TRANSPORTATION IMPACT ANALYSIS FOR

RIVERWALK SPECIFIC PLAN EIR

Riverbank, CA

Prepared For:

De Novo Planning Group
1020 Suncast Lane, Suite 106
El Dorado Hills, CA 95762

Prepared By:

KD Anderson & Associates, Inc.
3853 Taylor Road, Suite G
Loomis, CA 95650
(916) 660-1555

April 11, 2023

2290-02

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INTRODUCTION

This report summarizes **KD Anderson & Associates** analysis of the potential transportation impacts associated with development of the **Riverwalk Specific Plan** in Riverbank, California. The overall Project area includes approximately 1,522 acres encompassing: (1) the Berghill Boundary that includes approximately 772 acres, (2) the Riverwalk Specific Plan Area that includes a total of 993 acres, including the Berghill Boundary, and (3) the SOI expansion Boundary, which makes up the entire Project area.

The Riverwalk Specific Plan (RWSP) will guide development of areas planned for active senior and conventional residential uses and mixed-use commercial uses generally located north of Patterson Road (SR 108) and west of McHenry Avenue. The project site is located regionally in Figure 1, and Figure 2 is the proposed RWSP land use plan.

Approach

The purpose of this analysis is to identify the project's potential transportation impacts under the current requirements of the California Environmental Quality Act (CEQA) while a technical appendix also addressed the project's operational effects on area circulation system within the context of City of Riverbank General Plan policies. With the enactment of SB 743, the analysis of transportation impacts under CEQA has moved from consideration of operating Levels of Service (LOS) to evaluation of regional Vehicle Miles Traveled (VMT). However, CEQA transportation significance criteria continue to include a project's effects on alternative transportation modes (i.e., bicyclists, pedestrians and transit user), and while Level of Service on state highways is no longer a criterion, the effects of a project on safety, typically assessed in terms of vehicle queueing, has been retained under CEQA.

In addition to CEQA considerations, the Transportation Impact Analysis Appendix also provides a Traffic Operational Analysis in order to provide the information needed to support the CEQA safety evaluation and to allow review of the RWSP's consistency with City of Riverbank General Plan transportation and circulation polices. While not required under CEQA and provided for information only, the traffic operations analysis also includes discussion of the project's effects at locations beyond the City of Riverbank sphere of influence that are not on state highways.

CEQA impacts were identified by estimating project VMT and evaluating its effects based on the criteria presented in the Governor's Office of Planning and Research (OPR) CEQA technical directive. Impacts to alternative transportation modes were also assessed in the EIR along with safety on State highways.

The traffic operations analysis includes evaluation of existing circulation conditions in the area based on current daily and a.m./p.m. peak hour traffic volumes collected in early 2020 before COVID-19 began to affect traffic volumes. The extent to which improvements are already needed to ensure safety or to satisfy minimum General Plan LOS policies has been determined, and facilities serving alternative transportation modes have been catalogued. The general characteristics of the proposed project have been determined based on an analysis of the trip generation associated with the proposed land uses. Project trips were assigned to the study area street system, and resulting Levels of Service and peak period queue lengths were compared to current conditions in order to identify the safety impacts and operational effects of RWSP development alone. The appendix presents short term future conditions that assume occupancy of development projects identified by the City of Riverbank, including buildout of the Crossroads West Specific Plan (CWSP). Cumulative safety impacts and traffic operational effects were also evaluated assuming implementation of planned / programmed circulation system improvements and continuing development in the City of Riverbank as anticipated under the City of Riverbank General Plan and assumed in the EIR evaluation of the North County Corridor (NCC) project. Mitigation measures / operational improvements that will be needed to address both project specific and cumulative impacts and traffic operational effects were identified.

VICINITY MAP

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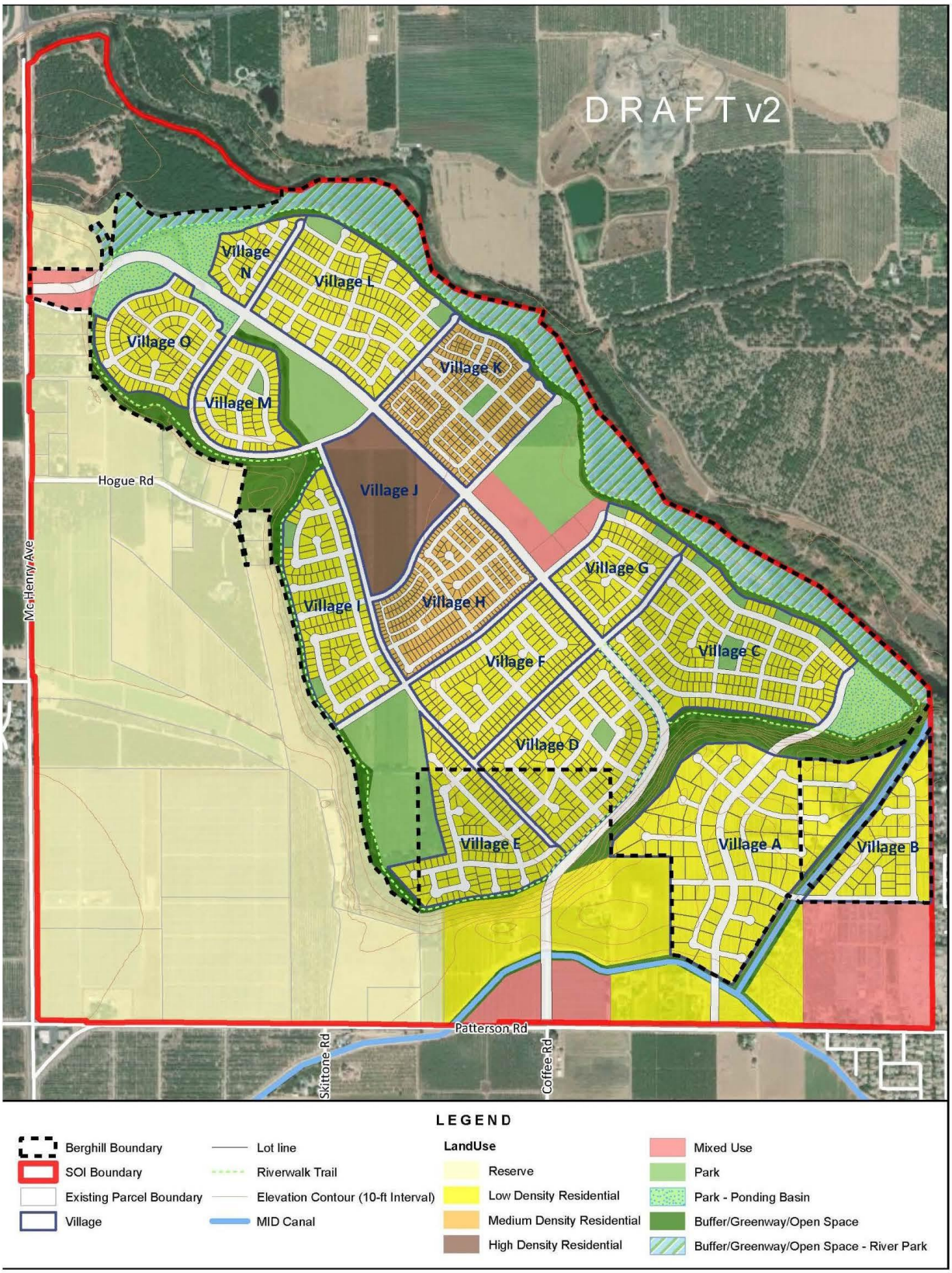
figure 1



SITE PLAN

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figure 2

EXISTING SETTING

Existing Circulation System

Roadways. Today regional access to the RWSP area is provided by many roads that fall under the jurisdiction of the City of Riverbank, as well as roads maintained by the City of Modesto, Stanislaus County and Caltrans. Patterson Road (SR 108) and McHenry Avenue (SR 108) and Claribel Road connect the project with the northern Modesto and SR 99 area to the west and with the Oakdale area to the east. McHenry Avenue also links the site with San Joaquin County to the north. North-south streets such as McHenry Avenue, Coffee Road and Oakdale Road connect the RWSP with the Modesto area to the south. The text which follows describes study area roadways.

Two major streets generally adjoin the RWSP:

Patterson Road is a major east-west arterial that extends easterly through Riverbank from an intersection on McHenry Avenue across rural Stanislaus County into the area south of Oakdale to its eastern terminus at the Albers Road – Oakdale – Waterford Highway intersection. The segment from McHenry Avenue through western Riverbank to Callander Avenue is also State Route 108 (SR 108). The ultimate plan for Patterson Road is a four-lane facility. Today Patterson Road is a two-lane rural highway from McHenry Avenue to the Hot Springs Lane intersection in western Riverbank. The route is then a four-lane facility from that point east to Jackson Avenue and is a two-lane road from Jackson Avenue through the Callander Avenue intersection. Patterson Road continues east after it leaves SR 108 as a two-lane road through Riverbank. The posted speed limit on Patterson Road is 35 mph immediately east of McHenry Avenue, 50 mph east of Coffee Road to the Riverbank city limit and 45 mph from the city limit to Oakdale Road.

Caltrans traffic counts for SR 108 for 2019 indicated that Patterson Road carried an *Annual Average Daily Traffic* (AADT) volume of 13,600 vpd east of McHenry Avenue to Coffee Road, 15,000 vpd from Coffee Road to Oakdale Road and 16,700 vpd east of Oakdale Road.

McHenry Avenue is a major north-south minor arterial that extends from the City of Modesto across the Stanislaus River to Escalon in San Joaquin County. The portion of McHenry Avenue south of Patterson Road is also SR 108. McHenry Avenue varies in width, as the roadway has six lanes south of Coralwood Road in Modesto, four-lanes from Coralwood Road through the Kiernan Avenue – Claribel Road intersection and two-lanes north into San Joaquin County. McHenry Avenue is planned as a four-lane facility within a 110 foot right of way. Stanislaus County has recently completed a project to widen northern McHenry Avenue over the Stanislaus River to four lanes, and other widening consistent with the ultimate standard has occurred on the west side of the road south of Stewart Street and at the Patterson Road intersection. Stanislaus County has completed the widening of McHenry Avenue north of Ladd Road to four lanes. The posted speed limit on McHenry Avenue is 55 mph north of the Patterson Road intersection and 45 mph northerly from a point 2,100 feet south of River Road.

Caltrans traffic counts indicate that in 2019 McHenry Avenue carried 19,200 AADT south of Kiernan Avenue and 12,700 AADT to the north. The volume was reported at 13,300 AADT south of Patterson Road. As noted later in this report, recent traffic counts are higher than the Caltrans AADT. Truck comprised 7% of the daily traffic on McHenry Avenue north of Kiernan Avenue.

The north-south streets within the study area include:

Coffee Road is a north south minor arterial street that today extends south from Patterson Road across Claribel Road into Modesto and to its southern terminus on Scenic Drive along the Tuolumne River. Coffee Road is a two-lane facility from Patterson Road to Mable Avenue and is a four-lane facility from that point south. The rural 55 mph prima facie speed limit applies to Coffee Road south of Patterson Road.

Traffic counts made for this study in 2020 indicated that Coffee Road carried 3,988 vpd from Patterson Road to Westgate Drive (Crawford Road), 6,168 vpd between Westgate Drive (Crawford Road) and Claribel Road and 12,393 vpd south of Claribel Road.

Oakdale Road is a major north-south arterial that extends from an intersection on Patterson Road (SR 108) south through Riverbank into Modesto to its southern terminus on Scenic Drive where the route becomes El Vista Avenue. Oakdale Road is a divided four-lane facility in most of Riverbank, but the segment from Morrill Road to Westgate Drive (Crawford Road) has a single southbound lane. Riverbank has plans to widen and complete this section in 2023-2024. Oakdale Road narrows to two-lanes in Modesto between Claribel Road and Claratina Avenue. The route gains a second southbound lane south of Claratina Avenue and is four-lanes south of Sylvan Avenue. The posted speed limit on Oakdale Road is 45 mph in Riverbank.

Traffic counts in March 2020 indicated that Oakdale Road carried 13,548 vpd between Patterson Road and Morrill Road, 13,801 vpd between Morrill Road and Westgate Drive (Crawford Road) , 17,306 vpd between Westgate Drive (Crawford Road) and Claribel Road and 18,816 vpd between Claribel Road and Claratina Avenue.

Skittone Road is a local Stanislaus County Road that extends south from Patterson Road to Westgate Drive (Crawford Road). This two-lane rural road provides access to a few rural residences. Based on the peak hour volume at the Patterson Road intersection, Skittone Road is estimated to carry less than 200 vpd.

Hot Springs Lane, Rock Creek Road and **Silverock Road** are two-lane local City of Riverbank streets that intersect Patterson Road (SR 108) opposite the project area at the western end of the existing Riverbank city limits. Hot Springs Road and Rock Creek Road provide access to roughly 70 existing homes, and these roads do not extend beyond the limits of this neighborhood. The estimated daily traffic volume on either street would be in the range of 400 vpd. Silverock Road connects Patterson Road and Oakdale Road, and about 175 homes have access via the street. The daily traffic volume on this street would be in the range of 1,200 to 1,500 vpd, depending on the location.

The area circulation system includes these east-west streets:

Morrill Road is an east-west collector street that runs from Coffee Road to Roselle Avenue through western Riverbank. Morrill Road is a two-lane facility. Traffic counts conducted for this study indicated that Morrill Road carried 2,472 vpd between Coffee Road and Oakdale Road in 2020.

Westgate Drive (Crawford Road) is a discontinuous east-west road in the area between McHenry Avenue and Oakdale Road. The segment of Crawford Road within Riverbank city limits was renamed Westgate Drive. One segment connects McHenry Avenue and Skittone Road, and another extends easterly from Coffee Road through the middle of the CWSP area across Oakdale Road to Roselle Avenue. Westgate Drive (Crawford Road) is a two-lane roadway in both areas. The western areas of both segments of Westgate Drive (Crawford Road) provides access to several rural residences. To minimize traffic in the eastern area a raised median was installed in the Oakdale Road / Westgate Drive (Crawford Road) intersection to preclude east-west through traffic. That feature is being eliminated with the CWSP, and eventually the eastern segment will be re-routed to a new intersection on Coffee Road further north.

Claribel Road is a major east-west Arterial that extends easterly from an intersection on McHenry Avenue (SR 108) at Kiernan Avenue along the south side of Riverbank into rural Stanislaus County beyond Oakdale-Waterford Highway. The Stanislaus County General Plan Circulation Element identified Claribel Road as a Minor Arterial in the areas that are not within the future NCC alignment. Claribel Road is designated an Arterial in the Riverbank General Plan Circulation Element. Today Claribel Road is a four-lane facility from McHenry Avenue to Oakdale Road, but between Oakdale Road and Squire Wells Way the north side has been widened to its ultimate four-lane width. The posted speed limit is 45 mph.

Traffic counts conducted for this study in March 2020 indicated that Claribel Road carried 28,870 vehicles per day (vpd) in the area from McHenry Avenue to Coffee Road and 25,865 vpd from Coffee Road to Oakdale Road.

Claratina Avenue – Pelandale Avenue is an east-west expressway across northern Modesto from SR 99 to Oakdale Road. Today Claratina Avenue is a two-lane road east of McHenry Avenue, but the City of Modesto is pursuing a project to widen Claratina Avenue to four-lanes.

Future North County Corridor (NCC). Future plans for regional circulation in this area of Stanislaus County involve the development of bypass routes to reduce traffic on existing state routes and other major facilities. The North County Corridor (NCC) Expressway is expected to link SR 99 in northern Modesto with SR 120/108 east of Oakdale. The NCC is identified in the Riverbank General Plan Element and Stanislaus County General Plan Circulation Element. The NCC will become State Route 108 when completed.

Intersections. In urban areas the quality of traffic flow during peak traffic hours is typically governed by the flow of traffic through major intersections. This analysis considers nineteen existing intersections in the vicinity of RWSP:

The **McHenry Avenue / River Road intersection** is in rural San Joaquin County just north of the Stanislaus River Bridge. The intersection was recently reconstructed to install a traffic signal and to widen McHenry Avenue to provide two through travel lanes in each direction. Those second lanes end just beyond the intersection.

The **McHenry Avenue / Stewart Road intersection** is a signalized "tee" intersection in Stanislaus County.

The **McHenry Avenue (SR 108) / Patterson Road (SR 108) / Ladd Road junction** is a set of three closely spaced signalized intersections. The main intersection is on McHenry Avenue and has two travel lanes in each direction on McHenry Avenue. Separate left turn lanes are provided on each approach, and a westbound right turn lane is provided. The route for SR 108 "by-passes" the main intersection via signalized intersections that are roughly 600 feet to the east and south. The eastern intersection has single through lanes and a westbound left turn lane. At the southern intersection McHenry Avenue has two southbound lanes and a two-lane northbound approach that is a single through lane and right turn lane.

Two unsignalized intersections exist on McHenry Avenue south of Patterson Road. The **McHenry Avenue / Francis Avenue intersection** is a "tee" that has a northbound left turn lane that continues as a receiving area for eastbound left turns. **The McHenry Avenue / Westgate Drive (Crawford Road) intersection** is a "tee" located in an area where McHenry Avenue has no center turn lane area.

The **McHenry Avenue (SR 108) / Kiernan Avenue / Claribel Road intersection** is controlled by an actuated traffic signal. The four-lane McHenry Avenue approaches have two through lanes and separate left turn and right turn lanes. The six-lane eastbound Kiernan Avenue approach has dual left turn lanes, three through lanes and a separate right turn lane. The westbound Claribel Road approach has dual left turn lanes, a through lane and a combined through+right turn lane. Crosswalks are striped across each leg of the intersection.

The **Carver Road / Ladd Road intersection** lies in Stanislaus County west of McHenry Avenue. The all-way stop controlled intersection has single lane approaches.

The **Patterson Road / Skittone Road intersection** is a "tee" controlled by a stop sign on the northbound approach. Each approach has a single travel lane.

The **Patterson Road (SR 108) / Coffee Road intersection** is a "tee" controlled by a stop sign on the southbound Coffee Road approach. The intersection is configured with single approach lanes which combine through and turning traffic, but a short westbound left turn lane is provided. No crosswalks exist at this location.

The **Patterson Road / Oakdale Road intersection** is controlled by an actuated traffic signal. The three-lane Oakdale Road approaches each have separate left turn, through lane and right turn lane, and the northbound right turn lane operates with an overlap phase. The westbound Patterson Road approach has dual left turn lanes. Crosswalks are striped across all legs of the intersection.

The **Coffee Road / Morrill Road intersection** is a "tee" controlled by a stop sign on the westbound Morrill Road approach. Each approach has a single lane, and there are no crosswalks at this intersection.

The **Coffee Road / Westgate Drive (Crawford Road) intersection** is a "tee" controlled by a stop sign on the westbound Westgate Drive (Crawford Road) approach. Each approach has a single lane, and there are no crosswalks at this location.

The **Coffee Road / Claribel Road intersection** is controlled by an actuated traffic signal. The three-lane Coffee Road approaches have separate left turn lane, through and right turn lanes. The eastbound Claribel Road approaches has a left turn, two through lanes and space for second left turn lane. The westbound approach has dual left turn lanes, two through lanes and a right turn lane. Crosswalks are striped across each leg of the intersection.

The **Coffee Avenue / Claratina Avenue intersection** in Modesto is controlled by an "interim" single lane roundabout with bypass lanes. The intersection is expected to be modified as part of the City's future Claratina Avenue improvement project.

The **Oakdale Road / Morrill Road intersection** is controlled by an actuated traffic signal. Each approach has three lanes. The Morrill Road approaches have separate left turn, right turn and through lanes, as does the southbound Oakdale Road approach. The northbound Oakdale Road approach has a left turn lane, a through lane and a combined through+right turn lane. Crosswalks are available on all legs of the intersection.

The **Oakdale Road / Claribel Road intersection** is controlled by an actuated traffic signal. The Claribel Road approaches have two through lanes and a separate left turn lane, and the westbound approach has a separated right turn lane. The northbound Oakdale Road approach has a left turn lane, a through lane and a combined through+right turn lane. The three-lane southbound Oakdale Road approach has separate left turn, through and right turn lanes. Crosswalks exist on all four legs of the intersection.

The **Claratina Avenue / Oakdale Road intersection** in Modesto is a "tee" controlled by a stop sign on the eastbound Claratina Avenue approach. The City of Modesto has secured funding to install a traffic signal at this location, but no changes to intersection geometry will occur. The intersection features a single through lane in each direction on Oakdale Road, and a northbound left turn lane is provided. The eastbound Claratina Avenue approach has separate left turn and right turn lanes, and the right turn lane continues beyond the intersection as the second southbound lane on Oakdale Road. Today there are no crosswalks at the intersection.

Alternative Transportation Modes

The Stanislaus County 2021 Non-Motorized Transportation Plan[1] (NTP) provides information regarding existing and planned facilities for pedestrians and bicyclists in this area of the County.

Pedestrian System. A majority of roadways in the developed areas of the City of Riverbank provide sidewalks and crossings for pedestrians, but these facilities are limited in the rural areas of the community that have not been developed and in the unincorporated areas of Stanislaus County near Riverbank. Pedestrians use paved shoulders along state highways. As noted in Table 1 sidewalks exist on SR 108 (Patterson Road) easterly from the Riverbank City limits.

A multipurpose trail (Class I bike trail) is planned along the south side of the MID Main canal through the Crossroads West Specific Plan (CWSP) linking Patterson Road (SR 108) with the Riverbank Sports Complex on Morrill Road.

TABLE 1
EXISTING SIDEWALK INVENTORY

Street	From	To	Side	Sidewalk
SR 108 (Patterson Road)	McHenry Avenue	Coffee Road	North	None
			South	None
	Coffee Road	Hot Springs Lane	North	None
			South	None
	Hot Springs Lane	600 feet west of Oakdale Road	North	Non
			South	Yes
	600 feet west of Oakdale Road		North	Yes
			South	Yes
McHenry Avenue	Patterson Road	900 feet south of Stewart Street	West	No
			East	No
	900 feet south of Stewart Street	Stewart Street	East	No
			West	Yes
	Stewart Street	Stanislaus River Bridge	East	No
			West	No
	Stanislaus River Bridge	River Road	East	No
			West	Yes

[1] http://www.stancog.org/pdf/documents/final_nonmotorized_transportation_plan.pdf

Bicycle Facilities. The NTP provides guidance with regard to regional bicycle facilities and suggests the following classifications for bikeways:

- Class 1 Bikeways: Bike paths that are separated from vehicular traffic
- Class 2 Bikeways: Bike lanes that are striped on streets alongside vehicular traffic
- Class 3.5 Bikeways: Bike routes where bicycles and vehicles share the road but where wide shoulders are available
- Class 3 Bikeways: Bike routes where bicycles and vehicles share the road but are only signed
- Class 4 Separated Bike Lanes: Bikes lanes with physical separation between cyclists and other vehicles

Dedicated bicycle facilities are limited in the area of the project today (NTP Appendix B.1).

Class 2 bike lanes exist on:

- Claribel Road from McHenry Avenue to Squire Wells Way west of Oakdale Road
- Morrill Road east of Oakdale Road
- Westgate Drive (Crawford Road) east of Oakdale Road

The NTP notes that cyclists using Paterson Road through Riverbank experience a high level of "Traffic Stress" (NTP Appendix B.2), as do cyclists on SR 108 and on McHenry Avenue north of Patterson Road.

The NTP identified "Potential Bicycle Barriers" (Appendix B.3), and in the study area those barriers are on Oakdale Road at the Modesto Main Canal crossing and at the crossing on Morrill Road east of Oakdale Road.

The NTP suggests these improvements:

- Patterson Road (SR 108) from McHenry Avenue east to the Riverbank city limit: Class 3.5 Bicycle Route (wide shoulders).
- Patterson Road (SR 108) from the city limit through Riverbank: Class 4 Separated Bicycle Lanes.
- McHenry Avenue (SR 108) south of Patterson Road: Class 3.5 Bicycle route (wide shoulders).
- In addition to the MID main canal trail, the CWSP circulation plan identifies Class I trails extending south from the MID Main Canal trail along a new north-south collector street and along Oakdale Road to Claribel Road.

Public Transit. The StanCOG 2019 Transit Efficiency and Innovations Study[2] provides information regarding transit services in this area. Riverbank is served by one transit provider, ***Stanislaus Regional Transit (StaRT)***. StaRT offers fixed route services and reported 309,935 annual boardings in 2017-2018. This ridership was equal to 0.6 annual ride per capita. StaRT Route 60[3] operates Monday through Friday between 5:00 a.m. and 9:43 p.m. This route was reported to average 275 daily boardings with 8 passengers per revenue hour. This bus operates thirteen round trips between Modesto and Oakdale and passes through Riverbank. On Saturday between 6:15 a.m. and 8:34 p.m., seven round trips are provided. The Saturday service is combined with the Modesto/Turlock route. Route follows Claribel Road east to Oakdale Road and then east along Patterson Road to Oakdale. The designated stop closest to the project is at the Oakdale Road / Patterson Road intersection.

Modesto Area Express (MAX) serves the City of Modesto and some outlying communities, and reported 2,175,283 boardings in 2017-2018, and this level of use was equal to 10.6 rides per capita. MAX Route 35 links the City of Escalon with northern Modesto destinations (i.e., Vintage Faire Mall and Kaiser Medical Center[4]), and this route follows McHenry Avenue in the area of the proposed project. Route 35 runs three times daily on weekdays starting in Escalon at 8:12, 1:12 and at 4:12

In response to the 2019 Transit Efficiency and Innovations Study, StaRT and MAX merged under the direction of the Stanislaus Regional Transit Authority in February 2021.

The Riverbank Dial-A-Ride service is available from 6:30 a.m. to 5:30 p.m. Monday through Friday. In 2017-2018 this service carried 1,209 passengers. The ADA Paratransit service is provided as a complement to fixed route service and is available to individuals with disabilities Monday 5:00 a.m. to 10:00 p.m. and Saturday service from 6:15 a.m. to 9:00 p.m. In 2017-2018 this service carried 5,389 passengers.

Analysis Methodologies

Levels of Service were determined at study area intersections and on roadway segments to quantitatively evaluate traffic conditions and to provide a basis for comparing operating conditions with and without project generated traffic.

"Level of Service" (LOS) is a quantitative measure of traffic operating conditions whereby a letter grade "A" through "F" is assigned to an intersection. LOS "A" through "F" represents progressively worsening traffic conditions. The characteristics associated with the various LOS for intersections are presented in Table 2. The City of Riverbank General Plan has established LOS "D" as the minimum standard. Stanislaus County identifies LOS C as its minimum but defers to the standard of the applicable city within adopted Spheres of Influence. The City of Modesto General Plan identified LOS D as the general standard but identifies specific locations where LOS E and LOS F are accepted.

[2] http://www.stancog.org/pdf/transit-efficieny-and-innovations-study.pdf
[3] https://www.srt.org/maps-schedules/
[4] https://www.modestoareaexpress.com/402/Route-35---Escalon-Transit-eTrans

Intersection Level of Service Calculation. Levels of Service were calculated for this study at intersections using the methodology contained in the Highway Capacity Manual, 6th Edition (HCM). Synchro 11.0 software was employed, and in the case closely spaced signalized intersections, SimTraffic simulation was used. The overall Level of Service for intersections was determined based on the average length of delays for all motorists at signalized intersections and locations controlled by all-way stops. At un-signalized intersections the Level of Service was predicated on the length of the average delay experienced by motorists who must yield the right of way before turning or continuing through an intersection, and the Level of Service calculated for the approach with greatest delays was employed for analysis to provide a "worst case" evaluation.

TABLE 2
LEVEL OF SERVICE DEFINITIONS

Level of Service	Signalized Intersection	Unsignalized Intersection	Roadway (Daily)
"A"	Uncongested operations, all queues clear in a single-signal cycle. Delay ≤ 10.0 sec	Little or no delay. Delay ≤ 10 sec/veh	Completely free flow.
"B"	Uncongested operations, all queues clear in a single cycle. Delay > 10.0 sec and ≤ 20.0 sec	Short traffic delays. Delay > 10 sec/veh and ≤ 15 sec/veh	Free flow, presence of other vehicles noticeable.
"C"	Light congestion, occasional backups on critical approaches. Delay > 20.0 sec and ≤ 35.0 sec	Average traffic delays. Delay > 15 sec/veh and ≤ 25 sec/veh	Ability to maneuver and select operating speed affected.
"D"	Significant congestions of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. Delay > 35.0 sec and ≤ 55.0 sec	Long traffic delays. Delay > 25 sec/veh and ≤ 35 sec/veh	Unstable flow, speeds and ability to maneuver restricted.
"E"	Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). Delay > 55.0 sec and ≤ 80.0 sec	Very long traffic delays, failure, extreme congestion. Delay > 35 sec/veh and ≤ 50 sec/veh	At or near capacity, flow quite unstable.
"F"	Total breakdown, stop-and-go operation. Delay > 80.0 sec	Intersection blocked by external causes. Delay > 50 sec/veh	Forced flow, breakdown.

Sources: Highway Capacity Manual, 6th Edition.

Roadway Segment Level of Service. The general Level of Service on roadway segments was determined based on fee adopted planning level thresholds of each agency.

City of Riverbank. Roadway service levels within the Sphere of Influence of the City of Riverbank are determined by comparing traffic volumes for selected roadway segments with daily LOS capacity thresholds. These thresholds, shown in Table 3, are taken from the City of Riverbank General Plan EIR.

