Executive Summary

To be provided in final report.
Introduction

This report presents an analysis of the potential traffic impacts that would be associated with development of a proposed multifamily housing development to be located on the southwest corner of the Petaluma Hill Road/Colgan Avenue intersection in the City of Santa Rosa. The traffic study was completed in accordance with the criteria established by the City of Santa Rosa, reflects a scope of work and study area reviewed and approved by City staff, and is consistent with standard traffic engineering techniques.

Prelude

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

Project Profile

The project as proposed includes 148 apartment units on a site located at the southwest corner of the Petaluma Hill Road/Colgan Avenue intersection in the City of Santa Rosa, as shown in Figure 1. Access to the project site would be taken via one new driveway on each of the site’s street frontages. Parking for 238 vehicles would be provided on-site.
Figure 1 – Study Area and Existing Lane Configurations
Transportation Setting

Operational Analysis

Study Area and Periods

The study area consists of the following intersections:

1. Petaluma Hill Road/Aston Avenue
2. Petaluma Hill Road/Colgan Avenue
3. Petaluma Hill Road/Santa Ana Drive
4. Petaluma Hill Road/Breeze Way
5. Santa Rosa Avenue/Baker Avenue Overcrossing
6. Santa Rosa Avenue/Colgan Avenue-US 101 North Ramps

It is noted that the project driveways were not considered as study intersections. The California Vehicle Code defines an intersection as “the area embraced within the prolongation of the lateral curb lines, or, if none, then the lateral boundary lines of the roadways, of two highways which join one another at approximately right angles or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict.” This definition specifies that intersections are created where two “highways,” or public streets, intersect. As driveways are not public streets, where they connect with a public road is not an intersection, so it would be unreasonable to evaluate it as such. The driveway connection was, however, evaluated for operational issues such as adequacy of sight distance and need for turn lanes.

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute.

Study Intersections

Petaluma Hill Road/Aston Avenue is a four-legged, signalized intersection with protected-permitted left-turn phasing on the north and south approaches. The phasing is split in the east and west directions and there is a right-turn overlap on the northbound approach. There is a “Do Not Enter” sign on the west leg, but the traffic counts and observations indicate that a modest amount of vehicle traffic does enter and exit this leg of Aston Way. Pedestrian phasing is provided on all legs.

Petaluma Hill Road/Colgan Avenue is a four-legged signalized intersection where the east leg is the driveway to a supermarket. There is protected-permitted left-turn phasing in the north and south directions and right-turn overlap phases on the southbound and eastbound approaches. The intersection operates with split phasing east-west, and pedestrian crossings are located on the west and south legs.

Petaluma Hill Road/Santa Ana Drive is an unsignalized intersection that is stop-controlled on the westbound approach. A crosswalk is provided on the east leg.

Petaluma Hill Road/Breeze Way is an unsignalized intersection that is stop-controlled on the westbound approach. A crosswalk with a pedestrian warning beacon system is provided on the north leg. A crosswalk is also marked on the east leg.
Traffic Impact Study for the Petaluma Hill Road/Colgan Avenue Apartments Project
April 9, 2020

Santa Rosa Avenue/Baker Avenue Overcrossing is a signalized four-legged intersection. Protected left-turn phasing is provided on the northbound and southbound approaches while the eastbound and westbound approaches operate with split phasing. The east leg of the intersection is a private commercial driveway. Crosswalks are provided on the north and west legs.

Santa Rosa Avenue/Colgan Avenue-US 101 North Ramps is a four-legged, signalized intersection with protected left-turn phasing on all approaches. The north and south legs are Santa Rosa Avenue, the east leg is Colgan Avenue, and the west leg is composed of US 101 Northbound off- and on-ramps. The east and west legs are offset and intersect Santa Rosa Avenue at a skewed angle. There are marked crosswalks on the north, east, and west legs.

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

Study Roadways

Petaluma Hill Road runs parallel to US 101 in a generally north-south alignment between Santa Rosa Avenue in Santa Rosa and Adobe Road in Penngrove. The section along the project frontage has one travel lane and a Class II bike lane in each direction, along with a center two-way left-turn lane (TWLTL). Sidewalks exist on the east side of the street, but the west side along the project frontage includes no curb and only a four-foot wide asphalt paved path. The roadway has total paved width of approximately 50 feet and a posted speed limit of 40 miles per hour (mph).

Colgan Avenue runs in a generally east-west alignment between Santa Rosa Avenue and Petaluma Hill Road in Santa Rosa. The section along the project frontage is generally unimproved, lacking curb, gutter, and sidewalks, and has one travel lane in each direction. The roadway has total paved width of approximately 26 feet and a posted speed limit of 35 mph.

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is September 1, 2014 through August 31, 2019.

As presented in Table 1, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in 2016 Collision Data on California State Highways, California Department of Transportation (Caltrans). Collision rates for five of the six study intersections were above the statewide average so were further reviewed. The collision rate calculations are provided in Appendix A.
Table 1 – Collision Rates at the Study Intersections

<table>
<thead>
<tr>
<th>Study Intersection</th>
<th>Number of Collisions (2014-2019)</th>
<th>Calculated Collision Rate (c/mve)</th>
<th>Statewide Average Collision Rate (c/mve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Petaluma Hill Rd/Aston Ave</td>
<td>7</td>
<td>0.22</td>
<td>0.24</td>
</tr>
<tr>
<td>2. Petaluma Hill Rd/Colgan Ave</td>
<td>9</td>
<td>0.27</td>
<td>0.24</td>
</tr>
<tr>
<td>3. Petaluma Hill Rd/Santa Ana Dr</td>
<td>3</td>
<td>0.10</td>
<td>0.08</td>
</tr>
<tr>
<td>4. Petaluma Hill Rd/Breeze Wy</td>
<td>3</td>
<td>0.10</td>
<td>0.08</td>
</tr>
<tr>
<td>5. Santa Rosa Ave/Baker Ave OC</td>
<td>25</td>
<td>0.46</td>
<td>0.24</td>
</tr>
<tr>
<td>6. Santa Rosa Ave/Colgan Ave-US 101 N Ramps</td>
<td>19</td>
<td>0.30</td>
<td>0.24</td>
</tr>
</tbody>
</table>

Note: \(c/mve\) = collisions per million vehicles entering; **bold** = collision rate exceeds Statewide average

The Petaluma Hill Road/Colgan Avenue intersection has a slightly higher collision rates than the statewide average. The predominant crash type at this intersection was broadside collisions, with the primary cause being right-of-way violation and traffic signals and signs. Five of the nine crashes at this location involved vehicles turning left off of Petaluma Hill Road, and three of these resulted in injuries. This type of crash has been noticed at other locations with protected-permitted left-turn phasing. The City’s Capital Improvement Program (CIP) includes the intersection of Petaluma Hill Road/Colgan Avenue in the flashing yellow left-turn retrofit project, which would retrofit and upgrade protective-permissive phasing with flashing yellow left-turn arrow displays that tend to be more intuitive and therefore better understood by the driving public. This project was anticipated to be completed in May 2020, though the schedule will likely be affected by the coronavirus pandemic and associated order for residents to remain in their homes. The City may wish to monitor collisions at this location after improvements are completed to determine if further changes are warranted.

