Recommendation
Provide feedback on the final intersection design layout of Ravenswood Avenue at Laurel Street (Attachments B and Attachment C).

Policy Issues
This project is consistent with the policies and programs (i.e., CIRC-1.1, CIR-4.4) stated in the 2016 general plan circulation element. These policies and programs seek to maintain and improve a circulation system through the Street Classification System that provides safe and efficient movement of people and goods throughout Menlo Park for residential and commercial purposes.

This project is also consistent with one of the guiding principles of the El Camino Real/Downtown Specific Plan which is to provide an integrated, safe and well-designed pedestrian and bicycle network.

This project is also consistent with the recommended intersection improvements in the Menlo Park Transportation Master Plan (TMP). The overall project (Attachments B and C,) includes traffic safety, signal upgrades, and pedestrian and bike safety improvements. It will also improve intersection level of service and reduce overall delay.

Background
Ravenswood Avenue is an east-west street. It is classified as Avenue-Mixed Use in the 2016 general plan circulation element between El Camino Real and Middlefield Road. Ravenswood Avenue has a posted speed limit of 30 miles per hour and has one lane in each direction east of Noel Drive and two lanes in each direction between El Camino Real and Noel Drive. It provides access to both commercial and residential uses. Near its intersection with Laurel Street, there are bike lanes on both sides of Ravenswood Avenue. The bike lanes on Ravenswood Avenue provide connection for bicyclists to Menlo Atherton High School, Burgess Park Campus, and the Stanford Research Institute. In 2019, Ravenswood Avenue between Laurel Street and Middlefield Road had a daily traffic volume of 14,900 vehicles and Ravenswood Avenue between Alma Street and Laurel Street had a daily traffic volume of 18,700. In 2019, during the am peak hour, there were 26 westbound bicyclists and 22 eastbound bicyclists. Also, during the pm peak hour, there were 22 westbound bicyclists and 12 eastbound bicyclists.

Laurel Street is a north-south street with one lane in each direction and a 25 miles per hour posted speed limit. It is classified as a Neighborhood Collector in the 2016 general plan circulation element. Near its intersection with Ravenswood Avenue, there are bike lanes on both sides of Laurel Street except the northbound bike lane stops approximately 120 feet short of the intersection. In 2019, it had a daily traffic...
volume of 4,300 vehicles between Oak Grove Avenue and Ravenswood Avenue and a daily traffic volume of 5,300 between Ravenswood Avenue and Willow Road. The bike lanes on Laurel Street provides connections and safe routes to elementary schools in the area such as Encinal School, Trinity School and Nativity School as well as to the Burgess Park campus. In 2019, during the am peak hour, there were 23 northbound bicyclists (14 going straight) and 20 southbound bicyclists. Also, during the pm peak hour, there were 25 northbound bicyclists (12 going straight) and 9 southbound bicyclists.

Attachment A shows the existing intersection layout on Ravenswood Avenue at Laurel Street. The northbound Laurel Street approach currently consists of one exclusive left turn lane, one shared through/right turn, and no bike lane. The southbound approach currently consists of one shared left turn/through/right turn lane and a bike lane. Both the eastbound and westbound approaches have one exclusive left turn lane, one shared through/right turn lane and a bike lane on the right side of the shared through/right turn lane.

The intersection of Ravenswood Avenue and Laurel Street is operated by a traffic signal. Because of its distant location to the other traffic signals on Ravenswood Avenue and on Laurel Street, this traffic signal is not coordinated with any other traffic signals. In the three year period between 2015 and 2017, there have been a total of 12 reported collisions at the intersection or an accident rate of 0.04 collision per million vehicle, which is relatively low compared to other similar City’s signalized intersections. Intersection accident rate is calculated as: number of collisions for three years X 1,000,000 / (Intersection Daily Traffic Volumes X 3).

This project originated as one of the transportation mitigation measures identified in the Station 1300 Project Environmental Impact Report (EIR). The Station 1300 Project, located on 1300 El Camino Real, is a mixed-use development that consists of non-medical office, residences, community-serving uses, and public/quasi-public spaces. It sits on a 6.4 acre site, close to Caltrain station and the downtown core. The project construction started in spring 2018 and is scheduled to be completed in 2021. Staff is currently working with the developer in scheduling completing the mitigation measures for the intersection of Ravenswood Avenue at Laurel Street and adding to this project the extension of the northbound bike lane that will be at the City’s expense.

Analysis

On April 10, 2019, the Complete Streets Commission passed a motion to recommend to City Council to approve the removal of on-street parking on the west side of Laurel Street at Ravenswood Avenue to install intersection improvements, to maintain existing time restriction between the Menlo Park Childcare Center and City Hall Buildings, and to return to the Commission with the final intersection design layout of Ravenswood Avenue and Laurel Street, specifically the final design layout for the northbound Laurel Street approach, which would include a new bike lane to be extended from where it currently stops approximately 120 feet from the intersection.

For the northbound Laurel Street approach, staff looked at the following lane configuration alternatives:

- Alternative I: One exclusive left turn lane, one shared through/right turn lane, bike lane on the right side of the shared through/right turn lane. (This is what is proposed in the final design intersection layout per Attachment B)
- Alternative II: One shared/through lane, bike lane (between lanes), one exclusive right turn lane

The table below shows the northbound traffic volumes at the intersection during the AM and PM peak hours:
Due to the significantly higher left turning vehicles over the right turning vehicles in both AM and PM peak hours, an exclusive left turn lane proposed to remain in Alternative I appears to be more warranted than an exclusive right turn lane proposed in Alternative II.