TABLE 3
CITY OF RIVERBANK
LEVEL OF SERVICE THRESHOLDS BASED ON SEGMENT TRAFFIC VOLUME

Classification / Terrain	Pavement Width	Shoulder Width	Level of Service Threshold				
			A	B	C	D	E
Two Lane Collector			-	-	7,700	11,600	12,900
Two Lane Undivided Urban Arterial			-	10,200	13,500	14,800	15,700
Four Lane Divided Urban Arterial			-	22,800	29,500	31,700	33,400
Six Lane Divided Urban Arterial			-	35,100	45,000	47,900	50,300
Rural Road - two lanes in "Level" terrain (HCM)	22	0	105 vph	285 vph	510 vph	920 vph	1,965 vph
Rural Road – Daily Volume Threshold for This Analysis			1,050	2,850	5,100	9,200	19,650

Source: City of Riverbank GPU EIR, Table 4.15-2

Stanislaus County. Service levels for roadways in Stanislaus County are also determined by comparing traffic volumes for selected roadway segments with the daily LOS capacity thresholds. These thresholds are shown in Table 4. These thresholds are taken from the Stanislaus County General Plan Circulation Element, which was last updated August 23, 2016.

TABLE 4
STANISLAUS COUNTY ROADWAY SEGMENTS
LEVEL OF SERVICE CRITERIA

Facility Type	Maximum Daily Volume				
	LOS A	LOS B	LOS C	LOS D	LOS E
2-lane Collector – Rural Minor	700	1,900	3,400	5,900	10,000
2-lane Collector – Rural Major	700	1.900	3,400	5,900	10,000
4-lane Collector – Rural Major	5,600	9,400	13,200	15,800	20,000
4-lane Arterial – Rural Minor	12,000	20,000	28,000	33,600	40,000
4-lane Arterial – Rural Principal	15,000	25,000	35,000	42,000	50,000

SOURCE: Stanislaus County General Plan Circulation Element (August 23, 2016)

City of Modesto. The City of Modesto General Plan identifies roadway segment Level of Service based on directional daily lane capacity. Table 5 presents these thresholds.

TABLE 5
CITY OF MODESTO ROADWAY SEGMENTS
LEVEL OF SERVICE CRITERIA

Type of Roadway Segment	Hourly Capacity (veh/ln/hr)	Maximum Volume Per Lane					
		A	B	C	D	E	F
Freeway Mainline	2,000	8,000	12,750	18,750	23,130	25,000	>25,000
Expressway (Class A)	1,500	5,630	9,380	13,210	15,750	18,750	>18,750
Expressway (Class B)	1,250	4,690	7,820	10,940	13,130	15,630	>15,630
Expressway (Class C)	1,000	3,750	6,250	8,750	10,500	12,500	>12,500
Principal Arterial	850	3,190	5,320	7,440	8,930	10,630	<10,630
Minor Arterial – 4+ lanes	925	810	2,190	3,930	6,820	11,560	>11,560
Minor Arterial – 4 lanes	750	660	1,780	3,190	5,530	9,380	>9,380
Minor Arterial – 2+ lanes	925	810	2,190	3,930	6,820	11,560	>11,560
Major Collector – 4 lanes	700	2,450	4,110	5,780	6,910	8,750	>8,750
Downtown Collector	700	2,450	4,110	5,780	6,910	8,750	>8,750
Minor Collector – 2+ lanes	925	810	2,190	3,930	6,820	11,560	>11,560
Local Roadway	500	440	1,190	2,130	3,690	6,250	>6,250
Rural Road	900	790	2,140	3,830	6,640	11,250	>11,250

Source: City of Modesto General Plan Master EIR, Table V-1-3

San Joaquin County. Facilities north of the Stanislaus are under the jurisdiction of San Joaquin County. The San Joaquin County General Plan EIR identifies the generalized capacity for two lane rural roadways (i.e., maximum capacity 22,500 ADT) and notes a LOS D threshold of 12,500 ADT.

Intersection Queues. The length of peak period queues at study intersections on state highways was determined as a byproduct of Synchro HCM analysis or SimTraffic simulation. Because Caltrans intends to evaluate the safety aspects of the operation of its facilities based on queuing, this analysis identifies the lengths of 95th percentile queues during peak traffic hours. The 95th percentile queue is not the maximum estimated queue but is the length of queue exceeded only 5% of the time during the peak hour. Projected queue lengths are then compared to these elements of circulations system capacity:

- Length of storage available in left turn lanes
- The distance between closely spaced intersections

An operational / safety issue can arise when estimated queues extend beyond the available distance.

Traffic Signal Warrants. The extent to which traffic signals may be justified is determined based on evaluation of guidelines published in the Manual of Uniform Traffic Control Devices (MUTCD)[5]. These guidelines make use of a system of nine traffic signal **Warrants** that consider various aspects of the effects of traffic controls, including traffic volumes at various times, pedestrian activity, collision history, etc. For this analysis Warrant 3 (peak hour volume warrant) has been applied. It is important to note that satisfaction of a single warrant is not by itself justification for installing a traffic signal. While useful for evaluating the relative effects of a project, an evaluation based on peak hour volumes should be supplemented by consideration of other applicable warrants before making a decision to install a signal.

Existing Traffic Volumes

To quantify existing traffic conditions, a base of current peak hour and daily traffic volume information was assembled from new traffic counts completed by this consultant in March 2020 before the effects of COVID-19 were noticeable. Figure 3 identifies the recorded daily traffic volumes collected on March 11, 2021, as well as the location of study area intersections. Figures 4A/4B present the observed weekday a.m. and p.m. peak hour traffic counts made at key intersections while are schools were in session on March 4, 2021. Current information regarding the number of lanes and traffic control devices assumed for Level of Service analysis are also presented in those figures.

Current Traffic Operating Conditions

Roadway Segment Level of Service. Current daily traffic volumes on key roadway segments in the vicinity of the project, along with the current jurisdiction with authority for the road are shown in Table 6. The maximum capacity of each road is also presented. Current volumes were compared to each agency's adopted LOS thresholds, and the results are also presented in Table 6. While most roadways carry volumes that satisfy the applicable minimum Level of Service goal, three segments operate with unacceptable Level of Service:

McHenry Avenue. The two-lane segments of McHenry Avenue north of Kiernan Avenue carry volumes that result in Levels of Service that exceed the minimum LOS standards for each agency along the route. The northern portion beyond Ladd Road is in the County's RTF fee program, and improvements by Stanislaus County have been announced beginning in fall of 2021.

Ladd Road. Ladd Road operates at LOS E-F from Stoddard Road to McHenry Avenue based on Stanislaus County thresholds.

Patterson Road (SR 108). The two-lane segments of Patterson Road west of Riverbank from McHenry Avenue to Hot Springs Lane operates at LOS F and LOS E under the thresholds adopted by Stanislaus County and the City of Riverbank. This roadway is in the City of Riverbank traffic impact fee program.

[5] Manual of Uniform Traffic Control Devices, Transportation Research Board, 2014

Oakdale Road. In Modesto, the two-lane segment of **Oakdale Road south of Claribel Road** carries a daily volume that is indicative of LOS E under the City's General Plan thresholds. A four-lane section would be needed to deliver the minimum LOS today, and this roadway is included in the City of Modesto's CFF program as a 6-lane principal arterial street.

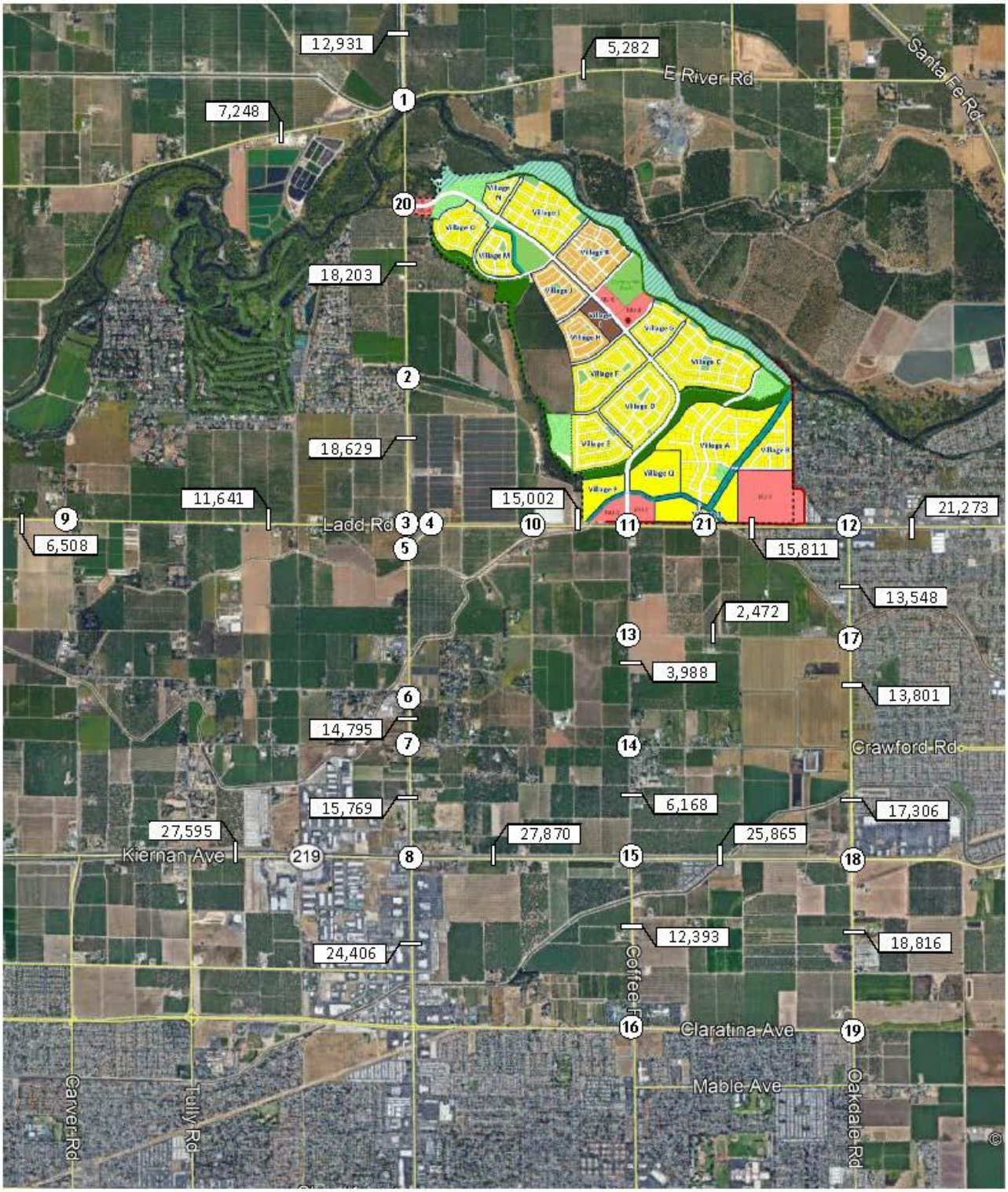
Intersection Levels of Service. Current a.m. and p.m. peak hour Levels of Service were calculated at existing study intersections (Refer to Appendix for calculation worksheets) under "Existing" conditions, and the results are presented in Table 7.

As indicated, with two exceptions, the Level of Service at each location satisfies the minimum LOS D standard established by the respective agencies. The two exceptions are:

- ***McHenry Avenue / Westgate Drive (Crawford Road),*** where the westbound approach operates at LOS E in the p.m. peak hour.
- ***Patterson Road (SR 108) / Coffee Road,*** where the northbound approach operates at LOS F in the a.m. peak hour and LOS E in the p.m. peak hour. A traffic signal at this location is in the City traffic impacts fee program.

Intersection 95th Percentile Queues. As requested by Caltrans, Table 8 identifies the 95th percentile queues calculated for intersections on SR 108. As indicated, all locations experience peak period queues that do not exceed the available storage, including subsequent two-way left-turn (TWLT) area.

Traffic Signal Warrants. Current traffic volumes were compared to the thresholds contained in Warrant 3 (peak hour volume) to determine whether traffic signals might be justified today at any un-signalized intersection. The results are also indicated in Table 9. As shown current peak hour volumes at the ***Patterson Road (SR 108) / Coffee Road intersection*** satisfy peak hour volume warrants during the a.m. and p.m. peak hours. Volumes at other locations do not reach the level that satisfies the peak hour warrant.

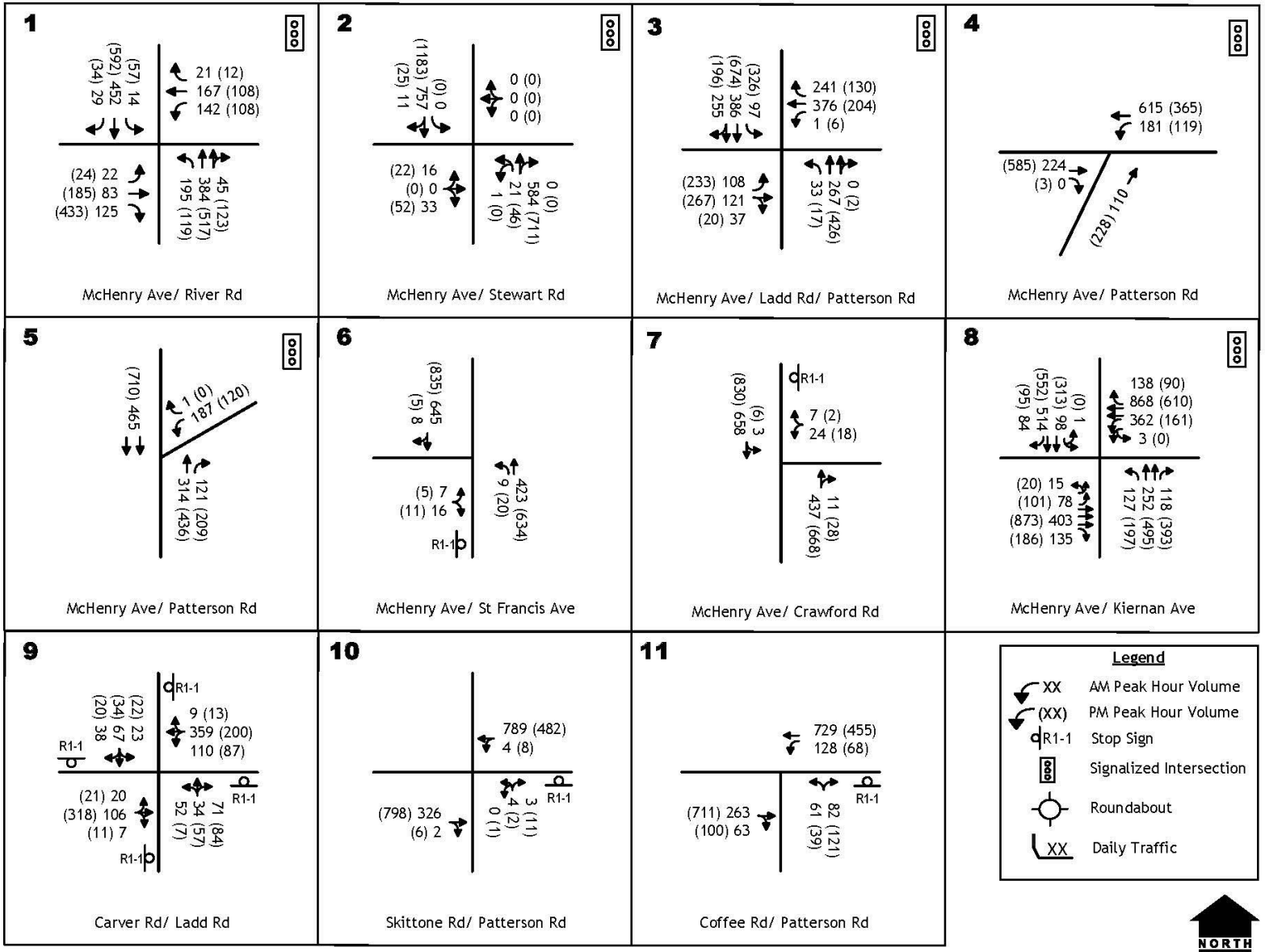


REGIONAL STUDY LOCATIONS
AND AVERAGE DAILY TRAFFIC VOLUMES

KD Anderson & Associates, Inc.
Transportation Engineers

2290-02 RA 8/31/2021

figure 3

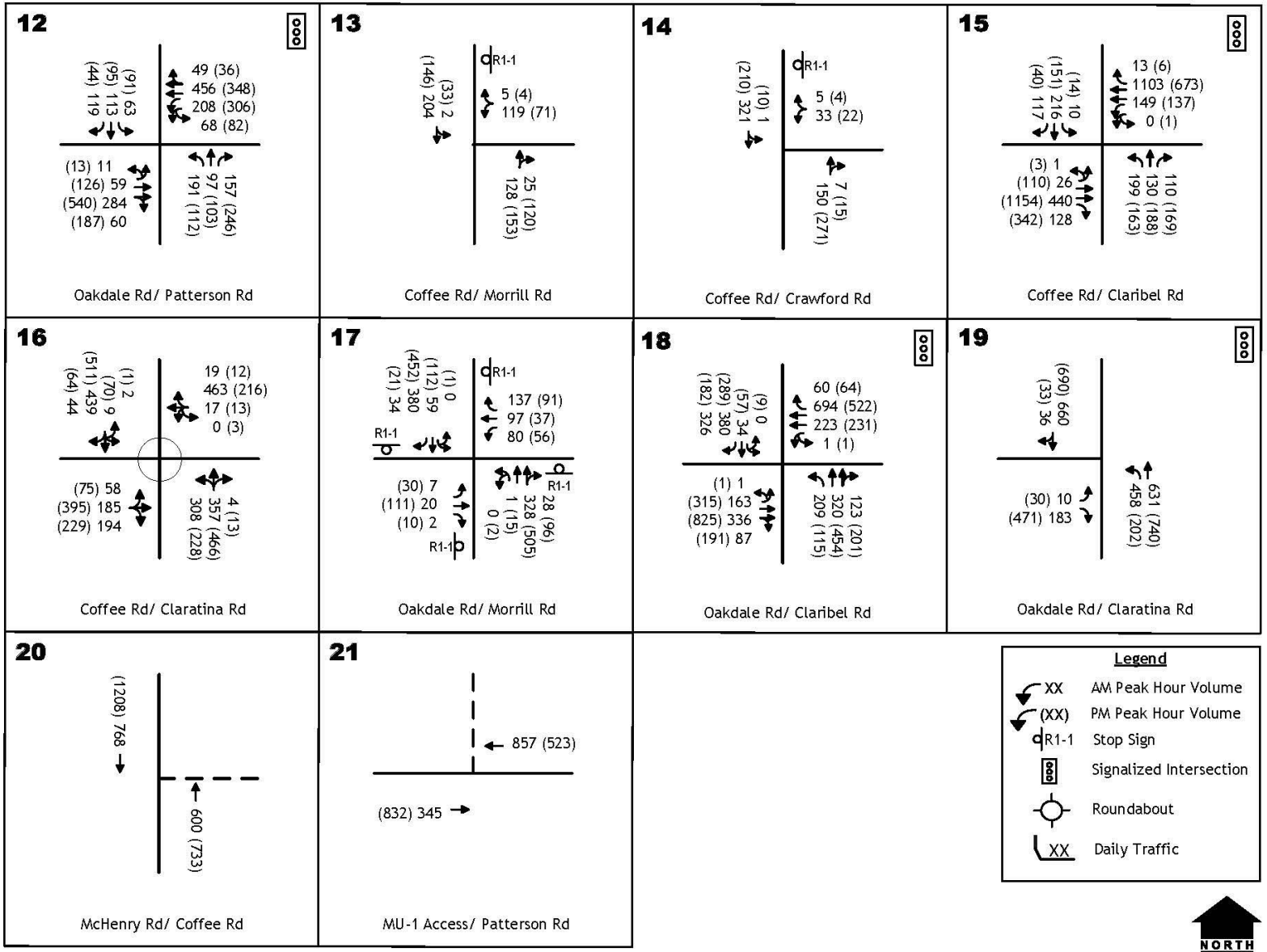


EXISTING TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers

2290-02 RA 8/31/2021

figure 4a



EXISTING TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers
2290-02 RA 8/31/2021

figure 4b

TABLE 6
EXISTING ROADWAY SEGMENT LEVELS OF SERVICE

Roadway	Location	Jurisdiction	Class	Maximum Volume (ADT)	LOS D Threshold (ADT	Existing Conditions	
						Volume (ADT)	LOS
McHenry Ave	Jones Road to River Road	San Joaquin Co	2-lane Min Art	24,900	12,500	**12,930**	**E**
	River Road to Coffee Road	Stanislaus Co	2-lane Arterial	10,000	5,900	**18,205**	**F**
	Coffee Road to Stewart Road	Stanislaus Co	2-lane Arterial	10,000	5,900	**18,205**	**F**
	Stewart Road to Ladd Road	Stanislaus Co	2-lane Arterial	10,000	5,900	**18,830**	**F**
McHenry Ave (SR 108)	Ladd Road to Westgate Drive (Crawford Road)	Caltrans / Stanislaus	2-lane arterial	10,000	5,900	**14,795**	**F**
	Westgate Drive (Crawford Road) to Kiernan Ave	Caltrans / Stanislaus	2-lane Arterial	10,000	5,900	**15,770**	**F**
	Kiernan Ave to Pelandale Ave	Caltrans / Modesto	4-lane Arterial	42,520	35,720	24,505	C
River Road	Murphy Road to McHenry Ave	San Joaquin Co	2-lane Maj Col	24,900	12,500	7,250	C
	McHenry Ave to Harold Ave	San Joaquin Co	2-lane Maj Col	24,900	12,500	5,285	C
Ladd Road	Stoddard Road to Carver Road	Stanislaus Co	2-lane Arterial	10,000	5,900	**6,610**	**E**
	Carver Road to McHenry Ave	Stanislaus Co	2-lane Arterial	10,000	5,900	**11,640**	**F**
Patterson Road (SR 108)	McHenry Ave to Coffee Road	Caltrans / Stanislaus	2-lane Arterial	10,000	5,900	**15,000**	**F**
	Coffee Road to Oakdale Road	Caltrans / Riverbank	2-lane Arterial	15,700	14,800	**15,810**	**E**
	Oakdale Road to Jackson Ave	Caltrans / Riverbank	4-lane Arterial	33,400	31,700	21,275	B
Skittone Road	Patterson Road to Westgate Drive (Crawford Road)	Stanislaus Co	2-lane Rural	10,000	5,900	270	A
Morrill Road	Coffee Road to Oakdale Road	Riverbank	2-lane Collector	12,900	11,600	2,475	B
Kiernan Ave (SR 219)	Tully Road to McHenry Ave	Caltrans / Stanislaus	4-lane EXP	62,520	52,520	27,595	B
Claribel Road	McHenry Ave to Coffee Road	Stanislaus Co	4-lane Arterial	40,000	33,600	27,870	C
	Coffee Road to Oakdale Road	Riverbank	4-lane Arterial	33,400	31,700	25,865	C
Coffee Road	Patterson Road to Westgate Drive (Crawford Road)	Stanislaus Co	2-lane Rural	10,000	5,900	3,990	C
	Westgate Drive (Crawford Road) to Claribel Road	Stanislaus Co	2-lane Rural	10,000	5,900	6,170	E

TABLE 6
EXISTING ROADWAY SEGMENT LEVELS OF SERVICE

Roadway	Location	Jurisdiction	Class	Maximum Volume (ADT)	LOS D Threshold (ADT	Existing Conditions	
						Volume (ADT)	LOS
	Claribel Road to Claratina Ave	Modesto	2-lane Rural	22,500	13,280	12,395	D
Oakdale Road	Patterson Road to Morrill Road	Riverbank	4-lane Arterial	33,400	31,700	13,550	B
	Morrill Road to Westgate Drive (Crawford Road)	Riverbank	2-lane Arterial	15,700	14,800	13,800	D
	Westgate Drive (Crawford Road) to Claribel Road	Riverbank	4-lane Arterial	33,400	31,700	17,305	B
	Claribel Road to Claratina Ave	Modesto	2-lane Rural	22,500	13,280	**18,815**	**E**

TABLE 7
EXISTING INTERSECTION LEVELS OF SERVICE

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
McHenry Ave / River Rd	Signal	23.4	C	29.0	C
McHenry Ave / Stewart Rd	Signal	8.4	A	51.6	D
McHenry Ave (SR 108) / Ladd Rd	Signal[1]	23.1	C	31.4	C
Patterson Ave (SR 108) / SR 108	Signal[1]	12.2	B	14.6	B
McHenry Ave (SR 108) / SR 108	Signal[1]	8.6	A	8.8	A
McHenry Ave (SR 108) / Francis Ave	EB Stop	14.2	B	16.4	C
McHenry Ave (SR 108) / Crawford Rd	WB Stop	23.5	C	**42.2**	**E**
McHenry Ave (SR 108) / Kiernan Ave	Signal	29.5	D	36.8	D
Carver Rd / Ladd Rd	AWS	24.3	C	12.1	B
Patterson Rd (SR108) / Skittone Rd	NB Stop	19.3	C	18.3	C
Patterson Rd (SR 108) / Coffee Rd	NB Stop	**50.1**	**F**	**43.4**	**E**
Patterson Rd (SR 108) / Oakdale Rd	Signal	22.8	C	31.7	C
Coffee Rd / Morrill Rd	WB Stop	13.1	B	13.0	B
Coffee Rd / Crawford Rd	WB Stop	12.5	C	12.7	B
Coffee Rd / Claribel Rd	Signal	32.5	C	33.3	C
Coffee Rd / Claratina Rd	Roundabout	27.7	D	23.7	C
Oakdale Rd / Morrill Rd	Signal	16.5	B	19.3	B
Oakdale Rd / Claribel Rd	Signal	50.9	D	48.8	D
Oakdale Rd / Claratina Rd	Signal[2]	32.1	C	13.5	B

[1] based on SimTraffic simulation
[2] planned for construction by the City of Modesto in Summer 2021.
BOLD values exceed LOS D

TABLE 8
EXISTING INTERSECTION QUEUES ON STATE HIGHWAYS

Intersection	Lane	Storage (feet)	AM Peak Hour Existing Volume (vph)	AM Peak Hour Existing 95th % Queue (feet)	PM Peak Hour Existing Volume (vph)	PM Peak Hour Existing 95th % Queue (feet)
McHenry Ave (SR 108) / Ladd Rd[1]	NB left	180	33	60	17	60
	SB left	300	97	105	364	285
	EB left	260	108	120	234	235
	WB left	90	1	<25	6	<25
Patterson Ave (SR 108) / SR 108[1]	WB left	530	181	130	123	120
McHenry Ave (SR 108) / SR 108[1]	WB left	750[2]	188	145	124	125
McHenry Ave (SR 108) / Francis Ave	NB left	90[3]	9	<25	20	<25
McHenry Ave (SR 108) / Crawford Rd	SB thru+left		3	<25	6	
McHenry Ave (SR 108) / Kiernan Ave	NB left	220[3]	127	255	231	385
	SB left	415[3]	99	185	313	585
	EB left (2)	770	93	105	131	110
	WB left (2)	965	365	280	285	165
Patterson Rd (SR108) / Skittone Rd	WB thru+left	n.a.	4	<25	8	<25
Patterson Rd (SR 108) / Coffee Rd	WB left	75	128		76	
Patterson Rd (SR 108) / Oakdale Rd	NB left	140[3]	191	240	115	205
	SB left	80[3]	63	105	91	180
	EB left	535	70	110	139	210
	WB left (2)[4]	500	276	190	513	290

[1] based on SimTraffic simulation
[2] distance to Patterson Rd. [3] lane continues as TWLT lane. [4] #2 turn lane continues for 250 feet
BOLD values are lengths that exceed storage

TABLE 9
EXISTING TRAFFIC SIGNAL WARRANTS

Intersection	Approach	AM Peak Hour		PM Peak Hour	
		Volume (vph)	Met?	Volume (vph)	Met?
McHenry Ave (SR 108) / Francis Ave	Major	1,085	No	1,494	No
	Minor	23		16	
McHenry Ave (SR 108) / Crawford Rd	Major	1,109	No	1,532	No
	Minor	31		20	
Carver Rd / Ladd Rd	Major	611	No	650	No
	Minor	157		148	
Patterson Rd (SR108) / Skittone Rd	Major	1,121	No	1,294	No
	Minor	7		14	
Patterson Rd (SR 108) / Coffee Rd	Major	**1,183**	**Yes**	**1,334**	**Yes**
	Minor	**143**		**160**	
Coffee Rd / Morrill Rd	Major	359	No	452	No
	Minor	124		75	
Coffee Rd / Crawford Rd	Major	479	No	506	No
	Minor	38		26	

POLICIES / PROGRAMS AND SIGNIFICANCE CRITERIA

Policies of local jurisdictions that affect circulation have been identified, and existing programs to fund circulation system improvements have been identified. The significance criteria for this analysis were developed from criteria presented in the "Environmental Checklist Form," of the CEQA Guidelines and based on the professional judgment of the City of Riverbank and this consultant. The significance criterion varies by jurisdiction. The significance criteria for the City of Modesto, Stanislaus County, and Caltrans are described below.

The following information is a description of the existing regulatory setting conditions in the project study area. While CEQA guidelines govern the overall transportation analysis, the study area includes streets and highways that are governed by various state and local jurisdictions. Each has adopted policies and minimum LOS standards for their facilities.

SB 743

SB 743 governs the application of new CEQA guidelines for addressing transportation impacts based on Vehicle Miles Traveled (VMT).