Collision rates at the Petaluma Hill Road/Santa Ana Drive intersection are marginally higher than the statewide average. All three reported collisions were broadside collisions with the cause being right-of-way violation, improper turning, and driving under the influence. As all three crashes involved different movements and the intersection had an injury rate of 33.3 percent, compared to the statewide average of 45.1 percent, no remedial action appears to be warranted.

The collision rate at Petaluma Hill Road/Breeze Way intersection is also slightly higher than average; all three reported incidents were southbound rear-end collisions. While none of the collisions were reported to involve pedestrians and there is insufficient detail to determine exact causes, given the presence of a frequently-used pedestrian crossing at this location, it is possible that one or more of the rear-ends occurred while a driver was stopped to wait for a crossing pedestrian and hit from behind by a second driver.

The collision rate at Santa Rosa Avenues/Baker Avenue OC is higher than the statewide average, with 17 of the 25 reported collisions being either rear-end or sideswipe collisions. Rear-end crashes are common at signalized intersections during congested conditions. Sideswipe collisions can result from improper lane changing and passing as well as right-of-way violations. While review of the collision records indicates no apparent trends indicating a safety deficiency, an increased enforcement presence may help to reduce the frequency of collisions involving speeding, right-of-way violations, and obeyance of traffic signals.

Review of the collisions reported at Santa Rosa Avenue/Colgan Avenue-US 101 North Ramps indicates that 12 of the 19 collisions were broadside collisions, eleven of which occurred on the northbound and southbound approaches to the intersection. This most common primary collision factor cited was violation of traffic signals and signs, and right of way violations. As noted for the previous intersection, an increased enforcement presence may help to reduce the frequency of these types of collisions.
Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. In general, a network of sidewalks, crosswalks, pedestrian signals, and curb ramps provide access for pedestrians in the vicinity of the proposed project site where property has been developed; however, sidewalk gaps can be found along and near the project site.

- **Colgan Avenue** – Several sections of sidewalk are provided from Santa Rosa Avenue to Petaluma Hill Road, but there are large gaps in sidewalk coverage on both sides of Colgan Avenue. In these areas, pedestrians walk on paved or gravel shoulders. Sidewalks have been constructed along the frontages of parcels that have been redeveloped since annexation to the City. Lighting is provided by overhead lights, mainly on the north side of the street.

- **Petaluma Hill Road** – Continuous sidewalk is provided from Santa Rosa Avenue to Colgan Avenue on both sides of the street. From Colgan Avenue to Kawana Springs Road, pedestrian facilities are continuous on both sides of the street through a mix of sidewalks and asphalt paths. As parcels have been developed, frontages have been improved with curb, gutter, and sidewalk. There are crosswalks at signalized and unsignalized intersections on the corridor within the study area; some unsignalized crossings have active warning devices. Overhead lighting is provided. The *City of Santa Rosa Bicycle & Pedestrian Master Plan Update 2018*, City of Santa Rosa, 2018, indicates the Petaluma Hill Road/Breeze Way intersection as a proposed crossing enhancement location.

Bicycle Facilities

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

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.
- **Class IV Bikeway** – also known as a separated bikeway, a Class IV Bikeway is for the exclusive use of bicycles and includes a separation between the bikeway and the motor vehicle traffic lane. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

In the project area, Class II bike lanes exist on Petaluma Hill Road between Barham Avenue and Breeze Way. Bicyclists ride in the roadway and/or on sidewalks along all other streets within the project study area. Table 2 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *City of Santa Rosa Bicycle & Pedestrian Master Plan Update 2018*. 
Table 2 – Bicycle Facility Summary

<table>
<thead>
<tr>
<th>Status</th>
<th>Facility</th>
<th>Class</th>
<th>Length (miles)</th>
<th>Begin Point</th>
<th>End Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>Colgan Creek Trail</td>
<td>I</td>
<td>0.6</td>
<td>Colgan Ave</td>
<td>Petaluma Hill Rd</td>
</tr>
<tr>
<td></td>
<td>Petaluma Hill Rd</td>
<td>II</td>
<td>0.4</td>
<td>Barham Ave-Pressley St</td>
<td>Colgan Ave</td>
</tr>
<tr>
<td></td>
<td>Santa Rosa Ave</td>
<td>II</td>
<td>0.4</td>
<td>Barham Ave</td>
<td>Colgan Ave</td>
</tr>
<tr>
<td>Planned</td>
<td>Aston Ave</td>
<td>II</td>
<td>0.40</td>
<td>Brookwood Ave</td>
<td>Hendley St</td>
</tr>
<tr>
<td></td>
<td>Baker Ave</td>
<td>II</td>
<td>0.22</td>
<td>Corby Ave</td>
<td>Santa Rosa Ave</td>
</tr>
<tr>
<td></td>
<td>Petaluma Hill Rd</td>
<td>II</td>
<td>0.16</td>
<td>Santa Rosa Ave</td>
<td>Barham Ave/Pressley St</td>
</tr>
<tr>
<td></td>
<td>Petaluma Hill Rd</td>
<td>II (buffered)</td>
<td>2.01</td>
<td>Yolanda Ave</td>
<td>Barham Ave/Pressley St</td>
</tr>
</tbody>
</table>

Source: City of Santa Rosa Bicycle & Pedestrian Master Plan Update 2018, City of Santa Rosa, 2018

Transit Facilities

Santa Rosa CityBus and Sonoma County Transit (SCT) provide fixed route bus service near the project site.

