FINAL REPORT

Traffic Impact Study for Artesa Vineyards Project

In the County of Sonoma

December 2, 2004

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INTRODUCTION AND SUMMARY

Introduction

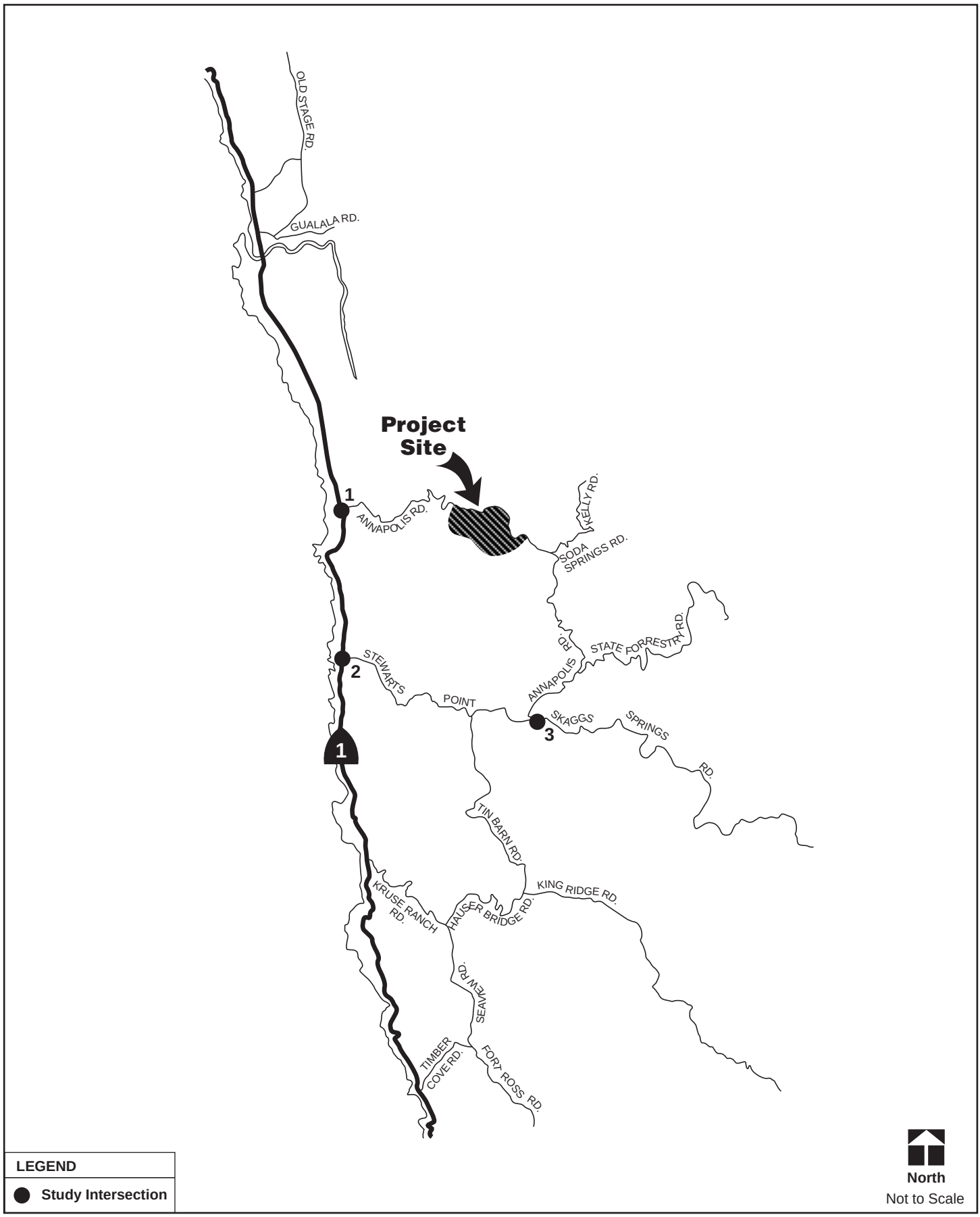
The conversion of approximately 200 acres of timberland to vineyard is proposed in the County of Sonoma. The project site is located southerly of Annapolis Road, approximately 5 miles east of State Route 1 (SR-1). The project site and its vicinity are shown in Figure 1.

Summary

The project is not expected to substantially increase overall delay at the intersections of SR-1/Annapolis Road, SR-1/Stewarts Point Road and Stewarts Point Road/Annapolis Road. The project does not trigger the need for traffic signal installation at these intersections. No other mitigation measures are needed.

Trip generation was estimated by using production rates of typical vineyards, trip generation research for wineries conducted by Sonoma County, and telephone interview with vineyard Director of Operations. During the harvest season, the proposed 200-acre vineyard will generate 128 average employee daily trips with 78 trips occurring during the morning and afternoon periods. Two trucks per day will be required to haul the harvested grapes.

The two bridges on Annapolis Road and Stewarts Point Road are expected to adequately serve projected traffic associated with the timberland conversion to a vineyard.



County of Sonoma
Artesa Vineyards Project

Vicinity Map

Figure 1

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Methodology

The study evaluated traffic conditions at the following intersections:

1. SR-1/Stewarts Point Road
2. Stewarts Point Road/Annapolis Road
3. SR-1/Annapolis Road

The study also evaluated level of service at the following links:

1. SR-1 between Annapolis Road and Stewarts Point Road
2. Annapolis Road between SR-1 and Stewarts Point Road
3. Stewarts Point Road between SR-1 and Annapolis Road

The following four scenarios were addressed in the study:

- *Existing Conditions* – This scenario evaluates intersection and roadway conditions based on existing traffic counts and field surveys.

- *Existing plus Proposed Artesa Vineyard Project* – This scenario evaluates intersection and roadway conditions based on existing plus project traffic count estimates.

- *Future Conditions*– This scenario evaluates projected intersection and roadway conditions based on an annual growth factor that is used to extrapolate existing traffic counts into the future.

- *Future plus Proposed Artesa Vineyard Project* – This scenario evaluates intersection and roadway conditions based on future plus project traffic count estimates.

Intersection Level of Service Methodology

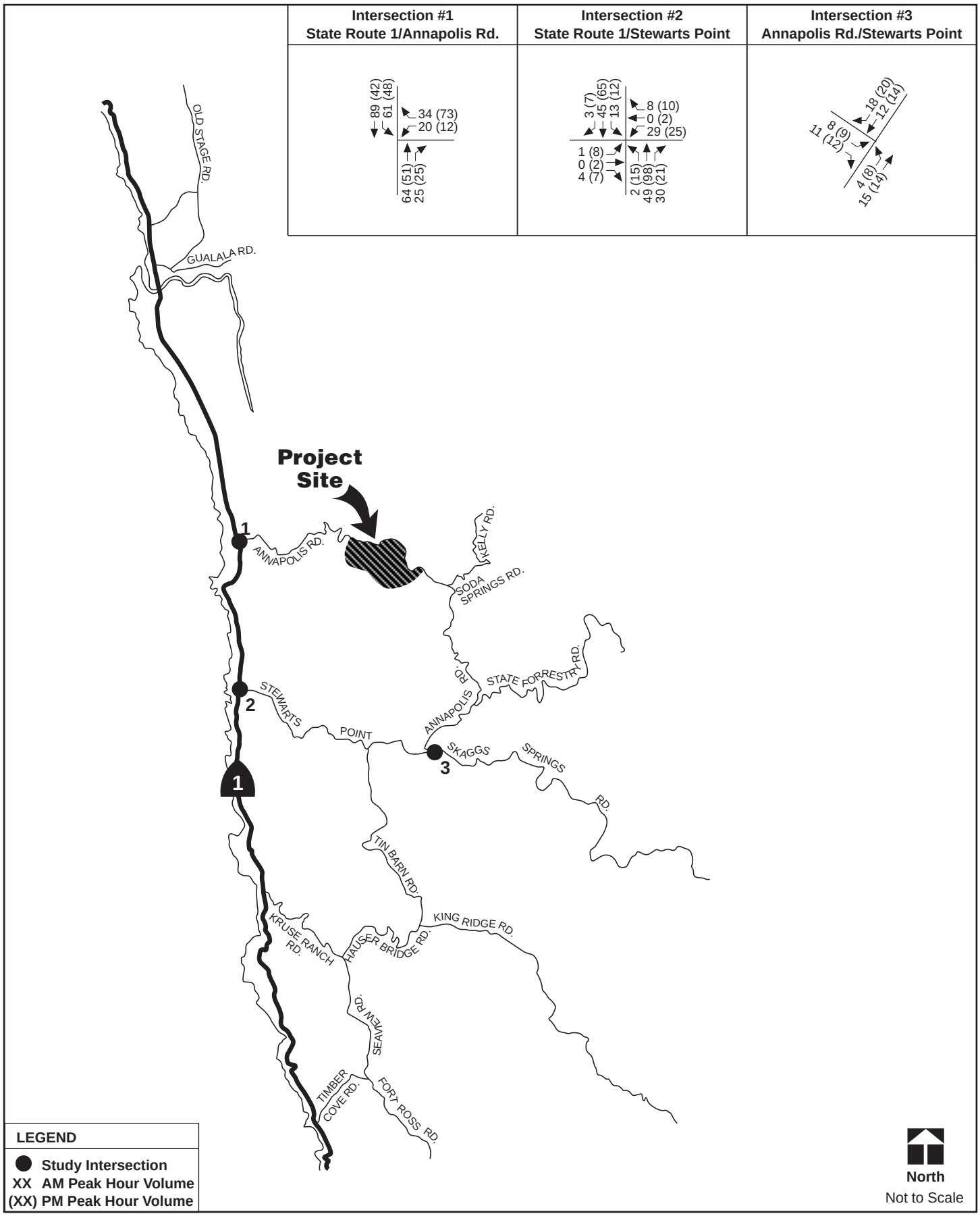
Level of Service (LOS) is a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and passengers. The LOS generally describes these conditions in terms of such factors as speed and travel time, delay, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. Six LOS are defined for each type of facility (*i.e.*, roadway or intersection) that is analyzed. They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F the worst.

Peak hour intersection conditions are reported as delay in seconds per vehicle with corresponding LOS. The operating conditions at all study intersections were evaluated using TRAFFIX version 7.6 software and Highway Capacity Manual (HCM) 2000 methodology. Appendix A contains a detailed description of this methodology.

Level of Service Standards

The *Sonoma County General Plan* is to maintain LOS C or better on arterial and collector roads. This objective is not rigidly applied and may be varied dependent upon local values (i.e., Table CT-1, Table CT-2 or Figure CT-6e [1]).

The County of Sonoma has not adopted a service level standard for non-signalized intersections.



County of Sonoma
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Existing Turning Movement Volumes

Figure
2

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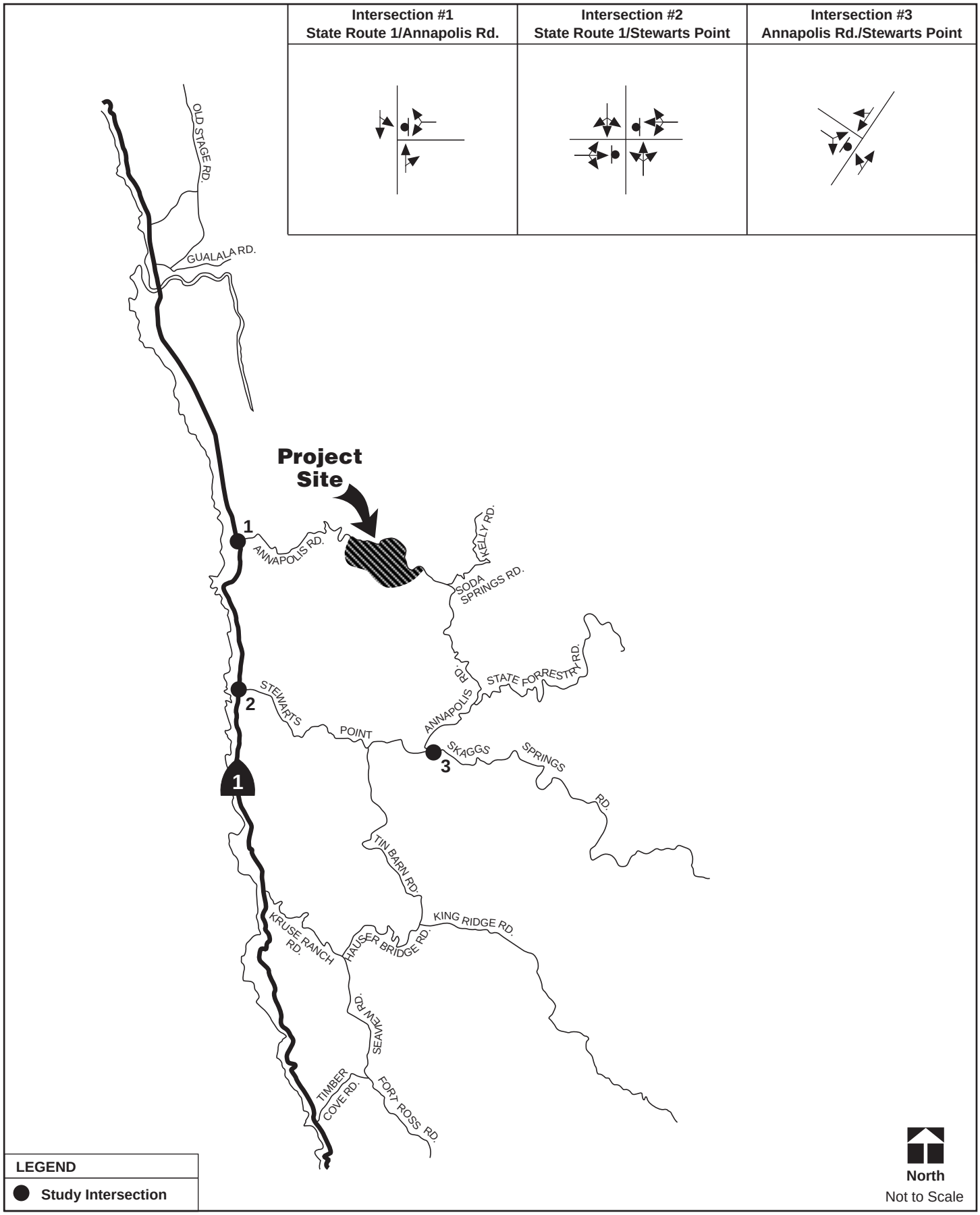

County of Sonoma
Artesa Vineyards Project

Existing Lane Configuration

Figure 3

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EXISTING PLUS PROJECT CONDITIONS

Trip Generation

Trip generation is defined as the number of "vehicle trips" produced by a particular land use or project. A trip is defined as a one-direction vehicle movement. The total number of trips generated by each land use includes the inbound and outbound trips.

The following analysis of trip generation characteristics of vineyards is deduced from the production input and output of a typical vineyard and trip generation research for wineries conducted by Sonoma County, and telephone interview with vineyard Director of Operations.

A summary of "harvest by the numbers" is given below. A single grapevine will produce 6.6 pounds of grapes during a typical year, enough to make 2.4 bottles of wine. A one-acre block of vineyard may:

- Yield about 1089 vines
- Yield about 4.5 tons of grapes
- Require 2.5 labor hours for an eight-person crew

Vineyard traffic consists of two components, employee traffic and truck traffic. Trips generated during the harvest season are used for this analysis.