> ***SB 743.*** Senate Bill 743 (Steinberg, 2013), which was codified in Public Resources Code section 21099, required changes to the guidelines implementing CEQA (CEQA Guidelines) (Cal. Code Regs., Title 14, Div. 6, Ch. 3, § 15000 et seq.) regarding the analysis of transportation impacts. The Governor's Office of Planning and Research (OPR) has proposed, and the California Natural Resources Agency (Agency) has certified and adopted, changes to the CEQA Guidelines that identify vehicle miles traveled (VMT) as the most appropriate metric to evaluate a project's transportation impacts. With the California Natural Resources Agency's certification and adoption of the changes to the CEQA Guidelines, automobile delay, as measured by "level of service" and other similar metrics, generally no longer constitutes a significant environmental effect under CEQA. (Pub. Resources Code, § 21099, subd. (b)(3).)"

The California Governor's Office of Planning and Research (OPR) document *Technical Advisory on Evaluating Transportation Impacts in CEQA* (California Governor's Office of Planning and Research 2018) provides general direction regarding the methods to be employed and significance criteria to evaluate VMT impacts, absent polices adopted by local agencies. At the time this analysis commenced, the City of Riverbank and Stanislaus County had not adopted guidelines for analyzing VMT or determining the significance of a project's impact on VMT. The VMT analysis presented herein is not intended to pre-empt any City process of developing and adopting VMT guidelines. Rather, the analysis presented in this traffic impact study is intended to be a good-faith effort at disclosing and identifying the VMT impacts of the project based on currently available data and guidance.

Caltrans

Caltrans is responsible for state highways and the intersections where freeway ramps intersect the local street system. Caltrans generally strives to maintain LOS C on its facilities but recognizes that circumstances may limit their ability to do so. The following three documents are relevant.

Traffic Study Guidelines. The Caltrans document *Transportation Impact Study Guide* (California Department of Transportation 2020) identifies circumstances under which Caltrans determines that a traffic impact study would be required. The document also details information that is to be included in the study, analysis scenarios, and guidance on acceptable analysis methodologies, including CEQA focus on VMT rather than LOS, alternative transportation modes and safety.

State Route 108 Transportation Concept Report. The Caltrans document *Transportation Concept Report – State Route 108 - District 10* (California Department of Transportation 2014) (TCR) is applicable to the highway. A TCR is a long-term planning document that each Caltrans district prepares for every state highway or portion thereof in its jurisdiction. This document usually represents the first step in Caltrans' long-range corridor planning process. The purpose of a TCR is to determine how a highway will be developed and managed so that it delivers the targeted LOS and quality of operations that are feasible to attain over a 20-year period. These are indicated in the "route concept." In addition to the 20-year route concept level, the TCR includes an "ultimate concept," which is the ultimate goal for the route beyond the 20-year planning horizon. Ultimate concepts must be used cautiously, however, because unforeseen changes in land use and other variables make forecasting beyond 20 years difficult. TCRs do not necessarily consider the amount, type, and location of development within local agency General Plans According to the SR 108 TCR, SR 108 from McHenry Avenue to Oakdale Road is designated as part of the IRRS, is subject to the general LOS criteria (LOS C) and is ultimately a four-lane facility. The Concept Level of Service is LOS D east of Oakdale Road.

Traffic Operations Policy Directive 13-02. Caltrans policy regarding applicable traffic controls has recently been expanded based on Traffic Operations Policy Directive 13-02. This directive requires that Caltrans consider the relative merits of alternative traffic controls when it becomes necessary to stop traffic on state highways. Roundabouts are the default intersection control, but all-way stops and traffic signals are to be considered. The policy directive requires preparation of an *Intersection Control Evaluation (ICE)* to determine the preferred traffic control.

Stanislaus Council of Governments (StanCOG)

2018 Regional Transportation Plan. The Regional Transportation Plan (RTP) is the region's blueprint for future transportation improvements and investments based on specific transportation goals and objectives defined by StanCOG, the public and elected officials. The

RTP is a 25-year planning tool prepared by the Metropolitan Planning Organization (MPO) to encourage and promote the safe and efficient management, operation and development of a regional intermodal transportation system that will serve the mobility needs of goods and people. The RTP covers all modes of a complete transportation system, including roadways, transit, bicycle/pedestrian improvements and aviation.

Transportation helps shape an area's economic health and quality of life; it influences the pattern of growth and economic activity through accessibility to land. Transportation also affects other public policy issues, like air quality, affordable housing, jobs/housing balance, and safety among many others. Transportation planning recognizes the critical links between transportation and other societal goals. The RTP process is more than merely listing highway and transit projects; it requires developing strategies for operating, managing, maintaining and financing the region's transportation system in such a way as to advance the region's long-term goals.

As the Metropolitan Planning Organization (MPO) and Regional Transportation Planning Agency (RTPA) for the Stanislaus region, StanCOG updates the RTP every four years. StanCOG adopted its 2018 RTP on August 15, 2018.

2021 Non-Motorized Transportation Plan. The StanCOG Non-Motorized Transportation Plan sets goals, assesses existing conditions, and identifies opportunities to improve non-motorized travel options and increase access to public transportation in the Stanislaus Region. It Identifies priority bicycle and pedestrian facilities that enhance regional connectivity and existing barriers such as railways, freeways, and waterways. This Plan helps identify and align new walking and bicycling projects with local, state, and federal funding sources to help make Stanislaus communities more competitive for future funding.

City of Riverbank

The City's goals, polices and implementation strategies regarding transportation and circulation are presented in its General Plan Circulation Element.

Goals and Policies. Goals and policies in this Element address various aspects of the circulation of people and goods to support buildout of the Riverbank General Plan.

Goal CIRC-1 Riverbank's Circulation Network Provides Convenience and Choice among All Modes of Transportation

Policy CIRC-1.1 Approved plans, projects, and subdivision requests in new growth areas shall include the construction or pro-rata funding of transportation infrastructure that includes a connected and integrated system of bicycle facilities and pedestrian facilities, designed to comply with the Americans with Disabilities Act.

Policy CIRC-1.2 Approved plans, projects, and subdivision requests in new growth areas shall provide a fully connected network of smaller roadways that provide many alternative routes between each point of origin and destination.

Policy CIRC-1.3 Approved projects, plans, and subdivision requests in new growth areas shall arrange streets in an interconnected block pattern, so that pedestrians, bicyclists, and drivers are not forced onto arterial streets for inter- or intra-neighborhood travel. This approach will also ensure safe and efficient movement of emergency responders.

Policy CIRC-1.4 Approved projects, plans, and subdivision requests with an internal street network shall provide an internal connectivity index of 1.4 or higher. The connectivity index is calculated by dividing the total number of road segments the number of nodes. Nodes are intersections plus cul-de-sacs. Roadway segments are between intersections. Cul-de-sacs are prohibited except where physical constraints make any other roadway solution impossible. The City may require higher levels of connectivity, beyond this standard, and will review plans and projects to take advantage of opportunities to provide more connectivity.

Policy CIRC-1.5 Approved projects, plans, and subdivision requests shall connect with adjacent roadways and stubbed roads and shall provide frequent stubbed roadways in coordination with future planned development areas. Plans and projects shall connect to adjacent planned development areas and adjacent roadways at a minimum of 600-foot intervals. This minimum interval does not apply to development areas that are adjacent to existing or planned future limited-access highways, freeways, or expressways.

Policy CIRC-1.6 Approved projects, plans, and subdivision requests shall provide a roadway network such that driving distance from any dwelling to the nearest collector street is a maximum of 2,000 feet and no more than three turning movements at intersections are required in order to travel from any home to a collector street

Policy CIRC-1.7 The City will ensure frequent street and trail connections between new residential developments and established neighborhoods, between downtown and surrounding neighborhoods, across the railroad, across the river, and between other important origin and destination points.

Policy CIRC-1.8 City street improvement standards and the street classification system will reflect the need to accommodate the full range of locally available travel modes.

Policy CIRC-1.9 In new and existing developed areas, the City will invest in a convenient, well-maintained, and safe system of pedestrian and bicycle paths that connect residences with shopping centers, public buildings, parks, places of employment, and schools.

Policy CIRC-1.10 The City will incorporate pedestrian and bicycle improvement projects into the City's Capital Improvements Program.

Policy CIRC-1.11 The City's level of service standards will balance the need to provide convenient vehicular travelways during peak hours of demand with other community goals, such as the desire to accommodate pedestrian and bicycle access.

Policy CIRC-1.12 The City will use Level of Service D as the goal for roadway segments, as measured on a daily basis. The City's goal for peak hour intersection level of service is LOS D. The City may elect to exceed of these standards in favor of other community planning and environmental goals and policies.

Policy CIRC-1.13 City environmental documents and associated mitigation programs will explicitly consider compact development, mixing of land uses, affordable housing, and other pedestrian, bicycle, and transit oriented design elements that generate fewer vehicle trips. Such approved plans, projects, and subdivision requests will have a correspondingly lower contribution toward any roadway or intersection improvement mitigation measures required in City environmental documents.

Policy CIRC-1.14 The City will ensure provision of signage and secure storage facilities in appropriate locations for bicycles.

Policy CIRC-1.15 The City will ensure that the pedestrian network is safe, accessible, attractive and efficient, running largely along public spaces (including streets and open spaces) fronted by houses, and avoids uses that generate major breaks in surveillance on routes to and from public transport and other routes used at night.

Goal CIRC-2 The City's Urban Development Pattern Supports All Locally Available Modes of Transportation

Policy CIRC-1.1 Approved plans, projects, and subdivision requests in new growth areas shall include the construction or pro-rata funding of transportation infrastructure that includes a connected and integrated system of bicycle facilities and pedestrian facilities, designed to comply with the Americans with Disabilities Act.

Policy CIRC-2.1 Approved plans, projects, and subdivision requests in new growth areas will provide an appropriate balance of higher-activity land uses, such as schools, parks, retail and commercial services, small offices, civic uses, apartments, in accessible neighborhood centers. Higher-activity land uses shall not be focused on a linear pattern along large roadways.

Policy CIRC-2.2 The City will not allow large, unbroken surface parking lots, which unnecessarily inhibit travel on foot and by bicycle. Please refer also to Community Character and Design Element policies that address the location and nature of surface parking.

Policy CIRC-2.3 Approved projects, plans, and subdivisions shall provide shade trees in parking areas at a ratio of at least one tree for every four parking spaces. These trees shall be dispersed throughout the parking area.

Policy CIRC-2.4 The City will ensure that redevelopment and revitalization efforts in the existing City are designed to accommodate and encourage pedestrian and bicycle travel, as well as public transit options, as such options become more widely available.

Policy CIRC-2.5 The City will be flexible in parking requirements or eliminate off-street parking requirements for redevelopment, infill, and multifamily projects by allowing cooperative shared use of parking between properties with different parking demand peaking periods, utilization of on-street parking spaces to meet parking requirements, allowing parking reductions for projects located in walkable areas with improvements that accommodate alternative forms of travel, and allowing parking reductions for multi-family development to reflect the trip generation characteristics of this type of development.

Policy CIRC-2.6 The City will pursue in the existing developed area, and require in new growth areas pedestrian amenities, such as street furniture, shade trees, pedestrian lighting, water fountains, and pedestrian oriented signage.

Policy CIRC-2.7 The City will encourage and support appropriate home-based businesses in residential areas and telecommuting centers in appropriate areas.

Goal CIRC-3 Increase the Availability and Use of Transit.

Policy CIRC-3.1 The City will coordinate planning efforts and project entitlements with the Riverbank Oakdale Transit Agency, the Stanislaus Area Regional Transit District (START), and any future providers serving Riverbank to enhance and expand transit services throughout the City and surrounding region.

Policy CIRC-3.2 The City will promote the development, improvement, expansion, and increased ridership of transit within the City, including the development of new transit agencies and new forms of transit, as they become available.

Policy CIRC-3.3 Approved plans, projects, and subdivision requests will accommodate transit facilities consistent with transit agency planning.

Policy CIRC-3.4 When transit stops are required in existing developed portions of Riverbank or new growth areas, the City will ensure that stops are safe, convenient, comfortable, well maintained, and complementary to the urban design in the surrounding vicinity.

Policy CIRC-3.5 The City will coordinate with local and regional transit providers in developing transit plans that link important origin and destination points affecting Riverbank residents and businesses.

Policy CIRC-3.6 The City will support and provide incentives to encourage local businesses and transit providers to develop transit incentive programs.

Policy CIRC-3.7 The City will coordinate with all agencies involved in planning for a future east-west expressway through northern Stanislaus County to ensure that transit service is provided along the route, including potentially the use of HOV/transit only lanes during peak hours.

Goal CIRC-4 Move Freight and Passengers Efficiently

Policy CIRC-4.1 The City will work with relevant public agencies and the railroad to appropriately regulate the movement of truck traffic and hazardous materials throughout the City.

Policy CIRC-4.2 The City will enforce weight limits as a means to safely regulate truck traffic in noise sensitive areas, such as residential neighborhoods and near schools and hospitals.

Policy CIRC-4.3 The City will ensure that signage indicating weight limits is clearly posted throughout the City.

Policy CIRC-4.4 The City will support the development and implementation of a quick-response emergency services program for railroad corridors and continue to support the County's Hazardous Materials Team.

Policy CIRC-4.5 The City will coordinate with rail transportation operators, such as BN&SF and Amtrak, to ensure safe and reliable rail transportation in and through the Planning Area.

Policy CIRC-4.6 The City will limit, with a maximum weight limit, truck traffic to appropriate routes. Truck routes include Highway 108 through the City (Patterson Road, Callander Avenue, and Atchison Street), Roselle Avenue, First Street in the downtown area, Claus Road, Claribel Road, Snedigar Avenue, and Coffee Road. Areas of the aforementioned listed streets not within the City limits will be formally designated by the City upon any annexation that may occur in the future. Although Claribel Road may not be fully within City limits, it is likely that this would be a major roadway serving the County at some point in the future and appropriate for truck traffic.

The City will designate, post signage, and otherwise restrict truck traffic from using other streets, with an emphasis on streets that are primarily residential. Trucks may go by direct route to and from restricted streets, where required for the purpose of making pickups and deliveries of goods, but are otherwise restricted to truck routes.

Implementation Strategies. The General Plan's Implementation Strategies are noted below:

Implementation Measure CIRC-1

The City will develop and implement a Bicycle Master Plan. In coordination with the public at large and other relevant public agencies, the City will outline a comprehensive bikeway system that serves the goals of the General Plan. Elements of the Bicycle Master Plan will be included in Citywide capital improvements planning. The Bicycle Master Plan will be coordinated, as appropriate, with City of Modesto Bikeway Planning and Countywide and regional efforts, as they arise. The City will specifically work with the City of Modesto to coordinate bikeways along the Hetch-Hetchy right-of-way and along the railroad line, as appropriate.

As a part of implementation of the City's bicycle master plan, the City will work with local irrigation districts, the County, local railroad concerns, other property owners, and other agencies and interested parties to acquire and/or use existing easements and rights-of-way for development of off-street pedestrian and bicycle pathways.

Implementation Measure CIRC-3

The City will work with outside agencies, employees, and employers to optimize the use of alternative travel modes and reduce the use of the automobile, especially during peak periods of congestion. To support this effort, the City will develop a Travel Demand Management ordinance that requires large employers to provide incentives for employees to commute via transit, bicycle, on foot, or by carpool, rather than the single-occupant vehicular commute.

Implementation Measure CIRC-4

The City will revise street improvement standards to be consistent with this Circulation Element, including consideration on equal footing of all locally available forms of travel. Standards will ensure, among other things:

- a complete and comprehensive pedestrian and bicycle system to allow such travel for daily needs; sidewalks are wide and shaded by trees;
- trees are placed to provide separation between pedestrians and auto traffic; avoid sidewalk damage by tree roots;
- the width and number of curb cuts (driveways) on City streets protects the safety of pedestrians;
- lower speed limits on roads that cyclists will share with motorists;
- automatic traffic signal actuators where cyclists may reach them without leaving the roadway; and,
- adequate paved shoulders on arterial and collector roadways for bicycles.

The City will also include in street improvement standards strategies for using pervious pavement for access streets and rubberized asphalt made from recycled tires for newly constructed collector and arterial roadways. Access will be designed to allow for future City control (and therefore increased access) along Patterson Road and the possible use of the Claribel Road alignment (and therefore limited access) as a future regional expressway and/or State Highway.

Implementation Measure CIRC-5

The City shall coordinate with relevant transit providers and include, as appropriate, transit improvements in the Capital Improvements Plan (CIP).

Implementation Measure CIRC-6

The City will actively pursue State and federal grant programs for developing, improving, and enhancing bicycle and pedestrian routes in the existing developed City, including Safe Routes to School associated funds.

Implementation Measure CIRC-7

The City will develop and implement a Parking Master Plan to coordinate and manage parking in the City. The Master Plan will include strategies and implementation measures for addressing the City's parking supply and parking requirements and design standards. The plan will include strategies to optimize the parking supply, especially in the downtown area, through shared parking; development of shared parking facilities; use of on-street parking to meet demand of nearby properties; ensuring parking standards reflect actual parking demand; ensuring parking standards are reduced for properties in walkable and bicycle friendly areas of the City; use innovative design standards, such as tandem parking, stacked parking, and valet parking; and other strategies. The City will develop and include maximum, as well as minimum parking requirements for new growth areas.

Implementation Measure CIRC-8

The City will work with surrounding jurisdictions, the County, and StanCOG to develop regional solutions to regional vehicular transportation issues. The City will evaluate and make use of City approved regional traffic modeling tools and use such tools for impact assessment and traffic mitigation for development projects.

Riverbank Impact Fee Program. The City of Riverbank has adopted a mitigation fee program to address the impacts of anticipated development. The current program was updated in 2020. Table 10 identifies the location of planned improvements in the study area that are addressed by the fee program.

TABLE 10 CITY OF RIVERBANK MITIGATION FEE TRANSPORTATION IMPROVEMENTS		
Index	**Location**	**Improvement**
14	SR 108	Widen to 4 lanes from McHenry Ave to Coffee Road
15	SR 108	Widen to 4 lanes from Coffee Road to Oakdale Road
16	SR 108	Widen to 4 lanes from Estelle Avenue to Jackson Street
22	Claribel Road	Widen to 4 lanes from Squire Wells Way to Roselle Avenue
27	Roselle Avenue	Build to Ultimate configuration from Patterson Rd to Claribel Rd
29	Claus Road	Widen to 4 lanes from Townsend Street to Claribel Road
30	SR 108 / Coffee Road	Construct Traffic Signal
41	Hetch Hetchy Trail System	Trail System Improvements
	Coffee Road	Widen to 4 lanes from Claribel Road to Patterson Road
	Oakdale Road	Widen to 4 lanes from MID Canal to Westgate Drive (Crawford Road)
	Oakdale Road	Widen to 4 lanes from Claribel Road to MID Canal
	Claribel Road	Widen to 4 lanes from MID lateral #6 to Oakdale Road
	Claribel Road	Intersection Improvements Claribel Road @ Oakdale Road
Source: City of Riverbank Final Nexus Fee Study, Wildan, July 16, 2020		

CEQA Significance Criteria – SB 743. With the exception of Policy CIR 1.12 that defines Level of Service minimum and exceptions, the City has not adopted formal transportation impact analysis guidelines to identify for determining CEQA impacts under SB 743. The following guidance set forth in the OPR *Technical Advisory on Evaluating Transportation Impacts in CEQA has been employed.*

OPR directive identifies screening criteria relating to project size, locally serving retail, affordable housing, proximity to transit, etc. The criteria identify projects that can be presumed to have a less than significant impact on regional VMT.

The OPR directive identified a statewide goal for a 15% reduction in overall VMT, and suggest that a project's impact on the regional VMT is significant if the average VMT "per capita" for residences or "per employee" VMT or employment centers that is not fifteen percent below that of existing development. This threshold has been addressed.

As a mixed-use project, the individual components of the project may be considered based on individual VMT metrics. Because the project includes several components that are not applicable to per capita or per employee metrics, (i.e., Mixed Use - Retail) this analysis also considers the project's combined effect on total regional VMT. Any increase in total regional VMT resulting from the project is a significant impact.

CEQA Criteria – Alternative Transportation Modes. These criteria have been applied:

Bicycle and Pedestrian Facilities. A project is considered to have a significant impact on bicycle or pedestrian facilities if it would:

- eliminate or adversely affect an existing bikeway or pedestrian facility in a way that would discourage its use;
- interfere with the implementation of a planned bikeway as shown in the Bicycle Master Plan; or
- result in unsafe conditions for bicyclists or pedestrians, including unsafe bicycle/pedestrian, bicycle/motor vehicle, or pedestrian/motor vehicle conflicts.

Public Transit. In this traffic impact study, a project is considered to have a significant impact on the public transit system if the project would generate ridership which may exceed available or planned system capacity, or create a demand for service that cannon reasonably be accommodated by existing transit services.

CEQA Criteria – Queuing on State Highways. The City of Livingston has not adopted criteria for determining the significance of safety impacts under QECA based on queueing. For this analysis a project's effects could be significant when:

- Project traffic causes the 95th percentile queue to increase by more than 20 feet and causes the queue length to exceed the available storage.

- At locations where the 95th percentile queue already exceeds the available storage, the project causes the queue to lengthen by more than 20 feet (i.e., one car length).

Stanislaus County

Policy. For study roadway segments that are within the jurisdiction of Stanislaus County, a separate set of criteria determines the acceptable operating standards. According to Policy 2.1 from the Circulation Element of the Stanislaus County General Plan, originally adopted in 1987 and most recently revised in 2000, the minimum acceptable operating standards has been determined as follows:

- The County shall maintain LOS C or better for all County roadways and intersections, except, within the sphere of influence of a city that has adopted a lower Level of Service standard, the City standard shall apply.

Public Facilities Fee (PFF) Program / Regional Traffic Impact Fee. Development in Stanislaus County and its incorporated cities pay fees toward the cost of circulation system improvements of regional benefit through the Public Facilities Fee (PFF) programs Regional Transportation Fee (RTF). The PFF was last published in September 2017. The planned update to the Stanislaus County Public Facilities Fee has yet to be adopted. The draft regional fee's project list is shown in Table 11.

The North County Corridor (NCC) is a project that is included for funding in the PFF program. However, the PFF is only one source of funds that would be needed to complete the NCC, as federal and state funds are also needed.

TABLE 11
STANISLAUS COUNTY REGIONAL TRANSPORTATION FEE (RTF) PROJECTS

Street	Location	Improvement
North County Corridor	SR 99 to SR 120	New Expressway
McHenry Avenue	Ladd Road to San Joaquin County	5 lanes

Source: ADM Draft Stanislaus County Comprehensive Public Facilities Impact Fee Update, Wildan, September 15, 2017

City of Modesto

General Plan Policy. City of Modesto standards specify the following:

"The City may allow individual locations to fall below the City's LOS standards in instances where the construction of physical improvements would be infeasible, be prohibitively expensive, significantly impact adjacent properties or the environment, significantly impact non-motorized transportation systems, or have a significant adverse effect on the character of the community. To the extent feasible, the City shall strive for **LOS D** on all streets and intersections.

Capital Facilities Fee (CFF). Capital Facilities Fees (CFF) are impact fees established to mitigate the impacts of new development as outlined in §66000 of the California Government Code. These fees may be used for the purchase, construction, expansion, rehabilitation, or acquisition of public facilities, including street improvements. CFF projects in the study area are listed in Table 12.

TABLE 12 MODESTO CFF PROJECTS		
Street	**Location**	**Improvement**
Claratina Avenue	McHenry Avenue to Coffee Road	6 lanes
	Coffee Road to Oakdale Road	6 lanes
	Oakdale Road to Roselle Road	6 lanes
	Roselle Avenue to R/R Tracks	4 lanes
Claus Road	Claribel Road to Sylvan Avenue	6 lanes
	Sylvan Avenue to Floyd Road	4 lanes
Coffee Road	Claribel Road to Claratina Avenue	4 lanes
	Claratina Avenue to Mable Avenue	4 lanes
McHenry Avenue	Kiernan Avenue to Pelandale Avenue	6 lanes
	Pelandale Avenue to Standiford Avenue	6 lanes
Oakdale Road	Claribel Road to Claratina Avenue	6 lanes
	Claratina Avenue to Sylvan Avenue	6 lanes
Roselle Avenue	Claribel Road to Claratina Avenue	4 lanes
	Claratina Avenue to Sylvan Avenue	4 lanes
Sylvan Avenue	McHenry Avenue to Oakdale Road	6 lanes
Claratina Avenue	Coffee Road	New
Claratina Avenue	Oakdale Road	New
Claratina Avenue	Roselle Avenue	New
Claribel Road	Oakdale Road	New
Claribel Road	Roselle Avenue	New
Claribel Road	Claus Road	New
Source: Documentation of Justification for Impact Fee Mitigation, Town Hall Services and OMNI-MEANS, June 3, 2003, Appendix VIII-A		

San Joaquin County

Policy. The San Joaquin County General Plan Public Facilities and Services Element notes Goal TM-3.1

The County shall maintain Level of Service (LOS) standards consistent with the San Joaquin Council of Governments (SJCOG) Congestion Management Program (CMP) for State highways and designated County roadways and intersections of regional significance. Per the CMP, all designated CMP roadways and intersections shall operate at an LOS D or better except for roadways with "grandfathered" LOS. LOS for State highways shall be maintained in cooperation with Caltrans. The County LOS standards for intersections is LOS "D" or better on Minor Arterials and roadways of higher classification and LOS "C" or better on all other non-CMP designated County roadways and intersections.

Regional Transportation Impact Fee. The San Joaquin Council of Governments (SJCOG) administers the regional fee for development in San Joaquin County. The fee was last updated in 2017. McHenry Avenue and River Road are in the RTF network, but review of the fee programs project list indicates that there are no candidate projects in the study area.

PROJECT CHARACTERISTICS

This report section describes the characteristics of development in the RWSP in terms of the amount of vehicular traffic associated with these uses and the routes that this traffic may use.

The overall Project area includes approximately 1,522 acres encompassing: (1) the Berghill Boundary that includes approximately 772 acres, (2) the Riverwalk Specific Plan Area that includes a total of 993 acres, including the Berghill Boundary, and (3) the SOI expansion Boundary, which makes up the entire Project area.

This report section describes the characteristics of development in the RWSP in terms of the amount of vehicular traffic associated with these uses and the routes that this traffic may use.

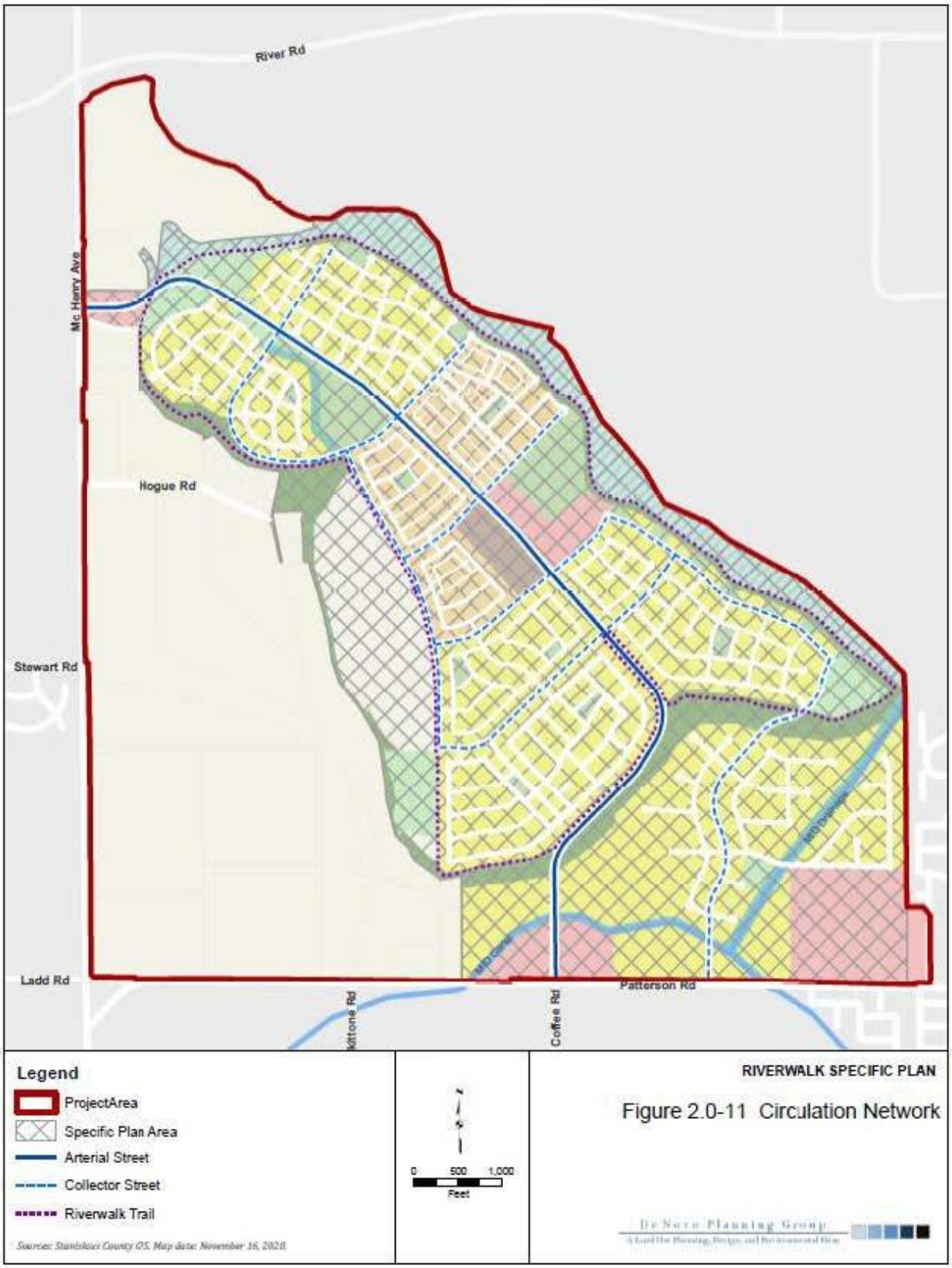
Proposed Circulation Network

Roadways. Figure 5 illustrates the circulation network for the Specific Plan. The Specific Plan includes an extension of Coffee Road as a major collector road north into the Plan Area before heading northwest to an intersection on McHenry Avenue. Secondary access would also be provided via a major collector street extension from Patterson Road located east of the Coffee Road extension (Village A Access). In addition, mixed use land uses located along Patterson Road (SR 108) and McHenry Avenue would have access consistent with the standard and policies of the responsible agency. New minor collector streets are also planned to connect on-site uses.