Santa Rosa CityBus Routes 3 and 5 provide loop service to destinations throughout the City including the downtown transit mall. Route 3 stops at Santa Rosa Avenue/Colgan Avenue and Route 5 stops at Petaluma Hill Road/Aston Avenue, Petaluma Hill Road/Colgan Avenue, and Petaluma Hill Road/Santa Ana Drive. Route 3 operates Monday through Friday with approximately half-hour headways between 6:00 a.m. and 7:30 p.m. Saturday service operates with approximately one-hour headways between 6:00 a.m. and 7:00 p.m. Sunday service operates approximately one-hour headways from 10:00 a.m. and 4:00 p.m. Route 5 operates Monday through Friday with approximately half-hour headways between 6:15 a.m. and 7:45 p.m. Saturday service operates with approximately one-hour headways between 6:30 a.m. and 7:30 p.m. Sunday service operates approximately one-hour headways from 10:30 a.m. and 4:30 p.m.

SCT Route 46 provides regional service between the Cotati Station and Santa Rosa Transit Mall with a stop at Petaluma Hill Road/Aston Avenue and Petaluma Hill Road/Colgan Avenue. This route operates during weekday a.m. and p.m. peak periods of 6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:00 p.m.

Two bicycles can be carried on most SCT and Santa Rosa buses. Bike rack space is on a first come, first served basis. Additional bicycles are allowed on SCT buses at the discretion of the driver.

Dial-a-ride, also known as paratransit, or door-to-door service, is available for those who are unable to independently use the transit system due to a physical or mental disability. SCT Paratransit is designed to serve the needs of individuals with disabilities within Santa Rosa and the greater Santa Rosa area.
Capacity Analysis

Intersection Level of Service Methodologies

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

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual (HCM)*, Transportation Research Board, 6th Edition, 2018. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

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

The study intersections that are currently controlled by a traffic signal were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether the signals are coordinated or not, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. For purposes of this study, delays were calculated using signal timing obtained from City of Santa Rosa.

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

<table>
<thead>
<tr>
<th>LOS</th>
<th>Two-Way Stop-Controlled</th>
<th>Signalized</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.</td>
<td>Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.</td>
</tr>
<tr>
<td>B</td>
<td>Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.</td>
<td>Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.</td>
</tr>
<tr>
<td>C</td>
<td>Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.</td>
<td>Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.</td>
</tr>
<tr>
<td>D</td>
<td>Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.</td>
<td>Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.</td>
</tr>
<tr>
<td>E</td>
<td>Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.</td>
<td>Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.</td>
</tr>
<tr>
<td>F</td>
<td>Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.</td>
<td>Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.</td>
</tr>
</tbody>
</table>

Traffic Operation Standards

Section 5.8 Transportation Goals & Policy of the City of Santa Rosa General Plan provides the following goals and policies relevant to the traffic analysis.

T-D-1 Maintain a Level of Service (LOS) D or better along all major corridors. Exceptions to meeting the standard include:

- Within downtown;
- Where attainment would result in significant degradation;
- Where topography or impacts makes the improvement impossible; or
- Where attainment would ensure loss of an area's unique character.

The LOS is to be calculated using the average traffic demand over the highest 60-minute period.

Traffic Engineering Division will require a level of service evaluation of arterial and collector corridors if deemed necessary.

T-D-2 Monitor level of service at intersections to assure that improvements or alterations to improve corridor level of service do not cause severe impacts at any single intersection.

General interpretation of Policy T-D-2. The impact to an intersection is considered adverse if the project related and/or future trips result in:

1. The level of service (LOS) at an intersection degrading from LOS D or better to LOS E or F, OR
2. An increase in average vehicle delay of greater than 5 seconds at a signalized intersection where the current LOS is either LOS E or F.
3. Queuing impacts based on a comparative analysis between the design queue length and the available queue storage capacity. Impacts include, but are not limited to, spillback queue at project access locations (both ingress and egress), turn lanes at intersections, lane drops, spillback that impacts upstream intersections or interchange ramps.
4. Exceptions may be granted under the following conditions:
   a. Within downtown,
   b. Where attainment would result in significant degradation,
   c. Where topography or impacts makes the improvement impossible; or
   d. Where attainment would ensure loss of an area's unique character.

T-C-3 Implement traffic calming techniques on streets subject to high speed and/or cut-through traffic, in order to improve neighborhood livability. Techniques include:

- Narrow Streets
- On-street parking
- Choker or diverters
- Decorative crosswalks
- Planted islands

General interpretation of Policy T-C-3. An impact is considered adverse if the project has the potential to alter community character by significantly increasing cut-through traffic, unexpected vehicle maneuvers or commercial vehicle trips in a residential area.

T-H-3 Require new development to provide transit improvements, where a rough proportionality to demand from the project is established. Transit improvements may include:
• Direct and paved pedestrian access to transit stops
• Bus turnouts and shelters
• Lane width to accommodate buses.

General interpretation of Policy T-H-3. An impact is considered adverse if the project has the potential to disrupt existing transit operations or establishes transit facilities and equipment such that it creates a sight distance deficiency or vehicle conflict point.

T-J Provide attractive and safe streets for pedestrian and bicyclists.

General interpretation of Policy T-J. An impact is considered adverse if the project generates 20 pedestrians in any single hour at an unsignalized intersection, mid-block crossing or where no crossing has been established.

An impact is further considered significant if the project interrupts existing or proposed pedestrian, bicycle and transit facilities, path or travel, direct access resulting in excessive rerouting or creates a vehicle conflict condition which affects the safety of other roadway users.

Use of LOS E or F at Unsignalized Intersections

On sections of certain arterial streets, it is typical to have all side streets operating at LOS E or F with long traffic delays, even where side street volumes are very low. In fact, it may be operationally, physically, and/or financially infeasible to provide mitigation which would allow Level of Service D conditions or better from all side streets during peak hours. The most typical mitigation measure used to improve operation for the side street is a traffic signal, and it is both operationally and financially undesirable to provide a traffic signal at every intersection along most street segments. For these reasons, mitigation measures were considered when LOS F conditions were projected for minor movements at unsignalized intersections.

Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Volume data was collected when while local schools were in session.

Under Existing Conditions, all intersections are operating acceptably. The existing traffic volumes are shown in Figure 2. A summary of the intersection level of service calculations is contained in Table 4, and copies of the Level of Service calculations are provided in Appendix B.
Traffic Impact Study for the Petaluma Hill Road/Colgan Avenue Apartments Project

Figure 2 – Existing Traffic Volumes

LEGEND
- Study Intersection
- AM Peak Hour Volume
- PM Peak Hour Volume

<table>
<thead>
<tr>
<th>Intersection</th>
<th>AM Peak Hour Volume</th>
<th>PM Peak Hour Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>236 (501)</td>
<td>18 (38)</td>
</tr>
<tr>
<td>2</td>
<td>96 (126)</td>
<td>18 (7)</td>
</tr>
<tr>
<td>3</td>
<td>433 (776)</td>
<td>126 (236)</td>
</tr>
<tr>
<td>4</td>
<td>69 (74)</td>
<td>78 (120)</td>
</tr>
<tr>
<td>5</td>
<td>360 (822)</td>
<td>4 (6)</td>
</tr>
<tr>
<td>6</td>
<td>145 (236)</td>
<td>447 (886)</td>
</tr>
</tbody>
</table>

Note: Traffic volumes are approximate and may vary.