Employees

The largest component of vineyard traffic is employee trips. Seasonal employees are used during the harvest season. Seasonal employment can range from two months to six months.

The number of seasonal employees needed depends upon the season and the rate at which the grapes ripen. A good yield will require about 30 to 40 tons per day harvest.

It was determined from interviews with vineyard operators that seasonal workers are typically hired on a piece rate basis (i.e. paid by amount of tonnage harvested) and full time employees on an hourly basis. For a 200-acre vineyard, nine eight-person crews (i.e., 72 seasonal workers) will be needed for harvesting the grapes. Six full time employees will be needed for vineyard operations such as vineyard equipment maintenance, irrigation, tractor work etc.

Employee trips constitute home to work trips, lunch trips, errands and other business trips. Ten percent of the employees are expected to carpool from home to work, 50 percent carpool for lunch and 0.2 trips per employee for errands and other business.

To be conservative in our analysis, a high percentage of car ownership is assumed for seasonal workers. With an average occupancy of 3 employees per car for carpooling the average employee traffic is therefore estimated as 128 trips per day.

Vineyard employees usually start work at 6:30 a.m. and get off work at 3:30 p.m. This shift is outside typical peak a.m. and p.m. periods for commute traffic. The morning and afternoon employee trips are estimated as 73 trips (obtained by assuming ten percent carpool with three person vehicle occupancy and drive alone for the remaining 70 employees). The morning and afternoon trips are the inbound and outbound trips, respectively, and are assumed to occur during the peak hour.

Truck Traffic

Truck traffic varies with the season. Trucks transport grapes from vineyards to wineries during the harvest season, which runs about eight weeks between late August and late October.

Non-harvest truck (gross vehicle weight less than 26,000 pounds) trips may include haulage of liquid fertilizers with a capacity of 3,000 gallons per truck. An estimate of 70 to 80 gallons of fertilizer is needed to fertilize one acre of vineyard. Fertilizer application depends upon vine needs. On the average, a 200-acre vineyard may require about six truck loads of fertilizer for the entire non-harvest seasons.

Grapes are usually delivered in double gondola trucks carrying 22 tons of grapes each, or on flat bed trucks carrying 11 tons of grapes each. In order to estimate the number of trucks required to deliver grapes, a truck composition of 80 percent gondola trucks and 20 percent flat bed trucks is used. On the average, each truck hauling grapes will carry 19.8 tons of fruit.

Two hundred acres of vineyard is estimated to yield 900 tons of grapes annually. This will require about 45 (= 900/19.8) trucks to haul the grapes during the harvest season. At an average harvest rate of 30 tons per day, about 30 maximum working days will be needed to harvest all 900 tons of grapes. About five days is assumed for other non-harvest activities such as loading trucks and preparing the soil for the next plantation.

We can therefore estimate the total number of weekday truck trips for the harvest season as the total number of trucks divided by the number of weekdays for the harvest multiplied by two trips (one inbound and one outbound) per truck. This translates to an average of three truck trips per day required during the harvest season.

Table IV below is a summary of peak hour traffic generated by the proposed vineyard.

TABLE II: PROJECT TRIP GENERATION

A.M. Peak Hour						**P.M. Peak Hour**					
Employee Trips		**Truck Trips**		**Total Trips**		**Employee Trips**		**Truck Trips**		**Total Trips**	
In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
73	0	2	0	75	0	0	73	0	2	0	75

*Trips assumed to occur during a.m. and p.m. peak periods.

Vineyard Trip Distribution and Assignment

Trip distribution is the process of determining in what proportion vehicles would travel between the project site and various destinations within the study area. Trip assignment is the process of determining the various route vehicles would take from the project site to each destination.

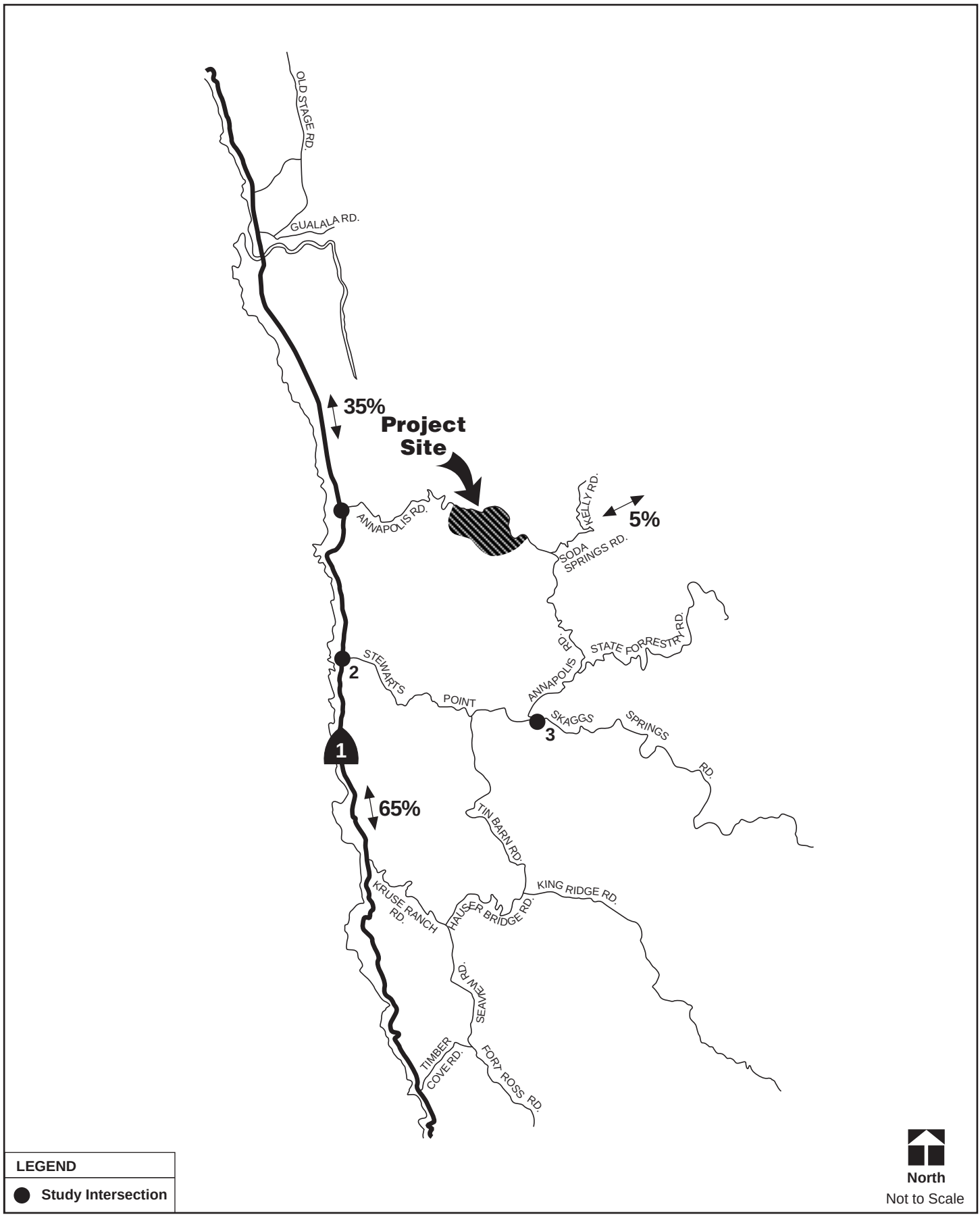
Traffic from SR-1 can only access the project site via Annapolis Road to the north and Stewarts Point Road to the south. Access via Annapolis Road appears to be the shorter of the two routes. Traffic using Stewarts Point Road will have to cross two narrow bridges with one-way traffic. This may result in more traffic using Annapolis Road to the site.

Figure 4 illustrates the trip distribution assumptions. The assumptions are based on the existing traffic counts and knowledge of the area. Trips are distributed as follows:

- 30% of traffic using Annapolis Road will travel to and from North on SR-1
- 30% of traffic using Annapolis Road will travel to and from South on SR-1
- 5% will travel to and from the surrounding areas
- 5% of traffic using Stewarts Point Road will travel to and from North on SR-1
- 30% of traffic using Stewarts Point Road will travel to and from South on SR-1

Intersection Level of Service Analysis

Figure 5 illustrates the existing plus project traffic volume projections at the study intersections. Table III summarizes the intersection levels of service under this scenario. Detailed calculations are contained in Appendix D.



County of Sonoma
Artesa Vineyards Project

Proposed Project Trip Distribution

Figure 4

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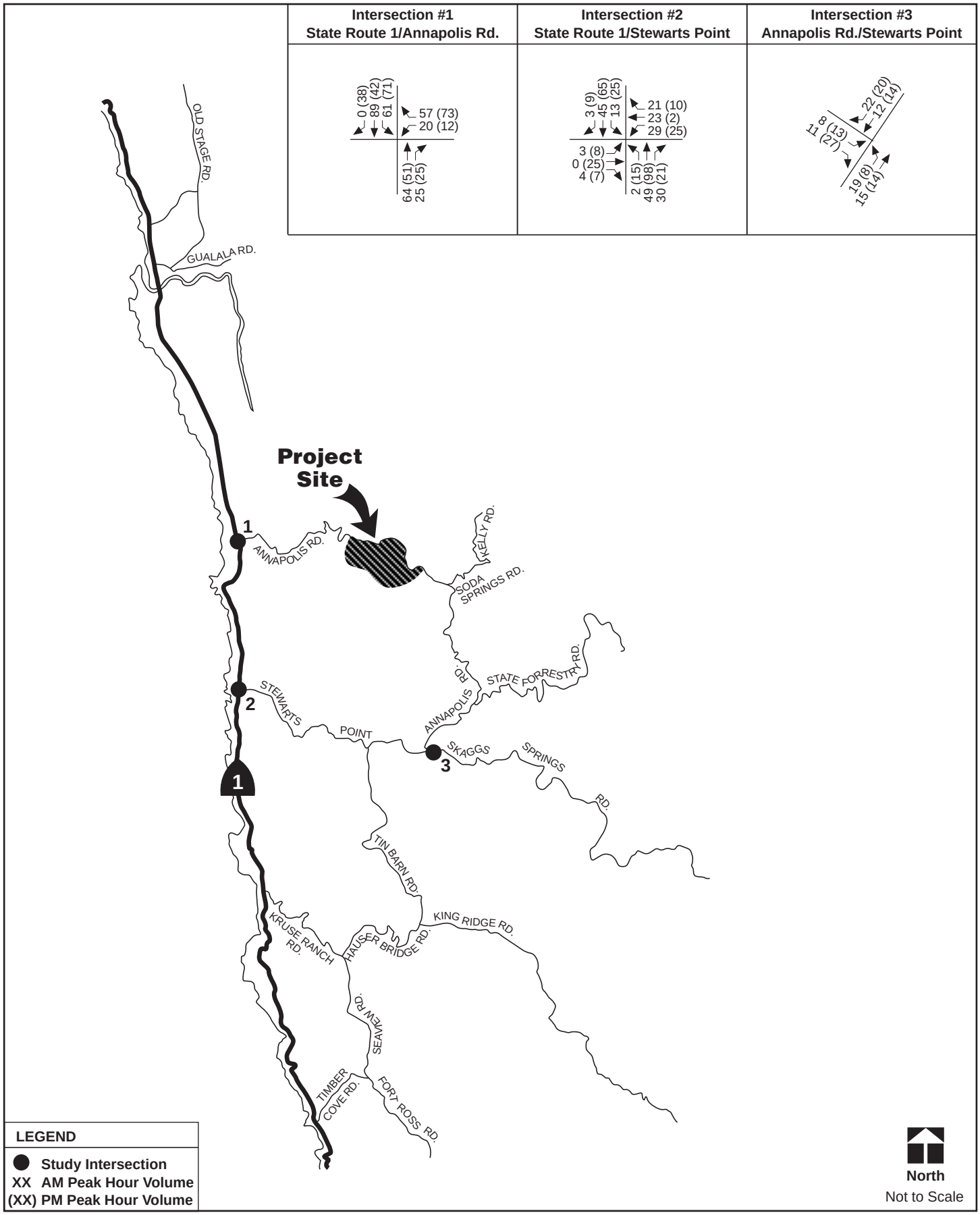

County of Sonoma
Artesa Vineyards Project

Existing + Project Turning Movement Volumes

Figure 5

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TABLE III: EXISTING PLUS PROJECT CONDITIONS INTERSECTION LEVELS OF SERVICE

Intersection	Control	A.M. Peak Hour		P.M. Peak Hour	
		Delay	LOS	Delay	LOS
State Route 1/Stewarts Point Road	Two-Way STOP	7.4(10.0)	A (A)	8.6(10.4)	A (A)
Stewarts Point Road/Annapolis Road	One-Way STOP	3.4(8.7)	A (A)	4.2(8.7)	A (A)
State Route 1/Annapolis Road	One-Way STOP	8.6(11.4)	A (A)	6.7(9.9)	A (A)

Note: LOS = Level of Service

X = Intersection level of service

X.X = Overall intersection delay in seconds per vehicle

(X) = Level of service for the minor approach

(X.X) = Average delay for the minor approach (in seconds per vehicle)

Delay =Average stopped delay at signalized intersections and average delay for all movements at STOP-controlled intersections. Values in parenthesis indicated average delay for the critical movement at One- and Two-Way STOP-controlled intersections.

With the addition of the project traffic, all the study intersections will operate at LOS A. A Comparison of Tables I and III illustrates that the levels of service for the study intersections remain unchanged with insignificant increase in approach delay in the near term.

Link Level of Service Analysis

The level of service for SR-1, Annapolis Road and Stewarts Point Road are summarized in Table IV. Detailed calculations are included in Appendix E.

Table IV shows that SR-1, Annapolis Road and Stewarts Point Road in the project vicinity are expected to operate at LOS B or better under Existing plus Project traffic scenario. This result implies that, traffic generated by the proposed conversion of a timberland to a vineyard is not expected to cause any noticeable congestion on SR-1, Annapolis Road and Stewarts Point Road.

TABLE IV: EXISTING PEAK HOUR LEVEL OF SERVICE ON ARTERIAL ROADS

Road	Lanes per Dir.	Hourly Capacity	Time of Day	Volume	V/C	LOS
State Route 1 (Class II)	1	2280	AM	306	0.13	B
			PM	272	0.12	B
Annapolis Road (Class II)	1	1780	AM	164	0.09	B
			PM	182	0.10	B
Stewarts Point Road (Class II)	1	1780	AM	114	0.07	A
			PM	106	0.06	A

The project contribution of the proposed project trips to each roadway segment is shown in Table V below. The table shows small percent project traffic contribution to the study roadway segments. For example, the project contributes about 32 percent of the traffic under Existing plus Project Traffic Conditions on Stewarts Point Road. This is not likely to have impact on the one-way traffic movement on the two small bridges on Annapolis Road and Stewarts Point Road.