Neighborhood Electric Vehicles. The Specific Plan includes a plan to develop a Neighborhood Electric Vehicle (NEV) system for the active adult villages and village center. The NEV system would require an ordinance approval and would be restricted to the Specific Plan Area.

Alternative Transportation Modes. Figure 6 illustrates the Bicycle and Pedestrian Network. The Specific Plan includes the River Walk Trail which would loop around the entire Plan Area, providing connections from the residential areas to the various park and open space areas located throughout the Plan Area. The River Walk Trail may be a network of paved Class I Bike Paths and NEV lanes, as well as natural dirt trails.

Planned Improvements. The project anticipates making ½ section frontage improvements along its Patterson Road (SR 108) frontage. In the area east of the MID Canal Crossing this work would result in a four-lane section with center left turn lane. In the area west of the MID Canal Crossing through the Coffee Road intersection, this level of improvement would yield a center turn lane, but until similar improvements are made on the south side of the highway the roadway would continue to function as a two-lane road.



CIRCULATION NETWORK

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figure 5

Figure 6 illustrates the Bicycle and Pedestrian Network

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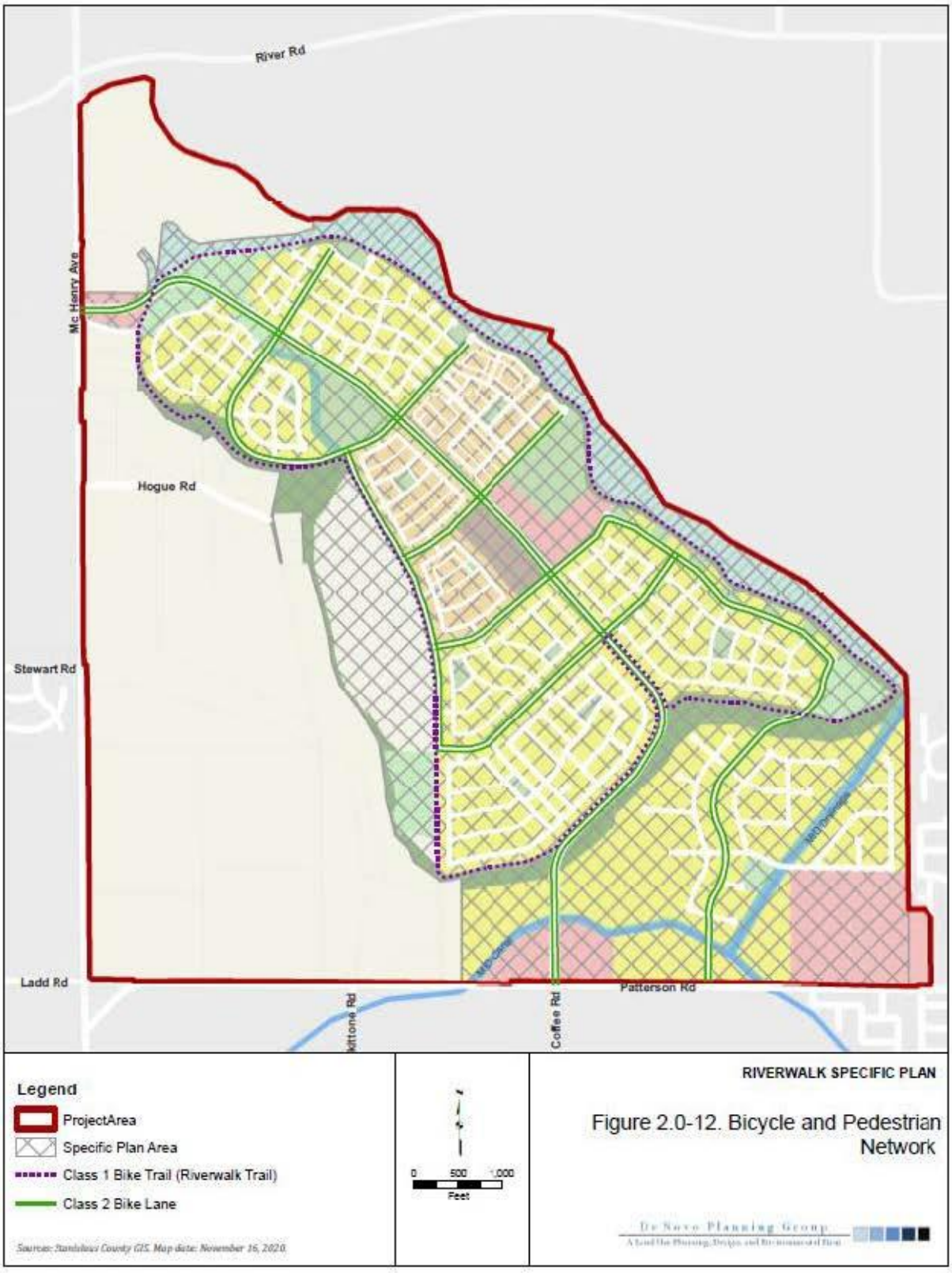

BICYCLE AND PEDESTRIAN NETWORK

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figure 6

Vehicle Trip Generation

The amount of traffic generated by development of the project has been estimated based on the trip generation characteristics of the proposed uses.

Trip Generation Rates. Table 13 presents the trip generation rates employed for this analysis. These rates are taken from the Institute of Transportation Engineers (ITE) publication *Trip Generation Manual, 9th Edition* and *Trip Generation Handbook, 3rd Edition.* Because the trip generation rates and pass-by trip percentages for retail uses vary greatly based on the size and character of the specific use, it was necessary to identify individual trip generation rates and pass-by percentages for the potential mixed-use retail centers.

ITE data does not specifically address travel by NEV's, and as result the extent of NEV traffic as a part of or in addition to ITE forecasts is unknown. Because NEV /golf cart transportation is a normal part of active senior communities, it is reasonable to conclude that an appreciable share of the resident travel within the community will be made using NEV's. However, to present a conservative evaluation of project effects, this analysis assumes that all trips based on ITE methods are made by automobile.

Trip Generation Forecasts. As shown in Table 14, development of the project could result in about 37,150 new daily trips after discount for pass-by trips drawn to retail areas, with 1,646 new trips generated in the a.m. peak hour and 3,604 new trips occurring in the p.m. peak hour.

TABLE 13
TRIP GENERATION RATES FOR RIVERWALK SPECIFIC PLAN AREA

ITE Code	Description	Quantity	Trips per Unit						
			Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
820	MU Retail – (1) (315 ksf)	ksf	41.64	62%	38%	0.98	48%	52%	4.03
820	MU Retail – (2) (85 ksf)	ksf	63.33	62%	38%	2.28	48%	52%	5.67
820	MU Retail – (6) (45 ksf)	ksf	77.62	62%	38%	3.87	48%	52%	6.69
820	MU Retail – (5) (820 average)	ksf	37.75	62%	38%	0.94	48%	52%	3.81
710	General Office	ksf	9.74	86%	14%	1.16	16%	84%	1.15
720	Medical Dental Office	ksf	34.80	78%	22%	2.78	28%	72%	3.46
210	LDR/MDR Residential (Detached Single Family Residential)	dwelling	9.44	25%	75%	0.74	63%	37%	0.99
220	HDR / MU Residential Multi-Family	dwelling	7.32	23%	77%	0.46	63%	37%	0.56
251	Senior Detached Housing	dwelling	4.27	33%	67%	0.24	61%	39%	0.30
252	Senior Attached Housing	dwelling	3.70	35%	65%	0.20	55%	45%	0.26
495	Recreational Community Center	ksf	28.82	66%	33%	1.76	47%	53%	2.31

TABLE 14
TRIP GENERATION FORECASTS FOR RIVERWALK SPECIFIC PLAN AREA

Village	Description	Quantity	Trips per Unit						
			Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
MU-1	*Mixed Use Retail (1)*	315 ksf	13,116	191	118	309	609	660	1,269
	Pass-by (28%)		*3,672*	*43*	*43*	*86*	*178*	*178*	*356*
	Net Primary Retail Trips		***9,444***	***148***	***75***	***223***	***431***	***482***	***913***
	Mixed Use Residential HDR	175 du	1,281	19	62	81	62	36	98
MU-2 / MU-3	*Mixed Use Retail (2)*	175 ksf	11,082	247	152	399	476	516	992
	Pass-by (33%)		*3,657*	*66*	*66*	*132*	*163*	*163*	*326*
	Net Primary Retail Trips		***7,425***	***181***	***86***	***267***	***313***	***353***	***666***
MU-4	*Clubhouse*	20 ksf	576	23	12	35	22	24	46
MU-5	*Mixed Use Retail (5)*	110 ksf	4,153	64	39	103	201	218	419
	Pass-by (15%)		*623*	*8*	*8*	*16*	*31*	*31*	*62*
	Net Primary Retail Trips		***3,530***	***56***	***31***	***87***	***170***	***187***	***357***
	Mixed Use Office	88 ksf	857	88	14	102	16	85	101
	Mixed Use Medical Office	22 ksf	766	48	13	61	21	55	76
MU-6	*Mixed Use Retail (6)*	44 ksf	3,415	106	64	170	141	153	294
	Pass-by (50%)		*1,708*	*43*	*42*	*85*	*73*	*74*	*147*
	Net Primary Retail Trips		***1,707***	***63***	***22***	***85***	***68***	***79***	***147***
210	*LDR / MDR/MU Residential*	267 du	2,520	49	149	198	167	97	264
251	*Senior Detached Housing*	1,969 du	8,378	155	316	471	359	230	589
252	*Senior Attached Housing*	180 du	666	13	23	36	26	21	47
TOTAL GROSS TRIPS			46,810	1,003	962	1,965	2,100	2,095	4,195
PROJECT TOTAL NET NEW TRIPS			**37,150**	**843**	**803**	**1,646**	**1,655**	**1,649**	**3,304**

Vehicle Trip Distribution and Assignment

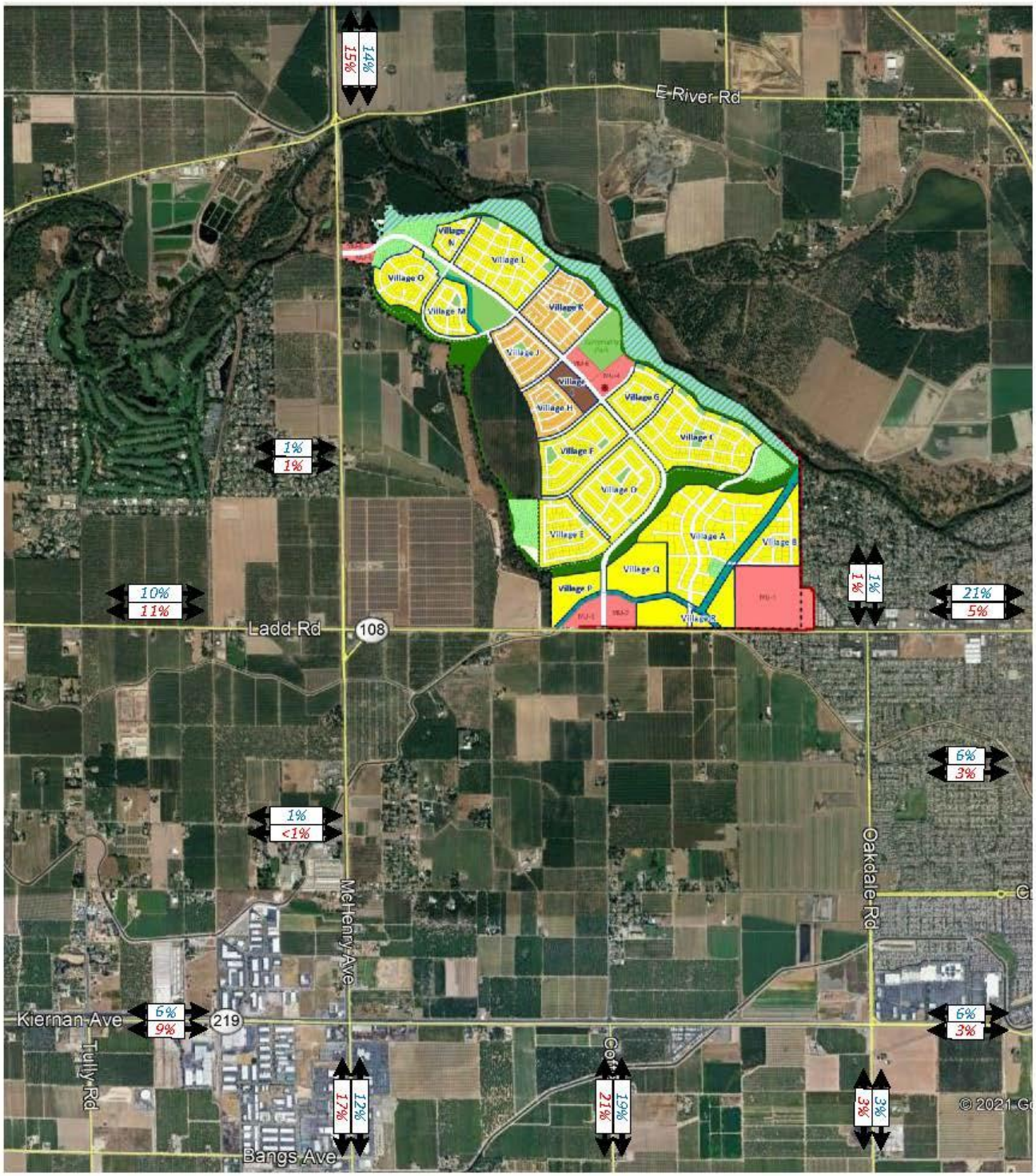
The regional distribution of the trips generated by the project's location on the northern Stanislaus County border north of the Modesto area and west Riverbank.

Trip Distribution. The regional distribution of project trips and the share of trips that will remain internal to the RWSP site were identified from a "select zone" analysis conducted with the regional travel demand forecasting model also employed for the cumulative analysis. The traffic model created for the North County Corridor EIR and previously modified for the CWSP EIR was employed for this purpose. The paths taken by trips generated in residential and commercial areas were determined separately, and the results are presented in Table 15.

As indicated, the primary travel directions for both residential and non-residential uses are to the south and west. Roughly 10% of the trips generated by new residential uses will remain on site. Figure 7 suggests these trip distribution assumptions graphically. Retail pass-by trips were assigned to the adjoining street system. This methodology yields conservative (i.e., worst case) assumptions based on the gravity model results and does not reflect customer choices based on the "quality" of alternative retail destinations in the area.

TABLE 15
SHORT TERM TRIP DISTRIBUTION ASSUMPTIONS

Direction	Route	Percentage of Total Trips	
		Residential	Non-Residential External Only
North	McHenry Ave beyond Coffee Rd	15%	14%
	Oakdale Rd beyond Patterson Rd	1%	1%
West	Ladd Rd beyond McHenry Ave	11%	10%
	Stewart Rd	1%	1%
	Francis Street	<1%	1%
	Kiernan Ave beyond McHenry Ave	9%	6%
East	Patterson Rd beyond Oakdale Rd	5%	21%
	Morrill Rd, Crawford Rd and Crossroads SC	3%	6%
	Claribel Rd beyond Oakdale Rd	3%	6%
South	McHenry Ave beyond Claribel Rd	17%	12%
	Coffee Rd beyond Claribel Rd	21%	19%
	Oakdale Rd beyond Claribel Rd	3%	3%
Internal	Within Project Area	10%	n.a.
Total		100%	100.00%



Legend

XX% Non-Residential External Trip Distribution Percentage

XX% Residential Trip Distribution Percentage

NORTH

N.T.S.

TRIP DISTRIBUTION PERCENTAGES

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figure 7

Trip Assignment. Project trips were assigned to the local area street system under the distribution assumptions presented above and the access assumptions described previously. Retail pass-by trips were assigned to the adjoining street system. The resulting "project only" trip assignment is presented in Figure 8 for daily trips, while Figures 9A/9B illustrate peak hour volumes.

The assignment of trips associated with MU-1 area has been illustrated in order to encompass all aspects of the travel to and from the RWSP. At this time no plan exists for developing the MU-1 area, and its actual access location(s) is unknown. This area has roughly 1,600 linear feet of frontage along SR 108 (Patterson Road), and today there are 12 separate private and public encroachments onto the state highway. Three public streets approach SR 108 from the south within the same area (i.e., Hot Springs Lane, Rock Creek Road and Silverock Road).

Access to SR 108 is controlled by Caltrans through their encroachment permit process. Individual encroachment permits are tied to the respective property, its owner and land use. Any proposal to appreciably redevelop this area, as has been assumed in this analysis, would require a new permit or a modification to an existing permit. At that time Caltrans would evaluate the adequacy of proposed access design within their adopted design standards, including consideration of the relationship between existing south-side intersections and any new or modified access within the project area. The level of traffic control needed, including installation of traffic signals or roundabout intersections, would be determined by Caltrans and installed by the developer.

Alternative Transportation Modes

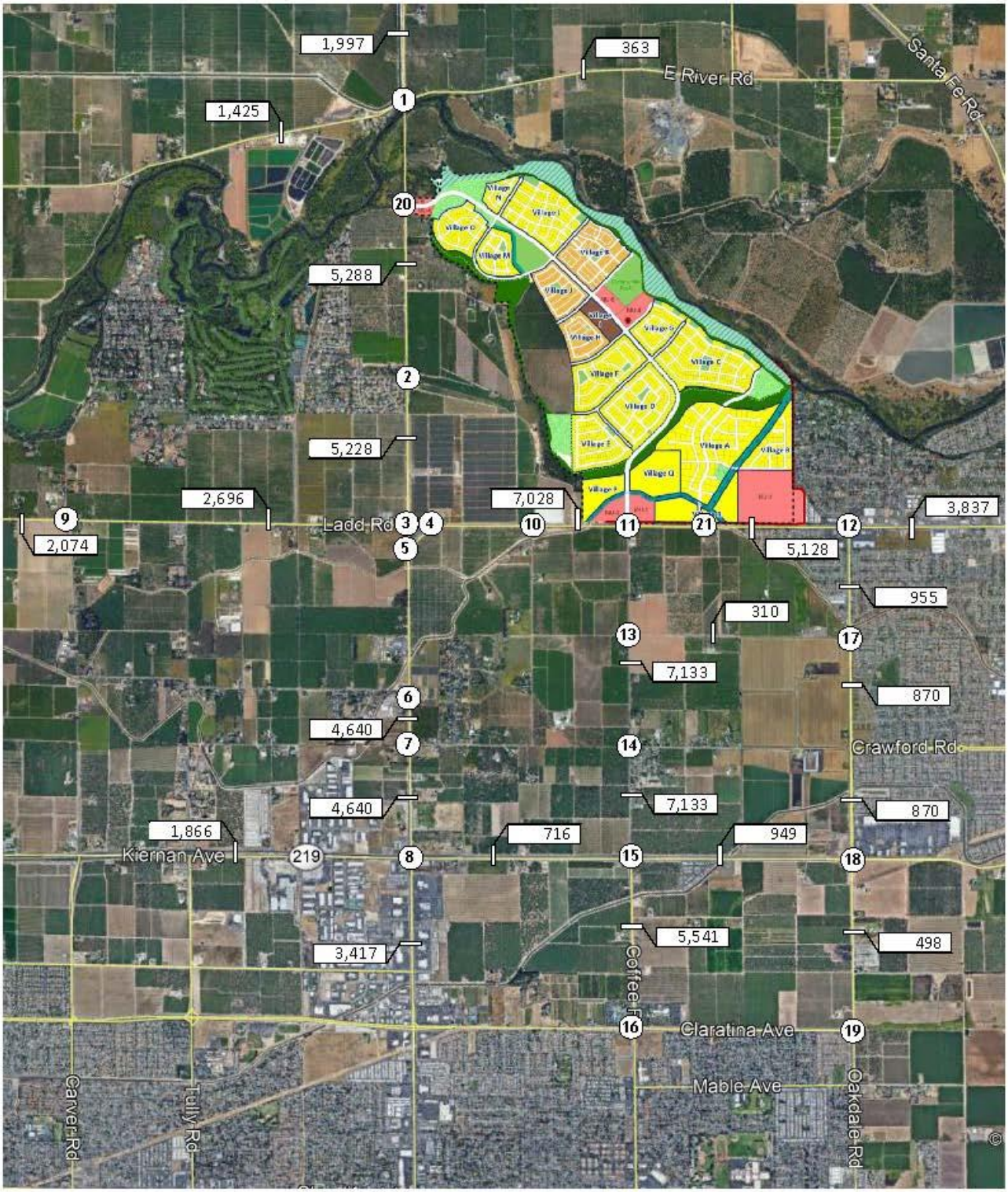
The project's impact on its environment have been considered with regards to use of alternative transportation modes for travel outside of the plan area.

Transit. The project could be expected to create the demand for transit services, particularly within the project's senior community. The number of potential riders can be inferred by the range of reported experiences of Max and StaRT. Max reports roughly 10.6 annual rides per capita. Assuming 5,622 residents, a total of 59,593 rides could occur annually. Assuming service 5.5 days per week, an average of 208 riders would be expected daily. This would reflect use in an urban area with reasonable service coverage. Alternatively, StaRT reports 0.6 rides pe capita. At this rate 3,373 rides could occur annually, with 12 riders per day. This estimate would assume more limited coverage in a rural area.

Recognizing that seniors are typically a transit dependent demographic, and the distance of the project to existing transit services, this analysis assumes that the project's transit demand could be the average of the two projections above or 110 riders daily.

Pedestrians. The project could generate pedestrian travel between the site and the balance of the Riverbank community. The extent of pedestrian travel will likely be related to the distance between the project and possible destinations, as well as the relative availability of similar goods and services within the project area. The commercial hub at Oakdale Road / Patterson Road is a likely destination, particularly until the project's MU-1 and MU5-MU-6 area are developed. That area is a mile from the main project access at the Coffee Road / Patterson Road intersection and 2/3 mile from the Village A access.

Bicycles. The project could generate bicycle travel between the site and the balance of the Riverbank community. As with pedestrians, the extent of pedestrian travel will likely be related to the distance between the project and possible destinations, as well as the relative availability of similar goods and services within the project area. The MID main canal trail would link Patterson Road east of the project with the Riverbank Sports Complex and via the Oakdale Road trail with the existing Crossroads Shopping Center a little more than two miles from the proposed project. The commercial hub at Oakdale Road / Patterson Road is a likely destination as well.



PROJECT ONLY AVERAGE DAILY TRAFFIC VOLUMES

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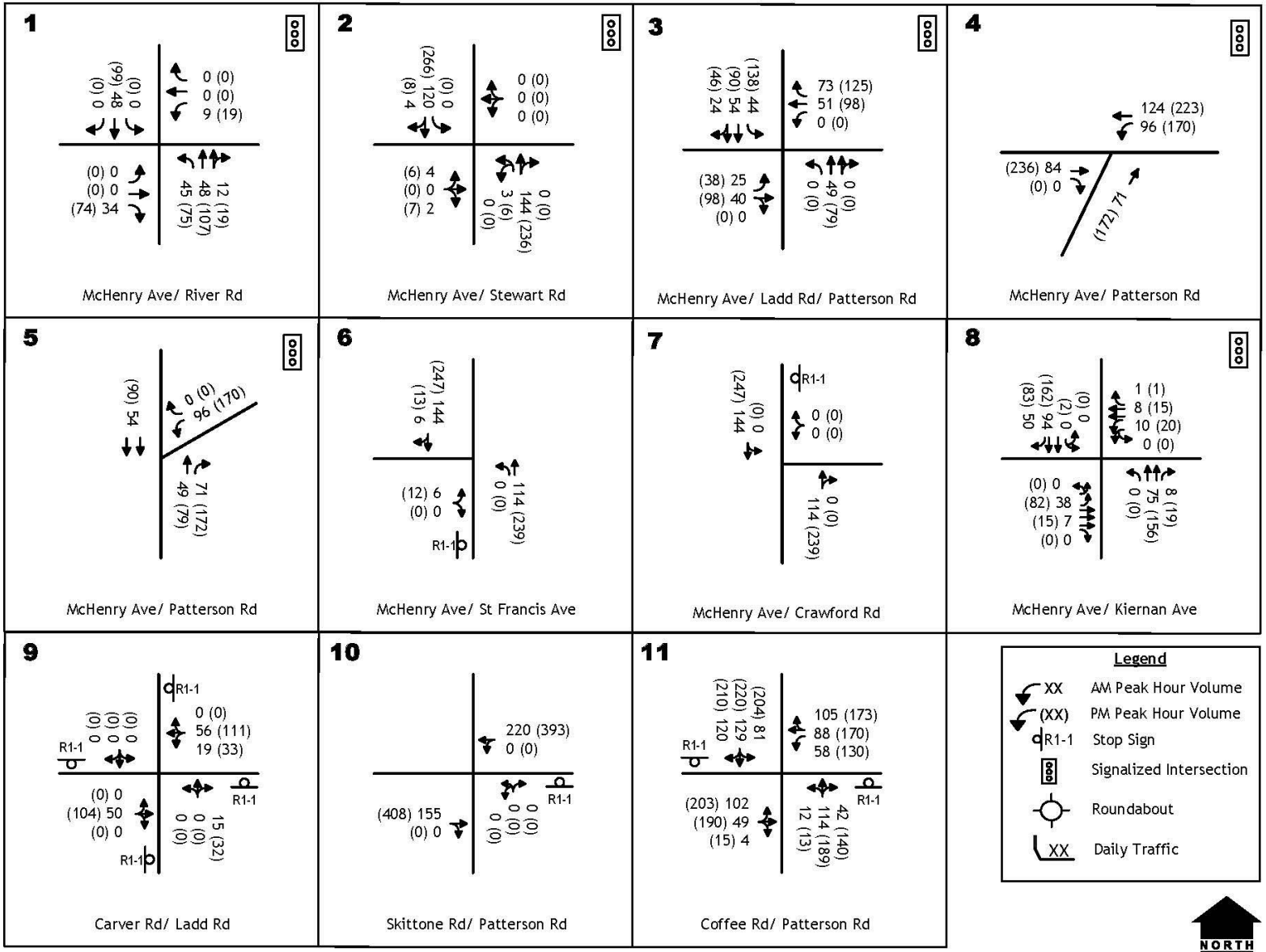
figure 8



PROJECT ONLY TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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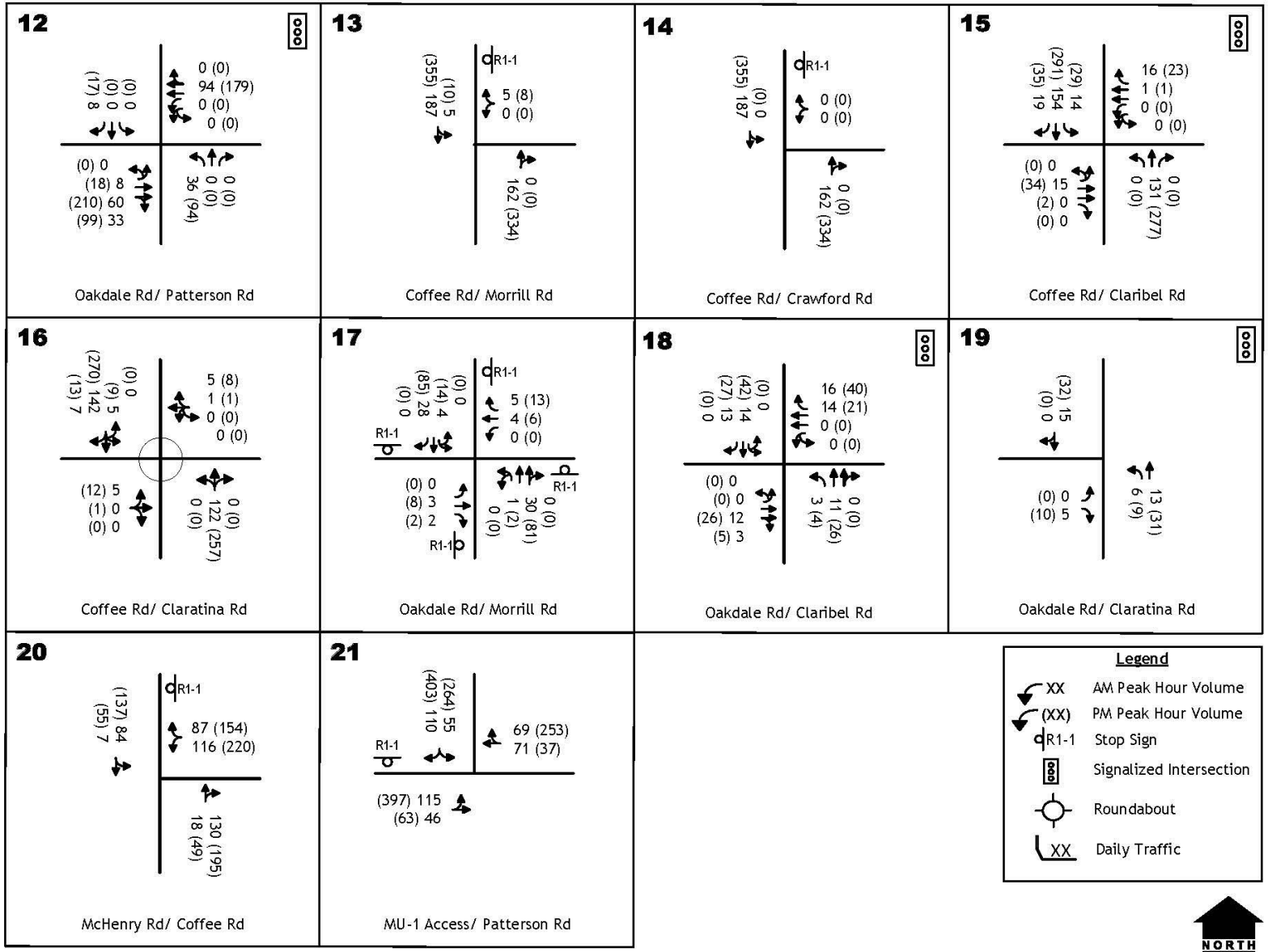
figure 9a



PROJECT ONLY TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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figure 9b

PROJECT TRANSPORTATION CEQA IMPACTS

Vehicle Miles Traveled (VMT) Analysis

VMT refers to the amount and distance of vehicle travel attributable to a project. VMT generally represents the number of vehicle trips generated by a project multiplied by the average trip length for those trips. For CEQA transportation impact assessment, VMT is to be calculated using the origin-destination VMT method, which accounts for the full distance of vehicle trips with one end from the project.