North

Project Site

Santa Rosa Ave

Aston Ave

Santa Ana Dr

Baker Ave

Colgan Ave

Petaluma Hill Rd

Breeze Wy

Not to Scale
Table 4 – Existing Peak Hour Intersection Levels of Service

<table>
<thead>
<tr>
<th>Study Intersection Approach</th>
<th>AM Peak</th>
<th>PM Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Delay</td>
<td>LOS</td>
</tr>
<tr>
<td>1. Petaluma Hill Rd/Aston Ave</td>
<td>14.1</td>
<td>B</td>
</tr>
<tr>
<td>2. Petaluma Hill Rd/Colgan Ave</td>
<td>6.8</td>
<td>A</td>
</tr>
<tr>
<td>3. Petaluma Hill Rd/Santa Ana Dr</td>
<td>2.1</td>
<td>A</td>
</tr>
<tr>
<td>Westbound (Santa Ana Dr) Approach</td>
<td>28.1</td>
<td>D</td>
</tr>
<tr>
<td>4. Petaluma Hill Rd/Breeze Wy</td>
<td>1.4</td>
<td>A</td>
</tr>
<tr>
<td>Westbound (Breeze Wy) Approach</td>
<td>23.9</td>
<td>C</td>
</tr>
<tr>
<td>5. Santa Rosa Ave/Baker Ave OC</td>
<td>14.1</td>
<td>B</td>
</tr>
<tr>
<td>6. Santa Rosa Ave/Colgan Ave-US 101 N Ramps</td>
<td>30.3</td>
<td>C</td>
</tr>
</tbody>
</table>

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

Future Conditions

Segment volumes for the horizon year of 2040 were obtained from the SCTM\15 regional travel demand model maintained by SCTA and translated to turning movement volumes at each of the study intersections using a combination of the “Furness” method and factoring, depending on how the model was configured at each intersection. The Furness method is an iterative process that employs existing turn movement data, existing link volumes and future link volumes to project likely turning future movement volumes at intersections.

Under the anticipated Future volumes, the study intersections are expected to operate acceptably overall, though the westbound approach at the Petaluma Hill Road/Santa Ana Drive intersection is expected to operate at LOS F during the a.m. peak hour and LOS E during the p.m. peak hour. Similarly, the westbound Breeze Way approach to Petaluma Hill Road is expected to operate at LOS E during the morning peak hour. Operating conditions are summarized in Table 5 and Future volumes are shown in Figure 3.

Table 5 – Future Peak Hour Intersection Levels of Service

<table>
<thead>
<tr>
<th>Study Intersection Approach</th>
<th>AM Peak</th>
<th>PM Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Delay</td>
<td>LOS</td>
</tr>
<tr>
<td>1. Petaluma Hill Rd/Aston Ave</td>
<td>24.5</td>
<td>C</td>
</tr>
<tr>
<td>2. Petaluma Hill Rd/Colgan Ave</td>
<td>7.4</td>
<td>A</td>
</tr>
<tr>
<td>3. Petaluma Hill Rd/Santa Ana Dr</td>
<td>10.0</td>
<td>B</td>
</tr>
<tr>
<td>Westbound (Santa Ana Dr) Approach</td>
<td>139.6</td>
<td>F</td>
</tr>
<tr>
<td>4. Petaluma Hill Rd/Breeze Wy</td>
<td>2.7</td>
<td>A</td>
</tr>
<tr>
<td>Westbound (Breeze Wy) Approach</td>
<td>46.4</td>
<td>E</td>
</tr>
<tr>
<td>5. Santa Rosa Ave/Baker Ave OC</td>
<td>19.0</td>
<td>B</td>
</tr>
<tr>
<td>6. Santa Rosa Ave/Colgan Ave-US 101 N Ramps</td>
<td>44.9</td>
<td>D</td>
</tr>
</tbody>
</table>

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** text = deficient operation
Figure 3 – Future Traffic Volumes
Project Description

The project consists of 147 dwelling units for a new multifamily housing development to be located on the southwest corner of the Petaluma Hill Road/Colgan Avenue intersection in the City of Santa Rosa. The proposed project site plan is shown in Figure 4.

Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual, 10th Edition, 2017* for “Multi-family Housing (Mid-Rise)” (ITE LU 221). Based on application of these rates, the proposed project is expected to generate an average of 800 trips per day, including 53 a.m. peak hour trips and 65 trips during the p.m. peak hour. These results are summarized in Table 6.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Units</th>
<th>Daily Rate</th>
<th>Daily Trips</th>
<th>AM Peak Hour Rate</th>
<th>AM Peak Hour Trips</th>
<th>AM Peak Hour In</th>
<th>AM Peak Hour Out</th>
<th>PM Peak Hour Rate</th>
<th>PM Peak Hour Trips</th>
<th>PM Peak Hour In</th>
<th>PM Peak Hour Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multifamily Housing (Mid-Rise)</td>
<td>147 du</td>
<td>5.44</td>
<td>800</td>
<td>0.36</td>
<td>53</td>
<td>14</td>
<td>39</td>
<td>0.44</td>
<td>65</td>
<td>39</td>
<td>26</td>
</tr>
</tbody>
</table>

Note: du = dwelling unit

Trip Distribution

The pattern used to allocate new project trips to the street network was based on a review of existing turning movements at the study intersections and knowledge of the area and surrounding region, including previous analyses prepared for other projects in the vicinity. Given the site’s configuration, travel paths to and from regional destinations were in some cases divided between the Colgan Avenue and Petaluma Hill Road driveways. The applied distribution assumptions and resulting trips are shown in Table 7.

<table>
<thead>
<tr>
<th>Route</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>From/to North via US 101 at Santa Rosa Ave/Colgan Ave</td>
<td>30%</td>
</tr>
<tr>
<td>From/to South via US 101 at Santa Rosa Ave/Colgan Ave</td>
<td>20%</td>
</tr>
<tr>
<td>From/to North via Petaluma Hill Rd</td>
<td>20%</td>
</tr>
<tr>
<td>From/to South via Petaluma Hill Rd</td>
<td>20%</td>
</tr>
<tr>
<td>From/to East via Aston Ave</td>
<td>10%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
</tr>
</tbody>
</table>

Vehicles Miles Traveled

Consideration was given to the project’s potential generation of Vehicle Miles Traveled (VMT). Because the City has not yet adopted a standard of significance for evaluating VMT, this data is being supplied for informational purposes.