TABLE V: PERCENT PROJECT CONTRIBUTION (LINK LEVEL) – EXISTING PLUS PROJECT CONDITIONS

Roadway Segment	*Existing Traffic (a.m.)*	*Project Traffic (a.m.)*	*Total Traffic (a.m.)*	*Percent Project Traffic (a.m.)*	*Existing Traffic (p.m.)*	*Project Traffic (p.m.)*	*Total Traffic (p.m.)*	*Percent Project Traffic (p.m.)*
State Route 1 (SB link)	248	58	306	*19*	124	58	272	*22*
Annapolis Road (WB link)	140	24	164	*15*	158	24	182	*14*
Stewarts Point Road (WB link)	80	34	114	*30*	72	34	106	*32*

FUTURE CONDITIONS

Future Traffic Conditions

Projected future traffic conditions (2025 planning horizon) are based on an annual growth factor derived from link traffic volumes in Sonoma County's 1995 Congestion Management Program (CMP) Update. The County's travel demand model, currently being updated, generated average P.M. peak volumes. The growth factor was calculated from 1995 existing model-calibrated volumes and 2000 estimated volumes on State Route 1 within the project area. The 2000 volumes assumed a full-build condition of the County's Capital Improvement Program at the time. An annual growth factor of 9.7% was used to estimate growth in turning movements at all study-area intersections.

Intersection Level of Service, Future Conditions

Future 2025 A.M. and P.M. peak hour traffic turning movements for the study-area intersections are based on existing turning movement counts, which have been extrapolated to 2025 using the above-mentioned growth factor. Figure 6 shows the peak hour turning movement volumes at the study intersections.

Under future conditions without the project, all the study intersections are expected to operate at an acceptable LOS B or better for both major and minor movements. Table VI summarizes the results of the intersection level of service analysis for future without project conditions. Detailed calculations are contained in Appendix F.

TABLE VI : FUTURE CONDITIONS INTERSECTION LEVEL OF SERVICE (NO PROJECT)

Intersection	*Control*	*A.M. Peak Hour*		*P.M. Peak Hour*	
		Delay	*LOS*	*Delay*	*LOS*
State Route 1/Stewarts Point Road	Two-Way STOP	9.9 (9.9)	A (A)	10.2 (10.2)	B (B)
Stewarts Point Road/Annapolis Road	One-Way STOP	8.6 (8.6)	A (A)	8.6 (8.6)	A (A)
State Route 1/Annapolis Road	One-Way STOP	10.4(10.4)	B (B)	9.9 (9.9)	A (A)

Note: LOS = Level of Service

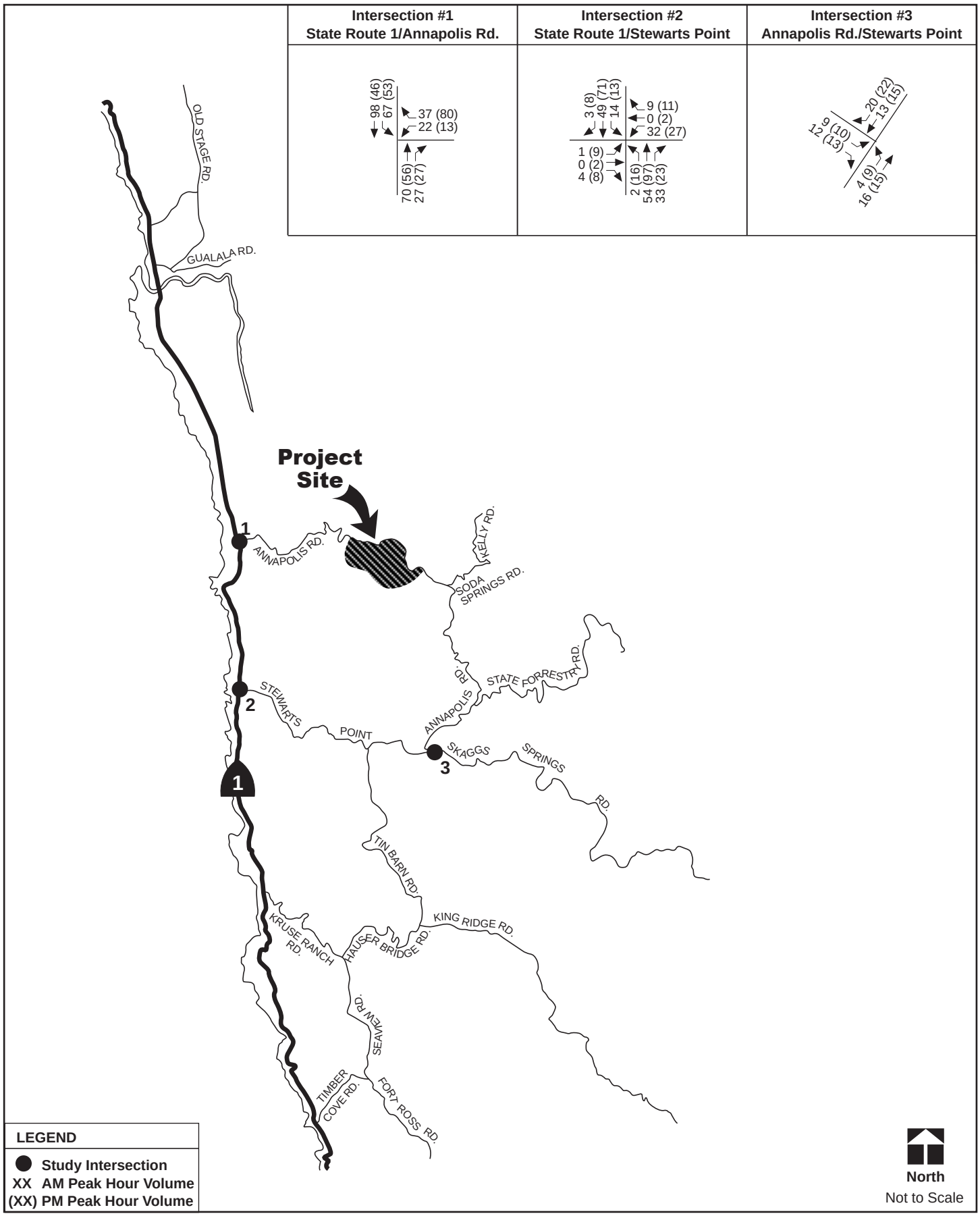
X = Intersection level of service

X.X = Overall intersection delay in seconds per vehicle

(X) = Level of service for the minor approach

(X.X) = Average delay for the minor approach (in seconds per vehicle)

Delay = Values in parenthesis indicated average delay for the critical movement at One- and Two-Way STOP-controlled intersections.



County of Sonoma
Artesa Vineyards Project

Future Turning Movement Volumes (2025)

Figure 6

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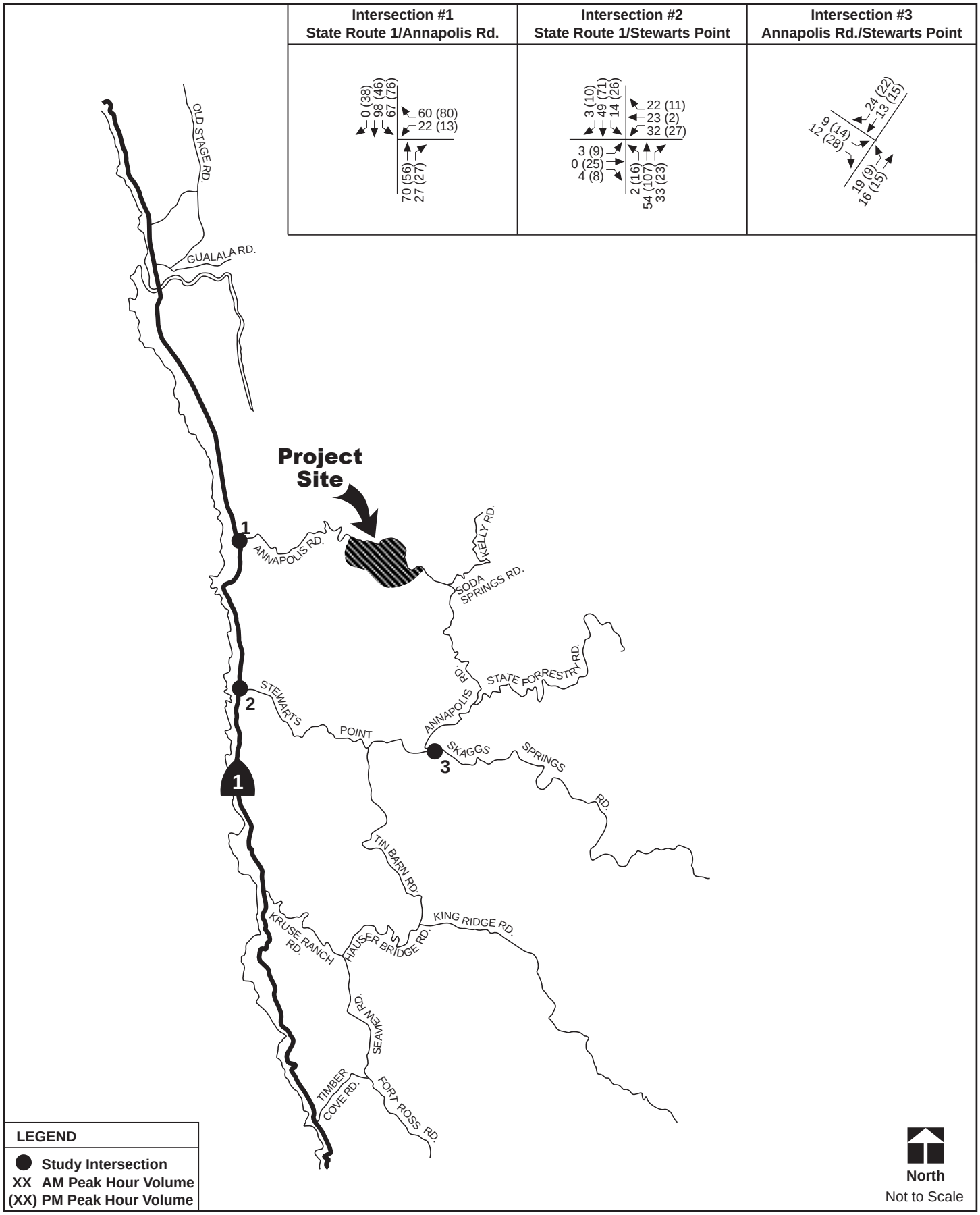
FUTURE PLUS PROJECT CONDITIONS

Trip Generation, Distribution, and Assignment

For the 2025 future plus project condition, the project's trip generation, distribution, and directional assignment are all expected to be the same as in the existing plus project condition. This report's section on existing plus project conditions contains the project's expected trip generation, distribution, and directional assignment, along with all associated assumptions.

Intersection Level of Service Analysis

Figure 7 illustrates the 2025 future plus project traffic volume projections at the study area intersections. Table VII summarizes the intersection levels of service under this scenario. Detailed calculations are contained in Appendix G.



County of Sonoma
Artesa Vineyards Project

Future + Project Turning Movement Volumes (2025)

Figure 7

117-075 - 2/4/04 - AK

TABLE VII: FUTURE PLUS PROJECT CONDITIONS: INTERSECTION LEVELS OF SERVICE

Intersection	*Control*	*A.M. Peak Hour*		*P.M. Peak Hour*	
		Delay	*LOS*	*Delay*	*LOS*
State Route 1/Stewarts Point Road	Two-Way STOP	10.1(10.1)	B (B)	10.4(10.4)	B (B)
Stewarts Point Road/Annapolis Road	One-Way STOP	8.7 (8.7)	A (A)	8.7 (8.7)	A (A)
State Route 1/Annapolis Road	One-Way STOP	11.7(11.7)	B (B)	10.0 (10.0)	B (B)

Note: LOS = Level of Service

X = Intersection level of service

X.X = Overall intersection delay in seconds per vehicle

(X) = Level of service for the minor approach

(X.X) = Average delay for the minor approach (in seconds per vehicle)

Delay =Average stopped delay at signalized intersections and average delay for all movements at STOP-controlled intersections. Values in parenthesis indicated average delay for the critical movement at One- and Two-Way STOP-controlled intersections.

With the addition of the project traffic under future 2025 conditions, all of the study intersections are expected to operate at LOS B or better. A comparison of Tables VI and VII illustrates that the study intersections will experience small but insignificant increases in approach delay. Levels of service at two intersections will change from LOS A to LOS B, though such a change is not detectable by the average driver.

Link Level of Service Analysis, 2025 Future Plus Project Conditions

The link level of service for SR-1, Annapolis Road and Stewarts Point Road under 2025 future plus project conditions are summarized in Table VIII. Detailed calculations are included in Appendix H.

Table VIII shows that SR-1, Annapolis Road and Stewarts Point Road in the project vicinity are expected to operate at LOS B or better under 2025 future plus project traffic conditions. This result implies that in the future, traffic generated by the proposed conversion of a timberland to a vineyard is not expected to cause any noticeable congestion on SR-1, Annapolis Road and Stewarts Point Road.

TABLE VIII: FUTURE + PROJECT CONDITIONS: PEAK HOUR LEVEL OF SERVICE ON ARTERIAL ROADS

Road	*Lanes per Dir.*	*Hourly Capacity*	*Time of Day*	*Volume*	*V/C*	*LOS*
State Route 1 (Class II)	1	2280	AM	330	0.14	B
			PM	293	0.13	B
Annapolis Road (Class II)	1	1780	AM	177	0.10	A
			PM	197	0.11	A
Stewarts Point Road (Class II)	1	1780	AM	114	0.06	A
			PM	139	0.08	A

The contribution of the proposed project trips to each roadway segment is shown in Table IX below. The Table shows small percent project traffic contribution to the study roadway segments. For example, the project contributes about 30 percent of the traffic under Future plus Project Traffic Conditions on Stewarts Point Road. This is not likely to have impact on the one-way traffic movement on the two small bridges on Annapolis Road and Stewarts Point Road.

TABLE IX: PERCENT PROJECT CONTRIBUTION (LINK LEVEL) – FUTURE PLUS PROJECT CONDITIONS

Roadway Segment	*Future Traffic (a.m.)*	*Project Traffic (a.m.)*	*Total Traffic (a.m.)*	*Percent Project Traffic (a.m.)*	*Future Traffic (p.m.)*	*Project Traffic (p.m.)*	*Total Traffic (p.m.)*	*Percent Project Traffic (p.m.)*
State Route 1 (SB link)	272	58	330	*18%*	235	58	293	*20%*
Annapolis Road (WB link)	153	24	177	*14%*	173	24	197	*12%*
Stewarts Point Road (WB link)	88	34	122	*28%*	78	34	112	*30%*

Conclusions

Existing and future 2025 traffic conditions will not be significantly impacted by the proposed vineyard project in Sonoma County. No measures are needed now or in the future to mitigate traffic that will be generated by the project.

The two bridges on Annapolis Road and Stewarts Point Road are expected to adequately serve projected traffic associated with the timberland conversion to a vineyard.

STUDY REFERENCES

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Lily Moore	Word Processing
Geri Foley	Graphics Designer

Data Collection

Baymetrics Traffic Resources

Persons Consulted

David DiPiero, Director of Vineyard Operations – Artesa Vineyards and Winery.

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APPENDIX A – LEVEL OF SERVICE METHODOLOGY

APPENDIX A

LEVEL OF SERVICE

The description and procedures for calculating capacity and level of service are found in Transportation Research Board, *Highway Capacity Manual 2000*. *Highway Capacity Manual 2000* represents the latest research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with level-of-service A representing the best operating conditions and level-of-service F the worst. Each level of service represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish service levels.

