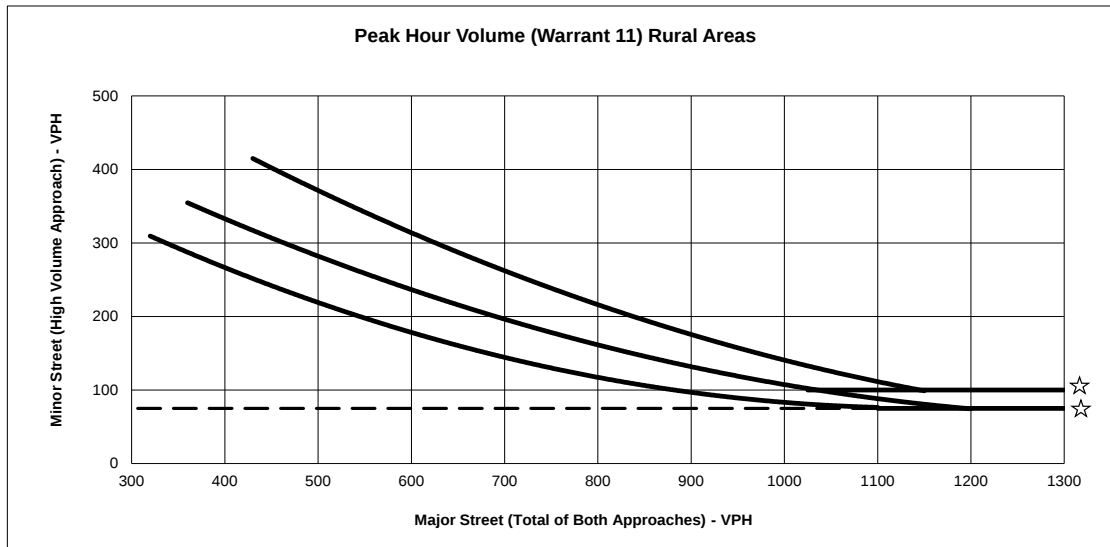


☆ NOTE:  
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection: SR-29 / Dowdell Lane  
Scenario: Existing PM Peak Hour Conditions  
Minor St. Volume: 137  
Major St. Volume: 1436  
Warrant Met?: YES

| 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

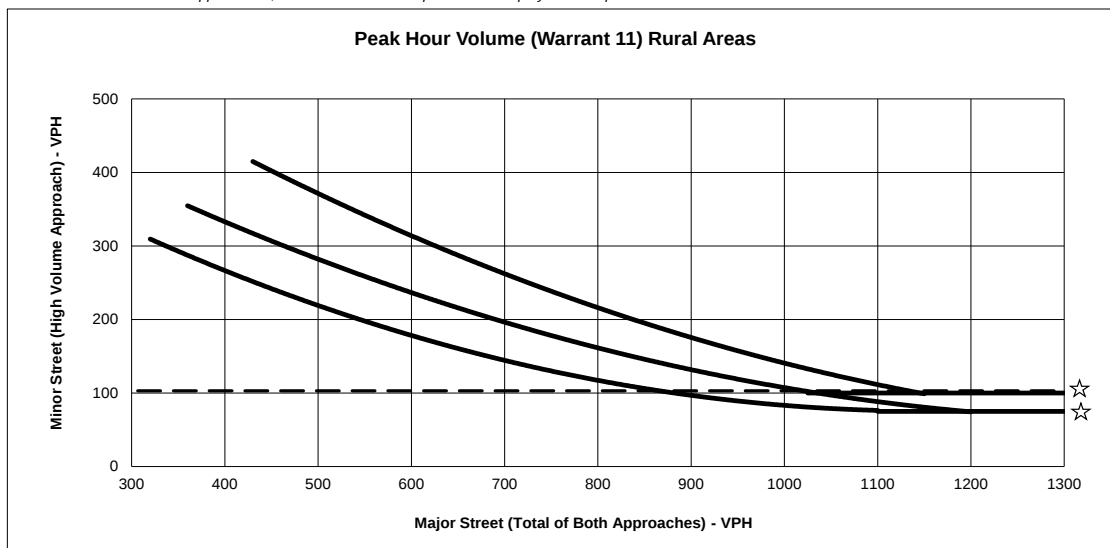


☆ NOTE:  
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET  
APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER  
THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection: SR-29 / Vintage Avenue  
Scenario: Existing AM Peak Hour Conditions  
Minor St. Volume: 75  
Major St. Volume: 1534  
Warrant Met?: **MARGINAL**

| 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 / Vintage Avenue  
Scenario: Existing PM Peak Hour Conditions  
Minor St. Volume: 103  
Major St. Volume: 1431  
Warrant Met?: YES

HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

AM Weekday Existing  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 99                                                                                | 68                                                                                | 50                                                                                | 730                                                                               | 712                                                                               | 97                                                                                |   |   |
| Future Volume (veh/h)        | 99                                                                                | 68                                                                                | 50                                                                                | 730                                                                               | 712                                                                               | 97                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 108                                                                               | 74                                                                                | 54                                                                                | 793                                                                               | 774                                                                               | 105                                                                               |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 149                                                                               | 133                                                                               | 71                                                                                | 1543                                                                              | 1196                                                                              | 162                                                                               |   |   |
| Arrive On Green              | 0.08                                                                              | 0.08                                                                              | 0.04                                                                              | 0.83                                                                              | 0.74                                                                              | 0.74                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1606                                                                              | 218                                                                               |   |   |
| Grp Volume(v), veh/h         | 108                                                                               | 74                                                                                | 54                                                                                | 793                                                                               | 0                                                                                 | 879                                                                               |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1824                                                                              |   |   |
| Q Serve(g_s), s              | 6.1                                                                               | 4.6                                                                               | 3.1                                                                               | 13.0                                                                              | 0.0                                                                               | 24.3                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 6.1                                                                               | 4.6                                                                               | 3.1                                                                               | 13.0                                                                              | 0.0                                                                               | 24.3                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.12                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 149                                                                               | 133                                                                               | 71                                                                                | 1543                                                                              | 0                                                                                 | 1358                                                                              |   |   |
| V/C Ratio(X)                 | 0.73                                                                              | 0.56                                                                              | 0.76                                                                              | 0.51                                                                              | 0.00                                                                              | 0.65                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 798                                                                               | 712                                                                               | 573                                                                               | 1543                                                                              | 0                                                                                 | 1358                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 45.8                                                                              | 45.1                                                                              | 48.7                                                                              | 2.6                                                                               | 0.0                                                                               | 6.5                                                                               |   |   |
| Incr Delay (d2), s/veh       | 6.6                                                                               | 3.6                                                                               | 15.5                                                                              | 1.2                                                                               | 0.0                                                                               | 2.4                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 3.3                                                                               | 4.2                                                                               | 1.8                                                                               | 6.9                                                                               | 0.0                                                                               | 12.9                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 52.4                                                                              | 48.8                                                                              | 64.3                                                                              | 3.9                                                                               | 0.0                                                                               | 8.8                                                                               |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | A                                                                                 |   |   |
| Approach Vol, veh/h          | 182                                                                               |                                                                                   |                                                                                   | 847                                                                               | 879                                                                               |                                                                                   |   |   |
| Approach Delay, s/veh        | 50.9                                                                              |                                                                                   |                                                                                   | 7.7                                                                               | 8.8                                                                               |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | A                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 13.1                                                                              | 8.6                                                                               | 80.8                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 15.0                                                                              |                                                                                   | 8.1                                                                               | 5.1                                                                               | 26.3                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 22.7                                                                              |                                                                                   | 0.6                                                                               | 0.1                                                                               | 13.1                                                                              |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 12.4                                                                              |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

Existing

Synchro 9 Report  
Page 1

HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

AM Weekday Existing  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.1                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 12                                                                                | 44                                                                                | 761                                                                               | 33    | 84                                                                                | 669                                                                               |
| Future Vol, veh/h        | 12                                                                                | 44                                                                                | 761                                                                               | 33    | 84                                                                                | 669                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                | 13                                                                                | 48                                                                                | 827                                                                               | 36    | 91                                                                                | 727                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1755                                                                              | 845                                                                               | 0                                                                                 | 0     | 863                                                                               | 0                                                                                 |
| Stage 1                  | 845                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 910                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 94                                                                                | 363                                                                               | -                                                                                 | -     | 779                                                                               | -                                                                                 |
| Stage 1                  | 421                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 393                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 83                                                                                | 363                                                                               | -                                                                                 | -     | 779                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 211                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 421                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 347                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 17.9                                                                              | 0                                                                                 | 1.1                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 211                                                                               | 363   | 779                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.062                                                                             | 0.132 | 0.117                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 23.2                                                                              | 16.4  | 10.2                                                                              | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | C                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.2                                                                               | 0.5   | 0.4                                                                               | -                                                                                 |

Existing

Synchro 9 Report  
Page 2

HCM 2010 TWSC  
3: SR-29 & Salvestrin

AM Weekday Existing  
05/03/2018

| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0      |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 1      | 1      | 1      | 793   | 680  | 1    |
| Future Vol, veh/h        | 1      | 1      | 1      | 793   | 680  | 1    |
| 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      | 0      | 100    | -     | -    | -    |
| 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                | 1      | 1      | 1      | 862   | 739  | 1    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 1604   | 740    | 740    | 0     | -    | 0    |
| Stage 1                  | 740    | -      | -      | -     | -    | -    |
| Stage 2                  | 864    | -      | -      | -     | -    | -    |
| 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       | 116    | 417    | 867    | -     | -    | -    |
| Stage 1                  | 472    | -      | -      | -     | -    | -    |
| Stage 2                  | 413    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 116    | 417    | 867    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 254    | -      | -      | -     | -    | -    |
| Stage 1                  | 472    | -      | -      | -     | -    | -    |
| Stage 2                  | 413    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     | SB     |       |      |      |
| HCM Control Delay, s     | 16.5   | 0      | 0      |       |      |      |
| HCM LOS                  | C      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 867    | -      | 254    | 417   | -    | -    |
| HCM Lane V/C Ratio       | 0.001  | -      | 0.004  | 0.003 | -    | -    |
| HCM Control Delay (s)    | 9.2    | -      | 19.2   | 13.7  | -    | -    |
| HCM Lane LOS             | A      | -      | C      | B     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0      | 0     | -    | -    |

Existing

Synchro 9 Report  
Page 3

HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

AM Weekday Existing  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.2                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 38                                                                                | 37                                                                                | 757                                                                               | 105   | 47                                                                                | 634                                                                               |
| Future Vol, veh/h        | 38                                                                                | 37                                                                                | 757                                                                               | 105   | 47                                                                                | 634                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                | 41                                                                                | 40                                                                                | 823                                                                               | 114   | 51                                                                                | 689                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1671                                                                              | 880                                                                               | 0                                                                                 | 0     | 937                                                                               | 0                                                                                 |
| Stage 1                  | 880                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 791                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 105                                                                               | 346                                                                               | -                                                                                 | -     | 731                                                                               | -                                                                                 |
| Stage 1                  | 406                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 447                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 98                                                                                | 346                                                                               | -                                                                                 | -     | 731                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 232                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 406                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 416                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 20.3                                                                              | 0                                                                                 | 0.7                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 232                                                                               | 346   | 731                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.178                                                                             | 0.116 | 0.07                                                                              | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 23.8                                                                              | 16.8  | 10.3                                                                              | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | C                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.6                                                                               | 0.4   | 0.2                                                                               | -                                                                                 |

Existing

Synchro 9 Report  
Page 4

HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

PM Weekday Existing  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 54                                                                                | 28                                                                                | 43                                                                                | 703                                                                               | 728                                                                               | 52                                                                                |   |   |
| Future Volume (veh/h)        | 54                                                                                | 28                                                                                | 43                                                                                | 703                                                                               | 728                                                                               | 52                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 59                                                                                | 30                                                                                | 47                                                                                | 764                                                                               | 791                                                                               | 57                                                                                |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 90                                                                                | 80                                                                                | 65                                                                                | 1599                                                                              | 1333                                                                              | 96                                                                                |   |   |
| Arrive On Green              | 0.05                                                                              | 0.05                                                                              | 0.04                                                                              | 0.86                                                                              | 0.78                                                                              | 0.78                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1717                                                                              | 124                                                                               |   |   |
| Grp Volume(v), veh/h         | 59                                                                                | 30                                                                                | 47                                                                                | 764                                                                               | 0                                                                                 | 848                                                                               |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1841                                                                              |   |   |
| Q Serve(g_s), s              | 3.2                                                                               | 1.8                                                                               | 2.6                                                                               | 9.7                                                                               | 0.0                                                                               | 18.9                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 3.2                                                                               | 1.8                                                                               | 2.6                                                                               | 9.7                                                                               | 0.0                                                                               | 18.9                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.07                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 90                                                                                | 80                                                                                | 65                                                                                | 1599                                                                              | 0                                                                                 | 1429                                                                              |   |   |
| V/C Ratio(X)                 | 0.66                                                                              | 0.37                                                                              | 0.72                                                                              | 0.48                                                                              | 0.00                                                                              | 0.59                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 827                                                                               | 738                                                                               | 594                                                                               | 1599                                                                              | 0                                                                                 | 1429                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 46.1                                                                              | 45.4                                                                              | 47.1                                                                              | 1.7                                                                               | 0.0                                                                               | 4.6                                                                               |   |   |
| Incr Delay (d2), s/veh       | 7.9                                                                               | 2.9                                                                               | 14.0                                                                              | 1.0                                                                               | 0.0                                                                               | 1.8                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 1.8                                                                               | 1.7                                                                               | 1.5                                                                               | 5.3                                                                               | 0.0                                                                               | 10.1                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 54.0                                                                              | 48.3                                                                              | 61.2                                                                              | 2.7                                                                               | 0.0                                                                               | 6.4                                                                               |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | A                                                                                 |   |   |
| Approach Vol, veh/h          | 89                                                                                |                                                                                   |                                                                                   | 811                                                                               | 848                                                                               |                                                                                   |   |   |
| Approach Delay, s/veh        | 52.1                                                                              |                                                                                   |                                                                                   | 6.1                                                                               | 6.4                                                                               |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | A                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 9.5                                                                               | 8.1                                                                               | 81.3                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 11.7                                                                              |                                                                                   | 5.2                                                                               | 4.6                                                                               | 20.9                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 21.0                                                                              |                                                                                   | 0.3                                                                               | 0.1                                                                               | 14.4                                                                              |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 8.6                                                                               |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

Baseline

Synchro 9 Report  
Page 1

HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

PM Weekday Existing  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.8                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 43                                                                                | 94                                                                                | 675                                                                               | 11    | 31                                                                                | 719                                                                               |
| Future Vol, veh/h        | 43                                                                                | 94                                                                                | 675                                                                               | 11    | 31                                                                                | 719                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                | 47                                                                                | 102                                                                               | 734                                                                               | 12    | 34                                                                                | 782                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1589                                                                              | 740                                                                               | 0                                                                                 | 0     | 746                                                                               | 0                                                                                 |
| Stage 1                  | 740                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 849                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 119                                                                               | 417                                                                               | -                                                                                 | -     | 862                                                                               | -                                                                                 |
| Stage 1                  | 472                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 419                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 114                                                                               | 417                                                                               | -                                                                                 | -     | 862                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 250                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 472                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 402                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 18.4                                                                              | 0                                                                                 | 0.4                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 250                                                                               | 417   | 862                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.187                                                                             | 0.245 | 0.039                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 22.7                                                                              | 16.4  | 9.3                                                                               | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | C                                                                                 | C     | A                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.7                                                                               | 1     | 0.1                                                                               | -                                                                                 |

HCM 2010 TWSC  
3: SR-29 & Salvestrin

PM Weekday Existing  
05/03/2018

| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0      |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 2      | 1      | 0      | 686   | 761  | 1    |
| Future Vol, veh/h        | 2      | 1      | 0      | 686   | 761  | 1    |
| 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      | 0      | 100    | -     | -    | -    |
| 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                | 2      | 1      | 0      | 746   | 827  | 1    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 1574   | 828    | 828    | 0     | -    | 0    |
| Stage 1                  | 828    | -      | -      | -     | -    | -    |
| Stage 2                  | 746    | -      | -      | -     | -    | -    |
| 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       | 121    | 371    | 803    | -     | -    | -    |
| Stage 1                  | 429    | -      | -      | -     | -    | -    |
| Stage 2                  | 469    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 121    | 371    | 803    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 260    | -      | -      | -     | -    | -    |
| Stage 1                  | 429    | -      | -      | -     | -    | -    |
| Stage 2                  | 469    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     |        | SB    |      |      |
| HCM Control Delay, s     | 17.6   | 0      |        | 0     |      |      |
| HCM LOS                  | C      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 803    | -      | 260    | 371   | -    | -    |
| HCM Lane V/C Ratio       | -      | -      | 0.008  | 0.003 | -    | -    |
| HCM Control Delay (s)    | 0      | -      | 19     | 14.7  | -    | -    |
| HCM Lane LOS             | A      | -      | C      | B     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0      | 0     | -    | -    |

Baseline

Synchro 9 Report  
Page 3

HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

PM Weekday Existing  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.4                                                                               |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR  | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |      |  |  |
| Traffic Vol, veh/h       | 56                                                                                | 47                                                                                | 639                                                                               | 30   | 22                                                                                | 740                                                                               |
| Future Vol, veh/h        | 56                                                                                | 47                                                                                | 639                                                                               | 30   | 22                                                                                | 740                                                                               |
| 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                                                                                | -                                                                                 | -    | 200                                                                               | -                                                                                 |
| 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                | 61                                                                                | 51                                                                                | 695                                                                               | 33   | 24                                                                                | 804                                                                               |

| Major/Minor          | Minor1 | Major1 | Major2 |   |       |
|----------------------|--------|--------|--------|---|-------|
| Conflicting Flow All | 1563   | 711    | 0      | 0 | 727   |
| Stage 1              | 711    | -      | -      | - | -     |
| Stage 2              | 852    | -      | -      | - | -     |
| 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   | 123    | 433    | -      | - | 876   |
| Stage 1              | 487    | -      | -      | - | -     |
| Stage 2              | 418    | -      | -      | - | -     |
| Platoon blocked, %   |        |        | -      | - | -     |
| Mov Cap-1 Maneuver   | 120    | 433    | -      | - | 876   |
| Mov Cap-2 Maneuver   | 257    | -      | -      | - | -     |
| Stage 1              | 487    | -      | -      | - | -     |
| Stage 2              | 407    | -      | -      | - | -     |

| Approach             | WB   | NB | SB  |
|----------------------|------|----|-----|
| HCM Control Delay, s | 19.2 | 0  | 0.3 |
| HCM LOS              | C    |    |     |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | WBLn2 | SBL   | SBT   |
|-----------------------|-----|----------|-------|-------|-------|
| Capacity (veh/h)      | -   | -        | 257   | 433   | 876   |
| HCM Lane V/C Ratio    | -   | -        | 0.237 | 0.118 | 0.027 |
| HCM Control Delay (s) | -   | -        | 23.3  | 14.4  | 9.2   |
| HCM Lane LOS          | -   | -        | C     | B     | A     |
| HCM 95th %tile Q(veh) | -   | -        | 0.9   | 0.4   | 0.1   |

HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

Weekend (Saturday) Mid-Day Exist  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 18                                                                                | 36                                                                                | 58                                                                                | 683                                                                               | 811                                                                               | 22                                                                                |   |   |
| Future Volume (veh/h)        | 18                                                                                | 36                                                                                | 58                                                                                | 683                                                                               | 811                                                                               | 22                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 20                                                                                | 39                                                                                | 63                                                                                | 742                                                                               | 882                                                                               | 24                                                                                |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 72                                                                                | 65                                                                                | 83                                                                                | 1615                                                                              | 1398                                                                              | 38                                                                                |   |   |
| Arrive On Green              | 0.04                                                                              | 0.04                                                                              | 0.05                                                                              | 0.87                                                                              | 0.77                                                                              | 0.77                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1805                                                                              | 49                                                                                |   |   |
| Grp Volume(v), veh/h         | 20                                                                                | 39                                                                                | 63                                                                                | 742                                                                               | 0                                                                                 | 906                                                                               |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1854                                                                              |   |   |
| Q Serve(g_s), s              | 1.1                                                                               | 2.4                                                                               | 3.4                                                                               | 8.6                                                                               | 0.0                                                                               | 21.1                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 1.1                                                                               | 2.4                                                                               | 3.4                                                                               | 8.6                                                                               | 0.0                                                                               | 21.1                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.03                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 72                                                                                | 65                                                                                | 83                                                                                | 1615                                                                              | 0                                                                                 | 1436                                                                              |   |   |
| V/C Ratio(X)                 | 0.28                                                                              | 0.60                                                                              | 0.76                                                                              | 0.46                                                                              | 0.00                                                                              | 0.63                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 835                                                                               | 746                                                                               | 600                                                                               | 1615                                                                              | 0                                                                                 | 1436                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 45.5                                                                              | 46.2                                                                              | 46.1                                                                              | 1.4                                                                               | 0.0                                                                               | 4.9                                                                               |   |   |
| Incr Delay (d2), s/veh       | 2.0                                                                               | 8.7                                                                               | 13.3                                                                              | 0.9                                                                               | 0.0                                                                               | 2.1                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 0.6                                                                               | 2.2                                                                               | 2.0                                                                               | 4.5                                                                               | 0.0                                                                               | 11.4                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 47.6                                                                              | 54.9                                                                              | 59.4                                                                              | 2.4                                                                               | 0.0                                                                               | 7.0                                                                               |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | A                                                                                 |   |   |
| Approach Vol, veh/h          | 59                                                                                |                                                                                   |                                                                                   | 805                                                                               | 906                                                                               |                                                                                   |   |   |
| Approach Delay, s/veh        | 52.4                                                                              |                                                                                   |                                                                                   | 6.8                                                                               | 7.0                                                                               |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | A                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 8.5                                                                               | 9.1                                                                               | 80.3                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 10.6                                                                              |                                                                                   | 4.4                                                                               | 5.4                                                                               | 23.1                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 22.2                                                                              |                                                                                   | 0.2                                                                               | 0.1                                                                               | 14.1                                                                              |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 8.4                                                                               |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

Exist

Synchro 9 Report  
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HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

Weekend (Saturday) Mid-Day Exist  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.5                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 10                                                                                | 26                                                                                | 727                                                                               | 8     | 27                                                                                | 810                                                                               |
| Future Vol, veh/h        | 10                                                                                | 26                                                                                | 727                                                                               | 8     | 27                                                                                | 810                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                | 28                                                                                | 790                                                                               | 9     | 29                                                                                | 880                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1734                                                                              | 795                                                                               | 0                                                                                 | 0     | 799                                                                               | 0                                                                                 |
| Stage 1                  | 795                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 939                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 96                                                                                | 388                                                                               | -                                                                                 | -     | 824                                                                               | -                                                                                 |
| Stage 1                  | 445                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 380                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 93                                                                                | 388                                                                               | -                                                                                 | -     | 824                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 226                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 445                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 367                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 16.9                                                                              | 0                                                                                 | 0.3                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 226                                                                               | 388   | 824                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.048                                                                             | 0.073 | 0.036                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 21.7                                                                              | 15    | 9.5                                                                               | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | C                                                                                 | C     | A                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.2                                                                               | 0.2   | 0.1                                                                               | -                                                                                 |

Exist

Synchro 9 Report  
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HCM 2010 TWSC  
3: SR-29 & Salvestrin

Weekend (Saturday) Mid-Day Exist  
05/03/2018

| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0.1    |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 6      | 0      | 1      | 735   | 820  | 0    |
| Future Vol, veh/h        | 6      | 0      | 1      | 735   | 820  | 0    |
| 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      | 50     | 100    | -     | -    | -    |
| 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      | 0      | 1      | 799   | 891  | 0    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 1692   | 891    | 891    | 0     | -    | 0    |
| Stage 1                  | 891    | -      | -      | -     | -    | -    |
| Stage 2                  | 801    | -      | -      | -     | -    | -    |
| 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    | 341    | 761    | -     | -    | -    |
| Stage 1                  | 401    | -      | -      | -     | -    | -    |
| Stage 2                  | 442    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 102    | 341    | 761    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 238    | -      | -      | -     | -    | -    |
| Stage 1                  | 401    | -      | -      | -     | -    | -    |
| Stage 2                  | 441    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     | SB     |       |      |      |
| HCM Control Delay, s     | 20.6   | 0      | 0      |       |      |      |
| HCM LOS                  | C      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 761    | -      | 238    | -     | -    | -    |
| HCM Lane V/C Ratio       | 0.001  | -      | 0.027  | -     | -    | -    |
| HCM Control Delay (s)    | 9.7    | -      | 20.6   | 0     | -    | -    |
| HCM Lane LOS             | A      | -      | C      | A     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0.1    | -     | -    | -    |

Exist

Synchro 9 Report  
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HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

Weekend (Saturday) Mid-Day Exist  
05/03/2018

| Intersection             |        |          |        |      |       |      |
|--------------------------|--------|----------|--------|------|-------|------|
| Int Delay, s/veh         | 0.8    |          |        |      |       |      |
| Movement                 | WBL    | WBR      | NBT    | NBR  | SBL   | SBT  |
| Lane Configurations      | ↰      | ↰        | ↰      |      | ↰     | ↰    |
| Traffic Vol, veh/h       | 28     | 29       | 707    | 23   | 28    | 792  |
| Future Vol, veh/h        | 28     | 29       | 707    | 23   | 28    | 792  |
| 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       | -      | -    | 200   | -    |
| 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                | 30     | 32       | 768    | 25   | 30    | 861  |
| Major/Minor              | Minor1 | Major1   | Major2 |      |       |      |
| Conflicting Flow All     | 1703   | 781      | 0      | 0    | 793   | 0    |
| Stage 1                  | 781    | -        | -      | -    | -     | -    |
| Stage 2                  | 922    | -        | -      | -    | -     | -    |
| 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    | 395      | -      | -    | 828   | -    |
| Stage 1                  | 451    | -        | -      | -    | -     | -    |
| Stage 2                  | 387    | -        | -      | -    | -     | -    |
| Platoon blocked, %       |        |          | -      | -    |       | -    |
| Mov Cap-1 Maneuver       | 97     | 395      | -      | -    | 828   | -    |
| Mov Cap-2 Maneuver       | 230    | -        | -      | -    | -     | -    |
| Stage 1                  | 451    | -        | -      | -    | -     | -    |
| Stage 2                  | 373    | -        | -      | -    | -     | -    |
| Approach                 | WB     | NB       | SB     |      |       |      |
| HCM Control Delay, s     | 18.9   | 0        | 0.3    |      |       |      |
| HCM LOS                  | C      |          |        |      |       |      |
| Minor Lane/Major Mvmt    | NBT    | NBRWBLn1 | WBLn2  | SBL  | SBT   |      |
| Capacity (veh/h)         | -      | -        | 230    | 395  | 828   | -    |
| HCM Lane V/C Ratio       | -      | -        | 0.132  | 0.08 | 0.037 | -    |
| HCM Control Delay (s)    | -      | -        | 23     | 14.9 | 9.5   | -    |
| HCM Lane LOS             | -      | -        | C      | B    | A     | -    |
| HCM 95th %tile Q(veh)    | -      | -        | 0.4    | 0.3  | 0.1   | -    |

Exist

Synchro 9 Report  
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HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

AM Wkday N-T (NP)  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 99                                                                                | 68                                                                                | 50                                                                                | 825                                                                               | 809                                                                               | 97                                                                                |   |   |
| Future Volume (veh/h)        | 99                                                                                | 68                                                                                | 50                                                                                | 825                                                                               | 809                                                                               | 97                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 108                                                                               | 74                                                                                | 54                                                                                | 897                                                                               | 879                                                                               | 105                                                                               |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 149                                                                               | 133                                                                               | 71                                                                                | 1543                                                                              | 1216                                                                              | 145                                                                               |   |   |
| Arrive On Green              | 0.08                                                                              | 0.08                                                                              | 0.04                                                                              | 0.83                                                                              | 0.74                                                                              | 0.74                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1633                                                                              | 195                                                                               |   |   |
| Grp Volume(v), veh/h         | 108                                                                               | 74                                                                                | 54                                                                                | 897                                                                               | 0                                                                                 | 984                                                                               |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1828                                                                              |   |   |
| Q Serve(g_s), s              | 6.1                                                                               | 4.6                                                                               | 3.1                                                                               | 16.3                                                                              | 0.0                                                                               | 30.5                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 6.1                                                                               | 4.6                                                                               | 3.1                                                                               | 16.3                                                                              | 0.0                                                                               | 30.5                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.11                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 149                                                                               | 133                                                                               | 71                                                                                | 1543                                                                              | 0                                                                                 | 1361                                                                              |   |   |
| V/C Ratio(X)                 | 0.73                                                                              | 0.56                                                                              | 0.76                                                                              | 0.58                                                                              | 0.00                                                                              | 0.72                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 798                                                                               | 712                                                                               | 573                                                                               | 1543                                                                              | 0                                                                                 | 1361                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 45.8                                                                              | 45.1                                                                              | 48.7                                                                              | 2.9                                                                               | 0.0                                                                               | 7.2                                                                               |   |   |
| Incr Delay (d2), s/veh       | 6.6                                                                               | 3.6                                                                               | 15.5                                                                              | 1.6                                                                               | 0.0                                                                               | 3.4                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 3.3                                                                               | 4.2                                                                               | 1.8                                                                               | 8.9                                                                               | 0.0                                                                               | 16.3                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 52.4                                                                              | 48.8                                                                              | 64.3                                                                              | 4.5                                                                               | 0.0                                                                               | 10.6                                                                              |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | B                                                                                 |   |   |
| Approach Vol, veh/h          | 182                                                                               |                                                                                   |                                                                                   | 951                                                                               | 984                                                                               |                                                                                   |   |   |
| Approach Delay, s/veh        | 50.9                                                                              |                                                                                   |                                                                                   | 7.9                                                                               | 10.6                                                                              |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | B                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 13.1                                                                              | 8.6                                                                               | 80.8                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 18.3                                                                              |                                                                                   | 8.1                                                                               | 5.1                                                                               | 32.5                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 29.4                                                                              |                                                                                   | 0.6                                                                               | 0.1                                                                               | 11.4                                                                              |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 12.9                                                                              |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

Baseline

Synchro 9 Report  
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HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

AM Wkday N-T (NP)  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.3                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 14                                                                                | 50                                                                                | 850                                                                               | 38    | 102                                                                               | 749                                                                               |
| Future Vol, veh/h        | 14                                                                                | 50                                                                                | 850                                                                               | 38    | 102                                                                               | 749                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                | 54                                                                                | 924                                                                               | 41    | 111                                                                               | 814                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1981                                                                              | 945                                                                               | 0                                                                                 | 0     | 965                                                                               | 0                                                                                 |
| Stage 1                  | 945                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 1036                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 68                                                                                | 318                                                                               | -                                                                                 | -     | 714                                                                               | -                                                                                 |
| Stage 1                  | 378                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 342                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 57                                                                                | 318                                                                               | -                                                                                 | -     | 714                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 175                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 378                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 289                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 20.5                                                                              | 0                                                                                 | 1.3                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 175                                                                               | 318   | 714                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.087                                                                             | 0.171 | 0.155                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 27.5                                                                              | 18.6  | 11                                                                                | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.3                                                                               | 0.6   | 0.5                                                                               | -                                                                                 |

HCM 2010 TWSC  
3: SR-29 & Salvestrin

AM Wkday N-T (NP)  
05/03/2018

| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0      |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 1      | 1      | 1      | 888   | 763  | 1    |
| Future Vol, veh/h        | 1      | 1      | 1      | 888   | 763  | 1    |
| 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      | 50     | 100    | -     | -    | -    |
| 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                | 1      | 1      | 1      | 965   | 829  | 1    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 1797   | 830    | 830    | 0     | -    | 0    |
| Stage 1                  | 830    | -      | -      | -     | -    | -    |
| Stage 2                  | 967    | -      | -      | -     | -    | -    |
| 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       | 88     | 370    | 802    | -     | -    | -    |
| Stage 1                  | 428    | -      | -      | -     | -    | -    |
| Stage 2                  | 369    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 88     | 370    | 802    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 221    | -      | -      | -     | -    | -    |
| Stage 1                  | 428    | -      | -      | -     | -    | -    |
| Stage 2                  | 369    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     | SB     |       |      |      |
| HCM Control Delay, s     | 18.1   | 0      | 0      |       |      |      |
| HCM LOS                  | C      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 802    | -      | 221    | 370   | -    | -    |
| HCM Lane V/C Ratio       | 0.001  | -      | 0.005  | 0.003 | -    | -    |
| HCM Control Delay (s)    | 9.5    | -      | 21.4   | 14.8  | -    | -    |
| HCM Lane LOS             | A      | -      | C      | B     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0      | 0     | -    | -    |