The Sonoma County Transportation Authority (SCTA) has developed a model that estimates traffic and VMT characteristics in specific areas of development within the County, known as Traffic Analysis Zones (TAZs). The
Traffic Impact Study for the Petaluma Hill Road/Colgan Avenue Apartments Project

Figure 4 – Site Plan
The proposed project would be located in TAZ 595. The model estimates the residential VMT per capita in this TAZ to be 10.08 miles per day. In comparison, the citywide average residential VMT per capita for Santa Rosa is 12.45 miles per day. Based on this data, the project can be expected to produce a per capita VMT that is approximately 19 percent lower than the citywide average. In terms of total VMT, and with an average occupancy of 2.34 persons per multifamily unit, the project can be expected to result in 3,467 daily vehicle miles of travel.

**Finding** – The project is anticipated to result in 3,467 daily miles of vehicle travel at a per capita rate that is 19 percent lower than the Santa Rosa citywide average.

### Intersection Operation

#### Existing plus Project Conditions

Upon the addition of project-related traffic to the existing volumes, the study intersections are expected to continue operating at acceptable service levels during both the a.m. and p.m. peak hours. These results are summarized in Table 8. Project traffic volumes are shown in Figure 5, and Existing plus Project volumes are shown in Figure 6.

<table>
<thead>
<tr>
<th>Study Intersection Approach</th>
<th>Existing Conditions AM Peak Delay LOS</th>
<th>Existing Conditions PM Peak Delay LOS</th>
<th>Existing plus Project AM Peak Delay LOS</th>
<th>Existing plus Project PM Peak Delay LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petaluma Hill Rd/Aston Ave</td>
<td>14.1 B</td>
<td>26.0 C</td>
<td>14.1 B</td>
<td>26.0 C</td>
</tr>
<tr>
<td>Petaluma Hill Rd/Colgan Ave</td>
<td>6.8 A</td>
<td>9.3 A</td>
<td>7.0 A</td>
<td>9.7 A</td>
</tr>
<tr>
<td>Petaluma Hill Rd/Santa Ana Dr</td>
<td>2.1 A</td>
<td>1.2 B</td>
<td>2.1 A</td>
<td>1.2 A</td>
</tr>
<tr>
<td>WB (Santa Ana Dr) Approach</td>
<td>28.1 D</td>
<td>21.8 C</td>
<td>28.6 D</td>
<td>21.9 C</td>
</tr>
<tr>
<td>Petaluma Hill Rd/Breeze Wy</td>
<td>1.4 A</td>
<td>0.6 A</td>
<td>1.4 A</td>
<td>0.6 A</td>
</tr>
<tr>
<td>WB (Breeze Wy) Approach</td>
<td>23.9 C</td>
<td>20.3 C</td>
<td>24.1 C</td>
<td>20.5 C</td>
</tr>
<tr>
<td>Santa Rosa Ave/Baker Ave OC</td>
<td>14.1 B</td>
<td>33.3 C</td>
<td>14.2 B</td>
<td>33.3 C</td>
</tr>
<tr>
<td>Santa Rosa Ave/Colgan Ave-US 101 N Ramps</td>
<td>30.3 C</td>
<td>43.4 D</td>
<td>31.1 C</td>
<td>42.9 D</td>
</tr>
</tbody>
</table>

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

It should be noted that with the addition of project-related traffic volumes average delay at the intersection of Santa Rosa Avenue/Colgan Avenue-US 101 North Ramps decreases during the p.m. peak hour. While this is counter-intuitive, this condition occurs when a project adds trips to movements that are currently underutilized or have delays that are below the intersection average, resulting in a better balance between approaches and lower overall average delay. The project adds traffic predominantly to the westbound through movement, which has an average delay that is lower than the average for the intersection as a whole, resulting in a slight reduction in the overall average delay. The conclusion could incorrectly be drawn that the project actually improves operation based on this data alone; however, it is more appropriate to conclude that the project trips are expected to make use of excess capacity, so drivers will experience little, if any, change in conditions as a result of the project.

**Finding** – The study intersections are expected to continue operating acceptably at the same levels of service upon the addition of project-generated traffic, indicating an acceptable impact due to adding project-generated trips.
Traffic Impact Study for the Petaluma Hill Road/Colgan Avenue Apartments Project

Figure 5 – Project Traffic Volumes
Figure 6 – Existing plus Project Traffic Volumes

Legends:
- Study Intersection
- AM Peak Hour Volume
- PM Peak Hour Volume

Not to Scale

Traffic Impact Study for the Petaluma Hill Road/Colgan Avenue Apartments Project
Future plus Project Conditions

Upon the addition of project-generated traffic to the anticipated Future volumes the study intersections are expected to operate acceptably overall. At the intersection of Petaluma Hill Road/Santa Ana Drive operation on the westbound minor approach of Santa Ana Drive is projected to operate at LOS F and LOS E during the a.m. and p.m. peak hours, respectively, both without and with the project. The project would be expected to increase delay on this minor approach by 0.3 to 2.5 seconds. Operation at the intersection could be substantially improved by marking a short right-turn pocket on the Santa Ana Drive approach. This modification would entail some minor roadway restriping and parking prohibitions near the intersection, both of which are examples of routine low-cost improvements completed by the City’s maintenance crews. If requested by the City, the applicant should contribute to the City’s cost of implementing these changes.

At the intersection of Petaluma Hill Road/Breeze Way, the westbound stop-controlled approach is projected to operate at LOS E during the a.m. peak hour, though the project would result in no measurable increases to this delay.

The Future plus Project operating conditions are summarized in Table 9, and Future plus Project volumes are shown in Figure 7.