A general description of service levels for various types of facilities is shown in Table A-I

Table A-I

Level of Service Description

Facility Type	**Uninterrupted Flow**	**Interrupted Flow**
	Freeways Multi-lane Highways Two-lane Highways Urban Streets	Signalized Intersections Unsignalized Intersections Two-way Stop Control All-way Stop Control
LOS		
A	Free-flow	Very low delay.
B	Stable flow. Presence of other users noticeable.	Low delay.
C	Stable flow. Comfort and convenience starts to decline.	Acceptable delay.
D	High density stable flow.	Tolerable delay.
E	Unstable flow.	Limit of acceptable delay.
F	Forced or breakdown flow.	Unacceptable delay

Source: *Highway Capacity Manual 2000*

Urban Streets

The term "urban streets" refers to urban arterials and collectors, including those in downtown areas.

Arterial streets are roads that primarily serve longer through trips. However, providing access to abutting commercial and residential land uses is also an important function of arterials.

Collector streets provide both land access and traffic circulation within residential, commercial and industrial areas. Their access function is more important than that of arterials, and unlike arterials their operation is not always dominated by traffic signals.

Downtown streets are signalized facilities that often resemble arterials. They not only move through traffic but also provide access to local businesses for passenger cars, transit buses, and trucks. Pedestrian conflicts and lane obstructions created by stopping or standing buses, trucks and parking vehicles that cause turbulence in the traffic flow are typical of downtown streets.

The speed of vehicles on urban streets is influenced by three main factors, street environment, interaction among vehicles and traffic control. As a result, these factors also affect quality of service.

The street environment includes the geometric characteristics of the facility, the character of roadside activity and adjacent land uses. Thus, the environment reflects the number and width of lanes, type of median, driveway density, spacing between signalized intersections, existence of parking, level of pedestrian activity and speed limit.

The interaction among vehicles is determined by traffic density, the proportion of trucks and buses, and turning movements. This interaction affects the operation of vehicles at intersections and, to a lesser extent, between signals.

Traffic control (including signals and signs) forces a portion of all vehicles to slow or stop. The delays and speed changes caused by traffic control devices reduce vehicle speeds, however, such controls are needed to establish right-of-way.

The average travel speed for through vehicles along an urban street is the determinant of the operating level of service. The travel speed along a segment, section or entire length of an urban street is dependent on the running speed between signalized intersections and the amount of control delay incurred at signalized intersections.

Level-of-service A describes primarily free-flow operations. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal.

Level-of-service B describes reasonably unimpeded operations. The ability to maneuver within the traffic stream is only slightly restricted, and control delays at signalized intersections are not significant.

Level-of-service C describes stable operations, however, ability to maneuver and change lanes in midblock location may be more restricted than at level-of-service B. Longer queues, adverse signal coordination, or both may contribute to lower travel speeds.

Level-of-service D borders on a range in which in which small increases in flow may cause substantial increases in delay and decreases in travel speed. Level-of-service D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors.

Level-of-service E is characterized by significant delays and lower travel speeds. Such operations are

caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.

Level-of-service F is characterized by urban street flow at extremely low speeds. Intersection congestion is likely at critical signalized locations, with high delays, high volumes, and extensive queuing.

The methodology to determine level of service stratifies urban streets into four classifications. The classifications are complex, and are related to functional and design categories. Table A-II describes the functional and design categories, while Table A-III relates these to the urban street classification.

Once classified, the urban street is divided into segments for analysis. An urban street segment is a one-way section of street encompassing a series of blocks or links terminating at a signalized intersection. Adjacent segments of urban streets may be combined to form larger street sections, provided that the segments have similar demand flows and characteristics.

Levels of service are related to the average travel speed of vehicles along the urban street segment or section.

Travel times for existing conditions are obtained by field measurements. The maximum-car technique is used. The vehicle is driven at the posted speed limit unless impeded by actual traffic conditions. In the maximum-car technique, a safe level of vehicular operation is maintained by observing proper following distances and by changing speeds at reasonable rates of acceleration and deceleration. The maximum-car technique provides the best base for measuring traffic performance.

An observer records the travel time and locations and duration of delay. The beginning and ending points are the centers of intersections. Delays include times waiting in queues at signalized intersections. The travel speed is determined by dividing the length of the segment by the travel time. Once the travel speed on the arterial is determined, the level of service is found by comparing the speed to the criteria in Table A-IV. Level-of-service criteria vary for the different classifications of urban street, reflecting differences in driver expectations.

Table A-II

Functional and Design Categories for Urban Streets

Criterion	Functional Category	
	Principal Arterial	**Minor Arterial**
Mobility function	Very important	Important
Access function	Very minor	Substantial
Points connected	Freeways, important activity centers, major traffic generators	Principal arterials
Predominant trips served	Relatively long trips between major points and through trips entering, leaving, and passing through city	Trips of moderate length within relatively small geographical areas

Criterion	Design Category			
	High-Speed	**Suburban**	**Intermediate**	**Urban**
Driveway access density	Very low density	Low density	Moderate density	High density
Arterial type	Multilane divided; undivided or two-lane with shoulders	Multilane divided: undivided or two-lane with shoulders	Multilane divided or undivided; one way, two lane	Undivided one way; two way, two or more lanes
Parking	No	No	Some	Usually
Separate left-turn lanes	Yes	Yes	Usually	Some
Signals per mile	0.5 to 2	1 to 5	4 to 10	6 to 12
Speed limits	45 to 55 mph	40 to 45 mph	30 to 40 mph	25 to 35 mph
Pedestrian activity	Very little	Little	Some	Usually
Roadside development	Low density	Low to medium density	Medium to moderate density	High density

Source: *Highway Capacity Manual 2000*

Table A-III

Urban Street Class based on Function and Design Categories

Design Category	Functional Category	
	Principal Arterial	**Minor Arterial**
High-Speed	I	Not applicable
Suburban	II	II
Intermediate	II	III or IV
Urban	III or IV	IV

Source: *Highway Capacity Manual 2000*

Table A-IV

Urban Street Levels of Service by Class

Urban Street Class	I	II	III	IV
Range of Free Flow Speeds (mph)	45 to 55	35 to 45	30 to 35	25 to 35
Typical Free Flow Speed (mph)	50	40	33	30
Level of Service	**Average Travel Speed (mph)**			
A	>42	>35	>30	>25
B	>34	>28	>24	>19
C	>27	>22	>18	>13
D	>21	>17	>14	>9
E	>16	>13	>10	>7
F	≤16	≤13	≤10	≤7

Source: *Highway Capacity Manual 2000*

Interrupted Flow

One of the more important elements limiting, and often interrupting the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals, stop and yield signs. These all operate quite differently and have differing impacts on overall flow.

Signalized Intersections

The capacity of a highway is related primarily to the geometric characteristics of the facility, as well as to the composition of the traffic stream on the facility. Geometrics are a fixed, or non-varying, characteristic of a facility.

At the signalized intersection, an additional element is introduced into the concept of capacity: time allocation. A traffic signal essentially allocates time among conflicting traffic movements seeking use of the same physical space. The way in which time is allocated has a significant impact on the operation of the intersection and on the capacity of the intersection and its approaches.

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, *i. e.,* in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Specifically, level of service criteria for traffic signals are stated in terms of average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the ratio of green time to cycle length and the volume to capacity ratio for the lane group.

For each intersection analyzed the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A level of service designation is given to the control delay to better describe the level of operation. A

description of levels of service for signalized intersections can be found in Table A-V

Table A-V

Description of Level of Service for Signalized Intersections

Level of Service	Description
A	Very low control delay, up to 10 seconds per vehicle. Progression is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	Control delay greater than 10 and up to 20 seconds per vehicle. There is good progression or short cycle lengths or both. More vehicles stop causing higher levels of delay.
C	Control delay greater than 20 and up to 35 seconds per vehicle. Higher delays are caused by fair progression or longer cycle lengths or both. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase doe not serve queued vehicles, and overflow occurs. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	Control delay greater than 35 and up to 55 seconds per vehicle. The influence of congestions becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Control delay greater than 55 and up to 80 seconds per vehicle. The limit of acceptable delay. High delays usually indicate poor progression, long cycle lengths, and high volumes. Individual cycle failures are frequent.
F	Control delay in excess of 80 seconds per vehicle. Unacceptable to most drivers. Oversaturation, arrival flow rates exceed the capacity of the intersection. Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.

Source: *Highway Capacity Manual 2000*

The use of control delay, which may also be referred to as signal delay, was introduced in the 1997 update to the *Highway Capacity Manual*, and represents a departure from previous updates. In the third edition, published in 1985 and the 1994 update to the third edition, delay only included stopped delay. Thus, the level of service criteria listed in Table A-V differs from earlier criteria.

Unsignalized Intersections

The current procedures on unsignalized intersections were first introduced in the 1997 update to the *Highway Capacity Manual* and represent a revision of the methodology published in the 1994 update to the 1985 *Highway Capacity Manual*. The revised procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, *i. e.,* in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Control delay is the

increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

Two-Way Stop Controlled Intersections

Two-way stop controlled intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At two-way stop-controlled intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay is determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A level of service designation is given to the expected control delay for each minor movement. Level of service is not defined for the intersection as a whole. Control delay is the increased time of travel for a vehicle approaching and passing through a stop-controlled intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection. A description of levels of service for two-way stop-controlled intersections is found in Table A-VI.

Table A-VI

Description of Level of Service for Two-Way Stop Controlled Intersections

Level of Service	Description
A	Very low control delay less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of tolerable control delay greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay in excess of 50 seconds per vehicle for each movement subject to delay.

Source: *Highway Capacity Manual 2000*

APPENDIX B – LEVEL OF SERVICE WORKSHEETS: EXISTING

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 State Route 1/Stewarts Point

Average Delay (sec/veh): 8.6 Worst Case Level Of Service: A[9.7]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0	
Volume Module:																								
Base Vol:	2		49		30		13		45		3		1		0		4		29		0		8	
Growth Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Initial Bse:	2		49		30		13		45		3		1		0		4		29		0		8	
User Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Volume:	2		49		30		13		45		3		1		0		4		29		0		8	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
Final Vol.:	2		49		30		13		45		3		1		0		4		29		0		8	
Critical Gap Module:																								
Critical Gp:	7.1		6.5		6.2		7.1		6.5		6.2		4.1	xxxx	xxxxx				4.1	xxxx	xxxxx			
FollowUpTim:	3.5		4.0		3.3		3.5		4.0		3.3		2.2	xxxx	xxxxx				2.2	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	90		70		2		106		68		4		8	xxxx	xxxxx				4	xxxx	xxxxx			
Potent Cap.:	900		824		1088		879		826		1085		1625	xxxx	xxxxx				1631	xxxx	xxxxx			
Move Cap.:	847		809		1088		804		811		1085		1625	xxxx	xxxxx				1631	xxxx	xxxxx			
Volume/Cap:	0.00		0.06		0.03		0.02		0.06		0.00		0.00	xxxx	xxxx				0.02	xxxx	xxxx			
Level Of Service Module:																								
Queue:	xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		0.0	xxxx	xxxxx				0.1	xxxx	xxxxx			
Stopped Del:	xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		7.2	xxxx	xxxxx				7.2	xxxx	xxxxx			
LOS by Move:	*		*		*		*		*		*		A		*		*		A		*		*	
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx		895	xxxxx			xxxx		820	xxxxx			xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx			
SharedQueue:	xxxxx		0.3	xxxxx			xxxxx		0.2	xxxxx			xxxxx	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			
Shrd StpDel:	xxxxx		9.4	xxxxx			xxxxx		9.7	xxxxx			xxxxx	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			
Shared LOS:	*		A		*		*		A		*		*		*		*		*		*		*	
ApproachDel:			9.4						9.7					xxxxxx						xxxxxx				
ApproachLOS:			A						A						*						*			

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2 Annapolis Road/Stewarts Point

Average Delay (sec/veh): 2.8 Worst Case Level Of Service: A[8.6]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	1	0	0	0		0	0	0	1	0		0	0	1!	0	0		0	0	0	0	0	
Volume Module:																								
Base Vol:	4	15	0				0	12	18				8	0	11				0	0	0			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	4	15	0				0	12	18				8	0	11				0	0	0			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	4	15	0				0	12	18				8	0	11				0	0	0			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Final Vol.:	4	15	0				0	12	18				8	0	11				0	0	0			
Critical Gap Module:																								
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx							6.4	xxxx					6.2	xxxxx	xxxx	xxxxx		
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx							3.5	xxxx					3.3	xxxxx	xxxx	xxxxx		
Capacity Module:																								
Cnflict Vol:	30	xxxx	xxxxx	xxxx	xxxx	xxxxx							44	xxxx					21	xxxx	xxxx	xxxxx		
Potent Cap.:	1596	xxxx	xxxxx	xxxx	xxxx	xxxxx							972	xxxx					1062	xxxx	xxxx	xxxxx		
Move Cap.:	1596	xxxx	xxxxx	xxxx	xxxx	xxxxx							970	xxxx					1062	xxxx	xxxx	xxxxx		
Volume/Cap:	0.00	xxxx	xxxx	xxxx	xxxx	xxxx							0.01	xxxx					0.01	xxxx	xxxx	xxxx		
Level Of Service Module:																								
Queue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
Stopped Del:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*												
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT														
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	1021	xxxxx	xxxx	xxxx	xxxxx												
SharedQueue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.1	xxxxx	xxxxx	xxxx	xxxxx												
Shrd StpDel:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.6	xxxxx	xxxxx	xxxx	xxxxx												
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*												
ApproachDel:	xxxxxx			xxxxxx			8.6			xxxxxx														
ApproachLOS:	*			*			A			*														

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #3 State Route 1/Annapolis Road

Average Delay (sec/veh): 9.0 Worst Case Level Of Service: B[10.4]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	1	0		0	1	0	0	0		0	0	0	0	0		0	0	1!	0	0	
Volume Module:																								
Base Vol:	0		64		25		61		89		0		0		0		0		20		0		34	
Growth Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Initial Bse:	0		64		25		61		89		0		0		0		0		20		0		34	
User Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Volume:	0		64		25		61		89		0		0		0		0		20		0		34	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
Final Vol.:	0		64		25		61		89		0		0		0		0		20		0		34	
Critical Gap Module:																								
Critical Gp:	xxxxx		6.5		6.2		7.1		6.5		xxxxx		xxxxx		xxxx		xxxxx		4.1		xxxx		xxxxx	
FollowUpTim:	xxxxx		4.0		3.3		3.5		4.0		xxxxx		xxxxx		xxxx		xxxxx		2.2		xxxx		xxxxx	
Capacity Module:																								
Cnflict Vol:	xxxx		74		0		89		57		xxxxx		xxxx		xxxx		xxxxx		0		xxxx		xxxxx	
Potent Cap.:	xxxx		820		900		901		838		xxxxx		xxxx		xxxx		xxxxx		900		xxxx		xxxxx	
Move Cap.:	xxxx		802		900		808		819		xxxxx		xxxx		xxxx		xxxxx		900		xxxx		xxxxx	
Volume/Cap:	xxxx		0.08		0.03		0.08		0.11		xxxx		xxxx		xxxx		xxxx		0.02		xxxx		xxxx	
Level Of Service Module:																								
Queue:	xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		0.1		xxxx		xxxxx	
Stopped Del:	xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		9.1		xxxx		xxxxx	
LOS by Move:	*		*		*		*		*		*		*		*		*		A		*		*	
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx		xxxx		827		815		xxxx		xxxxx		xxxx		xxxx		xxxxx		xxxx		xxxx		xxxxx	
SharedQueue:	xxxxx		xxxx		0.4		0.7		xxxx		xxxxx		xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx	
Shrd StpDel:	xxxxx		xxxx		9.9		10.4		xxxx		xxxxx		xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx	
Shared LOS:	*		*		A		B		*		*		*		*		*		*		*		*	
ApproachDel:			9.9						10.4						xxxxxx						xxxxxx			
ApproachLOS:			A						B						*						*			

