Central Arcata Areawide Traffic Study

Prepared for the City of Arcata

Submitted by
W-Trans

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Table of Contents

Appendices

Executive Summary

The *Central Arcata Areawide Traffic Impact Study* was commissioned by the City to address the cumulative traffic impacts associated with potential development of six sites located within less than three-quarters of a mile of one another. To provide information that can be used in the environmental clearance process for these projects, the impacts of each project were assessed individually as well as all together. The locations of the following six project sites are shown in Figure 1: The Village, Canyon Creek, Sunset Terrace, Open Door Health Center, Twin Parks, and Creekside Homes (Foster Avenue Annexation).

The study area included seven intersections for five of the projects, but was expanded to twelve existing and two new intersections for the Creekside Home project. Further, conditions with Foster Avenue connected or left in its current configuration were both evaluated.

Of the twelve study intersections, only one was found to be operating below the City's desired threshold under existing volumes. However, potential improvements to add capacity would have a negative impact on pedestrian and bicycle access, so a lower service level was deemed adequate at this location.

The addition of project-generated trips resulted in the need for restriping to provide turn lanes on Alliance Road at Foster Avenue with all but the Twin Parks project; with the Foster Avenue connection and the Creekside Homes project a turn lane is also needed on the west leg of Foster Avenue. Consideration was given to, restriping 11th Street at K Street to address reduced service levels associated with the Creekside Homes project; however, because such an improvement would require modifying the curb return radii, eliminating a section of bike lane, and prohibiting parking, the negative impacts were deemed more substantial than the potential improvements and a lower service level was deemed adequate for this location.

Improvements are needed at three locations to maintain or achieve acceptable operation under the 20-year horizon volumes projected using a growth factor of 1.5 percent per year. Installation of a five-legged roundabout at the intersections of Sunset Avenue/US 101 North ramps and LK Wood Boulevard is recommended to achieve acceptable operation, improve pedestrian and bicycle access, and eliminate the existing non-standard and potentially confusing configuration. Similarly, a roundabout is recommended at Foster Avenue/Alliance Road to accommodate projected future traffic volumes.

The improvements recommended for "without project" conditions are adequate to achieve acceptable operation upon the addition of all six projects to Future volumes, with one exception as noted below, and the proportional share that each project should contribute to help pay for these improvements was calculated and is noted in the body of the report. The exception is Sunset Avenue/US 101 North ramps-LK Wood Boulevard, which is projected to operate at LOS D during the p.m. peak hour with all projects added to future volumes.

Because the analysis is based on a growth factor rather than site-specific development potential, the growth in traffic projected can reasonably be expected to include project-generated trips. In this case, the projected Future volumes could be considered to reflect Future plus All Projects, a scenario under which acceptable condition can be achieved for all of the study intersections. In order to avoid providing excess capacity, which must often come at the expense of pedestrian and bicycle safety and comfort, it is recommended that no improvements beyond those identified for Future conditions (without the projects) be made without further study. To aid the City in determining when additional analysis may be appropriate, thresholds in terms of the number of new housing units permitted were developed and are provided in the body of the report.

Access for pedestrian, bicyclists and to transit was also considered. While sidewalks exist along some of the streets in the study area and the City's system of trails and bike lanes in the area is good, improvements are recommended for each individual project to ensure that frontage improvements are made, connections between each site and the regional network of trails are constructed and facilities to support bicycle travel, such as bike racks,

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Central Arcata Areawide Traffic Impact Study

Figure 1 – Study Area and Project Locations

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are provided as part of each development. Specifically, new segments of the trail along the railroad right-of-way should be constructed by The Village and Canyon Creek projects, a crossing of Foster Avenue should be provided by either the Sunset Terrace or Open Door Health Center project, and the Creekside project should have trail and/or sidewalk connections to Alliance Road as well as the terminus of Foster Avenue near Heather Lane.

Comments were received on the draft version of this document, and these are provided in Appendix A along with responses to any comments not addressed through changes to the document itself.

Introduction

This report presents an analysis of the potential traffic impacts that would be associated with development of six separate projects located in the central part of the City of Arcata west of US 101. In order to assess the cumulative traffic impacts of all of the proposed and potential projects in a relatively small area, a combined analysis of the traffic associated with all six sites was requested by City staff. The traffic study was completed in accordance with the criteria established by the City of Arcata, 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 that 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 in order 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 six projects included in the Central Arcata Traffic Analysis are detailed below.

The proposed **Village Project** would develop 240 dorm units, 800 beds, on the southern limit of St Louis Road. Only a pedestrian and cyclist connection is proposed between the project site and Eye Street, which northern limits dead end at the southern frontage of the project site. A preliminary site plan is included in Appendix B.

Canyon Creek proposed project includes 74 apartments units located between Eye Street and US 101 South with access where Eye Street has a 90 degree turn, approximately 300 feet east of Jay Street.

Sunset Terrace Project would include 142 apartment located south of Sunset Avenue, north of Foster Avenue, and west of the proposed Open Door Community Health Center. Project access would be only from Foster Avenue.

Open Door Community Health Center proposed project is located west of the Sunset Avenue/Foster Avenue-Jay Street roundabout. The proposed project would develop approximately 30,000 square feet of health offices. The only vehicular project access would be Foster Avenue.

Twin Parks Apartments Project would be located on the southeast corner of the Alliance Road/Foster Avenue intersection. The project would include 40 apartment units and it was assumed project access would be from both Foster Avenue and Alliance Road.

Creekside Homes (**Foster Avenue Annexation)** proposed project would be located north of Foster Avenue with the lower southeast corner located at the Foster Avenue-Q Street bend west of the McDaniel Slough, also referred to as Janes Creek. The proposed project would include a 100 assisted living units and 89 single family homes. An additional scenario will be analyzed in which the Foster Avenue is connected. Currently, the McDaniel Slough separates the avenue. A preliminary site plan is included in Appendix B.

Transportation Setting

Operational Analysis

Study Area and Periods

The study area consists of the following intersections:

1. St. Louis Road/US 101 Overpass
2. LK Wood Boulevard/US 101 Overpass
3. Sunset Avenue/LK Wood Boulevard
4. Sunset Avenue/US 101 NB Ramps
5. Sunset Avenue/US 101 SB Ramps-G Street-H Street
6. Sunset Avenue/Foster Avenue-Jay Street
7. Foster Avenue/Alliance Road

For the Creekside Homes project, the study area also includes the following intersections

8. 17th Street/Q Street
9. 17th Street/Alliance Road
10. 11th Street/K Street
11. 11th Street/Janes Road
12. Foster Avenue/Janes Road
13. Foster Avenue/Creekside Project Entrance (future intersection)
14. Q Street/Foster Avenue (potential future intersection with Foster Avenue extension)

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed projects as well as the highest volumes on the local transportation network. The morning peak hour typically 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

St. Louis Road/US 101 Overpass is a three-legged intersection, with stop controls on the northbound St. Louis Road and westbound overpass approaches. There is a crosswalk across the overpass approach.

LK Wood Boulevard/US 101 Overpass is also a three-legged intersection, with the southbound LK Wood approach stop-controlled. Although this intersection has stop controls on the northbound and eastbound approaches, because the overpass approach curves into the south leg of LK Wood, it essentially creates a standard tee intersection with the terminating southbound approach stop-controlled.

Sunset Avenue/LK Wood Boulevard is an all-way stop-controlled tee intersection that is separated from the ramps at US 101 North by less than 150 feet. It has separate right-turn lanes on the eastbound approach for both Sunset Avenue and the US 101 North off-ramp that converge just as they enter LK Wood Boulevard. The only crosswalk at the intersection is across the south leg of the intersection, and it crosses the eastbound right-turn lane coming from Sunset Boulevard but not the one from US 101 North.

Sunset Avenue/US 101 NB Ramps is a four-legged intersection with the off- and on-ramps forming the south and north legs of the intersection respectively. The off-ramp approach is stop-controlled and has a crosswalk connecting through to LK Wood Boulevard.

Sunset Avenue/US 101 SB Ramps-G Street-H Street is a four-legged, all-way stop-controlled intersection with a crosswalk on the south leg only. G and H Streets form a one-way couplet, with G Street serving the northbound approach to the intersection and H Street carrying southbound traffic away from intersection.

Sunset Avenue/Foster Avenue-Jay Street was recently converted to roundabout control, with crosswalks on all four legs of the intersection.

Foster Avenue/Alliance Road is a four-legged intersection with stop controls and crosswalks on all four approaches.

17th Street/Q Street is a three-legged intersection, with *de facto* stop-control on the northbound Q Street. There is a yellow crosswalk (school crossing) on the south leg of the intersection.

17th Street/Alliance Road is a three-legged intersection with stop control on the eastbound approach and a yellow crosswalk is the west leg.

11th Street/K Street is also a four-legged, all-way stop-controlled intersection with crosswalks on each leg.

11th Street/Janes Road is a four-legged intersection with stop-controls on the east and west leg. There is only a crosswalk on the west leg.

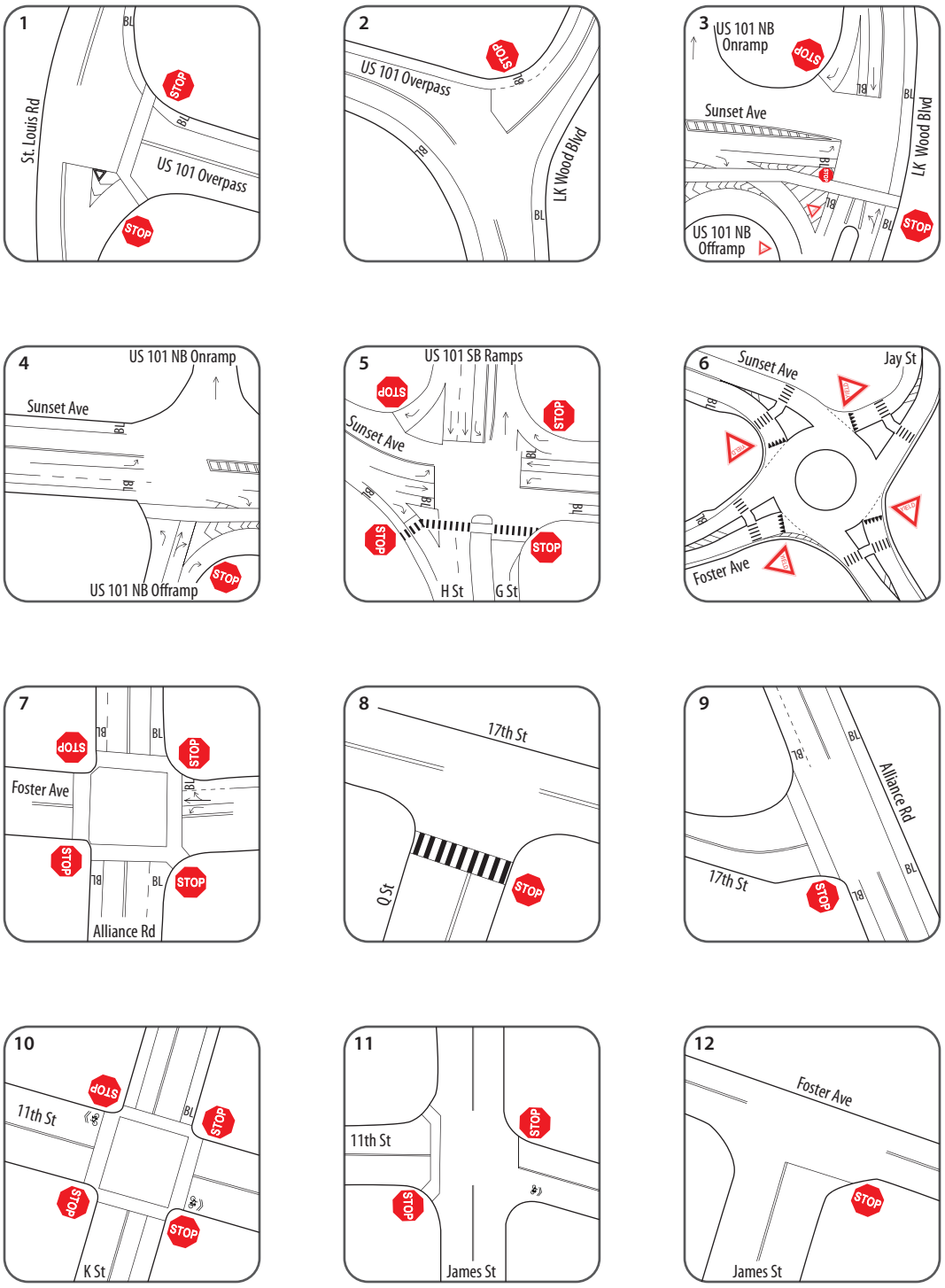
Foster Avenue/Janes Road is a three-legged intersection with stop-control on the northbound Janes Road.

The locations of the study intersections are shown in Figure 1, and the existing lane configurations and controls are shown in Figure 2.

Collision History

The collision histories for the study intersections were 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 January 1, 2011 through December 31, 2015.

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 *2012 Collision Data on California State Highways*, California Department of Transportation (Caltrans). These average rates statewide are for intersections in the same environment (within an urban boundary), with the same number of approaches (generally four-legged or tee intersections), and the same controls (all-way stops, two-way stops, etc.) As indicated in the table, eight of the twelve existing study intersections experienced collisions at a rate higher than the statewide average for similar facilities. The collision rate calculations are provided in Appendix C.



Central Arcata Areawide Traffic Impact Study

Figure 2 – Existing Lane Configurations

Table 1 – Collision Rates at the Study Intersections			
Study Intersection	**Number of Collisions (2011-2015)**	**Calculated Collision Rate (c/mve)**	**Statewide Average Collision Rate (c/mve)**
1. St. Louis Rd/US 101 Overpass	2	**0.30**	0.18
2. LK Wood Blvd/US 101 Overpass	0	0.00	0.18
3. Sunset Ave/LK Wood Blvd	3	**0.12**	0.05
4. Sunset Ave/US 101 NB Ramps	4	**0.18**	0.15
5. Sunset Ave/US 101 SB Ramps-G St-H St	10	**0.41**	0.21
6. Sunset Ave/Foster Ave-Jay St	1	0.08	0.18
7. Foster Ave/Alliance Rd	5	**0.23**	0.21
8. 17th St/Q St	0	0.00	0.06
9. 17th St/Alliance Rd	3	**0.19**	0.18
10. 11th St/K St	5	**0.24**	0.21
11. 11th St/Janes Rd	4	**0.68**	0.15
12. Foster Ave/Janes Rd	0	0.00	0.18

Note: c/mve = collisions per million vehicles entering; **Bold** = collision rate higher than the Statewide average

Further review was performed to determine any trends or concerns present at those locations with above-average collision rates. It is noted that the statewide rates are for highway facilities that generally carry much higher volumes; because the volumes are relatively low at some of the study intersections, even a nominal number of crashes results in an above-average collision rate. Consideration was therefore given not just to the rate, but also to the actual number of crashes reported.

St. Louis Road/US 101 Overpass – the two collisions involved drivers going in opposite directions on opposite sides of the intersection, with one crash involving two vehicles and the other a single vehicle, so no clear pattern was evident. It is noted that the unusual configuration of stop controls (the southbound approach is uncontrolled while the opposing northbound approach as well as the westbound approach are stop-controlled) may cause some driver confusion, so consideration could be given to converting this location to all-way stop controls to eliminate any confusion over the right-of-way assignment.

Sunset Avenue/LK Wood Boulevard – Despite having all-way stop controls, there were two broadside collisions reported, and one involved a driver turning right from the eastbound approach. With two right-turn lanes, a long crosswalk connecting across the adjacent intersection at US 101 North Ramps, and a bike lane, the geometrics of this location present challenges that have translated to a collision rate that is more than double the statewide average for all-way stop controlled intersections. Modification of this intersection to provide more standard geometrics would be expected to reduce the incidence of collisions.

Sunset Avenue/US 101 North Ramps – Like the adjacent intersection at LK Wood Boulevard, this intersection has a challenging configuration, especially for pedestrians and bicyclists. Of the four collisions reported at this location, three involved either a pedestrian or a cyclist, and one resulted in a pedestrian fatality. As noted for the LK Wood Boulevard intersection, modifications to provide a more standard configuration could address these concerns.

Sunset Avenue/US 101 South Ramps-G Street-H Street – Of the ten reported collisions, six involved right-of-way infractions, and two of these involved a pedestrian or cyclist. Additionally, there was one pedestrian fatality at this intersection. While no specific pattern emerged from the review, it appears that some enforcement of right-of-way laws may be beneficial.

Foster Avenue/Alliance Road – Three of the five collisions involved right-of-way violations, and two of these included either a pedestrian or a cyclist. Given the number of collisions noted at this intersection and others that involve pedestrians and bicyclists, a public safety campaign to remind such road users of their responsibility to follow the laws in the vehicle code may prove beneficial. Alternatively, additional enforcement of right-of-way laws at the intersection could also be beneficial.

17th Street/Alliance Road – Of the three collisions reported, two were single-vehicle crashes and one was due to an impaired driver. Given the limited number of crashes as well as the minimal amount by which the average rate was exceeded, no remedial measures are suggested.

11th Street/K Street – Four of the five collisions reported at this all-way stop-controlled intersection were broadsides. As noted above for pedestrians and bicyclists, a public safety campaign to reinforce the rules for right-of-way assignment at all-way stop-controlled intersections may help reduce the number of incidents.

11th Street/Janes Road – Three of the four collisions at this location were broadsides between southbound and westbound vehicles that occurred between 4:00 and 4:30 p.m. Sight lines appear to be adequate, and speed was *not* indicated as a collision factor, so it is unclear what precipitated this trend. Because the calculation rate has the volume in the denominator, the rate at this location is quite high despite the fact that there were on four collisions in five years, or less than one per year. While no mediation is suggested, the City may want to perform reviews of the collision record at this location occasionally to determine if a safety concern is developing.

Alternative Modes

Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. While there are some pedestrian facilities in the vicinity of the project sites, sidewalk gaps, obstacles, and barriers can be found along some or all of the connecting roadways. Existing gaps and obstacles along the connecting roadways impact convenient and continuous access for pedestrians and present safety concerns in those locations where appropriate pedestrian infrastructure would address potential conflict points.

- **Alliance Road** – Sidewalks exist continuously on Alliance Road on either one side of the street or the other, with crosswalks connecting locations where the sidewalk switches from one side to the other. Additionally, crosswalks exist at many of the study intersections.

- **Foster Avenue** – Intermittent sidewalk coverage is provided on Foster Road with significant gaps on the northerly side between Alliance Road and Jay Street. A pathway was recently constructed on the south side of the street that connects to existing facilities at Jay Street and Alliance Road, but access from Foster Avenue is currently limited to a connect at Eastern Avenue. Curb ramps and crosswalks at side street approaches are intermittent, non-existent, or not compliant with current ADA standards. Lighting is provided by overhead streetlights.

- **Eye Street/Jay Street** – Both of these streets have intermittent, discontinuous sidewalk facilities, and shoulder areas are of limited width, include drainage ditches, and may be impassable in wet weather due to mud. Pedestrians must walk in the street along most of the route from the Canyon Creek site to Sunset Avenue.

- **LK Wood Boulevard** – There is continuous sidewalk on the east side of this street, with a crosswalk connecting to the termination of the sidewalk on the west side that then connects to the US 101 Overpass.

- **St. Louis Road** – This roadway has no pedestrian facilities south of the US 101 Overpass. The road is narrow, with limited shoulder area, so pedestrian traffic would typically be required to walk in the roadway.

- **Sunset Avenue** – Continuous sidewalks are provided on the south side of this street east of Jay Street where there is a connection to the regional trail system. The geometrics of the intersections with US 101 North and LK Wood Boulevard result in pedestrians traveling a substantial distance in crosswalks crossing both of these intersecting streets in a configuration that is difficult and results in undesirable crossing conditions.

- **US 101 Overpass** – The existing sidewalk on the south side of the overpass connects St. Louis Road to LK Wood Boulevard.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2012, classifies bikeways into three 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.

Guidance for Class IV Bikeways is provided in *Design Information Bulletin Number 89: Class IV Bikeway Guidance (Separated Bikeways/Cycle Tracks)*, Caltrans, 2015.

- **Class IV Separated Bikeway/Cycle Track** – a bikeway for the exclusive use of bicycles and requires physical separation such as grade separations, flexible posts, inflexible physical barriers, or on-street parking between the bikeway and through vehicular traffic.

In the project area, Class II bike lanes exist on Alliance Road-K Street between Spear Avenue and 11th Street and Class III bike routes exist on Foster Avenue between Jay Street and Alliance Road. Bicyclists ride in the roadway and/or on sidewalks along 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 Arcata Pedestrian and Bicycle Master Plan*, 2010.

Table 2 – Bicycle Facility Summary				
Status **Facility**	**Class**	**Length (miles)**	**Begin Point**	**End Point**
Existing				
Alliance Road	II	1.40	Spear Avenue	11th Street
L.K. Wood Boulevard	II	0.97	US 101 Overpass	14th Street
Spear Avenue	II	0.70	Janes Road	St. Louis Road
St. Louis Road	II	0.20	Spear Avenue	US 101 Overpass
Sunset Avenue	II	0.13	L.K. Wood Boulevard	G Street
US 101 Overpass	II	0.20	St. Louis Road	LK Wood Boulevard
Foster Avenue	II	0.37	Jay Street	Alliance Road
Planned				
Annie & Mary Rail Trail	I	3.00	West End Road	Arcata Skate Park
Hammond Trail	I	1.40	Western City Limits	Annie & Mary Rail Trail
Sunset Avenue	II	0.45	Western Avenue	H Street
Baldwin Street	III	0.22	Cahill Park	Sunset Ave
Stromberg Avenue-Maple Lane	III	0.38	Janes Creek Linear Trial	Alliance Road

Source: *City of Arcata Pedestrian and Bicycle Master Plan*, 2010

Transit Facilities

The Humboldt Transit Authority (HTA) provides fixed route bus service in the City of Arcata through the Arcata and Mad River Transit System (AMRTS) and the Redwood Transit System (RTS). AMRTS Gold Route provides loop service to destinations throughout the City and stops on Alliance Road at the Foster Avenue Extension within the project vicinity. Gold Route operates Monday through Friday with approximately one-hour headways between 7:00 a.m. and 10:00 p.m. AMRTS Orange Route provides Saturday service with approximately one-hour headways between 7:00 a.m. and 7:00 p.m.

