16-0357 **Agenda Date:** 5/17/2016

REPORT TO COUNCIL

SUBJECT

Authorize the Conceptual Design Development of Maude Avenue Bikeways and Streetscapes Project

REPORT IN BRIEF

On February 26, 2013 the City Council approved a Resolution of Support for 11 One Bay Area Grant (OBAG) applications, including the "Maude Avenue Streetscape and Bike Lanes" project. The Maude Avenue Streetscape and Bike Lanes project proposed bike lanes on Maude Avenue between Mathilda Avenue and Fair Oaks Avenue (the project corridor). The City was awarded multiple OBAG grants, and on July 29, 2014, the City Council approved a budget modification to appropriate the funds for the Maude Avenue project. The bike lane on Maude Avenue has been part of Sunnyvale's transportation plans for many years. It was included as part of two Citywide bicycle planning efforts (The Bicycle Opportunities Study and Bicycle Capital Improvement Program) and was ultimately included in the adopted 2006 Sunnyvale Bicycle Plan.

The City hired Kimley-Horn and Associates, to analyze feasible alternatives to implement bike lanes. The addition of bike lanes on Maude Avenue is complicated due to the lack of pavement width on the road. Adding bike lanes will require either removal of parking, or the removal of the existing two-way center turn lane (TWCTL). Either option will affect traffic flow or parking patterns. Attachment 1 is the presentation used as part of the community meeting and provides a full overview of the project.

The analysis considered existing conditions, volumes, parking usage, collision history, and traffic congestion. Three different alternatives were developed for consideration:

- Design Alternative 1 (Attachment 2 & 3) - Installation of bike lanes by removing all on-street parking
- Design Alternative 2 (Attachment 4 & 5) - Installation of bike lanes by removing the two-way center turn lane (TWCTL) and about 30% of the on-street parking
- Design Alternative 3 (Attachment 6 & 7) - No bike lanes

In addition to the bike lane, the proposed project includes pedestrian improvements, such as removal of the pork-chop islands at the intersection of Maude/Sunnyvale, replacement of uplifted sidewalk, and planting of new street trees where space is available. Under all alternatives, staff would propose to test the restriping of westbound Maude at the Mathilda/Maude intersection to try to alleviate some of the existing queuing concerns.

Staff reviewed the analysis, community feedback, and existing General Plan and Council policy and recommends proceeding with design Alternative 1. Staff determined that any recommendation should include the installation of bike lanes, as bike lanes support the City's bicycle goals, General Plan

policies, and are included in the approved Bicycle Plan. Alternative 1 provides the best alternative for bicycle and automobile travel. However, parking will be removed, and cars currently parked on-street will have to be parked off-street (such as driveways) or on side streets. Staff also reviewed an alternative that would provide part-time bicycle lanes and parking similar to Homestead Road. Although this is not the staff recommendation, it is an alternative for Council consideration.

Alternative 2 removes the TWCTL which staff expects will create operational issues and could increase collisions. Alternative 3 maintains the status-quo and does not support the City's bicycle goals or Council and General Plan policies.

The Bicycle and Pedestrian Advisory Commission considered this item on April 21, 2016 and voted 5-2 in favor to recommend Alternatives 1, 5 and 6 (Attachment 15 - Excerpt from BPAC draft meeting minutes of April 21, 2016.) A summary of the BPAC's discussion and action are provided in the Public Contact section below.

BACKGROUND

Maude Avenue is an east-west industrial/commercial collector roadway that connects SR-237 in the west to Wolfe Road in the east. It is predominately one lane each direction with a TWCTL from Fair Oaks to Mathilda Avenue, and two lanes each direction with a TWCTL from Mathilda Avenue to SR-237. Land uses along Maude between Mathilda Avenue and Fair Oaks include the Sunnyvale Square Shopping Center on the western end, Bishop Elementary School, a retail shopping center directly across the street from the school, and a number of apartment complexes on either end of the project corridor. Maude has numerous driveways providing access to single and multi-family residential development.

Providing bicycle lanes within this section of Maude was included in the 2006 Bicycle Plan and was designated as an "intermediate" bike route on the City bicycle map. In order to implement bike lanes, the 2006 Bicycle Plan assumed removal of on-street parking and minor widening. Bicycle facilities would close a gap in the City's bicycle network and improve bicycle circulation (Attachment 8).