<table>
<thead>
<tr>
<th>Study Intersection</th>
<th>Future Conditions</th>
<th>Future plus Project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak</td>
<td>PM Peak</td>
</tr>
<tr>
<td></td>
<td>Delay</td>
<td>LOS</td>
</tr>
<tr>
<td>1. Petaluma Hill Rd/Ashton Ave</td>
<td>24.5</td>
<td>C</td>
</tr>
<tr>
<td>2. Petaluma Hill Rd/Colgan Ave</td>
<td>7.4</td>
<td>A</td>
</tr>
<tr>
<td>3. Petaluma Hill Rd/Santa Ana Dr Westbound (Santa Ana Dr) Approach</td>
<td>10.0</td>
<td>B</td>
</tr>
<tr>
<td>With Right-Turn Pocket</td>
<td>63.7</td>
<td>F</td>
</tr>
<tr>
<td>4. Petaluma Hill Rd/Breeze Wy Westbound (Breeze Wy) Approach</td>
<td>2.7</td>
<td>A</td>
</tr>
<tr>
<td>5. Santa Rosa Ave/Baker Ave OC</td>
<td>19.0</td>
<td>B</td>
</tr>
<tr>
<td>6. Santa Rosa Ave/Colgan Ave-US 101 N Ramps</td>
<td>44.9</td>
<td>D</td>
</tr>
</tbody>
</table>

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** text = deficient operation; Shaded cells = conditions with recommended improvements

Finding – The study intersections will continue operating acceptably overall with project traffic added, at the same Levels of Service as without it. At two study intersections anticipated to encounter LOS E or F operation on the minor approach, the project is expected to be responsible for delay increases of between zero and 2.5 seconds, which is less than the City’s 5-second threshold and therefore acceptable. Finding – Operation on the minor westbound approach at Petaluma Hill Road/Santa Ana Drive could be improved by striping a right-turn pocket and would entail low-cost changes that are typical of those performed by the City’s maintenance staff.
Figure 7 – Future plus Project Traffic Volumes
**Recommendation** – If requested by the City, the project applicant should contribute funds toward the cost of implementing a right-turn pocket on the westbound approach of Petaluma Hill Road/Santa Ana Drive.

**Queuing**

The project would have two access points near the Petaluma Hill Road/Colgan Avenue intersection, resulting in additional turning movements at the intersection and driveways that may affect queuing. The driveway on Colgan Avenue would be located 200 feet west of Petaluma Hill Road, and the driveway on Petaluma Hill Road would be located 330 feet south of Colgan Avenue. Queuing conditions were evaluated at the Petaluma Hill Road/Colgan Avenue intersection under the future and future plus project scenarios using the SIMTRAFFIC application of Synchro.

Petaluma Hill Road/Colgan Avenue is closely spaced to two adjacent intersections on Petaluma Hill Road. The signalized intersection at Aston Avenue is located 315 feet to the north, and the unsignalized Santa Ana Drive intersection 210 feet to the south (the nearest signalized intersection to the south is one-half mile away at Kawana Springs Road). Based on observations, queues during the busiest travel periods can extend to both adjacent intersections, and this can be expected to continue as volumes increase in the future.

Queues were calculated based on both the averaged 95<sup>th</sup> percentile queues as well as the average queues from ten simulation runs. A summary of the projected queues is provided in Table 10, and copies of the calculations are included in Appendix D.

### Table 10 – Projected Future Queuing at Petaluma Hill Road/Colgan Avenue

<table>
<thead>
<tr>
<th>Lane</th>
<th>Available Storage</th>
<th>AM Peak Hour</th>
<th></th>
<th>PM Peak Hour</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Future</td>
<td>Future + Project</td>
<td>Future</td>
<td>Future + Project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>95%</td>
<td>Avg</td>
<td>95%</td>
<td>Avg</td>
</tr>
<tr>
<td>Northbound Left</td>
<td>50</td>
<td>133</td>
<td>95</td>
<td>130</td>
<td>96</td>
</tr>
<tr>
<td>Northbound Through</td>
<td>210</td>
<td>1119</td>
<td>544</td>
<td>1128</td>
<td>548</td>
</tr>
<tr>
<td>Southbound Through</td>
<td>315</td>
<td>305</td>
<td>153</td>
<td>309</td>
<td>159</td>
</tr>
<tr>
<td>Southbound Right</td>
<td>120</td>
<td>146</td>
<td>54</td>
<td>147</td>
<td>56</td>
</tr>
<tr>
<td>Eastbound Right</td>
<td>40/520&lt;sup&gt;1&lt;/sup&gt;</td>
<td>40</td>
<td>15</td>
<td>38</td>
<td>14</td>
</tr>
<tr>
<td>Eastbound Left</td>
<td>520/125&lt;sup&gt;2&lt;/sup&gt;</td>
<td>61</td>
<td>22</td>
<td>71</td>
<td>31</td>
</tr>
</tbody>
</table>

Notes: Queue lengths based on the average of ten SIMTRAFFIC runs; all distances are measured in feet; 95% = 95<sup>th</sup> percentile queue length; Avg = average queue length; **Bold** = queue exceeds storage

1. Existing storage is 40 feet and would be extended to 520 feet with project-constructed frontage improvements
2. Existing storage is 520 feet which would become 125 feet plus abutting two-way left-turn lane with the project

The projected 95<sup>th</sup> percentile queues would exceed the available storage in all lanes in the northbound direction under all volume scenarios evaluated, and in the southbound direction in the right-turn lane during both peak hours and in the through lane during the p.m. peak hour. The proposed project is generally anticipated to increase average queue lengths by less than one vehicle length, except for the northbound queue on Petaluma Hill Road during the p.m. peak hour, for which the project is anticipated to increase the queue by approximately 48 feet (nearly two vehicle lengths). This condition was further reviewed to determine if measures exist that would reduce the project’s queuing impact.

In reviewing the traffic simulation runs, it was noted that the northbound queue is adversely affected by queue spillover in the northbound left-turn lane. Currently, the center turn lane on this segment of Petaluma Hill Road
Traffic Impact Study for the Petaluma Hill Road/Colgan Avenue Apartments Project
April 9, 2020

is striped with a 50-foot northbound left-turn pocket at Colgan Avenue, which transitions into a two-way left turn lane for 120 feet before transitioning again to a 40-foot long southbound left turn pocket at Santa Ana Drive. The two-way left-turn lane currently serves a driveway to Lola’s Market, as well as two residential properties that would be demolished as part of the proposed project. Lola’s Market is not reliant on having full vehicular access at this driveway, as it has full access as a fourth leg at the signalized Petaluma Hill Road/Colgan Avenue intersection, as well as full access via the unsignalized intersection at Petaluma Hill Road/Santa Ana Drive.

Given this circumstance, it is recommended that the two-way left-turn lane on this segment of Petaluma Hill Road be eliminated in order to increase storage in the northbound left-turn lane to approximately 115 feet, as shown diagrammatically in Plate 1. This modification may also help to reduce left-turns in and out of the Lola’s Market driveway, reducing the frequency of conflicting movements and thereby improving operation. With this improvement, the projected 95th percentile queues on northbound Petaluma Hill Road during the worst-case future plus project p.m. peak hour would be reduced by 243 feet to 993 feet. This would reduce the projected queue lengths to below the “no project” level. The project applicant should be responsible for implementing this modification.