Redwood Transit System (RTS) Routes 100 to 115 provide regional service between the City of Arcata and surrounding communities in Humboldt County. Each route stops at the Arcata Transit Center between 9th Street and 10th Street operating Monday through Friday with approximately one to three hour headways between 6:30 a.m. and 10:00 p.m. Saturday and Sunday service operates with approximately one to three hour headways between 9:00 a.m. and 8:00 p.m.

Two bicycles can be carried on most HTA buses. Bike rack space is on a first come, first served basis. Additional bicycles are allowed on HTA 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. Arcata Dial-A-Ride service is designed to serve the needs of individuals with disabilities within the City of Arcata and the greater City of Arcata 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, 2010. 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 with stop signs on all approaches were analyzed using the "All-Way Stop-Controlled" Intersection methodology from the HCM. This methodology evaluates delay for each approach based on turning movements, opposing and conflicting traffic volumes, and the number of lanes. Average vehicle delay is computed for the intersection as a whole, and is then related to a Level of Service.

Intersections that are currently or are proposed to be controlled by modern roundabouts were evaluated using the FHWA Roundabout Method, also contained within the Unsignalized Methodology of the HCM. This methodology determines intersection operation using the gap acceptance method using basic geometric and volume data to calculate entering and circulating flows. This information is then translated to an overall average vehicle delay, with LOS break points at the same delays as used in the signalized methodology. Because the HCM roundabout methodology is relatively unsophisticated, the much more advanced SIDRA roundabout analysis software was utilized in any cases where the basic HCM methodology predicts operation worse than LOS B.

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

Table 3 – Intersection Level of Service Criteria			
LOS	**Two-Way Stop-Controlled**	**All-Way Stop-Controlled**	**Roundabout**
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Upon stopping, drivers are immediately able to proceed.	Delay of 0 to 10 seconds.
B	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.	Delay of 10 to 15 seconds. Drivers may wait for one or two vehicles to clear the intersection before proceeding from a stop.	Delay of 10 to 20 seconds.
C	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.	Delay of 15 to 25 seconds. Drivers will enter a queue of one or two vehicles on the same approach, and wait for vehicle to clear from one or more approaches prior to entering the intersection.	Delay of 20 to 35 seconds.
D	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.	Delay of 25 to 35 seconds. Queues of more than two vehicles are encountered on one or more approaches.	Delay of 35 to 55 seconds.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 35 to 50 seconds. Longer queues are encountered on more than one approach to the intersection.	Delay of 55 to 80 seconds.
F	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.	Delay of more than 50 seconds. Drivers enter long queues on all approaches.	Delay of more than 80 seconds.

Reference: *Highway Capacity Manual,* Transportation Research Board, 2010

Traffic Operation Standards

City of Arcata

In the absence of an adopted policy, through discussions with staff of the City of Arcata, an operational threshold of LOS C was identified as being the desired minimum to be used for analysis purposes, with this threshold to be applied to the operation of the intersection as whole and not that of any one movement or approach. Further, the City's preference has been not to use traffic signals to achieve acceptable operation, instead using all-way stop controls where feasible or roundabouts where volumes exceed what can be handled by a stop-controlled intersection. The need for improvements to increase capacity and reduce delay was therefore considered only where the overall intersection delay was projected to exceed 25 seconds. However, if it was determined that feasible improvements would have a negative impact on pedestrian and/or bicycle access, priority was given to maintaining access for pedestrians and bicyclists, and lower service levels for vehicle operation were considered acceptable.

Caltrans

Caltrans indicates that they endeavor to maintain operation at the transition from LOS C to LOS D. Based on previous discussions with Caltrans staff, it is understood that the standard is to be applied to the overall average intersection delay and *not* that associated with any single movement or approach. Under this approach, if one movement experiences very high delay and also has moderate to high traffic volumes, the overall delay and level

of service should reflect the critical nature of the condition. However, if one movement is expected to experience high delay, but has very low traffic volumes, the overall intersection operation will likely still meet Caltrans standards.

Humboldt State University

The intersection of Sunset Avenue/LK Wood Boulevard is owned and operated by Humboldt State University. It is understood from the University that their emphasis is placed on pedestrian and bicycle access and safety, with operation for vehicular traffic given a lesser priority. Improvements at this intersection were therefore considered for operation of LOS D or lower, though lower service levels were deemed acceptable if improvements necessary to achieve a higher service level would negatively impact pedestrian and/or bicycle access.

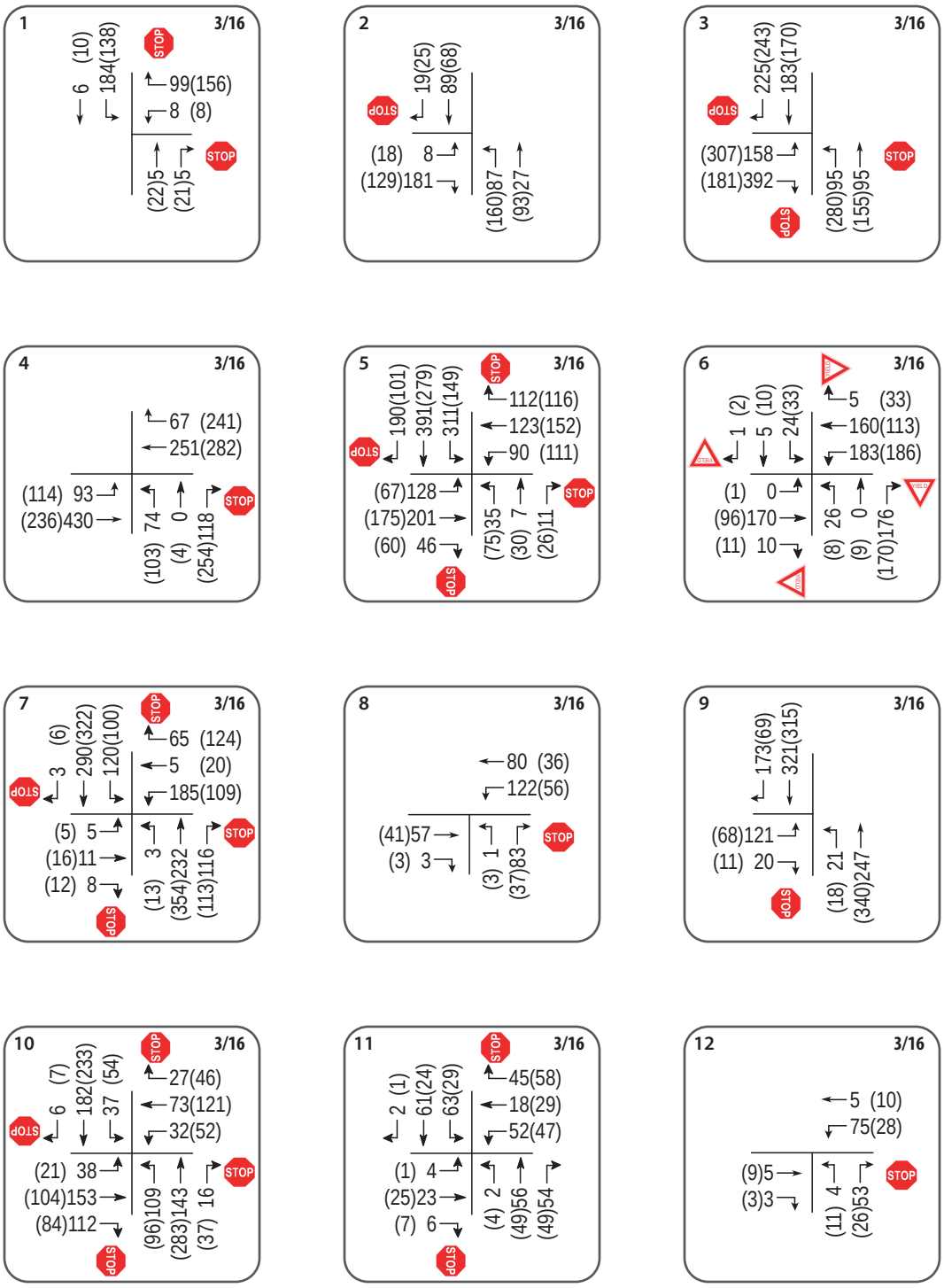
Existing Conditions

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 on March 3, 2016, while local schools, including Humboldt State, were in session.

In order to analyze the St. Louis Road/US 101 Overpass tee-intersection, which has two stop-controlled and one free approach, it was modeled as a four-legged intersection. The stop-controlled westbound approach to the intersection was input separately from the receiving lane on that same leg. The northbound approach and receiving lane was modeled as one leg; the southbound approach was similarly modeled.

Intersection Levels of Service

Under existing conditions, all but one of the study intersections are operating acceptably at LOS C or better during both peak periods evaluated. Sunset Avenue/LK Wood Boulevard is currently operating at LOS E during the p.m. peak period, which is below the threshold applied though still considered acceptable for this location as potential improvements identified as being feasible to improve vehicular operation would have a negative impact on pedestrian and bicycle access, so were rejected by Humboldt State University representatives. The existing traffic volumes are shown in Figure 3. 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 D.



Central Arcata Areawide Traffic Impact Study

Figure 3 – Existing Traffic Volumes

Table 4 – Existing Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	3.4	A	5.4	A
	Northbound St. Louis Rd Approach	*9.8*	*A*	*9.6*	*A*
	Westbound Overpass Approach	*9.0*	*A*	*9.2*	*A*
2.	LK Wood Blvd/US 101 Overpass	3.2	A	2.5	A
	Southbound LK Wood Blvd Approach	*11.4*	*B*	*11.7*	*B*
3.	Sunset Ave/LK Wood Blvd	13.3	B	**36.3**	**E**
4.	Sunset Ave/US 101 N Ramps	5.3	A	8.7	A
	Northbound US 101 N Off-ramp Approach	*24.3*	*C*	*27.0*	*D*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	14.2	B	11.4	B
6.	Sunset Ave/Foster Ave-Jay St	5.0	A	4.4	A
7.	Foster Ave/Alliance Rd	18.0	C	23.9	C
8.	17th St/Q St	4.9	A	4.3	A
	Northbound Q St Approach	*9.1*	*A*	*8.8*	*A*
9.	17th St/Alliance Rd	3.3	A	1.7	A
	Eastbound 17th St Approach	*19.6*	*C*	*16.2*	*C*
10.	11th St/K St	14.0	B	20.0	C
11.	11th St/Janes Rd	5.5	A	6.0	A
	Eastbound 11th St Approach	*11.4*	*B*	*10.3*	*B*
	Westbound 11th St Approach	*11.0*	*B*	*10.0*	*B*
12.	Foster Ave/Janes Rd	7.2	A	6.1	A
	Northbound Janes Rd Approach	*8.7*	*A*	*8.7*	*A*

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 = below desired threshold; Shaded cells = conditions with recommended improvements

Finding – Though vehicular operation at Sunset Avenue/LK Wood Boulevard falls below the desired threshold of LOS C, potential improvements that would increase vehicular capacity and reduce delay were determined to have a deleterious effect on pedestrian and bicycle traffic, so such improvements were rejected by representatives of Humboldt State University. Under the criterion applied, the existing LOS E operation is therefore deemed acceptable for this location.

Future Conditions

Future traffic volumes were developed using an assumed growth rate of 1.5 percent per year to a horizon year of 2036, or 20 years out. No changes to the infrastructure or transportation system were assumed for this scenario. Under the estimated Future volumes, three of the study intersections are expected to operate unacceptably during one or both peak periods. Sunset Avenue/LK Wood Boulevard, which was identified as operating unacceptably during the p.m. peak hour under current traffic volumes, would experience increased delay, and Sunset Avenue/US 101 North Ramps is expected to deteriorate to LOS D overall during this time period. The intersection of Foster Avenue/Alliance Road is expected to operate unacceptably during both peak periods and

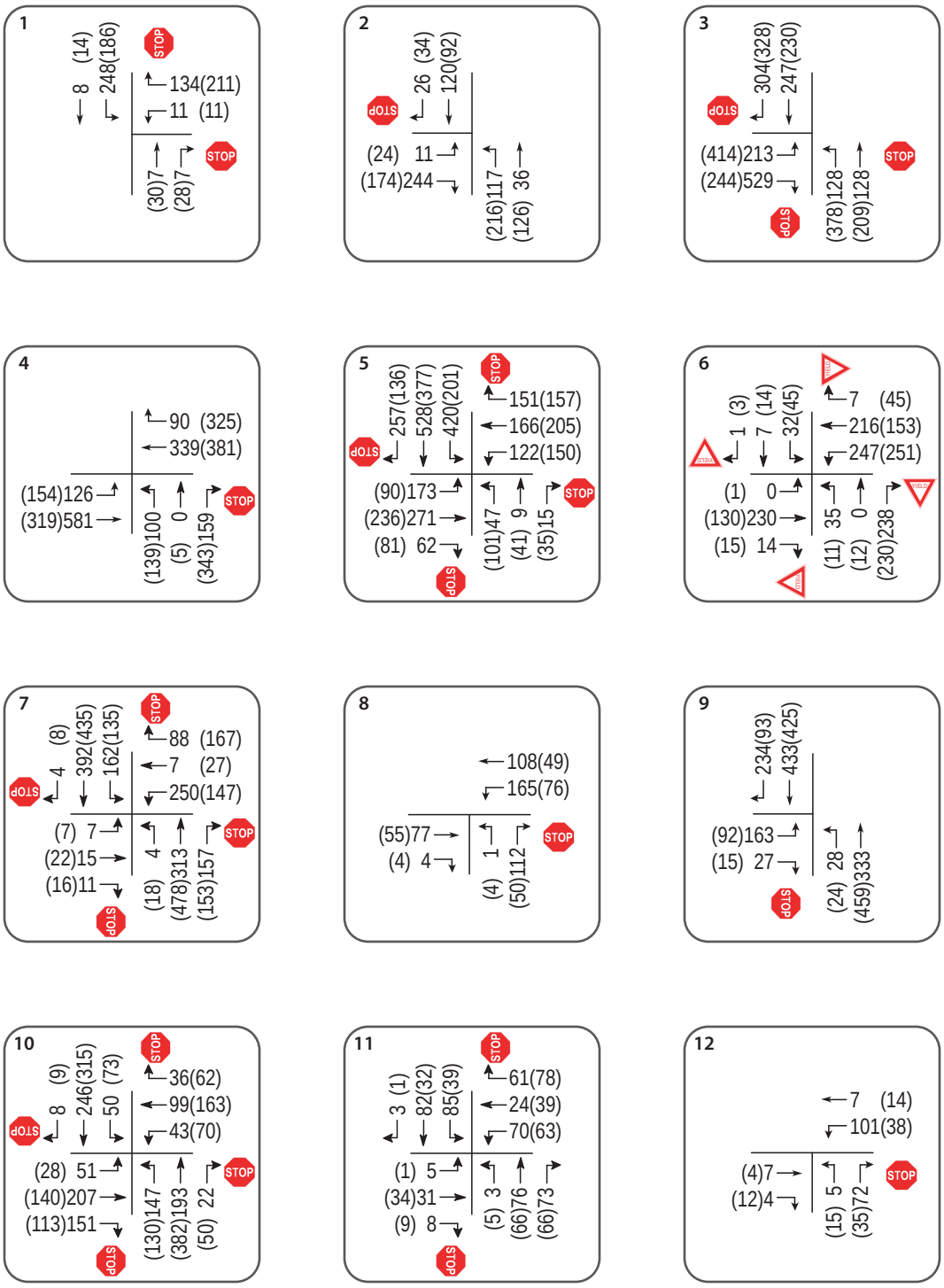
11th Street/K Street during the p.m. peak hour with the increased volumes. Future operating conditions are summarized in Table 5 and volumes are shown in Figure 4.

Table 5 – Future (without Projects) Peak Hour Intersection Levels of Service

Study Intersection *Approach*	AM Peak		PM Peak	
	Delay	**LOS**	**Delay**	**LOS**
1. St. Louis Rd/US 101 Overpass	3.5	A	5.6	A
Northbound St. Louis Rd Approach	*10.1*	*B*	*9.9*	*A*
Westbound Overpass Approach	*9.1*	*A*	*9.4*	*A*
2. LK Wood Blvd/US 101 Overpass	3.5	A	2.8	A
Southbound LK Wood Approach	*12.7*	*B*	*13.1*	*B*
3. Sunset Ave/LK Wood Blvd	17.1	C	**88.0**	**F**
Roundabout – Intersections 3 and 4	10.6	B	19.8	C
4. Sunset Ave/US 101 N Ramps	10.4	B	**28.5**	**D**
Northbound US 101 N Off-ramp Approach	*51.6*	*F*	*94.4*	*F*
5. Sunset Ave/US 101 S Ramps-G/H Streets	20.1	C	13.0	B
6. Sunset Ave/Foster Ave-Jay St	5.7	A	5.2	A
7. Foster Ave/Alliance Rd	**38.4**	**E**	**67.4**	**F**
Roundabout	8.4	A	9.0	A
8. 17th St/Q St	5.0	A	4.4	A
Northbound Q St Approach	*9.3*	*A*	*8.9*	*A*
9. 17th St/Alliance Rd	5.0	A	2.43	A
Eastbound 17th St Approach	*30.8*	*D*	*23.2*	*C*
10. 11th St/K St	22.43	C	**73.6**	**F**
11. 11th St/Janes Rd	5.9	A	6.2	A
Eastbound 11th St Approach	*12.3*	*B*	*10.7*	*B*
Westbound 11th St Approach	*11.9*	*B*	*10.4*	*B*
12. Foster Ave/Janes Rd	7.2	A	6.1	A
Northbound Janes Rd Approach	*8.7*	*A*	*8.8*	*A*

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 = below desired threshold; Shaded cells = conditions with recommended improvements

Since the two intersections at LK Wood Boulevard/Sunset Avenue and Sunset Avenue/US 101 North Ramps are in close proximity, it is recommended that long-term any improvements to one of the intersections include the other. Because the City of Arcata does not have signals and given the large right of way, a five-legged roundabout that combines the two intersections was considered. In evaluating the potential configuration of such a roundabout, it was determined that it would only be feasible if the existing connection from G Street to the US 101 North Off-ramp were closed. Because the counts at the intersection did not indicate which vehicles came from the off-ramp versus the overpass, it is unknown what volume this link carries. However, because of the short distance between the merge and the intersection, it appears that this movement cannot be accommodated while still achieving adequate deflection and separation for each of the five approaches. While the diverted traffic was not estimated, it is noted that the added vehicles would make a right turn at Sunset Avenue/US 101 S Ramps-G/H Streets; this



014arc.ai 12/16

Central Arcata Areawide Traffic Impact Study

Figure 4 – Future Traffic Volumes

movement is a low-delay movement and it would be added to an intersection already projected to operate at LOS C or B during the morning and evening peaks respectively. As a result, it is anticipated that the diversion would have a minimal impact on operation.

It was further determined that, given the extensive right-of-way available both at the intersection and across the overpass, it would be possible to include a separated bikeway, or cycle track, on the south side of Sunset Avenue between LK Wood Boulevard and US 101 South Ramps-G/H Streets. These potential improvements are shown in Figures 5 and 6.

In addition to the roundabout on Sunset Avenue at US 101 North and LK Wood Boulevard, additional capacity will be needed at Foster Avenue/Alliance Road. To achieve acceptable LOS C operation, a roundabout would be needed at this location as well. There is limited right-of-way available at this intersection, so use of a mini-roundabout was tested. This would provide the benefits of a roundabout in terms of operation, but requires a fully-mountable center island to accommodate large vehicles, including fire trucks. A conceptual layout of the mini-roundabout is provided in Figure 7.

Finally, under the projected future volumes, the intersection at 11th Street/K Street would need increased vehicular capacity to operate at LOS C. Vehicular capacity can be increased by re-striping the intersection to add turn lanes on each of the four approaches. However, it is noted that this will require additional right-of-way to accommodate truck turning radii and the elimination of a short segment of the bike lane and/or on-street parking on both sides of each approach. The City has identified that a lower service level is acceptable if the improvements would deteriorate operation for pedestrians and bicyclists. Because no feasible modifications were identified that would improve vehicular operation without deteriorating conditions for pedestrians and bicycles, no improvements are recommended, nor are they needed under the criteria applied.

Project Description

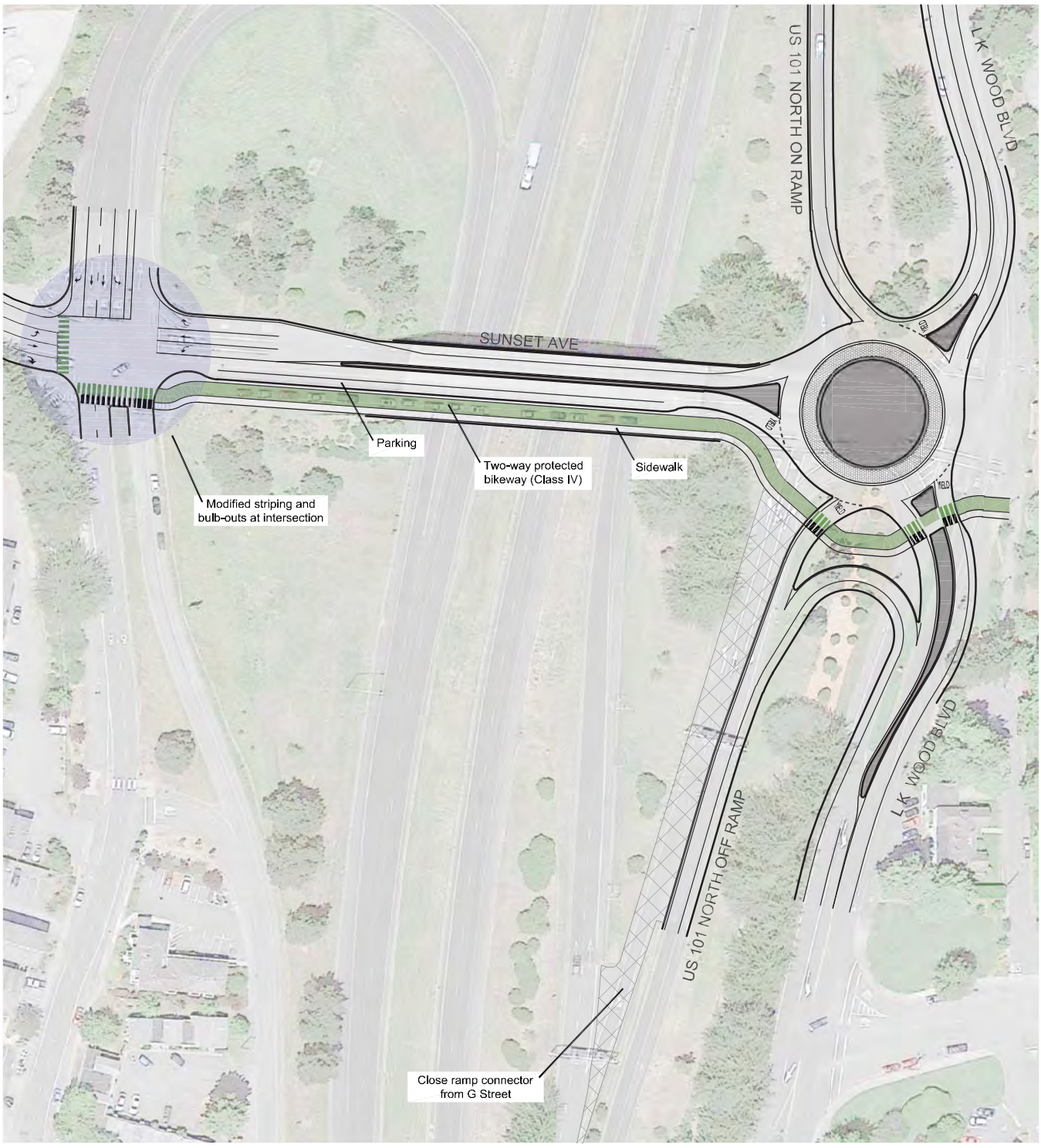
Six individual projects were evaluated to assess impacts areawide in Central Arcata. Following are the projects and the components included in each.