Because the City of Riverbank has not yet adopted guidelines or policies for dealing with VMT, the California Governor's Office of Planning and Research (OPR) document *Technical Advisory on Evaluating Transportation Impacts in CEQA* (California Governor's Office of Planning and Research 2018) provides general direction regarding the methods to be employed and significance criteria to evaluate VMT impacts, absent polices adopted by local agencies. The directive addresses several aspects of VMT impact analysis, and is organized as follows:

- ***Screening Criteria***: Screening criteria are intended to quickly identify when a project should be expected to cause a less-than-significant VMT impact without conducting a detailed study.
- ***Significance Thresholds***: Significance thresholds define what constitutes an acceptable level of VMT and what could be considered a significant level of VMT requiring mitigation.
- ***Analysis Methodology***: These are the potential procedures and tools for producing VMT forecasts to use in the VMT impact assessment.
- ***Mitigation***: Projects that are found to have a significant VMT impact based on the adopted significance thresholds are required to implement mitigation measures to reduce impacts to a less than significant level (or to the extent feasible).

Screening Criteria. Screening criteria can be used to quickly identify whether sufficient evidence exists to presume a project will have a less than significant VMT impact without conducting a detailed study. However, each project should be evaluated against the evidence supporting that screening criteria to determine if it applies. Projects meeting at least one of the criteria below can be presumed to have a less than significant VMT impact, absent substantial evidence that the project will lead to a significant impact.

The extent to which the proposed project qualifies under each criterion is noted.

- ***Small Projects:*** Defined as a project that generates 110 or fewer average daily vehicle trips.
- ***Affordable Housing:*** Defined as a project consisting of deed-restricted affordable housing.
- ***Local Serving Retail:*** Defined as retail uses of 50,000 square feet or less can be presumed to have a less than significant impact.

- ***Projects in Low VMT-Generating Area:*** Defined as a residential or office project that is in a VMT efficient area based on an available VMT Estimation Tool. The project must be consistent in size and land use type (i.e., density, mix of uses, transit accessibility, etc.) as the surrounding built environment.
- ***Proximity to High Quality Transit.*** The directive notes that employment and residential development located within ½ mile of a high-quality transit corridor can be presumed to have a less than significant impact.

Screening Evaluation. The extent to which the proposed project's VMT impacts can he presumed to be less than significant has been determined based on review of the OPR directive's screening criteria and general guidance.

The OPR ***Small Project*** criteria is not applicable to this project. The project is projected to generate 37,150 daily vehicle trips. As the 110 ADT threshold for automobiles is exceeded, the project's VMT impact cannot be presumed to be less than significant based on this criterion.

The OPR directive provides this explanation for a Presumption of Less Than Significant Impact for ***Affordable Residential Development***:

> Adding affordable housing to infill locations generally improves jobs-housing match, in turn shortening commutes and reducing VMT. Further, "… low-wage workers in particular would be more likely to choose a residential location close to their workplace, if one is available." In areas where existing jobs-housing match is closer to optimal, low income housing nevertheless generates less VMT than market- rate housing. Therefore, a project consisting of a high percentage of affordable housing may be a basis for the lead agency to find a less-than-significant impact on VMT. Evidence supports a presumption of less than significant impact for a 100 percent affordable residential development (or the residential component of a mixed-use development) in infill locations. Lead agencies may develop their own presumption of less than significant impact for residential projects (or residential portions of mixed use projects) containing a particular amount of affordable housing, based on local circumstances and evidence. Furthermore, a project which includes any affordable residential units may factor the effect of the affordability on VMT into the assessment of VMT generated by those units.

The proposed project's residences have not been designated as an affordable housing development, and the project's impacts cannot be presumed to be less than significant based on this screening criteria.

Some individual elements of the proposed project may be presumed to have a less than significant impact on regional VMT as ***Local Serving Retail*** uses. Under the assumptions made herein the retail uses in the MU-6 area would be less than the 50,000 square feet OPR threshold that would allow them to be presumed to have a less than significant impact. Based on their size the balance of the project's mixed-use areas is likely to develop with uses that exceed the 50,000 sf threshold.

The City of Riverbank and Stanislaus County have not yet identified ***Low VMT generating locations*** within their jurisdiction, so this screening criteria is not applicable.

Vehicle Miles Traveled (VMT) Estimation. The regional travel demand model employed for both the NCC EIR and City of Riverbank's CWSP EIR and that was used to forecast future traffic volumes for this report's traffic operational analysis was also employed to estimate regional VMT. This model was selected over other choices for the following reasons:

- The City of Riverbank General Plan traffic model has not been updated since the GP was adopted and may no longer reflect current conditions or anticipated regional growth.
- The StanCOG RTP/SCS regional traffic model base year forecasts for the project area were less accurate than NCC.

As with other tour-based regional travel demand forecasting models, the NCC EIR model has the ability to estimate regional vehicles miles traveled over the length of the trip within the context of its modeling area. The modeling area covers all of Stanislaus County and extends into San Joaquin and Merced Counties. The model area extends to SR 120 including the SR 99 / SR 120 interchange in Manteca. To the west the model area extends to Intestate 5. To the south the model extends through Turlock to the Merced County line.

The NCC model represents the applicable "region" for this analysis but does not cover the entire modeling area encompassed by the Tri-County traffic model being employed by the Stanislaus Council of Government's pending 2020 Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS) update. The model includes the breadth of the Stanislaus, San Joaquin and Merced Counties but it not available for use in this analysis.

Project Vehicle Miles Traveled Estimates. As with most tour-based regional travel demand forecasting models, the NCC EIR model has the ability to estimate regional VMT for the entire model area or for individual traffic analysis zones.

Table 16 compares total model area VMT under base year and 2042 conditions with and without the RWSP. As shown, the residential uses within the RWSP generate 75,640 VMT under the base condition, while non-residential uses generate 169,468 VMT. The project generates a total of 245,108 VMT.

Because of the relationship between residential and non-residential uses within the project and within the Riverbank area, the actual effect of the project on total regional VMT will be less than the sum of its individual estimates. For example, non-residential uses within the RWSP that serve residents will reduce VMT. Mixed-Use retail uses will also attract trips from current area residents and potentially reduce the distances they drive for goods and service. As indicated the addition of land uses contained in the RWSP is estimated to increase total base year VMT by 195,160 or about 80% of the sum of the estimates for the individual uses. The net increase represents a 1.4% increase in the regional total.

NCC model Year 2042 total regional VMT is also presented for comparison. Under year 2042 conditions the change caused by the RWSP is less, (i.e., 162,847 VMT). This reduction would be expected to result as additional development occurs in the Modesto-Riverbank areas of northern Stanislaus County. The RWSP's mixed use retail areas would provide additional options for future residential development and incrementally reduce the length of shopping trips made in this area.

TABLE 16
TOTAL REGIONAL VMT COMPARISON

Condition	Land Use	Total Vehicle Miles Traveled (VMT)
Base Year	RWSP - Residential Only	74,640
	RWSP - Non Residential	169,468
	RWSP Total	245,108
	Without Riverwalk Specific Plan	13,886,787[1]
	With Riverwalk Specific Plan	14,881,947
	Total Difference	195,160
	Difference attributable to no-residential uses	120,520

[1] as a comparison, the 2018 StanCOG RTP/SCS Appendix I Table 1 indicates 2018 total regional VMT of 14,178,336

Residential VMT. The specific characteristics of the VMT caused by new residential development are a specific focus of SB 743. Residential VMT is expressed in terms of Average VMT per Capita or VMT per Dwelling Unit, as noted in Table 17. As indicated the VMT characteristics of age restricted residences are lower than those of conventional dwellings, particularly in terms of VMT per dwelling. That difference occurs because age restricted dwellings have been found to generate roughly half of the daily trips of conventional dwellings. The relative difference decreases, however, when a per capita metric is applied. Because age restricted dwellings have fewer residents per unit, the average VMT per capita for age restricted dwellings is roughly 77% to 80% of that for the project's conventional dwelling units.

TABLE 17
RESIDENTIAL VMT METRICS

Land Use	Age Restricted?	Vehicle Miles Traveled (VMT)	
		Per Capita	Per Dwelling
Detached Single Family	No	15.74	55.58
Detached Single Family	Yes	13.26	27.17
Attached Single Family	No	12.24	43.21
Attached Single Family	Yes	11.53	21.79

Analysis / Conclusions. Because the City of Riverbank and Stanislaus County have not adopted significance criteria for evaluating VMT impacts, the project's impacts must be judged against the criteria contained in the OPR directive. Those criteria require 1) a 15% reduction from comparable baseline VMT within for the region or jurisdiction, and in case of non-residential uses no net increase in regional VMT. Based on the criteria, the following findings can be made:

Impact T-1 With regards to ***residential development***, because no relatable forecasts for the City of Riverbank or Stanislaus County are available, it is not possible to determine whether the project's residences will generate VMT per capita rate that is 15% below the current area average, as required under the OPR directive. ***Thus, it must be presumed that the VMT impact of the project residences is significant.***

Impact T-2 With regards to ***non-residential uses***, the net increase in regional VMT caused by the project's non-residential uses is the difference between the overall difference in total regional VMT (195,160 VMT) and the VMT caused by residential uses (74,640 VMT) is 120,520 VMT. ***Because this increase exceeds the OPR directive's threshold of no net increase in regional VMT, the impact of the project's non-residential uses on regional VMT is also significant.***

Mitigation Options. The extent to which the project's VMT impacts can be reduced through mitigation have been considered based on the circumstances of the project.

The project design already reflects many features that help reduce VMT, such as:

- ***Incorporate neighborhood electric vehicle network***
- ***Orient project towards transit, bicycle, and pedestrian facilities***
- ***Provide on-site goods and services***

Other measures that could be pursued include but are not limited to:

- ***Improve Access to Transit.*** Currently StaRT Route 60 passes through the Oakdale Road / Patterson Road intersection. A privately funded shuttle service could link the project with the current StaRT stop. Max Route 35 passes the project area on McHenry Avenue, and a privately funded shuttle could link the project with a potential stop at the Coffee Road / McHenry Avenue intersection.

- ***Increase Transit Frequency.*** The project could subsidize upgrades to StaRT / MAX service.

- ***Provide Transit Passes.*** The project could subsidize transit passes.

- ***Increase Access to Goods and Services***. A private shuttle service could link the project with key destinations in Riverbank and Modesto.

- ***Install Park-and-Ride Lots.*** A portion of the parking supply in mixed use areas could be designated for park-and-ride.

- ***Increase Pedestrian / Bicycle Connectivity.*** Existing and planned off-site bicycle and pedestrian facilities could be upgraded and gaps in existing systems could be eliminated.

Mitigation T-1. The project applicant shall implement VMT related mitigation measures / strategies, which could reduce the VMT generated by the project's land uses.

- Shuttle Bus Service. The proponents shall provide shuttle bus service linking the project with an applicable StaRT stop(s) and with key destinations in Riverbank and Modesto.

- ***Provide Transit Passes.*** The project proponents shall provide off project residents and employees subsidized transit passes.

- ***Install Park-and-Ride Lots.*** A portion of the parking supply in mixed use areas shall be designated for park-and-ride use.

- ***Increase Pedestrian / Bicycle Connectivity***. *Mitigation Measure T-2* will install off site pedestrian facilities to promote this mode and reduce VMT.

Though not all individual VMT reduction measures may be applicable this mitigation is considered generally feasible because it is within the applicant's purview to implement and has been found to be effective in peer-reviewed academic studies. However, the precise effectiveness of a given VMT reduction strategy is difficult to accurately measure.

Significance after Mitigation. Because there is no assurance that Mitigation Measure T-1 would fully mitigate Impacts T-1 and T-2, these impacts are considered to be significant and unavoidable.

Multi-Modal Impacts

The significance of the project's Multi-Modal impacts is discussed in the text which follows.

Transit Service and Facilities. StaRT routes do not pass directly by the site but MAX Route 35 passes on McHenry Avenue. While the project adds additional intersections and traffic on Patterson Road and McHenry Avenue, the project does not physically disrupt an existing transit service or facility nor interfere with implementation of a planned transit service or facility. Because LOS remains within minimum Riverbank GP standards, the project would not result in increased travel time for busses that adversely effects on-time performance.

The project would likely generate transit riders, partially if Route 35 were to stop at the McHenry Avenue / Coffee Road intersection, but based on current use of the StaRT and Max routes, if the project's ridership followed current patterns, the project would not result in increased transit ridership demands that result in passenger loads that exceed vehicle loading standards. As the project access is not adjacent to any transit facility, the project does not result in increased potential for safety conflicts involving transit vehicles and other modes of travel.

Conclusion. The project's impact to Transit Service and Facilities is not significant.

Bicycle Facilities. The project does not interfere with use of the existing paved shoulders on McHenry Avenue and Patterson Road by bicyclists. The project submittal indicates that the project proposes to widen Patterson Road in a manner that would provide eight-foot wide shoulders per Caltrans standards. The project does not interfere with implementation of a planned bicycle facility. Some project residents may elect to ride bicycles within the project and outside of the project for recreation, to retail destinations, entertainment, employment and schools, and the amount of project bicycle travel has been considered. In communities with much more developed bicycle facilities 5% of the residentially generated person trips could be made by bicycle. At that very conservative rate 60 to 80 daily bicycle trips could be made by this project. This level of use would not result in a significant increase in bicyclists on a facility that does not have adequate bicycle facilities, such that conflicts between bicyclists and other travel modes are likely to increase.

Conclusion. The project's impact to Bicycle Facilities is not significant.

Pedestrian Facilities. The project submittal indicates that sidewalks will be installed on project streets, and a comprehensive on-site trail system will be provided. Proposed improvements to SR 108 (Patterson Road) will include sidewalks. The project does not physically disrupt an existing pedestrian facility. It is very likely that some residents will travel on foot to reach destinations that are relatively close to the site, such as Riverbanks commercial areas and schools, and the extent to which safety issues could occur has been considered.

With implementation of planned improvements on SR 108 (Patterson Road) a 400 foot gap will remain between the project's sidewalk on Patterson Road and the existing sidewalk that ends west of Oakdale Road. Increased pedestrian volume in this area represents a potential safety concern.

Impact T-3. As the approved CWSP proceeds the MID Main Canal trail will become a likely pedestrian route between the site and the Riverbank Sports Complex and Crossroads SC. Increased pedestrian activity across SR 108 is a safety issue due to the speed of vehicles in this area. Thus the project's impact to Pedestrian Facilities is significant.

Mitigation T-2. The project proponents shall work with the City of Riverbank and Caltrans to design improvements to create an all-weather route to the MID trail and to address the gap in facilities east of the project on SR 108 and shall fund these improvements. The mitigation

shall include a safe crossing on SR 108 which may be incorporated into a traffic signal or roundabout at one of the RWSP access intersections or may take the form of a pedestrian hybrid beacon, subject to the approval of Caltrans. This mitigation shall be installed when directed by the Riverbank City Engineer with Caltrans approval.

Significance after Mitigation. Because improvements to state facilities are subject to Caltrans approval, there is no assurance that Caltrans would approve the improvements included under Mitigation Measure T-1. Because the City of Riverbank cannot ensure installation, Impact T-3 may not be fully mitigated, and this impact is considered to be significant and unavoidable.

Safety Impacts on Caltrans Facilities

As indicated in the traffic operations analysis presented in the Appendix to this report, there are two locations where development of the RWSP would result in significant safety impacts on state facilities.

Impact T-4. At the **McHenry Avenue / Ladd Road / Patterson Road intersection,** the project will cause the queue of peak hour traffic to exceed the available storage length in the southbound left turn lane and in the eastbound left turn lane. This is a significant safety impact.

To reduce the length of these queues it will be necessary to increase intersection capacity by:

- Eastbound approach: lengthen eastbound left turn lane to 300 feet
- Southbound approach: add a 2nd southbound left turn lane
- On Patterson Road add a second eastbound lane from McHenry Avenue easterly to a point 300 feet of the SR 108 connection.

This work would occur within the limits of Patterson Road improvements addressed by the City of Riverbank's traffic impact fee program. However, the fee program improvements are generically identified as SR 108 widening and this specific improvement is not included.

Mitigation T-4 RWSP development shall contribute its pro rata fair share to the cost of improvements to the McHenry Avenue / Ladd Road / Patterson Road intersection. While this improvement would eliminate the identified safety impact, there is no guarantee that funding would be available for the balance of construction cost. In addition, these improvements would be subject to the design requirements and approval of Caltrans, and there is no guarantee than Caltrans will permit their construction. Because the City of Riverbank cannot ensure installation, Impact T-4 may not be fully mitigated, and this impact is considered to be significant and unavoidable.

Impact T-5. The RWSP will add traffic on ***Patterson Road (SR 108) / Skittone Road intersection*** where no left turn lane exists, thus increasing the possibility of rear end collisions between through traffic on SR 108 and turning vehicles. This is a significant safety impact.

A westbound left turn lane should be installed on SR 108 at Skittone Road. This work would be within the area of SR 108 widening addressed by the City of Riverbank's traffic impact fee program but is under Caltrans jurisdiction. A left turn lane would be effective in eliminating the identified safety impact by separating through traffic from vehicles waiting to turn left.

Mitigation T-5. Development in RWSP shall construct a westbound left turn lane on SR 108 at the Skittone Road intersection. While this improvement would fully mitigate the identified safety impact, this improvement would be subject to the design requirements and approval of Caltrans, and there is no guarantee that Caltrans will permit its construction. Because the City of Riverbank cannot ensure installation, Impact T-5 may not be fully mitigated, and this impact is considered to be significant and unavoidable.

CUMULATIVE TRANSPORTATION CEQA IMPACTS

Vehicle Miles Traveled Estimates. Table 18 compares total model area VMT under Year 2042 conditions with and without the RWSP. Under Year 2042 conditions the change caused by the RWSP is less than under the baseline condition, (i.e., 162,847 VMT). This reduction would be expected to result as additional development occurs in the Modesto-Riverbank areas of northern Stanislaus County. The RWSP's mixed use retail areas would provide additional options for future residential development and incrementally reduce the length of shopping trips made in this area.

TABLE 18
CUMULATIVE TOTAL REGIONAL VMT COMPARISON

Condition	Land Use	Total Vehicle Miles Traveled (VMT)
2042	Without Riverwalk Specific Plan	21,712,316
	With Riverwalk Specific Plan	21,865,163
	Difference	162,847

Impact T-6. The net increase in cumulative regional VMT caused by the project exceeds the OPR directive's threshold of no net increase in regional VMT. The cumulative impact of the project on regional VMT is significant. The same mitigation identified for project impacts remains applicable. However, the precise effectiveness of a given VMT reduction strategy is difficult to accurately measure.

Significance after Mitigation. Because there is no assurance that Mitigation Measure T-1 would fully mitigate Impacts T-6, these impacts are considered to be significant and unavoidable.

APPENDIX

TRAFFIC OPERATIONAL ANALYSIS FOR RIVERWALK SPECIFIC PLAN EIR

Riverbank, CA

Prepared For:

De Novo Planning Group
1020 Suncast Lane, Suite 106
El Dorado Hills, CA 95762

Prepared By:

KD Anderson & Associates, Inc.
3853 Taylor Road, Suite G
Loomis, CA 95650
(916) 660-1555

August 30, 2021

2290-02

TRAFFIC OPERATIONAL ANALYSIS FOR RIVERWALK SPECIFIC PLAN EIR

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TRAFFIC OPERATIONAL ANALYSIS FOR
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INTRODUCTION

This appendix to the Transportation Impact Analysis for the Riverwalk Specific Plan EIR summarizes KD Anderson & Associates analysis of the potential traffic operational and safety effects associated with development of the Riverwalk Specific Plan in Riverbank, California.

PROJECT TRAFFIC OPERATIONAL EFFECTS

As noted previously, under SB 743 CEQA evaluation of a project's transportation impacts moves from assessment of Level of Service to consideration of impacts to VMT, alternative transportation modes and safety. The traffic operational analysis which follows is provided to support CEQA analysis of safety on state highways and to evaluate the consistency of the project's circulation and access design with regards to City of Riverbank policies and standards as well as Caltrans encroachment permit requirements. Additional analysis regarding the project's effects outside Riverbank within the context of current, short term future and long term cumulative traffic conditions is presented for informational purposes only.

Existing Plus Project Traffic Volumes

The analysis of project effects assumes 100% build out of the RWSP and superimposes project traffic onto current background traffic volumes. The resulting "Existing plus Project" traffic volumes are presented in Figure 1 for daily traffic and Figures 2A/2B for peak hour traffic.

Existing Plus Project Roadway Segment Operations

Segment traffic volumes on study area roads have been projected, and these forecasts are presented in Table 1. These volumes were then compared to the LOS threshold adopted by each agency, and the resulting Levels of Service are noted. As shown 15 roadway segments will carry daily traffic volumes that are indicative of LOS D or worse conditions with buildout of the project as assumed.

McHenry Avenue (SR 108) from Kiernan Avenue to Ladd Road (Stanislaus County / Caltrans). As is the case today, this segment of two-lane road would continue to operate at LOS F with buildout of the project under the LOS thresholds employed by Stanislaus County. A four-lane roadway is needed to meet the LOS D goal.

McHenry Avenue from Ladd Road to River Road (Stanislaus County). As is the case today, this segment of two-lane road would continue to operate at LOS F under thresholds employed by

Stanislaus County. A four-lane roadway is needed, and this improvement is included in the RTIP and announced by Stanislaus County.

McHenry Avenue from River Road to Jones Road (San Joaquin County). The addition of project traffic would take the LOS on this roadway from LOS E to LOS F. A four-lane roadway is needed. This work is not included in San Joaquin County's Regional Transportation Fee program.

Ladd Road west of McHenry Avenue (Stanislaus County). This two-lane rural roadway will continue to operate at LOS E-F with the addition of project traffic based on Stanislaus County's thresholds. No improvements are included in the Stanislaus County RTF.

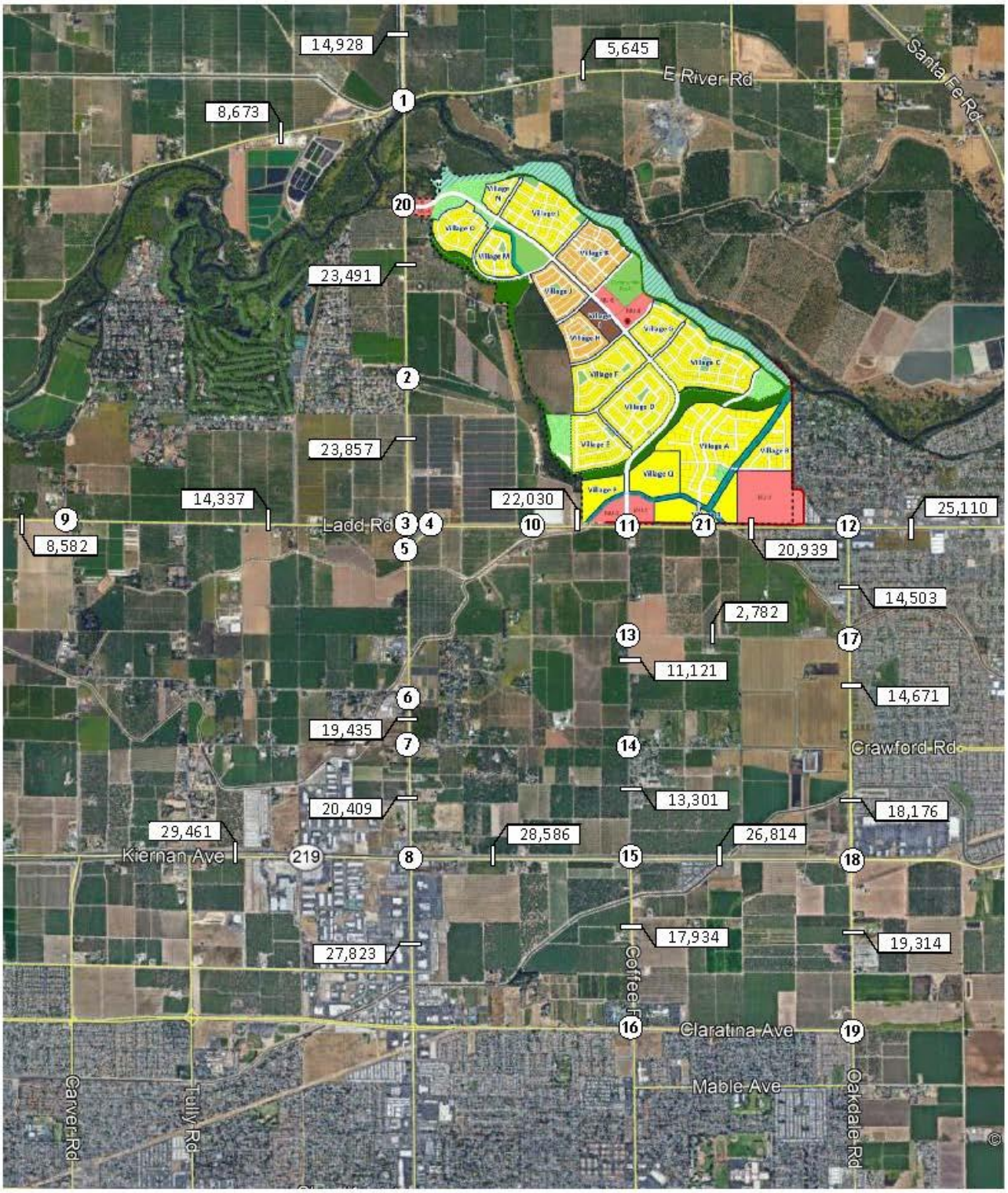
Patterson Road (SR 108) from McHenry Avenue to Oakdale Road (Stanislaus County / Riverbank). This two-lane roadway will continue to operate at LOS F with the addition of project traffic. A four-lane roadway is needed, and this widening is included in the City of Riverbank traffic impact fee program.

Coffee Road from Patterson Road to Claribel Road (Stanislaus County/ Riverbank). This two-lane roadway is projected to operate at LOS F with the addition of project traffic. Widening Coffee Road is included in the City of Riverbank traffic impact fee program.

Coffee Road from Claribel Road to Claratina Avenue (Stanislaus County / Modesto). This two-lane roadway within Modesto's sphere of influence would operate at LOS F with the addition of project traffic. A four-lane roadway is needed, and this level of improvement is included in the City of Modesto's CFF program.

Oakdale Road from Morrill Road to Westgate Drive (Crawford Road) (Riverbank). The two-lane segment of Oakdale Road will operate at LOS E with the addition of project traffic. The second southbound travel lane is needed and is included in the City or Riverbank traffic impact fee program.

Oakdale Road from Claribel Road to Claratina Avenue (Modesto). This two-lane roadway within Modesto's sphere of influence would continue to operate at LOS F with the addition of project traffic. A four-lane roadway is needed, and this level of improvement is included in the City of Modesto's CFF.