Baseline

Synchro 9 Report  
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HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

AM Wkday N-T (NP)  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.3                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 39                                                                                | 37                                                                                | 842                                                                               | 109   | 48                                                                                | 719                                                                               |
| Future Vol, veh/h        | 39                                                                                | 37                                                                                | 842                                                                               | 109   | 48                                                                                | 719                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                | 40                                                                                | 915                                                                               | 118   | 52                                                                                | 782                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1860                                                                              | 974                                                                               | 0                                                                                 | 0     | 1034                                                                              | 0                                                                                 |
| Stage 1                  | 974                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 886                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 81                                                                                | 306                                                                               | -                                                                                 | -     | 672                                                                               | -                                                                                 |
| Stage 1                  | 366                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 403                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 75                                                                                | 306                                                                               | -                                                                                 | -     | 672                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 203                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 366                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 372                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 23.1                                                                              | 0                                                                                 | 0.7                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 203                                                                               | 306   | 672                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.209                                                                             | 0.131 | 0.078                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 27.4                                                                              | 18.5  | 10.8                                                                              | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.8                                                                               | 0.4   | 0.3                                                                               | -                                                                                 |

HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

PM Wkday N-T (NP)  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 54                                                                                | 28                                                                                | 43                                                                                | 848                                                                               | 839                                                                               | 52                                                                                |   |   |
| Future Volume (veh/h)        | 54                                                                                | 28                                                                                | 43                                                                                | 848                                                                               | 839                                                                               | 52                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 59                                                                                | 30                                                                                | 47                                                                                | 922                                                                               | 912                                                                               | 57                                                                                |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 90                                                                                | 80                                                                                | 65                                                                                | 1599                                                                              | 1347                                                                              | 84                                                                                |   |   |
| Arrive On Green              | 0.05                                                                              | 0.05                                                                              | 0.04                                                                              | 0.86                                                                              | 0.78                                                                              | 0.78                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1735                                                                              | 108                                                                               |   |   |
| Grp Volume(v), veh/h         | 59                                                                                | 30                                                                                | 47                                                                                | 922                                                                               | 0                                                                                 | 969                                                                               |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1844                                                                              |   |   |
| Q Serve(g_s), s              | 3.2                                                                               | 1.8                                                                               | 2.6                                                                               | 13.7                                                                              | 0.0                                                                               | 24.5                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 3.2                                                                               | 1.8                                                                               | 2.6                                                                               | 13.7                                                                              | 0.0                                                                               | 24.5                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.06                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 90                                                                                | 80                                                                                | 65                                                                                | 1599                                                                              | 0                                                                                 | 1431                                                                              |   |   |
| V/C Ratio(X)                 | 0.66                                                                              | 0.37                                                                              | 0.72                                                                              | 0.58                                                                              | 0.00                                                                              | 0.68                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 827                                                                               | 738                                                                               | 594                                                                               | 1599                                                                              | 0                                                                                 | 1431                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 46.1                                                                              | 45.4                                                                              | 47.1                                                                              | 2.0                                                                               | 0.0                                                                               | 5.2                                                                               |   |   |
| Incr Delay (d2), s/veh       | 7.9                                                                               | 2.9                                                                               | 14.0                                                                              | 1.5                                                                               | 0.0                                                                               | 2.6                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 1.8                                                                               | 1.7                                                                               | 1.5                                                                               | 7.3                                                                               | 0.0                                                                               | 13.1                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 54.0                                                                              | 48.3                                                                              | 61.2                                                                              | 3.5                                                                               | 0.0                                                                               | 7.8                                                                               |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | A                                                                                 |   |   |
| Approach Vol, veh/h          | 89                                                                                |                                                                                   |                                                                                   | 969                                                                               | 969                                                                               |                                                                                   |   |   |
| Approach Delay, s/veh        | 52.1                                                                              |                                                                                   |                                                                                   | 6.3                                                                               | 7.8                                                                               |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | A                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 9.5                                                                               | 8.1                                                                               | 81.3                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 15.7                                                                              |                                                                                   | 5.2                                                                               | 4.6                                                                               | 26.5                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 30.0                                                                              |                                                                                   | 0.3                                                                               | 0.1                                                                               | 15.0                                                                              |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 9.0                                                                               |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

N-T(NP)

Synchro 9 Report  
Page 1

HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

PM Wkday N-T (NP)  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 2.3                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 49                                                                                | 115                                                                               | 804                                                                               | 14    | 41                                                                                | 820                                                                               |
| Future Vol, veh/h        | 49                                                                                | 115                                                                               | 804                                                                               | 14    | 41                                                                                | 820                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                | 53                                                                                | 125                                                                               | 874                                                                               | 15    | 45                                                                                | 891                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1862                                                                              | 882                                                                               | 0                                                                                 | 0     | 889                                                                               | 0                                                                                 |
| Stage 1                  | 882                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 980                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 80                                                                                | 345                                                                               | -                                                                                 | -     | 762                                                                               | -                                                                                 |
| Stage 1                  | 405                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 364                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   |                                                                                   |
| Mov Cap-1 Maneuver       | 75                                                                                | 345                                                                               | -                                                                                 | -     | 762                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 203                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 405                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 343                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 23.5                                                                              | 0                                                                                 | 0.5                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBR                                                                               | WBLn1                                                                             | WBLn2 | SBL                                                                               | SBT                                                                               |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 203                                                                               | 345   | 762                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.262                                                                             | 0.362 | 0.058                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 28.9                                                                              | 21.2  | 10                                                                                | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 1                                                                                 | 1.6   | 0.2                                                                               | -                                                                                 |

N-T(NP)

Synchro 9 Report  
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HCM 2010 TWSC  
3: SR-29 & Salvestrin

PM Wkday N-T (NP)  
05/03/2018

| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0      |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 2      | 1      | 0      | 818   | 869  | 1    |
| Future Vol, veh/h        | 2      | 1      | 0      | 818   | 869  | 1    |
| 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      | 50     | 100    | -     | -    | -    |
| 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                | 2      | 1      | 0      | 889   | 945  | 1    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 1834   | 945    | 946    | 0     | -    | 0    |
| Stage 1                  | 945    | -      | -      | -     | -    | -    |
| Stage 2                  | 889    | -      | -      | -     | -    | -    |
| 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       | 84     | 318    | 725    | -     | -    | -    |
| Stage 1                  | 378    | -      | -      | -     | -    | -    |
| Stage 2                  | 402    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 84     | 318    | 725    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 216    | -      | -      | -     | -    | -    |
| Stage 1                  | 378    | -      | -      | -     | -    | -    |
| Stage 2                  | 402    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     |        | SB    |      |      |
| HCM Control Delay, s     | 20     | 0      |        | 0     |      |      |
| HCM LOS                  | C      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 725    | -      | 216    | 318   | -    | -    |
| HCM Lane V/C Ratio       | -      | -      | 0.01   | 0.003 | -    | -    |
| HCM Control Delay (s)    | 0      | -      | 21.8   | 16.4  | -    | -    |
| HCM Lane LOS             | A      | -      | C      | C     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0      | 0     | -    | -    |

N-T(NP)

Synchro 9 Report  
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HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

PM Wkday N-T (NP)  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.5                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 60                                                                                | 48                                                                                | 765                                                                               | 31    | 22                                                                                | 851                                                                               |
| Future Vol, veh/h        | 60                                                                                | 48                                                                                | 765                                                                               | 31    | 22                                                                                | 851                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                | 65                                                                                | 52                                                                                | 832                                                                               | 34    | 24                                                                                | 925                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1821                                                                              | 848                                                                               | 0                                                                                 | 0     | 865                                                                               | 0                                                                                 |
| Stage 1                  | 848                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 973                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 85                                                                                | 361                                                                               | -                                                                                 | -     | 778                                                                               | -                                                                                 |
| Stage 1                  | 420                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 366                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 82                                                                                | 361                                                                               | -                                                                                 | -     | 778                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 213                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 420                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 355                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 23.6                                                                              | 0                                                                                 | 0.2                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 213                                                                               | 361   | 778                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.306                                                                             | 0.145 | 0.031                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 29.2                                                                              | 16.7  | 9.8                                                                               | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | A                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 1.2                                                                               | 0.5   | 0.1                                                                               | -                                                                                 |

N-T(NP)

Synchro 9 Report  
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HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

Weekend (Saturday) Mid-Day N-T (NP)  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 18                                                                                | 36                                                                                | 58                                                                                | 812                                                                               | 916                                                                               | 22                                                                                |   |   |
| Future Volume (veh/h)        | 18                                                                                | 36                                                                                | 58                                                                                | 812                                                                               | 916                                                                               | 22                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 20                                                                                | 39                                                                                | 63                                                                                | 883                                                                               | 996                                                                               | 24                                                                                |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 72                                                                                | 65                                                                                | 83                                                                                | 1615                                                                              | 1403                                                                              | 34                                                                                |   |   |
| Arrive On Green              | 0.04                                                                              | 0.04                                                                              | 0.05                                                                              | 0.87                                                                              | 0.77                                                                              | 0.77                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1811                                                                              | 44                                                                                |   |   |
| Grp Volume(v), veh/h         | 20                                                                                | 39                                                                                | 63                                                                                | 883                                                                               | 0                                                                                 | 1020                                                                              |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1855                                                                              |   |   |
| Q Serve(g_s), s              | 1.1                                                                               | 2.4                                                                               | 3.4                                                                               | 11.7                                                                              | 0.0                                                                               | 27.0                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 1.1                                                                               | 2.4                                                                               | 3.4                                                                               | 11.7                                                                              | 0.0                                                                               | 27.0                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.02                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 72                                                                                | 65                                                                                | 83                                                                                | 1615                                                                              | 0                                                                                 | 1437                                                                              |   |   |
| V/C Ratio(X)                 | 0.28                                                                              | 0.60                                                                              | 0.76                                                                              | 0.55                                                                              | 0.00                                                                              | 0.71                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 835                                                                               | 746                                                                               | 600                                                                               | 1615                                                                              | 0                                                                                 | 1437                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 45.5                                                                              | 46.2                                                                              | 46.1                                                                              | 1.6                                                                               | 0.0                                                                               | 5.5                                                                               |   |   |
| Incr Delay (d2), s/veh       | 2.0                                                                               | 8.7                                                                               | 13.3                                                                              | 1.3                                                                               | 0.0                                                                               | 3.0                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 0.6                                                                               | 2.2                                                                               | 2.0                                                                               | 6.2                                                                               | 0.0                                                                               | 14.5                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 47.6                                                                              | 54.9                                                                              | 59.4                                                                              | 3.0                                                                               | 0.0                                                                               | 8.5                                                                               |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | A                                                                                 |   |   |
| Approach Vol, veh/h          | 59                                                                                |                                                                                   |                                                                                   | 946                                                                               | 1020                                                                              |                                                                                   |   |   |
| Approach Delay, s/veh        | 52.4                                                                              |                                                                                   |                                                                                   | 6.7                                                                               | 8.5                                                                               |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | A                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 8.5                                                                               | 9.1                                                                               | 80.3                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 13.7                                                                              |                                                                                   | 4.4                                                                               | 5.4                                                                               | 29.0                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 30.9                                                                              |                                                                                   | 0.2                                                                               | 0.1                                                                               | 13.7                                                                              |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 9.0                                                                               |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

N-T (NP)

Synchro 9 Report  
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HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

Weekend (Saturday) Mid-Day N-T (NP)  
05/03/2018

| Intersection             |        |          |        |       |       |      |
|--------------------------|--------|----------|--------|-------|-------|------|
| Int Delay, s/veh         | 0.8    |          |        |       |       |      |
| Movement                 | WBL    | WBR      | NBT    | NBR   | SBL   | SBT  |
| Lane Configurations      | ↰      | ↰        | ↰      |       | ↰     | ↰    |
| Traffic Vol, veh/h       | 15     | 39       | 831    | 10    | 35    | 917  |
| Future Vol, veh/h        | 15     | 39       | 831    | 10    | 35    | 917  |
| 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       | -      | -     | 200   | -    |
| 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     | 42       | 903    | 11    | 38    | 997  |
| Major/Minor              | Minor1 | Major1   | Major2 |       |       |      |
| Conflicting Flow All     | 1982   | 909      | 0      | 0     | 914   | 0    |
| Stage 1                  | 909    | -        | -      | -     | -     | -    |
| Stage 2                  | 1073   | -        | -      | -     | -     | -    |
| 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       | 68     | 333      | -      | -     | 746   | -    |
| Stage 1                  | 393    | -        | -      | -     | -     | -    |
| Stage 2                  | 328    | -        | -      | -     | -     | -    |
| Platoon blocked, %       |        |          | -      | -     |       | -    |
| Mov Cap-1 Maneuver       | 65     | 333      | -      | -     | 746   | -    |
| Mov Cap-2 Maneuver       | 188    | -        | -      | -     | -     | -    |
| Stage 1                  | 393    | -        | -      | -     | -     | -    |
| Stage 2                  | 311    | -        | -      | -     | -     | -    |
| Approach                 | WB     | NB       | SB     |       |       |      |
| HCM Control Delay, s     | 19.8   | 0        | 0.4    |       |       |      |
| HCM LOS                  | C      |          |        |       |       |      |
| Minor Lane/Major Mvmt    | NBT    | NBRWBLn1 | WBLn2  | SBL   | SBT   |      |
| Capacity (veh/h)         | -      | -        | 188    | 333   | 746   | -    |
| HCM Lane V/C Ratio       | -      | -        | 0.087  | 0.127 | 0.051 | -    |
| HCM Control Delay (s)    | -      | -        | 26     | 17.4  | 10.1  | -    |
| HCM Lane LOS             | -      | -        | D      | C     | B     | -    |
| HCM 95th %tile Q(veh)    | -      | -        | 0.3    | 0.4   | 0.2   | -    |

N-T (NP)

Synchro 9 Report  
Page 2

HCM 2010 TWSC  
3: SR-29 & Salvestrin

Weekend (Saturday) Mid-Day N-T (NP)  
05/03/2018

| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0.1    |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 6      | 0      | 1      | 835   | 932  | 0    |
| Future Vol, veh/h        | 6      | 0      | 1      | 835   | 932  | 0    |
| 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      | 50     | 100    | -     | -    | -    |
| 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      | 0      | 1      | 908   | 1013 | 0    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 1923   | 1013   | 1013   | 0     | -    | 0    |
| Stage 1                  | 1013   | -      | -      | -     | -    | -    |
| Stage 2                  | 910    | -      | -      | -     | -    | -    |
| 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     | 290    | 684    | -     | -    | -    |
| Stage 1                  | 351    | -      | -      | -     | -    | -    |
| Stage 2                  | 393    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 74     | 290    | 684    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 203    | -      | -      | -     | -    | -    |
| Stage 1                  | 351    | -      | -      | -     | -    | -    |
| Stage 2                  | 392    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     | SB     |       |      |      |
| HCM Control Delay, s     | 23.3   | 0      | 0      |       |      |      |
| HCM LOS                  | C      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 684    | -      | 203    | -     | -    | -    |
| HCM Lane V/C Ratio       | 0.002  | -      | 0.032  | -     | -    | -    |
| HCM Control Delay (s)    | 10.3   | -      | 23.3   | 0     | -    | -    |
| HCM Lane LOS             | B      | -      | C      | A     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0.1    | -     | -    | -    |

N-T (NP)

Synchro 9 Report  
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HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

Weekend (Saturday) Mid-Day N-T (NP)  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.8                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 28                                                                                | 29                                                                                | 807                                                                               | 23    | 28                                                                                | 904                                                                               |
| Future Vol, veh/h        | 28                                                                                | 29                                                                                | 807                                                                               | 23    | 28                                                                                | 904                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                | 30                                                                                | 32                                                                                | 877                                                                               | 25    | 30                                                                                | 983                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1933                                                                              | 890                                                                               | 0                                                                                 | 0     | 902                                                                               | 0                                                                                 |
| Stage 1                  | 890                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 1043                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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                                                                                | 342                                                                               | -                                                                                 | -     | 754                                                                               | -                                                                                 |
| Stage 1                  | 401                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 339                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   |                                                                                   |
| Mov Cap-1 Maneuver       | 70                                                                                | 342                                                                               | -                                                                                 | -     | 754                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 196                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 401                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 326                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 21.6                                                                              | 0                                                                                 | 0.3                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 196                                                                               | 342   | 754                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.155                                                                             | 0.092 | 0.04                                                                              | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 26.7                                                                              | 16.6  | 10                                                                                | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | A                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.5                                                                               | 0.3   | 0.1                                                                               | -                                                                                 |

N-T (NP)

Synchro 9 Report  
Page 4

HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

AM Weekday E+Prj.  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 99                                                                                | 68                                                                                | 50                                                                                | 731                                                                               | 714                                                                               | 97                                                                                |   |   |
| Future Volume (veh/h)        | 99                                                                                | 68                                                                                | 50                                                                                | 731                                                                               | 714                                                                               | 97                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 108                                                                               | 74                                                                                | 54                                                                                | 795                                                                               | 776                                                                               | 105                                                                               |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 149                                                                               | 133                                                                               | 71                                                                                | 1543                                                                              | 1197                                                                              | 162                                                                               |   |   |
| Arrive On Green              | 0.08                                                                              | 0.08                                                                              | 0.04                                                                              | 0.83                                                                              | 0.74                                                                              | 0.74                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1607                                                                              | 217                                                                               |   |   |
| Grp Volume(v), veh/h         | 108                                                                               | 74                                                                                | 54                                                                                | 795                                                                               | 0                                                                                 | 881                                                                               |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1824                                                                              |   |   |
| Q Serve(g_s), s              | 6.1                                                                               | 4.6                                                                               | 3.1                                                                               | 13.1                                                                              | 0.0                                                                               | 24.4                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 6.1                                                                               | 4.6                                                                               | 3.1                                                                               | 13.1                                                                              | 0.0                                                                               | 24.4                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.12                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 149                                                                               | 133                                                                               | 71                                                                                | 1543                                                                              | 0                                                                                 | 1358                                                                              |   |   |
| V/C Ratio(X)                 | 0.73                                                                              | 0.56                                                                              | 0.76                                                                              | 0.52                                                                              | 0.00                                                                              | 0.65                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 798                                                                               | 712                                                                               | 573                                                                               | 1543                                                                              | 0                                                                                 | 1358                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 45.8                                                                              | 45.1                                                                              | 48.7                                                                              | 2.6                                                                               | 0.0                                                                               | 6.5                                                                               |   |   |
| Incr Delay (d2), s/veh       | 6.6                                                                               | 3.6                                                                               | 15.5                                                                              | 1.2                                                                               | 0.0                                                                               | 2.4                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 3.3                                                                               | 4.2                                                                               | 1.8                                                                               | 6.9                                                                               | 0.0                                                                               | 12.9                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 52.4                                                                              | 48.8                                                                              | 64.3                                                                              | 3.9                                                                               | 0.0                                                                               | 8.9                                                                               |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | A                                                                                 |   |   |
| Approach Vol, veh/h          | 182                                                                               |                                                                                   |                                                                                   | 849                                                                               | 881                                                                               |                                                                                   |   |   |
| Approach Delay, s/veh        | 50.9                                                                              |                                                                                   |                                                                                   | 7.7                                                                               | 8.9                                                                               |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | A                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 13.1                                                                              | 8.6                                                                               | 80.8                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 15.1                                                                              |                                                                                   | 8.1                                                                               | 5.1                                                                               | 26.4                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 22.9                                                                              |                                                                                   | 0.6                                                                               | 0.1                                                                               | 13.1                                                                              |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 12.4                                                                              |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

E+Prj.

Synchro 9 Report  
Page 1

HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

AM Weekday E+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.1                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 12                                                                                | 44                                                                                | 762                                                                               | 33    | 84                                                                                | 671                                                                               |
| Future Vol, veh/h        | 12                                                                                | 44                                                                                | 762                                                                               | 33    | 84                                                                                | 671                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                | 13                                                                                | 48                                                                                | 828                                                                               | 36    | 91                                                                                | 729                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1758                                                                              | 846                                                                               | 0                                                                                 | 0     | 864                                                                               | 0                                                                                 |
| Stage 1                  | 846                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 93                                                                                | 362                                                                               | -                                                                                 | -     | 779                                                                               | -                                                                                 |
| Stage 1                  | 421                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 392                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 82                                                                                | 362                                                                               | -                                                                                 | -     | 779                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 210                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 421                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 346                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 18                                                                                | 0                                                                                 | 1.1                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBR                                                                               | WBLn1                                                                             | WBLn2 | SBL                                                                               | SBT                                                                               |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 210                                                                               | 362   | 779                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.062                                                                             | 0.132 | 0.117                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 23.3                                                                              | 16.5  | 10.2                                                                              | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | C                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.2                                                                               | 0.5   | 0.4                                                                               | -                                                                                 |

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HCM 2010 TWSC  
3: SR-29 & Salvestrin

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| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0      |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 1      | 0      | 1      | 793   | 680  | 2    |
| Future Vol, veh/h        | 1      | 0      | 1      | 793   | 680  | 2    |
| 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      | 0      | 100    | -     | -    | -    |
| 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                | 1      | 0      | 1      | 862   | 739  | 2    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 1604   | 740    | 741    | 0     | -    | 0    |
| Stage 1                  | 740    | -      | -      | -     | -    | -    |
| Stage 2                  | 864    | -      | -      | -     | -    | -    |
| 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       | 116    | 417    | 866    | -     | -    | -    |
| Stage 1                  | 472    | -      | -      | -     | -    | -    |
| Stage 2                  | 413    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 116    | 417    | 866    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 254    | -      | -      | -     | -    | -    |
| Stage 1                  | 472    | -      | -      | -     | -    | -    |
| Stage 2                  | 413    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     | SB     |       |      |      |
| HCM Control Delay, s     | 19.2   | 0      | 0      |       |      |      |
| HCM LOS                  | C      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 866    | -      | 254    | -     | -    | -    |
| HCM Lane V/C Ratio       | 0.001  | -      | 0.004  | -     | -    | -    |
| HCM Control Delay (s)    | 9.2    | -      | 19.2   | 0     | -    | -    |
| HCM Lane LOS             | A      | -      | C      | A     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0      | -     | -    | -    |

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HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

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| Intersection             |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.2                                                                               |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR  | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |      |  |  |
| Traffic Vol, veh/h       | 38                                                                                | 37                                                                                | 758                                                                               | 105  | 47                                                                                | 634                                                                               |
| Future Vol, veh/h        | 38                                                                                | 37                                                                                | 758                                                                               | 105  | 47                                                                                | 634                                                                               |
| 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                                                                                | -                                                                                 | -    | 200                                                                               | -                                                                                 |
| 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                | 41                                                                                | 40                                                                                | 824                                                                               | 114  | 51                                                                                | 689                                                                               |

| Major/Minor          | Minor1 | Major1 | Major2 |   |       |
|----------------------|--------|--------|--------|---|-------|
| Conflicting Flow All | 1672   | 881    | 0      | 0 | 938   |
| Stage 1              | 881    | -      | -      | - | -     |
| Stage 2              | 791    | -      | -      | - | -     |
| 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   | 105    | 346    | -      | - | 730   |
| Stage 1              | 405    | -      | -      | - | -     |
| Stage 2              | 447    | -      | -      | - | -     |
| Platoon blocked, %   |        |        | -      | - | -     |
| Mov Cap-1 Maneuver   | 98     | 346    | -      | - | 730   |
| Mov Cap-2 Maneuver   | 232    | -      | -      | - | -     |
| Stage 1              | 405    | -      | -      | - | -     |
| Stage 2              | 416    | -      | -      | - | -     |

| Approach             | WB   | NB | SB  |
|----------------------|------|----|-----|
| HCM Control Delay, s | 20.3 | 0  | 0.7 |
| HCM LOS              | C    |    |     |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | WBLn2 | SBL   | SBT  |
|-----------------------|-----|----------|-------|-------|------|
| Capacity (veh/h)      | -   | -        | 232   | 346   | 730  |
| HCM Lane V/C Ratio    | -   | -        | 0.178 | 0.116 | 0.07 |
| HCM Control Delay (s) | -   | -        | 23.8  | 16.8  | 10.3 |
| HCM Lane LOS          | -   | -        | C     | C     | B    |
| HCM 95th %tile Q(veh) | -   | -        | 0.6   | 0.4   | 0.2  |

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HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

PM Weekday E+Prj.  
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|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 54                                                                                | 28                                                                                | 43                                                                                | 707                                                                               | 729                                                                               | 52                                                                                |   |   |
| Future Volume (veh/h)        | 54                                                                                | 28                                                                                | 43                                                                                | 707                                                                               | 729                                                                               | 52                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 59                                                                                | 30                                                                                | 47                                                                                | 768                                                                               | 792                                                                               | 57                                                                                |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 90                                                                                | 80                                                                                | 65                                                                                | 1599                                                                              | 1333                                                                              | 96                                                                                |   |   |
| Arrive On Green              | 0.05                                                                              | 0.05                                                                              | 0.04                                                                              | 0.86                                                                              | 0.78                                                                              | 0.78                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1717                                                                              | 124                                                                               |   |   |
| Grp Volume(v), veh/h         | 59                                                                                | 30                                                                                | 47                                                                                | 768                                                                               | 0                                                                                 | 849                                                                               |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1841                                                                              |   |   |
| Q Serve(g_s), s              | 3.2                                                                               | 1.8                                                                               | 2.6                                                                               | 9.8                                                                               | 0.0                                                                               | 18.9                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 3.2                                                                               | 1.8                                                                               | 2.6                                                                               | 9.8                                                                               | 0.0                                                                               | 18.9                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.07                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 90                                                                                | 80                                                                                | 65                                                                                | 1599                                                                              | 0                                                                                 | 1429                                                                              |   |   |
| V/C Ratio(X)                 | 0.66                                                                              | 0.37                                                                              | 0.72                                                                              | 0.48                                                                              | 0.00                                                                              | 0.59                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 827                                                                               | 738                                                                               | 594                                                                               | 1599                                                                              | 0                                                                                 | 1429                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 46.1                                                                              | 45.4                                                                              | 47.1                                                                              | 1.7                                                                               | 0.0                                                                               | 4.6                                                                               |   |   |
| Incr Delay (d2), s/veh       | 7.9                                                                               | 2.9                                                                               | 14.0                                                                              | 1.0                                                                               | 0.0                                                                               | 1.8                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 1.8                                                                               | 1.7                                                                               | 1.5                                                                               | 5.4                                                                               | 0.0                                                                               | 10.2                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 54.0                                                                              | 48.3                                                                              | 61.2                                                                              | 2.7                                                                               | 0.0                                                                               | 6.4                                                                               |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | A                                                                                 |   |   |
| Approach Vol, veh/h          | 89                                                                                |                                                                                   |                                                                                   | 815                                                                               | 849                                                                               |                                                                                   |   |   |
| Approach Delay, s/veh        | 52.1                                                                              |                                                                                   |                                                                                   | 6.1                                                                               | 6.4                                                                               |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | A                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 9.5                                                                               | 8.1                                                                               | 81.3                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 11.8                                                                              |                                                                                   | 5.2                                                                               | 4.6                                                                               | 20.9                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 21.1                                                                              |                                                                                   | 0.3                                                                               | 0.1                                                                               | 14.4                                                                              |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 8.6                                                                               |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

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HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

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| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.8                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 43                                                                                | 94                                                                                | 679                                                                               | 11    | 31                                                                                | 720                                                                               |
| Future Vol, veh/h        | 43                                                                                | 94                                                                                | 679                                                                               | 11    | 31                                                                                | 720                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                | 47                                                                                | 102                                                                               | 738                                                                               | 12    | 34                                                                                | 783                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1594                                                                              | 744                                                                               | 0                                                                                 | 0     | 750                                                                               | 0                                                                                 |
| Stage 1                  | 744                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 850                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 118                                                                               | 415                                                                               | -                                                                                 | -     | 859                                                                               | -                                                                                 |
| Stage 1                  | 470                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 419                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 113                                                                               | 415                                                                               | -                                                                                 | -     | 859                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 249                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 470                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 402                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 18.5                                                                              | 0                                                                                 | 0.4                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBR                                                                               | WBLn1                                                                             | WBLn2 | SBL                                                                               | SBT                                                                               |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 249                                                                               | 415   | 859                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.188                                                                             | 0.246 | 0.039                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 22.8                                                                              | 16.5  | 9.4                                                                               | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | C                                                                                 | C     | A                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.7                                                                               | 1     | 0.1                                                                               | -                                                                                 |

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| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0.1    |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 4      | 6      | 2      | 686   | 761  | 1    |
| Future Vol, veh/h        | 4      | 6      | 2      | 686   | 761  | 1    |
| 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      | 0      | 100    | -     | -    | -    |
| 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      | 7      | 2      | 746   | 827  | 1    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 1578   | 828    | 828    | 0     | -    | 0    |
| Stage 1                  | 828    | -      | -      | -     | -    | -    |
| Stage 2                  | 750    | -      | -      | -     | -    | -    |
| 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       | 120    | 371    | 803    | -     | -    | -    |
| Stage 1                  | 429    | -      | -      | -     | -    | -    |
| Stage 2                  | 467    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 120    | 371    | 803    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 259    | -      | -      | -     | -    | -    |
| Stage 1                  | 429    | -      | -      | -     | -    | -    |
| Stage 2                  | 466    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     | SB     |       |      |      |
| HCM Control Delay, s     | 16.6   | 0      | 0      |       |      |      |
| HCM LOS                  | C      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 803    | -      | 259    | 371   | -    | -    |
| HCM Lane V/C Ratio       | 0.003  | -      | 0.017  | 0.018 | -    | -    |
| HCM Control Delay (s)    | 9.5    | -      | 19.1   | 14.9  | -    | -    |
| HCM Lane LOS             | A      | -      | C      | B     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0.1    | 0.1   | -    | -    |

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HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

PM Weekday E+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.4                                                                               |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR  | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |      |  |  |
| Traffic Vol, veh/h       | 56                                                                                | 47                                                                                | 641                                                                               | 30   | 22                                                                                | 746                                                                               |
| Future Vol, veh/h        | 56                                                                                | 47                                                                                | 641                                                                               | 30   | 22                                                                                | 746                                                                               |
| 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                                                                                | -                                                                                 | -    | 200                                                                               | -                                                                                 |
| 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                | 61                                                                                | 51                                                                                | 697                                                                               | 33   | 24                                                                                | 811                                                                               |

| Major/Minor          | Minor1 | Major1 | Major2 |   |       |
|----------------------|--------|--------|--------|---|-------|
| Conflicting Flow All | 1572   | 713    | 0      | 0 | 729   |
| Stage 1              | 713    | -      | -      | - | -     |
| Stage 2              | 859    | -      | -      | - | -     |
| 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   | 121    | 432    | -      | - | 875   |
| Stage 1              | 486    | -      | -      | - | -     |
| Stage 2              | 415    | -      | -      | - | -     |
| Platoon blocked, %   |        |        | -      | - | -     |
| Mov Cap-1 Maneuver   | 118    | 432    | -      | - | 875   |
| Mov Cap-2 Maneuver   | 255    | -      | -      | - | -     |
| Stage 1              | 486    | -      | -      | - | -     |
| Stage 2              | 404    | -      | -      | - | -     |

| Approach             | WB   | NB | SB  |
|----------------------|------|----|-----|
| HCM Control Delay, s | 19.3 | 0  | 0.3 |
| HCM LOS              | C    |    |     |

| Minor Lane/Major Mvmt | NBT | NBR | WBLn1 | WBLn2 | SBL   | SBT |
|-----------------------|-----|-----|-------|-------|-------|-----|
| Capacity (veh/h)      | -   | -   | 255   | 432   | 875   | -   |
| HCM Lane V/C Ratio    | -   | -   | 0.239 | 0.118 | 0.027 | -   |
| HCM Control Delay (s) | -   | -   | 23.5  | 14.4  | 9.2   | -   |
| HCM Lane LOS          | -   | -   | C     | B     | A     | -   |
| HCM 95th %tile Q(veh) | -   | -   | 0.9   | 0.4   | 0.1   | -   |

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HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

Weekend (Saturday) Mid-Day E+Prj.  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 18                                                                                | 36                                                                                | 58                                                                                | 687                                                                               | 815                                                                               | 22                                                                                |   |   |
| Future Volume (veh/h)        | 18                                                                                | 36                                                                                | 58                                                                                | 687                                                                               | 815                                                                               | 22                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 20                                                                                | 39                                                                                | 63                                                                                | 747                                                                               | 886                                                                               | 24                                                                                |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 72                                                                                | 65                                                                                | 83                                                                                | 1615                                                                              | 1398                                                                              | 38                                                                                |   |   |
| Arrive On Green              | 0.04                                                                              | 0.04                                                                              | 0.05                                                                              | 0.87                                                                              | 0.77                                                                              | 0.77                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1805                                                                              | 49                                                                                |   |   |
| Grp Volume(v), veh/h         | 20                                                                                | 39                                                                                | 63                                                                                | 747                                                                               | 0                                                                                 | 910                                                                               |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1854                                                                              |   |   |
| Q Serve(g_s), s              | 1.1                                                                               | 2.4                                                                               | 3.4                                                                               | 8.7                                                                               | 0.0                                                                               | 21.3                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 1.1                                                                               | 2.4                                                                               | 3.4                                                                               | 8.7                                                                               | 0.0                                                                               | 21.3                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.03                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 72                                                                                | 65                                                                                | 83                                                                                | 1615                                                                              | 0                                                                                 | 1436                                                                              |   |   |
| V/C Ratio(X)                 | 0.28                                                                              | 0.60                                                                              | 0.76                                                                              | 0.46                                                                              | 0.00                                                                              | 0.63                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 835                                                                               | 746                                                                               | 600                                                                               | 1615                                                                              | 0                                                                                 | 1436                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 45.5                                                                              | 46.2                                                                              | 46.1                                                                              | 1.4                                                                               | 0.0                                                                               | 4.9                                                                               |   |   |
| Incr Delay (d2), s/veh       | 2.0                                                                               | 8.7                                                                               | 13.3                                                                              | 1.0                                                                               | 0.0                                                                               | 2.1                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 0.6                                                                               | 2.2                                                                               | 2.0                                                                               | 4.8                                                                               | 0.0                                                                               | 11.5                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 47.6                                                                              | 54.9                                                                              | 59.4                                                                              | 2.4                                                                               | 0.0                                                                               | 7.0                                                                               |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | A                                                                                 |   |   |
| Approach Vol, veh/h          | 59                                                                                |                                                                                   |                                                                                   | 810                                                                               | 910                                                                               |                                                                                   |   |   |
| Approach Delay, s/veh        | 52.4                                                                              |                                                                                   |                                                                                   | 6.8                                                                               | 7.0                                                                               |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | A                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 8.5                                                                               | 9.1                                                                               | 80.3                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 10.7                                                                              |                                                                                   | 4.4                                                                               | 5.4                                                                               | 23.3                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 22.5                                                                              |                                                                                   | 0.2                                                                               | 0.1                                                                               | 14.1                                                                              |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 8.4                                                                               |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

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HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

Weekend (Saturday) Mid-Day E+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.5                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 10                                                                                | 26                                                                                | 731                                                                               | 8     | 27                                                                                | 814                                                                               |
| Future Vol, veh/h        | 10                                                                                | 26                                                                                | 731                                                                               | 8     | 27                                                                                | 814                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                | 28                                                                                | 795                                                                               | 9     | 29                                                                                | 885                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1742                                                                              | 799                                                                               | 0                                                                                 | 0     | 803                                                                               | 0                                                                                 |
| Stage 1                  | 799                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 943                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 95                                                                                | 386                                                                               | -                                                                                 | -     | 821                                                                               | -                                                                                 |
| Stage 1                  | 443                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 379                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 92                                                                                | 386                                                                               | -                                                                                 | -     | 821                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 224                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 443                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 366                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 17                                                                                | 0                                                                                 | 0.3                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 224                                                                               | 386   | 821                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.049                                                                             | 0.073 | 0.036                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 21.9                                                                              | 15.1  | 9.5                                                                               | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | C                                                                                 | C     | A                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.2                                                                               | 0.2   | 0.1                                                                               | -                                                                                 |

E+Prj.