1. **The Village** – 240 apartment units housing a combined total of 800 beds for university students.
2. **Canyon Creek** – 74 apartments
3. **Sunset Terrace** – 142 apartments
4. **Open Door Community Health Center** – 30,000 square-foot medical office
5. **Twin Parks Apartment** – 40 apartments
6. **Creekside** – 67 single family dwellings with potential for 32 additional homes as "granny units" (for a total of 89 total units) and a 100-bed assisted living facility

Trip Generation

The anticipated trip generations for the various projects were estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 9th Edition, 2012. The Village, Canyon Creek, Sunset Terrace, and Twin Parks projects were evaluated using the trip generation rates for "Apartments" (ITE LU#220). In all cases, the fitted curve equation for the trip generation rate was applied; hence, the rates vary slightly from one project to another depending on their size. The Open Door Community Health Center was treated as a "Medical-Dental Office" based on rates for ITE LU#720. The Creekside project was evaluated using the rates for "Single Family Detached Housing" (ITE LU#210) for the homes and "Assisted Living" (ITE LU#254) for the 100-bed facility.

It is noted that consideration was given to what rate would be appropriate for the Village project since it is not strictly apartment units. There are no standard rates for a student dormitory, but data was obtained from a study



North

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Central Arcata Areawide Traffic Impact Study

Figure 5 – Conceptual Modifications near Sunset Avenue Interchange

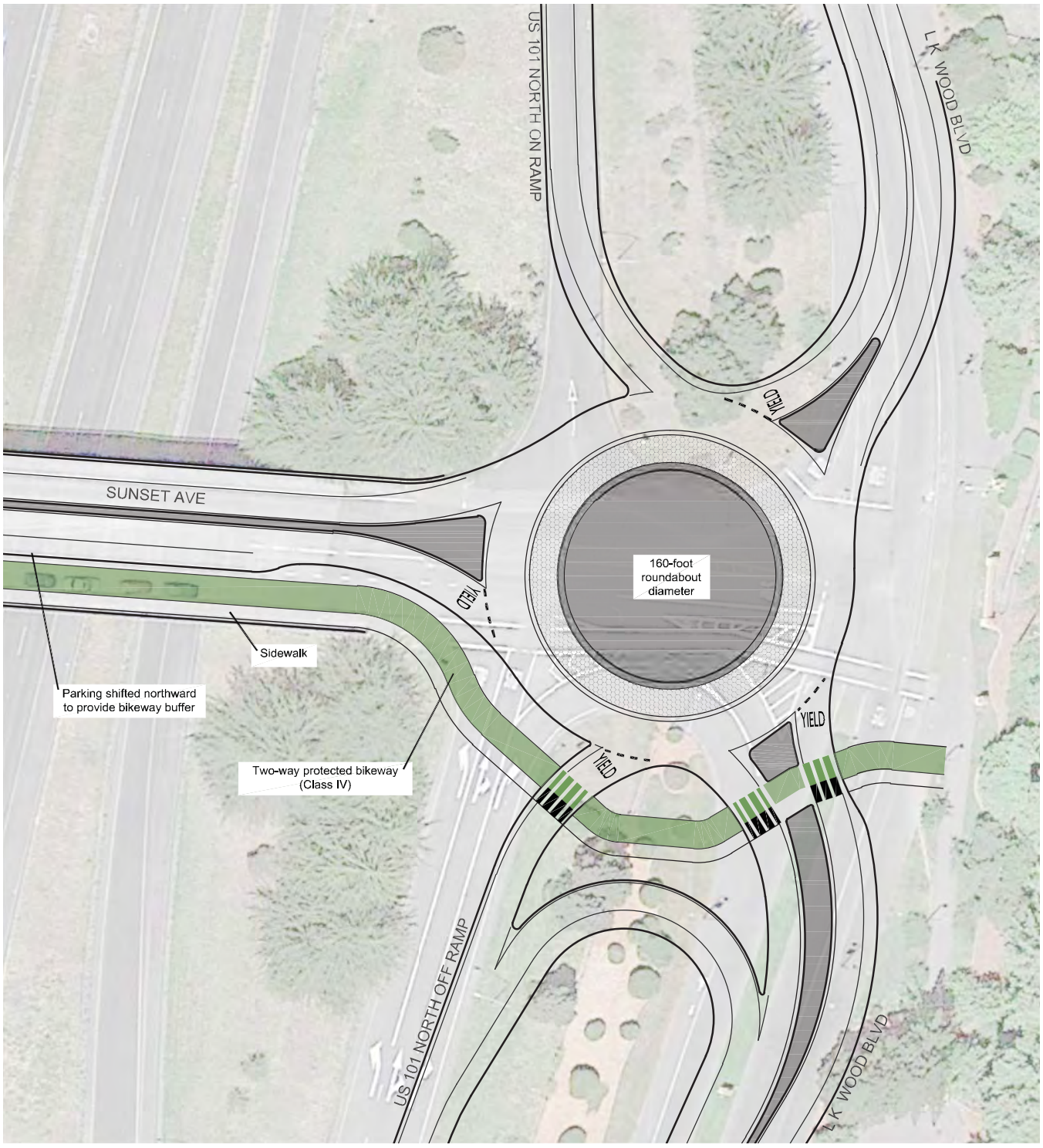

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Figure 6 – Conceptual Roundabout at Sunset Avenue/US 101N Ramps/LK Wood Boulevard

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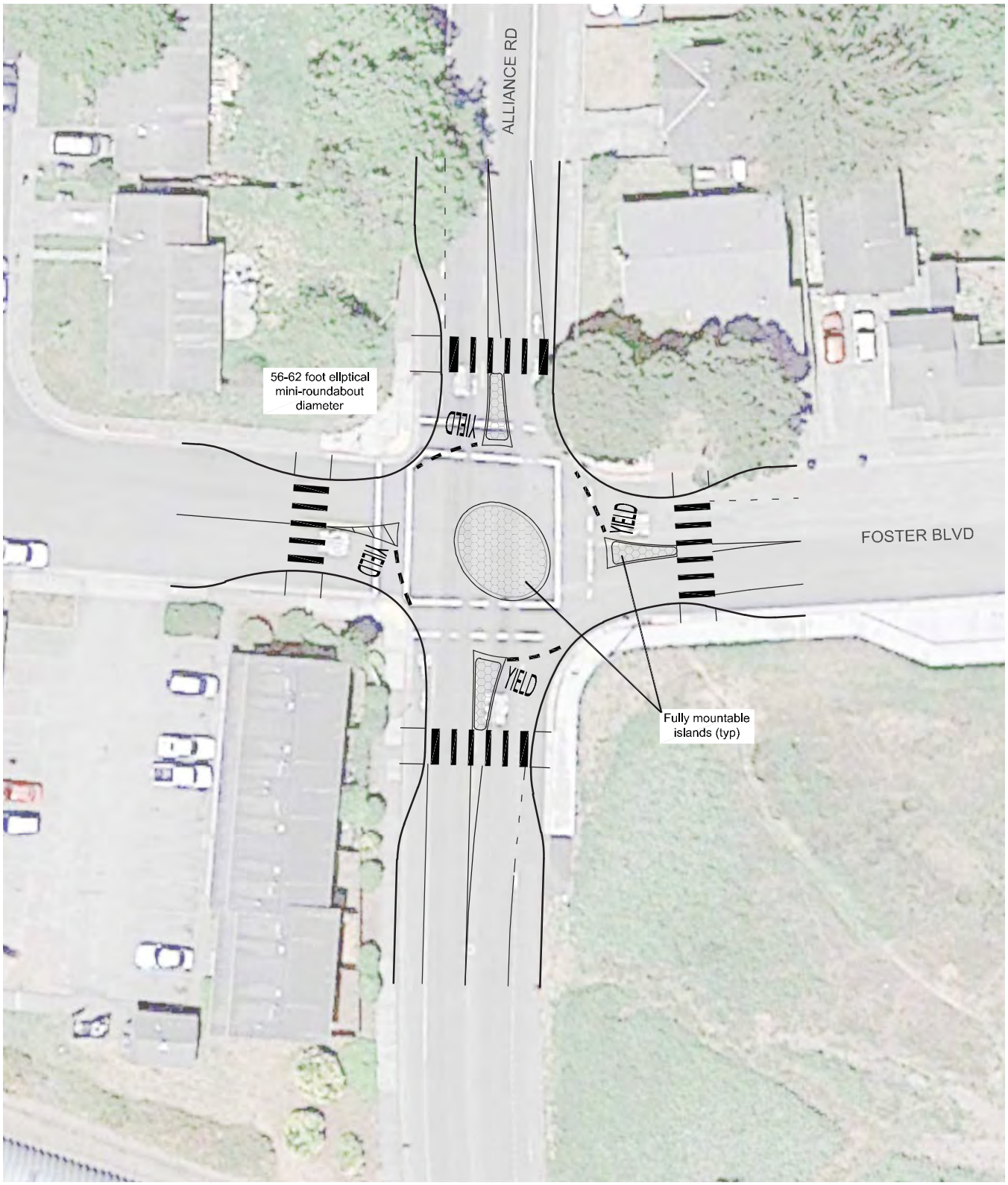

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Figure 7 – Conceptual Mini-Roundabout at Foster Avenue/Alliance Road

at Princeton University indicating the number of trips on a per-bed basis. A comparison was made between application of the rates from this study to an 800-bed facility and the standard ITE rates for a 240-unit apartment complex, and it was determined that the results using the ITE rates were similar, though slightly higher. Since this provided a rate that was both standard and conservative, these rates were applied.

Total Project Trip Generation

The expected trip generation potentials for each of the six proposed or potential projects are indicated in Table 6. Though the Village site is currently occupied, no deduction was taken as this site currently generates a minimal volume of trips. These new trips represent the increase in traffic associated with the projects compared to existing volumes.

Table 6 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
The Village											
Apartments	240 du	6.57	1,578	0.51	121	24	97	0.62	150	97	53
Canyon Creek											
Apartments	74 du	7.73	572	0.54	40	8	32	0.79	58	38	20
Open Door											
Medical Office	30 ksf	36.13	1,084	2.39	72	57	15	3.57	107	30	77
Sunset Terrace											
Apartments	142 du	6.93	984	0.52	73	15	58	0.67	96	62	34
Twin Parks											
Apartments	40 du	9.15	366	0.58	23	5	18	0.99	40	26	14
Creekside											
Single Family	89 du	9.52	847	0.75	67	17	50	1.00	89	56	33
Assisted Living	100 beds	2.66	266	0.14	14	9	5	0.22	22	10	12
Total			**5,697**		**410**	**135**	**275**		**562**	**319**	**243**

Note: du = dwelling unit; ksf = 1,000 square feet

Trip Distribution

The pattern used to allocate new project trips to the street network was based on data from the 2000 Census for home-to-work or work-to-home trips as well as approach volumes at the various study intersections. The applied distribution assumptions for individual projects are shown in Table 7.

Table 7 – Trip Distribution Assumptions

Routes	Projects					
	Apts*	Twin Parks	Village	Open Door	Creekside	
					Asst. Living	SFD**
To/from Humboldt State	25%	20%	75%	-	-	5%
To/from south on US 101	25%	20%	10%	15%	30%	30%
To/from south on G-H	15%	10%	-	25%	15%	10%
To/from south on Alliance	15%	20%	15%	25%	20%	20%
To/from north on US 101	10%	10%	-	10%	10%	10%
To/from north on Alliance	10%	20%	-	15%	25%	20%
To/from east of US 101	-	-	-	5%	-	-
To/from surrounding neighborhood	-	-	-	5%		
To/from south on Janes	-	-	-	-	-	5%
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Notes: * Canyon Creek and Sunset Terrace; ** Single Family Dwellings

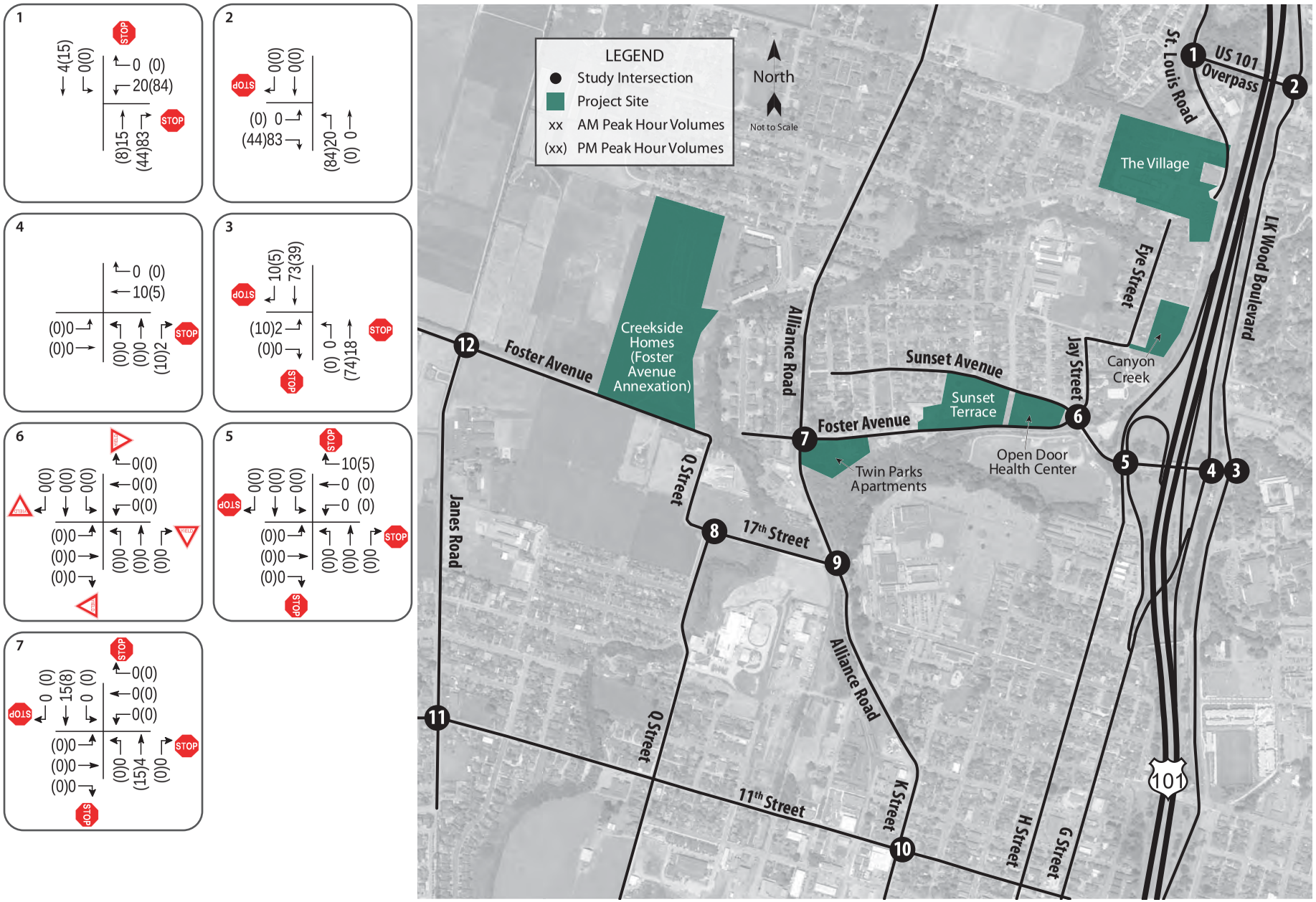
Intersection Operation

Existing plus Project Conditions

Conditions were evaluated with each of the six projects added individually to the existing volumes as well as with all six added to existing volumes.

Existing plus The Village

Upon the addition of traffic related to the Village project to the Existing volumes, the study intersection of Alliance Road/Foster Avenue would fall to an unacceptable level of service. All other study intersections, except LK Wood Boulevard/Sunset Avenue, which currently operates unacceptably at LOS E during the evening peak hour, would continue to operate at acceptable levels of service. Project traffic volumes are shown in Figure 8 and the resulting levels of service are summarized in Table 8.



014arc.ai 12/16

Central Arcata Areawide Traffic Impact Study

Figure 8 – The Village Project Traffic Volumes

Table 8 – Existing plus The Village Peak Hour Intersection Levels of Service					
Study Intersection *Approach*		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	5.3	A	6.9	A
	Northbound St. Louis Rd Approach	*10.0*	*B*	*9.7*	*A*
	Westbound Overpass Approach	*9.4*	*A*	*10.44*	*B*
2.	LK Wood Blvd/US 101 Overpass	2.8	A	2.2	A
	Southbound LK Wood Approach	*12.5*	*B*	*13.1*	*B*
3.	Sunset Ave/LK Wood Blvd	15.1	B	**58.9**	**F**
4.	Sunset Ave/US 101 N Ramps	5.3	A	8.8	A
	Northbound US 101 N Off-ramp Approach	*24.6*	*C*	*26.9*	*D*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	14.6	B	11.4	B
6.	Sunset Ave/Foster Ave-Jay St	5.0	A	4.4	A
7.	Foster Ave/Alliance Rd	19.0	C	**26.0**	**D**
	Restripe Alliance Road Approaches	14.0	B	17.7	C

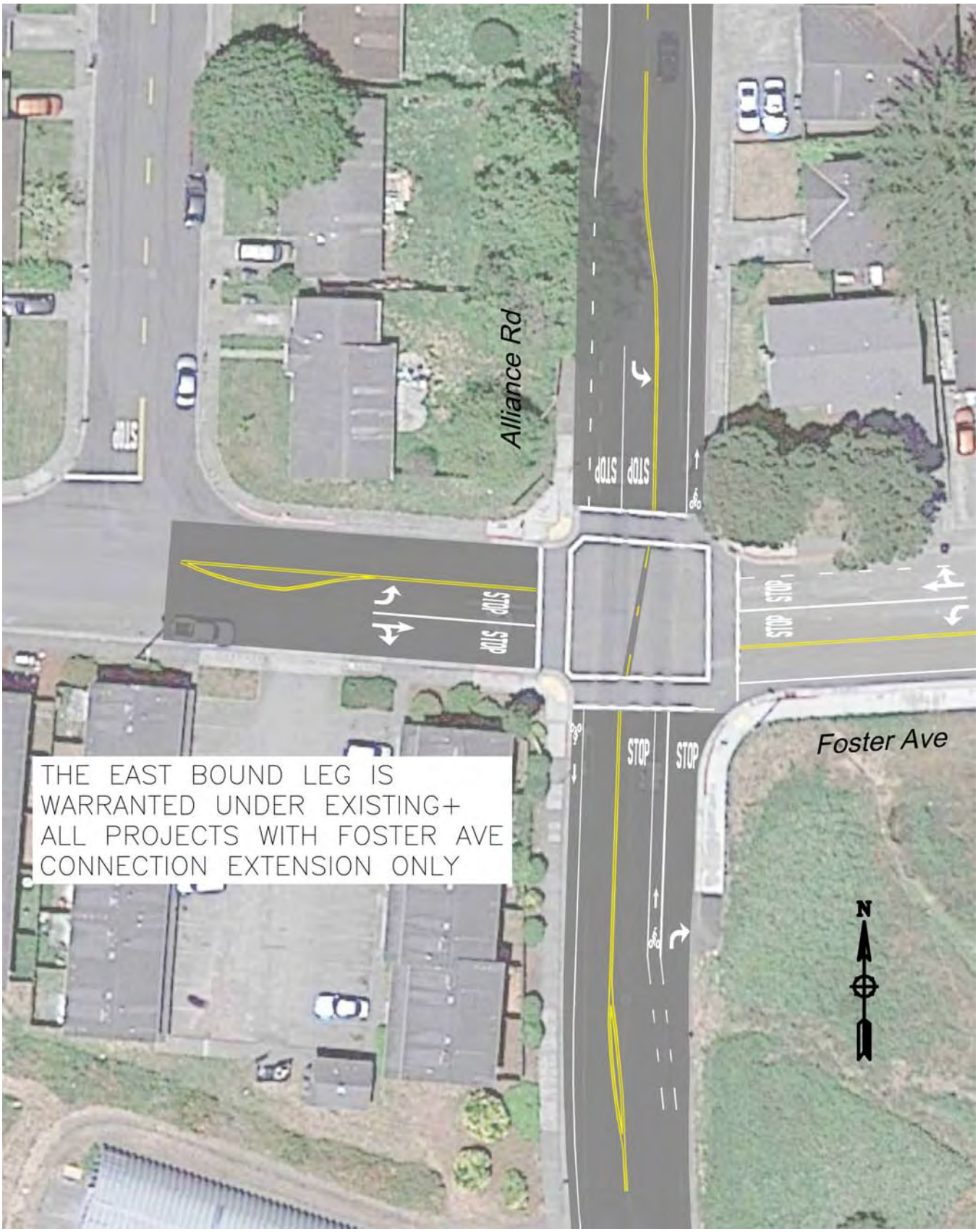
Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* **Bold** text = operation below desired threshold; Shaded cells = conditions with recommended improvements

It is noted that with the addition of project-related traffic volumes, average delay at the LK Wood Blvd/US 101 Overpass intersection decreases during both the a.m. and p.m. peak hours. While this is counter-intuitive, this condition occurs when a project adds trips to movements that have delays that are below the intersection average, resulting in a better balance between approaches and lower overall average delay. The project adds traffic to the 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.