The City applied for a One Bay Area Grant (OBAG) for the installation of bike lanes and other improvements on the project corridor, and a grant in the amount of $695,000 was awarded to the City. The City added $185,000 of Transportation Development Act (TDA) funds to the project for a total amount of $880,000. The initial scope of the grant application included the construction of a median island for the length of the project, however this was not feasible due to right-of-way, traffic, and funding constraints. Staff worked with the granting agency over a number of months to modify the scope and maintain the funds in Sunnyvale, while keeping the goal of exploring bicycle lanes on the corridor.

EXISTING POLICY

In performing the analysis and developing the conclusions identified in this report, the following General Plan policies were referenced and considered:

Chapter 3 Land Use and Transportation:

- LT-5.5(d): Maximize the provision of bicycle and pedestrian facilities.
- LT-5.8: Provide a safe and comfortable system of pedestrian and bicycle pathways.

- LT-5.9: Appropriate accommodations for motor vehicles, bicycles, and pedestrians shall be determined for city streets to increase the use of bicycle transportation and to enhance the safety and efficiency of the overall street network for bicyclists, pedestrians, and motor vehicles.
- LT-5.10: All modes of transportation shall have safe access to City streets.
- LT-5.12: City streets are public space dedicated to the movement of vehicles, bicycles and pedestrians. Providing safe accommodation for all transportation modes takes priority over non-transport uses. Facilities that meet minimum appropriate safety standards for transport uses shall be considered before non-transport uses are considered.
- LT-5.13: Parking is the storage of transportation vehicles and shall not be considered a transport use.
- LT-5.14: Historical precedence for street space dedicated for parking shall be a lesser consideration than providing street space for transportation uses when determining the appropriate future use of street space.

Chapter 6 - Safety and Noise

- SN-3.5: Facilitate the safe movement of pedestrians, bicyclists and vehicles.

ENVIRONMENTAL REVIEW

The action being considered does not constitute a “project” within the meaning of the California Environmental Quality Act (“CEQA”) pursuant to CEQA Guidelines section 15378(b)(5) in that it is a governmental organizational or administrative activity that will not result in direct or indirect changes in the environment. It is expected that the CEQA determination of this project will be a Class 1 categorical exemption pursuant to Section 15301 (c) and (d) for existing streets involving no expansion. All review of CEQA documentation will be part of the design review process.

DISCUSSION

The goal of the project, per the City’s approved bicycle plan, is to provide striped bicycle lanes on Maude Avenue between Fair Oaks and Mathilda. Staff hired Kimley-Horn and Associates to analyze feasible alternatives to implement bike lanes. The purpose of the study was to evaluate traffic operations, parking utilization, and associated safety implications. The analysis considered existing conditions, volumes, parking usage, collision history, and traffic congestion.

Analysis

Existing Maude Avenue

The study corridor is 1.3 miles long, has three signalized and seven un-signalized intersections, and approximately 67 driveways. Bicycle lanes are already provided on Maude Avenue from SR-237 to Pastoria Avenue, west of the project corridor. Bicycle facilities along this section of Maude Avenue would connect to bicycle lanes on Borregas Avenue, and bicycle routes on Sunnyvale Avenue, Morse Avenue, and Fair Oaks Avenue, providing an improved east-west connection in the bicycle network. Bicycle lanes will also provide a direct bicycle route to Bishop Elementary School, located along the project corridor.

The limited available right-of-way (ROW) requires a trade-off in terms of left-turn lanes and/or on-street parking in order to provide bicycle lanes.

Volumes

As part of the project, traffic and vehicle volumes were analyzed. East of Sunnyvale Avenue approximately 750 vehicles and use Maude Avenue during the weekday AM peak hour and 950 vehicles use Maude Avenue during the weekday PM peak hour. West of Sunnyvale Avenue approximately 1000 vehicles use Maude Avenue during the weekday AM peak hour and 1200 vehicles use Maude Avenue during the weekday PM peak hour. At its heaviest weekday peak hour, approximately 40 bicycles were counted along Maude Avenue. Heavy pedestrian activity also occurs in the vicinity of Bishop Elementary School, and greater than 40 pedestrian crossings per hour occur at many of the intersections during the peak school hours.