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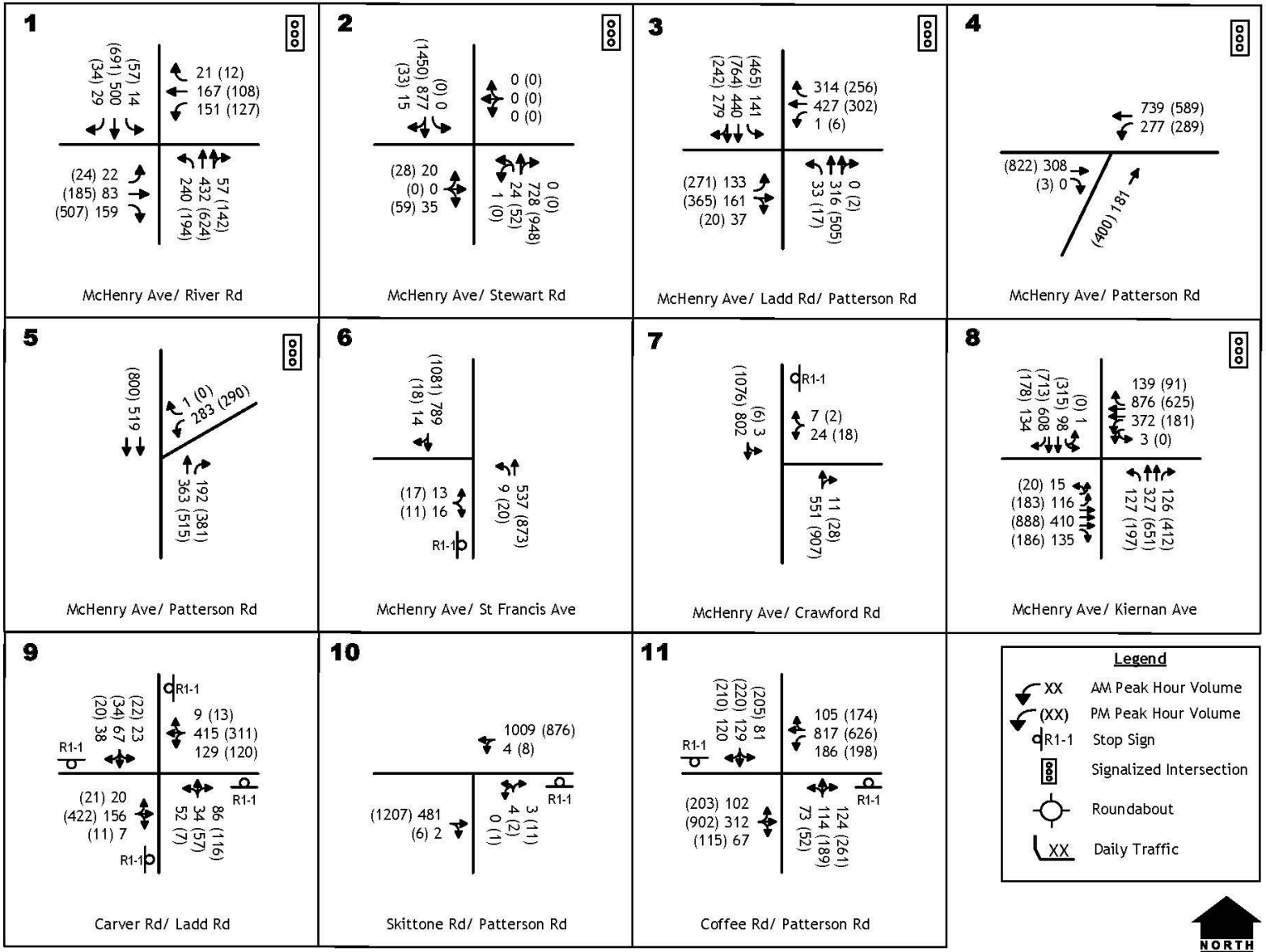
AVERAGE DAILY TRAFFIC PLUS PROJECT VOLUMES

figure 1



EXISTING PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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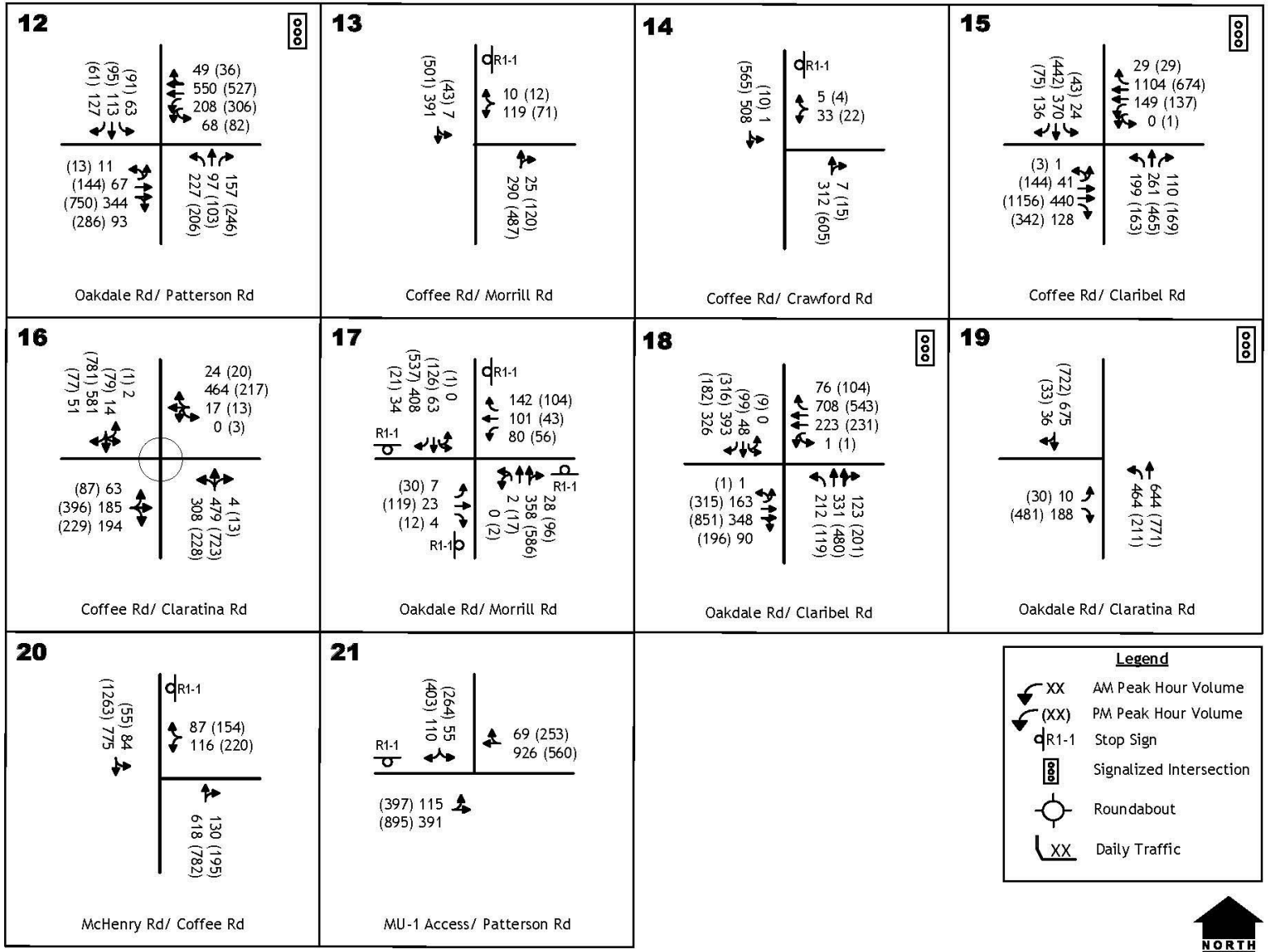
figure 2a



EXISTING PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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figure 2b

TABLE 1
EXISTING PLUS PROJECT ROADWAY SEGMENT LEVELS OF SERVICE

Roadway	Location	Class	Maximum Volume (ADT)	LOS D Threshold	Existing Conditions		Existing Plus RWSP		
					Daily Volume (ADT)	LOS	Daily Volume (ADT) Project Only	Daily Volume (ADT) Total	LOS
McHenry Ave	Jones Rd to River Rd	2-lane Min Art	24,900	12,500	**12,930**	**E**	**2,580**	**15,510**	**E**
	River Rd to Coffee Rd	2-lane Arterial	10,000	5,900	**18,205**	**F**	**4,750**	**22,955**	**F**
	Coffee Rd to Stewart Rd	2-lane Arterial	10,000	5,900	**18,205**	**F**	**6,205**	**24,410**	**F**
	Stewart Rd to Ladd Rd	2-lane Arterial	10,000	5,900	**18,830**	**F**	**6,220**	**25,050**	**F**
McHenry Ave (SR 108)	Ladd Rd to Crawford Rd	2-lane Arterial	10,000	5,900	**14,795**	**F**	**5,440**	**20,235**	**F**
	Crawford Rd to Kiernan Ave	2-lane Arterial	10,000	5,900	**15,770**	**F**	**5,615**	**21,385**	**F**
	Kiernan Ave to Pelandale Ave	4-lane Arterial	42,520	35,720	24,505	C	4,165	28,670	C
River Road	Murphy Rd to McHenry Ave	2-lane Maj Col	24,900	12,500	7,250	C	1,740	8,990	D
	McHenry Ave to Harold Ave	2-lane Maj Col	24,900	12,500	5,285	C	435	5,720	C
Ladd Road	Stoddard Rd to Carver Rd	2-lane Arterial	10,000	5,900	**6,610**	**E**	**2,625**	**9,235**	**E**
	Carver Rd to McHenry Ave	2-lane Arterial	10,000	5,900	**11,640**	**F**	**3,385**	**15,025**	**F**
Patterson Road (SR 108)	McHenry Ave to Coffee Rd	2-lane Arterial	10,000	5,900	15,000	~~E~~	**9,880**	**24,880**	**F**
	Coffee Rd to Oakdale Rd	2-lane Arterial	15,700	14,800	**15,810**	**F**	**7,845**	**23,655**	**F**
	Oakdale Rd to Jackson Ave	4-lane Arterial	33,400	31,500	21,275	B	5,230	26,505	C
Skittone Road	Patterson Rd to Crawford Rd	2-lane Rural	10,000	5,900	270	A	180	450	A
Morrill Road	Coffee Rd to Oakdale Rd	2-lane Collector	12,900	11,600	2,475	B	295	2,770	C
Kiernan Ave (SR 219)	Tully Rd to McHenry Ave	4-lane EXP	62,520	52,520	27,595	B	2,280	29,875	B
Claribel Road	McHenry Ave to Coffee Rd	4-lane Arterial	40,000	33,600	27,870	C	900	28,770	D
	Coffee Rd to Oakdale Rd	4-lane Arterial	33,400	31,700	25,865	C	915	26,780	C
Coffee Road	Patterson Rd to Crawford Rd	2-lane Rural	10,000	5,900	3,990	C	**8,930**	**12,920**	**F**
	Crawford Rd to Claribel Rd	2-lane Rural	10,000	5,900	6,170	D	**8,635**	**14,805**	**F**
	Claribel Rd to Claratina Ave	2-lane Rural	22,500	13,280	12,395	D	**6,890**	**19,285**	**F**
Oakdale Road	Patterson Rd to Morrill Rd	4-lane Arterial	33,400	31,700	13,550	B	2,065	15,615	B
	Morrill Rd to Crawford Rd	2-lane Arterial	15,700	14,800	13,800	D	**1,835**	**15,635**	**E**
	Crawford Rd to Claribel Rd	4-lane Arterial	33,400	31,700	17,305	B	1,835	19,140	B
	Claribel Rd to Claratina Ave	2-lane Rural	22,500	13,280	**18,815**	**E**	**715**	**19,530**	**E**

BOLD values exceed minimum LOS D standard

Internal Traffic Volumes

The volume of traffic occurring on internal RWSP streets has been identified and assessed with regards to City of Riverbank General Plan LOS thresholds. As noted in Table 2, projected volumes on Coffee Road through RWSP can be accommodated within minimum Riverbank General Plan standards.

The street section through the RWSP's Village Center includes diagonal parking, which has the effect of reducing overall roadway capacity due to delays caused by vehicles entering and exiting parking spaces. Assuming that those effects reduce the Collector Street LOS C threshold by 50% to 5,800 ADT, the projected traffic volumes in this area would continue to fall with the LOS C threshold. Thus, the proposed layout is adequate from the standpoint of traffic flow.

TABLE 2
RWSP INTERNAL ROADWAY SEGMENT LEVELS OF SERVICE

Roadway	Location	Class	Maximum Volume (ADT)	LOS D Threshold	Build Out Conditions	
					Daily Volume (ADT)	LOS
Coffee Road	McHenry Avenue through MU	Two-Lane Collector	12,900	11,600	6,200	C
	MU to Village Center	Two-lane Collector	12,900	11,600	4,345	C
	Through Village Center	Two-lane Collector	12,900	11,600	5,155	C
	Village Center to MU-5-6	Two lane Collector	12,900	11,600	8,315	C
	Mu-5-6 to Patterson Rd	Two-Lane Arterial	33,400	31,700	14,840	B

Existing Plus Project Intersection Levels of Service, Queueing and Traffic Signal Warrants

The effects of development of the RWSP at intersections have been identified based on the Level of Service at key intersections, queuing at intersections on state highways, and the status of peak hour traffic signal warrants at un-signalized intersections.

Levels of Service. As shown in Table 3 two existing intersections will continue to operate with Level of Service that exceeds LOS D if the RWSP is built out. The westbound approach at the **McHenry Avenue / Westgate Drive (Crawford Road) intersection** will operate at LOS F. With development of the RWSP the **Patterson Road (SR 108) / Coffee Road intersection** will operate at LOS F on the northbound approach.

Four additional intersections will exceed the LOS D minimum standard. **The Carver Road / Ladd Road intersection** is project to operate at LOS F in the a.m. peak hour. The westbound approach at the **Coffee Road / Morrill Road intersection** is projected to operate at LOS E. The **Coffee Road / Claribel Road intersection** is shown to operate at LOS E. The **Coffee Road / Claratina Road intersection** is expected to operate at LOS E.

95th Percentile Queues on State Highways. As noted in Table 4, development of the project will lengthen queues that already approach but do not exceed the available storage. At the **McHenry Avenue / Ladd Road / Patterson Road intersection** the projected queue lengths will exceed available storage in the southbound left turn lane and in the eastbound left turn lane. ***Under current CEQA guidelines and Caltrans direction this is a significant safety impact.*** Mitigation for this impact is discussed under the Improvements Section.

Peak Hour Traffic Signal Warrants. The addition of project traffic would result in five intersections satisfying peak hour traffic signal warrants, as noted in Table 5:

- Carver Road / Ladd Road
- Coffee Road / Morrill Road
- McHenry Avenue / Coffee Road
- Patterson Road (SR 108) / Village A access
- Patterson Road / MU-1 Access

TABLE 3
EXISTING PLUS PROJECT INTERSECTION LEVELS OF SERVICE

Intersection	Control	AM Peak Hour				PM Peak Hour			
		Existing		Existing Plus Project		Existing		Existing Plus Project	
		Average Delay (sec/veh)	LOS	Average Delay (Sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
McHenry Ave / River Rd	Signal	23.4	C	27.0	C	29.0	C	49.6	D
McHenry Ave / Stewart Rd	Signal	8.4	A	13.6	B	51.6	D	**114.9**	**F**
McHenry Ave (SR 108) / Ladd Rd	Signal	23.1	C	30.0	C	31.4	C	**57.7**	**E**
Patterson Ave (SR 108) / SR 108	Signal	12.2	B	17.3	B	14.6	B	31.9	C
McHenry Ave (SR 108) / SR 108	Signal	8.6	A	10.4	B	8.8	A	10.4	B
McHenry Ave (SR 108) / Francis Ave	EB Stop	14.2	B	17.8	C	16.4	C	22.2	C
McHenry Ave (SR 108) / Crawford Rd	WB Stop	23.5	C	**42.9**	**E**	**42.2**	**E**	**117.8**	**F**
McHenry Ave (SR 108) / Kiernan Ave	Signal	29.5	D	34.3	C	36.8	D	43.4	D
Carver Rd / Ladd Rd	AWS	24.3	C	**66.6**	**F**	12.1	B	18.8	C
Patterson Rd (SR108) / Skittone Rd	NB Stop	19.3	C	31.8	D	18.3	C	35.5	E
Patterson Rd (SR 108) / Coffee Rd	NB Stop	**50.1**	**F**	**>300**	**F**	**43.4**	**E**	**>300**	**F**
Patterson Rd (SR 108) / Oakdale Rd	Signal	22.8	C	25.6	C	31.7	C	49.0	D
Coffee Rd / Morrill Rd	WB Stop	13.1	B	**41.3**	**E**	13.0	B	**37.5**	**E**
Coffee Rd / Crawford Rd	WB Stop	12.5	C	23.9	C	12.7	B	27.1	D
Coffee Rd / Claribel Rd	Signal	**32.5**	**C**	**62.5**	**E**	33.3	C	**67.9**	**E**
Coffee Rd / Claratina Rd	Roundabout	27.7	D	**69.3**	**F**	23.7	C	**75.4**	**F**
Oakdale Rd / Morrill Rd	Signal	16.5	B	16.9	B	19.3	B	20.9	C
Oakdale Rd / Claribel Rd	Signal	50.9	D	53.7	D	48.8	D	54.9	D
Oakdale Rd / Claratina Rd	Signal	32.1	C	35.5	D	13.5	B	14.7	B
McHenry Ave / Coffee Rd	WB Stop			**>300**	**F**			**>300**	**F**
Patterson Rd (SR 108) / Village A	SB Stop			**56.3**	**F**			**>300**	**F**
Patterson Rd / MU-1	SB stop			**>300**	**F**			**>300**	**F**

TABLE 4
EXISTING PLUS PROJECT INTERSECTION QUEUES ON STATE HIGHWAYS

Intersection	Lane	Storage (feet)	AM Peak Hour				PM Peak Hour			
			Existing		Existing Plus Project		Existing		Existing Plus Project	
			Volume (vph)	95th % Queue	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)
McHenry Ave (SR 108) / Ladd Rd[1]	NB left	180	33	60	33	70	17	60	17	105
	SB left	300	97	105	180	190	364	285	464	**455**
	EB left	260	108	120	133	160	234	235	270	**365**
	WB left	90	1	<25	12	80	6	<25	19	110
Patterson Ave (SR 108) / SR 108[1]	WB left	530	181	130	307	255	123	120	257	235
McHenry Ave (SR 108) / SR 108[1]	WB left	750[2]	188	145	313	205	124	125	258	160
McHenry Ave (SR 108) / Francis Ave	NB left	90[3]	9	<25	9	<25	20	<25	20	<25
McHenry Ave (SR 108) / Crawford Rd	SB thru+left		3	<25	3	<25	6	<25	6	<25
McHenry Ave (SR 108) / Kiernan Ave	NB left	220[3]	127	255	127	255	231	385	197	385
	SB left	415[3]	99	185	99	185	313	585	314	590
	EB left (2)	770	93	105	143	170	131	110	201	210
	WB left (2)	965	365	280	378	295	285	165	179	190
Patterson Rd (SR108) / Skittone Rd	WB thru+left		4	<25	10	<25	8	<25	15	<25
Patterson Rd (SR 108) / Coffee Rd	WB left	75	128		186	<25	76		198	40
	EB left				212				199	30
Patterson Rd (SR 108) / Oakdale Rd	NB left	140[3]	191	240	235	335	115	205	205	390
	SB left	80[3]	63	105	63	105	91	180	91	180
	EB left	535	70	110	83	140	139	210	155	240
	WB left (2)[4]	500	276	190	276	190	513	290	388	290

[1] based on SimTraffic simulation

[2] distance to Patterson Rd. [3] lane continues as TWLT lane. [4] #2 turn lane continues for 250 feet

BOLD values exceed available storage. **HIGHLIGHTED** values are significant impact under CEQA

TABLE 5
EXISTING PLUS PROJECT TRAFFIC SIGNAL WARRANTS

Intersection	Approach	AM Peak Hour				PM Peak Hour			
		Existing		EX Plus Project		Existing		EX Plus Project	
		Volume (vph)	Met?	Volume (vph)	Met?	Volume (vph)	Met?	Volume (vph)	Met?
McHenry Ave (SR 108) / Francis Ave	Major	1,085	No	1,423	No	1,494	No	1,951	No
	Minor	23		32		16		27	
McHenry Ave (SR 108) / Crawford Rd	Major	1,109	No	1,443	No	1,532	No	1,985	No
	Minor	31		37		20		27	
Carver Rd / Ladd Rd	Major	611	No	791	**Yes**	650	No	881	**Yes**
	Minor	157		178		148		179	
Patterson Rd (SR108) / Skittone Rd	Major	1,121	No	1,726	No	1,294	No	2,064	No
	Minor	7		12		14		21	
Patterson Rd (SR 108) / Coffee Rd	Major	1,183	**Yes**	1,768	**Yes**	1,334	**Yes**	2,097	**Yes**
	Minor	143		640		160		554	
Coffee Rd / Morrill Rd	Major	359	No	892	**Yes**	452	No	1,099	**Yes**
	Minor	124		134		75		82	
Coffee Rd / Crawford Rd	Major	479	No	1,007	No	506	No	1,146	No
	Minor	38		38		26		26	
McHenry Ave / Coffee Rd	Major			1,607	**Yes**			2,295	**Yes**
	Minor			203				374	
Patterson Rd (SR 108)/ Village A Access	Major			1,441	**Yes**			1,972	No
	minor			94				65	
Patterson Rd (SR 108) / MU-1 Access	Major			1,501	**Yes**			2,105	**Yes**
	Minor			165				667	

EXISTING PLUS APPROVED PROJECTS CONDITIONS

This report section considers the traffic operational effects of RWSP within the context of conditions with occupancy of other approved projects identified in consultation with City of Riverbank, Stanislaus County and City of Modesto staff.

Approved Projects List

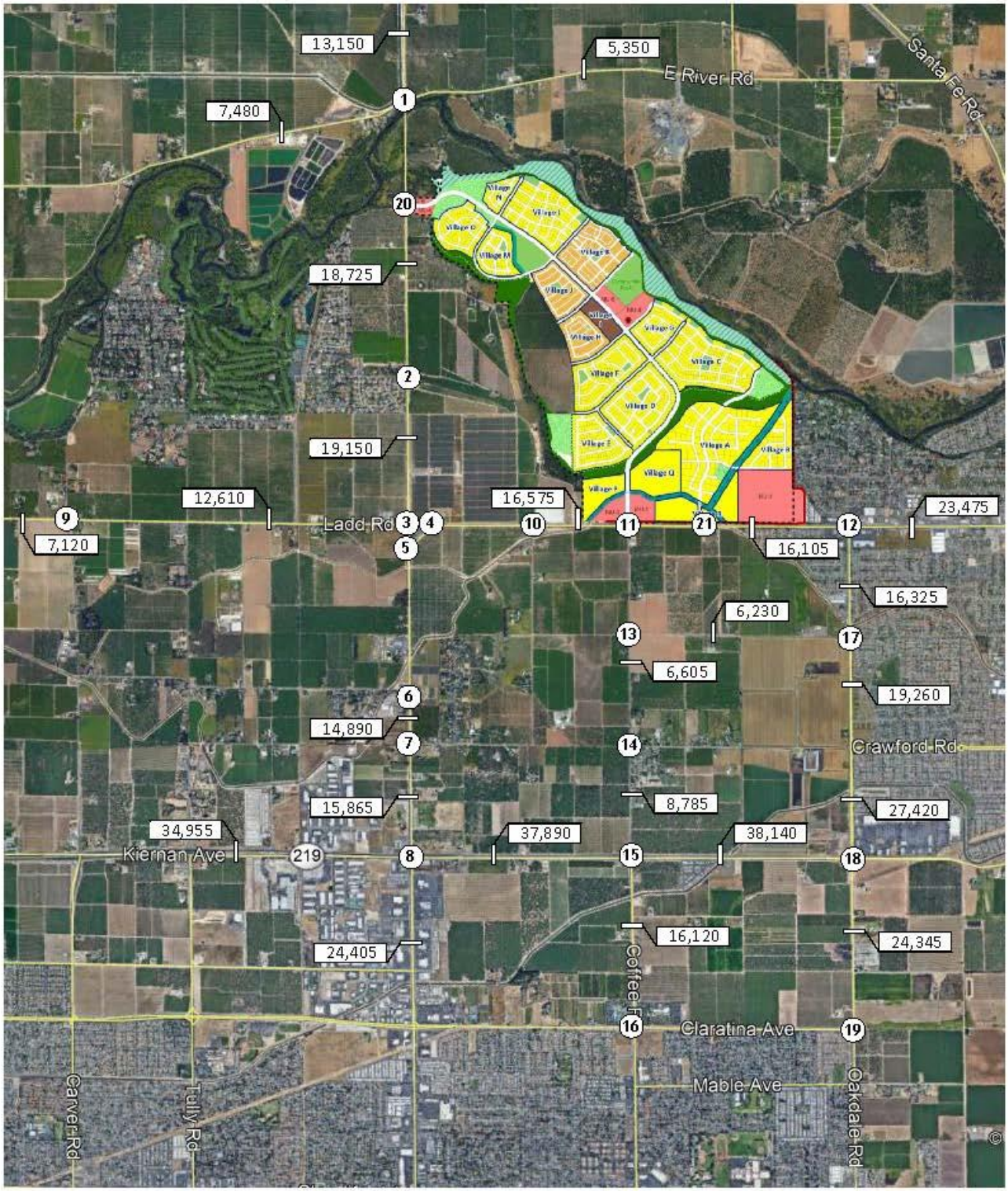
Land Use. Table 6 identifies development project identified by agency staff for this analysis. Only projects in Riverbank were identified by these agencies. The *Crossroads West SP* south of Patterson Road is assumed to be fully developed. The development within Riverbank's *CFD 2016-1* is located on the east side of Riverbank off of Claus Road. No other approved projects were identified in this area by Stanislaus County or the City of Modesto.

Trip Generation. As indicated in Table 6, these projects would generate a total of 36,088 new daily trips, with 2,020 trips in the a.m. peak hour and 3,792 trips in the p.m. peak hour.

TABLE 6
APPROVED PROJECTS / TRIP GENERATION

Jurisdiction	Name	Description	Trip Generation		
			Daily	AM Peak Hour	PM Peak Hour
Riverbank	CFD	285 SFR and 72 MFR east of Claus Rd near Patterson Rd	2,925	230	302
	Crossroads West SP	2,013 SFR/MFR, 577 ksf MU-Retail	33,163	1,790	3,490
Total			**36,088**	**2,020**	**3,792**

Traffic Volume Forecasts. The trips associated with approved projects were assigned to the regional street system based on information contained in their respective traffic studies or based on a distribution developed for the regional travel demand forecasting model. Figure 3 presents the resulting daily traffic volume at study locations, while Figures 4A/4B present peak hour intersection turning movements under EPAP background conditions.