Upon the addition of the project trips to the study intersection Foster Avenue/Alliance Road, the service level falls to a deficient LOS D. To mitigate the impact the intersection should be restriped to include turn lanes on the Alliance Road approaches, a right turn lane on the northbound approach and a left-turn lane on the southbound approach.

Finding – Five study intersections would continue operating acceptably upon the addition of traffic from The Village project. While Sunset Avenue/LK Wood Boulevard is projected to operate at LOS F, as indicated in the discussion of existing conditions, no improvements were identified that would not degrade pedestrian and bicyclists access and safety, so the lower service level is considered acceptable. The project results in deterioration of operation during the p.m. peak hour at Foster Avenue/Alliance Road to LOS D.

Recommendation – To achieve acceptable operation at Foster Avenue/Alliance Road, as part of the project the Alliance Road approaches should be restriped to provide left-turn and through/right-turn lanes southbound and a right-turn lane and left-turn/through lane on the northbound approach. This is a project-specific recommendation that should be completed by the first project to be constructed. A conceptual striping plan is provided in Figure 9.



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Central Arcata Areawide Traffic Impact Study

Figure 9 – Conceptual Striping Recommendation for Foster Avenue/Alliance Road

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Existing plus Canyon Creek

Upon the addition of traffic related to the Canyon Creek project to the Existing volumes, the study intersection of Alliance Road/Foster Avenue passes the acceptable threshold to LOS D. All other study intersections, with the exception of LK Wood Boulevard/Sunset Avenue, would continue to operate at acceptable levels of service. These results are summarized in Table 9 with project traffic volumes are shown in Figure 10.

Table 9 – Existing plus Canyon Creek Peak Hour Intersection Levels of Service

Study Intersection *Approach*	AM Peak		PM Peak	
	Delay	**LOS**	**Delay**	**LOS**
1. St. Louis Rd/US 101 Overpass	3.4	A	5.4	A
Northbound St. Louis Rd Approach	*9.8*	*A*	*9.6*	*A*
Westbound Overpass Approach	*9.0*	*A*	*9.2*	*A*
2. LK Wood Blvd/US 101 Overpass	3.2	A	2.5	A
Southbound LK Wood Approach	*11.4*	*B*	*11.7*	*B*
3. Sunset Ave/LK Wood Blvd	13.4	B	**37.8**	**E**
4. Sunset Ave/US 101 N Ramps	5.5	A	10.4	B
Northbound US 101 N Off-ramp Approach	*25.8*	*D*	*32.6*	*D*
5. Sunset Ave/US 101 S Ramps-G/H Streets	14.4	B	11.6	B
6. Sunset Ave/Foster Ave-Jay St	5.1	A	4.6	A
7. Foster Ave/Alliance Rd	18.3	C	**25.0**	**D**
Restripe Alliance Road Approaches	13.8	B	16.9	C

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 = operation below desired threshold; Shaded cells = conditions with recommended improvements

Finding – Five of the seven study intersections would continue operating acceptably upon the addition of traffic from the Sunset Terrace project. The higher delays have been deemed acceptable at Sunset Avenue/LK Wood Boulevard due to conflicts between potential improvements and pedestrian/bicycle access. The project results in deterioration of operation during the p.m. peak hour at Foster Avenue/ Alliance Road to LOS D.

Recommendation – Foster Avenue/Alliance Road should be restriped to provide left-turn and through/right-turn lanes southbound and a right-turn lane and left-turn/through lane on the northbound approach as part of the project, if not already completed as part of another project, as shown in Figure 9.

Existing plus Sunset Terrace

Upon the addition of traffic related to the Sunset Terrace project to the Existing volumes, the study intersection of Alliance Road/Foster Avenue falls to an unacceptable level of service. All other study intersections, with the exception of LK Wood Boulevard/Sunset Avenue, would continue to operate at acceptable levels of service. Project traffic volumes are shown in Figure 11 and the resulting levels of service are summarized in Table 10.

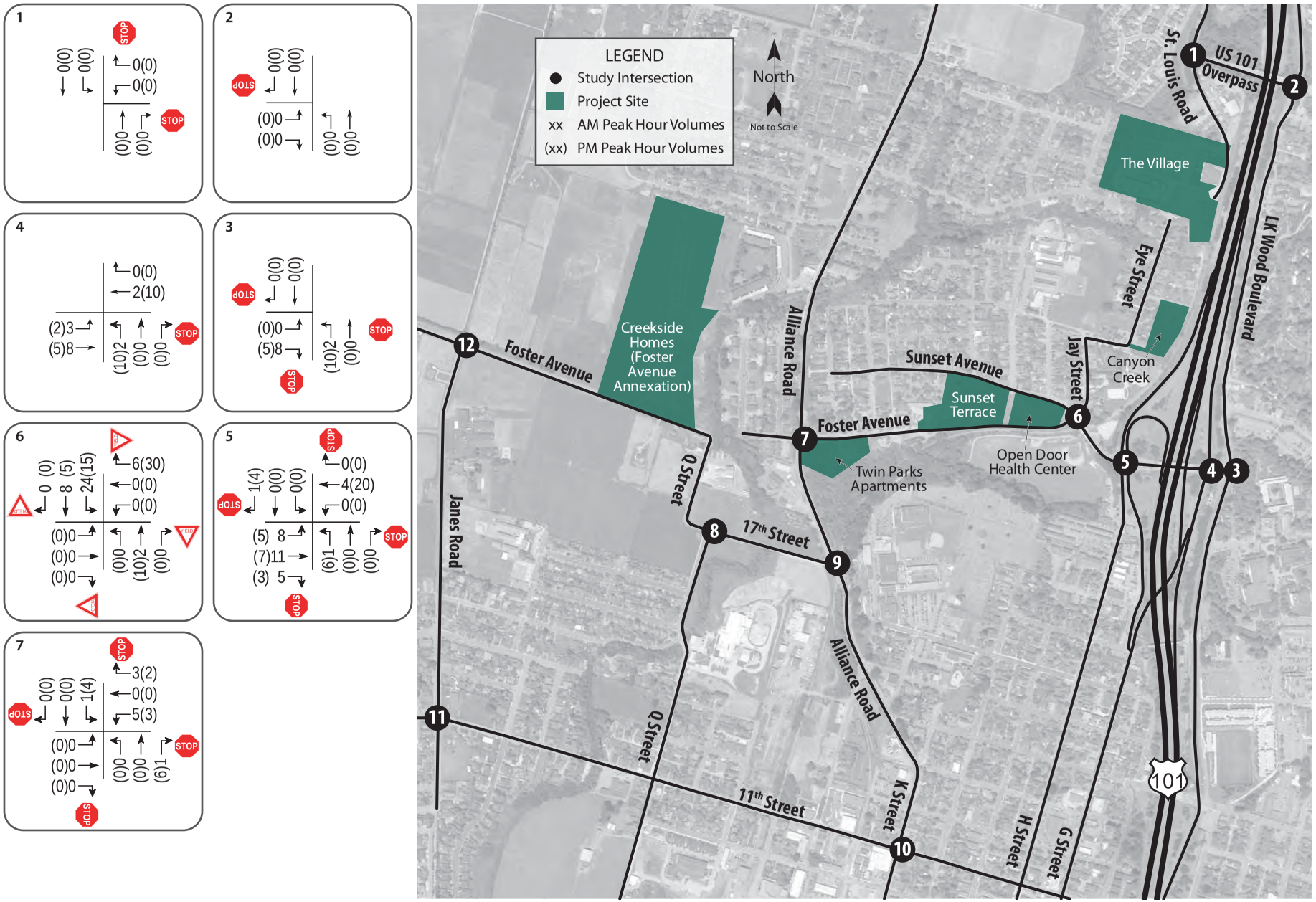

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Figure 10 – Canyon Creek Project Traffic Volumes

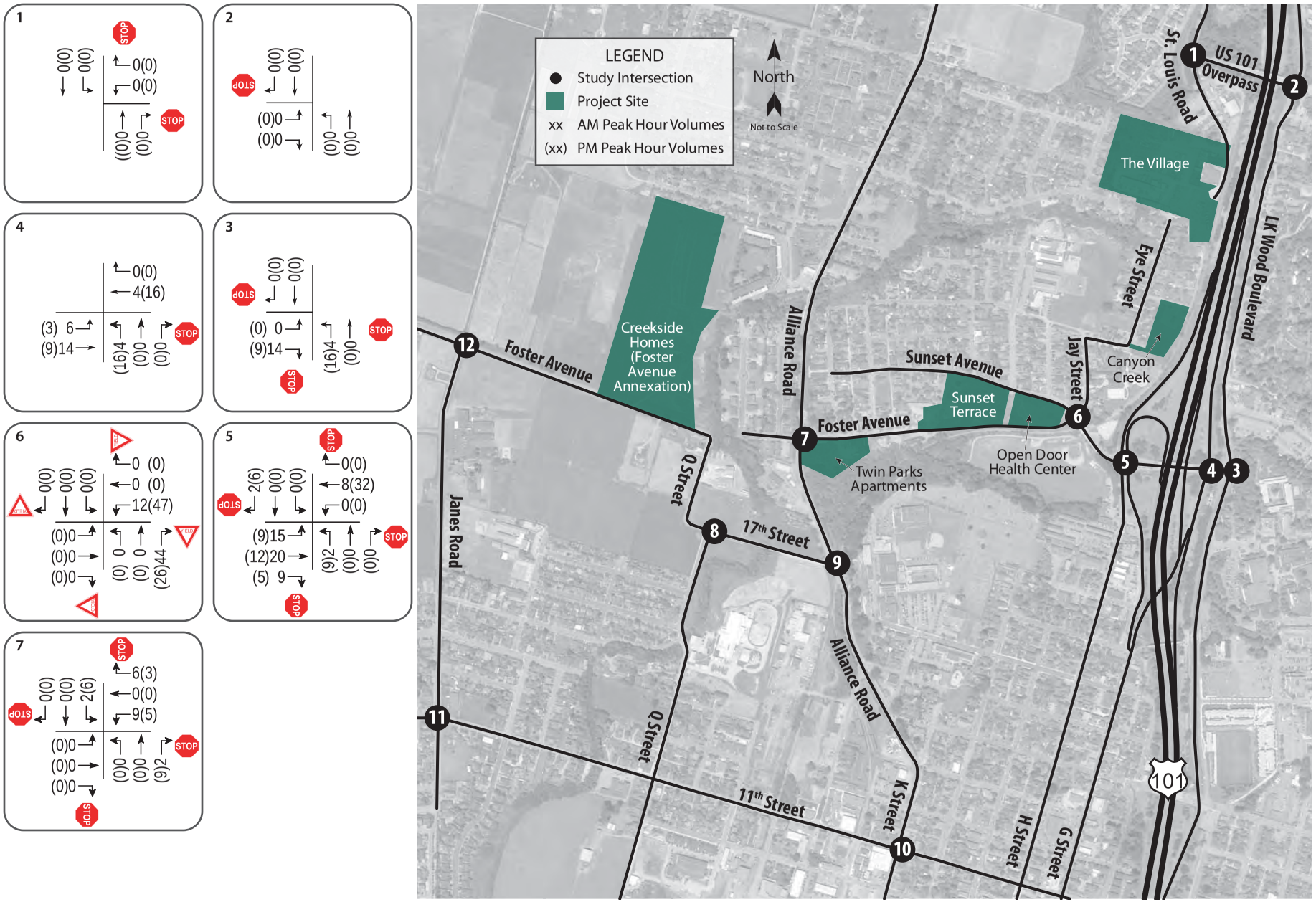

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Figure 11 – Sunset Terrace Project Traffic Volumes

Table 10 – Existing plus Sunset Terrace Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	3.4	A	5.4	A
	Northbound St. Louis Rd Approach	*9.8*	*A*	*9.6*	*A*
	Westbound Overpass Approach	*9.0*	*A*	*9.2*	*A*
2.	LK Wood Blvd/US 101 Overpass	3.2	A	2.5	A
	Southbound LK Wood Approach	*11.4*	*B*	*11.7*	*B*
3.	Sunset Ave/LK Wood Blvd	13.4	B	**39.2**	**E**
4.	Sunset Ave/US 101 N Ramps	5.9	A	11.7	B
	Northbound US 101 N Off-ramp Approach	*27.4*	*D*	*37.0*	*E*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	14.6	B	11.7	B
6.	Sunset Ave/Foster Ave-Jay St	5.2	A	4.7	A
7.	Foster Ave/Alliance Rd	18.6	C	**25.5**	**D**
	Restripe Alliance Road Approaches	13.9	B	17.0	C

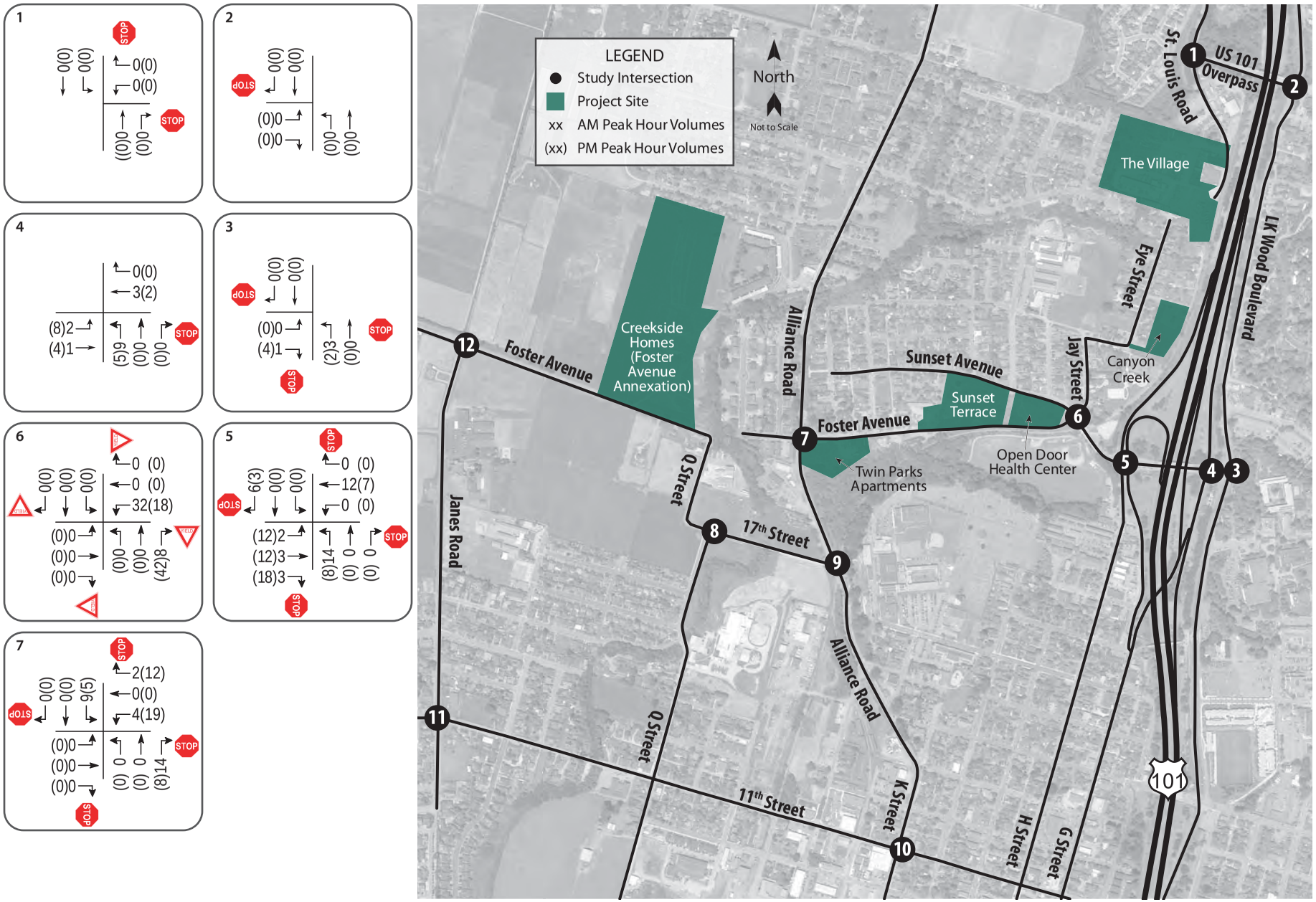
Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* **Bold** text = operation below desired threshold; Shaded cells = conditions with recommended improvements

Finding – Five of the seven study intersections would continue operating acceptably upon the addition of traffic from the Sunset Terrace project. No improvements are recommended for Sunset Avenue/LK Wood Boulevard, as LOS E operation was deemed acceptable to avoid negative impacts to pedestrian and bicyclist safety. The project results in deterioration of operation during the p.m. peak hour at Foster Avenue/Alliance Road to LOS D.

Recommendation – Foster Avenue/Alliance Road should be restriped to provide left-turn and through/right-turn lanes southbound and a right-turn lane and left-turn/through lane on the northbound approach as shown in Figure 9 as part of the project, if not already completed as part of another project.

Existing plus Open Door Health Center

With the addition of traffic related to the Open Door Health Center to the Existing volumes, the study intersection of Alliance Road/Foster Avenue falls to an unacceptable service level. All other study intersections, with the exception of LK Wood Boulevard/Sunset Avenue, which currently operates below the desired threshold of LOS C, would maintain acceptable levels of service. Project traffic volumes are shown in Figure 12 and the resulting levels of service are summarized in Table 11.



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Central Arcata Areawide Traffic Impact Study

Figure 12 – Open Door Health Center Project Traffic Volumes

Table 11 – Existing plus Open Door Health Center Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	3.4	A	5.4	A
	Northbound St. Louis Rd Approach	*9.8*	*A*	*9.6*	*A*
	Westbound Overpass Approach	*9.0*	*A*	*9.2*	*A*
2.	LK Wood Blvd/US 101 Overpass	3.2	A	2.5	A
	Southbound LK Wood Approach	*11.4*	*B*	*11.7*	*B*
3.	Sunset Ave/LK Wood Blvd	13.3	B	**35.9**	E
4.	Sunset Ave/US 101 N Ramps	6.0	A	10.0	B
	Northbound US 101 N Off-ramp Approach	*27.5*	*D*	*31.0*	*D*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	14.4	B	11.5	B
6.	Sunset Ave/Foster Ave-Jay St	5.2	A	4.6	B
7.	Foster Ave/Alliance Rd	19.1	C	**26.7**	**D**
	Restripe Alliance Road Approaches	13.8	B	17.6	C

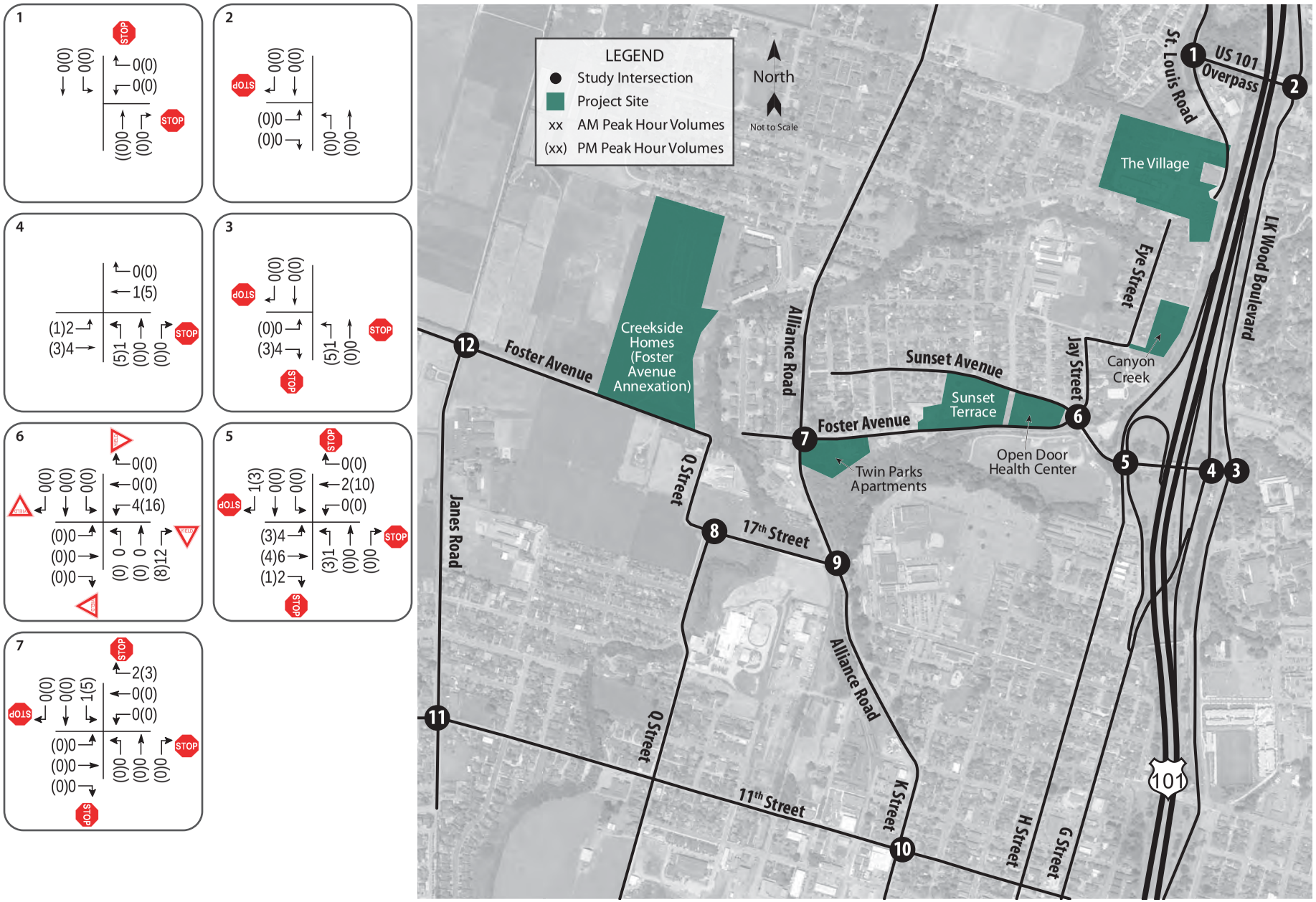
Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics;* **Bold** text = operation below desired threshold; Shaded cells = conditions with recommended improvements

Finding – Five of the seven study intersections would continue operating acceptably upon the addition of traffic from the Open Door Health project. Sunset Avenue/LK Wood Boulevard is considered as operating acceptably, as discussed previously. The project results in deterioration of operation during the p.m. peak hour at Foster Avenue/ Alliance Road to LOS D.