Synchro 9 Report  
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HCM 2010 TWSC  
3: SR-29 & Salvestrin

Weekend (Saturday) Mid-Day E+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.1                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Movement                 | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |
| Lane Configurations      |  |  |  |  |  |  |
| Traffic Vol, veh/h       | 4                                                                                 | 5                                                                                 | 5                                                                                 | 735                                                                               | 820                                                                               | 4                                                                                 |
| Future Vol, veh/h        | 4                                                                                 | 5                                                                                 | 5                                                                                 | 735                                                                               | 820                                                                               | 4                                                                                 |
| 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                                                                                 | 50                                                                                | 100                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| 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                                                                                 | 5                                                                                 | 5                                                                                 | 799                                                                               | 891                                                                               | 4                                                                                 |
|                          |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Major/Minor              | Minor2                                                                            | Major1                                                                            |                                                                                   | Major2                                                                            |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1703                                                                              | 893                                                                               | 896                                                                               | 0                                                                                 | -                                                                                 | 0                                                                                 |
| Stage 1                  | 893                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 810                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| 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                                                                               | 340                                                                               | 757                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 1                  | 400                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 438                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   |                                                                                   | -                                                                                 | -                                                                                 | -                                                                                 |
| Mov Cap-1 Maneuver       | 100                                                                               | 340                                                                               | 757                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| Mov Cap-2 Maneuver       | 236                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 1                  | 400                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 435                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
|                          |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Approach                 | EB                                                                                | NB                                                                                |                                                                                   | SB                                                                                |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 17.9                                                                              | 0.1                                                                               |                                                                                   | 0                                                                                 |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
|                          |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBL                                                                               | NBT                                                                               | EBLn1                                                                             | EBLn2                                                                             | SBT                                                                               | SBR                                                                               |
| Capacity (veh/h)         | 757                                                                               | -                                                                                 | 236                                                                               | 340                                                                               | -                                                                                 | -                                                                                 |
| HCM Lane V/C Ratio       | 0.007                                                                             | -                                                                                 | 0.018                                                                             | 0.016                                                                             | -                                                                                 | -                                                                                 |
| HCM Control Delay (s)    | 9.8                                                                               | -                                                                                 | 20.5                                                                              | 15.8                                                                              | -                                                                                 | -                                                                                 |
| HCM Lane LOS             | A                                                                                 | -                                                                                 | C                                                                                 | C                                                                                 | -                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | 0                                                                                 | -                                                                                 | 0.1                                                                               | 0                                                                                 | -                                                                                 | -                                                                                 |

E+Prj.

Synchro 9 Report  
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HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

Weekend (Saturday) Mid-Day E+Prj.  
05/03/2018

| Intersection             |        |          |        |      |       |      |
|--------------------------|--------|----------|--------|------|-------|------|
| Int Delay, s/veh         | 0.8    |          |        |      |       |      |
| Movement                 | WBL    | WBR      | NBT    | NBR  | SBL   | SBT  |
| Lane Configurations      | ↰      | ↱        | ↰      | ↱    | ↰     | ↱    |
| Traffic Vol, veh/h       | 28     | 29       | 712    | 23   | 28    | 797  |
| Future Vol, veh/h        | 28     | 29       | 712    | 23   | 28    | 797  |
| 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       | -      | -    | 200   | -    |
| 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                | 30     | 32       | 774    | 25   | 30    | 866  |
| Major/Minor              | Minor1 | Major1   | Major2 |      |       |      |
| Conflicting Flow All     | 1713   | 786      | 0      | 0    | 799   | 0    |
| Stage 1                  | 786    | -        | -      | -    | -     | -    |
| Stage 2                  | 927    | -        | -      | -    | -     | -    |
| 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       | 99     | 392      | -      | -    | 824   | -    |
| Stage 1                  | 449    | -        | -      | -    | -     | -    |
| Stage 2                  | 385    | -        | -      | -    | -     | -    |
| Platoon blocked, %       |        |          | -      | -    |       | -    |
| Mov Cap-1 Maneuver       | 95     | 392      | -      | -    | 824   | -    |
| Mov Cap-2 Maneuver       | 228    | -        | -      | -    | -     | -    |
| Stage 1                  | 449    | -        | -      | -    | -     | -    |
| Stage 2                  | 371    | -        | -      | -    | -     | -    |
| Approach                 | WB     | NB       | SB     |      |       |      |
| HCM Control Delay, s     | 19     | 0        | 0.3    |      |       |      |
| HCM LOS                  | C      |          |        |      |       |      |
| Minor Lane/Major Mvmt    | NBT    | NBRWBLn1 | WBLn2  | SBL  | SBT   |      |
| Capacity (veh/h)         | -      | -        | 228    | 392  | 824   | -    |
| HCM Lane V/C Ratio       | -      | -        | 0.133  | 0.08 | 0.037 | -    |
| HCM Control Delay (s)    | -      | -        | 23.2   | 15   | 9.5   | -    |
| HCM Lane LOS             | -      | -        | C      | C    | A     | -    |
| HCM 95th %tile Q(veh)    | -      | -        | 0.5    | 0.3  | 0.1   | -    |

E+Prj.

Synchro 9 Report  
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HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

AM Wkday N-T+Prj.  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 99                                                                                | 68                                                                                | 50                                                                                | 826                                                                               | 811                                                                               | 97                                                                                |   |   |
| Future Volume (veh/h)        | 99                                                                                | 68                                                                                | 50                                                                                | 826                                                                               | 811                                                                               | 97                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 108                                                                               | 74                                                                                | 54                                                                                | 898                                                                               | 882                                                                               | 105                                                                               |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 149                                                                               | 133                                                                               | 71                                                                                | 1543                                                                              | 1217                                                                              | 145                                                                               |   |   |
| Arrive On Green              | 0.08                                                                              | 0.08                                                                              | 0.04                                                                              | 0.83                                                                              | 0.74                                                                              | 0.74                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1634                                                                              | 195                                                                               |   |   |
| Grp Volume(v), veh/h         | 108                                                                               | 74                                                                                | 54                                                                                | 898                                                                               | 0                                                                                 | 987                                                                               |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1828                                                                              |   |   |
| Q Serve(g_s), s              | 6.1                                                                               | 4.6                                                                               | 3.1                                                                               | 16.4                                                                              | 0.0                                                                               | 30.7                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 6.1                                                                               | 4.6                                                                               | 3.1                                                                               | 16.4                                                                              | 0.0                                                                               | 30.7                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.11                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 149                                                                               | 133                                                                               | 71                                                                                | 1543                                                                              | 0                                                                                 | 1361                                                                              |   |   |
| V/C Ratio(X)                 | 0.73                                                                              | 0.56                                                                              | 0.76                                                                              | 0.58                                                                              | 0.00                                                                              | 0.72                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 798                                                                               | 712                                                                               | 573                                                                               | 1543                                                                              | 0                                                                                 | 1361                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 45.8                                                                              | 45.1                                                                              | 48.7                                                                              | 2.9                                                                               | 0.0                                                                               | 7.3                                                                               |   |   |
| Incr Delay (d2), s/veh       | 6.6                                                                               | 3.6                                                                               | 15.5                                                                              | 1.6                                                                               | 0.0                                                                               | 3.4                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 3.3                                                                               | 4.2                                                                               | 1.8                                                                               | 8.9                                                                               | 0.0                                                                               | 16.4                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 52.4                                                                              | 48.8                                                                              | 64.3                                                                              | 4.5                                                                               | 0.0                                                                               | 10.7                                                                              |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | B                                                                                 |   |   |
| Approach Vol, veh/h          | 182                                                                               |                                                                                   |                                                                                   | 952                                                                               | 987                                                                               |                                                                                   |   |   |
| Approach Delay, s/veh        | 50.9                                                                              |                                                                                   |                                                                                   | 7.9                                                                               | 10.7                                                                              |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | B                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 13.1                                                                              | 8.6                                                                               | 80.8                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 18.4                                                                              |                                                                                   | 8.1                                                                               | 5.1                                                                               | 32.7                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 29.6                                                                              |                                                                                   | 0.6                                                                               | 0.1                                                                               | 11.3                                                                              |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 12.9                                                                              |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

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Synchro 9 Report  
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HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

AM Wkday N-T+Prj.  
05/03/2018

| Intersection             |        |               |        |      |       |      |
|--------------------------|--------|---------------|--------|------|-------|------|
| Int Delay, s/veh         | 1.3    |               |        |      |       |      |
| Movement                 | WBL    | WBR           | NBT    | NBR  | SBL   | SBT  |
| Lane Configurations      | ↰      | ↰             | ↰      |      | ↰     | ↰    |
| Traffic Vol, veh/h       | 14     | 50            | 851    | 38   | 102   | 751  |
| Future Vol, veh/h        | 14     | 50            | 851    | 38   | 102   | 751  |
| 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            | -      | -    | 200   | -    |
| 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     | 54            | 925    | 41   | 111   | 816  |
| Major/Minor              | Minor1 | Major1        | Major2 |      |       |      |
| Conflicting Flow All     | 1984   | 946           | 0      | 0    | 966   | 0    |
| Stage 1                  | 946    | -             | -      | -    | -     | -    |
| Stage 2                  | 1038   | -             | -      | -    | -     | -    |
| 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       | 67     | 317           | -      | -    | 713   | -    |
| Stage 1                  | 377    | -             | -      | -    | -     | -    |
| Stage 2                  | 341    | -             | -      | -    | -     | -    |
| Platoon blocked, %       |        |               | -      | -    |       | -    |
| Mov Cap-1 Maneuver       | 57     | 317           | -      | -    | 713   | -    |
| Mov Cap-2 Maneuver       | 174    | -             | -      | -    | -     | -    |
| Stage 1                  | 377    | -             | -      | -    | -     | -    |
| Stage 2                  | 288    | -             | -      | -    | -     | -    |
| Approach                 | WB     | NB            | SB     |      |       |      |
| HCM Control Delay, s     | 20.7   | 0             | 1.3    |      |       |      |
| HCM LOS                  | C      |               |        |      |       |      |
| Minor Lane/Major Mvmt    | NBT    | NBRWBLn1WBLn2 | SBL    | SBT  |       |      |
| Capacity (veh/h)         | -      | - 174 317     | 713    | -    |       |      |
| HCM Lane V/C Ratio       | -      | - 0.087 0.171 | 0.155  | -    |       |      |
| HCM Control Delay (s)    | -      | - 27.7 18.7   | 11     | -    |       |      |
| HCM Lane LOS             | -      | - D C         | B      | -    |       |      |
| HCM 95th %tile Q(veh)    | -      | - 0.3 0.6     | 0.5    | -    |       |      |

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HCM 2010 TWSC  
3: SR-29 & Salvestrin

AM Wkday N-T+Prj.  
05/03/2018

| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0      |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 1      | 0      | 1      | 888   | 763  | 2    |
| Future Vol, veh/h        | 1      | 0      | 1      | 888   | 763  | 2    |
| 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      | 50     | 100    | -     | -    | -    |
| 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                | 1      | 0      | 1      | 965   | 829  | 2    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 1797   | 830    | 832    | 0     | -    | 0    |
| Stage 1                  | 830    | -      | -      | -     | -    | -    |
| Stage 2                  | 967    | -      | -      | -     | -    | -    |
| 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       | 88     | 370    | 801    | -     | -    | -    |
| Stage 1                  | 428    | -      | -      | -     | -    | -    |
| Stage 2                  | 369    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 88     | 370    | 801    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 221    | -      | -      | -     | -    | -    |
| Stage 1                  | 428    | -      | -      | -     | -    | -    |
| Stage 2                  | 369    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     | SB     |       |      |      |
| HCM Control Delay, s     | 21.4   | 0      | 0      |       |      |      |
| HCM LOS                  | C      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 801    | -      | 221    | -     | -    | -    |
| HCM Lane V/C Ratio       | 0.001  | -      | 0.005  | -     | -    | -    |
| HCM Control Delay (s)    | 9.5    | -      | 21.4   | 0     | -    | -    |
| HCM Lane LOS             | A      | -      | C      | A     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0      | -     | -    | -    |

NT+Prj.

Synchro 9 Report  
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HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

AM Wkday N-T+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.3                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 39                                                                                | 37                                                                                | 843                                                                               | 109   | 48                                                                                | 719                                                                               |
| Future Vol, veh/h        | 39                                                                                | 37                                                                                | 843                                                                               | 109   | 48                                                                                | 719                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                | 40                                                                                | 916                                                                               | 118   | 52                                                                                | 782                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1862                                                                              | 976                                                                               | 0                                                                                 | 0     | 1035                                                                              | 0                                                                                 |
| Stage 1                  | 976                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 886                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 80                                                                                | 305                                                                               | -                                                                                 | -     | 672                                                                               | -                                                                                 |
| Stage 1                  | 365                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 403                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 74                                                                                | 305                                                                               | -                                                                                 | -     | 672                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 202                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 365                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 372                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 23.2                                                                              | 0                                                                                 | 0.7                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBR                                                                               | WBLn1                                                                             | WBLn2 | SBL                                                                               | SBT                                                                               |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 202                                                                               | 305   | 672                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.21                                                                              | 0.132 | 0.078                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 27.5                                                                              | 18.6  | 10.8                                                                              | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.8                                                                               | 0.5   | 0.3                                                                               | -                                                                                 |

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Synchro 9 Report  
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HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

PM Wkday N-T+Prj.  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 54                                                                                | 28                                                                                | 43                                                                                | 852                                                                               | 840                                                                               | 52                                                                                |   |   |
| Future Volume (veh/h)        | 54                                                                                | 28                                                                                | 43                                                                                | 852                                                                               | 840                                                                               | 52                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 59                                                                                | 30                                                                                | 47                                                                                | 926                                                                               | 913                                                                               | 57                                                                                |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 90                                                                                | 80                                                                                | 65                                                                                | 1599                                                                              | 1347                                                                              | 84                                                                                |   |   |
| Arrive On Green              | 0.05                                                                              | 0.05                                                                              | 0.04                                                                              | 0.86                                                                              | 0.78                                                                              | 0.78                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1735                                                                              | 108                                                                               |   |   |
| Grp Volume(v), veh/h         | 59                                                                                | 30                                                                                | 47                                                                                | 926                                                                               | 0                                                                                 | 970                                                                               |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1844                                                                              |   |   |
| Q Serve(g_s), s              | 3.2                                                                               | 1.8                                                                               | 2.6                                                                               | 13.8                                                                              | 0.0                                                                               | 24.6                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 3.2                                                                               | 1.8                                                                               | 2.6                                                                               | 13.8                                                                              | 0.0                                                                               | 24.6                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.06                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 90                                                                                | 80                                                                                | 65                                                                                | 1599                                                                              | 0                                                                                 | 1431                                                                              |   |   |
| V/C Ratio(X)                 | 0.66                                                                              | 0.37                                                                              | 0.72                                                                              | 0.58                                                                              | 0.00                                                                              | 0.68                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 827                                                                               | 738                                                                               | 594                                                                               | 1599                                                                              | 0                                                                                 | 1431                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 46.1                                                                              | 45.4                                                                              | 47.1                                                                              | 2.0                                                                               | 0.0                                                                               | 5.2                                                                               |   |   |
| Incr Delay (d2), s/veh       | 7.9                                                                               | 2.9                                                                               | 14.0                                                                              | 1.5                                                                               | 0.0                                                                               | 2.6                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 1.8                                                                               | 1.7                                                                               | 1.5                                                                               | 7.6                                                                               | 0.0                                                                               | 13.2                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 54.0                                                                              | 48.3                                                                              | 61.2                                                                              | 3.5                                                                               | 0.0                                                                               | 7.8                                                                               |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | A                                                                                 |   |   |
| Approach Vol, veh/h          | 89                                                                                |                                                                                   |                                                                                   | 973                                                                               | 970                                                                               |                                                                                   |   |   |
| Approach Delay, s/veh        | 52.1                                                                              |                                                                                   |                                                                                   | 6.3                                                                               | 7.8                                                                               |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | A                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 9.5                                                                               | 8.1                                                                               | 81.3                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 15.8                                                                              |                                                                                   | 5.2                                                                               | 4.6                                                                               | 26.6                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 30.2                                                                              |                                                                                   | 0.3                                                                               | 0.1                                                                               | 15.0                                                                              |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 9.0                                                                               |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

N-T+Prj.

Synchro 9 Report  
Page 1

HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

PM Wkday N-T+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 2.3                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 49                                                                                | 115                                                                               | 808                                                                               | 14    | 41                                                                                | 821                                                                               |
| Future Vol, veh/h        | 49                                                                                | 115                                                                               | 808                                                                               | 14    | 41                                                                                | 821                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                | 53                                                                                | 125                                                                               | 878                                                                               | 15    | 45                                                                                | 892                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1868                                                                              | 886                                                                               | 0                                                                                 | 0     | 893                                                                               | 0                                                                                 |
| Stage 1                  | 886                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 982                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 80                                                                                | 343                                                                               | -                                                                                 | -     | 759                                                                               | -                                                                                 |
| Stage 1                  | 403                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 363                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   |                                                                                   |
| Mov Cap-1 Maneuver       | 75                                                                                | 343                                                                               | -                                                                                 | -     | 759                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 203                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 403                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 341                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 23.6                                                                              | 0                                                                                 | 0.5                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 203                                                                               | 343   | 759                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.262                                                                             | 0.364 | 0.059                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 28.9                                                                              | 21.4  | 10                                                                                | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 1                                                                                 | 1.6   | 0.2                                                                               | -                                                                                 |

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Synchro 9 Report  
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HCM 2010 TWSC  
3: SR-29 & Salvestrin

PM Wkday N-T+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.1                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Movement                 | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |
| Lane Configurations      |  |  |  |  |  |  |
| Traffic Vol, veh/h       | 4                                                                                 | 6                                                                                 | 2                                                                                 | 818                                                                               | 869                                                                               | 1                                                                                 |
| Future Vol, veh/h        | 4                                                                                 | 6                                                                                 | 2                                                                                 | 818                                                                               | 869                                                                               | 1                                                                                 |
| 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                                                                                 | 50                                                                                | 100                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| 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                                                                                 | 7                                                                                 | 2                                                                                 | 889                                                                               | 945                                                                               | 1                                                                                 |
| Major/Minor              | Minor2                                                                            | Major1                                                                            | Major2                                                                            |                                                                                   |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1838                                                                              | 945                                                                               | 946                                                                               | 0                                                                                 | -                                                                                 | 0                                                                                 |
| Stage 1                  | 945                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 893                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| 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       | 83                                                                                | 318                                                                               | 725                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 1                  | 378                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 400                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   |                                                                                   | -                                                                                 | -                                                                                 | -                                                                                 |
| Mov Cap-1 Maneuver       | 83                                                                                | 318                                                                               | 725                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| Mov Cap-2 Maneuver       | 215                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 1                  | 378                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 399                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Approach                 | EB                                                                                | NB                                                                                | SB                                                                                |                                                                                   |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 18.8                                                                              | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBL                                                                               | NBT                                                                               | EBLn1                                                                             | EBLn2                                                                             | SBT                                                                               | SBR                                                                               |
| Capacity (veh/h)         | 725                                                                               | -                                                                                 | 215                                                                               | 318                                                                               | -                                                                                 | -                                                                                 |
| HCM Lane V/C Ratio       | 0.003                                                                             | -                                                                                 | 0.02                                                                              | 0.021                                                                             | -                                                                                 | -                                                                                 |
| HCM Control Delay (s)    | 10                                                                                | -                                                                                 | 22.1                                                                              | 16.6                                                                              | -                                                                                 | -                                                                                 |
| HCM Lane LOS             | A                                                                                 | -                                                                                 | C                                                                                 | C                                                                                 | -                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | 0                                                                                 | -                                                                                 | 0.1                                                                               | 0.1                                                                               | -                                                                                 | -                                                                                 |

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HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

PM Wkday N-T+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.5                                                                               |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR  | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |      |  |  |
| Traffic Vol, veh/h       | 60                                                                                | 48                                                                                | 767                                                                               | 31   | 22                                                                                | 857                                                                               |
| Future Vol, veh/h        | 60                                                                                | 48                                                                                | 767                                                                               | 31   | 22                                                                                | 857                                                                               |
| 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                                                                                | -                                                                                 | -    | 200                                                                               | -                                                                                 |
| 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                | 65                                                                                | 52                                                                                | 834                                                                               | 34   | 24                                                                                | 932                                                                               |

| Major/Minor          | Minor1 | Major1 | Major2 |   |       |
|----------------------|--------|--------|--------|---|-------|
| Conflicting Flow All | 1830   | 851    | 0      | 0 | 867   |
| Stage 1              | 851    | -      | -      | - | -     |
| Stage 2              | 979    | -      | -      | - | -     |
| 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   | 84     | 360    | -      | - | 777   |
| Stage 1              | 419    | -      | -      | - | -     |
| Stage 2              | 364    | -      | -      | - | -     |
| Platoon blocked, %   |        |        | -      | - | -     |
| Mov Cap-1 Maneuver   | 81     | 360    | -      | - | 777   |
| Mov Cap-2 Maneuver   | 212    | -      | -      | - | -     |
| Stage 1              | 419    | -      | -      | - | -     |
| Stage 2              | 353    | -      | -      | - | -     |

| Approach             | WB   | NB | SB  |
|----------------------|------|----|-----|
| HCM Control Delay, s | 23.8 | 0  | 0.2 |
| HCM LOS              | C    |    |     |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | WBLn2 | SBL   | SBT   |
|-----------------------|-----|----------|-------|-------|-------|
| Capacity (veh/h)      | -   | -        | 212   | 360   | 777   |
| HCM Lane V/C Ratio    | -   | -        | 0.308 | 0.145 | 0.031 |
| HCM Control Delay (s) | -   | -        | 29.4  | 16.7  | 9.8   |
| HCM Lane LOS          | -   | -        | D     | C     | A     |
| HCM 95th %tile Q(veh) | -   | -        | 1.2   | 0.5   | 0.1   |

N-T+Prj.

Synchro 9 Report  
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HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

Weekend (Saturday) Mid-Day N-T+Prj.  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 18                                                                                | 36                                                                                | 58                                                                                | 816                                                                               | 920                                                                               | 22                                                                                |   |   |
| Future Volume (veh/h)        | 18                                                                                | 36                                                                                | 58                                                                                | 816                                                                               | 920                                                                               | 22                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 20                                                                                | 39                                                                                | 63                                                                                | 887                                                                               | 1000                                                                              | 24                                                                                |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 72                                                                                | 65                                                                                | 83                                                                                | 1615                                                                              | 1403                                                                              | 34                                                                                |   |   |
| Arrive On Green              | 0.04                                                                              | 0.04                                                                              | 0.05                                                                              | 0.87                                                                              | 0.77                                                                              | 0.77                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1812                                                                              | 43                                                                                |   |   |
| Grp Volume(v), veh/h         | 20                                                                                | 39                                                                                | 63                                                                                | 887                                                                               | 0                                                                                 | 1024                                                                              |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1855                                                                              |   |   |
| Q Serve(g_s), s              | 1.1                                                                               | 2.4                                                                               | 3.4                                                                               | 11.8                                                                              | 0.0                                                                               | 27.2                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 1.1                                                                               | 2.4                                                                               | 3.4                                                                               | 11.8                                                                              | 0.0                                                                               | 27.2                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.02                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 72                                                                                | 65                                                                                | 83                                                                                | 1615                                                                              | 0                                                                                 | 1437                                                                              |   |   |
| V/C Ratio(X)                 | 0.28                                                                              | 0.60                                                                              | 0.76                                                                              | 0.55                                                                              | 0.00                                                                              | 0.71                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 835                                                                               | 746                                                                               | 600                                                                               | 1615                                                                              | 0                                                                                 | 1437                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 45.5                                                                              | 46.2                                                                              | 46.1                                                                              | 1.6                                                                               | 0.0                                                                               | 5.6                                                                               |   |   |
| Incr Delay (d2), s/veh       | 2.0                                                                               | 8.7                                                                               | 13.3                                                                              | 1.3                                                                               | 0.0                                                                               | 3.0                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 0.6                                                                               | 2.2                                                                               | 2.0                                                                               | 6.3                                                                               | 0.0                                                                               | 14.9                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 47.6                                                                              | 54.9                                                                              | 59.4                                                                              | 3.0                                                                               | 0.0                                                                               | 8.6                                                                               |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | A                                                                                 |   |   |
| Approach Vol, veh/h          | 59                                                                                |                                                                                   |                                                                                   | 950                                                                               | 1024                                                                              |                                                                                   |   |   |
| Approach Delay, s/veh        | 52.4                                                                              |                                                                                   |                                                                                   | 6.7                                                                               | 8.6                                                                               |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | A                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 8.5                                                                               | 9.1                                                                               | 80.3                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 13.8                                                                              |                                                                                   | 4.4                                                                               | 5.4                                                                               | 29.2                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 31.2                                                                              |                                                                                   | 0.2                                                                               | 0.1                                                                               | 13.6                                                                              |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 9.0                                                                               |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

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Synchro 9 Report  
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HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

Weekend (Saturday) Mid-Day N-T+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.8                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 15                                                                                | 39                                                                                | 835                                                                               | 10    | 35                                                                                | 921                                                                               |
| Future Vol, veh/h        | 15                                                                                | 39                                                                                | 835                                                                               | 10    | 35                                                                                | 921                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                | 42                                                                                | 908                                                                               | 11    | 38                                                                                | 1001                                                                              |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1990                                                                              | 913                                                                               | 0                                                                                 | 0     | 918                                                                               | 0                                                                                 |
| Stage 1                  | 913                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 1077                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 67                                                                                | 331                                                                               | -                                                                                 | -     | 743                                                                               | -                                                                                 |
| Stage 1                  | 391                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 327                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 64                                                                                | 331                                                                               | -                                                                                 | -     | 743                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 187                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 391                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 310                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 19.9                                                                              | 0                                                                                 | 0.4                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 187                                                                               | 331   | 743                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.087                                                                             | 0.128 | 0.051                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 26.1                                                                              | 17.5  | 10.1                                                                              | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.3                                                                               | 0.4   | 0.2                                                                               | -                                                                                 |

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HCM 2010 TWSC  
3: SR-29 & Salvestrin

Weekend (Saturday) Mid-Day N-T+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.1                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Movement                 | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |
| Lane Configurations      |  |  |  |  |  |  |
| Traffic Vol, veh/h       | 4                                                                                 | 5                                                                                 | 5                                                                                 | 835                                                                               | 932                                                                               | 4                                                                                 |
| Future Vol, veh/h        | 4                                                                                 | 5                                                                                 | 5                                                                                 | 835                                                                               | 932                                                                               | 4                                                                                 |
| 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                                                                                 | 50                                                                                | 100                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| 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                                                                                 | 5                                                                                 | 5                                                                                 | 908                                                                               | 1013                                                                              | 4                                                                                 |
| Major/Minor              | Minor2                                                                            | Major1                                                                            | Major2                                                                            |                                                                                   |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1933                                                                              | 1015                                                                              | 1017                                                                              | 0                                                                                 | -                                                                                 | 0                                                                                 |
| Stage 1                  | 1015                                                                              | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 918                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| 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                                                                                | 289                                                                               | 682                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 1                  | 350                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 389                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   |                                                                                   | -                                                                                 | -                                                                                 | -                                                                                 |
| Mov Cap-1 Maneuver       | 72                                                                                | 289                                                                               | 682                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| Mov Cap-2 Maneuver       | 200                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 1                  | 350                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 386                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Approach                 | EB                                                                                | NB                                                                                | SB                                                                                |                                                                                   |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 20.2                                                                              | 0.1                                                                               | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBL                                                                               | NBT                                                                               | EBLn1                                                                             | EBLn2                                                                             | SBT                                                                               | SBR                                                                               |
| Capacity (veh/h)         | 682                                                                               | -                                                                                 | 200                                                                               | 289                                                                               | -                                                                                 | -                                                                                 |
| HCM Lane V/C Ratio       | 0.008                                                                             | -                                                                                 | 0.022                                                                             | 0.019                                                                             | -                                                                                 | -                                                                                 |
| HCM Control Delay (s)    | 10.3                                                                              | -                                                                                 | 23.4                                                                              | 17.7                                                                              | -                                                                                 | -                                                                                 |
| HCM Lane LOS             | B                                                                                 | -                                                                                 | C                                                                                 | C                                                                                 | -                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | 0                                                                                 | -                                                                                 | 0.1                                                                               | 0.1                                                                               | -                                                                                 | -                                                                                 |