Separate from the bike lane project, staff has received a number of concerns regarding morning queuing on Maude at the Mathilda/Maude intersection. Staff completed a City Manager Bi-Weekly Report (CMBWR) on October 22, 2015 (Attachment 9) and in an effort to verify its findings, hired a consultant to perform similar work. As part of that consultant analysis, 24-hour vehicle counts were completed for a period of five days (Attachment 10). Those counts show the average peak hour volumes on Maude Avenue and align with the volumes measured as part of the bike lane project:

- Maude Avenue East of Sunnyvale Avenue - 700 cars AM Peak, 1,050 cars PM Peak
- Maude Avenue West of Pastoria Avenue - 1,050 cars AM Peak, 1,400 cars PM Peak

Parking

In partnership with the consultant team, staff analyzed both the current capacity and utilization of on-street parking and the available off-street parking that could potentially accommodate the loss of the on-street parking spaces.

On-Street Parking

There are approximately 174 on-street, parallel parking spaces available throughout the corridor. Bishop Elementary School provides an additional 33 angled parking spaces located on the south side of Maude Avenue adjacent to the school, however, these spaces are mostly on school property and are proposed to be removed by the school under a separate school project. Parking data was collected on a Tuesday thru Thursday, and the average weekday peak occupancies of the on-street parking were observed at 45% and 64% for the mid-day and evening periods respectively. Attachment 11 provides a summary of parking utilization.

Off-Street Parking

Maude Avenue has a mix of commercial, multi-family, and single family properties. This mix of uses makes it more difficult to analyze the available off-street spaces. As an example, an apartment tenant that currently parks on-street would not be able to park on a retail parking lot or a private driveway. To be more conservative, staff excluded available off-street parking spaces associated with all commercial uses and apartment buildings.

This parking observation was conducted on a Wednesday evening between the hours of 9:00 to 11:00 pm. There are approximately 24 off-street (on driveways) parking spaces available on Maude Avenue within the project corridor. Out of these, 16 were found occupied which means the off-street occupancy rate was found to be at 67%. These are mostly single family home driveways, so these spaces would not be available to current commercial or apartment building users who currently use the on-street parking. Staff also reviewed the availability of

retail and multifamily parking. As expected the retail spaces were fairly empty during the hours of the survey. For multi-family, staff looked at spaces that were visible from the street. While these spaces were not fully utilized, staff cannot determine how these spaces are assigned (as an example as visitor spaces) and could not analyze availability.

Collision History

Over a recent three year period, a total of 79 collisions were reported across the project corridor, including 21 collisions involving injuries and one fatality at the intersection of Maude Avenue/Fair Oaks Avenue. Three collisions involved pedestrians and one involved a bicycle. To determine how a roadway functions in terms of collisions, staff uses the overall Collision Rate (CR), expressed in collisions per million vehicle miles traveled. For this this segment of Maude Avenue, the CR is 2.85 and injury/fatality CR is 1.01 as compared to state-wide CRs of 1.37 and 0.57, respectively, for roads similar to Maude Avenue. Staff's goal is to minimize all collisions, especially those that result in injury or death. Using the State CRs for similar type roads provides a good benchmark to evaluate how a road is functioning and to whether or not to recommend changes. Maude Avenue CRs are almost double that of the state-wide CRs.

Congestion

On numerous occasions, residents have expressed concerns regarding congestion on Maude Avenue, specifically queuing at its intersection with Mathilda Avenue. The City Council also asked staff additional questions on the current traffic conditions on Maude Avenue. As a result, staff completed field verification and traffic modeling, and the findings reflected long queues for the westbound through movement on Maude Avenue at its intersection with Mathilda Avenue. The current queues on westbound Maude Avenue were found to be a result of the volumes on Mathilda Avenue and limited available green time for Maude Avenue. These findings were reported in the City Manager Biweekly Report of October 22, 2015.

As previously discussed, staff also hired a consultant to review the current traffic on Maude Avenue. The traffic consultant reviewed Maude Avenue between Wolfe Road and Mathilda Avenue and conducted traffic counts, an origin-destination survey, and also made field observations. In general, the consultant analysis aligned with the information that staff has previously provided to Council.