Recommendation – As shown in Figure 9, Foster Avenue/Alliance Road should be restriped to provide left-turn and through/right-turn lanes southbound and a right-turn lane and left-turn/through lane on the northbound approach as part of the project, if not already completed as part of another project.

Existing plus Twin Parks

With the addition of traffic related to the Twin Parks project to the Existing volumes, all the study intersections, with the exception of LK Wood Boulevard/Sunset Avenue, would continue to operate at acceptable service levels. Project traffic volumes are shown in Figure 13 and the resulting levels of service are summarized in Table 12.



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Central Arcata Areawide Traffic Impact Study

Figure 13 – Twin Parks Project Traffic Volumes

Table 12 – Existing plus Twin Parks Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	3.4	A	5.4	A
	Northbound St. Louis Rd Approach	*9.8*	*A*	*9.6*	*A*
	Westbound Overpass Approach	*9.0*	*A*	*9.2*	*A*
2.	LK Wood Blvd/US 101 Overpass	3.2	A	2.5	A
	Southbound LK Wood Approach	*11.4*	*B*	*11.7*	*B*
3.	Sunset Ave/LK Wood Blvd	13.3	B	**36.5**	**E**
4.	Sunset Ave/US 101 N Ramps	5.4	A	9.5	A
	Northbound US 101 N Off-ramp Approach	*25.1*	*D*	*29.6*	*D*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	14.3	B	11.5	B
6.	Sunset Ave/Foster Ave-Jay St	5.0	A	4..5	A
7.	Foster Ave/Alliance Rd	18.1	C	24.4	C

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 = operation below desired threshold; Shaded cells = conditions with recommended improvements

Finding – All of the study intersections would continue operating acceptably upon the addition of traffic from the Twin Parks project. No changes are proposed at Sunset Avenue/LK Wood Boulevard due to conflicts between potential improvements and access for pedestrians and bicyclists.

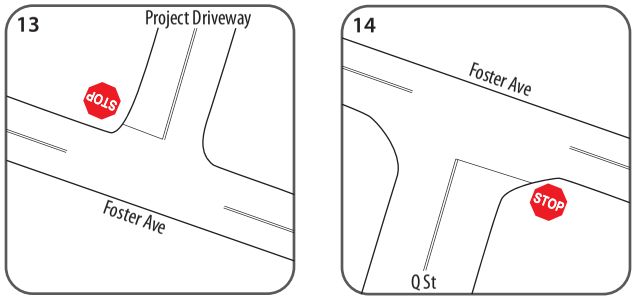
Existing plus Creekside Homes

Two access alternatives were analyzed for the Creekside Homes project. In addition to using the existing street system, an alternative was evaluated that includes the connection of Foster Avenue west of Alliance Road and east of Q Street, where the McDaniel Slough, or Janes Creek, divides the existing road. For this project only, there are additional study intersections, including Foster Avenue/Project Driveway. In the alternative analysis with the Foster Avenue connection, the intersection of Foster Avenue/Q Street is added to the analysis. Figure 14 shows the locations and assumed lane configurations for the two new intersections.

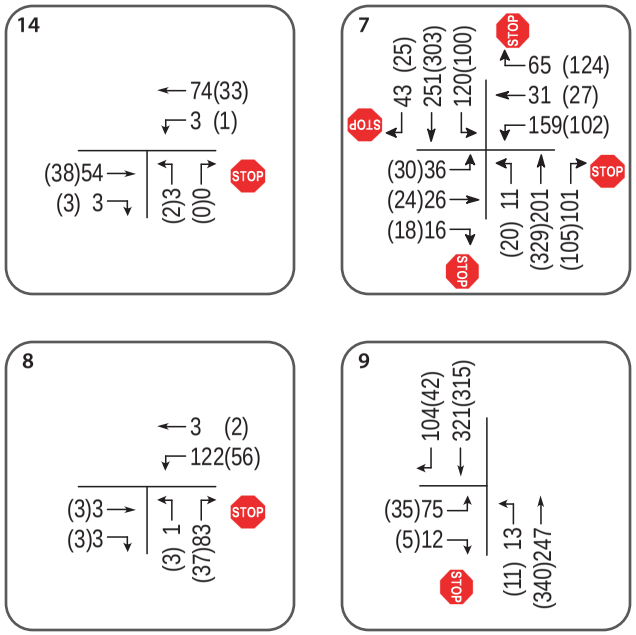
Existing Roadways Configuration

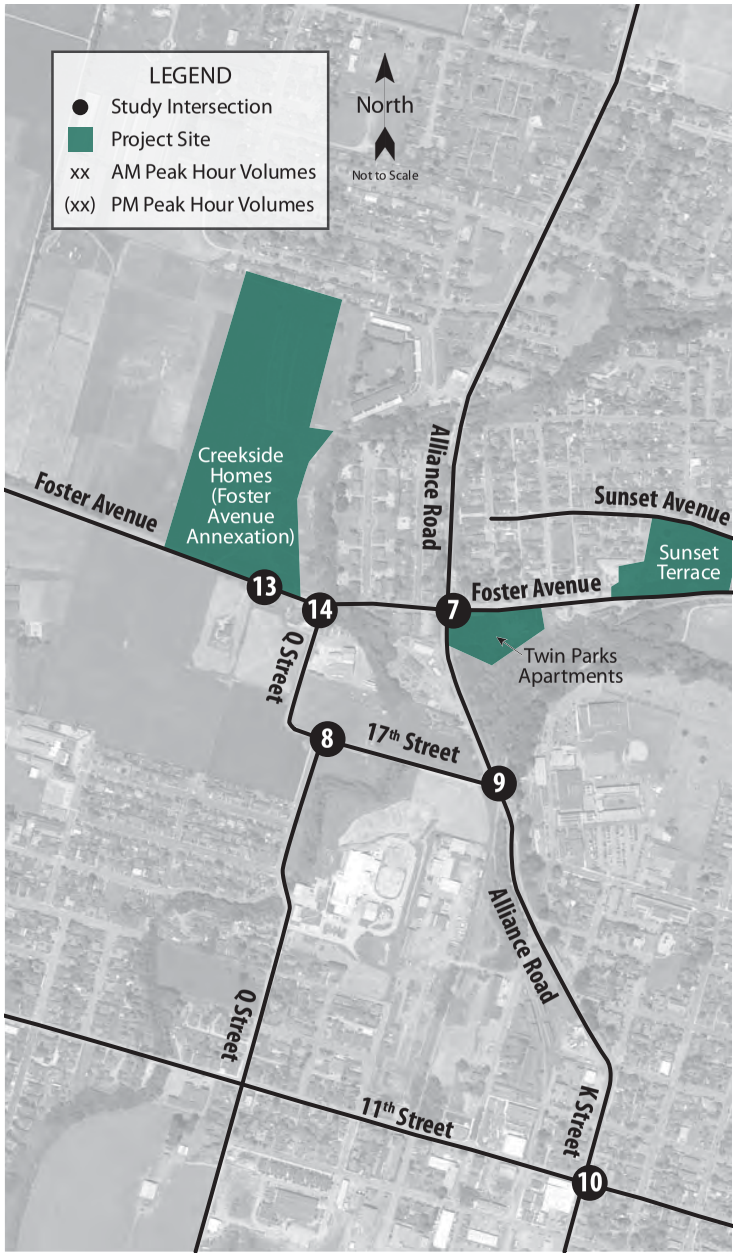
Upon the addition of traffic related to the Creekside Homes project to Existing volumes, the study intersections of Alliance Road/Foster Avenue and 11th Street/K Street fall to unacceptable service levels. All other study intersections, with the exception of LK Wood Boulevard/Sunset Avenue, would continue to operate at acceptable levels of service. Project traffic volumes are shown in Figure 15 and the resulting levels of service are summarized in Table 13.

New Intersections



Changes to Existing Volumes

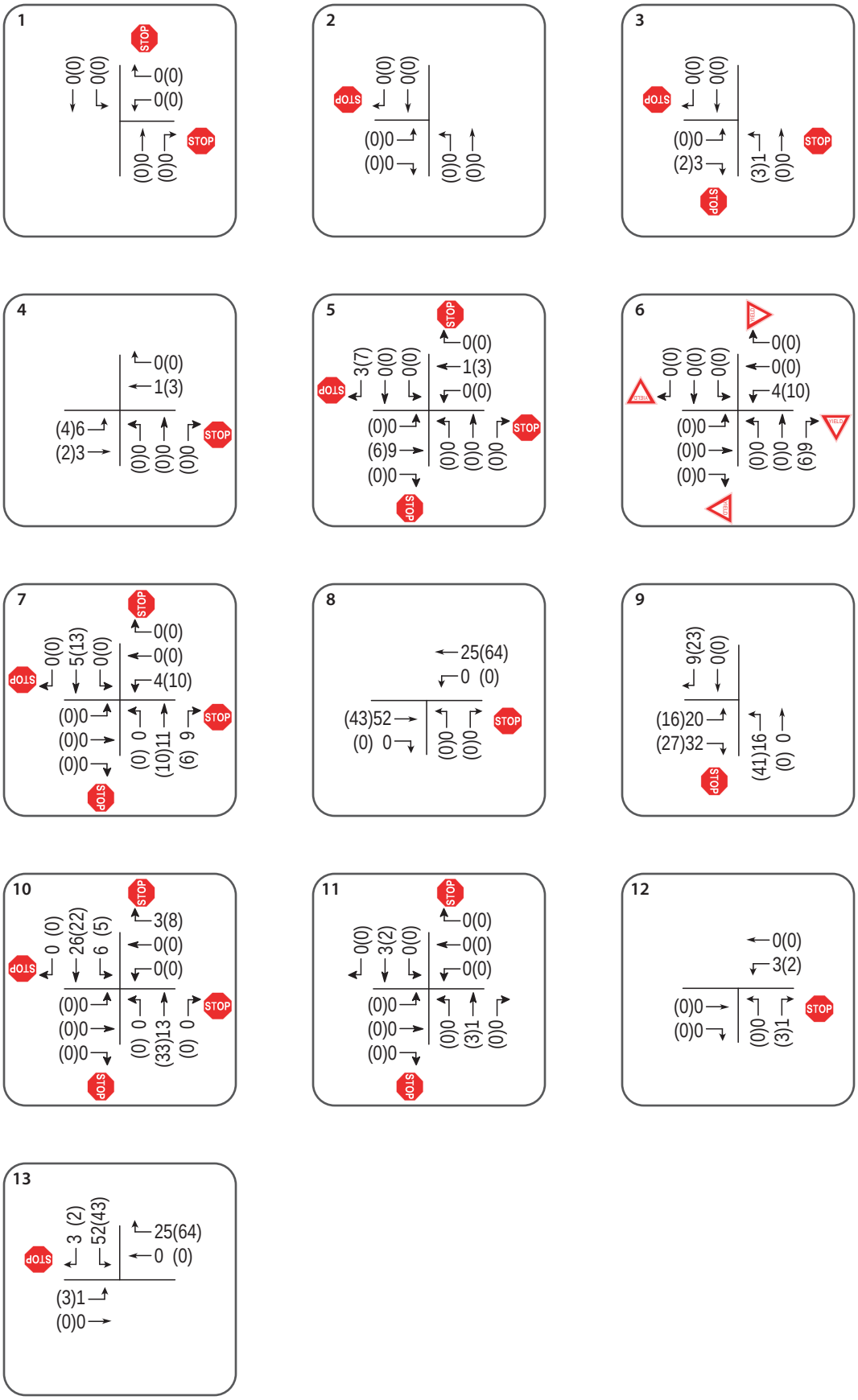




014arc.ai 12/16

Central Arcata Areawide Traffic Impact Study

Figure 14 – Foster Avenue Extension: New Intersections and Changes to Existing Traffic Volumes



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Central Arcata Areawide Traffic Impact Study

Figure 15 – Creekside Homes Project Traffic Volumes

Table 13 – Existing plus Creekside Homes Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	3.4	A	5.4	A
	Northbound St. Louis Rd Approach	*9.8*	*A*	*9.6*	*A*
	Westbound Overpass Approach	*9.0*	*A*	*9.2*	*A*
2.	LK Wood Blvd/US 101 Overpass	3.2	B	2.5	A
	Southbound LK Wood Approach	*11.4*	*B*	*11.7*	*B*
3.	Sunset Ave/LK Wood Blvd	13.3	B	**36.1**	**E**
4.	Sunset Ave/US 101 N Ramps	5.4	A	9.0	A
	Northbound US 101 N Off-ramp Approach	*25.2*	*D*	*28.0*	*D*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	14.3	B	11.4	B
6.	Sunset Ave/Foster Ave-Jay St	5.0	A	4.5	A
7.	Foster Ave/Alliance Rd	19.1	C	**27.2**	**D**
	Restripe Alliance Road Approaches	14.0	B	18.0	C
8.	17th St/Q St	4.1	B	2.8	A
	Northbound Q St Approach	*9.5*	*A*	*9.1*	*A*
9.	17th St/Alliance Rd	4.6	A	2.9	A
	Eastbound 17th St Approach	*21.6*	*C*	*18.0*	*C*
10.	11th St/K St	15.1	C	**26.1**	**D**
11.	11th St/Janes Rd	5.5	A	5.9	A
	Eastbound 11th St Approach	*11.4*	*B*	*10.3*	*B*
	Westbound 11th St Approach	*11.0*	*B*	*10.0*	*B*
12.	Foster Ave/Janes Rd	7.2	A	6.2	A
	Northbound Janes Rd Approach	*8.7*	*A*	*8.7*	*A*
13.	Foster Ave/Creekside Project Entrance	2.4	A	3.8	A
	Northbound Q St Approach	*9.6*	*A*	8.9	*A*

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 = operation below desired threshold; Shaded cells = conditions with recommended improvements

Finding – Ten of the twelve existing study intersections would continue operating acceptably upon the addition of traffic from the Creekside project, and the new intersection of the project entrance would also operate acceptably. Operation at Sunset Avenue/LK Wood Boulevard would continue to be acceptable for the reasons noted above. Restriping would be needed at Foster Avenue/ Alliance Road to achieve acceptable operation upon adding project-generated trips. Operation of the intersection of 11th Street/K Street would deteriorate during the p.m. peak hour as a result of the project, though adding turn lanes on K Street would achieve acceptable operation.

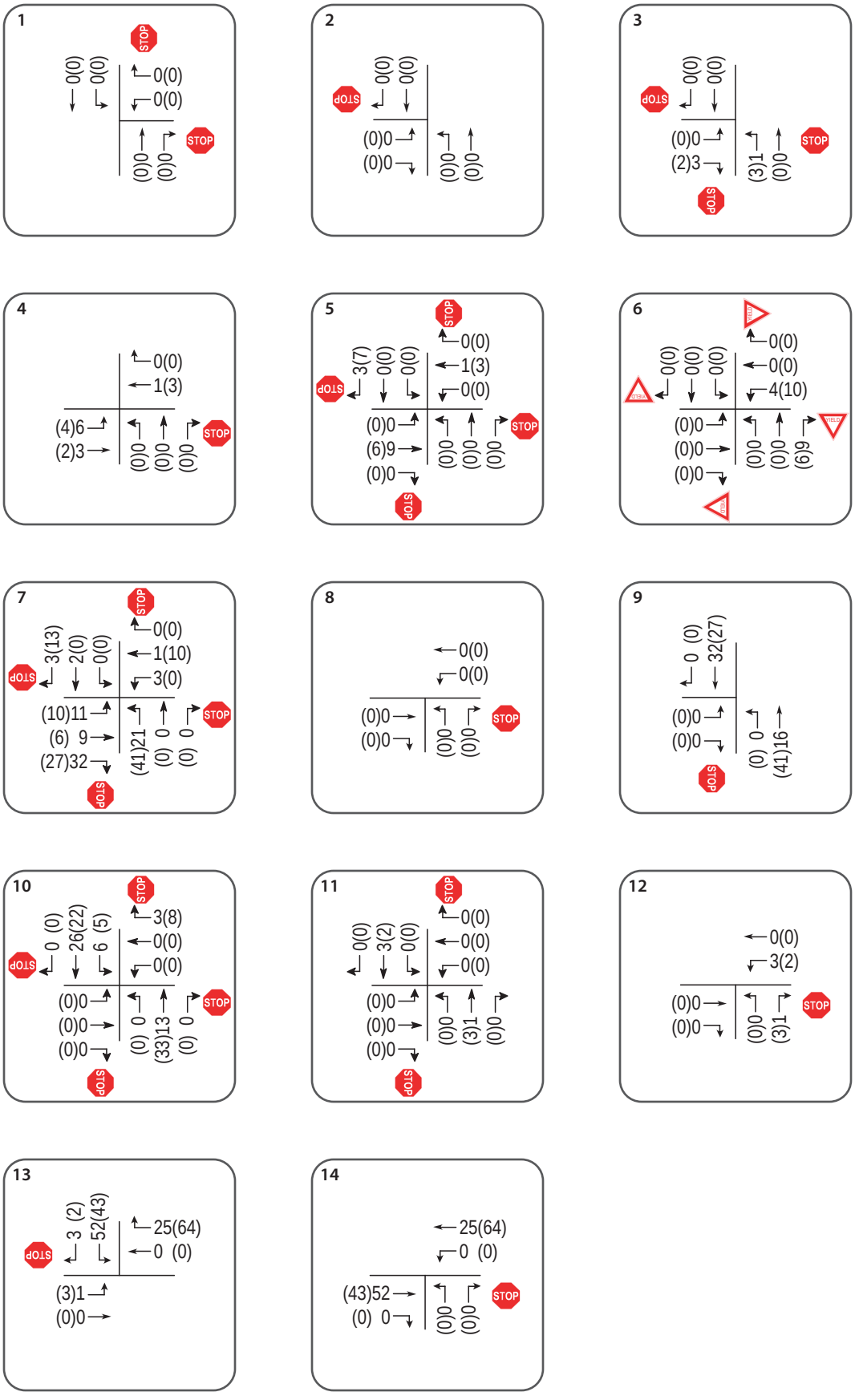
Recommendations – Foster Avenue/Alliance Road should be restriped to provide left-turn and through/right-turn lanes southbound and a right-turn lane and left-turn/through lane on the northbound approach as part of the project, if not already completed as part of another project, as shown in Figure 9. Although LOS D operation is projected at 11th Street/K Street, potential improvements to achieve LOS C operation would require restriping

of the 11th Street approaches to provide turn lanes, which would require elimination of bike lanes and modification of the curb returns to include larger radii to accommodate truck turns. Because these modifications would have a negative impact on both pedestrian and bicycle access, and these modes are given priority, the lower service level is deemed acceptable.

Alternative Analysis with Foster Avenue Connection

In order to evaluate conditions with Foster Avenue connected and continuous between Janes Road and Alliance Road, volumes at the study intersections of Foster Avenue/Alliance Road, 17th Street/Q Street and 17th Street/ Alliance Road were reviewed to determine how traffic moves through the area as well as what trips would potentially divert to the new connection. These modified volumes, which are shown in Figure 14, were used to evaluate Existing plus Creekside with Foster Avenue Connection.

With the proposed Foster Avenue connection, and traffic related to the Creekside Homes project added to Existing volumes, the study intersections of Alliance Road/Foster Avenue and 11th Street/K Street would still fall to unacceptable service levels. All other study intersections, with the exception of LK Wood Boulevard/Sunset Avenue, would continue to operate at acceptable levels of service. Project traffic volumes are shown in Figure 16 and the resulting levels of service are summarized in Table 14.



014arc.ai 12/16

Central Arcata Areawide Traffic Impact Study

Figure 16 – Creekside Homes Project Traffic Volumes with Foster Avenue Extenstion

Table 14 – Existing plus Creekside Homes and Alternative Access Peak Hour Intersection Levels of Service				
Study Intersection ***Approach***	**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
1. St. Louis Rd/US 101 Overpass	3.4	A	5.4	A
Northbound St. Louis Rd Approach	*9.8*	*A*	*9.6*	*A*
Westbound Overpass Approach	*9.0*	*A*	*9.2*	*A*
2. LK Wood Blvd/US 101 Overpass	3.2	B	2.5	A
Southbound LK Wood Approach	*11.4*	*B*	*11.7*	*B*
3. Sunset Ave/LK Wood Blvd	13.3	B	**36.1**	**E**
4. Sunset Ave/US 101 N Ramps	5.4	A	9.0	A
Northbound US 101 N Off-ramp Approach	*25.2*	*D*	*28.0*	*D*
5. Sunset Ave/US 101 S Ramps-G/H Streets	14.3	B	11.4	B
6. Sunset Ave/Foster Ave-Jay St	5.0	A	4.5	A
7. Foster Ave/Alliance Rd	21.7	C	**39.8**	**E**
Restripe Alliance Road Approaches	15.1	C	22.4	C
8. 17th St/Q St	7.7	A	7.3	A
Northbound Q St Approach	*8.8*	*A*	*8.6*	*A*
9. 17th St/Alliance Rd	1.9	A	0.9	A
Eastbound 17th St Approach	*16.9*	*C*	*15.7*	*C*
10. 11th St/K St	15.1	C	**26.1**	**D**
11. 11th St/Janes Rd	5.5	A	5.9	A
Eastbound 11th St Approach	*11.4*	*B*	*10.3*	*B*
Westbound 11th St Approach	*11.0*	*B*	*10.0*	*B*
12. Foster Ave/Janes Rd	7.2	A	6.2	A
Northbound Janes Rd Approach	*8.7*	*A*	*8.7*	*A*
13. Foster Ave/Creekside Project Entrance	2.4	A	2.3	A
Southbound Project Entrance	9.6	A	9.3	A
14. Q St/Foster Ave	0.2	A	0.1	A
Northbound Q St Approach	*9.7*	*A*	9.5	A

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 = operation below the desired threshold; Shaded cells = conditions with recommended improvements

It is noted that the intersection of 17th Street/Alliance Road is projected to operate better under this scenario than without the Foster Avenue connection. This occurs because outbound traffic would be diverted away from this intersection to the new connection, thereby contributing less new traffic at this location.