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HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

Weekend (Saturday) Mid-Day N-T+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.8                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 28                                                                                | 29                                                                                | 812                                                                               | 23    | 28                                                                                | 909                                                                               |
| Future Vol, veh/h        | 28                                                                                | 29                                                                                | 812                                                                               | 23    | 28                                                                                | 909                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                | 30                                                                                | 32                                                                                | 883                                                                               | 25    | 30                                                                                | 988                                                                               |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 1944                                                                              | 895                                                                               | 0                                                                                 | 0     | 908                                                                               | 0                                                                                 |
| Stage 1                  | 895                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 1049                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 71                                                                                | 339                                                                               | -                                                                                 | -     | 750                                                                               | -                                                                                 |
| Stage 1                  | 399                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 337                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 68                                                                                | 339                                                                               | -                                                                                 | -     | 750                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 194                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 399                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 324                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 21.8                                                                              | 0                                                                                 | 0.3                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 194                                                                               | 339   | 750                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.157                                                                             | 0.093 | 0.041                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 27                                                                                | 16.7  | 10                                                                                | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.5                                                                               | 0.3   | 0.1                                                                               | -                                                                                 |

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HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

AM Wkday Yr. 2035 (NP)  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 99                                                                                | 68                                                                                | 50                                                                                | 1082                                                                              | 1035                                                                              | 97                                                                                |   |   |
| Future Volume (veh/h)        | 99                                                                                | 68                                                                                | 50                                                                                | 1082                                                                              | 1035                                                                              | 97                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 108                                                                               | 74                                                                                | 54                                                                                | 1176                                                                              | 1125                                                                              | 105                                                                               |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 149                                                                               | 133                                                                               | 71                                                                                | 1543                                                                              | 1250                                                                              | 117                                                                               |   |   |
| Arrive On Green              | 0.08                                                                              | 0.08                                                                              | 0.04                                                                              | 0.83                                                                              | 0.74                                                                              | 0.74                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1678                                                                              | 157                                                                               |   |   |
| Grp Volume(v), veh/h         | 108                                                                               | 74                                                                                | 54                                                                                | 1176                                                                              | 0                                                                                 | 1230                                                                              |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1835                                                                              |   |   |
| Q Serve(g_s), s              | 6.1                                                                               | 4.6                                                                               | 3.1                                                                               | 30.1                                                                              | 0.0                                                                               | 53.2                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 6.1                                                                               | 4.6                                                                               | 3.1                                                                               | 30.1                                                                              | 0.0                                                                               | 53.2                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.09                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 149                                                                               | 133                                                                               | 71                                                                                | 1543                                                                              | 0                                                                                 | 1366                                                                              |   |   |
| V/C Ratio(X)                 | 0.73                                                                              | 0.56                                                                              | 0.76                                                                              | 0.76                                                                              | 0.00                                                                              | 0.90                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 798                                                                               | 712                                                                               | 573                                                                               | 1543                                                                              | 0                                                                                 | 1366                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 45.8                                                                              | 45.1                                                                              | 48.7                                                                              | 4.1                                                                               | 0.0                                                                               | 10.1                                                                              |   |   |
| Incr Delay (d2), s/veh       | 6.6                                                                               | 3.6                                                                               | 15.5                                                                              | 3.6                                                                               | 0.0                                                                               | 9.8                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 3.3                                                                               | 4.2                                                                               | 1.8                                                                               | 16.6                                                                              | 0.0                                                                               | 30.0                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 52.4                                                                              | 48.8                                                                              | 64.3                                                                              | 7.7                                                                               | 0.0                                                                               | 19.9                                                                              |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | B                                                                                 |   |   |
| Approach Vol, veh/h          | 182                                                                               |                                                                                   |                                                                                   | 1230                                                                              | 1230                                                                              |                                                                                   |   |   |
| Approach Delay, s/veh        | 50.9                                                                              |                                                                                   |                                                                                   | 10.2                                                                              | 19.9                                                                              |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | B                                                                                 | B                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 13.1                                                                              | 8.6                                                                               | 80.8                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 32.1                                                                              |                                                                                   | 8.1                                                                               | 5.1                                                                               | 55.2                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 41.3                                                                              |                                                                                   | 0.6                                                                               | 0.1                                                                               | 0.0                                                                               |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 17.5                                                                              |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

AM Wkday Yr. 2035 (NP)  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.4                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 14                                                                                | 50                                                                                | 1107                                                                              | 38    | 102                                                                               | 975                                                                               |
| Future Vol, veh/h        | 14                                                                                | 50                                                                                | 1107                                                                              | 38    | 102                                                                               | 975                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                | 54                                                                                | 1203                                                                              | 41    | 111                                                                               | 1060                                                                              |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 2506                                                                              | 1224                                                                              | 0                                                                                 | 0     | 1245                                                                              | 0                                                                                 |
| Stage 1                  | 1224                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 1282                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 31                                                                                | 218                                                                               | -                                                                                 | -     | 559                                                                               | -                                                                                 |
| Stage 1                  | 278                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 260                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 25                                                                                | 218                                                                               | -                                                                                 | -     | 559                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 120                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 278                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 208                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 29.6                                                                              | 0                                                                                 | 1.2                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | D                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBR                                                                               | WBLn1                                                                             | WBLn2 | SBL                                                                               | SBT                                                                               |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 120                                                                               | 218   | 559                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.127                                                                             | 0.249 | 0.198                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 39.3                                                                              | 26.9  | 13                                                                                | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | E                                                                                 | D     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.4                                                                               | 1     | 0.7                                                                               | -                                                                                 |

HCM 2010 TWSC  
3: SR-29 & Salvestrin

AM Wkday Yr. 2035 (NP)  
05/03/2018

| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0      |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 1      | 1      | 1      | 1144  | 988  | 1    |
| Future Vol, veh/h        | 1      | 1      | 1      | 1144  | 988  | 1    |
| 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      | 50     | 100    | -     | -    | -    |
| 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                | 1      | 1      | 1      | 1243  | 1074 | 1    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 2320   | 1074   | 1075   | 0     | -    | 0    |
| Stage 1                  | 1074   | -      | -      | -     | -    | -    |
| Stage 2                  | 1246   | -      | -      | -     | -    | -    |
| 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     | 267    | 649    | -     | -    | -    |
| Stage 1                  | 328    | -      | -      | -     | -    | -    |
| Stage 2                  | 271    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 41     | 267    | 649    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 154    | -      | -      | -     | -    | -    |
| Stage 1                  | 328    | -      | -      | -     | -    | -    |
| Stage 2                  | 271    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     | SB     |       |      |      |
| HCM Control Delay, s     | 23.5   | 0      | 0      |       |      |      |
| HCM LOS                  | C      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 649    | -      | 154    | 267   | -    | -    |
| HCM Lane V/C Ratio       | 0.002  | -      | 0.007  | 0.004 | -    | -    |
| HCM Control Delay (s)    | 10.6   | -      | 28.5   | 18.5  | -    | -    |
| HCM Lane LOS             | B      | -      | D      | C     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0      | 0     | -    | -    |

HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

AM Wkday Yr. 2035 (NP)  
05/03/2018

| Intersection                                                                                                         |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh                                                                                                     | 1.4                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                                                                                                             | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations                                                                                                  |  |  |  |       |  |  |
| Traffic Vol, veh/h                                                                                                   | 39                                                                                | 37                                                                                | 1106                                                                              | 109   | 48                                                                                | 945                                                                               |
| Future Vol, veh/h                                                                                                    | 39                                                                                | 37                                                                                | 1106                                                                              | 109   | 48                                                                                | 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                | 40                                                                                | 1202                                                                              | 118   | 52                                                                                | 1027                                                                              |
| Major/Minor                                                                                                          | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All                                                                                                 | 2393                                                                              | 1261                                                                              | 0                                                                                 | 0     | 1321                                                                              | 0                                                                                 |
| Stage 1                                                                                                              | 1261                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 1132                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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                                                                              | 208                                                                               | -                                                                                 | -     | 523                                                                               | -                                                                                 |
| Stage 1                                                                                                              | 267                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 308                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %                                                                                                   |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   |                                                                                   |
| Mov Cap-1 Maneuver                                                                                                   | ~ 33                                                                              | 208                                                                               | -                                                                                 | -     | 523                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver                                                                                                   | 139                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                                                                                                              | 267                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 277                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                                                                                                             | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s                                                                                                 | 34.4                                                                              | 0                                                                                 | 0.6                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                                                                                                              | D                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt                                                                                                | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)                                                                                                     | -                                                                                 | -                                                                                 | 139                                                                               | 208   | 523                                                                               | -                                                                                 |
| HCM Lane V/C Ratio                                                                                                   | -                                                                                 | -                                                                                 | 0.305                                                                             | 0.193 | 0.1                                                                               | -                                                                                 |
| HCM Control Delay (s)                                                                                                | -                                                                                 | -                                                                                 | 41.9                                                                              | 26.4  | 12.6                                                                              | -                                                                                 |
| HCM Lane LOS                                                                                                         | -                                                                                 | -                                                                                 | E                                                                                 | D     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)                                                                                                | -                                                                                 | -                                                                                 | 1.2                                                                               | 0.7   | 0.3                                                                               | -                                                                                 |
| Notes                                                                                                                |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |

HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

PM Wkday Yr. 2035 (NP)  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 54                                                                                | 28                                                                                | 43                                                                                | 1076                                                                              | 1065                                                                              | 52                                                                                |   |   |
| Future Volume (veh/h)        | 54                                                                                | 28                                                                                | 43                                                                                | 1076                                                                              | 1065                                                                              | 52                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 59                                                                                | 30                                                                                | 47                                                                                | 1170                                                                              | 1158                                                                              | 57                                                                                |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 90                                                                                | 80                                                                                | 65                                                                                | 1599                                                                              | 1367                                                                              | 67                                                                                |   |   |
| Arrive On Green              | 0.05                                                                              | 0.05                                                                              | 0.04                                                                              | 0.86                                                                              | 0.78                                                                              | 0.78                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1761                                                                              | 87                                                                                |   |   |
| Grp Volume(v), veh/h         | 59                                                                                | 30                                                                                | 47                                                                                | 1170                                                                              | 0                                                                                 | 1215                                                                              |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1847                                                                              |   |   |
| Q Serve(g_s), s              | 3.2                                                                               | 1.8                                                                               | 2.6                                                                               | 23.7                                                                              | 0.0                                                                               | 42.5                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 3.2                                                                               | 1.8                                                                               | 2.6                                                                               | 23.7                                                                              | 0.0                                                                               | 42.5                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.05                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 90                                                                                | 80                                                                                | 65                                                                                | 1599                                                                              | 0                                                                                 | 1434                                                                              |   |   |
| V/C Ratio(X)                 | 0.66                                                                              | 0.37                                                                              | 0.72                                                                              | 0.73                                                                              | 0.00                                                                              | 0.85                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 827                                                                               | 738                                                                               | 594                                                                               | 1599                                                                              | 0                                                                                 | 1434                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 46.1                                                                              | 45.4                                                                              | 47.1                                                                              | 2.7                                                                               | 0.0                                                                               | 7.2                                                                               |   |   |
| Incr Delay (d2), s/veh       | 7.9                                                                               | 2.9                                                                               | 14.0                                                                              | 3.0                                                                               | 0.0                                                                               | 6.4                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 1.8                                                                               | 1.7                                                                               | 1.5                                                                               | 13.0                                                                              | 0.0                                                                               | 23.5                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 54.0                                                                              | 48.3                                                                              | 61.2                                                                              | 5.7                                                                               | 0.0                                                                               | 13.6                                                                              |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | B                                                                                 |   |   |
| Approach Vol, veh/h          | 89                                                                                |                                                                                   |                                                                                   | 1217                                                                              | 1215                                                                              |                                                                                   |   |   |
| Approach Delay, s/veh        | 52.1                                                                              |                                                                                   |                                                                                   | 7.8                                                                               | 13.6                                                                              |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | B                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 9.5                                                                               | 8.1                                                                               | 81.3                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 25.7                                                                              |                                                                                   | 5.2                                                                               | 4.6                                                                               | 44.5                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 44.5                                                                              |                                                                                   | 0.3                                                                               | 0.1                                                                               | 2.7                                                                               |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 12.2                                                                              |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

PM Wkday Yr. 2035 (NP)  
05/03/2018

| Intersection                                                                                                         |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh                                                                                                     | 2.8                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                                                                                                             | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations                                                                                                  |  |  |  |       |  |  |
| Traffic Vol, veh/h                                                                                                   | 49                                                                                | 115                                                                               | 1032                                                                              | 14    | 41                                                                                | 1046                                                                              |
| Future Vol, veh/h                                                                                                    | 49                                                                                | 115                                                                               | 1032                                                                              | 14    | 41                                                                                | 1046                                                                              |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                                            | 53                                                                                | 125                                                                               | 1122                                                                              | 15    | 45                                                                                | 1137                                                                              |
| Major/Minor                                                                                                          | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All                                                                                                 | 2355                                                                              | 1129                                                                              | 0                                                                                 | 0     | 1137                                                                              | 0                                                                                 |
| Stage 1                                                                                                              | 1129                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 1226                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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                                                                                                   | ~ 39                                                                              | 248                                                                               | -                                                                                 | -     | 614                                                                               | -                                                                                 |
| Stage 1                                                                                                              | 309                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 277                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %                                                                                                   |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver                                                                                                   | ~ 36                                                                              | 248                                                                               | -                                                                                 | -     | 614                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver                                                                                                   | 144                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                                                                                                              | 309                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 257                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                                                                                                             | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s                                                                                                 | 36.6                                                                              | 0                                                                                 | 0.4                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                                                                                                              | E                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt                                                                                                | NBT                                                                               | NBR                                                                               | WBLn1                                                                             | WBLn2 | SBL                                                                               | SBT                                                                               |
| Capacity (veh/h)                                                                                                     | -                                                                                 | -                                                                                 | 144                                                                               | 248   | 614                                                                               | -                                                                                 |
| HCM Lane V/C Ratio                                                                                                   | -                                                                                 | -                                                                                 | 0.37                                                                              | 0.504 | 0.073                                                                             | -                                                                                 |
| HCM Control Delay (s)                                                                                                | -                                                                                 | -                                                                                 | 44                                                                                | 33.4  | 11.3                                                                              | -                                                                                 |
| HCM Lane LOS                                                                                                         | -                                                                                 | -                                                                                 | E                                                                                 | D     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)                                                                                                | -                                                                                 | -                                                                                 | 1.5                                                                               | 2.6   | 0.2                                                                               | -                                                                                 |
| Notes                                                                                                                |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |

HCM 2010 TWSC  
3: SR-29 & Salvestrin

PM Wkday Yr. 2035 (NP)  
05/03/2018

| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0      |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 2      | 1      | 0      | 1044  | 1094 | 1    |
| Future Vol, veh/h        | 2      | 1      | 0      | 1044  | 1094 | 1    |
| 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      | 50     | 100    | -     | -    | -    |
| 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                | 2      | 1      | 0      | 1135  | 1189 | 1    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 2325   | 1190   | 1190   | 0     | -    | 0    |
| Stage 1                  | 1190   | -      | -      | -     | -    | -    |
| Stage 2                  | 1135   | -      | -      | -     | -    | -    |
| 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     | 229    | 587    | -     | -    | -    |
| Stage 1                  | 289    | -      | -      | -     | -    | -    |
| Stage 2                  | 307    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 41     | 229    | 587    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 155    | -      | -      | -     | -    | -    |
| Stage 1                  | 289    | -      | -      | -     | -    | -    |
| Stage 2                  | 307    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     | SB     |       |      |      |
| HCM Control Delay, s     | 26     | 0      | 0      |       |      |      |
| HCM LOS                  | D      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 587    | -      | 155    | 229   | -    | -    |
| HCM Lane V/C Ratio       | -      | -      | 0.014  | 0.005 | -    | -    |
| HCM Control Delay (s)    | 0      | -      | 28.6   | 20.8  | -    | -    |
| HCM Lane LOS             | A      | -      | D      | C     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0      | 0     | -    | -    |

HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

PM Wkday Yr. 2035 (NP)  
05/03/2018

| Intersection                                                                                                         |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh                                                                                                     | 1.8                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                                                                                                             | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations                                                                                                  |  |  |  |       |  |  |
| Traffic Vol, veh/h                                                                                                   | 60                                                                                | 48                                                                                | 993                                                                               | 31    | 22                                                                                | 1077                                                                              |
| Future Vol, veh/h                                                                                                    | 60                                                                                | 48                                                                                | 993                                                                               | 31    | 22                                                                                | 1077                                                                              |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                                            | 65                                                                                | 52                                                                                | 1079                                                                              | 34    | 24                                                                                | 1171                                                                              |
| Major/Minor                                                                                                          | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All                                                                                                 | 2314                                                                              | 1096                                                                              | 0                                                                                 | 0     | 1113                                                                              | 0                                                                                 |
| Stage 1                                                                                                              | 1096                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 1218                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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                                                                                                   | ~ 42                                                                              | 259                                                                               | -                                                                                 | -     | 627                                                                               | -                                                                                 |
| Stage 1                                                                                                              | 320                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 280                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %                                                                                                   |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver                                                                                                   | ~ 40                                                                              | 259                                                                               | -                                                                                 | -     | 627                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver                                                                                                   | 151                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                                                                                                              | 320                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 269                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                                                                                                             | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s                                                                                                 | 35.4                                                                              | 0                                                                                 | 0.2                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                                                                                                              | E                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt                                                                                                | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)                                                                                                     | -                                                                                 | -                                                                                 | 151                                                                               | 259   | 627                                                                               | -                                                                                 |
| HCM Lane V/C Ratio                                                                                                   | -                                                                                 | -                                                                                 | 0.432                                                                             | 0.201 | 0.038                                                                             | -                                                                                 |
| HCM Control Delay (s)                                                                                                | -                                                                                 | -                                                                                 | 45.8                                                                              | 22.4  | 11                                                                                | -                                                                                 |
| HCM Lane LOS                                                                                                         | -                                                                                 | -                                                                                 | E                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)                                                                                                | -                                                                                 | -                                                                                 | 1.9                                                                               | 0.7   | 0.1                                                                               | -                                                                                 |
| Notes                                                                                                                |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |

HCM 2010 Signalized Intersection Summary    Weekend (Saturday) Mid-Day Yr. 2035 (NP)  
 1: SR-29 & Grayson Ave. 05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 18                                                                                | 36                                                                                | 58                                                                                | 974                                                                               | 1099                                                                              | 22                                                                                |   |   |
| Future Volume (veh/h)        | 18                                                                                | 36                                                                                | 58                                                                                | 974                                                                               | 1099                                                                              | 22                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 20                                                                                | 39                                                                                | 63                                                                                | 1059                                                                              | 1195                                                                              | 24                                                                                |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 72                                                                                | 65                                                                                | 83                                                                                | 1615                                                                              | 1410                                                                              | 28                                                                                |   |   |
| Arrive On Green              | 0.04                                                                              | 0.04                                                                              | 0.05                                                                              | 0.87                                                                              | 0.77                                                                              | 0.77                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1820                                                                              | 37                                                                                |   |   |
| Grp Volume(v), veh/h         | 20                                                                                | 39                                                                                | 63                                                                                | 1059                                                                              | 0                                                                                 | 1219                                                                              |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1856                                                                              |   |   |
| Q Serve(g_s), s              | 1.1                                                                               | 2.4                                                                               | 3.4                                                                               | 17.1                                                                              | 0.0                                                                               | 42.2                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 1.1                                                                               | 2.4                                                                               | 3.4                                                                               | 17.1                                                                              | 0.0                                                                               | 42.2                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.02                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 72                                                                                | 65                                                                                | 83                                                                                | 1615                                                                              | 0                                                                                 | 1438                                                                              |   |   |
| V/C Ratio(X)                 | 0.28                                                                              | 0.60                                                                              | 0.76                                                                              | 0.66                                                                              | 0.00                                                                              | 0.85                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 835                                                                               | 746                                                                               | 600                                                                               | 1615                                                                              | 0                                                                                 | 1438                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 45.5                                                                              | 46.2                                                                              | 46.1                                                                              | 2.0                                                                               | 0.0                                                                               | 7.2                                                                               |   |   |
| Incr Delay (d2), s/veh       | 2.0                                                                               | 8.7                                                                               | 13.3                                                                              | 2.1                                                                               | 0.0                                                                               | 6.4                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 0.6                                                                               | 2.2                                                                               | 2.0                                                                               | 9.2                                                                               | 0.0                                                                               | 23.5                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 47.6                                                                              | 54.9                                                                              | 59.4                                                                              | 4.1                                                                               | 0.0                                                                               | 13.6                                                                              |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | B                                                                                 |   |   |
| Approach Vol, veh/h          | 59                                                                                |                                                                                   |                                                                                   | 1122                                                                              | 1219                                                                              |                                                                                   |   |   |
| Approach Delay, s/veh        | 52.4                                                                              |                                                                                   |                                                                                   | 7.2                                                                               | 13.6                                                                              |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | B                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 8.5                                                                               | 9.1                                                                               | 80.3                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 19.1                                                                              |                                                                                   | 4.4                                                                               | 5.4                                                                               | 44.2                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 44.3                                                                              |                                                                                   | 0.2                                                                               | 0.1                                                                               | 3.0                                                                               |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 11.6                                                                              |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

Weekend (Saturday) Mid-Day Yr. 2035 (NP)  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.8                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 15                                                                                | 39                                                                                | 997                                                                               | 10    | 35                                                                                | 1100                                                                              |
| Future Vol, veh/h        | 15                                                                                | 39                                                                                | 997                                                                               | 10    | 35                                                                                | 1100                                                                              |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                | 42                                                                                | 1084                                                                              | 11    | 38                                                                                | 1196                                                                              |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 2361                                                                              | 1089                                                                              | 0                                                                                 | 0     | 1095                                                                              | 0                                                                                 |
| Stage 1                  | 1089                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 1272                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 39                                                                                | 262                                                                               | -                                                                                 | -     | 637                                                                               | -                                                                                 |
| Stage 1                  | 323                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 263                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 37                                                                                | 262                                                                               | -                                                                                 | -     | 637                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 144                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 323                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 247                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 24.7                                                                              | 0                                                                                 | 0.3                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 144                                                                               | 262   | 637                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.113                                                                             | 0.162 | 0.06                                                                              | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 33.2                                                                              | 21.4  | 11                                                                                | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.4                                                                               | 0.6   | 0.2                                                                               | -                                                                                 |

HCM 2010 TWSC  
3: SR-29 & Salvestrin

Weekend (Saturday) Mid-Day Yr. 2035 (NP)  
05/03/2018

| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0.1    |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 6      | 0      | 1      | 1002  | 1118 | 0    |
| Future Vol, veh/h        | 6      | 0      | 1      | 1002  | 1118 | 0    |
| 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      | 50     | 100    | -     | -    | -    |
| 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      | 0      | 1      | 1089  | 1215 | 0    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 2306   | 1215   | 1215   | 0     | -    | 0    |
| Stage 1                  | 1215   | -      | -      | -     | -    | -    |
| Stage 2                  | 1091   | -      | -      | -     | -    | -    |
| 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       | 42     | 221    | 574    | -     | -    | -    |
| Stage 1                  | 281    | -      | -      | -     | -    | -    |
| Stage 2                  | 322    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 42     | 221    | 574    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 156    | -      | -      | -     | -    | -    |
| Stage 1                  | 281    | -      | -      | -     | -    | -    |
| Stage 2                  | 321    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     | SB     |       |      |      |
| HCM Control Delay, s     | 29.1   | 0      | 0      |       |      |      |
| HCM LOS                  | D      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 574    | -      | 156    | -     | -    | -    |
| HCM Lane V/C Ratio       | 0.002  | -      | 0.042  | -     | -    | -    |
| HCM Control Delay (s)    | 11.3   | -      | 29.1   | 0     | -    | -    |
| HCM Lane LOS             | B      | -      | D      | A     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0.1    | -     | -    | -    |

HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

Weekend (Saturday) Mid-Day Yr. 2035 (NP)  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.9                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 28                                                                                | 29                                                                                | 965                                                                               | 23    | 28                                                                                | 1081                                                                              |
| Future Vol, veh/h        | 28                                                                                | 29                                                                                | 965                                                                               | 23    | 28                                                                                | 1081                                                                              |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                | 30                                                                                | 32                                                                                | 1049                                                                              | 25    | 30                                                                                | 1175                                                                              |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 2297                                                                              | 1061                                                                              | 0                                                                                 | 0     | 1074                                                                              | 0                                                                                 |
| Stage 1                  | 1061                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 1236                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 43                                                                                | 272                                                                               | -                                                                                 | -     | 649                                                                               | -                                                                                 |
| Stage 1                  | 333                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 274                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 41                                                                                | 272                                                                               | -                                                                                 | -     | 649                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 152                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 333                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 261                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 27.1                                                                              | 0                                                                                 | 0.3                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | D                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 152                                                                               | 272   | 649                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.2                                                                               | 0.116 | 0.047                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 34.5                                                                              | 20    | 10.8                                                                              | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.7                                                                               | 0.4   | 0.1                                                                               | -                                                                                 |

Yr. 2035 (NP)

Synchro 9 Report  
Page 4

HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

AM Wkday Yr. 2035+Prj.  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 99                                                                                | 68                                                                                | 50                                                                                | 1083                                                                              | 1037                                                                              | 97                                                                                |   |   |
| Future Volume (veh/h)        | 99                                                                                | 68                                                                                | 50                                                                                | 1083                                                                              | 1037                                                                              | 97                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 108                                                                               | 74                                                                                | 54                                                                                | 1177                                                                              | 1127                                                                              | 105                                                                               |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 149                                                                               | 133                                                                               | 71                                                                                | 1543                                                                              | 1250                                                                              | 116                                                                               |   |   |
| Arrive On Green              | 0.08                                                                              | 0.08                                                                              | 0.04                                                                              | 0.83                                                                              | 0.74                                                                              | 0.74                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1679                                                                              | 156                                                                               |   |   |
| Grp Volume(v), veh/h         | 108                                                                               | 74                                                                                | 54                                                                                | 1177                                                                              | 0                                                                                 | 1232                                                                              |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1835                                                                              |   |   |
| Q Serve(g_s), s              | 6.1                                                                               | 4.6                                                                               | 3.1                                                                               | 30.2                                                                              | 0.0                                                                               | 53.5                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 6.1                                                                               | 4.6                                                                               | 3.1                                                                               | 30.2                                                                              | 0.0                                                                               | 53.5                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.09                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 149                                                                               | 133                                                                               | 71                                                                                | 1543                                                                              | 0                                                                                 | 1366                                                                              |   |   |
| V/C Ratio(X)                 | 0.73                                                                              | 0.56                                                                              | 0.76                                                                              | 0.76                                                                              | 0.00                                                                              | 0.90                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 798                                                                               | 712                                                                               | 573                                                                               | 1543                                                                              | 0                                                                                 | 1366                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 45.8                                                                              | 45.1                                                                              | 48.7                                                                              | 4.1                                                                               | 0.0                                                                               | 10.2                                                                              |   |   |
| Incr Delay (d2), s/veh       | 6.6                                                                               | 3.6                                                                               | 15.5                                                                              | 3.6                                                                               | 0.0                                                                               | 9.9                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 3.3                                                                               | 4.2                                                                               | 1.8                                                                               | 16.6                                                                              | 0.0                                                                               | 30.1                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 52.4                                                                              | 48.8                                                                              | 64.3                                                                              | 7.7                                                                               | 0.0                                                                               | 20.0                                                                              |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | C                                                                                 |   |   |
| Approach Vol, veh/h          | 182                                                                               |                                                                                   |                                                                                   | 1231                                                                              | 1232                                                                              |                                                                                   |   |   |
| Approach Delay, s/veh        | 50.9                                                                              |                                                                                   |                                                                                   | 10.2                                                                              | 20.0                                                                              |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | B                                                                                 | C                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 13.1                                                                              | 8.6                                                                               | 80.8                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 32.2                                                                              |                                                                                   | 8.1                                                                               | 5.1                                                                               | 55.5                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 41.4                                                                              |                                                                                   | 0.6                                                                               | 0.1                                                                               | 0.0                                                                               |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 17.6                                                                              |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

AM Wkday Yr. 2035+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 1.4                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 14                                                                                | 50                                                                                | 1108                                                                              | 38    | 102                                                                               | 977                                                                               |
| Future Vol, veh/h        | 14                                                                                | 50                                                                                | 1108                                                                              | 38    | 102                                                                               | 977                                                                               |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                | 54                                                                                | 1204                                                                              | 41    | 111                                                                               | 1062                                                                              |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 2509                                                                              | 1225                                                                              | 0                                                                                 | 0     | 1246                                                                              | 0                                                                                 |
| Stage 1                  | 1225                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 1284                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 31                                                                                | 218                                                                               | -                                                                                 | -     | 559                                                                               | -                                                                                 |
| Stage 1                  | 278                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 260                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 25                                                                                | 218                                                                               | -                                                                                 | -     | 559                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 120                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 278                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 208                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 29.6                                                                              | 0                                                                                 | 1.2                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | D                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBR                                                                               | WBLn1                                                                             | WBLn2 | SBL                                                                               | SBT                                                                               |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 120                                                                               | 218   | 559                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.127                                                                             | 0.249 | 0.198                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 39.3                                                                              | 26.9  | 13                                                                                | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | E                                                                                 | D     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.4                                                                               | 1     | 0.7                                                                               | -                                                                                 |

HCM 2010 TWSC  
3: SR-29 & Salvestrin

AM Wkday Yr. 2035+Prj.  
05/03/2018

| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0      |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 1      | 0      | 1      | 1144  | 988  | 2    |
| Future Vol, veh/h        | 1      | 0      | 1      | 1144  | 988  | 2    |
| 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      | 50     | 100    | -     | -    | -    |
| 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                | 1      | 0      | 1      | 1243  | 1074 | 2    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 2321   | 1075   | 1076   | 0     | -    | 0    |
| Stage 1                  | 1075   | -      | -      | -     | -    | -    |
| Stage 2                  | 1246   | -      | -      | -     | -    | -    |
| 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     | 267    | 648    | -     | -    | -    |
| Stage 1                  | 328    | -      | -      | -     | -    | -    |
| Stage 2                  | 271    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 41     | 267    | 648    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 154    | -      | -      | -     | -    | -    |
| Stage 1                  | 328    | -      | -      | -     | -    | -    |
| Stage 2                  | 271    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     | SB     |       |      |      |
| HCM Control Delay, s     | 28.5   | 0      | 0      |       |      |      |
| HCM LOS                  | D      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 648    | -      | 154    | -     | -    | -    |
| HCM Lane V/C Ratio       | 0.002  | -      | 0.007  | -     | -    | -    |
| HCM Control Delay (s)    | 10.6   | -      | 28.5   | 0     | -    | -    |
| HCM Lane LOS             | B      | -      | D      | A     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0      | -     | -    | -    |

HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

AM Wkday Yr. 2035+Prj.  
05/03/2018

| Intersection                                                                                                         |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh                                                                                                     | 1.4                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                                                                                                             | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations                                                                                                  |  |  |  |       |  |  |
| Traffic Vol, veh/h                                                                                                   | 39                                                                                | 37                                                                                | 1107                                                                              | 109   | 48                                                                                | 945                                                                               |
| Future Vol, veh/h                                                                                                    | 39                                                                                | 37                                                                                | 1107                                                                              | 109   | 48                                                                                | 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                | 40                                                                                | 1203                                                                              | 118   | 52                                                                                | 1027                                                                              |
| Major/Minor                                                                                                          | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All                                                                                                 | 2395                                                                              | 1263                                                                              | 0                                                                                 | 0     | 1322                                                                              | 0                                                                                 |
| Stage 1                                                                                                              | 1263                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 1132                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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                                                                              | 207                                                                               | -                                                                                 | -     | 523                                                                               | -                                                                                 |
| Stage 1                                                                                                              | 266                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 308                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %                                                                                                   |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   |                                                                                   |
| Mov Cap-1 Maneuver                                                                                                   | ~ 33                                                                              | 207                                                                               | -                                                                                 | -     | 523                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver                                                                                                   | 139                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                                                                                                              | 266                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 277                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                                                                                                             | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s                                                                                                 | 34.4                                                                              | 0                                                                                 | 0.6                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                                                                                                              | D                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt                                                                                                | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)                                                                                                     | -                                                                                 | -                                                                                 | 139                                                                               | 207   | 523                                                                               | -                                                                                 |
| HCM Lane V/C Ratio                                                                                                   | -                                                                                 | -                                                                                 | 0.305                                                                             | 0.194 | 0.1                                                                               | -                                                                                 |
| HCM Control Delay (s)                                                                                                | -                                                                                 | -                                                                                 | 41.9                                                                              | 26.5  | 12.6                                                                              | -                                                                                 |
| HCM Lane LOS                                                                                                         | -                                                                                 | -                                                                                 | E                                                                                 | D     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)                                                                                                | -                                                                                 | -                                                                                 | 1.2                                                                               | 0.7   | 0.3                                                                               | -                                                                                 |
| Notes                                                                                                                |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |

HCM 2010 Signalized Intersection Summary  
1: SR-29 & Grayson Ave.