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 State Route 1/Stewarts Point

Average Delay (sec/veh): 9.0 Worst Case Level Of Service: B[10.2]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Stop Sign				Stop Sign				Uncontrolled				Uncontrolled			
Rights:	Include				Include				Include				Include			
Lanes:	0	0	1!	0 0	0	0	1!	0 0	0	0	1!	0 0	0	0	1!	0 0
Volume Module:																
Base Vol:	15	98	21		12	65	7		8	2	7		25	2	10	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	15	98	21		12	65	7		8	2	7		25	2	10	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	15	98	21		12	65	7		8	2	7		25	2	10	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Final Vol.:	15	98	21		12	65	7		8	2	7		25	2	10	
Critical Gap Module:																
Critical Gp:	7.1	6.5	6.2		7.1	6.5	6.2		4.1	xxxx	xxxxx		4.1	xxxx	xxxxx	
FollowUpTim:	3.5	4.0	3.3		3.5	4.0	3.3		2.2	xxxx	xxxxx		2.2	xxxx	xxxxx	
Capacity Module:																
Cnflict Vol:	114	84	6		138	82	7		12	xxxx	xxxxx		9	xxxx	xxxxx	
Potent Cap.:	867	811	1083		837	812	1081		1620	xxxx	xxxxx		1624	xxxx	xxxxx	
Move Cap.:	795	794	1083		732	795	1081		1620	xxxx	xxxxx		1624	xxxx	xxxxx	
Volume/Cap:	0.02	0.12	0.02		0.02	0.08	0.01		0.00	xxxx	xxxx		0.02	xxxx	xxxx	
Level Of Service Module:																
Queue:	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		0.0	xxxx	xxxxx		0.0	xxxx	xxxxx	
Stopped Del:	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		7.2	xxxx	xxxxx		7.3	xxxx	xxxxx	
LOS by Move:	*	*	*		*	*	*		A	*	*		A	*	*	
Movement:	LT	-	LTR	- RT	LT	-	LTR	- RT	LT	-	LTR	- RT	LT	-	LTR	- RT
Shared Cap.:	xxxx		829	xxxxx	xxxx		803	xxxxx	xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx	
SharedQueue:	xxxxx		0.6	xxxxx	xxxxx		0.3	xxxxx	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shrd StpDel:	xxxxx		10.2	xxxxx	xxxxx		10.0	xxxxx	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shared LOS:	*		B	*	*		B	*	*	*	*		*	*	*	
ApproachDel:			10.2				10.0			xxxxxx				xxxxxx		
ApproachLOS:			B				B			*				*		

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2 Annapolis Road/Stewarts Point

Average Delay (sec/veh): 3.1 Worst Case Level Of Service: A[8.6]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	1	0	0	0		0	0	0	1	0		0	0	1!	0	0		0	0	0	0	0	
Volume Module:																								
Base Vol:	8	14	0				0	14	20				9	0	12				0	0	0			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	8	14	0				0	14	20				9	0	12				0	0	0			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	8	14	0				0	14	20				9	0	12				0	0	0			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Final Vol.:	8	14	0				0	14	20				9	0	12				0	0	0			
Critical Gap Module:																								
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx							6.4	xxxx					6.2	xxxxx	xxxx	xxxxx		
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx							3.5	xxxx					3.3	xxxxx	xxxx	xxxxx		
Capacity Module:																								
Cnflict Vol:	34	xxxx	xxxxx	xxxx	xxxx	xxxxx							54	xxxx					24	xxxx	xxxx	xxxxx		
Potent Cap.:	1591	xxxx	xxxxx	xxxx	xxxx	xxxxx							959	xxxx					1058	xxxx	xxxx	xxxxx		
Move Cap.:	1591	xxxx	xxxxx	xxxx	xxxx	xxxxx							955	xxxx					1058	xxxx	xxxx	xxxxx		
Volume/Cap:	0.01	xxxx	xxxx	xxxx	xxxx	xxxx							0.01	xxxx					0.01	xxxx	xxxx	xxxx		
Level Of Service Module:																								
Queue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
Stopped Del:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*												
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	1012	xxxxx	xxxx	xxxx	xxxxx												
SharedQueue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.1	xxxxx	xxxxx	xxxx	xxxxx												
Shrd StpDel:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.6	xxxxx	xxxxx	xxxx	xxxxx												
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*												
ApproachDel:	xxxxxx			xxxxxx				8.6			xxxxxx													
ApproachLOS:	*			*				A			*													

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #3 State Route 1/Annapolis Road

Average Delay (sec/veh): 7.0 Worst Case Level Of Service: A[9.9]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	1	0		0	1	0	0	0		0	0	0	0	0		0	0	1!	0	0	
Volume Module:																								
Base Vol:	0		51		25		48		42		0		0		0		0		12		0		73	
Growth Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
Initial Bse:	0		51		25		48		42		0		0		0		0		12		0		73	
User Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
PHF Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
PHF Volume:	0		51		25		48		42		0		0		0		0		12		0		73	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
Final Vol.:	0		51		25		48		42		0		0		0		0		12		0		73	
Critical Gap Module:																								
Critical Gp:	xxxxx		6.5		6.2		7.1		6.5	xxxxx	xxxxx	xxxx	xxxxx		4.1	xxxx	xxxxx							
FollowUpTim:	xxxxx		4.0		3.3		3.5		4.0	xxxxx	xxxxx	xxxx	xxxxx		2.2	xxxx	xxxxx							
Capacity Module:																								
Cnflict Vol:	xxxx		97		0		86		61	xxxxx	xxxx	xxxx	xxxxx		0	xxxx	xxxxx							
Potent Cap.:	xxxx		797		900		905		834	xxxxx	xxxx	xxxx	xxxxx		900	xxxx	xxxxx							
Move Cap.:	xxxx		786		900		828		823	xxxxx	xxxx	xxxx	xxxxx		900	xxxx	xxxxx							
Volume/Cap:	xxxx	0.06		0.03		0.06	0.05		xxxx	xxxx	xxxx		xxxx	0.01		xxxx	xxxx							
Level Of Service Module:																								
Queue:	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx		0.0	xxxx	xxxxx							
Stopped Del:	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx		9.1	xxxx	xxxxx							
LOS by Move:	*	*	*			*	*	*			*	*	*		A	*	*							
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx		820			826	xxxx	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx					
SharedQueue:	xxxxx	xxxx		0.3			0.4	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx					
Shrd StpDel:	xxxxx	xxxx		9.8			9.9	xxxx	xxxxx			xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx					
Shared LOS:	*	*		A			A	*	*			*	*	*			*	*	*					
ApproachDel:		9.8					9.9					xxxxxx					xxxxxx							
ApproachLOS:		A					A					*					*							

APPENDIX C – LEVEL OF SERVICE WORKSHEETS: EXISTING + PROJECT

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 State Route 1/Stewarts Point

Average Delay (sec/veh): 7.4 Worst Case Level Of Service: A[10.0]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0	
Volume Module:																								
Base Vol:	2		49		30		13		45		3		1		0		4		29		0		8	
Growth Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Initial Bse:	2		49		30		13		45		3		1		0		4		29		0		8	
Added Vol:	0		0		0		0		0		0		2		0		0		0		22		12	
PasserByVol:	0		0		0		0		0		0		0		0		0		0		0		0	
Initial Fut:	2		49		30		13		45		3		3		0		4		29		22		20	
User Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Volume:	2		49		30		13		45		3		3		0		4		29		22		20	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
Final Vol.:	2		49		30		13		45		3		3		0		4		29		22		20	
Critical Gap Module:																								
Critical Gp:	7.1		6.5		6.2		7.1		6.5		6.2		4.1	xxxx	xxxxx				4.1	xxxx	xxxxx			
FollowUpTim:	3.5		4.0		3.3		3.5		4.0		3.3		2.2	xxxx	xxxxx				2.2	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	122		108		2		138		100		32		42	xxxx	xxxxx				4	xxxx	xxxxx			
Potent Cap.:	858		786		1088		838		794		1048		1580	xxxx	xxxxx				1631	xxxx	xxxxx			
Move Cap.:	805		770		1088		763		778		1048		1580	xxxx	xxxxx				1631	xxxx	xxxxx			
Volume/Cap:	0.00		0.06		0.03		0.02		0.06		0.00		0.00	xxxx	xxxx				0.02	xxxx	xxxx			
Level Of Service Module:																								
Queue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx							0.0	xxxx	xxxxx				0.1	xxxx	xxxxx			
Stopped Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx							7.3	xxxx	xxxxx				7.2	xxxx	xxxxx			
LOS by Move:	*	*	*	*	*	*							A	*	*				A	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx		865	xxxxx	xxxx		785	xxxxx	xxxx		xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx								
SharedQueue:	xxxxx		0.3	xxxxx	xxxxx		0.3	xxxxx	xxxxx		xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx							
Shrd StpDel:	xxxxx		9.6	xxxxx	xxxxx		10.0	xxxxx	xxxxx		xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx								
Shared LOS:	*		A	*	*		A	*	*		*	*	*	*	*	*								
ApproachDel:			9.6				10.0					xxxxxx				xxxxxx								
ApproachLOS:			A				A					*				*								

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Annapolis Road/Stewarts Point

Average Delay (sec/veh): 3.4 Worst Case Level Of Service: A[8.7]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	1	0	0	0		0	0	0	1	0		0	0	1!	0	0		0	0	0	0	0	
Volume Module:																								
Base Vol:	4	15	0				0	12	18				8	0	11				0	0	0			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	4	15	0				0	12	18				8	0	11				0	0	0			
Added Vol:	14	0	0				0	0	4				0	0	0				0	0	0			
PasserByVol:	0	0	0				0	0	0				0	0	0				0	0	0			
Initial Fut:	18	15	0				0	12	22				8	0	11				0	0	0			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	18	15	0				0	12	22				8	0	11				0	0	0			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Final Vol.:	18	15	0				0	12	22				8	0	11				0	0	0			
Critical Gap Module:																								
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx							6.4	xxxx					6.2	xxxxx	xxxx	xxxxx		
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx							3.5	xxxx					3.3	xxxxx	xxxx	xxxxx		
Capacity Module:																								
Cnflict Vol:	34	xxxx	xxxxx	xxxx	xxxx	xxxxx							74	xxxx					23	xxxx	xxxx	xxxxx		
Potent Cap.:	1591	xxxx	xxxxx	xxxx	xxxx	xxxxx							935	xxxx					1060	xxxx	xxxx	xxxxx		
Move Cap.:	1591	xxxx	xxxxx	xxxx	xxxx	xxxxx							926	xxxx					1060	xxxx	xxxx	xxxxx		
Volume/Cap:	0.01	xxxx	xxxx	xxxx	xxxx	xxxx							0.01	xxxx					0.01	xxxx	xxxx	xxxx		
Level Of Service Module:																								
Queue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
Stopped Del:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*												
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	999	xxxxx	xxxx	xxxx	xxxxx												
SharedQueue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.1	xxxxx	xxxxx	xxxx	xxxxx												
Shrd StpDel:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.7	xxxxx	xxxxx	xxxx	xxxxx												
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*												
ApproachDel:	xxxxxx			xxxxxx				8.7			xxxxxx													
ApproachLOS:	*			*				A			*													

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 State Route 1/Annapolis Road

Average Delay (sec/veh): 8.6 Worst Case Level Of Service: B[11.4]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	1	0		0	1	0	0	0		0	1	0	0	0		0	0	1!	0	0	
Volume Module:																								
Base Vol:	0	64		25			61	89		0			0	0		0			20	0		34		
Growth Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
Initial Bse:	0	64		25			61	89		0			0	0		0			20	0		34		
Added Vol:	0	0		0			0	0		0			36	2		0			0	0		22		
PasserByVol:	0	0		0			0	0		0			0	0		0			0	0		0		
Initial Fut:	0	64		25			61	89		0			36	2		0			20	0		56		
User Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
PHF Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
PHF Volume:	0	64		25			61	89		0			36	2		0			20	0		56		
Reduct Vol:	0	0		0			0	0		0			0	0		0			0	0		0		
Final Vol.:	0	64		25			61	89		0			36	2		0			20	0		56		
Critical Gap Module:																								
Critical Gp:	xxxxx	6.5		6.2			7.1	6.5		xxxxx			4.1	xxxx		xxxxx			4.1	xxxx		xxxxx		
FollowUpTim:	xxxxx	4.0		3.3			3.5	4.0		xxxxx			2.2	xxxx		xxxxx			2.2	xxxx		xxxxx		
Capacity Module:																								
Cnflict Vol:	xxxx	170		2			187	142		xxxxx			56	xxxx		xxxxx			2	xxxx		xxxxx		
Potent Cap.:	xxxx	727		1088			779	753		xxxxx			1562	xxxx		xxxxx			1634	xxxx		xxxxx		
Move Cap.:	xxxx	701		1088			689	726		xxxxx			1562	xxxx		xxxxx			1634	xxxx		xxxxx		
Volume/Cap:	xxxx	0.09		0.02			0.09	0.12		xxxx			0.02	xxxx		xxxx			0.01	xxxx		xxxx		
Level Of Service Module:																								
Queue:	xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			0.1	xxxx		xxxxx			0.0	xxxx		xxxxx		
Stopped Del:	xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			7.4	xxxx		xxxxx			7.2	xxxx		xxxxx		
LOS by Move:	*	*		*			*	*		*			A	*		*			A	*		*		
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx		779			710	xxxx		xxxxx			xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx		
SharedQueue:	xxxxx	xxxx		0.4			0.8	xxxx		xxxxx			0.1	xxxx		xxxxx			xxxxx	xxxx		xxxxx		
Shrd StpDel:	xxxxx	xxxx		10.2			11.4	xxxx		xxxxx			7.4	xxxx		xxxxx			xxxxx	xxxx		xxxxx		
Shared LOS:	*	*		B			B	*		*			A	*		*			*	*		*		
ApproachDel:		10.2						11.4						xxxxxx						xxxxxx				
ApproachLOS:		B						B						*						*				

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 State Route 1/Stewarts Point