Findings – Nine of the twelve existing study intersections would continue operating acceptably upon the addition of traffic from the Creekside project as well as the connection of Foster Avenue. As discussed previously, Sunset Avenue/LK Wood Boulevard would operate at a lower service level, though this is considered acceptable under the criteria applied. Similarly, K Street/11th Street is expected to operate at LOS D, but this is considered acceptable under the applied criterion as modifications to increase vehicular capacity would have a negative impact on

pedestrian and bicycle access. The project results in deterioration of operation during the p.m. peak hour at Foster Avenue/Alliance Road to LOS E, even with the turn lanes recommended without the connection. The two new intersections at the project driveway and Q Street/Foster Avenue (which is currently a curve and not an intersection) are expected to operate acceptably.

Recommendations – To achieve acceptable operation at Foster Avenue/Alliance Road, as part of the project the Alliance Road approaches should be restriped to provide left-turn and through/right-turn lanes southbound and a right-turn lane and left-turn/through lane on the northbound approach, if not already completed as part of another project. Further, a left-turn lane would be needed on the eastbound approach of Foster Avenue, as shown in Figure 9.

Existing plus All Project Conditions

Existing Roadways Configuration

Under existing conditions with traffic that would be generated by all six of the projects included in the area-wide study, the study intersections would be expected to continue operating acceptably at LOS C or better with the exception of Sunset Avenue/LK Wood Boulevard, Foster Avenue/Alliance Road and 11th Street/K Street. The results of this scenario are indicated in Table 15.

Table 15 – Existing plus All Projects Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	5.3	B	6.9	A
	Northbound St. Louis Rd Approach	*10.0*	*B*	*9.7*	*A*
	Westbound Overpass Approach	*9.4*	*A*	*10.4*	*B*
2.	LK Wood Blvd/US 101 Overpass	2.8	A	2.2	A
	Southbound LK Wood Approach	*12.5*	*B*	*13.1*	*B*
3.	Sunset Ave/LK Wood Blvd	15.7	C	**73.1**	**F**
4.	Sunset Ave/US 101 N Ramps	8.0	B	21.1	C
	Northbound US 101 N Off-ramp Approach	*38.3*	*E*	*67.7*	*F*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	15.3	C	12.4	B
6.	Sunset Ave/Foster Ave-Jay St	5.6	A	5.3	A
7.	Foster Ave/Alliance Rd	23.3	C	**42.1**	**E**
	Restripe Alliance Road Approaches	15.1	C	20.8	C
8.	17th St/Q St	4.1	A	2.8	A
	Northbound Q St Approach	*9.5*	*A*	*9.0*	*A*
9.	17th St/Alliance Rd	4.9	A	3.0	A
	Eastbound 17th St Approach	*24.6*	*C*	*20.2*	*C*
10.	11th St/K St	17.0	C	**39.0**	**E**
11.	11th St/Janes Rd	5.5	A	5.9	A
	Eastbound 11th St Approach	*11.4*	*B*	*10.3*	*B*
	Westbound 11th St Approach	*11.0*	*B*	*10.0*	*B*
12.	Foster Ave/Janes Rd	7.2	A	6.2	A
	Northbound Janes Rd Approach	*8.7*	*A*	*8.7*	*A*
13.	Foster Ave/Creekside Project Entrance	2.4	A	3.8	A
	Southbound Project Entrance	*9.6*	*A*	*8.9*	*A*

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 = operation below the desired threshold; Shaded cells = conditions with recommended improvements

It should be noted that with the addition of all the project-related traffic volumes, average delay at the intersection of LK Wood Boulevard/US 101 Overpass decreases during the a.m. and p.m. peak hours. 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 uncontrolled through movement and northbound right turn, both of which have average delays 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.

Findings – Eleven of the twelve existing study intersections as well as the new intersection created by Creekside would continue operating acceptably upon adding traffic for all six proposed projects based on the criteria applied. As discussed above, capacity enhancements are not recommended at either Sunset Avenue/LK Wood Boulevard or K Street/11th Street due to the associated negative impacts on pedestrian and bicycle traffic. With the proposed restriping on Alliance Road, which would need to be completed by the first of the six projects to trigger this improvement, the intersection of Foster Avenue/Alliance Road would operate acceptably upon the addition of the traffic generated by all six projects. These improvements are shown in Figure 9.

Alternative Analysis with Foster Avenue Connection

With the proposed Foster Avenue connection and the addition of traffic related to all six projects to existing volumes (as modified where appropriate), the study intersections of Foster Avenue/Alliance Road and 11th Street/ K Street are expected to fall to an unacceptable level of service. All other study intersections, with the exception of LK Wood Boulevard/Sunset Avenue, would continue to operate at acceptable levels of service. These results are summarized in Table 16.

Table 16 – Existing plus All Projects with Foster Connection Peak Hour Intersection Levels of Service

Study Intersection *Approach*	AM Peak		PM Peak	
	Delay	**LOS**	**Delay**	**LOS**
1. St. Louis Rd/US 101 Overpass	5.3	B	6.9	A
Northbound St. Louis Rd Approach	*10.0*	*B*	*9.7*	*A*
Westbound Overpass Approach	*9.4*	*A*	*10.4*	*B*
2. LK Wood Blvd/US 101 Overpass	2.8	A	2.2	A
Southbound LK Wood Approach	*12.5*	*B*	*13.1*	*B*
3. Sunset Ave/LK Wood Blvd	15.7	C	**73.1**	**F**
4. Sunset Ave/US 101 N Ramps	8.0	B	21.1	C
Northbound US 101 N Off-ramp Approach	*38.3*	*E*	*67.7*	*F*
5. Sunset Ave/US 101 S Ramps-G/H Streets	15.3	C	12.4	B
6. Sunset Ave/Foster Ave-Jay St	5.6	A	5.3	A
7. Foster Ave/Alliance Rd	**29.1**	**D**	**58.6**	**F**
Restripe Alliance Road Approaches	16.5	C	**27.0**	**D**
Additional: Restripe EB Approach	15.5	C	24.2	C
8. 17th St/Q St	7.7	A	7.3	A
Northbound Q St Approach	*8.8*	*A*	*8.6*	*A*
9. 17th St/Alliance Rd	1.9	A	0.9	A
Eastbound 17th St Approach	*19.4*	*C*	*17.1*	*C*
10. 11th St/K St	17.0	C	**39.0**	**E**
11. 11th St/Janes Rd	5.5	B	5.9	A
Eastbound 11th St Approach	*11.4*	*B*	*10.3*	*B*
Westbound 11th St Approach	*11.0*	*B*	*10.0*	*B*
12. Foster Ave/Janes Rd	7.2	A	6.2	A
Northbound Janes Rd Approach	*8.7*	*A*	*8.7*	*A*
13. Foster Ave/Creekside Project Entrance	2.4	A	2.3	A
Southbound Project Entrance	*9.6*	*A*	*9.3*	*A*
14. Q St/Foster Ave	0.2	A	0.1	A
Northbound Q St Approach	9.7	A	9.5	A

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 = operation below the desired threshold; Shaded cells = conditions with recommended improvements

Findings – Eleven of the twelve existing study intersections would also continue operating acceptably upon adding traffic for all six proposed projects with the Foster Avenue connection based on the criteria applied. With the proposed restriping on Alliance Road, which would need to be completed by the first of the six projects to trigger the need for this improvement, the intersection of Foster Avenue/Alliance Road would still operate unacceptably upon the addition of the traffic generated by all six projects with the Foster Avenue connection. A left-turn lane on the eastbound approach would be required to bring the level of service to an acceptable LOS C.

Recommendations – As shown in Figure 9, Foster Avenue/Alliance Road should be restriped to provide left-turn and through/right-turn lanes southbound and a right-turn lane and left-turn/through lane on the northbound approach as part of the first project. If the Foster Avenue connection is completed, then the west leg at Alliance Road should be restriped with a left-turn lane.

Future plus Project Conditions

Conditions were evaluated with each of the six projects added individually to the future volumes as well as with all six added to future volumes. It is noted that to arrive at future volumes a growth rate was applied uniformly to all movements at all intersections without specific consideration of the growth potential for each movement. This approach generally results in a relatively conservative analysis as project-generated trips, which would normally be considered as part of this future growth, are then added on top of the estimated increase. Because of the conservative approach applied, the volumes projected for Future plus Project conditions, especially the "all projects" scenario, are unlikely to ever actually be experienced, but the analysis performed provides guidance in the event that volumes do increase to this level.

Future plus The Village

Upon the addition of traffic generated by The Village to the anticipated Future volumes, four of the seven study intersections are expected to operate acceptably. Sunset Avenue/LK Wood Boulevard, Sunset Avenue/US 101 North Ramps, and Foster Avenue/Alliance Road intersections would operate at a service level below LOS C in their current configurations. The Future plus Project operating conditions are summarized in Table 17.

Table 17 – Future plus The Village Peak Hour Intersection Levels of Service

	Study Intersection ***Approach***	**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	5.1	A	7.0	A
	Northbound St. Louis Rd Approach	*10.4*	*B*	*9.9*	*A*
	Westbound Overpass Approach	*9.5*	*A*	*10.8*	*B*
2.	LK Wood Blvd/US 101 Overpass	3.3	A	2.6	A
	Southbound LK Wood Approach	*14.4*	*B*	*14.9*	*B*
3.	Sunset Ave/LK Wood Blvd	19.9	C	**122.3**	**F**
	Roundabout – Intersections 3 and 4	12.3	B	27.7	D
4.	Sunset Ave/US 101 N Ramps	10.6	B	**28.8**	**D**
	Northbound US 101 N Off-ramp Approach	*53.0*	*F*	*94.3*	*F*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	20.2	C	13.0	B
6.	Sunset Ave/Foster Ave-Jay St	5.7	A	5.2	A
7.	Foster Ave/Alliance Rd	**40.4**	**E**	**73.1**	**F**
	Roundabout	8.6	A	9.1	A

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;* ** = delay greater than 120 seconds; **Bold** text = operation below desired threshold; Shaded cells = conditions with recommended improvements

Findings – Four of the seven study intersections would continue operating acceptably upon adding traffic from the Sunset Terrace project to the future volumes. With the roundabout described previously as being needed between Sunset Avenue/LK Wood Boulevard and Sunset Avenue/US 101 North Ramps, these two intersections would operate acceptably upon adding project-generated traffic. With the roundabout recommended at Foster

Avenue/Alliance Road, this intersection would also operate acceptably upon the addition of the Sunset Terrace generated traffic.

Recommendation – To fund the improvements expected to be needed to accommodate future growth, including The Village project, proportional share fees should be paid as described in the section dedicated to this topic.

Future plus Canyon Creek

Upon adding traffic generated by the Canyon Creek project to the anticipated Future volumes, four of the seven study intersections are expected to operate acceptably. Sunset Avenue/LK Wood Boulevard, Sunset Avenue/US 101 North Ramps, and Foster Avenue/Alliance Road intersections would operate at service levels below the desired threshold in their current configurations. The Future plus Project operating conditions are summarized in Table 18.

Table 18 – Future plus Canyon Creek Peak Hour Intersection Levels of Service

	Study Intersection ***Approach***	**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	3.5	A	5.6	A
	Northbound St. Louis Rd Approach	*10.1*	*B*	*9.9*	*A*
	Westbound Overpass Approach	*9.1*	*A*	*9.4*	*A*
2.	LK Wood Blvd/US 101 Overpass	3.5	A	2.8	A
	Southbound LK Wood Approach	*12.7*	*B*	*13.1*	*B*
3.	Sunset Ave/LK Wood Blvd	17.3	C	**91.9**	**F**
	Roundabout – Intersections 3 and 4	10.8	B	21.1	C
4.	Sunset Ave/US 101 N Ramps	11.3	B	**35.4**	**F**
	Northbound US 101 N Off-ramp Approach	*56.6*	*F*	*117.3*	*F*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	20.6	C	13.2	B
6.	Sunset Ave/Foster Ave-Jay St	5.8	A	5.4	A
7.	Foster Ave/Alliance Rd	**39.6**	**E**	**70.3**	**F**
	Roundabout	8.5	A	9.1	A

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;* ** = delay greater than 120 seconds; **Bold** text = operation below desired threshold; Shaded cells = conditions with recommended improvements

Findings – Four of the seven study intersections would continue operating acceptably upon adding traffic from the Canyon Creek project to anticipated future volumes. The three intersections requiring capacity enhancements at Sunset Avenue/LK Wood Boulevard and Sunset Avenue/US 101 North Ramps as well as Foster Avenue/Alliance Road would also operate acceptably upon the addition of the Canyon Creek trips with the recommended improvements.

Recommendation – Proportional share fees should be paid to fund the improvements expected to be needed to accommodate future growth, including the Canyon Creek project. The proportional shares are detailed in the section dedicated to the Traffic Impact Mitigation Fee Program.

Future plus Sunset Terrace

Upon the addition of Sunset Terrace generated traffic to the anticipated Future volumes, four of the seven study intersections are expected to operate acceptably. Sunset Avenue/LK Wood Boulevard, Sunset Avenue/US 101 North Ramps, and Foster Avenue/Alliance Road intersections would operate below the desired LOS C in their current configurations. The Future plus Project operating conditions are summarized in Table 19.

Table 19 – Future plus Sunset Terrace Peak Hour Intersection Levels of Service

	Study Intersection ***Approach***	**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	3.5	A	5.6	A
	Northbound St. Louis Rd Approach	*10.1*	*B*	*9.9*	*A*
	Westbound Overpass Approach	*9.1*	*A*	*9.4*	*A*
2.	LK Wood Blvd/US 101 Overpass	3.5	A	2.8	A
	Southbound LK Wood Approach	*12.7*	*B*	*13.1*	*B*
3.	Sunset Ave/LK Wood Blvd	17.4	C	**94.3**	**F**
	Roundabout – Intersections 3 and 4	10.9	B	22.2	C
4.	Sunset Ave/US 101 N Ramps	12.2	B	**40.0**	**D**
	Northbound US 101 N Off-ramp Approach	*61.9*	*F*	**	*F*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	21.0	C	13.4	B
6.	Sunset Ave/Foster Ave-Jay St	5.9	A	5.5	A
7.	Foster Ave/Alliance Rd	**40.7**	**E**	**71.9**	**F**
	Roundabout	8.6	A	9.2	A

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;* ** = delay greater than 120 seconds; **Bold** text = operation below desired threshold; Shaded cells = conditions with recommended improvements

Findings – Four of the seven study intersections would continue operating acceptably upon adding traffic from the Sunset Terrace project to the future volumes. With the roundabout mentioned previously as being needed between Sunset Avenue/LK Wood Boulevard and Sunset Avenue/US 101 North Ramps, these two intersections would operate acceptably upon adding project-generated traffic. With the roundabout recommended at the Foster Avenue/Alliance Road, this intersection would also operate acceptably upon the addition of the Sunset Terrace generated traffic.

Recommendation – To fund the improvements expected to be needed to accommodate future growth, including the Sunset Terrace project, proportional share fees should be paid for both roundabout projects as described in the section detailing fees for planned improvements.

Future plus Open Door Health Center

Four of the seven study intersections are expected to operate acceptably upon adding Open Door Health trips to anticipated future volumes. Sunset Avenue/LK Wood Boulevard, Sunset Avenue/US 101 North Ramps, and Foster Avenue/Alliance Road would operate at a service level below LOS C in their current configurations. The Future plus Project operating conditions are summarized in Table 20.

Table 20 – Future plus Open Door Health Center Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	3.5	A	5.6	A
	Northbound St. Louis Rd Approach	*10.1*	*B*	*9.9*	*A*
	Westbound Overpass Approach	*9.1*	*A*	*9.4*	*A*
2.	LK Wood Blvd/US 101 Overpass	3.5	A	2.8	A
	Southbound LK Wood Approach	*12.7*	*B*	*13.1*	*B*
3.	Sunset Ave/LK Wood Blvd	17.2	C	**88.7**	**F**
	Roundabout – Intersections 3 and 4	10.7	B	20.6	C
4.	Sunset Ave/US 101 N Ramps	12.7	C	**33.3**	**D**
	Northbound US 101 N Off-ramp Approach	*62.6*	*F*	*110.8*	*F*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	20.5	C	13.1	B
6.	Sunset Ave/Foster Ave-Jay St	5.9	A	5.4	A
7.	Foster Ave/Alliance Rd	**40.9**	**E**	**74.2**	**F**
	Roundabout	8.7	A	9.3	A

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;* ** = delay greater than 120 seconds; **Bold** text = operation below desired threshold; Shaded cells = conditions with recommended improvements

Findings – Four of the seven study intersections would continue operating acceptably upon adding traffic from the Open Door Health project to future volumes. Trips generated by the Open Door Health project could be accommodated while maintaining acceptable operation with these proposed improvements.

Recommendation – Proportional share fees should be paid by the Open Door Health applicant to fund both roundabout projects. The Open Door Health project's proportional shares are 3.5 percent for the Sunset Avenue/US 101 North Ramps and LK Wood Boulevard intersections and 9.2 percent for Foster Avenue/Alliance Road.

Future plus Twin Parks

With traffic generated by Twin Parks added to the anticipated Future volumes, four of the seven study intersections are expected to operate acceptably. Sunset Avenue/LK Wood Boulevard, Sunset Avenue/US 101 North Ramps, and Foster Avenue/Alliance Road intersections would have operating conditions below LOS C in their current configurations. The Future plus Project operating conditions are summarized in Table 21.

Table 21 – Future plus Twin Parks Peak Hour Intersection Levels of Service					
Study Intersection	***Approach***	**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	3.5	A	5.6	A
	Northbound St. Louis Rd Approach	*10.1*	*B*	*9.9*	*A*
	Westbound Overpass Approach	*3.5*	*A*	*9.4*	*A*
2.	LK Wood Blvd/US 101 Overpass	3.5	A	2.8	A
	Southbound LK Wood Approach	*12.7*	*B*	*13.1*	*B*
3.	Sunset Ave/LK Wood Blvd	17.2	C	**89.9**	**F**
	Roundabout – Intersections 3 and 4	10.7	B	20.4	C
4.	Sunset Ave/US 101 N Ramps	10.8	B	**31.8**	**D**
	Northbound US 101 N Off-ramp Approach	*54.3*	*F*	*105.6*	*F*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	20.3	C	13.1	B
6.	Sunset Ave/Foster Ave-Jay St	5.8	A	5.3	A
7.	Foster Ave/Alliance Rd	**38.7**	**E**	**68.8**	**F**
	Roundabout	8.5	A	9.0	A

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;* ** = delay greater than 120 seconds; **Bold** text = operation below desired threshold; Shaded cells = conditions with recommended improvements

Findings – Three of the seven study intersections would operate unacceptably under anticipated future volumes, without or with the Twin Parks project. With the roundabouts described previously, all intersections would operate acceptably upon the addition of the Twin Parks project traffic.

Recommendation – Proportional share fees should be paid by the Twin Park applicant to fund both roundabout projects. The Twin Park project's proportional shares are 2.6 percent for the Sunset Avenue/US 101 North Ramps and LK Wood Boulevard intersections and 1.4 percent for Foster Avenue/Alliance Road.

Future plus Creekside Homes

The Creekside project was again evaluated both with the current street configuration as well as an alternative that includes the connection of Foster Avenue west of Alliance Road and east of Q Street, where currently the McDaniel Slough divides the road. Four to five additional intersections are included in the study area for this project, depending on the circulation alternative, as well as the new intersection created by the project entrance road.

Existing Roadways Configuration

With Creekside Homes traffic added to the anticipated Future volumes, the four of seven study intersections evaluated for all projects are expected to operate acceptably and the same three locations would operate unacceptably. Of the additional intersections evaluated for this project, one (11th Street/K Street) is expected to operate at a service level below LOS C. The Future plus Project operating conditions are summarized in Table 22.

Table 22 – Future plus Creekside Homes Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	3.5	A	5.6	A
	Northbound St. Louis Rd Approach	*10.1*	*B*	*9.9*	*A*
	Westbound Overpass Approach	*9.1*	*A*	*9.4*	*A*
2.	LK Wood Blvd/US 101 Overpass	3.5	A	2.8	A
	Southbound LK Wood Approach	*12.7*	*B*	*13.1*	*B*
3.	Sunset Ave/LK Wood Blvd	17.2	C	**89.1**	**F**
	Roundabout – Intersections 3 and 4	10.7	B	20.1	C
4.	Sunset Ave/US 101 N Ramps	10.9	B	**29.7**	**D**
	Northbound US 101 N Off-ramp Approach	*54.8*	*F*	*99.0*	*F*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	20.4	C	13.1	B
6.	Sunset Ave/Foster Ave-Jay St	5.7	A	5.3	A
7.	Foster Ave/Alliance Rd	**42.8**	**E**	**75.5**	**F**
	Roundabout	8.6	A	9.3	A
8.	17th St/Q St	4.4	B	3.1	A
	Northbound Q St Approach	*9.6*	*A*	*9.2*	*A*
9.	17th St/Alliance Rd	7.3	A	4.0	A
	Eastbound 17th St Approach	*37.4*	*E*	*28.8*	*D*
10.	11th St/K St	**25.8**	**D**	**96.4**	**F**
11.	11th St/Janes Rd	5.8	B	6.1	B
	Eastbound 11th St Approach	*12.3*	*B*	*10.7*	*B*
	Westbound 11th St Approach	*11.9*	*B*	*10.5*	*B*
12.	Foster Ave/Janes Rd	7.3	A	6.2	A
	Northbound Janes Rd Approach	*8.7*	*A*	*8.8*	*A*
13.	Foster Ave/Creekside Project Entrance	2.1	A	2.1	A
	Southbound Creekside Project Entrance	*9.9*	*A*	9.5	A

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;* ** = delay greater than 120 seconds; **Bold** text = operation below desired threshold; Shaded cells = conditions with recommended improvements

Findings – Nine of the thirteen intersections studied for this project are expected to continue operating acceptably upon adding traffic from the Creekside project to future volumes. Improvements have been identified previously to provide sufficient capacity at three of the four locations that are otherwise expected to operate below LOS C.