PM Wkday Yr. 2035+Prj.  
05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 54                                                                                | 28                                                                                | 43                                                                                | 1080                                                                              | 1066                                                                              | 52                                                                                |   |   |
| Future Volume (veh/h)        | 54                                                                                | 28                                                                                | 43                                                                                | 1080                                                                              | 1066                                                                              | 52                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 59                                                                                | 30                                                                                | 47                                                                                | 1174                                                                              | 1159                                                                              | 57                                                                                |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 90                                                                                | 80                                                                                | 65                                                                                | 1599                                                                              | 1367                                                                              | 67                                                                                |   |   |
| Arrive On Green              | 0.05                                                                              | 0.05                                                                              | 0.04                                                                              | 0.86                                                                              | 0.78                                                                              | 0.78                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1761                                                                              | 87                                                                                |   |   |
| Grp Volume(v), veh/h         | 59                                                                                | 30                                                                                | 47                                                                                | 1174                                                                              | 0                                                                                 | 1216                                                                              |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1847                                                                              |   |   |
| Q Serve(g_s), s              | 3.2                                                                               | 1.8                                                                               | 2.6                                                                               | 23.9                                                                              | 0.0                                                                               | 42.6                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 3.2                                                                               | 1.8                                                                               | 2.6                                                                               | 23.9                                                                              | 0.0                                                                               | 42.6                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.05                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 90                                                                                | 80                                                                                | 65                                                                                | 1599                                                                              | 0                                                                                 | 1434                                                                              |   |   |
| V/C Ratio(X)                 | 0.66                                                                              | 0.37                                                                              | 0.72                                                                              | 0.73                                                                              | 0.00                                                                              | 0.85                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 827                                                                               | 738                                                                               | 594                                                                               | 1599                                                                              | 0                                                                                 | 1434                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 46.1                                                                              | 45.4                                                                              | 47.1                                                                              | 2.7                                                                               | 0.0                                                                               | 7.2                                                                               |   |   |
| Incr Delay (d2), s/veh       | 7.9                                                                               | 2.9                                                                               | 14.0                                                                              | 3.0                                                                               | 0.0                                                                               | 6.4                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 1.8                                                                               | 1.7                                                                               | 1.5                                                                               | 13.1                                                                              | 0.0                                                                               | 23.8                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 54.0                                                                              | 48.3                                                                              | 61.2                                                                              | 5.7                                                                               | 0.0                                                                               | 13.6                                                                              |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | B                                                                                 |   |   |
| Approach Vol, veh/h          | 89                                                                                |                                                                                   |                                                                                   | 1221                                                                              | 1216                                                                              |                                                                                   |   |   |
| Approach Delay, s/veh        | 52.1                                                                              |                                                                                   |                                                                                   | 7.8                                                                               | 13.6                                                                              |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | B                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 9.5                                                                               | 8.1                                                                               | 81.3                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 25.9                                                                              |                                                                                   | 5.2                                                                               | 4.6                                                                               | 44.6                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 44.5                                                                              |                                                                                   | 0.3                                                                               | 0.1                                                                               | 2.6                                                                               |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 12.2                                                                              |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

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HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

PM Wkday Yr. 2035+Prj.  
05/03/2018

| Intersection                                                                                                         |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh                                                                                                     | 2.8                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                                                                                                             | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations                                                                                                  |  |  |  |       |  |  |
| Traffic Vol, veh/h                                                                                                   | 49                                                                                | 115                                                                               | 1036                                                                              | 14    | 41                                                                                | 1047                                                                              |
| Future Vol, veh/h                                                                                                    | 49                                                                                | 115                                                                               | 1036                                                                              | 14    | 41                                                                                | 1047                                                                              |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                                            | 53                                                                                | 125                                                                               | 1126                                                                              | 15    | 45                                                                                | 1138                                                                              |
| Major/Minor                                                                                                          | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All                                                                                                 | 2361                                                                              | 1134                                                                              | 0                                                                                 | 0     | 1141                                                                              | 0                                                                                 |
| Stage 1                                                                                                              | 1134                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 1227                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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                                                                                                   | ~ 39                                                                              | 247                                                                               | -                                                                                 | -     | 612                                                                               | -                                                                                 |
| Stage 1                                                                                                              | 307                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 277                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %                                                                                                   |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver                                                                                                   | ~ 36                                                                              | 247                                                                               | -                                                                                 | -     | 612                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver                                                                                                   | 144                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                                                                                                              | 307                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 257                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                                                                                                             | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s                                                                                                 | 36.7                                                                              | 0                                                                                 | 0.4                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                                                                                                              | E                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt                                                                                                | NBT                                                                               | NBR                                                                               | WBLn1                                                                             | WBLn2 | SBL                                                                               | SBT                                                                               |
| Capacity (veh/h)                                                                                                     | -                                                                                 | -                                                                                 | 144                                                                               | 247   | 612                                                                               | -                                                                                 |
| HCM Lane V/C Ratio                                                                                                   | -                                                                                 | -                                                                                 | 0.37                                                                              | 0.506 | 0.073                                                                             | -                                                                                 |
| HCM Control Delay (s)                                                                                                | -                                                                                 | -                                                                                 | 44                                                                                | 33.6  | 11.3                                                                              | -                                                                                 |
| HCM Lane LOS                                                                                                         | -                                                                                 | -                                                                                 | E                                                                                 | D     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)                                                                                                | -                                                                                 | -                                                                                 | 1.5                                                                               | 2.6   | 0.2                                                                               | -                                                                                 |
| Notes                                                                                                                |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |

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HCM 2010 TWSC  
3: SR-29 & Salvestrin

PM Wkday Yr. 2035+Prj.  
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| Intersection             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.1                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Movement                 | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |
| Lane Configurations      |  |  |  |  |  |  |
| Traffic Vol, veh/h       | 4                                                                                 | 6                                                                                 | 2                                                                                 | 1044                                                                              | 1094                                                                              | 1                                                                                 |
| Future Vol, veh/h        | 4                                                                                 | 6                                                                                 | 2                                                                                 | 1044                                                                              | 1094                                                                              | 1                                                                                 |
| 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                                                                                 | 50                                                                                | 100                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| 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                                                                                 | 7                                                                                 | 2                                                                                 | 1135                                                                              | 1189                                                                              | 1                                                                                 |
| Major/Minor              | Minor2                                                                            | Major1                                                                            | Major2                                                                            |                                                                                   |                                                                                   |                                                                                   |
| Conflicting Flow All     | 2329                                                                              | 1190                                                                              | 1190                                                                              | 0                                                                                 | -                                                                                 | 0                                                                                 |
| Stage 1                  | 1190                                                                              | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 1139                                                                              | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| 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                                                                                | 229                                                                               | 587                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 1                  | 289                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 305                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   |                                                                                   | -                                                                                 | -                                                                                 | -                                                                                 |
| Mov Cap-1 Maneuver       | 41                                                                                | 229                                                                               | 587                                                                               | -                                                                                 | -                                                                                 | -                                                                                 |
| Mov Cap-2 Maneuver       | 154                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 1                  | 289                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Stage 2                  | 304                                                                               | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                 |
| Approach                 | EB                                                                                | NB                                                                                | SB                                                                                |                                                                                   |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 24.4                                                                              | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBL                                                                               | NBT                                                                               | EBLn1                                                                             | EBLn2                                                                             | SBT                                                                               | SBR                                                                               |
| Capacity (veh/h)         | 587                                                                               | -                                                                                 | 154                                                                               | 229                                                                               | -                                                                                 | -                                                                                 |
| HCM Lane V/C Ratio       | 0.004                                                                             | -                                                                                 | 0.028                                                                             | 0.028                                                                             | -                                                                                 | -                                                                                 |
| HCM Control Delay (s)    | 11.2                                                                              | -                                                                                 | 29.1                                                                              | 21.2                                                                              | -                                                                                 | -                                                                                 |
| HCM Lane LOS             | B                                                                                 | -                                                                                 | D                                                                                 | C                                                                                 | -                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | 0                                                                                 | -                                                                                 | 0.1                                                                               | 0.1                                                                               | -                                                                                 | -                                                                                 |

HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

PM Wkday Yr. 2035+Prj.  
05/03/2018

| Intersection                                                                                                         |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh                                                                                                     | 1.8                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                                                                                                             | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations                                                                                                  |  |  |  |       |  |  |
| Traffic Vol, veh/h                                                                                                   | 60                                                                                | 48                                                                                | 995                                                                               | 31    | 22                                                                                | 1083                                                                              |
| Future Vol, veh/h                                                                                                    | 60                                                                                | 48                                                                                | 995                                                                               | 31    | 22                                                                                | 1083                                                                              |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                                            | 65                                                                                | 52                                                                                | 1082                                                                              | 34    | 24                                                                                | 1177                                                                              |
| Major/Minor                                                                                                          | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All                                                                                                 | 2323                                                                              | 1098                                                                              | 0                                                                                 | 0     | 1115                                                                              | 0                                                                                 |
| Stage 1                                                                                                              | 1098                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 1225                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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                                                                              | 259                                                                               | -                                                                                 | -     | 626                                                                               | -                                                                                 |
| Stage 1                                                                                                              | 319                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 278                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %                                                                                                   |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver                                                                                                   | ~ 39                                                                              | 259                                                                               | -                                                                                 | -     | 626                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver                                                                                                   | 150                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                                                                                                              | 319                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                                                                                                              | 267                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                                                                                                             | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s                                                                                                 | 35.7                                                                              | 0                                                                                 | 0.2                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                                                                                                              | E                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt                                                                                                | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)                                                                                                     | -                                                                                 | -                                                                                 | 150                                                                               | 259   | 626                                                                               | -                                                                                 |
| HCM Lane V/C Ratio                                                                                                   | -                                                                                 | -                                                                                 | 0.435                                                                             | 0.201 | 0.038                                                                             | -                                                                                 |
| HCM Control Delay (s)                                                                                                | -                                                                                 | -                                                                                 | 46.3                                                                              | 22.4  | 11                                                                                | -                                                                                 |
| HCM Lane LOS                                                                                                         | -                                                                                 | -                                                                                 | E                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)                                                                                                | -                                                                                 | -                                                                                 | 1.9                                                                               | 0.7   | 0.1                                                                               | -                                                                                 |
| Notes                                                                                                                |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |

HCM 2010 Signalized Intersection Summary      Weekend (Saturday) Mid-Day Yr. 2035+Prj.  
 1: SR-29 & Grayson Ave. 05/03/2018

|                              |  |  |  |  |  |  |   |   |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|
| Movement                     | EBL                                                                               | EBR                                                                               | NBL                                                                               | NBT                                                                               | SBT                                                                               | SBR                                                                               |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Traffic Volume (veh/h)       | 18                                                                                | 36                                                                                | 58                                                                                | 978                                                                               | 1103                                                                              | 22                                                                                |   |   |
| Future Volume (veh/h)        | 18                                                                                | 36                                                                                | 58                                                                                | 978                                                                               | 1103                                                                              | 22                                                                                |   |   |
| Number                       | 7                                                                                 | 14                                                                                | 5                                                                                 | 2                                                                                 | 6                                                                                 | 16                                                                                |   |   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |   |   |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Adj Sat Flow, veh/h/ln       | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1863                                                                              | 1900                                                                              |   |   |
| Adj Flow Rate, veh/h         | 20                                                                                | 39                                                                                | 63                                                                                | 1063                                                                              | 1199                                                                              | 24                                                                                |   |   |
| Adj No. of Lanes             | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 1                                                                                 | 0                                                                                 |   |   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |   |   |
| Percent Heavy Veh, %         | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 | 2                                                                                 |   |   |
| Cap, veh/h                   | 72                                                                                | 65                                                                                | 83                                                                                | 1615                                                                              | 1410                                                                              | 28                                                                                |   |   |
| Arrive On Green              | 0.04                                                                              | 0.04                                                                              | 0.05                                                                              | 0.87                                                                              | 0.77                                                                              | 0.77                                                                              |   |   |
| Sat Flow, veh/h              | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 1820                                                                              | 36                                                                                |   |   |
| Grp Volume(v), veh/h         | 20                                                                                | 39                                                                                | 63                                                                                | 1063                                                                              | 0                                                                                 | 1223                                                                              |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1774                                                                              | 1583                                                                              | 1774                                                                              | 1863                                                                              | 0                                                                                 | 1856                                                                              |   |   |
| Q Serve(g_s), s              | 1.1                                                                               | 2.4                                                                               | 3.4                                                                               | 17.3                                                                              | 0.0                                                                               | 42.6                                                                              |   |   |
| Cycle Q Clear(g_c), s        | 1.1                                                                               | 2.4                                                                               | 3.4                                                                               | 17.3                                                                              | 0.0                                                                               | 42.6                                                                              |   |   |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 0.02                                                                              |   |   |
| Lane Grp Cap(c), veh/h       | 72                                                                                | 65                                                                                | 83                                                                                | 1615                                                                              | 0                                                                                 | 1438                                                                              |   |   |
| V/C Ratio(X)                 | 0.28                                                                              | 0.60                                                                              | 0.76                                                                              | 0.66                                                                              | 0.00                                                                              | 0.85                                                                              |   |   |
| Avail Cap(c_a), veh/h        | 835                                                                               | 746                                                                               | 600                                                                               | 1615                                                                              | 0                                                                                 | 1438                                                                              |   |   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |   |   |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |   |   |
| Uniform Delay (d), s/veh     | 45.5                                                                              | 46.2                                                                              | 46.1                                                                              | 2.0                                                                               | 0.0                                                                               | 7.3                                                                               |   |   |
| Incr Delay (d2), s/veh       | 2.0                                                                               | 8.7                                                                               | 13.3                                                                              | 2.1                                                                               | 0.0                                                                               | 6.5                                                                               |   |   |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |   |   |
| %ile BackOfQ(50%),veh/ln     | 0.6                                                                               | 2.2                                                                               | 2.0                                                                               | 9.2                                                                               | 0.0                                                                               | 23.7                                                                              |   |   |
| LnGrp Delay(d),s/veh         | 47.6                                                                              | 54.9                                                                              | 59.4                                                                              | 4.1                                                                               | 0.0                                                                               | 13.8                                                                              |   |   |
| LnGrp LOS                    | D                                                                                 | D                                                                                 | E                                                                                 | A                                                                                 |                                                                                   | B                                                                                 |   |   |
| Approach Vol, veh/h          | 59                                                                                |                                                                                   |                                                                                   | 1126                                                                              | 1223                                                                              |                                                                                   |   |   |
| Approach Delay, s/veh        | 52.4                                                                              |                                                                                   |                                                                                   | 7.2                                                                               | 13.8                                                                              |                                                                                   |   |   |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 | B                                                                                 |                                                                                   |   |   |
| Timer                        | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7 | 8 |
| Assigned Phs                 |                                                                                   | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |   |   |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 89.4                                                                              |                                                                                   | 8.5                                                                               | 9.1                                                                               | 80.3                                                                              |   |   |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |   |   |
| Max Green Setting (Gmax), s  |                                                                                   | 84.9                                                                              |                                                                                   | 46.1                                                                              | 33.1                                                                              | 47.3                                                                              |   |   |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 19.3                                                                              |                                                                                   | 4.4                                                                               | 5.4                                                                               | 44.6                                                                              |   |   |
| Green Ext Time (p_c), s      |                                                                                   | 44.6                                                                              |                                                                                   | 0.2                                                                               | 0.1                                                                               | 2.6                                                                               |   |   |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 Ctrl Delay          |                                                                                   |                                                                                   | 11.7                                                                              |                                                                                   |                                                                                   |                                                                                   |   |   |
| HCM 2010 LOS                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |   |   |

HCM 2010 TWSC  
2: SR-29 & Dowdell Ln.

Weekend (Saturday) Mid-Day Yr. 2035+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.8                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 15                                                                                | 39                                                                                | 1001                                                                              | 10    | 35                                                                                | 1104                                                                              |
| Future Vol, veh/h        | 15                                                                                | 39                                                                                | 1001                                                                              | 10    | 35                                                                                | 1104                                                                              |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                                                                                | 42                                                                                | 1088                                                                              | 11    | 38                                                                                | 1200                                                                              |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 2369                                                                              | 1093                                                                              | 0                                                                                 | 0     | 1099                                                                              | 0                                                                                 |
| Stage 1                  | 1093                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 1276                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 38                                                                                | 261                                                                               | -                                                                                 | -     | 635                                                                               | -                                                                                 |
| Stage 1                  | 321                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 262                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   | -                                                                                 |
| Mov Cap-1 Maneuver       | 36                                                                                | 261                                                                               | -                                                                                 | -     | 635                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 143                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 321                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 246                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 24.7                                                                              | 0                                                                                 | 0.3                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | C                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 143                                                                               | 261   | 635                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.114                                                                             | 0.162 | 0.06                                                                              | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 33.4                                                                              | 21.4  | 11                                                                                | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.4                                                                               | 0.6   | 0.2                                                                               | -                                                                                 |

Yr. 2035+Prj.

Synchro 9 Report  
Page 2

HCM 2010 TWSC  
3: SR-29 & Salvestrin

Weekend (Saturday) Mid-Day Yr. 2035+Prj.  
05/03/2018

| Intersection             |        |        |        |       |      |      |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh         | 0.2    |        |        |       |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT   | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱      | ↰      | ↱     | ↰    | ↱    |
| Traffic Vol, veh/h       | 4      | 5      | 5      | 1002  | 1118 | 4    |
| Future Vol, veh/h        | 4      | 5      | 5      | 1002  | 1118 | 4    |
| 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      | 50     | 100    | -     | -    | -    |
| 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      | 5      | 5      | 1089  | 1215 | 4    |
| Major/Minor              | Minor2 | Major1 | Major2 |       |      |      |
| Conflicting Flow All     | 2317   | 1217   | 1220   | 0     | -    | 0    |
| Stage 1                  | 1217   | -      | -      | -     | -    | -    |
| Stage 2                  | 1100   | -      | -      | -     | -    | -    |
| 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       | 42     | 220    | 571    | -     | -    | -    |
| Stage 1                  | 280    | -      | -      | -     | -    | -    |
| Stage 2                  | 319    | -      | -      | -     | -    | -    |
| Platoon blocked, %       |        |        |        | -     | -    | -    |
| Mov Cap-1 Maneuver       | 42     | 220    | 571    | -     | -    | -    |
| Mov Cap-2 Maneuver       | 155    | -      | -      | -     | -    | -    |
| Stage 1                  | 280    | -      | -      | -     | -    | -    |
| Stage 2                  | 316    | -      | -      | -     | -    | -    |
| Approach                 | EB     | NB     | SB     |       |      |      |
| HCM Control Delay, s     | 25     | 0.1    | 0      |       |      |      |
| HCM LOS                  | D      |        |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | EBLn2 | SBT  | SBR  |
| Capacity (veh/h)         | 571    | -      | 155    | 220   | -    | -    |
| HCM Lane V/C Ratio       | 0.01   | -      | 0.028  | 0.025 | -    | -    |
| HCM Control Delay (s)    | 11.4   | -      | 28.9   | 21.8  | -    | -    |
| HCM Lane LOS             | B      | -      | D      | C     | -    | -    |
| HCM 95th %tile Q(veh)    | 0      | -      | 0.1    | 0.1   | -    | -    |

Yr. 2035+Prj.

Synchro 9 Report  
Page 3

HCM 2010 TWSC  
4: SR-29 & Vintage Ave.

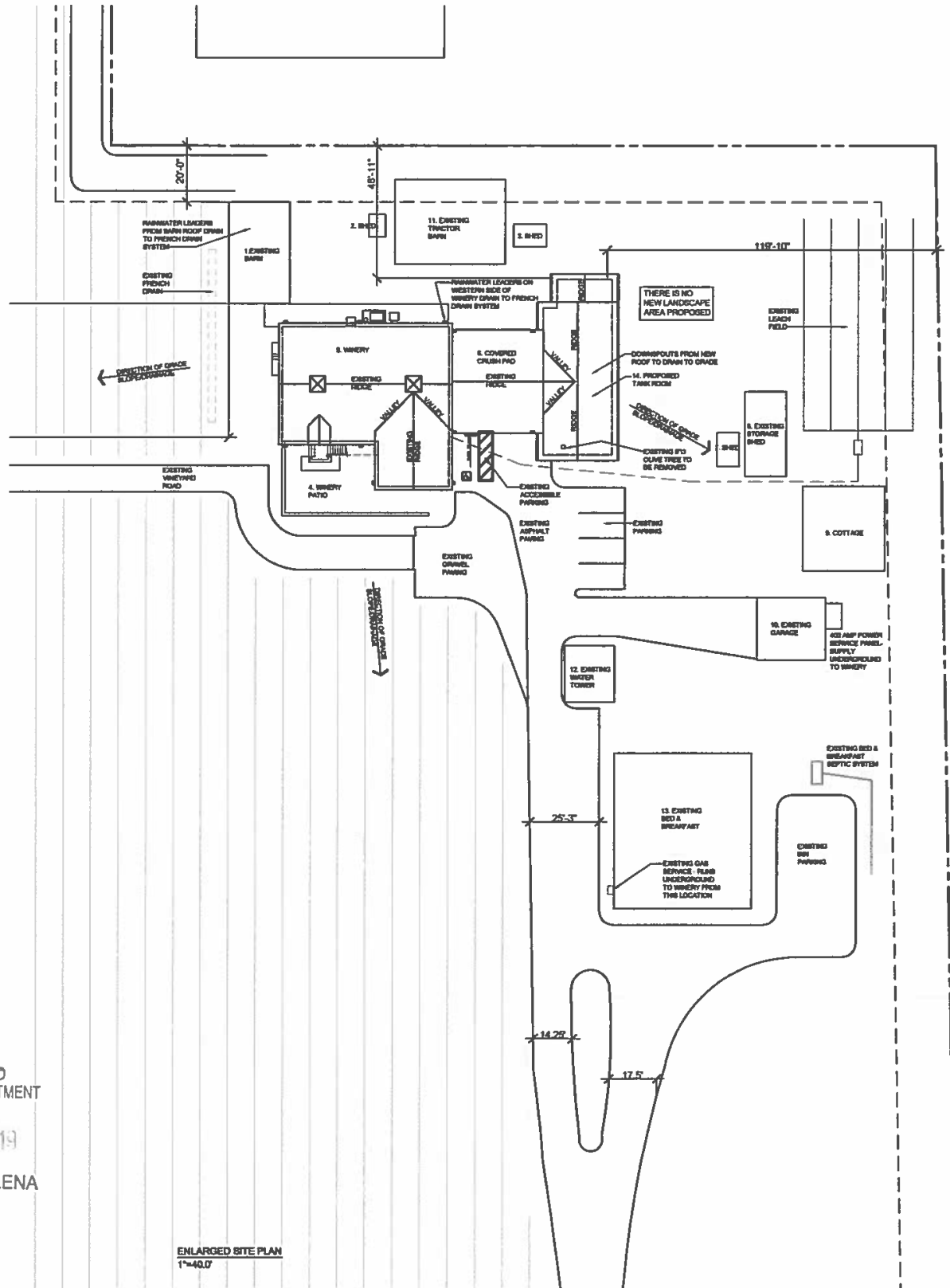
Weekend (Saturday) Mid-Day Yr. 2035+Prj.  
05/03/2018

| Intersection             |                                                                                   |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Int Delay, s/veh         | 0.9                                                                               |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Movement                 | WBL                                                                               | WBR                                                                               | NBT                                                                               | NBR   | SBL                                                                               | SBT                                                                               |
| Lane Configurations      |  |  |  |       |  |  |
| Traffic Vol, veh/h       | 28                                                                                | 29                                                                                | 970                                                                               | 23    | 28                                                                                | 1087                                                                              |
| Future Vol, veh/h        | 28                                                                                | 29                                                                                | 970                                                                               | 23    | 28                                                                                | 1087                                                                              |
| 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                                                                                | -                                                                                 | -     | 200                                                                               | -                                                                                 |
| 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                | 30                                                                                | 32                                                                                | 1054                                                                              | 25    | 30                                                                                | 1182                                                                              |
| Major/Minor              | Minor1                                                                            | Major1                                                                            | Major2                                                                            |       |                                                                                   |                                                                                   |
| Conflicting Flow All     | 2309                                                                              | 1067                                                                              | 0                                                                                 | 0     | 1079                                                                              | 0                                                                                 |
| Stage 1                  | 1067                                                                              | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| 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       | 42                                                                                | 270                                                                               | -                                                                                 | -     | 646                                                                               | -                                                                                 |
| Stage 1                  | 331                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 272                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Platoon blocked, %       |                                                                                   |                                                                                   | -                                                                                 | -     |                                                                                   |                                                                                   |
| Mov Cap-1 Maneuver       | 40                                                                                | 270                                                                               | -                                                                                 | -     | 646                                                                               | -                                                                                 |
| Mov Cap-2 Maneuver       | 151                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 1                  | 331                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Stage 2                  | 259                                                                               | -                                                                                 | -                                                                                 | -     | -                                                                                 | -                                                                                 |
| Approach                 | WB                                                                                | NB                                                                                | SB                                                                                |       |                                                                                   |                                                                                   |
| HCM Control Delay, s     | 27.3                                                                              | 0                                                                                 | 0.3                                                                               |       |                                                                                   |                                                                                   |
| HCM LOS                  | D                                                                                 |                                                                                   |                                                                                   |       |                                                                                   |                                                                                   |
| Minor Lane/Major Mvmt    | NBT                                                                               | NBRWBLn1                                                                          | WBLn2                                                                             | SBL   | SBT                                                                               |                                                                                   |
| Capacity (veh/h)         | -                                                                                 | -                                                                                 | 151                                                                               | 270   | 646                                                                               | -                                                                                 |
| HCM Lane V/C Ratio       | -                                                                                 | -                                                                                 | 0.202                                                                             | 0.117 | 0.047                                                                             | -                                                                                 |
| HCM Control Delay (s)    | -                                                                                 | -                                                                                 | 34.8                                                                              | 20.1  | 10.8                                                                              | -                                                                                 |
| HCM Lane LOS             | -                                                                                 | -                                                                                 | D                                                                                 | C     | B                                                                                 | -                                                                                 |
| HCM 95th %tile Q(veh)    | -                                                                                 | -                                                                                 | 0.7                                                                               | 0.4   | 0.1                                                                               | -                                                                                 |

Yr. 2035+Prj.

Synchro 9 Report  
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RECEIVED  
PLANNING DEPARTMENT  
MAR 05 2019  
CITY OF ST HELENA



**PROJECT TEAM/SHEET INDEX**

OWNER:  
Rich Salvestrin/Salvestrin Winery  
357 Main Street  
St. Helena, CA 94574

ARCHITECT:  
KAREN JENSEN  
Karen Jensen  
1813 Cedar Street  
Calistoga, CA 94515  
T: (707) 942-8267  
karen@kjarchitecture.com

**ARCHITECTURAL SHEET INDEX:**  
A0 COVER SHEET & SITE PLAN  
A1 PROPOSED LOWER LEVEL FLOOR PLAN  
A2 EXISTING UPPER LEVEL FLOOR PLAN  
A3 EXTERIOR ELEVATIONS  
A4 EXTERIOR ELEVATIONS  
A5 ROOF PLAN

**PROJECT DATA:**

**PROJECT DESCRIPTION:**  
ONE STORY WOOD-FRAMED TANK ROOM  
OCCUPANCY S-2  
CONSTRUCTION TYPE: V-B  
SPRINKLERED: YES  
CITY WATER: YES  
NATURAL GAS: YES  
CITY SEWER: YES  
CITY OF ST. HELENA ZONING: A-20  
TWENTY ACRE AGRICULTURAL DISTRICT  
PARCEL AREA: 12.05 ACRES

**WINERY FLOOR AREAS:**  
BARREL/TANK PRODUCTION ROOM 2,400 SQ.FT.  
OFFICE/RESTROOM/STORAGE 400 SQ.FT.  
UPSTAIRS HOSPITALITY ROOM 400 SQ.FT.  
PROPOSED TANK ROOM 1,300 SQ.FT.  
PROPOSED LAB 200 SQ.FT.  
TOTAL PROPOSED WINERY 4,700 SQ.FT.