Average Delay (sec/veh): 8.6 Worst Case Level Of Service: B[10.4]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0	
Volume Module:																								
Base Vol:	15		98		21		12		65		7		8		2		7		25		2		10	
Growth Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Initial Bse:	15		98		21		12		65		7		8		2		7		25		2		10	
Added Vol:	0		0		0		12		0		2		0		22		0		0		0		0	
PasserByVol:	0		0		0		0		0		0		0		0		0		0		0		0	
Initial Fut:	15		98		21		24		65		9		8		24		7		25		2		10	
User Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Volume:	15		98		21		24		65		9		8		24		7		25		2		10	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
Final Vol.:	15		98		21		24		65		9		8		24		7		25		2		10	
Critical Gap Module:																								
Critical Gp:	7.1		6.5		6.2		7.1		6.5		6.2		4.1	xxxx	xxxxx				4.1	xxxx	xxxxx			
FollowUpTim:	3.5		4.0		3.3		3.5		4.0		3.3		2.2	xxxx	xxxxx				2.2	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	138		106		28		160		104		7		12	xxxx	xxxxx				31	xxxx	xxxxx			
Potent Cap.:	838		788		1054		810		790		1081		1620	xxxx	xxxxx				1595	xxxx	xxxxx			
Move Cap.:	765		772		1054		706		773		1081		1620	xxxx	xxxxx				1595	xxxx	xxxxx			
Volume/Cap:	0.02		0.13		0.02		0.03		0.08		0.01		0.00	xxxx	xxxx				0.02	xxxx	xxxx			
Level Of Service Module:																								
Queue:	xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		0.0	xxxx	xxxxx				0.0	xxxx	xxxxx			
Stopped Del:	xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		7.2	xxxx	xxxxx				7.3	xxxx	xxxxx			
LOS by Move:	*		*		*		*		*		*		A	*	*				A	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx		805	xxxxx			xxxx		775	xxxxx			xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx			
SharedQueue:	xxxxx		0.6	xxxxx			xxxxx		0.4	xxxxx			xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx			
Shrd StpDel:	xxxxx		10.4	xxxxx			xxxxx		10.3	xxxxx			xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx			
Shared LOS:	*		B	*			*		B	*			*	*	*				*	*	*			
ApproachDel:	10.4						10.3						xxxxxx						xxxxxx					
ApproachLOS:	B						B						*						*					

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Annapolis Road/Stewarts Point

Average Delay (sec/veh): 4.2 Worst Case Level Of Service: A[8.7]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	1	0	0	0		0	0	0	1	0		0	0	1!	0	0		0	0	0	0	0	
Volume Module:																								
Base Vol:	8	14		0			0		14		20		9		0		12		0		0		0	
Growth Adj:	1.00	1.00		1.00			1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Initial Bse:	8	14		0			0		14		20		9		0		12		0		0		0	
Added Vol:	0	0		0			0		0		0		4		0		14		0		0		0	
PasserByVol:	0	0		0			0		0		0		0		0		0		0		0		0	
Initial Fut:	8	14		0			0		14		20		13		0		26		0		0		0	
User Adj:	1.00	1.00		1.00			1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Adj:	1.00	1.00		1.00			1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Volume:	8	14		0			0		14		20		13		0		26		0		0		0	
Reduct Vol:	0	0		0			0		0		0		0		0		0		0		0		0	
Final Vol.:	8	14		0			0		14		20		13		0		26		0		0		0	
Critical Gap Module:																								
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx							6.4	xxxx			6.2	xxxxx	xxxx	xxxxx				
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx							3.5	xxxx			3.3	xxxxx	xxxx	xxxxx				
Capacity Module:																								
Cnflict Vol:	34	xxxx	xxxxx	xxxx	xxxx	xxxxx							54	xxxx			24	xxxx	xxxx	xxxxx				
Potent Cap.:	1591	xxxx	xxxxx	xxxx	xxxx	xxxxx							959	xxxx			1058	xxxx	xxxx	xxxxx				
Move Cap.:	1591	xxxx	xxxxx	xxxx	xxxx	xxxxx							955	xxxx			1058	xxxx	xxxx	xxxxx				
Volume/Cap:	0.01	xxxx	xxxx	xxxx	xxxx	xxxx							0.01	xxxx			0.02	xxxx	xxxx	xxxx				
Level Of Service Module:																								
Queue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
Stopped Del:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*												
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	1022	xxxxx	xxxx	xxxx	xxxxx												
SharedQueue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.1	xxxxx	xxxxx	xxxx	xxxxx												
Shrd StpDel:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.7	xxxxx	xxxxx	xxxx	xxxxx												
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*												
ApproachDel:	xxxxxx			xxxxxx				8.7			xxxxxx													
ApproachLOS:	*			*				A			*													

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 State Route 1/Annapolis Road

Average Delay (sec/veh): 7.5 Worst Case Level Of Service: B[10.0]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	1	0		0	0	1!	0	0		0	0	0	0	0		0	0	1!	0	0	
Volume Module:																								
Base Vol:	0	51		25			48		42		0		0		0		0		12		0		73	
Growth Adj:	1.00	1.00		1.00			1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Initial Bse:	0	51		25			48		42		0		0		0		0		12		0		73	
Added Vol:	0	0		0			22		0		36		0		0		0		0		2		0	
PasserByVol:	0	0		0			0		0		0		0		0		0		0		0		0	
Initial Fut:	0	51		25			70		42		36		0		0		0		12		2		73	
User Adj:	1.00	1.00		1.00			1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Adj:	1.00	1.00		1.00			1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Volume:	0	51		25			70		42		36		0		0		0		12		2		73	
Reduct Vol:	0	0		0			0		0		0		0		0		0		0		0		0	
Final Vol.:	0	51		25			70		42		36		0		0		0		12		2		73	
Critical Gap Module:																								
Critical Gp:	xxxxx	6.5		6.2			7.1		6.5		6.2		xxxxx		xxxx		xxxxx		4.1		xxxx		xxxxx	
FollowUpTim:	xxxxx	4.0		3.3			3.5		4.0		3.3		xxxxx		xxxx		xxxxx		2.2		xxxx		xxxxx	
Capacity Module:																								
Cnflict Vol:	xxxx	99		0			88		63		39		xxxx		xxxx		xxxxx		0		xxxx		xxxxx	
Potent Cap.:	xxxx	795		900			902		832		1039		xxxx		xxxx		xxxxx		900		xxxx		xxxxx	
Move Cap.:	xxxx	784		900			825		821		1039		xxxx		xxxx		xxxxx		900		xxxx		xxxxx	
Volume/Cap:	xxxx	0.07		0.03			0.08		0.05		0.03		xxxx		xxxx		xxxx		0.01		xxxx		xxxx	
Level Of Service Module:																								
Queue:	xxxxx	xxxx		xxxxx			xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		0.0		xxxx		xxxxx	
Stopped Del:	xxxxx	xxxx		xxxxx			xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		9.1		xxxx		xxxxx	
LOS by Move:	*	*		*			*		*		*		*		*		*		A		*		*	
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx		819			xxxx		867		xxxxx		xxxx		xxxx		xxxxx		xxxx		xxxx		xxxxx	
SharedQueue:	xxxxx	xxxx		0.3			xxxxx		0.6		xxxxx		xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx	
Shrd StpDel:	xxxxx	xxxx		9.8			xxxxx		10.0		xxxxx		xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx	
Shared LOS:	*	*		A			*		B		*		*		*		*		*		*		*	
ApproachDel:		9.8						10.0						xxxxxx						xxxxxx				
ApproachLOS:		A						B						*						*				

APPENDIX D – TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEETS, EXISTING PLUS PROJECT CONDITIONS

- STATE ROUTE 1
- ANNAPOLIS ROAD
- STEWARTS POINT ROAD

HCS2000: Two-Lane Highways Release 4.1d

Two-Way Two-Lane Highway Segment Analysis

Analyst	Andrew Kluter
Agency/Co.	TJKM Transport. Consultants
Date Performed	12/1/2004
Analysis Time Period	AM Peak
Highway	State Route 1
From/To	Stewarts Point - Annapolis Rd
Jurisdiction	Sonoma County
Analysis Year	2004-Existing+Project
Description	117-075 - Artesa Winery - Sonoma County

Input Data

Highway class	Class 2				
Shoulder width	2.0	ft	Peak-hour factor, PHF	0.85	
Lane width	10.0	ft	% Trucks and buses	5	%
Segment length	4.0	mi	% Recreational vehicles	7	%
Terrain type	Rolling		% No-passing zones	40	%
Grade: Length		mi	Access points/mi	10	/mi
Up/down		%			

Two-way hourly volume, V	306	veh/h	
Directional split	60 / 40	%	

Average Travel Speed

Grade adjustment factor, fG	0.71	
PCE for trucks, ET	2.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.924	
Two-way flow rate,(note-1) vp	549	pc/h
Highest directional split proportion (note-2)	329	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	2.5	mi/h
Free-flow speed, FFS	43.8	mi/h
Adjustment for no-passing zones, fnp	2.1*	mi/h
Average travel speed, ATS	37.4	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.77	
PCE for trucks, ET	1.8	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.962	
Two-way flow rate,(note-1) vp	486	pc/h
Highest directional split proportion (note-2)	292	
Base percent time-spent-following, BPTSF	34.8	%
Adj.for directional distribution and no-passing zones, fd/np	15.8	
Percent time-spent-following, PTSF	50.5	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.17	
Peak 15-min vehicle-miles of travel, VMT15	360	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1224	veh-mi
Peak 15-min total travel time, TT15	9.6	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

HCS2000: Two-Lane Highways Release 4.1d

Two-Way Two-Lane Highway Segment Analysis

Analyst	Andrew Kluter
Agency/Co.	TJKM Transport. Consultants
Date Performed	12/1/2004
Analysis Time Period	PM Peak
Highway	Annapolis Road
From/To	SR 1 - Stewarts Point Road
Jurisdiction	Sonoma County
Analysis Year	2004-Existing+Project
Description	117-075 - Artesa Winery - Sonoma County

Input Data

Highway class	Class 2				
Shoulder width	2.0	ft	Peak-hour factor, PHF	0.85	
Lane width	11.0	ft	% Trucks and buses	5	%
Segment length	8.0	mi	% Recreational vehicles	7	%
Terrain type	Rolling		% No-passing zones	40	%
Grade: Length		mi	Access points/mi	10	/mi
Up/down		%			

Two-way hourly volume, V	182	veh/h	
Directional split	54 / 46	%	

Average Travel Speed

Grade adjustment factor, fG	0.71	
PCE for trucks, ET	2.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.924	
Two-way flow rate,(note-1) vp	326	pc/h
Highest directional split proportion (note-2)	176	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	3.7*	mi/h
Adj. for access points, fA	2.5	mi/h
Free-flow speed, FFS	43.8	mi/h
Adjustment for no-passing zones, fnp	1.3*	mi/h
Average travel speed, ATS	40.0	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.77	
PCE for trucks, ET	1.8	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.962	
Two-way flow rate,(note-1) vp	289	pc/h
Highest directional split proportion (note-2)	156	
Base percent time-spent-following, BPTSF	22.4	%
Adj.for directional distribution and no-passing zones, fd/np	17.5	
Percent time-spent-following, PTSF	39.9	%

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.10	
Peak 15-min vehicle-miles of travel, VMT15	428	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1456	veh-mi
Peak 15-min total travel time, TT15	10.7	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

HCS2000: Two-Lane Highways Release 4.1d

Two-Way Two-Lane Highway Segment Analysis

Analyst	Andrew Kluter
Agency/Co.	TJKM Transport. Consultants
Date Performed	12/1/2004
Analysis Time Period	AM Peak
Highway	Stewarts Point Road
From/To	SR 1 - Annapolis Road
Jurisdiction	Sonoma County
Analysis Year	2004-Existing+Project
Description	117-075 - Artesa Winery - Sonoma County

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.85	
Lane width	11.0	ft	% Trucks and buses	5	%
Segment length	4.0	mi	% Recreational vehicles	7	%
Terrain type	Rolling		% No-passing zones	60	%
Grade: Length		mi	Access points/mi	10	/mi
Up/down		%			

Two-way hourly volume, V	114		veh/h
Directional split	54	/ 46	%

Average Travel Speed

Grade adjustment factor, fG	0.71	
PCE for trucks, ET	2.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.924	
Two-way flow rate,(note-1) vp	204	pc/h
Highest directional split proportion (note-2)	110	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	45.0	mi/h
Adj. for lane and shoulder width, fLS	3.7*	mi/h
Adj. for access points, fA	2.5	mi/h
Free-flow speed, FFS	38.8	mi/h
Adjustment for no-passing zones, fnp	1.3*	mi/h
Average travel speed, ATS	35.9	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.77	
PCE for trucks, ET	1.8	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.962	
Two-way flow rate,(note-1) vp	181	pc/h
Highest directional split proportion (note-2)	98	
Base percent time-spent-following, BPTSF	14.7	%
Adj.for directional distribution and no-passing zones, fd/np	21.0	
Percent time-spent-following, PTSF	35.8	%

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.06	
Peak 15-min vehicle-miles of travel, VMT15	134	veh-mi
Peak-hour vehicle-miles of travel, VMT60	456	veh-mi
Peak 15-min total travel time, TT15	3.7	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

APPENDIX E – LEVEL OF SERVICE WORKSHEETS: FUTURE

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 State Route 1/Stewarts Point

Average Delay (sec/veh): 8.6 Worst Case Level Of Service: A[9.9]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0	
Volume Module: Future AM Peak																								
Base Vol:	2	54	33				14	49	3				1	0	4				32	0	9			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	2	54	33				14	49	3				1	0	4				32	0	9			
Added Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
PasserByVol:	0	0	0				0	0	0				0	0	0				0	0	0			
Initial Fut:	2	54	33				14	49	3				1	0	4				32	0	9			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	2	54	33				14	49	3				1	0	4				32	0	9			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Final Vol.:	2	54	33				14	49	3				1	0	4				32	0	9			
Critical Gap Module:																								
Critical Gp:	7.1	6.5	6.2				7.1	6.5	6.2				4.1	xxxx	xxxxx				4.1	xxxx	xxxxx			
FollowUpTim:	3.5	4.0	3.3				3.5	4.0	3.3				2.2	xxxx	xxxxx				2.2	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	99	77	2				116	75	5				9	xxxx	xxxxx				4	xxxx	xxxxx			
Potent Cap.:	888	817	1088				865	820	1085				1624	xxxx	xxxxx				1631	xxxx	xxxxx			
Move Cap.:	831	800	1088				783	803	1085				1624	xxxx	xxxxx				1631	xxxx	xxxxx			
Volume/Cap:	0.00	0.07	0.03				0.02	0.06	0.00				0.00	xxxx	xxxx				0.02	xxxx	xxxx			
Level Of Service Module:																								
Queue:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				0.0	xxxx	xxxxx				0.1	xxxx	xxxxx			
Stopped Del:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				7.2	xxxx	xxxxx				7.3	xxxx	xxxxx			
LOS by Move:	*	*	*				*	*	*				A	*	*				A	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx		888	xxxxx			xxxx		808	xxxxx			xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx			
SharedQueue:	xxxxx		0.3	xxxxx			xxxxx		0.3	xxxxx			xxxxx	xxxxx	xxxxx				xxxxx	xxxx	xxxxx			
Shrd StpDel:	xxxxx		9.5	xxxxx			xxxxx		9.9	xxxxx			xxxxx	xxxxx	xxxxx				xxxxx	xxxx	xxxxx			
Shared LOS:	*		A	*			*		A	*			*	*	*				*	*	*			
ApproachDel:			9.5						9.9					xxxxxx						xxxxxx				
ApproachLOS:			A						A					*						*				

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Annapolis Road/Stewarts Point