Additionally the consultant completed a travel time analysis to provide information on how long it takes an average vehicle to travel through Maude Avenue. To complete the work six sensors were installed on Maude Avenue. These sensors are able to pick up bluetooth on vehicles (whether on the vehicles themselves or cell phones) and track vehicles as they travel through the project corridor. The travel time was completed for three different days (Attachment 12) and shows that the average travel time to get from Fair Oaks past the Mathilda/Maude intersection in the morning is 4.4 minutes eastbound, 3.9 minutes westbound and in the evening are 3.1 minutes eastbound and 3.9 minutes westbound. It must be noted that during school drop-off there is short term additional congestion.

Bike Lane Alternatives

As a result of the analysis, two alternatives with differing roadway cross-sections that accommodate bike lanes were developed and evaluated. Both alternatives provide bike lanes for the full extent of the project corridor, except in the westbound direction between San Angelo Avenue and Mathilda Avenue, where a lack of roadway width/ROW precludes dedicated bike lanes. Staff also reviewed a third alternative that would maintain the existing roadway configuration, including all parking spaces, and would not implement bike lanes, however it would add additional bike route signing and striping.

Alternative 1 - Removal of On-Street Parking

Alternative 1 (Attachment 2 & 3) provides buffered bicycle lanes, removes on-street parking from both sides of the street, and maintains the TWCTL. This alternative is consistent with the improvements proposed in the 2006 Bicycle Plan. Removing on-street parking provides the necessary width for buffered bike lanes on both sides of Maude Avenue, excluding the westbound direction between San Angelo Avenue and Mathilda Avenue (approximately 500 feet). The provision of an eastbound bike lane in this segment would require the removal of one of the two westbound left-turn lanes from Maude Avenue to southbound Mathilda Avenue. The remaining westbound left-turn lane would need to be extended to provide the required additional storage. This modification would be considered part of the pilot project.

This alternative maintains the TWCTL, which eliminates the potential for left-turning vehicles affecting corridor progression, travel time, and limiting the possibility of additional collisions. The removal of on -street parking and the provision of buffered bike lanes provide significant benefits to bicycle and vehicular safety by reducing friction along the corridor. This alternative would require removal of all 174 available on-street parking spaces, which would increase parking demand on the side-streets, and is a concern to the residents. Based on the parking utilization analysis and available parking, it is expected that during the peak evening period approximately 110 cars will have to find an alternative parking spot.

A possible modification to Alternative 1 is a compromise that would provide weekday, part-time bicycle lanes from 7:00 AM to 7:00 PM. Outside of this time period the bike lanes would be converted to parking lanes. This arrangement is similar to the one on Homestead Road. The modification would preserve overnight and weekend parking for the residents, and provide improvement in bicycle safety during the hours the bike lane is operational. As with any time-limited operation, enforcement is always a concern.

Alternative 2 - Removal of Two Way Center Left Turn Lane

Alternative 2 (Attachment 4 & 5) provides bicycle lanes and no buffers, removes the TWCTL, maintains left-turn pockets at a limited number of intersections, and preserves on-street parking on both sides of the roadway where feasible. Removal of the TWCTL provides the width necessary for provision of six-foot bicycle lanes for the full extent on both sides of Maude Avenue, excluding in the westbound direction between San Angelo Avenue and Mathilda Avenue (approximately 500 feet). As in Alternative 1, the provision of an eastbound bike lane in this segment would require the removal of one of the two westbound left-turn lanes from Maude Avenue to southbound Mathilda Avenue. The remaining westbound left-turn lane would need to be extended to provide the required additional storage. This modification would be considered part of the pilot project.

Due to the need to provide left-turn lanes at several intersections along the project corridor, this alternative requires the loss of 48 out of 174 available on-street parking spaces. The alternative preserves sufficient on-street parking to meet observed demand for the corridor as a whole, although segments of the corridor would experience parking demand exceeding available supply. In addition, as previously discussed, the on-street parking that is removed might not align with the availability of off-street parking.