**SCOPE OF WORK:**  
THIS IS A DESIGN REVIEW APPLICATION TO  
CONSTRUCT A TANK ROOM (1,300 SQ.FT.) AND LAB  
(200 SQ.FT.) ADDITION TO AN EXISTING WINERY

ARCHITECT  
**KAREN JENSEN  
ARCHITECTURE**  
1813 Cedar Street, Calistoga, CA 94515  
707.942.8267  
karen@kjarchitecture.com

**LICENSED ARCHITECT**  
KAREN A. JENSEN  
No. C-32358  
EXPI. 9/9/17  
STATE OF CALIFORNIA

PROJECT NUMBER: SALV-2017

| DATE     | DESCRIPTION   |
|----------|---------------|
| 06.12.17 | DESIGN REVIEW |
| 08.10.18 | USE PERMIT    |

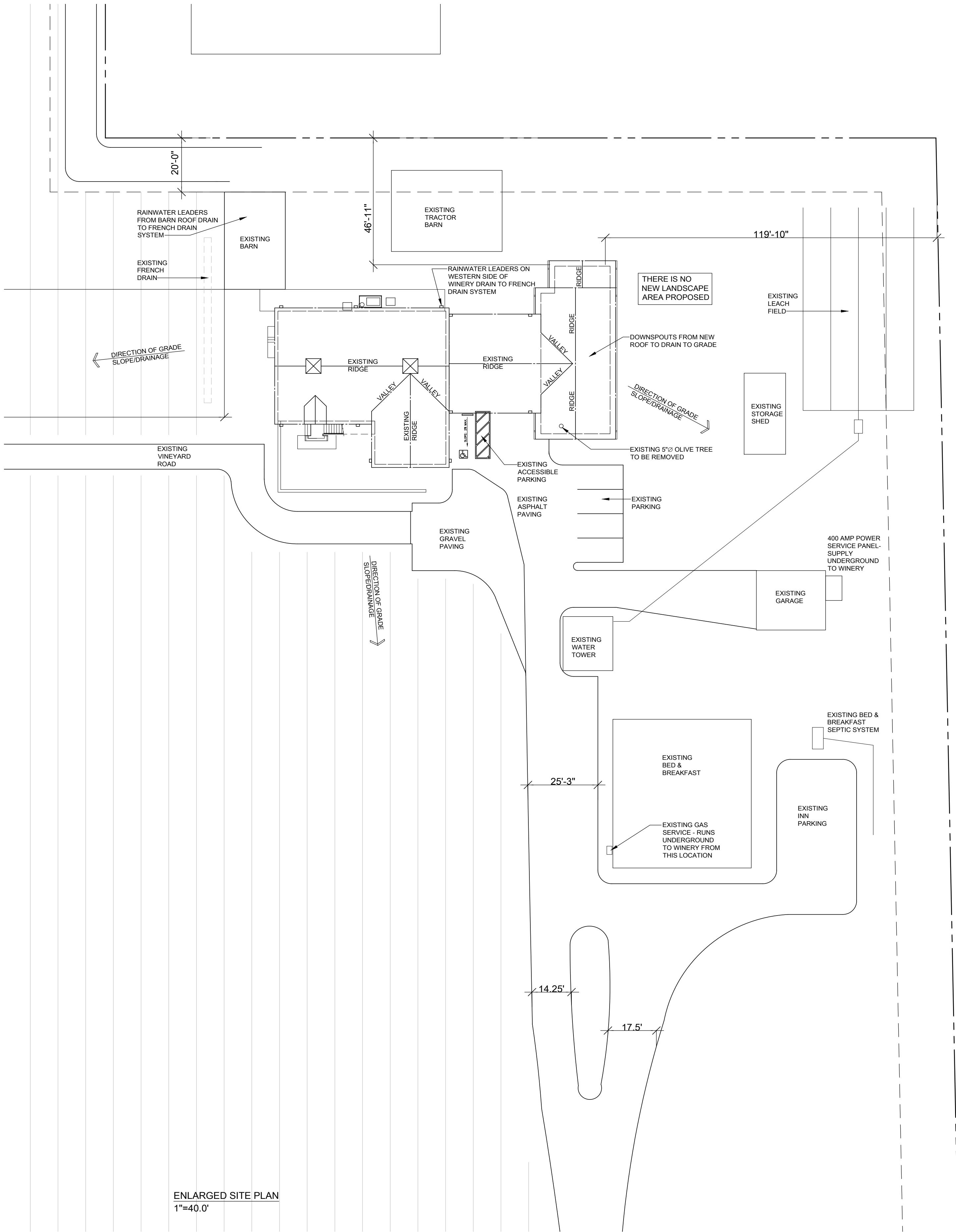
PROJECT

**SALVESTRIN WINERY  
TANK ROOM ADDITION**  
APN: 000-350-018  
357 MAIN STREET, ST. HELENA, CA 94574

SHEET TITLE  
**SITE PLANS  
AND PROJECT  
DATA**

SHEET NUMBER  
**A0**

SITE PLAN  
1"=80.0'



ENLARGED SITE PLAN  
1"=40.0'

PROJECT TEAM/SHEET INDEX

OWNER:  
Rich Salvestrin/Salvestrin Winery  
397 Main Street  
St. Helena, CA 94574

ARCHITECT:

KAREN JENSEN  
Karen Jensen  
1813 Cedar Street  
Calistoga, CA 94515  
T: (707) 942-8267  
karen@kjarchitecture.com

ARCHITECTURAL SHEET INDEX:

- A0 COVER SHEET & SITE PLAN
- A1 PROPOSED LOWER LEVEL FLOOR PLAN
- A2 EXISTING UPPER LEVEL FLOOR PLAN
- A3 EXTERIOR ELEVATIONS
- A4 EXTERIOR ELEVATIONS
- A5 ROOF PLAN

PROJECT DATA:

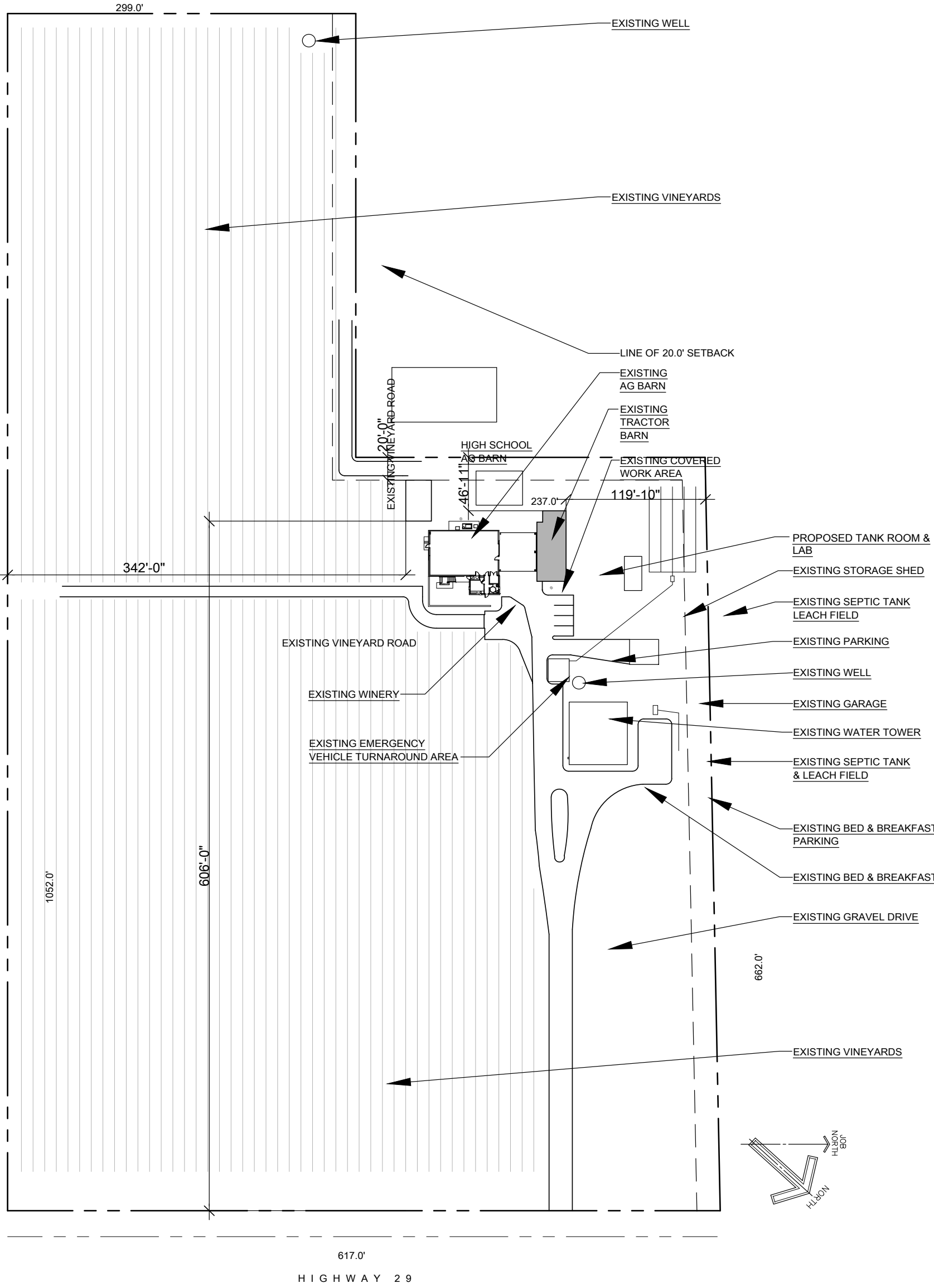
PROJECT DESCRIPTION:

ONE STORY WOOD-FRAMED TANK ROOM  
OCCUPANCY S-2  
CONSTRUCTION TYPE: V-B  
SPRINKLERED: YES  
CITY WATER: YES  
NATURAL GAS: YES  
CITY SEWER: YES  
CITY OF ST. HELENA ZONING: A-20  
TWENTY ACRE AGRICULTURAL DISTRICT  
PARCEL AREA: 12.05 ACRES

|                             |              |
|-----------------------------|--------------|
| WINERY FLOOR AREAS:         |              |
| BARREL/TANK PRODUCTION ROOM | 2,400 SQ.FT. |
| OFFICE/RESTROOM/STORAGE     | 400 SQ.FT.   |
| UPSTAIRS HOSPITALITY ROOM   | 400 SQ.FT.   |
| PROPOSED TANK ROOM          | 1,300 SQ.FT. |
| PROPOSED LAB                | 200 SQ.FT.   |
| TOTAL PROPOSED WINERY       | 4,700 SQ.FT. |

SCOPE OF WORK:

THIS IS A DESIGN REVIEW APPLICATION TO  
CONSTRUCT A TANK ROOM (1,300 SQ.FT.) AND LAB  
(200 SQ.FT.) ADDITION TO AN EXISTING WINERY



SITE PLAN  
1"=80.0'

ARCHITECT

KAREN JENSEN  
ARCHITECTURE  
1813 Cedar Street, Calistoga, CA 94515  
707.942.8267  
karen@kjarchitecture.com



| PROJECT NUMBER SALV-2017 |          |               |
|--------------------------|----------|---------------|
| ISSUE                    |          |               |
| NO.                      | DATE     | DESCRIPTION   |
| 0                        | 12.22.17 | DESIGN REVIEW |

SALVESTRIN WINERY  
TANK ROOM ADDITION

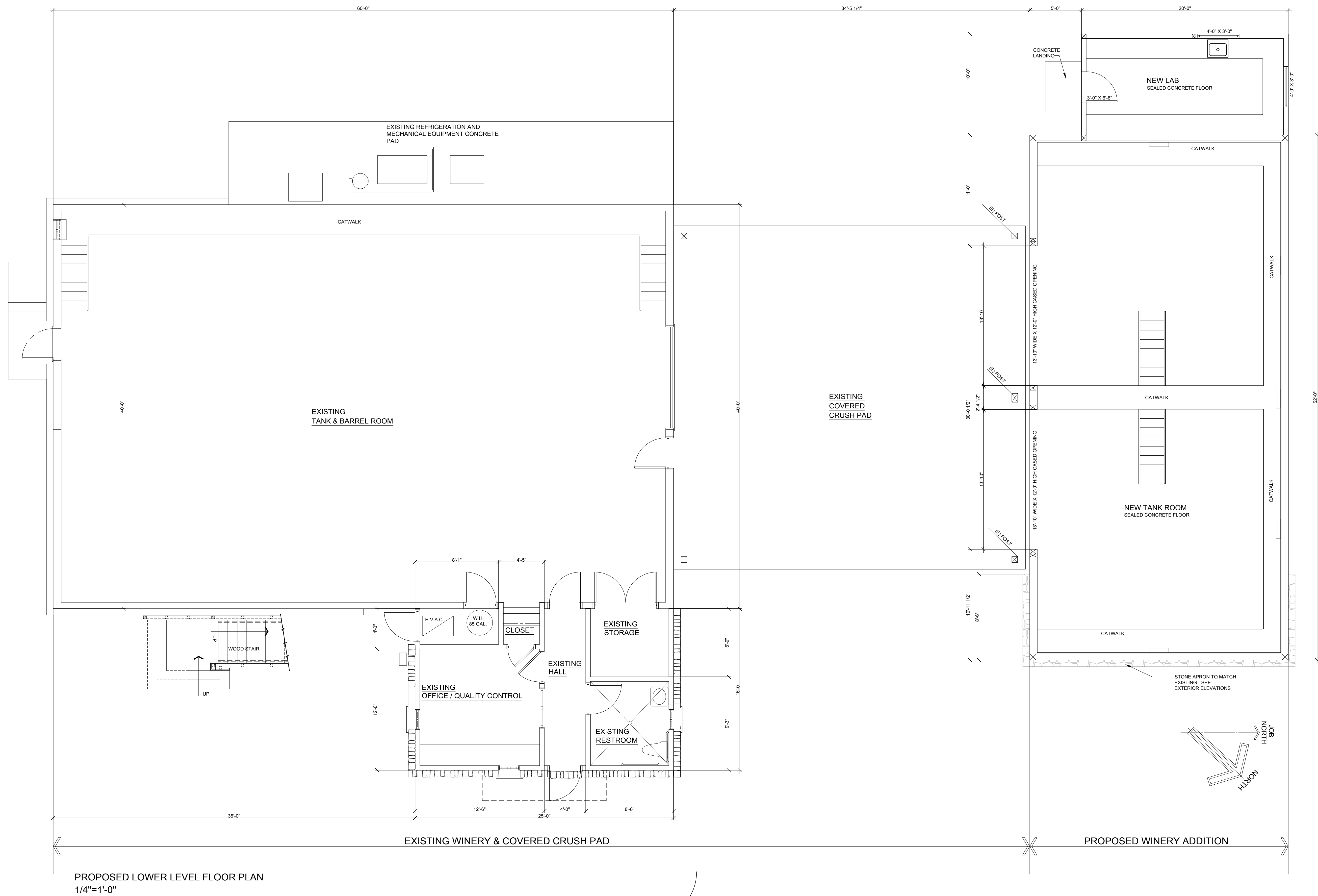
APN: 008-350-018  
397 MAIN STREET, ST. HELENA, CA 94574

SHEET TITLE

SITE PLANS  
AND PROJECT  
DATA

SHEET NUMBER

A0



ARCHITECT

**KAREN JENSEN**  
**ARCHITECTURE**

[illegible]

PROJECT

# SALVESTRIN WINERY TANK ROOM ADDITION

APN: 009-350-018  
397 MAIN STREET, ST. HELENA, CA 94574

SHEET TITLE

## PROPOSED GROUND LEVEL FLOOR PLAN

SHEET NUMBER

# A1

|                        |          |             |
|------------------------|----------|-------------|
| PROJECT NUMBER SALV-20 |          |             |
| ISSUE                  |          |             |
| NO.                    | DATE     | DESCRIPTION |
| 0                      | 12.22.17 | DESIGN REVI |

PROJECT

**SAL VESTRIN WINERY  
TANK ROOM ADDITION**

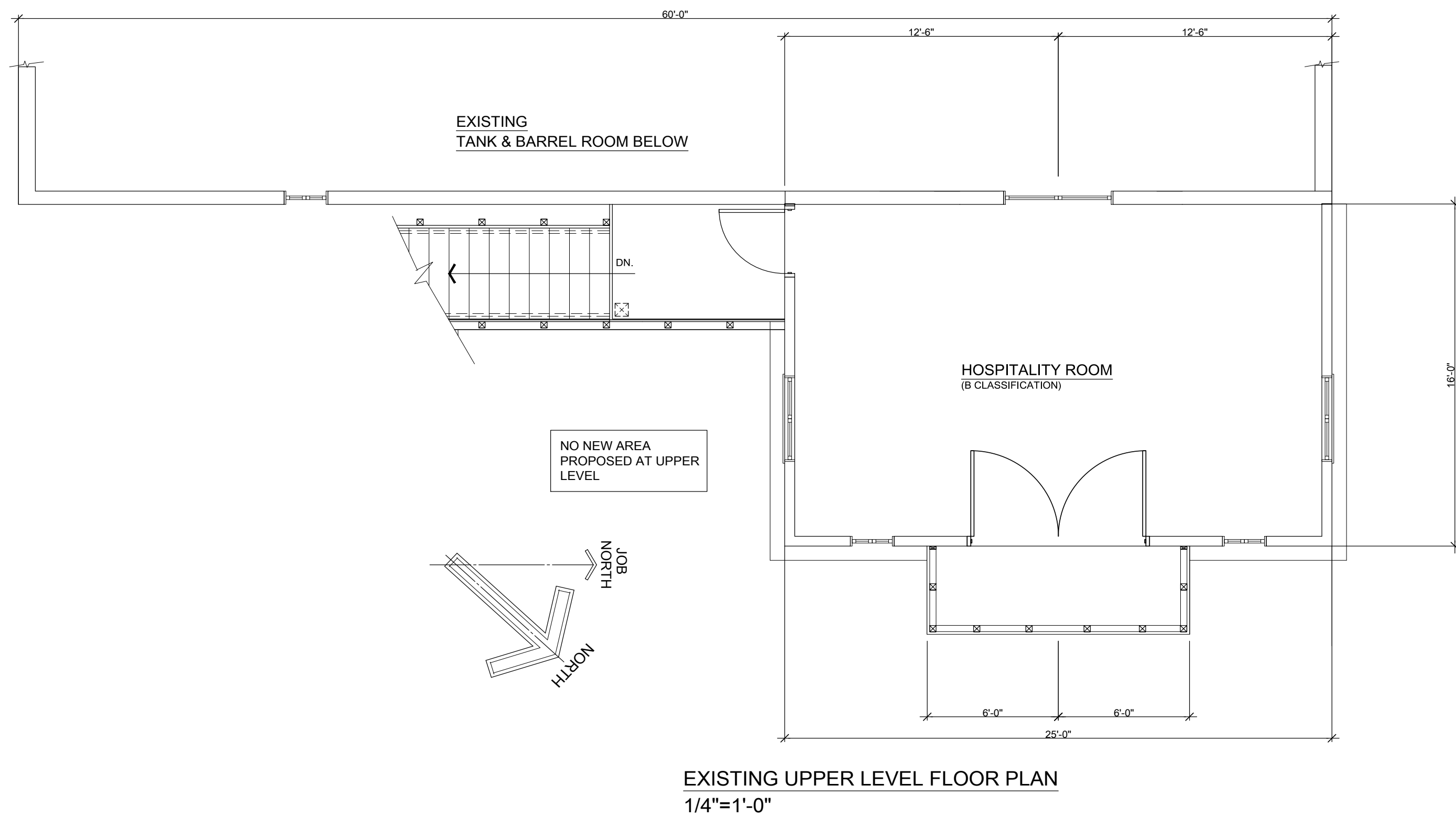
APN: 009-350-018  
397 MAIN STREET ST. HELENA CA 94574

SHEET TITLE

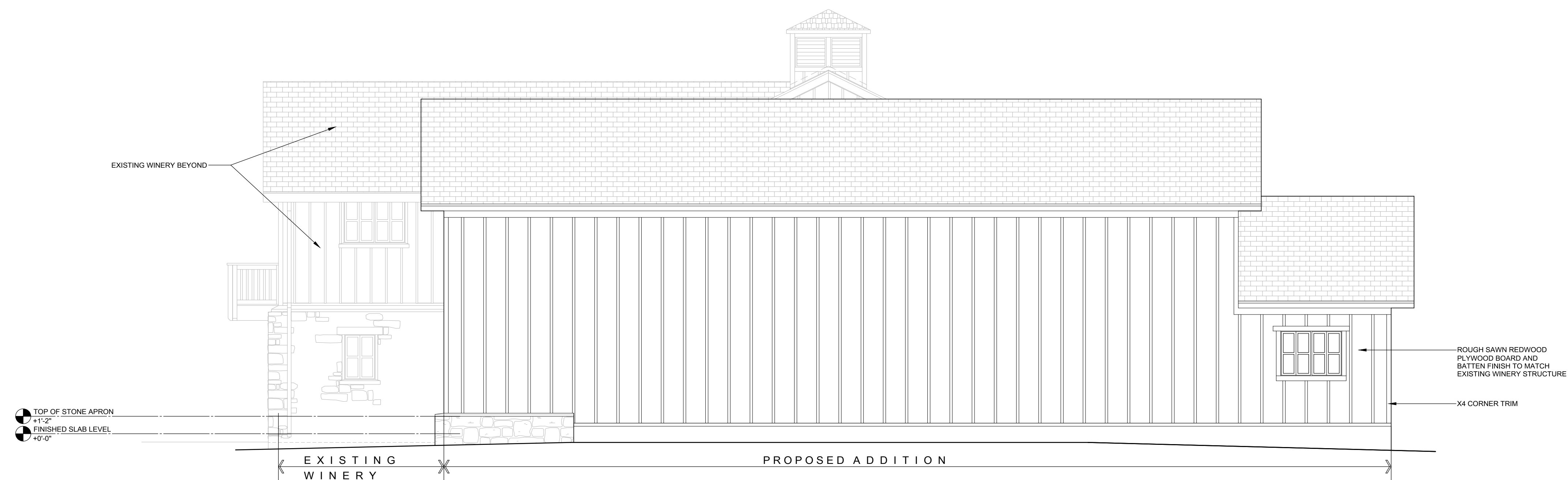
EXISTING  
UPPER LEVEL  
FLOOR PLAN

SHEET NUMBER

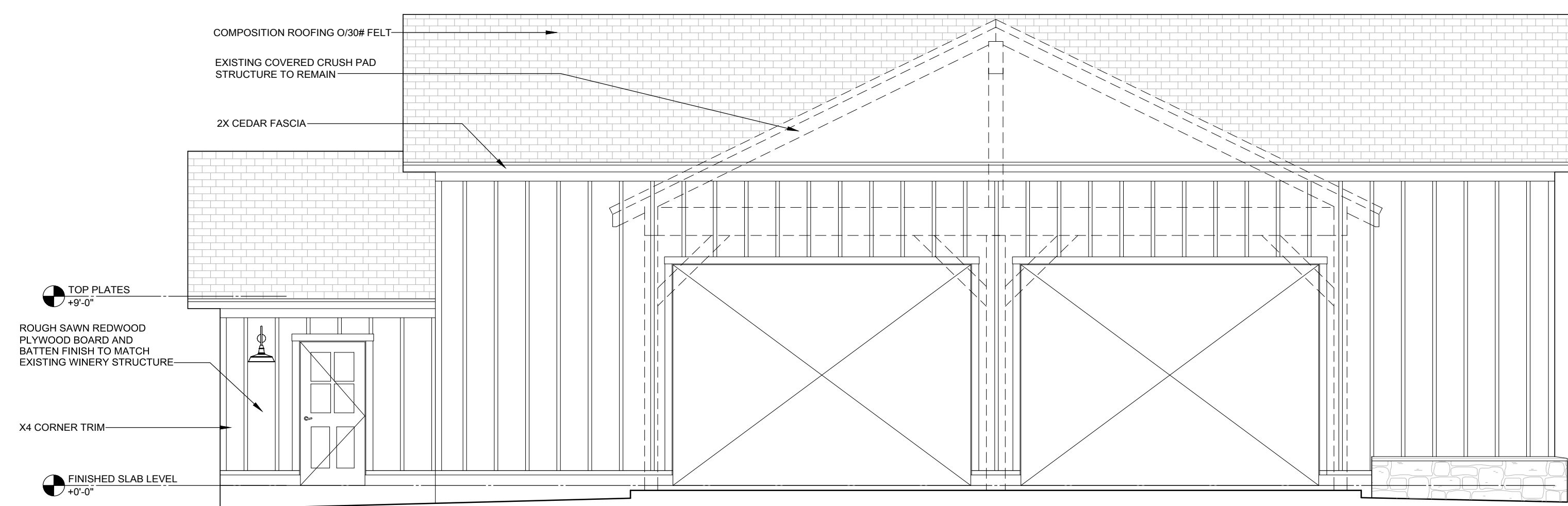
**A2**







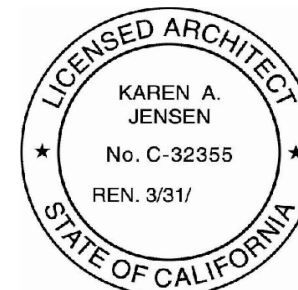
NORTH ELEVATION  
1/4"=1'-0"



SOUTH ELEVATION  
1/4"=1'-0"

ARCHITECT

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karen@kjarchitecture.com

[illegible]

PROJECT

# SALVESTRIN WINERY TANK ROOM ADDITION

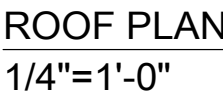
APN: 009-350-018  
397 MAIN STREET, ST HELENA, CA 94574

SHEET TITLE

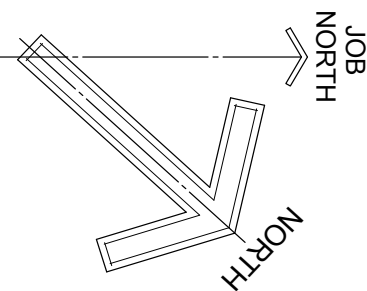
## EXTERIOR ELEVATIONS

SHEET NUMBER

**A4**



**TYPICAL ROOF VENTING:**  
(12'-0") (12) (24) = 3,456 SQ.IN.  
3,456 SQ.IN./300 = 11.52 SQ.IN.  
SUPPLY A MINIMUM OF 5.76 SQ.IN. OF  
VENTING AT THE EAVES & AT THE  
UPPER THIRD OF THE ROOF FRAMING.  
VENT UPPER ROOF AREA WITH  
CONTINUOUS RIDGE VENT.  
VENT EAVES WITH (2) 2" DIA.  
SCREENED VENTS PER BLOCK OR  
EQUAL, TYP.



ARCHITECT

**KAREN JENSEN  
ARCHITECTURE**

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707.942.8267

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[illegible]

**SALVESTRIN WINERY**  
**TANK ROOM ADDITION**

APN: 009-350-018  
397 MAIN STREET, ST. HELENA, CA 94574

SHEET TITLE

SECTION, ROOF  
PLAN & DETAILS

SHEET NUMBER

**A5**











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## THEORETICAL WATER DEMAND ANALYSIS

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FOR THE

**SALVESTRIN WINERY  
USE PERMIT MODIFICATION  
PL18-002**

PROJECT LOCATION

397 MAIN STREET  
ST. HELENA, CA 94574

COUNTY: NAPA  
APN: 009-350-047

JANUARY 24, 2020

PREPARED FOR REVIEW BY:

**CITY OF ST. HELENA  
PUBLIC WORKS DEPARTMENT**  
1572 RAILROAD AVENUE  
ST. HELENA, CA 94574



## I. **BACKGROUND & PROJECT DESCRIPTION**

### A. **Background**

Salvestrin Winery has applied to the City of St. Helena for Use Permit Amendment and Design Review (#PL18-002) to construct an addition to their existing wine production facility and increase wine production, employee count, and visitation.

The City of St. Helena's Water Neutral Policy requires new development or expansion of existing development to be water-neutral with the City's municipal water supply system. For a particular development or expansion of existing use, the 'post-construction' city water use must be less than or equal to the 'pre-construction' city water use.

Pursuant to Condition of Approval #25 in the Use Permit Amendment and Design Review #2000-82, all water used at Salvestrin Winery was to be supplied by an on-site well water system and no municipal water was to be used at the winery. However, after initial review of the project application for use permit modification #PL18-002, the City of St. Helena public works department determined that city water must be used for all non-production related use at the winery.

This report has been prepared to provide a detailed analysis of the proposed city water demand for the proposed winery expansion and associated on-site retrofits to be incorporated in order for the expansion to achieve water neutrality. To achieve a water-neutral state, Salvestrin Winery proposes to retrofit existing water fixtures based on the following water demand analysis.

### B. **Project Description**

Salvestrin Winery is a small winery currently operating under the City of St. Helena Use Permit and Design Review #96-102 and Use Permit Amendment and Design Review #2000-82. The winery is currently approved for the following uses that contribute to water demand:

#### **Current Use Summary**

|                                  |                                      |
|----------------------------------|--------------------------------------|
| Production Capacity:             | 11,500 Gallons Wine / Year           |
| Employees:                       | 1 full-time, 1 part-time             |
| Daily Visitors (By Appointment): | 10-persons per day, 2-times per week |
| Events:                          | None                                 |

Salvestrin Winery's Use Permit Amendment and Design Review application #PL18-002 requests to increase the following uses that contribute to water demand:

#### **Proposed Use Summary**

|                                  |                                          |
|----------------------------------|------------------------------------------|
| Production Capacity:             | 20,000 Gallons Wine / Year               |
| Employees:                       | 4 full-time                              |
| Daily Visitors (By Appointment): | 28-persons per day, 6-days per week      |
| Events:                          | Following events limited to 1 per month: |
|                                  | - Event with 125 guests (2 per year)     |
|                                  | - Event with 50 guests (4 per year)      |
|                                  | - Event with 40 guests (2 per year)      |



## II. WATER DEMAND ANALYSIS

### A. **Baseline Water Use (Pre-Project Water Use)**

All water used at the winery facility is currently provided by the on-site well water system. Therefore, there is no baseline city water use for the winery.

### B. **Proposed Non-Production Water Demand**

The City of St. Helena will supply municipal water for all non-production water uses at Salvestrin Winery. Municipal water will be for the benefit and use of employees, wine tasting visitors, and event attendees from non-production water fixtures in the winery building. All wine production will continue to utilize the on-site wells for water.

The winery non-production water fixtures include a restroom sink and toilet and a tasting room sink. This analysis assumes the sink in the restroom is used for handwashing only and the sink in the tasting room is for consumption and rinsing wine dumped by tasting room visitors. There are no additional non-production water fixtures proposed as part of this project.

The non-production water demand is estimated by multiplying the sum of employees, wine tasting visitor, and event guests by their expected use of non-production water fixtures. Based on this calculation, the table below summarizes the non-production water demand from the proposed project:

| PROPOSED CITY WATER DEMAND       |                    |                |           |                    |                 |                               |                                |
|----------------------------------|--------------------|----------------|-----------|--------------------|-----------------|-------------------------------|--------------------------------|
| Fixture - Use Type               | Quantity (Persons) | Fixture Demand | Daily Use | Duration (Minutes) | Use Days / Year | Total Annual Demand (gallons) | Average Daily Demand (gallons) |
| Toilet - Employees               | 4                  | 1.60 gpf       | 3         |                    | 250             | 4,800                         | 13                             |
| Toilet - Tasting Visitors        | 28                 | 1.60 gpf       | 0.5       |                    | 312             | 6,989                         | 19                             |
| Toilet - Event Attendees         | 125                | 1.60 gpf       | 2         |                    | 2               | 800                           | 2                              |
| Toilet - Event Attendees         | 50                 | 1.60 gpf       | 2         |                    | 4               | 640                           | 2                              |
| Toilet - Event Attendees         | 40                 | 1.60 gpf       | 2         |                    | 2               | 256                           | 1                              |
| Toilet - Event Attendees         | 25                 | 1.60 gpf       | 2         |                    | 4               | 320                           | 1                              |
| Handwash Sink - Employees        | 4                  | 1.50 gpm       | 2         | 0.25               | 250             | 750                           | 2                              |
| Handwash Sink - Tasting Visitors | 28                 | 1.50 gpm       | 0.5       | 0.25               | 312             | 1,638                         | 4                              |
| Handwash Sink - Event Attendees  | 125                | 1.50 gpm       | 2         | 0.25               | 2               | 188                           | 0.5                            |
| Handwash Sink - Event Attendees  | 50                 | 1.50 gpm       | 2         | 0.25               | 4               | 150                           | 0.4                            |
| Handwash Sink - Event Attendees  | 40                 | 1.50 gpm       | 2         | 0.25               | 2               | 60                            | 0.2                            |
| Handwash Sink - Event Attendees  | 25                 | 1.50 gpm       | 2         | 0.25               | 4               | 75                            | 0.2                            |
| Tasting Room Sink - Rinse        | 28                 | 1.50 gpm       | 1         | 0.05               | 312             | 655                           | 1.8                            |
| Tasting Room Sink - Consumption  | 28                 | 1.50 gpm       | 1         | 0.1                | 312             | 1,310                         | 3.6                            |
| <b>Total:</b>                    |                    |                |           |                    |                 | <b>18,631</b>                 | <b>51.0</b>                    |

gpf = gallons per flush

gpm = gallons per minute

The average daily non-production water demand from the proposed project is 51-gallons which results in an increase in demand of 51-gallons per day on the city water system. To reduce this demand and to comply with the City of St. Helena's Water Neutral Policy, retrofits must be made to existing water fixtures using city water.

### C. **Water Neutrality: On-Site Retrofits**

Given the project baseline water use is zero and by connecting to municipal water for use at the winery



for non-production uses, the resulting water offset required to achieve a 'water neutral' project is 51 gallons per day.

Water neutrality for the project will be achieved by retrofitting existing fixtures and capping certain hose bibs on the parcel which are connected to the municipal water system. These retrofits will offset the proposed non-productions uses at the winery.