Average Delay (sec/veh): 2.8 Worst Case Level Of Service: A[8.6]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	1	0	0	0		0	0	0	1	0		0	0	1!	0	0		0	0	0	0	0	
Volume Module: Future AM Peak																								
Base Vol:	4	15	0				0	12	18				8	0	11				0	0	0			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	4	15	0				0	12	18				8	0	11				0	0	0			
Added Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
PasserByVol:	0	0	0				0	0	0				0	0	0				0	0	0			
Initial Fut:	4	15	0				0	12	18				8	0	11				0	0	0			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	4	15	0				0	12	18				8	0	11				0	0	0			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Final Vol.:	4	15	0				0	12	18				8	0	11				0	0	0			
Critical Gap Module:																								
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx							6.4	xxxx					6.2	xxxxx	xxxx	xxxxx		
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx							3.5	xxxx					3.3	xxxxx	xxxx	xxxxx		
Capacity Module:																								
Cnflict Vol:	30	xxxx	xxxxx	xxxx	xxxx	xxxxx							44	xxxx					21	xxxx	xxxx	xxxxx		
Potent Cap.:	1596	xxxx	xxxxx	xxxx	xxxx	xxxxx							972	xxxx					1062	xxxx	xxxx	xxxxx		
Move Cap.:	1596	xxxx	xxxxx	xxxx	xxxx	xxxxx							970	xxxx					1062	xxxx	xxxx	xxxxx		
Volume/Cap:	0.00	xxxx	xxxx	xxxx	xxxx	xxxx							0.01	xxxx					0.01	xxxx	xxxx	xxxx		
Level Of Service Module:																								
Queue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
Stopped Del:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*												
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	1021	xxxxx	xxxx	xxxx	xxxxx												
SharedQueue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.1	xxxxx	xxxxx	xxxx	xxxxx												
Shrd StpDel:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.6	xxxxx	xxxxx	xxxx	xxxxx												
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*												
ApproachDel:	xxxxxx			xxxxxx				8.6			xxxxxx													
ApproachLOS:	*			*				A			*													

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 State Route 1/Annapolis Road

Average Delay (sec/veh): 9.1 Worst Case Level Of Service: B[10.6]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	1	0		0	1	0	0	0		0	0	0	0	0		0	0	1!	0	0	
Volume Module: Future AM Peak																								
Base Vol:	0	70	27				67	98	0				0	0	0				22	0	37			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	0	70	27				67	98	0				0	0	0				22	0	37			
Added Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
PasserByVol:	0	0	0				0	0	0				0	0	0				0	0	0			
Initial Fut:	0	70	27				67	98	0				0	0	0				22	0	37			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	0	70	27				67	98	0				0	0	0				22	0	37			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Final Vol.:	0	70	27				67	98	0				0	0	0				22	0	37			
Critical Gap Module:																								
Critical Gp:	xxxxx	6.5	6.2				7.1	6.5	xxxxx	xxxxx	xxxx	xxxxx							4.1	xxxx	xxxxx			
FollowUpTim:	xxxxx	4.0	3.3				3.5	4.0	xxxxx	xxxxx	xxxx	xxxxx							2.2	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	xxxx	81	0				98	63	xxxxx	xxxx	xxxx	xxxxx							0	xxxx	xxxxx			
Potent Cap.:	xxxx	813	900				889	832	xxxxx	xxxx	xxxx	xxxxx							900	xxxx	xxxxx			
Move Cap.:	xxxx	793	900				790	812	xxxxx	xxxx	xxxx	xxxxx							900	xxxx	xxxxx			
Volume/Cap:	xxxx	0.09	0.03				0.08	0.12	xxxx	xxxx	xxxx	xxxx							0.02	xxxx	xxxx			
Level Of Service Module:																								
Queue:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx							0.1	xxxx	xxxxx			
Stopped Del:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx							9.1	xxxx	xxxxx			
LOS by Move:	*	*	*				*	*	*	*	*								A	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	820				803	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx			
SharedQueue:	xxxxx	xxxx	0.4				0.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx			
Shrd StpDel:	xxxxx	xxxx	10.0				10.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx			
Shared LOS:	*	*	A				B	*	*	*	*	*	*	*	*				*	*	*			
ApproachDel:	10.0						10.6						xxxxxx						xxxxxx					
ApproachLOS:	A						B						*						*					

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 State Route 1/Stewarts Point

Average Delay (sec/veh): 9.0 Worst Case Level Of Service: B[10.2]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0	
Volume Module: Future PM Peak																								
Base Vol:	16		97		23		13		71		8		9		2		8		27		2		11	
Growth Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Initial Bse:	16		97		23		13		71		8		9		2		8		27		2		11	
Added Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
PasserByVol:	0		0		0		0		0		0		0		0		0		0		0		0	
Initial Fut:	16		97		23		13		71		8		9		2		8		27		2		11	
User Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Volume:	16		97		23		13		71		8		9		2		8		27		2		11	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
Final Vol.:	16		97		23		13		71		8		9		2		8		27		2		11	
Critical Gap Module:																								
Critical Gp:	7.1		6.5		6.2		7.1		6.5		6.2		4.1	xxxx	xxxxx				4.1	xxxx	xxxxx			
FollowUpTim:	3.5		4.0		3.3		3.5		4.0		3.3		2.2	xxxx	xxxxx				2.2	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	125		91		6		146		89		8		13	xxxx	xxxxx				10	xxxx	xxxxx			
Potent Cap.:	854		803		1083		828		804		1081		1619	xxxx	xxxxx				1623	xxxx	xxxxx			
Move Cap.:	776		785		1083		721		786		1081		1619	xxxx	xxxxx				1623	xxxx	xxxxx			
Volume/Cap:	0.02		0.12		0.02		0.02		0.09		0.01		0.01	xxxx	xxxx				0.02	xxxx	xxxx			
Level Of Service Module:																								
Queue:	xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		0.0	xxxx	xxxxx				0.1	xxxx	xxxxx			
Stopped Del:	xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		7.2	xxxx	xxxxx				7.3	xxxx	xxxxx			
LOS by Move:	*		*		*		*		*		*		A	*	*				A	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx		822	xxxxx			xxxx		795	xxxxx			xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx			
SharedQueue:	xxxxx		0.6	xxxxx			xxxxx		0.4	xxxxx			xxxxx	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			
Shrd StpDel:	xxxxx		10.2	xxxxx			xxxxx		10.1	xxxxx			xxxxx	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			
Shared LOS:	*		B	*			*		B	*			*	*	*				*	*	*			
ApproachDel:	10.2						10.1						xxxxxx						xxxxxx					
ApproachLOS:	B						B						*						*					

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Annapolis Road/Stewarts Point

Average Delay (sec/veh): 3.1 Worst Case Level Of Service: A[8.6]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	1	0	0	0		0	0	0	1	0		0	0	1!	0	0		0	0	1!	0	0	
Volume Module:																								
Base Vol:	9	15		0			0	15		22			0	0		0			10	0		13		
Growth Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
Initial Bse:	9	15		0			0	15		22			0	0		0			10	0		13		
Added Vol:	0	0		0			0	0		0			0	0		0			0	0		0		
PasserByVol:	0	0		0			0	0		0			0	0		0			0	0		0		
Initial Fut:	9	15		0			0	15		22			0	0		0			10	0		13		
User Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
PHF Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
PHF Volume:	9	15		0			0	15		22			0	0		0			10	0		13		
Reduct Vol:	0	0		0			0	0		0			0	0		0			0	0		0		
Final Vol.:	9	15		0			0	15		22			0	0		0			10	0		13		
Critical Gap Module:																								
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx		xxxxx	xxxxx	xxxx	xxxxx			6.4	xxxx		6.2								
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx		xxxxx	xxxxx	xxxx	xxxxx			3.5	xxxx		3.3								
Capacity Module:																								
Cnflict Vol:	37	xxxx	xxxxx	xxxx	xxxx		xxxxx	xxxx	xxxx	xxxxx			59	xxxx		15								
Potent Cap.:	1587	xxxx	xxxxx	xxxx	xxxx		xxxxx	xxxx	xxxx	xxxxx			953	xxxx		1070								
Move Cap.:	1587	xxxx	xxxxx	xxxx	xxxx		xxxxx	xxxx	xxxx	xxxxx			949	xxxx		1070								
Volume/Cap:	0.01	xxxx	xxxx	xxxx	xxxx		xxxx	xxxx	xxxx	xxxx			0.01	xxxx		0.01								
Level Of Service Module:																								
Queue:	0.0	xxxx	xxxxx	xxxxx	xxxx		xxxxx	xxxxx	xxxx	xxxxx			xxxxx	xxxx		xxxxx								
Stopped Del:	7.3	xxxx	xxxxx	xxxxx	xxxx		xxxxx	xxxxx	xxxx	xxxxx			xxxxx	xxxx		xxxxx								
LOS by Move:	A	*		*			*		*				*			*								
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx		xxxx		xxxx	xxxxx		xxxx			0	xxxxx		xxxx			1014	xxxxx				
SharedQueue:	0.0	xxxx	xxxxx	xxxxx	xxxx		xxxxx	xxxxx	xxxx	xxxxx			xxxxx	xxxxx		0.1	xxxxx							
Shrd StpDel:	7.3	xxxx	xxxxx	xxxxx	xxxx		xxxxx	xxxxx	xxxx	xxxxx			xxxxx	xxxxx		8.6	xxxxx							
Shared LOS:	A	*		*			*		*				*			A								
ApproachDel:	xxxxxx			xxxxxx				xxxxxx					8.6											
ApproachLOS:	*			*				*					A											

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 State Route 1/Annapolis Road

Average Delay (sec/veh): 7.0 Worst Case Level Of Service: B[10.0]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	1	0		0	1	0	0	0		0	0	0	0	0		0	0	1!	0	0	
Volume Module: Future+Project_PM																								
Base Vol:	0	56		27			53	46		0			0	0		0			13	0		80		
Growth Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
Initial Bse:	0	56		27			53	46		0			0	0		0			13	0		80		
Added Vol:	0	0		0			0	0		0			0	0		0			0	0		0		
PasserByVol:	0	0		0			0	0		0			0	0		0			0	0		0		
Initial Fut:	0	56		27			53	46		0			0	0		0			13	0		80		
User Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
PHF Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
PHF Volume:	0	56		27			53	46		0			0	0		0			13	0		80		
Reduct Vol:	0	0		0			0	0		0			0	0		0			0	0		0		
Final Vol.:	0	56		27			53	46		0			0	0		0			13	0		80		
Critical Gap Module:																								
Critical Gp:	xxxxx	6.5		6.2			7.1	6.5		xxxxx			xxxxx	xxxx		xxxxx			4.1	xxxx		xxxxx		
FollowUpTim:	xxxxx	4.0		3.3			3.5	4.0		xxxxx			xxxxx	xxxx		xxxxx			2.2	xxxx		xxxxx		
Capacity Module:																								
Cnflict Vol:	xxxx	106		0			94	66		xxxxx			xxxx	xxxx		xxxxx			0	xxxx		xxxxx		
Potent Cap.:	xxxx	788		900			894	829		xxxxx			xxxx	xxxx		xxxxx			900	xxxx		xxxxx		
Move Cap.:	xxxx	776		900			811	816		xxxxx			xxxx	xxxx		xxxxx			900	xxxx		xxxxx		
Volume/Cap:	xxxx	0.07		0.03			0.07	0.06		xxxx			xxxx	xxxx		xxxx			0.01	xxxx		xxxx		
Level Of Service Module:																								
Queue:	xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			0.0	xxxx		xxxxx		
Stopped Del:	xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			9.1	xxxx		xxxxx		
LOS by Move:	*	*		*			*	*		*			*	*		*			A	*		*		
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx		813			813	xxxx		xxxxx			xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx		
SharedQueue:	xxxxx	xxxx		0.3			0.4	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx		
Shrd StpDel:	xxxxx	xxxx		9.9			10.0	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx		
Shared LOS:	*	*		A			B	*		*			*	*		*			*	*		*		
ApproachDel:		9.9						10.0						xxxxxx						xxxxxx				
ApproachLOS:		A						B						*						*				

APPENDIX F – LEVEL OF SERVICE WORKSHEETS: FUTURE + PROJECT

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 State Route 1/Stewarts Point

Average Delay (sec/veh): 7.5 Worst Case Level Of Service: B[10.1]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1!	0 0		0 0 1!	0 0		0 0 1!	0 0		0 0 1!	0 0	
Volume Module: Future AM Peak												
Base Vol:	2	54	33	14	49	3	1	0	4	32	0	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	2	54	33	14	49	3	1	0	4	32	0	9
Added Vol:	0	0	0	0	0	0	2	0	0	0	22	12
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	2	54	33	14	49	3	3	0	4	32	22	21
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	2	54	33	14	49	3	3	0	4	32	22	21
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	2	54	33	14	49	3	3	0	4	32	22	21
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	131	115	2	148	107	33	43	xxxx	xxxxx	4	xxxx	xxxxx
Potent Cap.:	847	779	1088	825	787	1047	1579	xxxx	xxxxx	1631	xxxx	xxxxx
Move Cap.:	790	762	1088	744	770	1047	1579	xxxx	xxxxx	1631	xxxx	xxxxx
Volume/Cap:	0.00	0.07	0.03	0.02	0.06	0.00	0.00	xxxx	xxxx	0.02	xxxx	xxxx
Level Of Service Module:												
Queue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	0.1	xxxx	xxxxx
Stopped Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	7.3	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	858	xxxxx	xxxx	774	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.3	xxxxx	xxxxx	0.3	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd StpDel:	xxxxx	9.7	xxxxx	xxxxx	10.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	A	*	*	B	*	*	*	*	*	*	*
ApproachDel:		9.7			10.1			xxxxxx			xxxxxx	
ApproachLOS:		A			B			*			*	

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Annapolis Road/Stewarts Point

Average Delay (sec/veh): 3.4 Worst Case Level Of Service: A[8.7]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	1	0	0	0		0	0	0	1	0		0	0	1!	0	0		0	0	0	0	0	
Volume Module: Future AM Peak																								
Base Vol:	4	15	0				0	12	18				8	0	11				0	0	0			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	4	15	0				0	12	18				8	0	11				0	0	0			
Added Vol:	14	0	0				0	0	4				0	0	0				0	0	0			
PasserByVol:	0	0	0				0	0	0				0	0	0				0	0	0			
Initial Fut:	18	15	0				0	12	22				8	0	11				0	0	0			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	18	15	0				0	12	22				8	0	11				0	0	0			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Final Vol.:	18	15	0				0	12	22				8	0	11				0	0	0			
Critical Gap Module:																								
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx							6.4	xxxx					6.2	xxxxx	xxxx	xxxxx		
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx							3.5	xxxx					3.3	xxxxx	xxxx	xxxxx		
Capacity Module:																								
Cnflict Vol:	34	xxxx	xxxxx	xxxx	xxxx	xxxxx							74	xxxx					23	xxxx	xxxx	xxxxx		
Potent Cap.:	1591	xxxx	xxxxx	xxxx	xxxx	xxxxx							935	xxxx					1060	xxxx	xxxx	xxxxx		
Move Cap.:	1591	xxxx	xxxxx	xxxx	xxxx	xxxxx							926	xxxx					1060	xxxx	xxxx	xxxxx		
Volume/Cap:	0.01	xxxx	xxxx	xxxx	xxxx	xxxx							0.01	xxxx					0.01	xxxx	xxxx	xxxx		
Level Of Service Module:																								
Queue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
Stopped Del:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*												
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	999	xxxxx	xxxx	xxxx	xxxxx												
SharedQueue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.1	xxxxx	xxxxx	xxxx	xxxxx												
Shrd StpDel:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.7	xxxxx	xxxxx	xxxx	xxxxx												
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*												
ApproachDel:	xxxxxx			xxxxxx				8.7			xxxxxx													
ApproachLOS:	*			*				A			*													

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 State Route 1/Annapolis Road