With this alternative, all turn pockets would be maintained at signalized intersections, and therefore would not trigger any California Environmental Quality Act (CEQA) Level-of-Service (LOS) impacts,

however it would create operational issues such as additional delays and queues on Maude Avenue. Vehicles wanting to turn left to smaller side-streets and to the driveways along the corridor would have to wait in the through lane, blocking through traffic until they find a gap in the opposing traffic to make a left-turn. This may also increase delay for vehicles turning onto Maude Avenue. The loss of some left-turn lanes will make it more difficult to access the corridor and side-streets, may increase conflicts at un-signalized intersections, and may increase vehicle conflicts. The provision of a TWCTL has been shown to provide reductions in collision frequency by up to 50 percent (Caltrans Local Roadway Safety Manual, April 2015). Therefore, removal of the existing TWCTL may further increase the collision rate along the corridor.

Alternative 3 - No Bicycle Lanes

Alternative 3 (Attachment 6 & 7) would not provide bicycle lanes in the study area. It would maintain the existing configuration of on-street parking and the TWCTL. Alternative 3 would only provide limited additional signage and striping to designate the bike route, but would not provide dedicated bicycle facilities. This would provide minimal improvement in bicycle safety and would not increase bicycle ridership.

Additional Improvements

Optional Improvement - Westbound Maude Approaching the Mathilda/Maude Intersection

This option would be a variant on any of the alternatives to provide an additional westbound through lane West of the Murphy Avenue and Mathilda Avenue to alleviate existing queues. This lane would provide additional roadway capacity and queuing storage for westbound traffic approaching the Mathilda Avenue intersection. Additional analysis and preliminary design will be required to determine how far the modifications will extend on the western approach of Maude to Mathilda. Based on the current volumes and queuing analysis, it would be expected that the intersection lane modification would extend from Maude/Mathilda to somewhere near Maude/San Angelo, and striping transitions would be required between Maude/San Angelo and Maude/Stonewell.

Under Alternative 1 and 2 - The additional westbound through lane would replace both the TWCTL and on-street parking for this segment, and one of the two westbound left turns lane. The roadway would consist of bicycle lanes, two westbound lanes, and one eastbound lane. The option could eliminate up to 56 on-street parking spaces west of Borregas Avenue. This is the same number of parking spaces as Alternative 1 for this segment, and 45 more parking spaces than with Alternative 2 for this segment. Similar to Alternative 2, the option would preclude the ability to provide left-turn lanes to Stowell Avenue and San Angelo Avenue.

This option would convert the right-turn lane to Mathilda Avenue to a shared through/right-turn lane. Overall, this would reduce delays and queues for westbound Maude Avenue, and may increase some delay for westbound right-turn movements from Maude Avenue to northbound North Mathilda Avenue. The net effect could reduce average delays and queues on Maude Avenue at its intersection with Mathilda Avenue.

Under Alternative 3 - Even without a bike lane project, staff would like to explore modifications to Mathilda/Maude to relieve some of queuing on westbound Maude Avenue. Staff is considering a test project to analyze the benefits of removing the dedicated right turn-lane on westbound Maude and converting it to a shared through/right lane.

Pedestrian Improvements

To improve pedestrian and bike safety, all the alternatives remove the channelized right-turn lanes and pork-chops at the signalized intersection of Maude Avenue/Sunnyvale Avenue, directly adjacent to Bishop Elementary School. The project would also relocate the existing VTA bus-stop, located mid-block, across from Bishop Elementary School to the intersection of Maude Avenue & North Sunnyvale Avenue, to provide closer access to the signalized crosswalks at that intersection. In addition, the project would include sidewalk replacements where needed and planting of new street trees, where space is available.

Community Meetings
Staff and the consultant held a community meeting to present the three project alternatives. The community meeting was held on March 8 and was attended by over 100 people. Staff received verbal and written feedback at the meeting, as well as further discussion at different small group stations. In general, the majority of the verbal comments expressed concern regarding existing traffic, future traffic, and parking loss. Also, a number of comments were received regarding the importance of having a good bicycle network. One of the stations allowed for a dot exercise for people to select their preferred alternative (Attachment 13) by placing a dot next to their preferred alternative (the color of the dot does not have any significance). Approximately 84 dots were placed on the board, and the results showed a preference for alternative 3 (50%), alternative 1 as a close second (35%), and alternative 2 receiving minimal support (15%).