The proposed retrofits will occur at the existing Salvestrin Bed & Breakfast (B&B) located on the subject parcel. The B&B is supplied by the municipal water system. There are four bedrooms in the B&B. One bedroom is occupied by the full-time resident and the three remaining bedrooms are available for overnight guests. Of the three guest bedrooms, only two may be occupied at any one time by guests. According to information provided by the owner, the overnight guest occupancy rate is 70-percent with an average of two-guests per room. Also, per an inspection by the owner, each shower head in the B&B is rated at 2.5-gallons per minute. This project proposes to replace each existing shower heads in the B&B with a low-flow 1.5-gallon per minute shower head.

In addition to the water savings from retrofitting the showerhead, two of the hose bibs around the B&B will either be capped. These hose bibs are connected to the B&B water system which is connected to the municipal water system. The hose bibs have a flow rate of 12 gpm and an estimated use of once per day for 5 minutes. By capping or connecting these to the on-site well an additional water saving of 17 gpd can be achieved.

The table below summarizes the water reduction achieved by installing low-flow shower heads and disconnecting the hose bib from city water.

| RETROFIT - ON-SITE CITY WATER DEMAND REDUCTION |                            |                                   |                                   |                         |           |                    |               |                                  |                                   |
|------------------------------------------------|----------------------------|-----------------------------------|-----------------------------------|-------------------------|-----------|--------------------|---------------|----------------------------------|-----------------------------------|
| Fixture - Use Type                             | Quantity (Persons or Unit) | Existing Fixture Demand (GPM/GPF) | Proposed Fixture Demand (GPM/GPF) | Fixture Reduction (GPM) | Daily Use | Duration (Minutes) | Use days/year | Total Annual Reduction (gallons) | Average Daily Reduction (gallons) |
| Shower - Guest Room                            | 4                          | 2.5                               | 1.5                               | 1.0                     | 1         | 8                  | 255           | 8,160                            | 22.4                              |
| Shower - Resident                              | 1                          | 2.5                               | 1.5                               | 1.0                     | 1         | 8                  | 365           | 2,920                            | 8.0                               |
| Shower-Second Unit                             | 1                          | 2.5                               | 1.5                               | 1.0                     | 1         | 8                  | 365           | 2,920                            | 8.0                               |
| Hose Bibs                                      | 2                          | 12                                | 0                                 | 12.0                    | 1         | 5                  | 104           | 6,240                            | 17.1                              |
| <b>Total</b>                                   |                            |                                   |                                   |                         |           |                    |               | <b>20,240</b>                    | <b>55.5</b>                       |

A calculated in the table above, by installing low-flow shower heads and disconnecting the hose bib from using municipal water will reduce municipal water use at the B&B by approximately 56-gallons per day. This reduction in existing daily municipal water use exceeds the proposed 51-gallon per day water demand from the proposed modifications at the winery and will allow the project to comply with the City of St. Helena Water Neutral Policy.

### III. CONCLUSION

Salvestrin Winery has submitted Use Permit Amendment and Design Review application #PL18-002 to the City of St. Helena for construct of an addition to the winery and to increase production, employees, and visitation. As part of the increase in employees and visitation, Salvestrin Winery is required to connect to the municipal water system for non-production water use. The winery currently uses an on-site well to supply all water demand. For the proposed winery modifications to comply with the city's water neutrality policy, all non-production water demand associated with the project expansion must be offset by on-site retrofits. The



non-production water demand from the proposed improvements is approximately 51-gallons per day. By retrofitting the shower heads in the B&B and the hose bib used to irrigate an existing lawn (from municipal to well water) water demand can be reduced by approximately 56 gallons per day. This reduction in city water demand will allow the proposed project to comply with the City of St. Helena Water Neutral Policy.



A Tradition of Stewardship  
A Commitment to Service

Planning, Building & Environmental Services

1195 Third Street, Suite 210  
Napa, CA 94559  
www.countyofnapa.org

David Morrison  
Director

MEMORANDUM

|       |                                                            |       |                                                        |
|-------|------------------------------------------------------------|-------|--------------------------------------------------------|
| To:   | Project Planner, City of St. Helena<br>Planning Department | From: | Kim Withrow, Environmental Health<br>Supervisor        |
|       | Erica Ahmann Smithies, City of St.<br>Helena Public Works  |       |                                                        |
| Date: | January 31, 2020                                           | Re:   | Salvestrin Winery<br>APN 009-350-047<br>File #PL18-002 |

Environmental Health staff has reviewed an application requesting approval to expand an existing winery within St. Helena City limits. The winery is served by on site wastewater treatment and disposal and onsite wells along with City water for domestic uses on the parcel. This Division has no objection to approval of the application, please include the following conditions of approval if the project is approved:

Prior to building permit issuance:

1. Plans for the proposed process wastewater treatment and reuse system shall be designed by a licensed Civil Engineer or Registered Environmental Health Specialist and be accompanied by complete design criteria based upon local conditions and current fee. No building clearance (or issuance of a building permit) for any structure that generates wastewater to be disposed of by this system will be approved until such plans are approved by this Division. Adequate reserve area for all uses on the parcel must be identified in this application.

Please be advised-requirements for process wastewater treatment systems in Napa County are being reviewed and may be modified to comply with State Water Quality Control Board (SWQCB) minimum standards.

2. A permit to construct the proposed process wastewater treatment and reuse system must be secured from this Division prior to approval of a building clearance (or issuance of a building permit) for any structure that generates wastewater to be disposed of by this system.
3. Prior to the approval of a building permit, an inspection of the existing sewage disposal system must be performed by a licensed sewage contractor and a report submitted to this Division for

Planning Division  
(707) 253-4417

Building Division  
(707) 253-4417

Engineering & Conservation  
(707) 253-4417

Environmental Health  
(707) 253-4471

Parks & Open Space  
(707) 259-5933

review and approval. Any deficiencies noted must be corrected under permit issued by this Division if necessary.

4. The applicant has indicated City of St. Helena will provide water for domestic uses on the parcel. Additionally, the onsite wells will be used for winery process water and irrigation. The water supply is not required to be regulated by this Division as a small public water system, but proof the City is providing water will be required prior to this Division approving building permits for the winery expansion. The separate plumbing systems (process water and domestic water) shall be permitted by the Building Department, comply with California Building Standards and remain completely separate systems. All domestic water serving drinking fountains, hand wash sinks, eyewash stations, restrooms and other similar fixtures shall be provided from City of St. Helena.
5. The applicant shall maintain regular monitoring of the above ground waste water treatment system as required by this Division which includes submitting quarterly monitoring reports. An annual operating permit is required for the waste water system.

Upon final occupancy and thereafter:

6. A commercial food facility was not included in this project. As indicated in the septic feasibility report, all food service for events will be catered. Therefore, all food must be prepared and served by a Napa County permitted caterer. If the caterer selected does not possess a valid Napa County Permit to operate, refer the business to this Division for assistance in obtaining the required permit prior to providing any food service.
7. Within 30 (thirty) days of initiation of the use or change of tenants, an updated Hazardous Materials Business shall be submitted to <http://cers.calepa.ca.gov/> and approved by this Division.
8. The use of the absorption field/drain field area shall be restricted to activities which will not contribute to compaction of the soil with consequent reduction in soil aeration. Activities which must be avoided in the area of the septic system include equipment storage, traffic, parking, pavement, livestock, etc.
9. All solid waste shall be stored and disposed of in a manner to prevent nuisances or health threats from insects, vectors and odors.
10. During the construction, demolition, or renovation period of the project the applicant must use the franchised garbage hauler for the service area in which they are located for all wastes generated during project development, unless applicant transports their own waste. If the applicant transports their own waste, they must use the appropriate landfill or solid waste transfer station for the service area in which the project is located.
11. All diatomaceous earth/bentonite must be disposed of in an approved manner. If the proposed septic system is an alternative sewage treatment system the plan submitted for review and approval must address bentonite disposal.

RECORDING REQUESTED BY AND  
WHEN RECORDED MAIL TO:

Planning Director  
City of St. Helena  
1480 Main Street  
St. Helena, CA 94574

EXEMPT FROM RECORDING FEES -  
GOVERNMENT CODE SECTION 6103



1997 002414  
OFFICIAL RECORDS OF  
**NAPA COUNTY**  
H. KATHLEEN BONDS

AT REQUEST OF: ST HELENA CITY  
02/03/1997 10:06 am  
Fee: \$ .00 Pgs: 8  
TT: \$ .00

*IDV/KC*

**USE PERMIT and DESIGN REVIEW 96-102**

**USE PERMIT OF THE CITY OF ST. HELENA  
STATE OF CALIFORNIA, GRANTED TO  
SALVESTRIN WINERY  
397 MAIN STREET**

PROPERTY OWNER: Edward and Suzanne Salvestrin APN: 009-350-047

Recitals

Richard J. Salvestrin submitted an application for a Use Permit to establish a family winery at 397 Main Street within the A-20: Twenty Acre Agriculture zoning district; and

The Planning Commission of the City of St. Helena, State of California, held a noticed public hearing on December 3, 1996.

The Planning Commission of the City of St. Helena, State of California, approves the Use Permit as follows:

**Section 1.** The Planning Commission hereby finds that this project is exempt from the California Environmental Quality Act pursuant to Section 15303, Class 3 of the CEQA Guidelines.

**Section 2.** The Planning Commission makes the following findings:

1. That the proposed use would not generate odors, fumes, dust, light, glare, radiation or refuse that would be injurious to surrounding uses or to the community.
2. That the proposed use would not generate levels of noise that adversely affect the health, safety, or welfare of neighboring properties or uses.
3. That the proposed use would not generate traffic noise in excess of the "normally acceptable" range identified in the General Plan.

(Planning/96.Projects/96-102/UP.96-102)

77114

4. That the proposed use would not make excessive demands on the provision of public services including water supply, sewer capacity, energy supply, communication facilities, police protection, and fire protection.
5. That the proposed use would provide adequate ingress and egress to and from the proposed location.
6. That allowing the proposed use would not conflict with the City's goal of maintaining the economic viability of a local serving economy.
7. That the proposed use would be compatible with surrounding land uses and would not conflict with the purpose established for the district within which it would be located.
8. That the proposed use would not be in conflict with the City's General Plan.
9. That the proposed use would not be injurious to public health, safety, or welfare.
10. That granting the use permit would not set a precedent for the approval of similar uses whose incremental effect would be detrimental to the City or would be in conflict with the General Plan.
11. That, as demonstrated on a detailed plan submitted by the applicant, adequate off-street parking to accommodate the long term parking needs of employees and business owners and customers is available.
12. That the capacity of surrounding streets is adequate to serve the automobile and delivery truck traffic generated by the proposed use.

**Section 3.** The Use Permit for the above described use is granted subject to compliance with the following conditions. Permit shall be in conformance with all City ordinances, rules, regulations and policies in effect at the time of issuance of a building permit. The conditions noted below are particularly pertinent to this permit and shall not be construed to permit violation of other laws and policies not so listed.

#### **USE PERMIT CONDITIONS**

1. The Use Permit is valid for one (1) year from the date of approval or it shall expire. This permit is valid for this use only. A new permit must be applied for upon any change in use. The permit will expire if the use is discontinued pursuant to then existing ordinances and regulations.
2. The Use Permit shall not become effective until fourteen (14) calendar days after approval, providing that the action is not appealed by the City Council or any other interested party within that 14 day period.
3. Any request for an extension of the Use Permit must be justified in writing and received by the Planning Department at least thirty (30) days prior to expiration.

(Planning/96.Projects/96-102/UP.96-102)

4. All required fees shall be paid prior to issuance of building permit. Compliance with all permit conditions shall occur in accordance with specific regulations but in all cases no later than prior to occupancy or initiation of use unless another time is set by law or by this approval.
5. The applicant will defend and indemnify and hold the City, its agents, officers, and employees harmless of any claim, action or proceedings to attack, set aside, void or annul an approval so long as the City promptly notifies the applicant of any such claim, action, or proceedings and the City cooperates fully in the defense of the action or proceedings.
6. Provided they are in general compliance with the Use Permit, minor modification may be approved by the Planning Director.
7. This Use Permit shall run with the land and shall be binding upon all parties having any right, title or interest in the real property or any part thereof, their heirs, successors and assigns, and shall inure to their benefit and benefit of the City of St. Helena.
8. This Use Permit authorizes the establishment of a small winery at 397 Main Street in the A-20: Twenty Acre Agriculture zoning district. The winery shall be located in the tank house as shown on Exhibit A, dated 12/03/96. Modifications to the tank house shall be as shown on Exhibits B and C dated 12/03/96 or as required by the Fire Marshall.
9. The maximum annual production of the winery shall be 5,000 gallons of wine. For the purposes of this Use Permit the premises shall be defined as the three contiguous vineyard parcels located at 347, 357 and 397 Main Street (APN 009-350-047, 048, and 017). No less than eighty-five percent of the grapes used for the wine produced by Salvestrin Winery shall be grown on the premises. The premises may be reduced in size without approval of an amendment to the Use Permit.
10. The facility shall not be used for custom production of wines by entities other than Salvestrin Winery. Crushing, fermentation, and barrel aging will occur on site. Bottling, storage, and additional crushing and fermentation will take place at other wineries.
11. Tasting and sale of wine shall be by appointment only; no public tours or tasting are permitted. No items other than wine produced on the premises, as defined in condition #9 above, shall be sold at the winery. Appointments for visits to the winery, including marketing events but not including B & B guests or family members, are limited to two hours per day, two days per week, with no more than 10 persons visiting on one day.
12. No temporary events open to the public are permitted at the winery.
13. No signs shall be installed without Planning Commission approval of a Sign Permit. The winery identification sign shall include a statement that the winery is not open to the public for tours or tasting, and that tasting and sale of wine is by appointment only.
14. The winery shall utilize well water. Prior to issuance of building permits for the establishment of the winery, the owners shall sign a water use agreement with the City of St. Helena acknowledging that there is no guarantee of future use of municipal water if the well fails.

(Planning/96.Projects/96-102/UP.96-102)

15. Prior to issuance of building permits for the establishment of the winery the owner shall sign a deferred improvement agreement for the dedication and construction of a minimal pedestrian path for public use along the Main Street frontage of this parcel located at 397 Main Street (APN 009-350-047) and a separate deferred improvement agreement for the acquisition, dedication and construction of the continuation of the path on the adjacent property located at 357 Main Street (APN 009-350-048). The owners shall be entitled to petition the City Council to terminate the deferred improvement agreement for the path along the frontage of 357 Main Street in the event that they prove that the grapes from this parcel are no longer utilized in the wine produced by Salvestrin Winery. When the construction of the pedestrian path is deemed necessary the design of the path shall be subject to Design Review by the Planning Commission.
16. The Building Official shall inspect the tank house to insure compliance with the provisions of the Uniform Building Code prior to the change in use. Building shall be brought into compliance prior to occupancy by the winery.
17. The Fire Department shall review the access drive and the adequacy of the staging area for emergency vehicles prior to occupancy by the winery. The owners shall install a Knox box rapid entry system as required by the Fire Chief.
18. Winery wastewater shall be disposed of in an on-site septic system. The owners shall secure a permit from Napa County Department of Environmental Management for a winery septic tank and additional leachlines. Operation of the winery shall be in compliance with the October 22, 1996 memo from the Napa County Department of Environmental Management.
19. Parking shall be located as shown on Exhibit A, dated 12/03/96. Parking shall be compacted and surfaced with decomposed granite, shale, gravel or other suitable surface.
20. Fire equipment shall be installed as required by the Fire Marshall. Equipment shall be subject to annual inspections.
21. No signs, awnings, or facade modifications shall be installed or constructed without approval of a Sign Permit or Design Review.
22. Trash bins shall not be visible from public right of way.

**Section 3.** The City Clerk is hereby directed to record this Use Permit at the office of the County Recorder of the County of Napa.

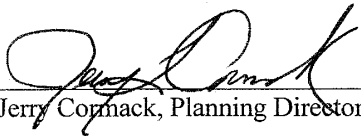
**I HEREBY CERTIFY** that the foregoing Use Permit was duly and regularly approved by the Planning Commission of the City of St. Helena at a regular meeting of said Planning Commission held on December 3, 1996 by the following roll call vote:

**AYES:** Commissioners Ryan, Fanucci, Potter, Chairman York

**NOES:** None

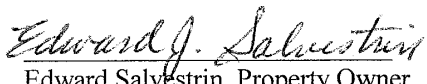
**ABSENT:** Commissioner Beatty

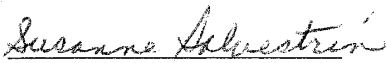
**ATTEST:**

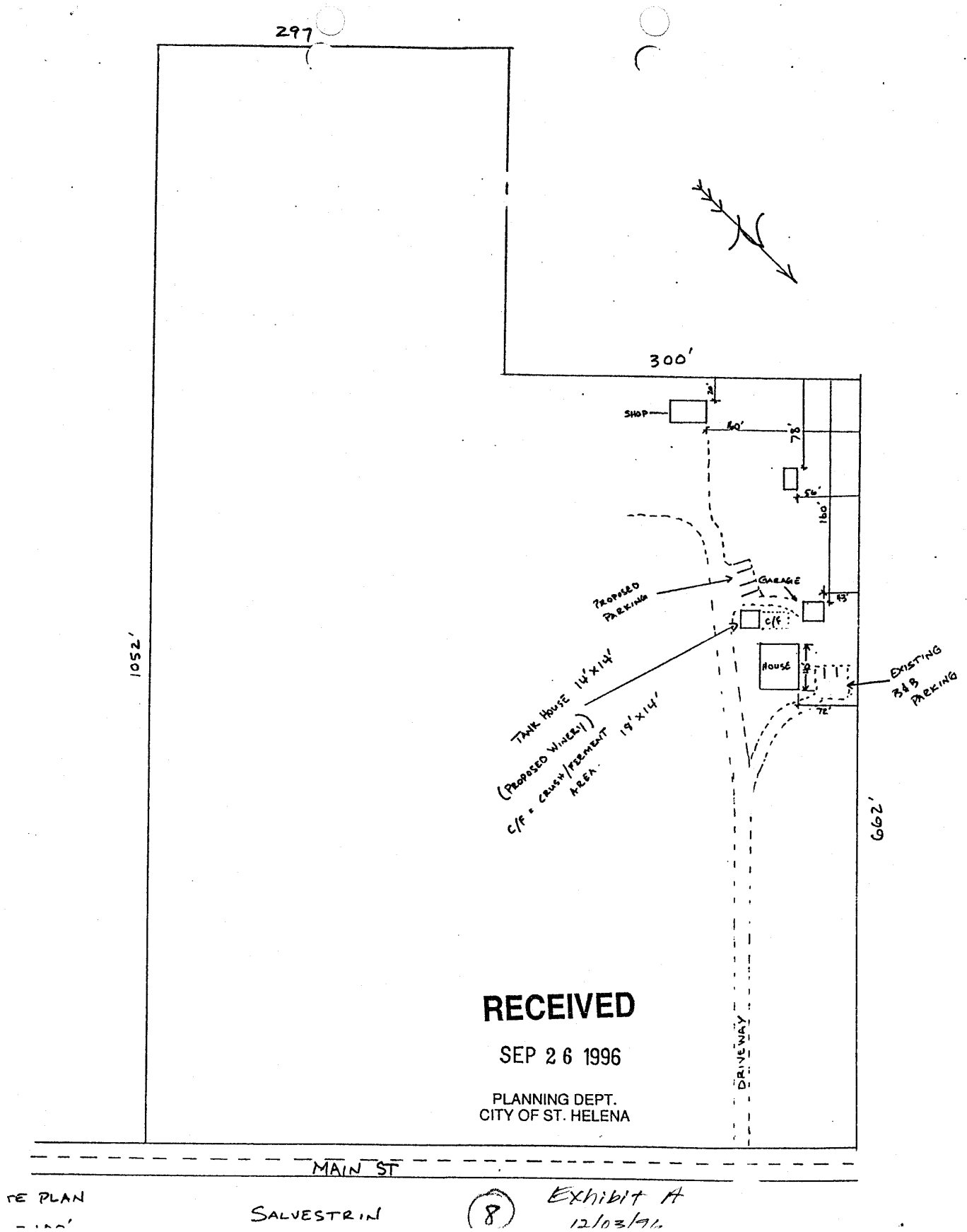
  
Jerry Cornack, Planning Director

  
Richard Salvestrin, Applicant



  
Edward Salvestrin, Property Owner

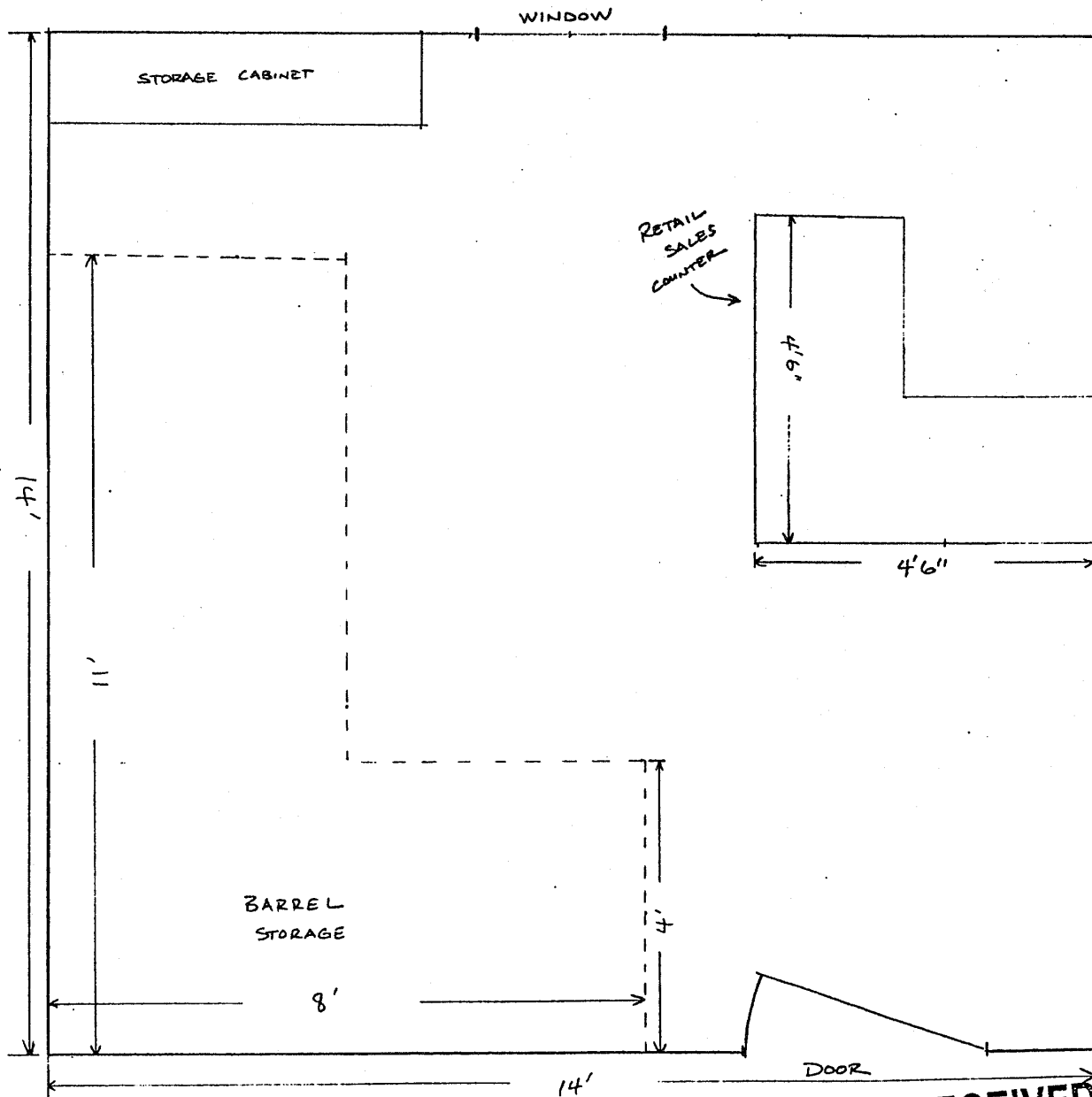
  
Suzanne Salvestrin, Property Owner



SALVESTRIN PROJECT  
TANK HOUSE FLOOR PLAN  
FIRST FLOOR

9-16-96

SCALE - 1" = 2'



⑨

Exhibit B  
12/03/96

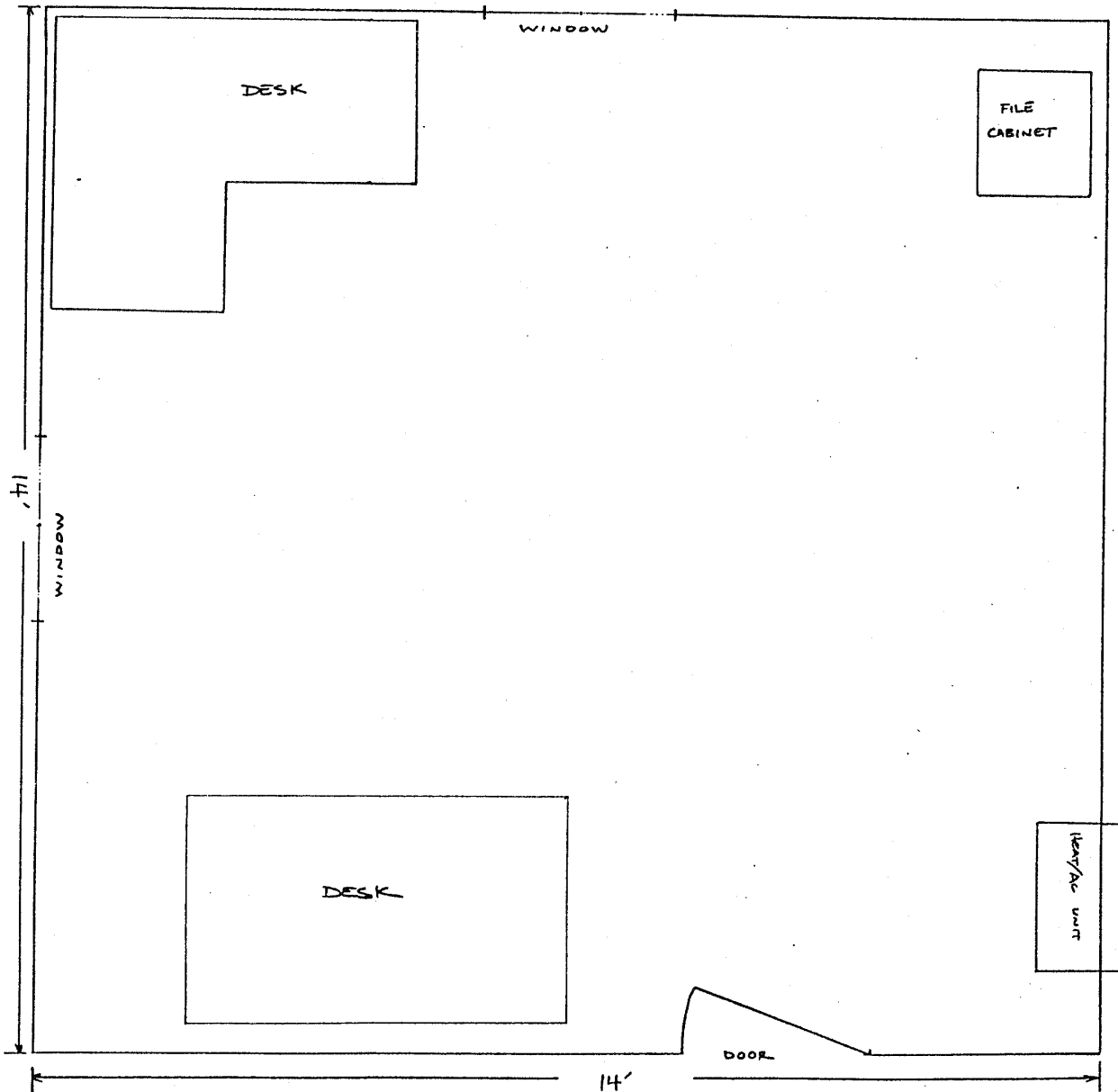
RECEIVED

SEP 26 1996

END OF DOCUMENT

OLIVESTRIN PROJECT  
ANK HOUSE FLOOR PLAN  
SECOND FLOOR OFFICE

9-16-96



RECEIVED

SEP 26 1996

(10)

Exhibit C 12/03/96  
SCALE

**USE PERMIT AMENDMENT and DESIGN REVIEW NO. 2000-82**

**USE PERMIT AMENDMENT and DESIGN REVIEW OF THE CITY OF ST. HELENA  
STATE OF CALIFORNIA, GRANTED TO  
RICHARD SALVESTRIN for an EXPANDED PRODUCTION CAPACITY and for  
CONSTRUCTION of a SMALL WINERY BUILDING  
397 MAIN STREET**

PROPERTY OWNER: Ed and Susanne Salvestrin APN: 009-350-047

WHEREAS, **Richard Salvestrin** submitted an application for a Use Permit Amendment to expand the production capacity of the existing Salvestrin winery and for Design Review for the construction of a small winery building at **397 Main Street** in the A-20: Twenty Acre Agriculture district. The main portion of the building will be a 2,400 square foot production area, which will house barrels and tanks and will have a space for processing and for storing equipment. There will also be a two-story portion of the building consisting of 400 square feet of lab/office, bathroom, and storage downstairs, and a 400 square foot tasting room upstairs. Finally, there will be a 1,100 square foot covered crush pad located on the west side of the new building.

The main production area and the tasting room area will have rough-sawn redwood plywood board and batten walls. The downstairs portion of the building will have stone masonry walls and the entire building will have a composition shingle roof to match the house/bed and breakfast.

The proposal includes construction of three additional on-site parking spaces and a new gravel access road around the eastern side of the new winery building.

The total amount of non-agricultural coverage on this parcel is approximately 0.46 acres.

The Planning Commission of the City of St. Helena, State of California, held a noticed public hearing on June 20, 2000, August 1, 2000 and August 15, 2000 for purposes of discussing small winery policy.

**WHEREAS**, the Planning Commission of the City of St. Helena, State of California, held a noticed public hearing on January 16, 2001 for the purpose of reviewing the Salvestrin Use Permit and Design Review applications.

**NOW, THEREFORE, BE IT RESOLVED** by the Planning Commission of the City of St. Helena as follows:

**Section 1.** The Planning Commission hereby finds that the operation of the winery is exempt pursuant to Section 15303, Class 3 New Construction or Conversion of Small Structures, which exempts construction and location of limited numbers of new, small facilities or structures in urbanized areas, including commercial buildings not exceeding 10,000 square feet in floor area.

U:\data\Planning\2000\2000Projects\2000-82\UPandDR.2000-82.doc

**Section 2.** Pursuant to Section 27.439, the Planning Commission makes the following findings to support the motion to approve the Use Permit Amendment:

1. That the proposed use would not generate odors, fumes, dust, light, glare, radiation or refuse that would be injurious to surrounding uses or to the community.
2. That the proposed use would not generate levels of noise that adversely affect the health, safety, or welfare of neighboring properties or uses.
3. That the proposed use would not generate traffic noise in excess of the "normally acceptable" range identified in the General Plan.
4. That the proposed use would not make excessive demands on the provision of public services including water supply, sewer capacity, energy supply, communication facilities, police protection, and fire protection.
5. That the proposed use would provide adequate ingress and egress to and from the proposed location.
6. That allowing the proposed use would not conflict with the City's goal of maintaining the economic viability of a local serving economy.
7. That the proposed use would be compatible with surrounding land uses and would not conflict with the purpose established for the district within which it would be located.
8. That the proposed use would not be in conflict with the City's General Plan.
9. That the proposed use would not be injurious to public health, safety, or welfare.
10. That granting the use permit would not set a precedent for the approval of similar uses whose incremental effect would be detrimental to the City or would be in conflict with the General Plan.
11. That, as demonstrated on a detailed plan submitted by the applicant, adequate off-street parking to accommodate the long term parking needs of employees and business owners and customers is available.
12. That the capacity of surrounding streets is adequate to serve the automobile and delivery truck traffic generated by the proposed use.