The project would widen Colgan Avenue along its frontage (plus transitions to the west) to include a center two-way left-turn lane. The center turn lane would accommodate eastbound left-turn movements at the Petaluma Hill Road signalized intersection, as well as westbound left turns into the project driveway 200 feet to the west. Based on the results of the queuing analysis, eastbound queues at the Petaluma Hill Road/Colgan Avenue intersection are projected to be 130 feet or less under Future plus Project conditions. The proposed project driveway near the site’s western property boundary would be beyond the anticipated queues and would therefore not be expected to adversely affect operation at the signalized intersection.

Findings

- Queuing at the Petaluma Hill Road/Colgan Avenue intersection currently extends to adjacent intersections at Aston Avenue and Santa Ana Drive, and can be expected to further lengthen in the future.

- The proposed project would result in negligible changes to queueing at Petaluma Hill Road/Colgan Avenue except on northbound Petaluma Hill Road, where the project is anticipated to lengthen 95th percentile queues by nearly two vehicle lengths under future p.m. peak hour volumes. This condition is largely attributable to queue spillover in the northbound left-turn pocket.

- The project’s impacts to queuing on northbound Petaluma Hill Road could be reduced below the “no project” level by increasing storage in the northbound left-turn pocket at Petaluma Hill Road/Colgan Avenue.

- Eastbound queues and operation at the Petaluma Hill Road/Colgan Avenue intersection are not expected to be adversely affected by the project’s Colgan Avenue driveway.

Recommendation – The applicant should be responsible for increasing storage in the northbound left-turn pocket at the Petaluma Hill Road/Colgan Avenue intersection to approximately 115 feet.
Alternative Modes

Pedestrian Facilities

Given that the site is surrounded by both commercial and residential land uses, it is reasonable to assume that some project residents would want to walk and/or use transit to reach their destinations. As proposed, the project would include a sidewalk along its entire frontages on Colgan Avenue and Petaluma Hill Road, which would effectively connect the site to the surrounding pedestrian network and neighboring uses. Residents would be able to access existing and proposed sidewalks to reach nearby transit stops, grocery, and retail uses, and would also be able to cross Petaluma Hill Road and Colgan Avenue via existing crosswalks at the signalized Petaluma Hill Road/Colgan Avenue intersection.

Students traveling to Kawana Elementary School located on Tokay Street between Breeze Way and Brookwood Avenue could reach the school by walking along the west side of Petaluma Hill Road on sidewalks constructed by the project and an existing all-weather path to the Breeze Way intersection, where there is an existing crosswalk with pedestrian-activated flashing beacon. From there, pedestrians could walk along Breeze Way and Tokay Street to reach the school.

The flashing beacon at the Petaluma Hill Road/Breeze Way intersection is an older type of pedestrian warning system developed by the City in the 1990s. While still functional, this type of device is no longer installed in the city, with most modern applications instead using modern rapid rectangular flashing beacon (RRFB) systems. Because the proposed project can be expected to result in a marked increase in school-related pedestrian crossings at this location, it is recommended that the project be responsible for replacing the existing pedestrian beacons at the Petaluma Hill Road/Breeze Way intersection with an RRFB system. This is consistent with the City of Santa Rosa Bicycle & Pedestrian Master Plan Update 2018 which calls for further enhancements to this pedestrian crossing.

Finding – Pedestrian facilities serving the project site are expected to be generally adequate upon the completion of the proposed frontage improvements.

Recommendation – The project should replace the existing flashing beacons at the Petaluma Hill Road/Breeze Way intersection with a modern RRFB system.

Bicycle Facilities

Existing bike lanes on Petaluma Hill Road along with planned future bicycle facilities in the vicinity would provide adequate access for bicyclists. Residents of the proposed development would be able to use the bike lanes on Petaluma Hill Road to connect to many of the primary bicycle facilities in the City as well as recreational uses and commercial uses along Petaluma Hill Road.

Finding – Bicycle facilities serving the project site are adequate.

Transit

Existing transit routes are adequate to accommodate project-generated transit trips. Bus stops are within a convenient walking distance of the site and, upon completion of the project’s frontage improvements, would be accessible via a continuous sidewalk network. At the request of Santa Rosa CityBus the project would construct a new far-side southbound bus pullout on Petaluma Hill Road/Colgan Avenue, replacing the existing stop on the north side of the intersection.

Finding – Transit facilities serving the project site are adequate.
Access and Circulation

Site Access

The project would have two driveways providing primary access to the site, one on Colgan Avenue 200 feet west of Petaluma Hill Road near the site’s western property line, and one on Petaluma Hill Road 330 feet south of Colgan Avenue (and 85 feet south of the unsignalized Santa Ana Drive intersection). A gated emergency vehicle access (EVA) driveway would be located on Petaluma Hill Road 140 feet south of Colgan Avenue.

Sight Distance

Sight distances along Colgan Avenue and Petaluma Hill Road at the project driveways were evaluated based on sight distance criteria contained in the Highway Design Manual published by Caltrans. The recommended sight distance for driveway approaches is based on stopping sight distance and uses the approach travel speed as the basis for determining the recommended sight distance.

Both Petaluma Hill Road and Colgan Avenue are straight in the vicinity of the project site. For Petaluma Hill Road, which has a posted speed of 40 mph, the minimum stopping sight distance is 300 feet. The minimum stopping sight distance on Colgan Avenue, which has a posted speed limit of 35 mph, is 250 feet. Available sight lines were field measured and exceed 500 feet at both driveways, which meets the sight distance requirements. Any landscaping near project driveways should be low-profile, with any trees set back from driveways.

Finding – Based on field observations and the site plan, sight distances along Petaluma Hill Road and Colgan Avenue at the project driveways are adequate.

Recommendation – To maintain a clear line of sight from the project driveways, it is recommended that any landscaping be low-profile, and that trees be set back outside the vision triangle.

Access

There is an existing two-way left-turn lane on Petaluma Hill Road that will accommodate left turns into and out of the project site. The project driveway on Petaluma Hill Road would be located 85 feet south of the intersection at Santa Ana Drive, and as such, opposing left-turn movements from Petaluma Hill Road would not conflict with one another. Some drivers making outbound left-turns from Santa Ana Drive and the project driveway would use the center turn lane to make two-stage left turns, though from the project driveway, left-turn volumes would be low at approximately six movements during the a.m. peak hour and four movements during the p.m. peak hour. Sufficient space exists for these maneuvers to occur, and given the low volumes exiting the project driveway, the two-way left-turn lane is anticipated to function acceptably in a manner that is typical of other two-way left-turn lane facilities.