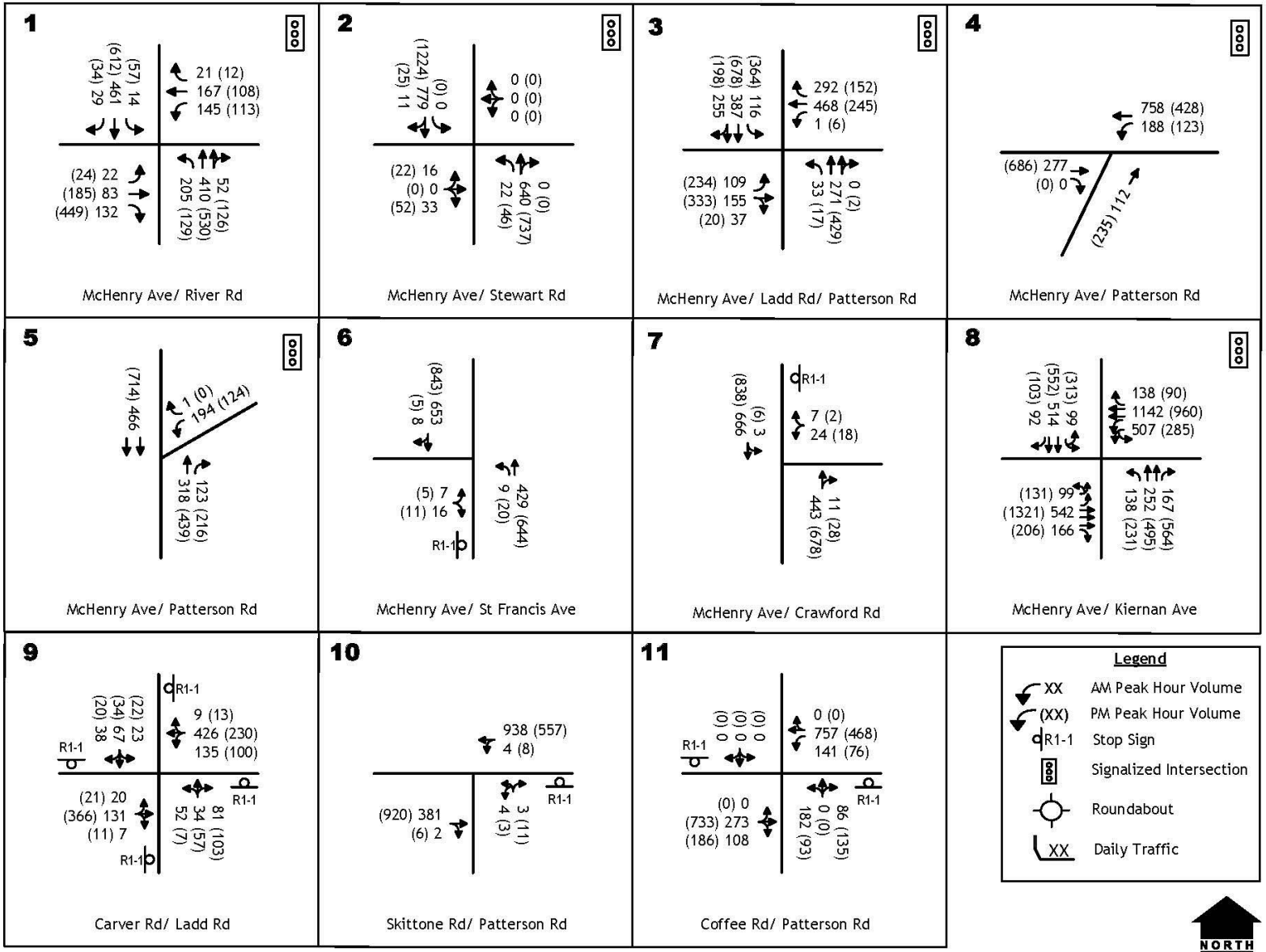


EPAP AVERAGE DAILY TRAFFIC VOLUMES

KD Anderson & Associates, Inc.
Transportation Engineers

2290-02 RA 8/31/2021

figure 3

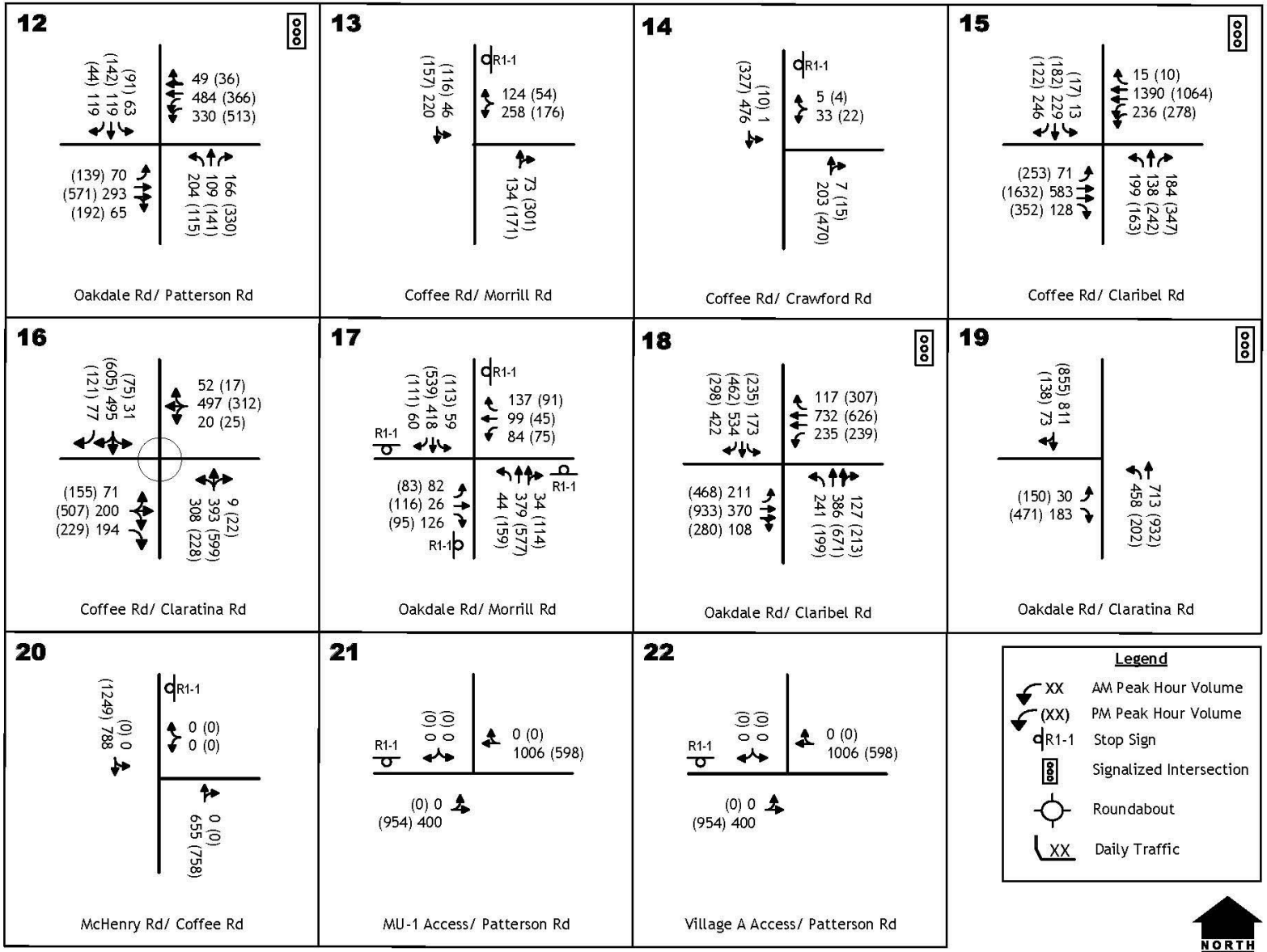


EXISTING PLUS APPROVED PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers

2290-02 RA 8/31/2021

figure 4a



EXISTING PLUS APPROVED PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers

2290-02 RA 8/31/2021

figure 4b

Existing Plus Approved Projects Conditions

Roadway Segment Levels of Service. The addition of trips from approved projects will increase the traffic volumes on some study area roadways. As noted in Table 7 without improvements sixteen segments will operate with Level of Service that exceed the minimum LOS D standard of the responsible agency.

Intersection Traffic Operations. The Levels of Service occurring at study intersections under the Existing Plus Approved Projects baseline conditions with and without the proposed RWSP were calculated and are identified in Table 8.

As shown, if the other approved projects proceed, then ten intersections would operate with Levels of Service below the adopted minimum standard.

95th Percentile Queues. As noted in Table 9, no locations experience queues in excess of storage under EPAP conditions.

Traffic Signal Warrants. The extent to which the addition of trips from Approved projects affects the status of traffic signal warrants at un-signalized intersection is noted in Table 10. As shown, three intersections satisfy peak hour warrants with the approved projects.

TABLE 7
EXISTING PLUS APPROVED PROJECTS (EPAP) PLUS RWSP ROADWAY SEGMENT LEVELS OF SERVICE

Roadway	Location	Class	Maximum Volume (ADT)	LOS D Threshold	EPAP Conditions		EPAP Plus RWSP		
					Daily Volume (ADT)		Daily Volume (ADT)		
							Project Only	Total	
					Daily Volume (ADT)	LOS	Project Only	Total	LOS
McHenry Ave	Jones Rd to River Rd	2-lane Min Art	24,900	12,500	**13,150**	**E**	2,580	**15,730**	**E**
	River Rd to Coffee Rd	2-lane Arterial	10,000	5,900	**18,725**	**F**	4,750	**23,475**	**F**
	Coffee Rd to Stewart Rd	2-lane Arterial	10,000	5,900	**18,725**	**F**	6,205	**24,930**	**F**
	Stewart Rd to Ladd Rd	2-lane Arterial	10,000	5,900	**19,150**	**F**	6,220	**25,370**	**F**
McHenry Ave (SR 108)	Ladd Rd to Crawford Rd	2-lane Arterial	10,000	5,900	**14,890**	**F**	5,440	**20,330**	**F**
	Crawford Rd to Kiernan Ave	2-lane Arterial	10,000	5,900	**15,865**	**F**	5,615	**21,480**	**F**
	Kiernan Ave to Pelandale Ave	4-lane Arterial	42,520	35,720	24,405	B	4,165	28,570	C
River Road	Murphy Rd to McHenry Ave	2-lane Maj Col	24,900	12,500	7,480	C	1,740	9,220	D
	McHenry Ave to Harold Ave	2-lane Maj Col	24,900	12,500	5,350	C	435	5,785	C
Ladd Road	Stoddard Rd to Carver Rd	2-lane Arterial	10,000	5,900	**7,120**	**E**	2,625	**9,745**	**E**
	Carver Rd to McHenry Ave	2-lane Arterial	10,000	5,900	**12,610**	**F**	3,385	**15,995**	**F**
Patterson Road (SR 108)	McHenry Ave to Coffee Rd	2-lane Arterial	10,000	5,900	**16,575**	**F**	9,880	**25,455**	**F**
	Coffee Rd to Oakdale Rd	2-lane Arterial	15,700	14,800	**16,105**	**F**	7,845	**23,950**	**F**
	Oakdale Rd to Jackson Ave	4-lane Arterial	33,400	31,700	23,475	C	5,230	28,705	C
Skittone Road	Patterson Rd to Crawford Rd	2-lane Rural	10,000	5,900	270	A	180	450	A
Morrill Road	Coffee Rd to Oakdale Rd	2-lane Collector	12,900	11,600	6,230	C	295	6,525	C
Kiernan Ave (SR 219)	Tully Rd to McHenry Ave	4-lane EXP	62,520	52,520	34,955	C	2,280	37,235	C
Claribel Road	McHenry Ave to Coffee Rd	4-lane Arterial	40,000	33,600	37,890	D	900	38,790	D
	Coffee Rd to Oakdale Rd	4-lane Arterial	33,400	31,700	**38,140**	**F**	915	**39,055**	**F**
Coffee Road	Patterson Rd to Crawford Rd	2-lane Rural	10,000	5,900	**6,605**	**E**	8,930	**15,535**	**F**
	Crawford Rd to Claribel Rd	2-lane Rural	10,000	5,900	**8,785**	**E**	8,635	**17,420**	**F**
	Claribel Rd to Claratina Ave	2-lane Rural	22,500	13,280	**16,120**	**E**	6,890	**23,010**	**F**
Oakdale Road	Patterson Rd to Morrill Rd	4-lane Arterial	33,400	31,700	16,325	B	2,065	18,390	B
	Morrill Rd to Crawford Rd	2-lane Arterial	15,700	14,800	**19,260**	**F**	1,835	**21,095**	**F**
	Crawford Rd to Claribel Rd	4-lane Arterial	33,400	31,700	27,420	D	1,835	29,255	D
	Claribel Rd to Claratina Ave	2-lane Rural	22,500	13,280	**24,345**	**F**	715	**25,060**	**F**

BOLD values exceed minimum LOS D standard (1) with project traffic peak volume is p.m. peak hour

TABLE 8
EXISTING PLUS APPROVED PROJECTS (EPAP) PLUS RWSP INTERSECTION LEVELS OF SERVICE

Intersection	Control	AM Peak Hour				PM Peak Hour			
		Existing Plus Approved Projects		EPAP Plus Project		Existing Plus Approved Projects		EPAP Plus Project	
		Average Delay (sec/veh)	LOS	Average Delay (Sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
McHenry Ave / River Rd	Signal	24.2	C	27.8	C	31.6	C	**55.7**	**E**
McHenry Ave / Stewart Rd	Signal	8.7	A	14.8	B	**60.8**	**E**	**125.3**	**F**
McHenry Ave (SR 108) / Ladd Rd	Signal[1]	26.2	C	34.6	C	35.7	D	54.2	D
Patterson Ave (SR 108) / SR 108	Signal[1]	14.2	B	37.0	D	15.3	B	34.5	C
McHenry Ave (SR 108) / SR 108	Signal[1]	8.6	A	10.4	B	8.6	A	10.6	B
McHenry Ave (SR 108) / Francis Ave	EB Stop	14.3	B	18.0	C	16.5	C	22.4	C
McHenry Ave (SR 108) / Crawford Rd	WB Stop	23.9	C	**43.7**	**E**	**43.4**	**E**	**124.5**	**F**
McHenry Ave (SR 108) / Kiernan Ave	Signal	39.0	D	47.6	D	**113.4**	**F**	**125.2**	**F**
Carver Rd / Ladd Rd	AWS	**52.7**	**F**	**117.1**	**F**	14.1	B	**26.7**	**F**
Patterson Rd (SR108) / Skittone Rd	NB Stop	24.4	C	42.8	D	21.8	C	**45.8**	**E**
Patterson Rd (SR 108) / Coffee Rd	NB Stop	**>300**	**F**	**>300**	**F**	**>300**	**F**	**>300**	**F**
Patterson Rd (SR 108) / Oakdale Rd	Signal	23.4	C	26.7	C	52.7	D	**72.3**	**E**
Coffee Rd / Morrill Rd	WB Stop	**44.3**	**E**	**>300**	**F**	**41.4**	**E**	**>300**	**F**
Coffee Rd / Crawford Rd	WB Stop	15.6	C	33.7	D	17.7	C	**46.3**	**E**
Coffee Rd / Claribel Rd	Signal	**78.0**	**E**	**100.8**	**F**	**154.4**	**F**	**189.7**	**F**
Coffee Rd / Claratina Rd	Roundabout	**49.7**	**E**	**103.8**	**F**	**87.5**	**F**	**152.4**	**F**
Oakdale Rd / Morrill Rd	Signal	21.0	C	22.1	C	30.1	C	35.0	D
Oakdale Rd / Claribel Rd	Signal	**98.4**	**F**	107.8	D	**128.9**	**F**	**148.2**	**F**
Oakdale Rd / Claratina Rd	Signal	**57.3**	**E**	**62.2**	**E**	36.1	D	**40.5**	**D**
McHenry Ave / Coffee Rd	WB Stop			**>300**	**F**			**>300**	**F**
Patterson Rd (SR 108) / Village A	SB Stop			**99.8**	**F**			**>300**	**F**
Patterson Rd (SR 108) / MU-1 access	SB Stop			**>300**	**F**			**268.0**	**F**

[1] based on SimTraffic Simulation

TABLE 9
EXISTING PLUS APPROVED PROJECTS (EPAP) PLUS RWSP INTERSECTION QUEUES

Intersection	Lane	Storage (feet)	AM Peak Hour				PM Peak Hour			
			Existing Plus Approved Projects		EPAP Plus Project		Existing Plus Approved Projects		EPAP Plus Project	
			Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)
McHenry Ave (SR 108) / Ladd Rd	NB left	180	33	65	33	75	17	65	17	125
	SB left	300	116	130	199	205	364	305	502	**390**
	EB left	260	109	130	134	170	234	265	271	**380**
	WB left	90	1	25	12	80	6	60	19	**115**
Patterson Ave (SR 108) / SR 108	WB left	530	188	135	314	**540**	123	115	261	350
McHenry Ave (SR 108) / SR 108	WB left	750[1]	194	145	320	210	124	125	262	235
McHenry Ave (SR 108) / Francis Ave	NB left	90[2]	9	<25	9	<25	20	<25	20	<25
McHenry Ave (SR 108) / Crawford Rd	SB thru+left		3	<25	3	<25	6	<25	6	<25
McHenry Ave (SR 108) / Kiernan Ave	NB left	220[2]	138	280	138	280	231	470	231	470
	SB left	415[2]	99	185	99	185	313	585	315	640
	EB left (2)	770	99	110	149	175	131	120	211	220
	WB left (2)	965	507	440	523	455	285	315	303	335
Patterson Rd (SR108) / Skittone Rd	WB thru+left		4	<25	10	<25	8	<25	15	<25
Patterson Rd (SR 108) / Coffee Rd	WB left	75	141	<25	199	<25	76	<25	206	50
	EB left		0	<25	261	60	0	<25	117	<25
Patterson Rd (SR 108) / Oakdale Rd	NB left	140[2]	204	275	248	365	115	210	208	395
	SB left	80[2]	63	100	63	105	91	175	91	180
	EB left	535	70	110	83	140	139	210	155	240
	WB left (2)[3]	500	330	245	330	245	513	405	513	405
Patterson Rd (SR 108) / Village A	EB left	-	-	-	27	<25	-	-	88	<25
Patterson Rd (SR 108) / MU-1 Access	EB left	-	-	-	182	40	-	-	308	60

[1] distance to Patterson Rd. [2] lane continues as TWLT lane. [3] #2 turn lane continues for 250 feet.

BOLD values exceed available storage. **HIGHLIGHTED** values are significant impact under CEQA

TABLE 10
EXISTING PLUS APPROVED PROJECTS (EPAP) PLUS RWSP TRAFFIC SIGNAL WARRANTS

Intersection	Approach	AM Peak Hour				PM Peak Hour			
		Existing Plus Approved Projects		EPAP Plus Project		Existing Plus Approved Projects		EPAP Plus Project	
		Volume (vph)	Met?	Volume (vph)	Met?	Volume (vph)	Met?	Volume (vph)	Met?
McHenry Ave (SR 108) / Francis Ave	Major	1,099	No	1,437	No	1,512	No	1,969	No
	Minor	23		32		16		27	
McHenry Ave (SR 108) / Crawford Rd	Major	1,123	No	1,452	No	1,550	No	2,003	No
	Minor	31		37		20		27	
Carver Rd / Ladd Rd	Major	728	**Yes**	908	**Yes**	741	**Yes**	972	**Yes**
	Minor	167		188		167		198	
Patterson Rd (SR108) / Skittone Rd	Major	1,325	No	1,930	No	1,491	No	2,261	No
	Minor	7		12		14		21	
Patterson Rd (SR 108) / Coffee Rd	Major	1,279	**Yes**	1,864	**Yes**	1,463	**Yes**	2,331	**Yes**
	Minor	268		737		228		559	
Coffee Rd / Morrill Rd	Major	473	**Yes**	1,012	**Yes**	745	**Yes**	1,392	**Yes**
	Minor	382		392		230		237	
Coffee Rd / Crawford Rd	Major	687	No	1,215	No	822	No	1,462	No
	Minor	38		38		26		26	
McHenry Ave / Coffee Rd	Major			1,765	**Yes**			2,431	**Yes**
	Minor			204				261	
Patterson Rd (SR 108) / Village A	Major			1,907	**Yes**			2,480	No
	Minor			94				65	
Patterson Rd (SR 108) / MU-1	Major			1,855	**Yes**			2,254	**Yes**
	Minor			300				489	

Existing Plus Approved Projects (EPAP) Plus RWSP Conditions

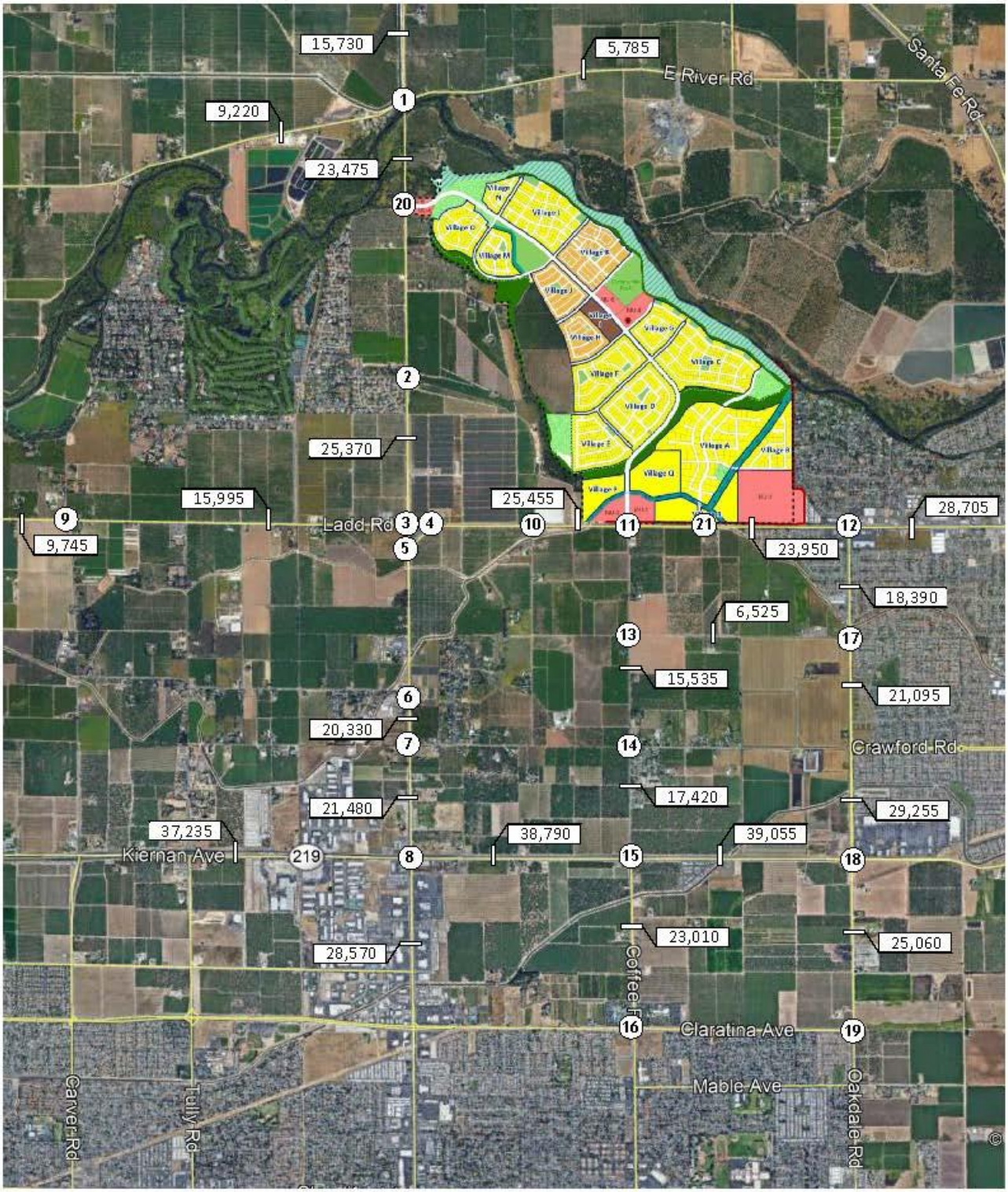
Traffic Volumes. The trips identified for RWSP were superimposed onto the EPAP baseline condition to create the daily EPAP plus Project volumes shown in Figure 5, and Figures 6A/6B present peak hour intersection volumes under this condition. These volumes are the basis for the subsequent analysis of Level of Service and traffic signal warrants.

Roadway Segments. Table 7 compares roadway segments Level of Service with and without the project. As indicated the same eleven locations which were deficient under Existing Plus Project conditions operate with Level of Service below LOS D under EPAP plus Project conditions, and five additional locations would operate at LOS D or worse.

Intersection Levels of Service. Table 8 compares Intersection Levels of Service at study locations with and without RWSP. As indicated, the same intersections that operated with Level of Service less than the adopted standard under Existing Plus Approved Projects conditions would do so with the addition of RWSP traffic, and seven additional locations would be deficient.

Peak Hour Queues. As noted in Table 9, peak period queues at the McHenry Avenue / Ladd Road / Patterson Road intersection would exceed available storage, and the spillover effects at this intersection would cause the queue at the adjoining SR 108 bypass intersection to exceed storage.

Traffic Signal Warrants. Table 10 compares the results of peak hour traffic signal warrants analysis at un-signalized study intersections with and without the project. As indicated the same locations that satisfied warrants under Existing Plus Project conditions do so under the EPAP Plus Project conditions.



EPAP PLUS PROJECT
AVERAGE DAILY TRAFFIC VOLUMES

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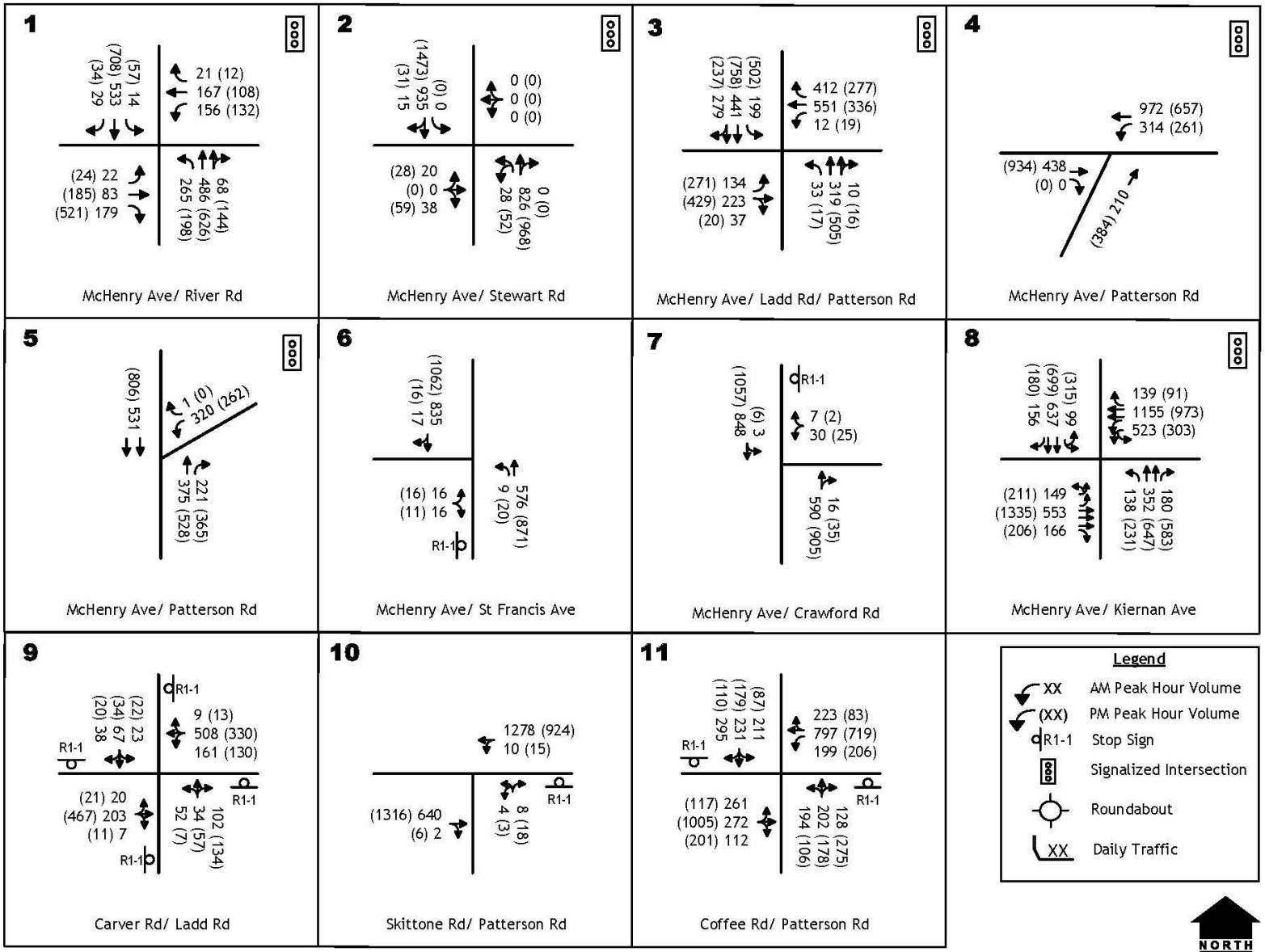
figure 5



EPAP PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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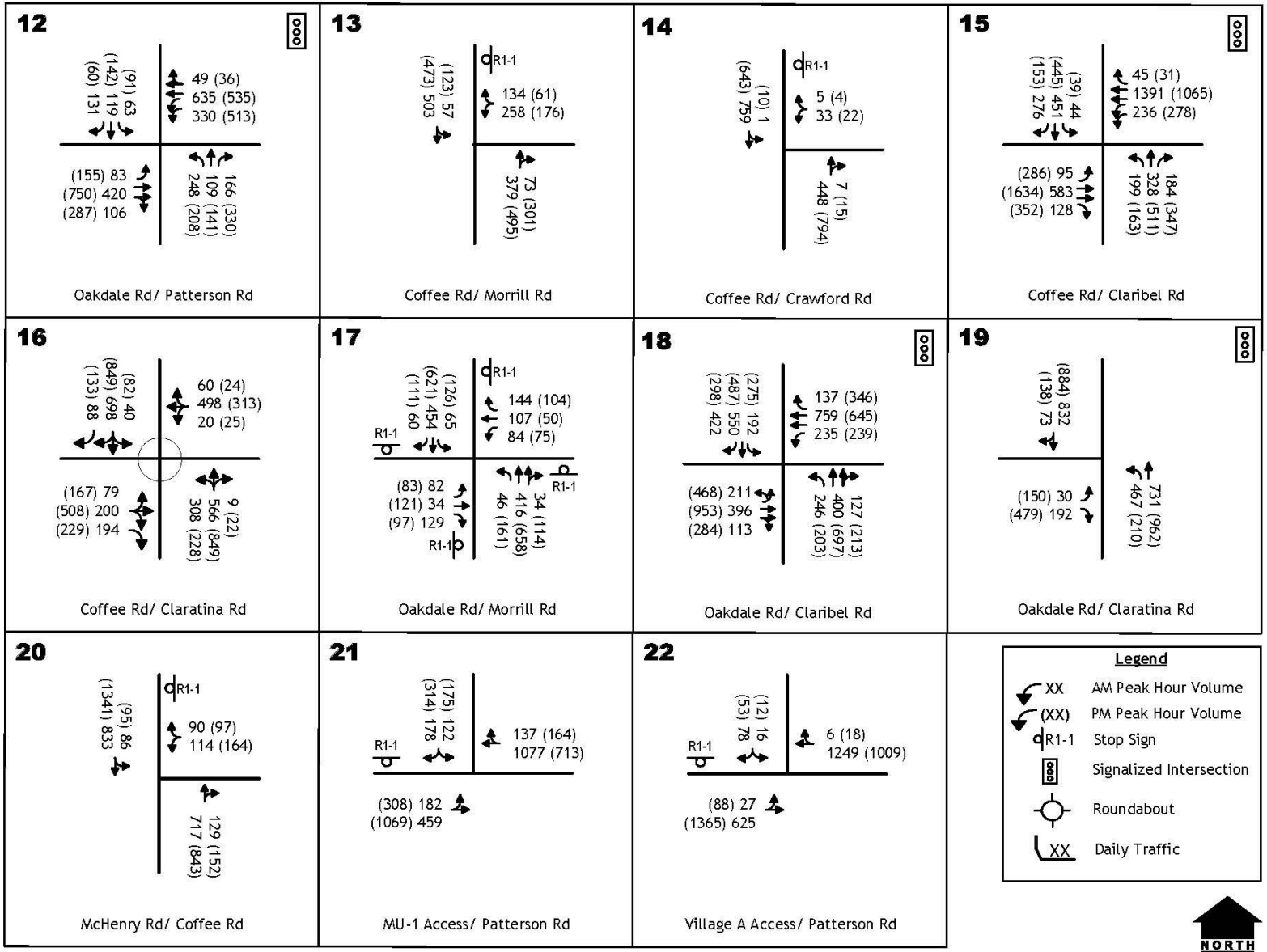
figure 6a



EPAP PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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figure 6b

CUMULATIVE TRAFFIC EFFECTS

This report section considers the impacts of the RWSP within the context of long-term traffic conditions that may accompany the development of regional circulation system improvements and regional residential and non-residential development.