FISCAL IMPACT
The project is part of the Capital program (project number 831120). Depending on the selected scope, it is anticipated that additional funds would be required for construction. Those funds would either need to be added to the project, or the project will have to be constructed in phases. Once an Engineers estimate is available, staff will provide additional information to the City Council.

PUBLIC CONTACT
Public contact was made by posting the Council agenda on the City's official-notice bulletin board outside City Hall, at the Sunnyvale Senior Center, Community Center and Department of Public Safety; and by making the agenda and report available at the Sunnyvale Public Library, the Office of the City Clerk and on the City's website.

Public contact was also made by posting a community flyer to adjacent residents within 1,000 feet radius of the project boundary. A community meeting was held on March 8, 2015, 6:30 pm, to receive public input of the alternative concepts. Approximately 100 members of the public attended. Attachment 14 includes a full meeting summary, comments received at the meeting, and additional comments received via email.

The Bicycle and Pedestrian Advisory Commission considered this item at a noticed public hearing on April 21, 2016 and voted 5-2 in favor to recommend Alternatives 1, 5 and 6 with additional mid-block crosswalks throughout the corridor (Attachment 15 - Excerpt from BPAC draft meeting minutes of April 21, 2016). Staff does not support the recommendation of additional mid-block crosswalks as part of the project. The implementation of mid-block crosswalks requires separate analysis to verify the need and assure safe implementation.

ALTERNATIVES
1. Design Alternative 1 - Remove all on-street parking and install bike lanes from Fair Oaks Avenue to Borregas Avenue.

2. Design Alternative 2 - Remove 30% of the on-street parking spaces, the two-way center turn lane, and install bike lanes from Fair Oaks Avenue to Borregas Avenue.
3. Design Alternative 3 - Maintain the current roadway as-is and add additional bike signage and striping.
4. Time Limited Bike Lanes - Proceed with the design of Alternative 1 but with part time bike lanes and parking - Convert the on-street parking to weekday part time bicycle lanes from 7:00AM to 7:00PM.
5. Optional Improvements at the Mathilda/Maude Intersection - Test/pilot improvements on westbound Maude Avenue at the Mathilda/Maude Intersection. Striping modifications would start west of Borregas. This could require parking removal.
6. Pedestrian Improvements - Proceed with the pedestrian improvements.
7. Do not make any modifications.

BOARD AND COMMISSION, AND STAFF RECOMMENDATION

Authorize Alternatives 1, 5 and 6: 1) Remove all on-street parking and install bike lanes from Fair Oaks Avenue to Borregas Avenue; 5) Test/pilot improvements on westbound Maude Avenue at the Mathilda/Maude Intersection; and 6) Proceed with the pedestrian improvements.

Staff believes that Alternative 1 provides for the safest roadway configuration and meets the City's bicycle and General Plan goals by providing buffered bicycle lanes, and maintaining the TWCTL from Fair Oaks Avenue to Borregas Avenue. Maintaining the TWCTL would help maintain a better level of access to and from side-streets and driveways along the project corridor, and would also minimize potential collisions. Alternative 5 could allow for improved operations on westbound Maude at the Mathilda/Maude intersection and a possible continuation of the bicycle lane. Alternative 6 would remove the pork-chops at the North Sunnyvale Avenue intersection, fix uplifted sidewalk locations, and plant street trees, where space is available. This would improve conditions for pedestrians, specifically children walking to school, and bicyclists on Maude Avenue.

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ATTACHMENTS

1. Maude Avenue Community Meeting Presentation
2. Alternative 1 Cross Section
3. Alternative 1 Layout
4. Alternative 2 Cross Section
5. Alternative 2 Layout
6. Alternative 3 Cross Section
7. Alternative 3 Layout
8. Bicycle Network Near Maude Avenue
9. City Manager Bi-Weekly Report
10. 24-Hour Vehicle Counts
11. Parking Occupancy
12. Travel Times
13. Dot Exercise
14. Community Meeting Summary

15. Excerpt from Draft Bicycle and Pedestrian Advisory Commission meeting Minutes of April 21, 2016