As part of its frontage improvements a two-way left-turn lane would be constructed along the site’s Colgan Avenue frontage. The center turn lane would accommodate eastbound left turns at the Petaluma Hill Road/Colgan Avenue interaction as well as westbound left turns into the project site. As indicated above in the queuing analysis, 95th percentile eastbound queues at the signal are anticipated to extend approximately 130 feet, which leaves 60 feet available in the center turn lane to accommodate westbound left turns into the project driveway. The project access is therefore anticipated to function acceptably.

Finding – Access to the site is anticipated to be acceptable.
Onsite Circulation

The site consists of several clusters of apartment buildings separated by drive aisles with perpendicular parking spaces and access to garages. All drive aisles connect internally, allowing access to both Colgan Avenue and Petaluma Hill Road. One of the drive aisles includes a gated emergency vehicle access onto Petaluma Hill Road. Drive aisle widths have been designed to accommodate emergency vehicle maneuverability.

Finding – Onsite circulation is anticipated to function acceptably.
Parking

The project was analyzed to determine whether the proposed parking supply would be sufficient for the anticipated parking demand. The project site as proposed would provide a total of 238 parking spaces for the 147 units, a ratio of 1.62 parking spaces per unit.

Jurisdiction parking supply requirements are based on the City of Santa Rosa Municipal Code, Chapter 20-36.040; Number of Parking Spaces Required. The municipal code requires multifamily apartment buildings to provide parking at a rate of 1.5 spaces per unit for one-bedroom apartments and 2.5 spaces per unit for two-bedroom apartments. Under the City’s code, 285 spaces would be required. The proposed parking supply of 238 spaces falls short of the code requirement by 16.5 percent.

Parking demand rates included in the publication Parking Generation, 5th Edition, Institute of Transportation Engineers, 2019 were consulted to assess the project’s total parking demand. Using rates for the “Multifamily Housing (Mid-Rise)” land use for a suburban context with no rail transit within one-half mile, the proposed 147-unit complex is projected to have an 85th percentile parking demand of 222 spaces. This parking demand would be met by the proposed 238-space supply.

Section 20-36-050 (C) of the zoning code indicates that the City can discretionarily apply a reduction in parking requirements of up to 25 percent. Given that the project’s 85th percentile parking demand would be met according to ITE rates, as well as the project’s proximity to transit including CityBus Route 3 which links the site to the downtown transit mall and has 30-minute headways, as well Sonoma County Transit Route 46 which provides regional service during peak hours, it would be reasonable for the City to grant the 16.5 percent reduction in parking requirements.

The proposed parking supply and City of Santa Rosa requirements are shown in Table 11.

<table>
<thead>
<tr>
<th>Table 11 – Parking Analysis Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land Use</strong></td>
</tr>
<tr>
<td>1-Bedroom Apartments</td>
</tr>
<tr>
<td>2-Bedroom Apartments</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Finding – The proposed parking supply falls 16.5 percent short of the requirements specified in the City’s zoning code. Given the site’s proximity to local and regional transit service, it would be reasonable for the City to approve a parking reduction as allowed by code.

Bicycle Parking

The City of Santa Rosa’s Municipal Code Section 20-36.040 stipulates the City’s bicycle parking requirements for residential developments. Bicycle parking is required at a ratio of one space per four residential units if the residential units do not have a private garage or private storage space for bicycles. All units in the proposed project would include a patio or balcony where bicycle parking could be accommodated.

Finding – Bicycle storage would be adequate.
Conclusions and Recommendations

Conclusions

- The proposed project would be expected to result in 800 daily trips on average, including 53 trips during the weekday a.m. peak hour and 65 trips during the p.m. peak hour.

- Under Existing, Existing plus Project, Future, and Future plus Project Conditions, all study intersections are expected to operate acceptably at LOS D or better overall during both the a.m. and p.m. peak hours.

- At Petaluma Hill Road/Santa Ana Drive, the minor approach is anticipated to encounter LOS E or F operation in the future, with the project adding an additional delay of 0.3 to 2.5 seconds.

- Operation on the minor westbound approach at Petaluma Hill Road/Santa Ana Drive could be improved by striping a right-turn pocket and would entail low-cost changes that are typical of those performed by the City’s maintenance staff.

- The project is anticipated to result in 3,467 daily miles of vehicle travel at a per capita rate that is 19 percent lower than the Santa Rosa citywide average.

- Queuing at the Petaluma Hill Road/Colgan Avenue intersection currently extends to adjacent intersections at Aston Avenue and Santa Ana Drive, and can be expected to lengthen in the future.

- The proposed project would result in negligible changes to queuing at Petaluma Hill Road/Colgan Avenue except on northbound Petaluma Hill Road, where the project is anticipated to lengthen 95th percentile queues by nearly two vehicle lengths under future p.m. peak hour volumes. This condition is largely attributable to queue spillover in the northbound left-turn pocket.

- The project’s impacts on queuing on northbound Petaluma Hill Road could be reduced below the “no project” level by increasing storage in the northbound left-turn pocket at Petaluma Hill Road/Colgan Avenue.

- Eastbound queues and operation at the Petaluma Hill Road/Colgan Avenue intersection are not expected to be adversely affected by the project’s Colgan Avenue driveway.

- Pedestrian, bicycle, and transit facilities serving the project site are adequate.

- Sight distances along Petaluma Hill Road and Colgan Avenue at the project driveways are adequate.

- Site access and on-site circulation are anticipated to function acceptably.

- The proposed parking supply falls 16.5 percent short of the requirements specified in the City’s zoning code but would exceed the 85th percentile parking demand projected using ITE rates. Given the site’s proximity to local and regional transit service, it would be reasonable for the City to approve a parking reduction as allowed by code.

- Bicycle storage would be adequate.
Recommendations

- If requested by the City, the project should contribute funds toward the cost of implementing a right-turn pocket on the westbound approach of Petaluma Hill Road/Santa Ana Drive.

- The applicant should be responsible for increasing storage in the northbound left-turn pocket at the Petaluma Hill Road/Colgan Avenue intersection to approximately 115 feet.

- The project should replace the existing pedestrian flashing beacons at the Petaluma Hill Road/Breeze Way intersection with a modern RRFB system.

- To maintain a clear line of sight from the project driveways, it is recommended that any landscaping be low-profile, and that trees be set back outside the vision triangle.
Study Participants and References

Study Participants

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