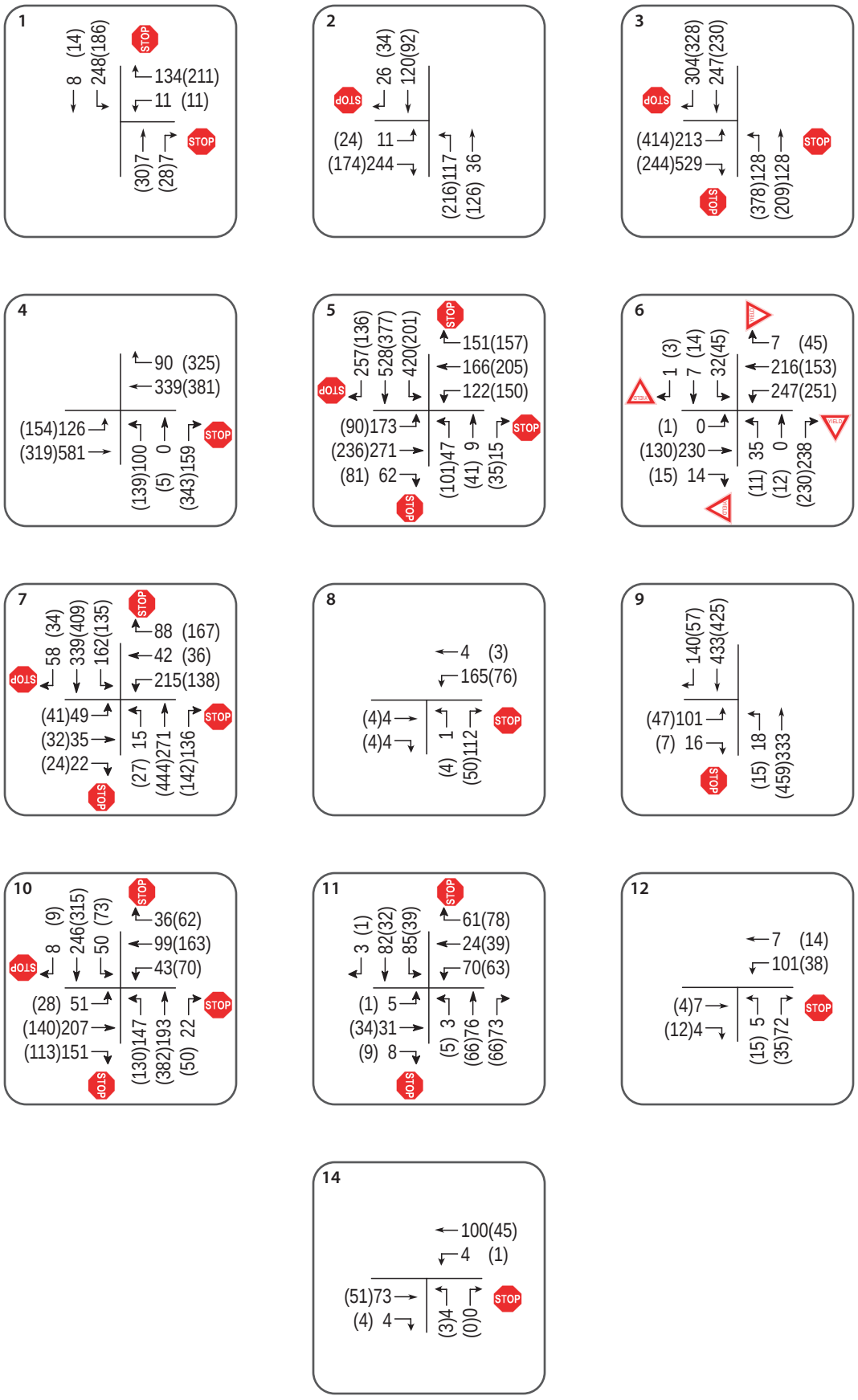
The intersection of 11th Street/K Street, which is expected to operate at LOS F under Future volumes without the project, is expected to continue operating at greater than desired delays during the p.m. peak hour upon adding project-generated traffic to anticipated future volumes. Various options for increasing capacity were explored, including turn lanes and even a roundabout, but given the constraints on two of the four corners associated with buildings and signs, a roundabout does not appear to be a feasible option, and adding turn lanes was deemed to have a substantial negative impact on pedestrian and bicycle traffic. As discussed under Future Conditions

(without the Project), the anticipated higher delays are deemed acceptable to offset the negative impacts on pedestrians and bicyclists.

Recommendations – To fund the improvements identified as being needed to accommodate anticipated future growth, including the Creekside project, proportional share fees should be paid as indicated in the section dedicated to this information.

Alternative Analysis with Foster Avenue Connection

With the Foster Avenue connection, the addition of traffic generated by Creekside Homes to future volumes would result in the impacts at the same intersections of Sunset Avenue/LK Wood Boulevard, Sunset Avenue/US 101 North Ramps, Foster Avenue/Alliance Road and 11th Street/K Street, if left in their current configurations. Future volumes (without the Project) with the Foster Avenue Extension are shown in Figure 17. Operating conditions for the Future plus Creekside Homes with the Foster Avenue connection scenario are summarized in Table 23.



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Central Arcata Areawide Traffic Impact Study

Figure 17 – Future Traffic Volumes with Foster Avenue Extension

Table 23 – Future plus Creekside Homes with Foster Connection Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	3.5	A	5.6	A
	Northbound St. Louis Rd Approach	*10.1*	*B*	*9.9*	*A*
	Westbound Overpass Approach	*9.1*	*A*	*9.4*	*A*
2.	LK Wood Blvd/US 101 Overpass	3.5	A	2.8	A
	Southbound LK Wood Approach	*12.7*	*B*	*13.1*	*B*
3.	Sunset Ave/LK Wood Blvd	17.2	C	**89.1**	**F**
	Roundabout – Intersections 3 and 4	10.7	B	20.1	C
4.	Sunset Ave/US 101 N Ramps	10.9	B	**29.7**	**D**
	Northbound US 101 N Off-ramp Approach	*54.8*	*F*	*99.0*	*F*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	20.4	C	13.1	B
6.	Sunset Ave/Foster Ave-Jay St	5.7	A	5.3	A
7.	Foster Ave/Alliance Rd	**51.4**	**F**	**99.8**	**F**
	Roundabout	7.6	A	10.0	B
8.	17th St/Q St	7.7	A	7.3	A
	Northbound Q St Approach	*8.9*	*A*	*8.6*	*A*
9.	17th St/Alliance Rd	2.5	A	1.1	A
	Eastbound 17th St Approach	*21.9*	*C*	*20.5*	*C*
10.	11th St/K St	**25.8**	**D**	**96.4**	**F**
11.	11th St/Janes Rd	5.8	A	6.1	B
	Eastbound 11th St Approach	*12.3*	*B*	*10.7*	*B*
	Westbound 11th St Approach	*11.9*	*B*	*10.5*	*B*
12.	Foster Ave/Janes Rd	7.3	A	6.2	A
	Northbound Janes Rd Approach	*8.7*	*A*	*8.8*	*A*
13.	Foster Ave/Creekside Project Entrance	2.1	A	2.1	A
	Southbound Project Entrance	*9.9*	*A*	*9.5*	*A*
14.	Q St/Foster Ave	0.3	A	0.2	A
	Northbound Q St Approach	*10.0*	*B*	*9.6*	*A*

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;* ** = delay greater than 120 seconds; **Bold** text = operation below desired threshold; Shaded cells = conditions with recommended improvements

Findings – Ten of the fourteen intersections analyzed for this scenario are expected to continue operating acceptably upon adding traffic from the Creekside project to future volumes with the Foster Avenue connection. Improvements have been identified previously that would provide sufficient capacity at three of the four locations that are expected to operate below the LOS C threshold otherwise. While the intersection of 11th Street/K Street is expected to operate at LOS F during the p.m. peak hour without or with the project, because any improvements that could feasibly be made at this location would result in negative impacts on pedestrian and bicycle access, the lower service level was deemed acceptable.

Recommendations – To fund the improvements identified as being needed to accommodate anticipated future growth, including the Creekside project, proportional share fees should be paid as described in the section regarding fees.

Future plus All Project Conditions

An additional alternative was analyzed for the Creekside project. The alternative would include the connection of Foster Avenue west of Alliance Road and east of Q Street, where currently Janes Creek divides the road. The study area for both Creekside project scenarios includes additional intersections.

Existing Roadways Configuration

Upon the addition of traffic from all six projects to the anticipated Future volumes, four of the seven study intersections evaluated for all projects are expected to operate acceptably. Sunset Avenue/LK Wood Boulevard, Sunset Avenue/US 101 North Ramps, and Foster Avenue/Alliance Road would operate at a service level below the threshold of LOS C in their current configurations. Of the additional intersections analyzed for the Creekside project, the intersection of 11th Street/K Street is projected to operate at LOS F during the p.m. peak hour. The Future plus Project operating conditions are summarized in Table 24.

Table 24 – Future plus All Projects Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	5.1	A	7.0	A
	Northbound St. Louis Rd Approach	*10.4*	*B*	*9.9*	*A*
	Westbound Overpass Approach	*9.5*	*A*	*10.8*	*B*
2.	LK Wood Blvd/US 101 Overpass	3.3	A	2.6	A
	Southbound LK Wood Approach	*14.4*	*B*	*14.9*	*B*
3.	Sunset Ave/LK Wood Blvd	20.9	C	**	**F**
	Roundabout – Intersections 3 and 4	13.9	B	**39.9**	**D**
4.	Sunset Ave/US 101 N Ramps	18.9	C	**63.3**	**F**
	Northbound US 101 N Off-ramp Approach	*96.56*	*F*	**	*F*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	23.4	C	14.2	B
6.	Sunset Ave/Foster Ave-Jay St	6.4	A	6.2	A
7.	Foster Ave/Alliance Rd	**52.5**	**F**	**98.1**	**F**
	Roundabout	9.3	A	10.3	B
8.	17th St/Q St	4.4	A	3.1	A
	Northbound Q St Approach	*9.6*	*A*	*9.2*	*A*
9.	17th St/Alliance Rd	8.4	A	4.4	A
	Westbound 17th St Approach	*45.1*	*E*	*34.4*	*D*
10.	11th St/K St	**32.9**	**D**	**121.3**	**F**
11.	11th St/Janes Rd	5.8	A	6.1	A
	Eastbound 11th St Approach	*12.3*	*B*	*10.7*	*B*
	Westbound 11th St Approach	*11.9*	*B*	*10.5*	*B*
12.	Foster Ave/Janes Rd	7.3	A	6.2	A
	Northbound Janes Rd Approach	*8.7*	*A*	*8.8*	*A*
13.	Foster Ave/Creekside Project Entrance	2.1	A	2.1	A
	Southbound Creekside Project Entrance	*9.9*	*A*	*9.5*	*A*

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;* ** = delay greater than 120 seconds; **Bold** text = operation below desired threshold; Shaded cells = conditions with recommended improvements

Findings – Upon adding traffic for the six projects to the future volumes, and with recommendations previously identified as being needed to accommodate future volumes without any of the six projects, three of the study locations are still projected to operate unacceptably. With the roundabout previously indicated as being needed between Sunset Avenue/LK Wood Boulevard and Sunset Avenue/US 101 North Ramps, these intersections would operate acceptably during the a.m. peak hour, but at LOS D during the p.m. peak hour. The intersection of 11th Street/K Street, which is expected to operate at LOS F without the project, would experience further increases in delay with project traffic added, though this is deemed acceptable under the standards applied as discussed previously.

It is noted that the assumed 1.5 percent growth per year used to project the future volumes should be considered conservative. Additionally, the project-generated trips were added to the future volumes; this is also conservative since the projected growth would typically include the growth associated with the proposed projects. A review of volumes at the proposed Sunset Avenue/US 101 North-LK Wood Boulevard roundabout indicates that, in order for operation to deteriorate below LOS C for the proposed roundabout, approximately 1,500 new residential units would need to be constructed that use the interchange for primary access.

Recommendations – While it is anticipated that the proposed roundabout at Sunset Avenue/US 101 North-LK Wood Boulevard will be adequate to accommodate all future growth in the City of Arcata, the City should monitor growth, and use 1,500 new residential units as a trigger indicating the need to evaluate operation and determine if further capacity enhancements are needed at Sunset Avenue/US 101 North-LK Wood Boulevard. As an alternative, the City could elect to use LOS D operation as the acceptable threshold for this location.

Alternative Analysis with Foster Avenue Connection

With the proposed Foster Avenue connection and the addition of traffic related to all six projects to the future volumes, the results of the operational analysis are the same as without the connection; even with improvements proposed under various scenarios three locations are projected to operate unacceptably. The Future plus All Projects with the Foster Avenue connection operating conditions are summarized in Table 25.

Table 25 – Future plus All Projects with Foster Connection Peak Hour Intersection Levels of Service					
Study Intersection ***Approach***		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**
1.	St. Louis Rd/US 101 Overpass	5.1	A	7.0	A
	Northbound St. Louis Rd Approach	*10.4*	*B*	*9.9*	*A*
	Westbound Overpass Approach	*9.5*	*A*	*10.8*	*B*
2.	LK Wood Blvd/US 101 Overpass	3.3	A	2.6	A
	Southbound LK Wood Approach	*14.4*	*B*	*14.9*	*B*
3.	Sunset Ave/LK Wood Blvd	20.9	C	**	**F**
	Roundabout – Intersections 3 and 4	13.9	B	**39.9**	**D**
4.	Sunset Ave/US 101 N Ramps	18.9	C	**63.3**	**F**
	Northbound US 101 N Off-ramp Approach	*96.56*	*F*	**	*F*
5.	Sunset Ave/US 101 S Ramps-G/H Streets	23.4	C	14.2	B
6.	Sunset Ave/Foster Ave-Jay St	6.4	A	6.2	A
7.	Foster Ave/Alliance Rd	**66.4**	**F**	**	**F**
	Roundabout	9.7	A	11.3	B
8.	17th St/Q St	7.7	A	7.3	A
	Northbound Q St Approach	*8.9*	*A*	*8.6*	*A*
9.	17th St/Alliance Rd	2.6	A	1.2	A
	Westbound 17th St Approach	*24.1*	*C*	*22.7*	*C*
10.	11th St/K St	**32.9**	**D**	**121.3**	**F**
11.	11th St/Janes Rd	5.8	A	6.1	A
	Eastbound 11th St Approach	*12.3*	*B*	*10.7*	*B*
	Westbound 11th St Approach	*11.9*	*B*	*10.5*	*B*
12.	Foster Ave/Janes Rd	7.3	A	6.2	A
	Northbound Janes Rd Approach	*8.7*	*A*	*8.8*	*A*
13.	Foster Ave/Creekside Project Entrance	2.1	A	2.1	A
	Southbound Project Entrance	9.9	A	9.5	A
14.	Q St/Foster Ave	0.3	A	0.2	A
	Northbound Q St Approach	*10.0*	*B*	9.6	A

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;* ** = delay greater than 120 seconds; **Bold** text = operation below desired threshold; Shaded cells = conditions with recommended improvements

Findings – With the Foster Avenue connection and trips from all six projects added to Future volumes, as well as various capacity improvements identified above, three of the study intersections are projected to operate at service levels below the desired threshold. As discussed, due to the conservative nature of the study, it appears likely that these volumes will not be achieved, so capacity enhancements should be limited to what can reasonably be expected to be needed. Excess capacity is undesirable in that it generally results in higher travel speeds and comes at the expense of pedestrians and bicyclists.

Recommendations – The City should monitor growth, and use 1,500 new residential units as a trigger indicating the need to evaluate operation at Sunset Avenue/US 101 North-LK Wood Boulevard and determine if further capacity enhancements are needed. As an alternative, the City could elect to use LOS D operation as the acceptable threshold for this location.

Travel Demand Management

As a means of reducing traffic demand and pushing the need for improvements out to a later date if not eliminating some altogether, Travel Demand Management (TDM) techniques should be made part of all new development in Arcata. TDM is generally included in a plan with enforceable measures as a means to reduce the total number of vehicles driving to and from a project site, thereby reducing or at least managing a project's vehicle miles traveled (VMT).

TDM measures are typically enacted in an attempt to induce mode shifts from single occupancy auto travel to transit, ride-share, bicycle, or pedestrian travel. In order to create this shift, TDM measures often include incentives and disincentives to encourage use of alternative transportation options. Benefits associated with TDM strategies include reduced vehicle trips, reduction in overall vehicle miles traveled, reduced congestion, lower carbon emissions, improved public health, and an increase in transportation choices. The most effective TDM programs often include financial incentives through measures such as pricing parking, subsidizing transit, and informing users of the cost savings associated with ride-sharing, biking, or walking.

Ultimately, TDM strategies need to successfully change human travel behavior. TDM measures that work for some people may not work for all. Therefore, an effective TDM plan needs to include multiple options and incentives to allow customization to meet the varied needs of individuals. As such, below are several TDM measures that are applicable to the proposed developments within this study.

Proposed TDM Measures

Transportation Information Packet

Information packets could be provided to tenants when they move in that include transit maps, schedules, and website addresses for all nearby transit operators. This packet would also provide maps showing where bike and pedestrian facilities are located. Further, suggested routes for residents to travel to popular destinations, like Humboldt State University, via active transportation would be provided. These resources would be an effective tool for educating tenants on the variety of transportation options available to them and the health and financial benefits associated with using active forms of transportation.

Car-sharing

Car-sharing can reduce the need for automobile ownership by allowing people to have on-demand access to shared vehicles on an as-needed basis. Car-sharing for tenants traveling to and from a proposed project site would be encouraged by providing a list of car sharing services as part of the move-in packet or by providing cars for sharing as part of the site amenities.

Zipcar Car-Sharing

Zipcar is a common ride-sharing service that can be implemented within the City and near the proposed project sites.

Taxi Services

A project could encourage tenants to use private taxi and on-demand vehicle services. In addition to traditional taxi services, there are other transportation services that provide on-demand rides at a discounted rate. These service providers include Uber or Lyft. While not currently in the area, such services are continuously expanding their area of coverage.

Bicycling

Bike Share

Similar to car sharing, bike sharing allows members to use a bicycle within the system and travel between popular locations where bicycle stations are installed.

Transit

Transit Kiosk

A project could provide a transit kiosk, or centralized information center, on-site that provides transit maps, schedules, fares, and rider information. The kiosk could also sell daily or monthly passes for transit. Further, the kiosk would include maps detailing the closest transit stops and routes to access them.

On-Site Transportation Coordinator

The project applicant potentially could have the on-site property manager that also serves as the transportation coordinator to assist tenants and be a point of contact for transportation questions. This person would be designated to answer questions regarding any TDM measures.

Marketing and Education

The transportation coordinator will also be responsible for general marketing and to host/arrange free workshops on transportation options in the area, trip planning resources, and safe biking/walking classes.

Alternative Modes

Pedestrian Facilities

Given the proximity of the various projects to Humboldt State University and the tendency for college students to walk or bike if possible, it is reasonable to assume that some project residents, patrons, and employees will want to walk, bicycle, and/or use transit to reach the various project sites. In fact, standard trip generation rates reflect the need for such facilities as these rates would be higher if all residents, employees and patrons of various types of development traveled exclusively by passenger vehicle.

As noted in the discussion of existing pedestrian facilities, the existing crossing on Sunset Avenue of the US 101 North ramp and LK Wood Boulevard provides an undesirable condition from the perspective of pedestrian safety and convenience. Conversion to a roundabout, as recommended to accommodate future volumes, would be expected to substantially increase pedestrian safety, so should be pursued as early as possible to improve conditions at this location. As a short-term interim improvement, new markings should be provided to better delineate and protect pedestrian facilities, as shown in Figure 18. Caltrans has indicated a willingness to install these markings in the near term. As a longer-timer interim improvement, raised islands could replace the striped islands, as shown in Figure 19. With these improvements, the intersection is expected to continue to operate at LOS C, with no more than a 3.6-second increase in delay under volumes for existing conditions plus all projects.

The Village

Sidewalks do not currently exist along the project's frontages or elsewhere on St. Louis Road, and this route is used by numerous heavy vehicles generated by a lumber yard near the US 101 Overpass. As indicated on the site plan, included in the appendices, no off-site sidewalk improvements are included. However, the City's proposed bikeway network includes a trail along the railroad right-of-way on the east side of St. Louis Road, across from the project site.

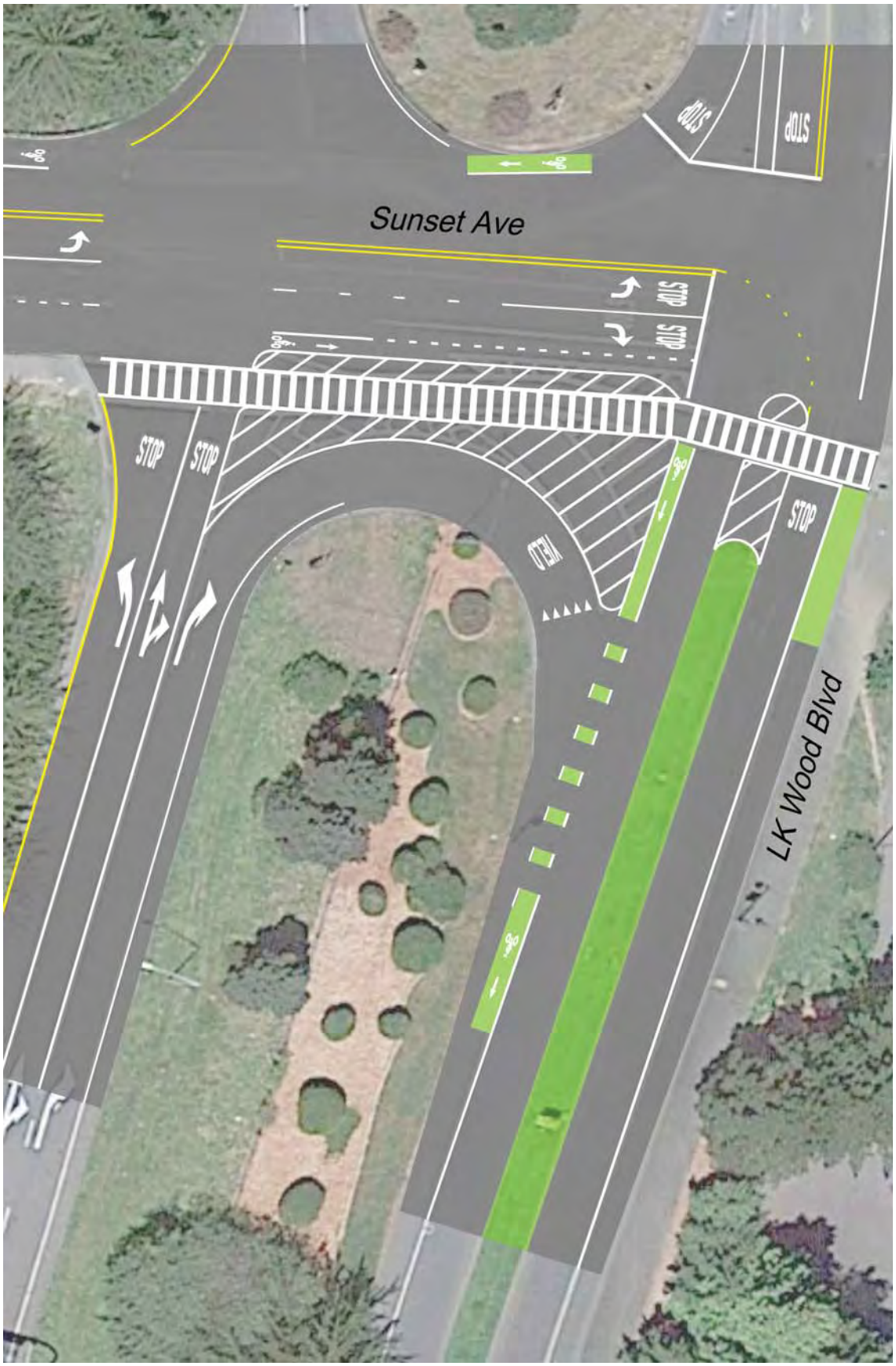
While there would be no vehicular access to Eye Street, it is understood that there would be pedestrian and bicycle access, and from the site to Humboldt State University, it is actually a shorter distance via Eye Street than St. Louis Road. While there are no sidewalks on Eye Street in the vicinity of the project, this roadway has lower volumes and does not experience substantial truck traffic. Similarly, Jay Street has discontinuous sidewalk facilities, but relatively low traffic volumes so can serve pedestrian trips.