Average Delay (sec/veh): 8.8 Worst Case Level Of Service: B[11.7]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	1	0		0	1	0	0	0		0	1	0	0	0		0	0	1!	0	0	
Volume Module: Future AM Peak																								
Base Vol:	0	70	27				67	98	0				0	0	0				22	0	37			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	0	70	27				67	98	0				0	0	0				22	0	37			
Added Vol:	0	0	0				0	0	0				36	2	0				0	0	22			
PasserByVol:	0	0	0				0	0	0				0	0	0				0	0	0			
Initial Fut:	0	70	27				67	98	0				36	2	0				22	0	59			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	0	70	27				67	98	0				36	2	0				22	0	59			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Final Vol.:	0	70	27				67	98	0				36	2	0				22	0	59			
Critical Gap Module:																								
Critical Gp:	xxxxx	6.5	6.2				7.1	6.5	xxxxx				4.1	xxxx	xxxxx				4.1	xxxx	xxxxx			
FollowUpTim:	xxxxx	4.0	3.3				3.5	4.0	xxxxx				2.2	xxxx	xxxxx				2.2	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	xxxx	177	2				196	148	xxxxx				59	xxxx	xxxxx				2	xxxx	xxxxx			
Potent Cap.:	xxxx	720	1088				767	748	xxxxx				1558	xxxx	xxxxx				1634	xxxx	xxxxx			
Move Cap.:	xxxx	694	1088				672	720	xxxxx				1558	xxxx	xxxxx				1634	xxxx	xxxxx			
Volume/Cap:	xxxx	0.10	0.02				0.10	0.14	xxxx				0.02	xxxx	xxxx				0.01	xxxx	xxxx			
Level Of Service Module:																								
Queue:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				0.1	xxxx	xxxxx				0.0	xxxx	xxxxx			
Stopped Del:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				7.4	xxxx	xxxxx				7.2	xxxx	xxxxx			
LOS by Move:	*	*	*				*	*	*				A	*	*				A	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	771				700	xxxx	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx			
SharedQueue:	xxxxx	xxxx	0.4				0.9	xxxx	xxxxx				0.1	xxxx	xxxxx				xxxxx	xxxx	xxxxx			
Shrd StpDel:	xxxxx	xxxx	10.3				11.7	xxxx	xxxxx				7.4	xxxx	xxxxx				xxxxx	xxxx	xxxxx			
Shared LOS:	*	*	B				B	*	*				A	*	*				*	*	*			
ApproachDel:	10.3						11.7						xxxxxx						xxxxxx					
ApproachLOS:	B						B						*						*					

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 State Route 1/Stewarts Point

Average Delay (sec/veh): 8.6 Worst Case Level Of Service: B[10.4]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0	
Volume Module: Future PM Peak																								
Base Vol:	16		97		23		13		71		8		9		2		8		27		2		11	
Growth Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Initial Bse:	16		97		23		13		71		8		9		2		8		27		2		11	
Added Vol:	0		0		0		12		0		2		0		22		0		0		0		0	
PasserByVol:	0		0		0		0		0		0		0		0		0		0		0		0	
Initial Fut:	16		97		23		25		71		10		9		24		8		27		2		11	
User Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Volume:	16		97		23		25		71		10		9		24		8		27		2		11	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
Final Vol.:	16		97		23		25		71		10		9		24		8		27		2		11	
Critical Gap Module:																								
Critical Gp:	7.1		6.5		6.2		7.1		6.5		6.2		4.1	xxxx	xxxxx				4.1	xxxx	xxxxx			
FollowUpTim:	3.5		4.0		3.3		3.5		4.0		3.3		2.2	xxxx	xxxxx				2.2	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	148		113		28		168		112		8		13	xxxx	xxxxx				32	xxxx	xxxxx			
Potent Cap.:	825		781		1053		801		782		1081		1619	xxxx	xxxxx				1593	xxxx	xxxxx			
Move Cap.:	746		763		1053		695		765		1081		1619	xxxx	xxxxx				1593	xxxx	xxxxx			
Volume/Cap:	0.02		0.13		0.02		0.04		0.09		0.01		0.01	xxxx	xxxx				0.02	xxxx	xxxx			
Level Of Service Module:																								
Queue:	xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		0.0	xxxx	xxxxx				0.1	xxxx	xxxxx			
Stopped Del:	xxxxx		xxxx		xxxxx		xxxxx		xxxx		xxxxx		7.2	xxxx	xxxxx				7.3	xxxx	xxxxx			
LOS by Move:	*		*		*		*		*		*		A	*	*				A	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx		798	xxxxx			xxxx		768	xxxxx			xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx			
SharedQueue:	xxxxx		0.6	xxxxx			xxxxx		0.5	xxxxx			xxxxx	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			
Shrd StpDel:	xxxxx		10.4	xxxxx			xxxxx		10.4	xxxxx			xxxxx	xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx			
Shared LOS:	*		B	*			*		B	*			*	*	*				*	*	*			
ApproachDel:	10.4						10.4						xxxxxx						xxxxxx					
ApproachLOS:	B						B						*						*					

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Annapolis Road/Stewarts Point

Average Delay (sec/veh): 4.1 Worst Case Level Of Service: A[8.7]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	1	0	0	0		0	0	0	1	0		0	0	1!	0	0		0	0	1!	0	0	
Volume Module:																								
Base Vol:	9	15		0			0	15		22			0	0		0			10	0		13		
Growth Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
Initial Bse:	9	15		0			0	15		22			0	0		0			10	0		13		
Added Vol:	0	0		0			0	0		0			4	0		14			0	0		0		
PasserByVol:	0	0		0			0	0		0			0	0		0			0	0		0		
Initial Fut:	9	15		0			0	15		22			4	0		14			10	0		13		
User Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
PHF Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
PHF Volume:	9	15		0			0	15		22			4	0		14			10	0		13		
Reduct Vol:	0	0		0			0	0		0			0	0		0			0	0		0		
Final Vol.:	9	15		0			0	15		22			4	0		14			10	0		13		
Critical Gap Module:																								
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx							7.1	xxxx		6.2			7.1	xxxx		6.2		
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx							3.5	xxxx		3.3			3.5	xxxx		3.3		
Capacity Module:																								
Cnflict Vol:	37	xxxx	xxxxx	xxxx	xxxx	xxxxx							66	xxxx		26			66	xxxx		15		
Potent Cap.:	1587	xxxx	xxxxx	xxxx	xxxx	xxxxx							933	xxxx		1056			932	xxxx		1070		
Move Cap.:	1587	xxxx	xxxxx	xxxx	xxxx	xxxxx							918	xxxx		1056			916	xxxx		1070		
Volume/Cap:	0.01	xxxx	xxxx	xxxx	xxxx	xxxx							0.00	xxxx		0.01			0.01	xxxx		0.01		
Level Of Service Module:																								
Queue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
Stopped Del:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx												
LOS by Move:	A	*		*		*	*	*		*		*												
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	1021	xxxxx	xxxx	997	xxxxx												
SharedQueue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.1	xxxxx	xxxxx	0.1	xxxxx												
Shrd StpDel:	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.6	xxxxx	xxxxx	8.7	xxxxx												
Shared LOS:	A	*		*		*	*	A		*		A												
ApproachDel:	xxxxxx			xxxxxx				8.6			8.7													
ApproachLOS:	*			*				A			A													

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 State Route 1/Annapolis Road

Average Delay (sec/veh): 7.6 Worst Case Level Of Service: B[10.2]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	1	0		0	0	1!	0	0		0	0	0	0	0		0	0	1!	0	0	
Volume Module: Future+Project_PM																								
Base Vol:	0	56	27				53	46	0				0	0	0				13	0	80			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	0	56	27				53	46	0				0	0	0				13	0	80			
Added Vol:	0	0	0				22	0	36				0	0	0				0	2	0			
PasserByVol:	0	0	0				0	0	0				0	0	0				0	0	0			
Initial Fut:	0	56	27				75	46	36				0	0	0				13	2	80			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	0	56	27				75	46	36				0	0	0				13	2	80			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Final Vol.:	0	56	27				75	46	36				0	0	0				13	2	80			
Critical Gap Module:																								
Critical Gp:	xxxxx	6.5	6.2				7.1	6.5	6.2				xxxxx	xxxx	xxxxx				4.1	xxxx	xxxxx			
FollowUpTim:	xxxxx	4.0	3.3				3.5	4.0	3.3				xxxxx	xxxx	xxxxx				2.2	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	xxxx	108	0				96	68	42				xxxx	xxxx	xxxxx				0	xxxx	xxxxx			
Potent Cap.:	xxxx	786	900				891	826	1034				xxxx	xxxx	xxxxx				900	xxxx	xxxxx			
Move Cap.:	xxxx	774	900				808	814	1034				xxxx	xxxx	xxxxx				900	xxxx	xxxxx			
Volume/Cap:	xxxx	0.07	0.03				0.09	0.06	0.03				xxxx	xxxx	xxxx				0.01	xxxx	xxxx			
Level Of Service Module:																								
Queue:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				0.0	xxxx	xxxxx			
Stopped Del:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				9.1	xxxx	xxxxx			
LOS by Move:	*	*	*				*	*	*				*	*	*				A	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	811				xxxx	853	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx			
SharedQueue:	xxxxx	xxxx	0.3				xxxxx	0.7	xxxxx				xxxxx	xxxxx	xxxx				xxxxx	xxxx	xxxxx			
Shrd StpDel:	xxxxx	xxxx	9.9				xxxxx	10.2	xxxxx				xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx			
Shared LOS:	*	*	A				*	B	*				*	*	*				*	*	*			
ApproachDel:	9.9						10.2						xxxxxx						xxxxxx					
ApproachLOS:	A						B						*						*					

APPENDIX G – TWO-WAY TWO-LANE HIGHWAY SEGMENT WORKSHEETS, FUTURE PLUS PROJECT CONDITIONS

- STATE ROUTE 1
- ANNAPOLIS ROAD
- STEWARTS POINT ROAD

HCS2000: Two-Lane Highways Release 4.1d

Two-Way Two-Lane Highway Segment Analysis

Analyst	Andrew Kluter
Agency/Co.	TJKM Transport. Consultants
Date Performed	12/1/2004
Analysis Time Period	AM Peak
Highway	State Route 1
From/To	Stewarts Point - Annapolis Rd
Jurisdiction	Sonoma County
Analysis Year	2025-Future+Project
Description	117-075 - Artesa Winery - Sonoma County

Input Data

Highway class	Class 2				
Shoulder width	2.0	ft	Peak-hour factor, PHF	0.85	
Lane width	10.0	ft	% Trucks and buses	5	%
Segment length	4.0	mi	% Recreational vehicles	7	%
Terrain type	Rolling		% No-passing zones	40	%
Grade: Length		mi	Access points/mi	10	/mi
Up/down		%			

Two-way hourly volume, V	330		veh/h
Directional split	60	/ 40	%

Average Travel Speed

Grade adjustment factor, fG	0.71	
PCE for trucks, ET	2.5	
PCE for RVs, ER	1.0*	
Heavy-vehicle adjustment factor,	0.930	
Two-way flow rate,(note-1) vp	588	pc/h
Highest directional split proportion (note-2)	353	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	2.5	mi/h
Free-flow speed, FFS	43.8	mi/h
Adjustment for no-passing zones, fnp	2.7*	mi/h
Average travel speed, ATS	36.5	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.77	
PCE for trucks, ET	1.8	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.962	
Two-way flow rate,(note-1) vp	524	pc/h
Highest directional split proportion (note-2)	314	
Base percent time-spent-following, BPTSF	36.9	%
Adj.for directional distribution and no-passing zones, fd/np	15.6	
Percent time-spent-following, PTSF	52.5	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.18	
Peak 15-min vehicle-miles of travel, VMT15	388	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1320	veh-mi
Peak 15-min total travel time, TT15	10.6	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

HCS2000: Two-Lane Highways Release 4.1d

Two-Way Two-Lane Highway Segment Analysis

Analyst	Andrew Kluter
Agency/Co.	TJKM Transport. Consultants
Date Performed	12/1/2004
Analysis Time Period	PM Peak
Highway	Annapolis Road
From/To	SR 1 - Stewarts Point Road
Jurisdiction	Sonoma County
Analysis Year	2025-Future+Project
Description	117-075 - Artesa Winery - Sonoma County

Input Data

Highway class	Class 2				
Shoulder width	2.0	ft	Peak-hour factor, PHF	0.85	
Lane width	11.0	ft	% Trucks and buses	5	%
Segment length	8.0	mi	% Recreational vehicles	7	%
Terrain type	Rolling		% No-passing zones	40	%
Grade: Length		mi	Access points/mi	10	/mi
Up/down		%			

Two-way hourly volume, V	197	veh/h	
Directional split	52 / 48	%	

Average Travel Speed

Grade adjustment factor, fG	0.71	
PCE for trucks, ET	2.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.924	
Two-way flow rate,(note-1) vp	353	pc/h
Highest directional split proportion (note-2)	184	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	3.0*	mi/h
Adj. for access points, fA	2.5	mi/h
Free-flow speed, FFS	44.5	mi/h
Adjustment for no-passing zones, fnp	1.4*	mi/h
Average travel speed, ATS	40.4	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.77	
PCE for trucks, ET	1.8	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.962	
Two-way flow rate,(note-1) vp	313	pc/h
Highest directional split proportion (note-2)	163	
Base percent time-spent-following, BPTSF	24.1	%
Adj.for directional distribution and no-passing zones, fd/np	17.9	
Percent time-spent-following, PTSF	42.0	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.11	
Peak 15-min vehicle-miles of travel, VMT15	464	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1576	veh-mi
Peak 15-min total travel time, TT15	11.5	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

HCS2000: Two-Lane Highways Release 4.1d

Two-Way Two-Lane Highway Segment Analysis

Analyst	Andrew Kluter
Agency/Co.	TJKM Transport. Consultants
Date Performed	12/1/2004
Analysis Time Period	AM Peak
Highway	Stewarts Point Road
From/To	SR 1 - Annapolis Road
Jurisdiction	Sonoma County
Analysis Year	2025-Future+Project
Description	117-075 - Artesa Winery - Sonoma County

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.85	
Lane width	11.0	ft	% Trucks and buses	5	%
Segment length	4.0	mi	% Recreational vehicles	7	%
Terrain type	Rolling		% No-passing zones	60	%
Grade: Length		mi	Access points/mi	10	/mi
Up/down		%			

Two-way hourly volume, V	114	veh/h	
Directional split	54 / 46	%	

Average Travel Speed

Grade adjustment factor, fG	0.71	
PCE for trucks, ET	2.5	
PCE for RVs, ER	1.1	
Heavy-vehicle adjustment factor,	0.924	
Two-way flow rate,(note-1) vp	204	pc/h
Highest directional split proportion (note-2)	110	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	45.0	mi/h
Adj. for lane and shoulder width, fLS	3.0*	mi/h
Adj. for access points, fA	2.5	mi/h
Free-flow speed, FFS	39.5	mi/h
Adjustment for no-passing zones, fnp	1.3*	mi/h
Average travel speed, ATS	36.6	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.77	
PCE for trucks, ET	1.8	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	0.962	
Two-way flow rate,(note-1) vp	181	pc/h
Highest directional split proportion (note-2)	98	
Base percent time-spent-following, BPTSF	14.7	%
Adj.for directional distribution and no-passing zones, fd/np	21.0	
Percent time-spent-following, PTSF	35.8	%

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.06	
Peak 15-min vehicle-miles of travel, VMT15	134	veh-mi
Peak-hour vehicle-miles of travel, VMT60	456	veh-mi
Peak 15-min total travel time, TT15	3.7	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value