The results of the intersection Level of Service (LOS) analysis comparing Alternatives I and II are shown in the following table:

<table>
<thead>
<tr>
<th></th>
<th>Alternative I</th>
<th>Alternative II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periods</td>
<td>AM</td>
<td>PM</td>
</tr>
<tr>
<td>Intersection delay (seconds)</td>
<td>29.0</td>
<td>30.9</td>
</tr>
<tr>
<td>Intersection level of service</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Queue length (ft) worst case</td>
<td>158</td>
<td>273</td>
</tr>
<tr>
<td>Vehicle length, 20 ft. long</td>
<td>8</td>
<td>13</td>
</tr>
</tbody>
</table>

The intersection Level of Service analysis shows that Alternative I will provide a better level of service as well as shorter queue lengths during both the AM and PM peak hours.

For the above reasons, staff recommends that the northbound Laurel Street approach have the Alternative I lane configuration, as illustrated on Attachment “B”.

Attachment C illustrates the new traffic signal layout of the intersection and the proposed traffic signal phasing.

**Impact on City Resources**

The proposed and planned improvements at the intersection (Attachments B and C) will be funded both by the Station 1300 project and by the City from its traffic signal modification and signing and striping program budget. Staff is currently working with the Station 1300 developer for the completion of this project.
Environmental Review
The proposed and planned improvements at the intersection (Attachments B and C,) are categorically exempt under Class 1 of the California Environmental Quality Act. Class 1 allows for minor alterations of existing facilities, including highways and streets, sidewalks, gutters, bicycle and pedestrian access, and similar facilities, as long as there is negligible or no expansion of use.

Public Notice
Public Notification was achieved by posting the agenda, with the agenda items being listed, at least 72 hours prior to the meeting.

Attachments
A. Existing intersection layout of ravenswood avenue at Laurel Street
B. Final intersection design layout on Ravenswood Avenue at Laurel Street
C. Final traffic signal layout on Ravenswood Avenue at Laurel Street

Report prepared by:
Rene Baile, Associate Transportation Engineer

Report reviewed by:
Kevin Chen, Acting Senior Transportation Engineer
EXISTING INTERSECTION LAYOUT – RAVENSWOOD AVENUE AT LAUREL STREET
**SIGNING AND STRIPING NOTES:**

1. ALL STRIPING ARE BASED ON THE LATEST CALTRANS STANDARD PLANS.
2. THE CONTRACTOR SHALL REMOVE AND RAMP EXISTING STRIPING AND PAVEMENT MARKING WHICH CONFICT WITH THIS PLAN.
3. ALL STRIPING AND PAVEMENT MARKING SHALL BE THERMOPLASTIC UNLESS OTHERWISE NOTED.
4. EXACT LOCATION AND POSITION OF ROADSIDE SIGNS TO BE DETERMINED BY THE ENGINEER.
5. EXACT LOCATION AND POSITION OF PAVEMENT MARKINGS TO BE DETERMINED BY THE ENGINEER.
6. ALL SIGNS ARE BASED ON THE LATEST CALIFORNIA MUTCD.
EXISTING EQUIPMENT TO BE REMOVED AND SALVAGED

1. Controller cabinet assembly with Type I service
2. 2 1-8 poles
3. 4 Vehicle signal heads
4. 4 Pedestrian signal heads
5. Traffic light (model or manufacturer)
6. 2 Regulatory signs
7. 1 Video detection camera (to be relocated per these plans)

LEGEND

- Bike detection zone
- Video detection zone

PROJECT NOTES:

- Furnish and install Model 2070 controller in Type II cabinet.
- Furnish and install new Type II service cabinet.
- Furnish and install new 4-section signal head. See Detail A.
- Furnish and install new 5-section boothouse signal head. See Detail B.
- Remove existing R3-4 sign. Install new R10-12 sign.
- From the existing pull box, carefully remove all existing video detection cables from conduits leading to the existing controller. At the intersection of Ravenswood Ave/Laurel St, do not cut splice, or damage the existing video detection cables. Upon completion of installation of conduits and pull boxes, reinstall the existing cables to the new controller at Ravenswood Ave/Laurel St as indicated on these plans. Contractor shall install new cables if the existing cables are not long enough or are damaged during construction.

ADVANCED DETECTION ZONE

EXISTING PHASE DIAGRAM

PROPOSED PHASE DIAGRAM

DETAIL A
4-SECTION SIGNAL HEAD
NO SCALE

DETAIL B
5-SECTION (RAVENSWOOD) SIGNAL HEAD
NO SCALE

DETAL C
1:10 SCALE

RAYSWOOD AVE
12"
12" RED ARROW
12" GREEN ARROW

LAUREL ST
12" YELLOW ARROW
12" GREEN ARROW

ADVANCED DETECTION ZONE

SEE DETAIL C ON THIS SHEET

EXIST SNS (Laurel St)
PM4 (AMP)
PM4 (AMP)

EXIST SNS (Ravenswood Ave)
PM4 (AMP)
PM4 (AMP)

TO SERVICE POINT
2C. 30V (SERVICED)
2C. 30V (SERVICED)
2C. 30V (CONTROLLER)