Findings – Pedestrian facilities for the project site are expected to be inadequate. Because of the potential for conflict with truck traffic along St. Louis Road, pedestrians would be more appropriately routed along Eye Street toward the Sunset Avenue overcrossing toward Humboldt State University. Providing continuous sidewalk or trails facilities to the north is likely infeasible due to lack of right-of-way; however, the project should construct a portion of the planned trail along the railroad right-of-way to provide future connectivity for site residents.

Recommendation – Sidewalks should be constructed on the project frontage as well as within the site connecting buildings and to Eye Street. The portion of the planned trail along the railroad right-of-way across from the site and connecting to the Sunset Avenue/Foster Avenue-Jay Street roundabout should be constructed to provide for future pedestrian and bicycle access. Facilities should direct pedestrian traffic toward Eye Street and not St. Louis Road until such time as adjacent section of the trail is completed.

Canyon Creek

Like The Village, the Canyon Creek project would generate pedestrian trips along Eye and Jay Streets toward Sunset Avenue. This area has limited sidewalks, but will be served by the trail on the railroad right-of way when complete.



014arc.ai 3/17

Central Arcata Areawide Traffic Impact Study

Figure 18 – Conceptual Interim Left-Turn Pocket Recommendation for LK Wood Boulevard/Sunset Avenue

Findings – Pedestrian facilities for the project site are inadequate. While pedestrians will be able to use Eye and Jay Streets in the short term, the completion of the trail along the railroad right-of-way is necessary to serve such trips safely.

Recommendation – The portion of the planned trail along the railroad right-of-way along the project frontage and connecting to Sunset Avenue should be constructed to provide for adequate pedestrian and bicycle access.

Sunset Terrace

Sidewalks do not currently exist along the project's frontages on either Foster Avenue or Sunset Avenue, so should be included as part of the project improvements. Additionally, a connection should be made between the project site and the existing trail through Shay Park on the south side of Foster Avenue. To ensure visibility to westbound drivers, the crossing should be placed as close to the east end of the project site as possible and near a streetlight. Consideration should be given to installing the crosswalk on a speed table to increase visibility and help maintain lower traffic speeds at the crossing location. Finally, to connect Sunset Avenue to the trail a pedestrian pathway or sidewalk should be provided between Sunset Avenue and Foster Avenue along the easterly border of the site.

Finding – Pedestrian facilities for the project site are inadequate.

Recommendation – Sidewalks should be constructed on the Foster Avenue and Sunset Avenue frontages as part of the project. Also, the project should construct facilities to support a crosswalk connecting the site to the trail on the south side of Foster Avenue. Finally, a pedestrian pathway or sidewalk should be provided on the easterly border of the site between Sunset Avenue and Foster Avenue.

Open Door Community Health Center

Like Sunset Terrace, this project is located between Foster Avenue and Sunset Avenue, neither of which has sidewalks so should therefore be included along the frontages as part of the project improvements. A connection across Foster Avenue to the existing trail through Shay Park is needed. While it is anticipated that Sunset Terrace will precede this project, should Open Door be constructed first, a crossing should be installed as close to the west end of the project site as possible and near a streetlight. Consideration should be given to installing the crosswalk on a speed table to increase visibility and help maintain lower traffic speeds at the crossing location. Finally, to connect Sunset Avenue to the trail a pedestrian pathway or sidewalk should be provided between Sunset Avenue and Foster Avenue along the westerly border of the site if not already installed by the Sunset Terrace project.

Finding – Pedestrian facilities for the project site are inadequate.

Recommendation – Sidewalks should be constructed on the Foster Avenue and Sunset Avenue frontages as part of the project. If not already completed, the project should construct facilities to support a crosswalk connecting the site to the trail on the south side of Foster Avenue and a pedestrian pathway or sidewalk should be provided on the easterly border of the site between Sunset Avenue and Foster Avenue.

Twin Parks Apartment

Twin Parks has frontage along Foster Avenue. Sidewalks exist on the project's frontage. The Shay Park trail runs behind the project site.

Finding – Pedestrian facilities for the project site are inadequate.

Recommendation – A connection should be provided between the project site and the trail system in Shay Park.

Creekside Homes

This project site is located in a rural area with no existing pedestrian facilities. As currently proposed, a connection would be made to a deeded right-of-way that would provide access between the site and Alliance Road. It is anticipated that sidewalks would be provided through the site, connecting homes along the internal street system, as well as along the frontage on Foster Avenue. It is understood that two pedestrian crossings would be provided on-site, one in the middle of the site and one at the south end. The sidewalk as shown on preliminary plans terminates at the edge of Janes Creek, without providing a connection through to Heather Lane.

Finding – Pedestrian facilities for the project site as preliminarily proposed are inadequate.

Recommendation – In addition to the sidewalks proposed on the preliminary site plan, a pedestrian connection should be provided between the project site and Heather Lane, regardless of whether Foster Road is extended or not. If extended, sidewalk should be provided along the length of the extension. Further, the trail connecting the site to Alliance Road should be constructed as part of the project if sufficient right-of-way is available.

Bicycle Facilities

While bike lanes are provided on Sunset Avenue between G Street-H Street and LK Wood Boulevard in the eastbound direction, the bike lane starts at the US 101 North On-ramp and ends short of the US 101 South Off-ramp in the westbound direction. Bicycle access would be substantially improved through provision of the "cycle track" or Class IV bikeway on the south side of Sunset Avenue which is included as part of the roundabout conversion at the easterly end of this segment, as depicted in Figure 5. While this improvement was identified as being needed for long-term volume increases, it would provide a benefit immediately in terms of accessibility for bicycle traffic, so should be pursued sooner, if possible.

The Village

There are currently no bicycle facilities in the vicinity of The Village site. As noted for pedestrian trips, use of St. Louis Road is undesirable due to the high volume of truck traffic.

Findings – Bicycle facilities for the project site are inadequate. Because of the potential for conflict with truck traffic along St. Louis Road, bicyclists would be more appropriately routed along Eye Street toward the Sunset Avenue overcrossing toward Humboldt State University. Providing continuous sidewalk or trails facilities to the north is likely infeasible due to lack of right-of-way; however, the project should construct a portion of the planned trail along the railroad right-of-way to provide future connectivity for site residents.

Recommendation – A bicycle connection should be provided between the site and Eye Street. The portion of the planned trail along the railroad right-of-way across from the site and connecting to the Canyon Creek site should be constructed to provide for future pedestrian and bicycle access. Bicycle traffic should be directed toward Eye Street and not St. Louis Road until such time as adjacent section of the trail is completed.

Canyon Creek

Canyon Creek would generate bicycle trips along Eye and Jay Streets toward Sunset Avenue, with bicyclists needing to ride in the street along these narrow roadways.

Findings – Bicycle facilities for the project site are inadequate. While Eye and Jay Streets can be used for bicycle trips, the completion of the trail along the railroad right-of-way is necessary to serve such trips safely.

Recommendation – The portion of the planned trail along the railroad right-of-way along the project frontage and connecting to Sunset Avenue should be constructed to provide for adequate pedestrian and bicycle access.

Sunset Terrace

Foster Avenue has existing bike lanes in both directions connecting to the areawide system.

Finding – Bicycle facilities for the project site will be adequate upon completion of the connection across Foster Avenue to the trailhead in Shay Park.

Recommendation – The crosswalk on Foster Avenue should be constructed as recommended for pedestrian access.

Open Door Community Health Center

Foster Avenue has existing bike lanes in both directions connecting to the areawide system.

Finding – Bicycle facilities for the project site will be adequate upon completion of the connection across Foster Avenue to the trailhead in Shay Park.

Recommendation – The crosswalk on Foster Avenue should be constructed as recommended for pedestrian access, if not already complete when this project moves forward.

Twin Parks Apartment

Twin Parks is located near the corner of Foster Avenue and Alliance Road; both streets have existing bike lanes. The Shay Park trail runs behind the project site.

Findings – Bicycle facilities for the project site are adequate, though a connection between the site and the trail system should be provided.

Recommendation – A connection should be provided between the project site and the trail system in Shay Park.

Creekside Homes

There are no existing bicycle facilities serving this project site. As currently proposed, bicyclists would ride in the road or, eventually, along the trail connecting to Alliance Road.

Finding – Bicycle facilities for the project site as preliminarily proposed are inadequate.

Recommendation – In order to accommodate bicycle trips other than on the adjacent system of County roads, which are narrow and lack amenities, the trail connecting the site to Alliance Road should be constructed as part of the project if sufficient right-of-way is available. As recommended for pedestrian access, a connection should also be made across Janes Creek to connect the site to the easterly portion of Foster Avenue where bike lanes exist.

Bicycle Storage

Short-term bicycle parking will need to be provided at each of the sites by bike racks located to be convenient to the residents, employees and/or patrons. Since site-specific plans are generally unavailable, the adequacy of such on-site facilities will need to be determined on a case-by-case basis as development plans come forward.

Transit

The Village

The Village site is not located within "easy" walking distance of a transit stop as it is more than one-quarter of a mile from the nearest transit route at about 0.35 miles to Foster Avenue where the Arcata Gold and Red Routes runs. Upon completion of the trail along the railroad the distance will remain similar, but the path will be more pedestrian-friendly. While this distance exceeds the typical desirable walking distance, it should be acceptable to college-aged students, so is considered adequate. However, it is understood that a bus stop near the site is proposed as part of the project. The applicant will need to work with local transit provider to have this stop served.

Canyon Creek

This project site is located slightly more than one-quarter mile from a transit stop for the Arcata Gold and Red Routes, though this distance will be reduced to about one-quarter of a mile upon completion of the trail along the railroad right-of-way that is recommended as part of the project. This would make transit access adequate.

Sunset Terrace

The Arcata Gold and Red Routes travel along Foster Avenue, directly in front of the project site. Transit access is therefore adequate.

Open Door Community Health Center

This site has adequate access to transit via the Arcata Gold and Red Routes that travel along Foster Avenue past the site.

Twin Parks Apartment

The Arcata Gold and Red Routes will pass directly by this site along Foster Avenue, providing acceptable transit access.

Creekside Homes

There are no existing transit facilities serving this site, nor are any currently contemplated. As currently envisioned, the project would provide inadequate pedestrian access to existing transit services.

Finding – Transit facilities serving the project site are inadequate.

Recommendation – In order to provide access to transit, the trail connecting the site to Alliance Road as well as a connection across McDaniel Slough (Janes Creek) should be constructed as part of the project if sufficient right-of-way is available and/or Foster Avenue is extended to connect at Heather Lane.

Traffic Impact Mitigation Fee Program

In order to fund the improvement projects identified in this report as being needed, the Traffic Impact Mitigation Fee Collection Program was established. The short-term improvement projects included in the fee are re-striping of Sunset Avenue/LK Wood Boulevard and installation of new raised median islands, as shown in Figure 19, as well as the re-striping of Alliance Road/Foster Avenue. The specific improvements needed at the intersection of Alliance Road/Foster Avenue and their associated cost would depend on whether or not the Foster Avenue connection is completed, which would also alter the routes of the Creekside project and therefore the proportional cost toward these improvements.

The future improvements that were included in the fee program are the proposed roundabout combining the two intersections on Sunset Avenue at US 101 North Ramps and LK Wood Boulevard and the mini-roundabout at the intersection of Alliance Road/Foster Avenue. The full estimated cost of each of the improvements projects was included in the fee with the exception of the future roundabout at the intersections on Sunset Avenue at the US 101 North Ramps and LK Wood Boulevard. The cost estimates of each of these projects, along with the percent included in the fee, are summarized in Table 26.

Table 26 – Anticipated Improvement Project Costs

Project Location	Cost (in $1,000's)	Percent of Project Cost included in Fee
Near-term		
Sunset Ave/LK Wood Blvd Re-Striping	$98.9	100%
Alliance Rd/Sunset Ave Re-Stripe	$6.4 / $8.8*	100%
Future		
Sunset Ave/LK Wood Blvd Roundabout	$3,195	15%
Alliance Rd/Sunset Ave Roundabout	$325	100%
Total of All Improvement Projects	**$3,625.3/$3,627.7***	**$909.5/$911.9***

Notes: * cost with the Foster Avenue Connection

Using the trips that each project contributes to each of the locations needing improvements, the proportional share of costs for each development project were calculated. The sum of these amounts both without and with the Foster Avenue connection are indicated for each development project in Table 27.

014arc.ai 3/17

Central Arcata Areawide Traffic Impact Study

Figure 19 – Conceptual Long Term Left-Turn Pocket Recommendation for LK Wood Boulevard/Sunset Avenue

Table 27 – Summary of Traffic Impact Mitigation Fee by Development Project		
Development Project	**Cost (in $1,000's)**	**Cost (in $1,000's) – with Foster Avenue Connection**
The Village	$353.55	$337.59
Canyon Creek	$97.30	$86.89
Open Door	$146.37	$133.19
Sunset Terrace	$152.80	$122.27
Twin Parks	$50.95	$45.4
Creekside	$108.57	$186.59
Total	**$909.54**	**$911.9**

Notes: ORH = Old Redwood Highway

Additional details for each of the improvement projects and the proportional share assigned to each development projects are included in the Appendix E

Conclusions and Recommendations

Conclusions

- The Village project would be expected to generate an average of 1,578 daily trips; of which 121 trips would be during the a.m. peak hour and 150 would be during the p.m. peak hour.
- Canyon Creek project is expected to generate 572 daily trips on average with 40 trips during the morning peak hour and 58 trips during the evening peak hour.
- The Open Door Health Center would be expected to generate 1,084 daily trips; 72 trips would be expected during the morning peak hour and 107 during the evening peak hour.
- The Sunset Terrace project would be expected to generate an average of 984 daily trips which includes 73 during the morning peak hour and 96 during the evening peak hour.
- Twin Parks is expected to generate 366 daily trips, with 23 trips anticipated during the a.m. peak hour and 40 during the p.m. peak hour.
- The Creekside Homes project, which includes single family homes and an assisted living community, would be expected to have a combined total daily trip generation of 1,113 trips which includes 81 trips during the morning peak hour and 111 trips during the p.m. peak hour.
- Under existing conditions, the intersection of LK Wood Boulevard/Sunset Avenue operates below the desired threshold, but still acceptably under the criteria applied; all other study intersections are currently operating at LOS C or better.
- With the exception of the Twin Parks project, the addition of trips from each individual project to existing volumes would result in operation below LOS C at the intersection of Alliance Road/Foster Avenue.
- Additionally, the addition of Creekside project trips, with or without the Foster Avenue connection, results in the intersection of 11th Street/K Street operating at a level of service below the LOS C threshold.
- Eight of the twelve intersection would operate acceptably under future volumes projected using a growth rate of 1.5 percent per year over 20 years. The intersections of Sunset Avenue/LK Wood Boulevard, Sunset Avenue/US 101 North Ramps, Foster Avenue/Alliance Road, and 11th Street/K Street are expected to operate at levels of service below the desired threshold of LOS C. These same four intersections would operate below LOS C with trips added from each individual project as well as all six combined.
- With the proposed recommended roundabout, Alliance Road/Foster Avenue would operate acceptably under all volume scenarios evaluated.
- The recommended five-legged roundabout at Sunset Avenue/US 101 North-LK Wood Boulevard is projected to operate acceptably for all future scenarios except that LOS D operation is projected during the p.m. peak hour with the addition of traffic from all six projects. Because the volume of traffic projected using the growth factor plus the six projects likely results in double-counting of trips, this result is quite conservative.
- 11th Street/K Street is projected to operate at a level of service below LOS C under Existing conditions with trips from the Creekside project added and under Future conditions without or with the Creekside project

traffic. Because potential capacity improvements at this location would have a deleterious effect on pedestrian and bicycle facilities, the lower service level was deemed acceptable.

- Pedestrian access to each of the project sites is generally inadequate.
- Bicycle access to the Village, Canyon Creek, and Creekside Homes projects are inadequate, while access to the Sunset Terrace, Twin Parks, and Open Door Health Center projects will be adequate with the completion recommended connections to the trail system through Shay Park.
- With the exception of the Creekside project, access to transit from all project sites is adequate.

Recommendations

General (All Projects)

- Since the two intersections at LK Wood Boulevard/Sunset Avenue and Sunset Avenue/US 101 North Ramps are in close proximity, it is recommended that any long-term improvements to either of the intersections include the other. Because the City of Arcata does not have signals and given the large right-of-way, a five-legged roundabout that combines the two intersections is recommended.
- Given the conservative analysis in determining the p.m. future scenario with the addition of trips from all six projects, the proposed five-legged roundabout joining the Sunset Avenue/LK Wood Boulevard and Sunset Avenue/US 101 North Ramps intersections is expected to be adequate to accommodate the future growth in Arcata despite the projection of LOS D operation in this analysis. However, the City should monitor growth, and use 1,500 new residential units as a trigger indicating the need to evaluate operation and determine if further capacity enhancements are needed at Sunset Avenue/US 101 North-LK Wood Boulevard. Alternatively, the City could elect to use LOS D operation as the acceptable standard for this location.
- To achieve acceptable LOS C operation at Foster Avenue/Alliance Road under projected future volumes that include area wide growth as well as all six projects, conversion to a roundabout is recommended.

The Village

- If the Village is first of the six projects to be completed the Alliance Road approaches to Foster Avenue should be restriped to provide turn lanes.
- To fund the future improvements expected to be needed to accommodate future growth, the Village project should pay proportional shares as indicated in Table 27.
- Sidewalks should be constructed on the project frontage of St. Louis Road as well as within the site connecting buildings and to Eye Street. The portion of the planned trail along the railroad right-of-way across from the site and connecting to the Canyon Creek site should be constructed as part of the project.
- A bicycle connection should be provided between the site and Eye Street and bike parking provided on-site.
- Facilities should direct pedestrian traffic toward Eye Street and not St. Louis Road until the trail connection to Sunset Avenue is completed.

Canyon Creek

- If Canyon Creek is the first of the six projects to be complete, the restriping of Alliance Road at Foster Avenue should be completed as part of the project.
- In order to fund the improvements necessary to accommodate the projected future growth, the Canyon Creek project should pay fees as indicated in Table 27.
- The portion of planned trail along the railroad right-of way fronting the project site and connecting the Sunset Avenue should be constructed to provide adequate access for pedestrians and bicyclists, as well as to reduce the distance to access transit.

Sunset Terrace

- The restriping at Alliance Road/Foster Avenue should be completed as part of the project is not already in place.
- To help fund the improvements expected to be needed to accommodate the future growth, Sunset Terrace should pay a proportion of the total project costs of the planned improvements, as indicated in Table 27.
- Sidewalks should be provided along both of the Sunset Terrace site's street frontages. A crossing of Foster Road should be provided connecting the site to the existing trail at Shay Park and a pedestrian pathway or sidewalk should be provided on the easterly border of the site between Sunset Avenue and Foster Avenue. These improvements should be completed as part of this project unless the Open Door Health Center project is completed before Sunset Terrace and provides these connections.
- Bicycle parking should be provided on site.

Open Door Health Center

- If not completed by an earlier project, the striping on Alliance Road to provide turn lanes at Foster Avenue should be completed by this project.
- The Open Door Health Center's proportional shares of the recommended improvements as shown in Table 27.
- Sidewalks should be provided along both of the Open Door Health Center site's street frontages. If the Open Door Health Center is completed before the Sunset Terrace project, a crossing of Foster Road should be provided connecting the site to the existing trail at Shay Park. Consideration should be given to a raised crosswalk to improve visibility and support lower travel speeds along this corridor. Finally, a pedestrian pathway or sidewalk should be provided on the easterly border of the site between Sunset Avenue and Foster Avenue, also to be completed by the first project to be completed.
- Bicycle parking should be provided.

Twin Parks

- Proportional share fees for the improvements expected to be needed under future volumes should be paid by the Twin Park applicant as detailed in Table 27.

- Sidewalks should be constructed along the Alliance Road frontage and a connection provided between the project site and the trail system in Shay Park.

- Bicycle racks should be provided as part of the site development.

Creekside Homes

- Creekside Homes should complete the striping modifications at Foster Avenue/Alliance Road if not completed by others, except that the eastbound Foster Avenue approach should be re-striped by this project even if the other striping has already been completed.

- Creekside Homes should pay a proportion of the total project costs of the two recommended improvements. These costs are detailed in Table 27.

- A pedestrian connection should be provided between the project site and Heather Lane, regardless of whether Foster Road is extended or not. If extended, sidewalk should be provided along the length of the extension. Further, the trail connecting the site to Alliance Road should be constructed as part of the project if sufficient right-of-way is available.

- Bicycle racks should be provided as part of the site development.

Study Participants and References

Study Participants

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