**Section 3.** The Use Permit and Design Review for the use described above are granted subject to compliance with the following conditions. The permits shall be in conformance with all City ordinances, rules, regulations and policies in effect at the time of issuance of a building permit. The conditions noted below are particularly pertinent to these permits and shall not be construed to permit violation of other laws and policies not so listed.

USE PERMIT AMENDMENTS and DESIGN REVIEW CONDITIONS

1. All conditions of Use Permit and Design Review #96-102 shall apply to this Use Permit Amendment unless the following conditions define a more stringent requirement. In this case, the new condition will take precedence over the previous condition.
2. The Use Permit and Design Review are valid for one (1) year from the date of approval or they shall expire. These permits are valid for this use only. New permits must be applied for upon any change in use. These permits will expire if the use is discontinued pursuant to then existing ordinances and regulations.
3. The Use Permit and Design Review shall not become effective until fourteen (14) calendar days after approval, providing that the action is not appealed by the City Council or any other interested party within that 14 day period.
4. Any request for an extension of the Use Permit or Design Review must be justified in writing and received by the Planning Department at least thirty (30) days prior to expiration.
5. All required fees, including planning fees, development fees and building fees shall be paid prior to issuance of a building permit. Fees shall be those in effect at the time of the issuance of the building permit. Current fees are attached hereto.
6. Compliance with all permit conditions shall occur in accordance with specific regulations, but in all cases not later than prior to occupancy or initiation of use unless another time is set by law or by this approval. Occupancy or final inspection of a project may be withheld if all conditions, including payment of fees for services rendered by the City, are not met.
7. The applicant will defend and indemnify and hold the City, its agents, officers, and employees harmless of any claim, action or proceedings to attack, set aside, void or annul an approval so long as the City promptly notifies the applicant of any such claim, action, or proceedings and the City cooperates fully in the defense of the action or proceedings.
8. Provided they are in general compliance with the Use Permit or Design Review, minor modifications may be approved by the Planning Director.
9. The Use Permit and Design Review shall run with the land and shall be binding upon all parties having any right, title or interest in the real property or any part thereof, their heirs, successors and assigns, and shall inure to their benefit and the benefit of the City of St. Helena.
10. The primary purpose of this review is for compliance with the General Plan and Zoning Ordinance. The owner/applicant is responsible for meeting with the Building Official / Fire Inspector to review compliance with Building and Fire Codes, including fire protection systems and the accessibility standards of Title 24.
11. Design Review approval will be required for the construction of additional structures on the property. Non-agricultural coverage shall not exceed one (1) acre.

12. All uses of the property shall be in compliance with the A-20: Twenty Acre Agriculture district zoning regulations.
13. Construction shall be in compliance with plans marked Exhibits A – G, dated 01/16/01. All plans are subject to review and approval by the Napa County Environmental Management, the City of St. Helena Building Official and Fire Marshal, and the City Engineer.
14. The winery is authorized as an accessory use to a residential use. The residential use shall be the primary residence of the winery owner.
15. The maximum production capacity of the winery is limited to 11,500 gallons.
16. The processing and sale of wine is limited to that primarily produced on the premises. A minimum of 85% of the grape source utilized for the wine produced at the winery shall be grown on the premises.

*Premises is defined as the parcel where the winery is located (397 Main Street), and the contiguous properties at 347 and 357 Main Street.*

*Produced is defined as any aspect of the winemaking process. For example, grapes grown off-premises cannot be brought to the winery for crushing only.*

17. Winery employees, exclusive of vineyard workers, are limited to two employees who are not family members living on the premises. Any seasonal vineyard workers are not included in this limit.
18. Tasting and sale of wine shall be by appointment only. No public tours or tasting are permitted. No items other than wine produced on the premises shall be sold at the winery. Appointments for visits to the winery, including marketing events, but not including B & B guests or family members, are limited to two hours per day, two days per week, with no more than 10 persons visiting on one day
19. Public events are not permitted at the winery.
20. The mobile bottling line truck shall be parked on-site and shall not block access to the home or the winery.
21. All winery operations shall be conducted within the winery building.
22. Pomace shall be composted in the existing vineyard or by Upper Valley Disposal Service. Winery operations shall generate no discernible odors of sewerage or putrefying organic material origin, other than normal fermentation odors, at the property line.
23. The winery shall comply with all of the regulations of state (ABC) and federal (ATF) agencies. No winery business is permitted on the premises until the appropriate permits have been obtained.

24. An on-site septic system and leach field shall be utilized for waste disposal. In the event that the existing septic system and leach field need to be expanded to service the expanded production capacity, plans shall be subject to review and approval by the City Engineer and Napa County Environmental Management prior to issuance of a building permit for the winery and the well shall be installed prior to issuance of a Certificate of Occupancy.
25. Water for all winery and vineyard uses shall be supplied by an on-site well. No municipal water shall be used. If the existing well(s) on the property cannot support the requested increase in production capacity, an expanded well shall be approved by the Napa County Environmental Management and the City Engineer and shall be installed to supply all winery and vineyard irrigation prior to issuance of Certificate of Occupancy. Total water use, including municipal and well water, for the parcel at 397 Main Street shall be limited to one acre foot of water per acre of land or a total of 12.05 acre feet of water per year. A meter shall be installed on the well to measure all groundwater used on the parcel. Meter readings shall be recorded monthly and reported to the Director of Public Works at the beginning of May and November of each year.
26. The applicant shall sign a water use agreement, as defined in Condition #14 of Use Permit 96-102, prior to issuance of Certificate of Occupancy.
27. Submission of a soils report and an erosion control plan may be required if deemed necessary by the City Engineer.
28. The winery building shall have fully monitored interior and exterior fire sprinklers. A Knox box rapid entry system is required for each winery building.
29. All winery facilities must be in compliance with ADA regulations.
30. Landscape plans shall be submitted with the application for building permit and installed prior to occupancy of the winery. Plans shall be designed and verified by a landscape professional and shall include drought tolerant landscaping. Landscaping shall not block vision from exits or at street intersections.
31. A Hazardous Materials Business Plan must be submitted and approved by the Hazardous Materials Section of the Napa County Department of Environmental Management. This must be submitted within 60 days of receiving the use permit unless the applicant submits a letter stating the hazardous materials will not be brought on site until a specified future date. In this case, the Business Plan must be submitted within 30 days of bringing the Hazardous Materials on site.
32. Exterior lighting shall be directed or shielded to prevent glare onto the public roadway or adjacent properties.
33. A backflow prevention device shall be installed prior to occupancy unless waived by the Public Works Director.

34. No signs, awnings, or facade modifications shall be installed or constructed without approval of a Sign Permit or Design Review as deemed necessary by the Planning Director.
35. The applicant shall provide for the enclosed storage of trash and separated recyclable materials. The design of the trash storage and recycling area shall be reviewed and approved by the Planning Director.
36. The builder shall submit manufacturer information pertaining to the noise generation of any mechanical equipment that is proposed to be located on the exterior of the structure. The information will help the building official determine whether the ambient noise level at any property line will be increased by more than 5 dba. If it is determined that the noise level will be increased by more than this amount, appropriate measures shall be imposed to reduce the increase in the ambient noise level to less than 5 dba. These measures could include replacement, relocation, removal or shielding of the equipment.
37. To reduce disturbance of residents in the project vicinity, construction activities which generate noise that can be heard at the property line of any parcel of real property within the City limits shall be limited to 8:00 a.m. to 5:00 p.m. Monday through Saturday. Delivery of materials/equipment and cleaning and servicing of machines/equipment shall be limited to 7:00 a.m. to 6:00 p.m. Exceptions to these time restrictions may be granted by the Public Works Director for one of the following reasons: (1) inclement weather affecting work, (2) emergency work, or (3) other work, if work and equipment will not create noise that may be unreasonably offensive to neighbors as to constitute a nuisance. The public Works Director must be notified and give approval in advance of such work. No construction activities shall occur on Sundays or federal or local holidays that generate noise that can be heard at the property line of any parcel of real property within the City limits.
38. The property is located in an agricultural district and there exists a right-to-farm the adjoining property. There is a good faith expectation that no complaints will occur regarding legal, normal agricultural activities on the adjacent land. Such activities may include day or night disbursement of chemicals, and creation of dust, noise, or fumes.
39. The following definitions shall apply:

***Winery** is defined as an agricultural processing facility used for the fermenting and processing of grape juice into wine or the refermenting of still wine into sparkling wine.*

***Accessory use** is defined as any use subordinate to the main use and customarily a part thereof. An accessory use must be clearly incidental, related and subordinate to the main use, reasonably compatible with the other principal uses in the zoning district and with the intent of the zoning district and cannot change the character of the main use.*

***Tours and tastings** are tours of the winery and/or tastings of wine, where such tours and tasting are limited to members of the wine trade, persons invited by a winery who have pre-established business or personal relationships with the winery or its owners, and persons who have made unsolicited prior appointments for tours or tastings.*

*Marketing of wine is defined as any activity of a winery conducted at the winery and is limited to members of the wine trade, persons who have pre-established business or personal relationships with the winery or its owners, or members of a particular group for which the activity is being conducted on a pre-arranged basis. Marketing of wine is limited to activities for the education and development of the persons or group listed above with respect to wine which can be sold at the winery on a retail basis and may include food service without charge except to the extent of cost recovery when provided in association with such education and development, but shall not include cultural and social events unrelated to such education and development.*

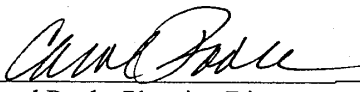
**I HEREBY CERTIFY** that the foregoing Use Permit and Design Review were duly and regularly adopted by the Planning Commission of the City of St. Helena at a regular meeting of said Planning Commission held on January 16, 2001 by the following roll call vote:

**AYES:** Commissioners Ryan, Philippakis, Chairman York

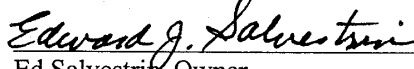
**NOES:** None

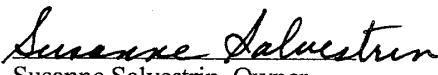
**ABSTAIN:** Commissioner Fanucci

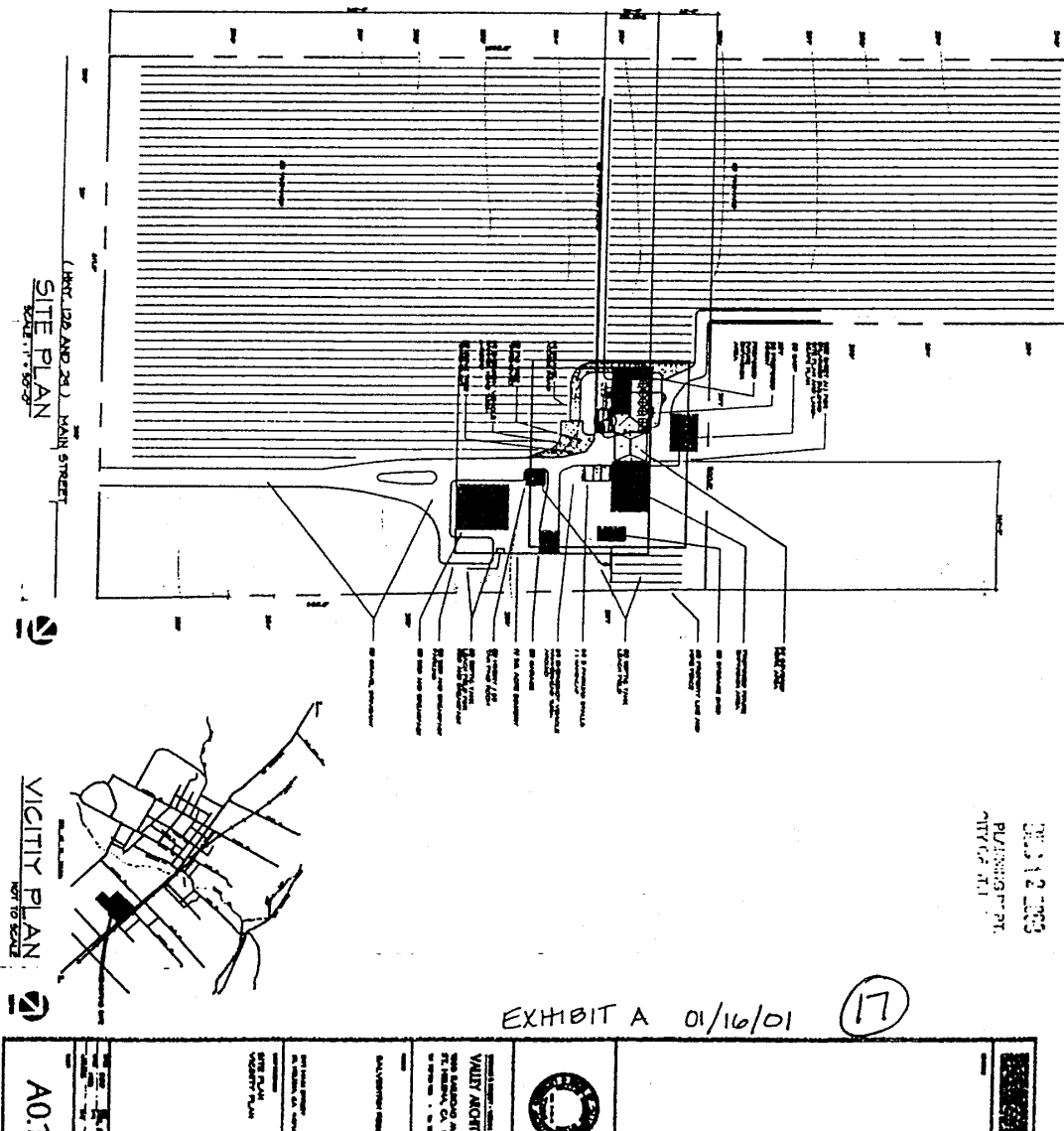
**ABSENT:** Commissioner Katz

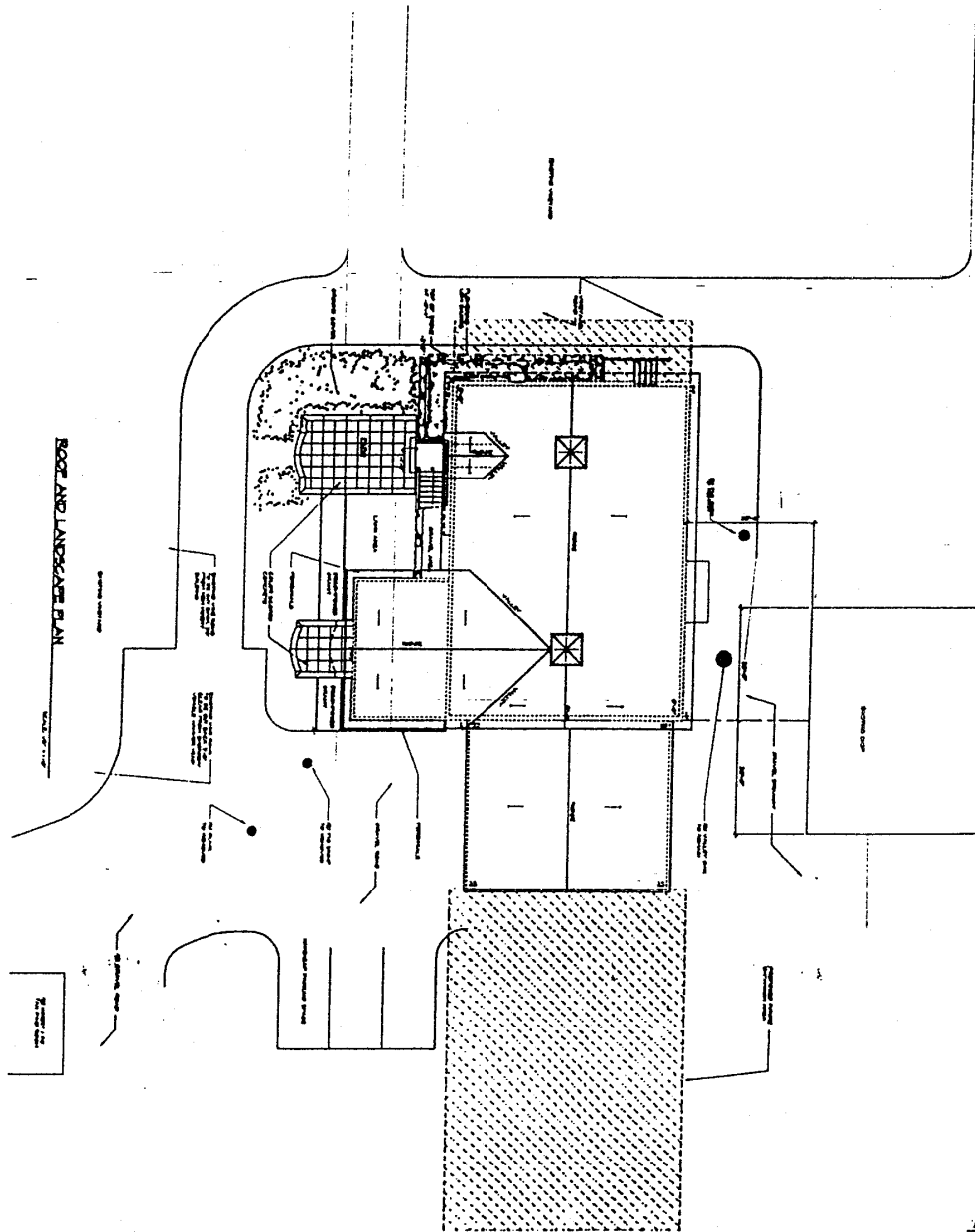
  
Carol Poole, Planning Director

  
Richard Salvestrin, Applicant

  
Ed Salvestrin, Owner

  
Susanne Salvestrin, Owner





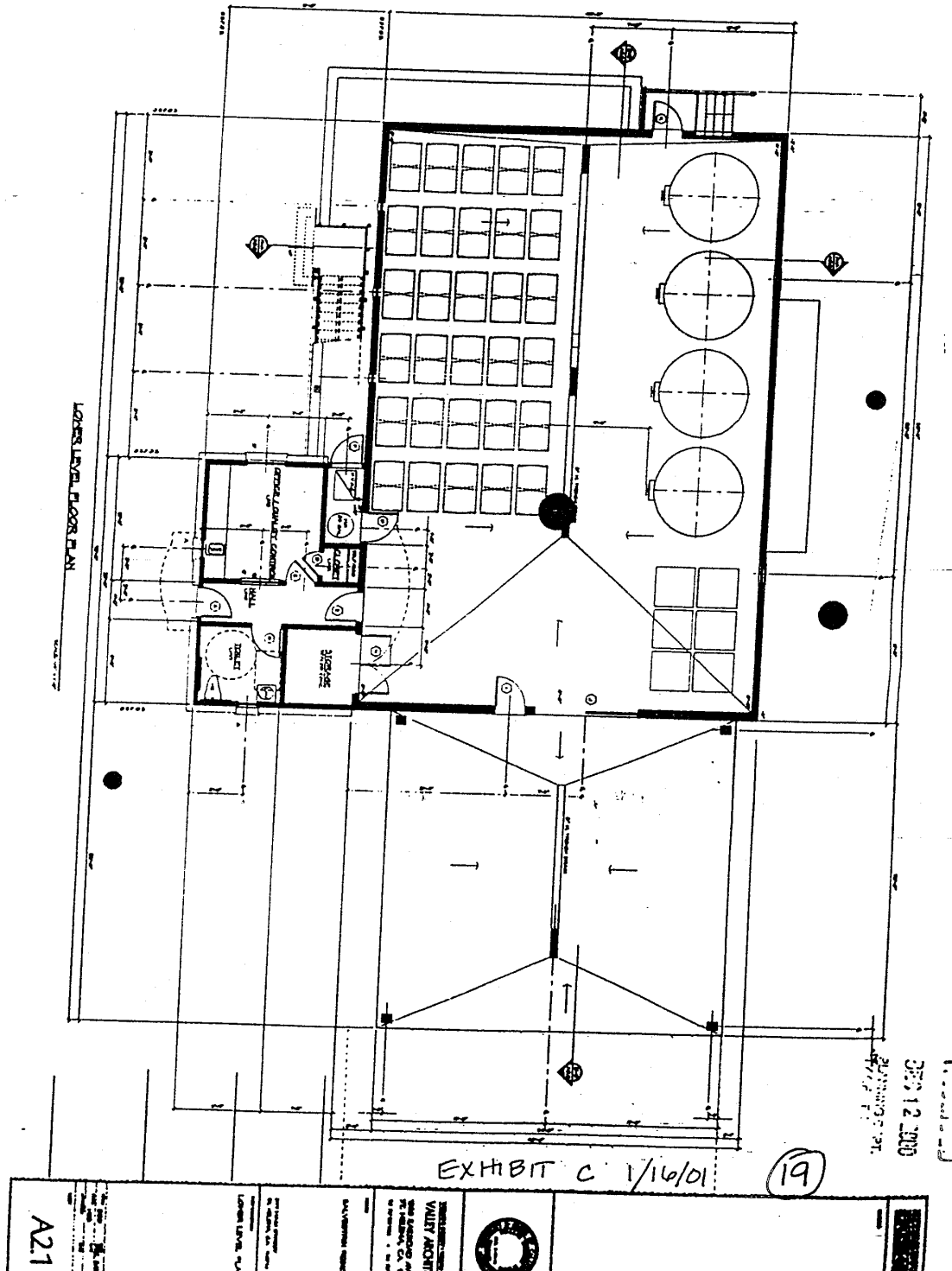
**VALLEY ARCHITECTS**  
2800 BROADWAY, SUITE 200  
SAN JOSE, CA 95128  
TEL: (415) 435-1000  
FAX: (415) 435-1001  
WWW.VA-ARCH.COM

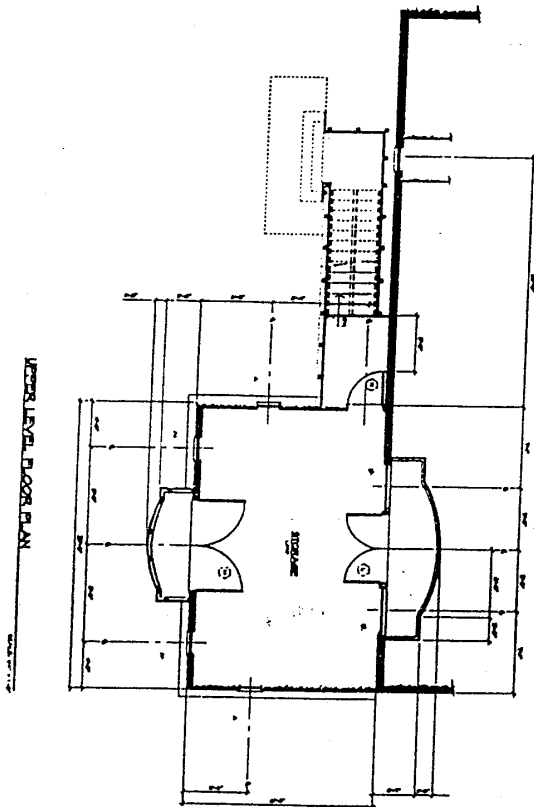
**PROJECT:** VALLEY ARCHITECTS  
**DATE:** 01/16/01  
**BY:** [Signature]

SEP 12 2000  
PLANNING DEPT.  
CITY OF SAN JOSE

EXHIBIT B 01/16/01 **(18)**

**A1.1**

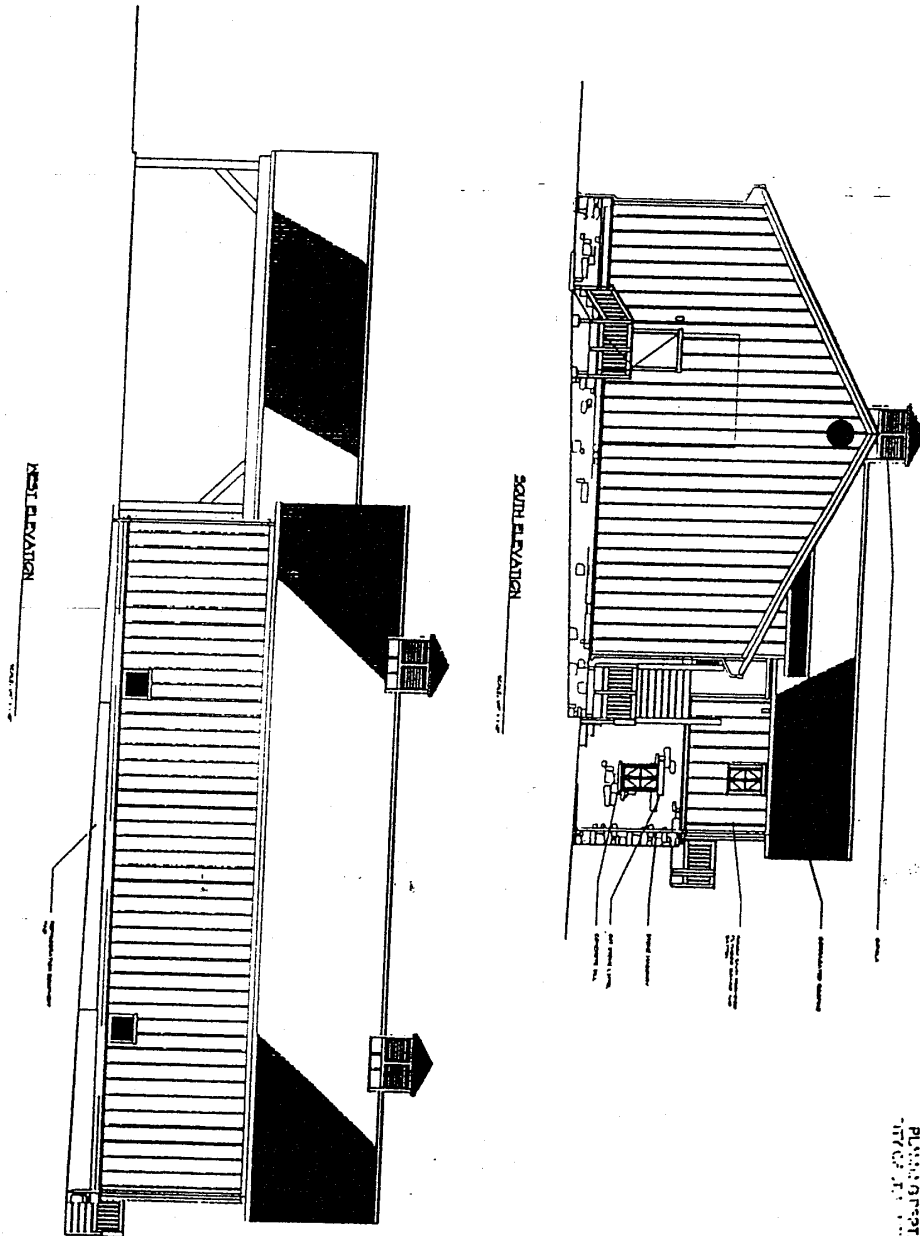




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DEC 12 2000  
PLANNING DEPT.  
CITY OF ST. LOUIS

EXHIBIT D 1/16/01 (20)

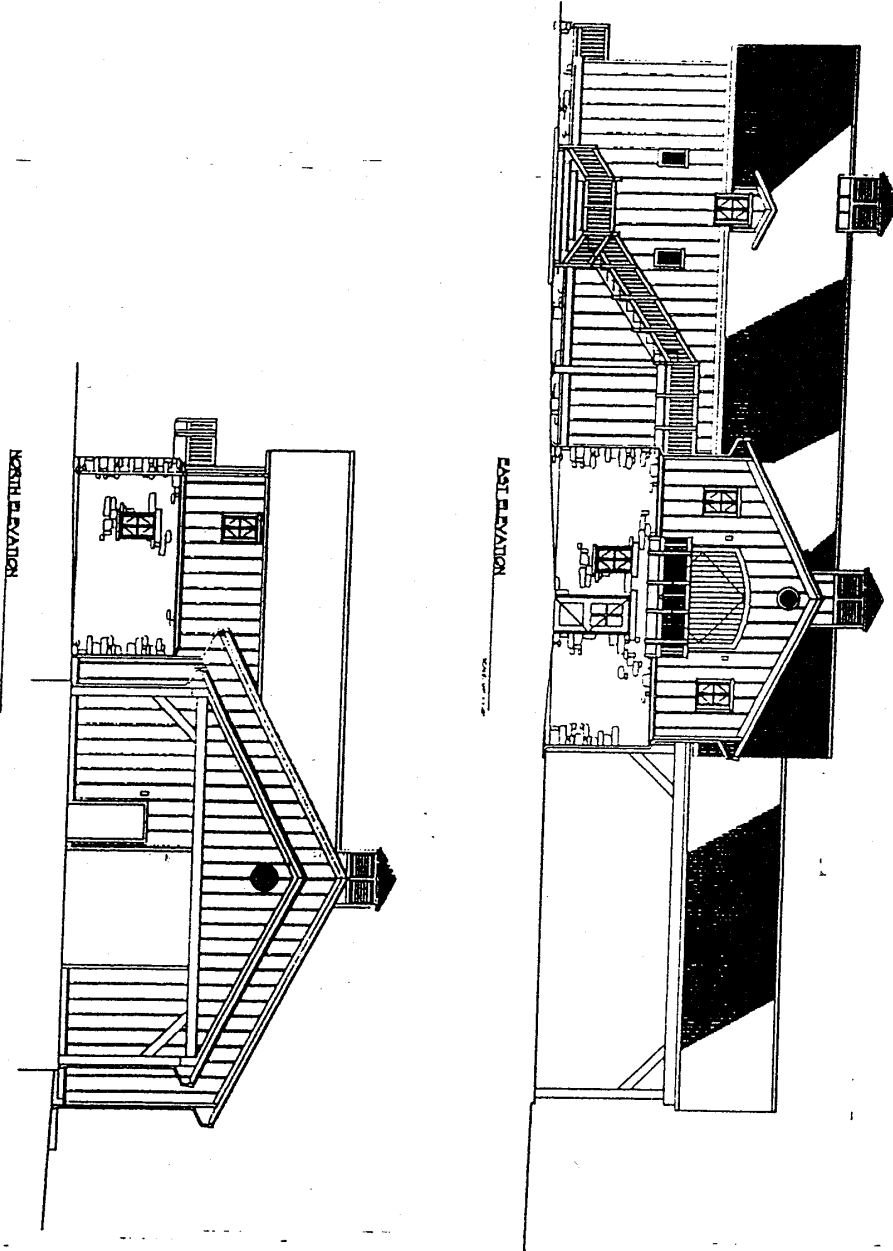
|                                                                                                                                               |                                        |                      |                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------|-----------------|
| <b>VALLEY ARCHITECT</b><br>200 S. BROADWAY, SUITE 200<br>ST. LOUIS, MO 63102<br>TEL: (314) 241-1111<br>FAX: (314) 241-1112<br>WWW.VA-ARCH.COM | <b>PROJECT:</b> UPPER LEVEL FLOOR PLAN | <b>DATE:</b> 1/16/01 | <b>BY:</b> A2.2 |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------|-----------------|



1/16/01  
 12:00  
 12:00  
 12:00

EXHIBIT E 1/16/01 (21)

|             |                         |              |              |              |              |              |              |              |
|-------------|-------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <p>A3.1</p> | <p>VALLEY ARCHITECT</p> | <p>12:00</p> | <p>12:00</p> | <p>12:00</p> | <p>12:00</p> | <p>12:00</p> | <p>12:00</p> | <p>12:00</p> |
|-------------|-------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|



DEC 12 2000  
PLANNING DEPT.  
CITY OF ST. LOUIS

22

EXHIBIT F 1/16/01

|                   |                         |                              |                           |
|-------------------|-------------------------|------------------------------|---------------------------|
| <p><b>A32</b></p> | <p><b>ST. LOUIS</b></p> | <p><b>PLANNING DEPT.</b></p> | <p><b>DEC 12 2000</b></p> |
|                   | <p><b>ST. LOUIS</b></p> | <p><b>PLANNING DEPT.</b></p> | <p><b>DEC 12 2000</b></p> |