Approach to Traffic Volume Forecasting

Available sources of information regarding long term traffic conditions were reviewed, and the basis for cumulative analysis was selected in consultation with City of Riverbank. The City of Riverbank General Plan Update EIR regional travel demand forecasting model was considered. That tool was created from the StanCOG regional model as it existed when the GPU began in 2007 and may not represent the most current information regarding regional development. The traffic model employed for the most recent StanCOG Regional Transportation Plan Updated (RTP) was obtained and reviewed. That tool was obtained and reviewed but as the specific traffic volume forecasts for study area roadways have not been endorsed by local agencies this alternative was not selected.

The regional traffic model employed for the pending North County Corridor (NCC) DEIR was reviewed and found to be the best available resource. This model produced Year 2042 land use forecasts that represent a "Worst Case" view of regional growth, and the results identified in the Traffic Operational Analysis accompanying the DEIR have been accepted by Caltrans and Stanislaus County.

Modeling Approach in NCC Area. The approach to making use of the traffic model was intended to make use of information presented in the CWSP DEIR while reflecting comments received from the City of Riverbank and City of Modesto during the preparation of the CWSP traffic impact analysis. Because the CWSP EIR analysis addressed some but not all of the locations to be evaluated for RWSP, two alternative measures were employed.

Where CWSP EIR Analysis forecasts were not available the traffic model was reviewed and modified to reflect the specific land use assumptions inherent to the RWSP, and the local roadway network was modified to reflect the proposed project. The locations evaluated under this approach generally lie along the McHenry Avenue. To best account for inherent limitations of a regional model an "incremental" approach was taken to create the Year 2042 traffic volumes used for this analysis. The 2042 with CWSP model run results were compared to the NCC model's calibrated baseline year forecasts and the incremental difference in segment volume was identified on a daily and peak hour basis. These increments were added to observed Year 2020 volumes to create the "adjusted" future condition. Individual growth rates were then calculated for each segment and intersection approach by comparing observed and adjusted future volumes. Finally, these growth rates were applied to the turning movement volumes at each intersection, and the results were balanced using the techniques contained in *Transportation Research Board's (TRB's) NCHRP report 255, Highway Data for Urbanized Area Project Planning and Design*.

As noted earlier the analysis of future conditions assumes implementation of the NCC, and the planned expressway is included in the model. While four alternative alignments have been included in the DEIR analysis contained in the NCC's environmental document, Alternative 2B has been assumed. In general, all NCC alternatives are similar on the area of Riverbank but differ in the paths followed east of Claus Road.

Project Access. Because any regional model lacks the ability to account for specific local access conditions, the specific assignment of RWSP trips was identified assuming implementation of the future circulation system. The new trips associated with RWSP were then manually assigned to the study intersections and segments, and the results adjusted to balance to the forecasts at regional intersections.

Plus Project Conditions. To identify the incremental effects of RWSP in the Year 2042, the trips associated with RWSP were manually added to the new 2042 No Project forecasts or were added to the CWSP DEIR forecasts at intersections where that data was available.

Long Term Circulation System Improvements

This analysis addresses implementation of improvements that are reasonably foreseeable by the Year 2042.

The NCC project included the following study area improvements:

- Realignment of Claribel Road west of Oakdale Road along a new alignment to Coffee Road, with improvements to Coffee Road between the NCC and the new Claribel Road.
- Realignment of Claribel Road east of Roselle Avenue over the BN&SF to a new intersection on Claus Road.

It is important to note that NCC funding will be provided by a combination of RTF funds collected from new development, as well as federal and state funds. While funding for the total NCC has not yet been secured and cannot be guaranteed in the short term, its completion by 2042 is reasonably foreseeable.

Alternatively, other projects could be completed that are included in adopted fee programs. To present a conservative analysis of RWSP effects those fee program improvements projects have not been assumed but are reserved for consideration as potential improvements.

The City of Riverbank impact fee program and Stanislaus County's fee program include these projects:

- Widening SR 108 to 4 lanes from McHenry Avenue through Riverbank to Snedigar Road
- Widening Coffee Road to 4-lanes from Patterson Road to Claribel Road
- Widening McHenry Avenue to 4 lanes from Patterson Road to San Joaquin County line

In Modesto, improvements addressed by the City's CFF will occur in concert with assumed development. These include widening Coffee Road and Oakdale Road south of NCC.

Traffic Volume Forecasts

Figure 7 and Figures 8A/8B display resulting Year 2042 traffic volumes under daily and a.m. and p.m. peak hour conditions without the RWSP. Figure 9 illustrates daily volumes if the RWSP is developed, while Figures 10A/10B are Year 2042 conditions with the project at intersections.

Cumulative (Year 2042) No Project Conditions

No Project Roadway Segment Level of Service. If RWSP does not develop, then 15 roadways will operate with a Level of Service in excess of LOS D as noted in Table 11.

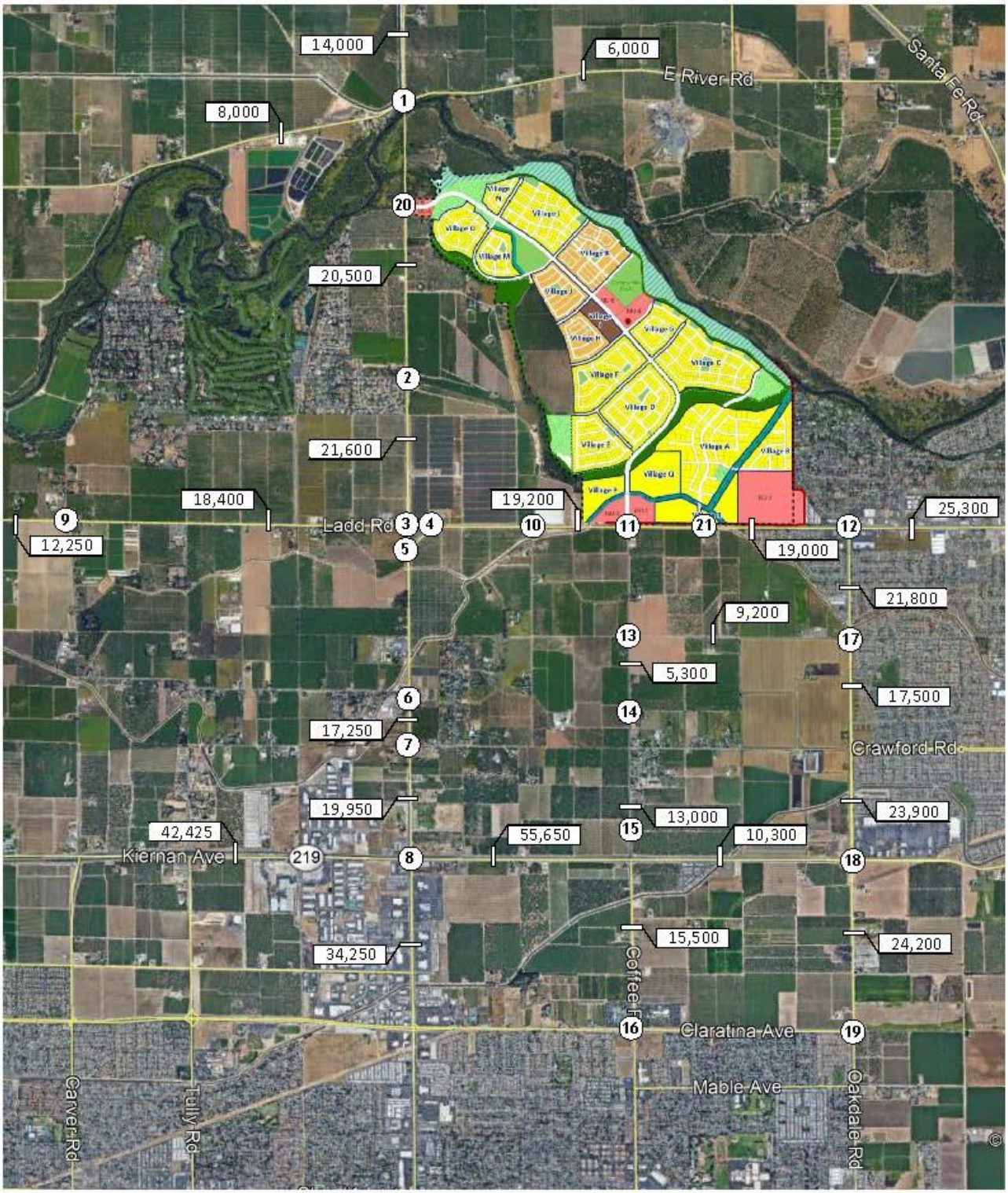
No Project Intersection Levels of Service. As noted in Table 12, Levels of Service in excess of the LOS D minimum satisfying agency minimum LOS D standard are anticipated at eleven intersections if the RWSP was not developed.

No Project Intersection Queues. As noted in Table 13, two intersections on state highways will experience queues that exceed available storage if the RWSP does not proceed:

- McHenry Avenue (SR 108) / Ladd Road / Patterson Road
- Patterson Road / SR 108 Bypass

No Project Traffic Signal Warrants. If RWSP does not proceed, then four intersections would continue to satisfy peak hour traffic signal warrants, as noted in Table 14.

- Carver Road / Ladd Road
- Patterson Road (SR 108) / Coffee Road
- Coffee Road / Morrill Road
- Coffee Road / Relocated Claribel Road



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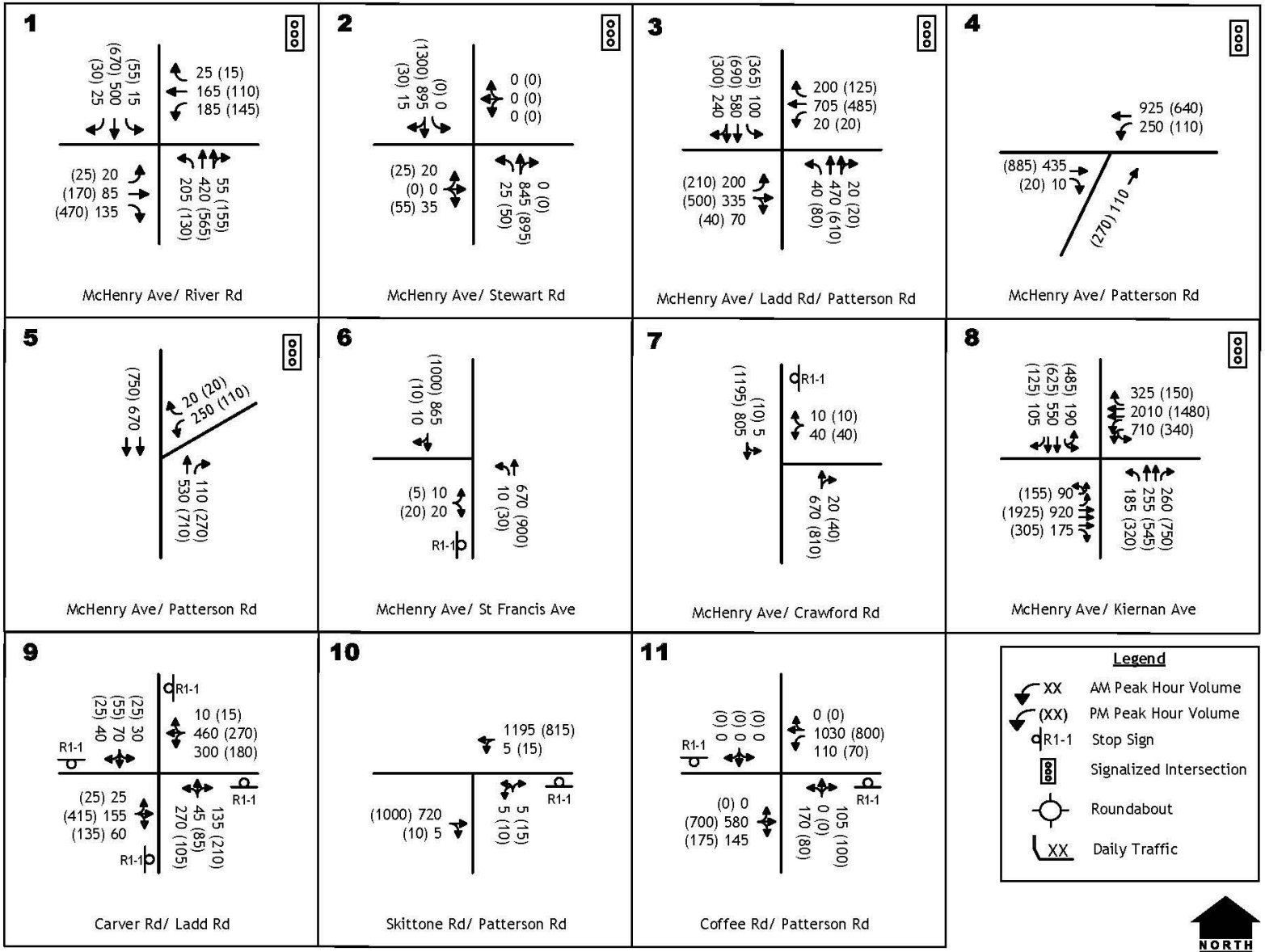
2042 CUMULATIVE AVERAGE DAILY TRAFFIC VOLUMES

figure 7



2042 CUMULATIVE TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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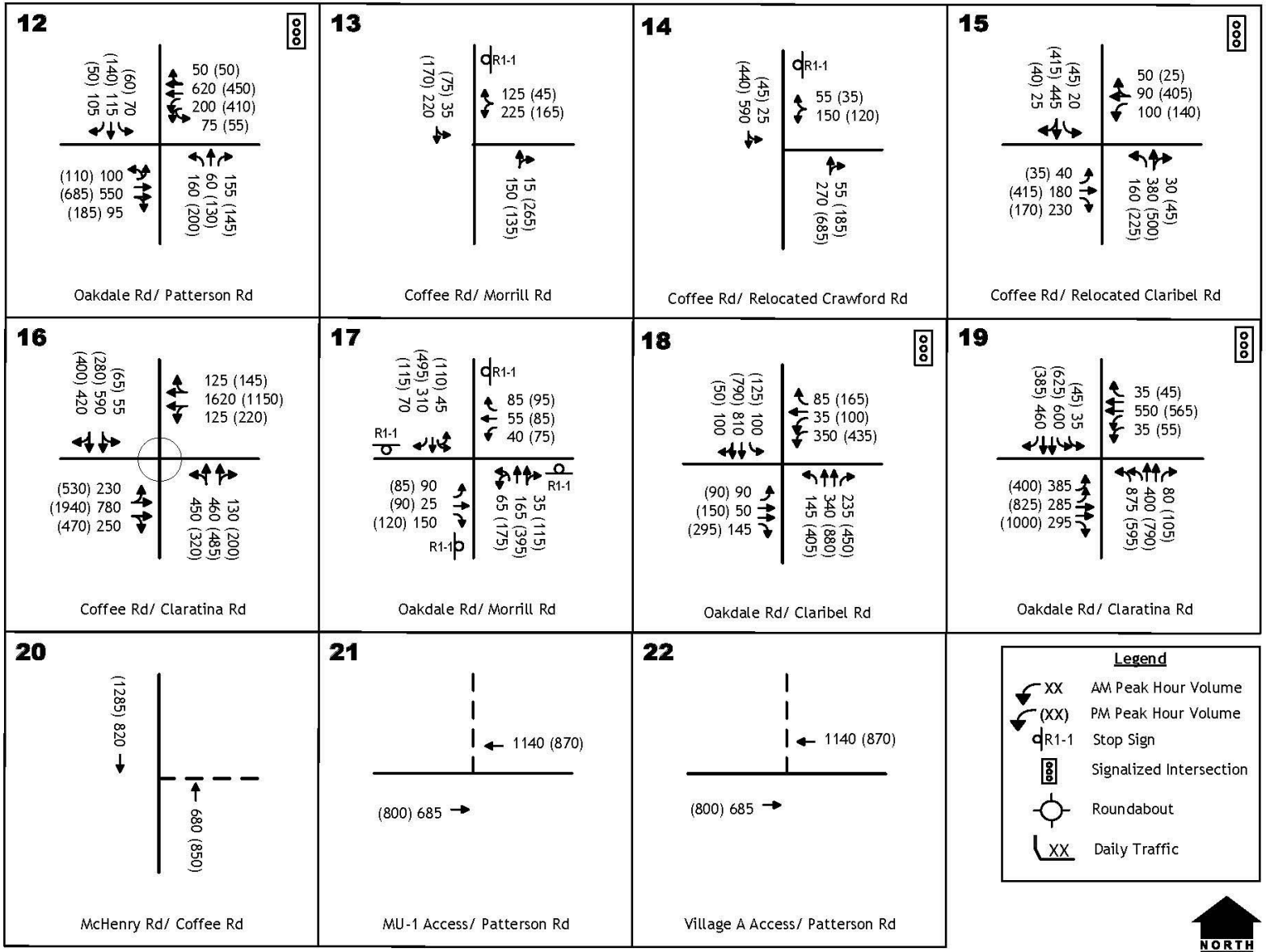
figure 8a



2042 CUMULATIVE TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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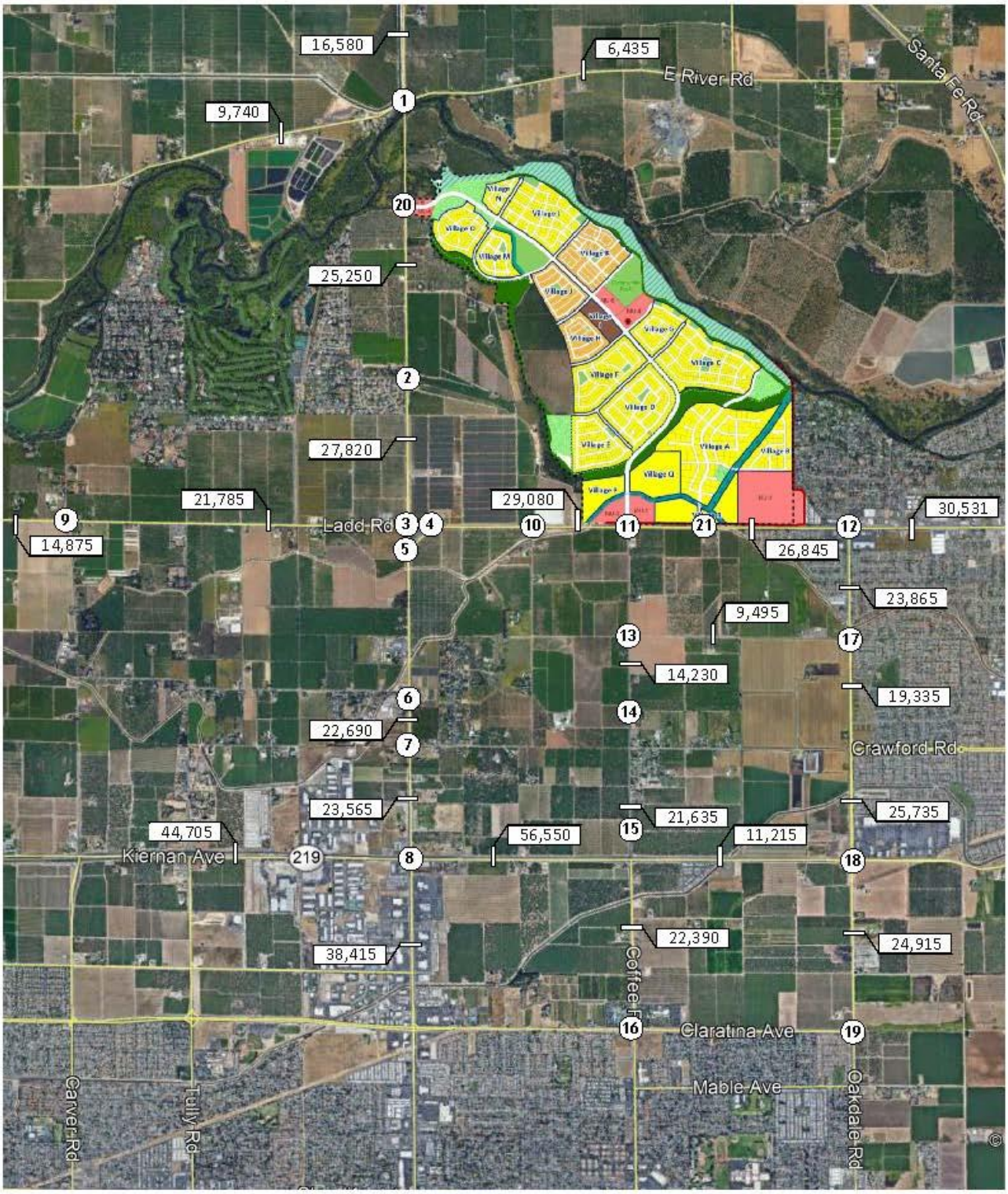
figure 8b



2042 CUMULATIVE PLUS PROJECT
AVERAGE DAILY TRAFFIC VOLUMES

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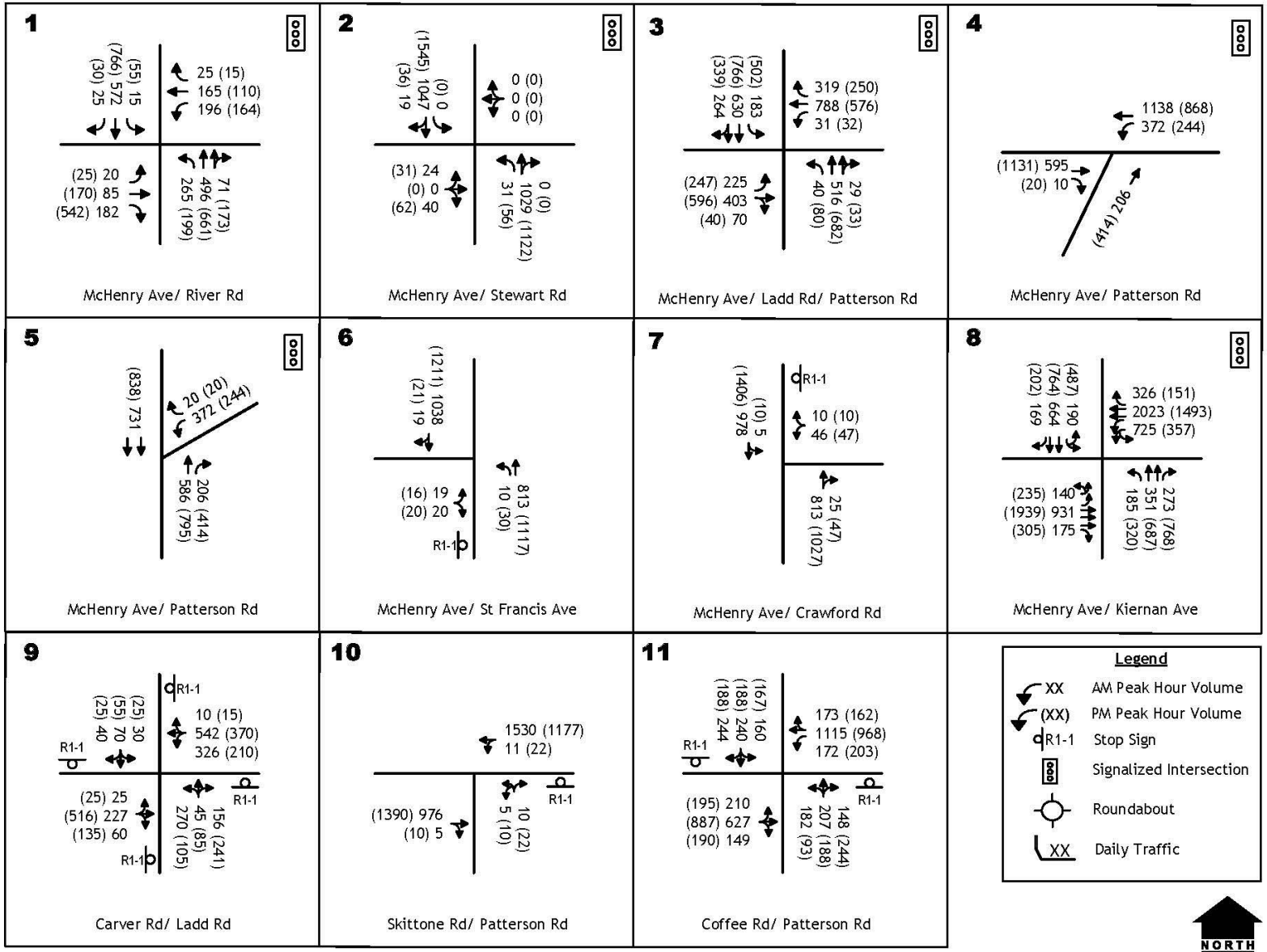
figure 9



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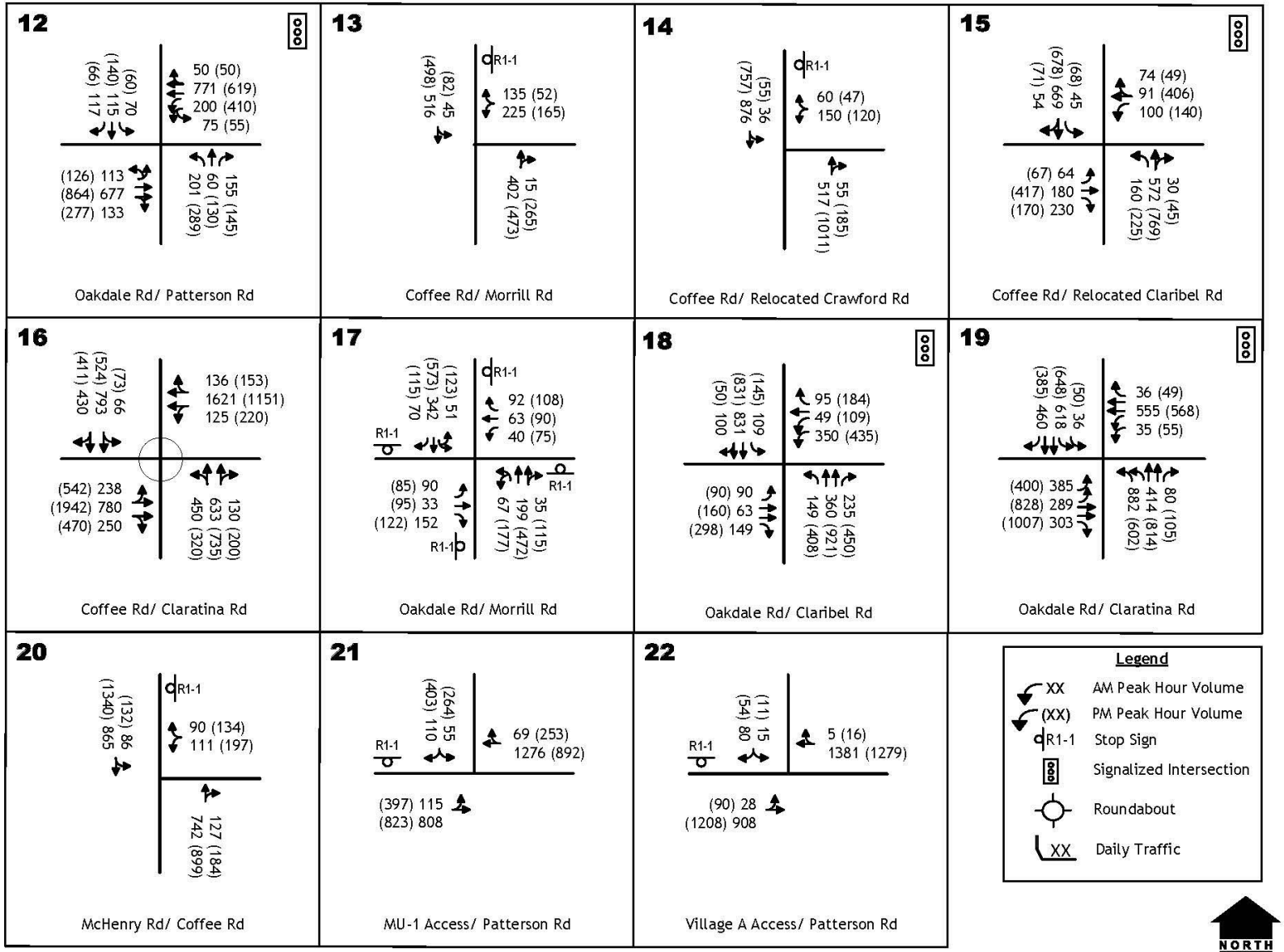
2042 CUMULATIVE PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

figure 10a



2042 CUMULATIVE PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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figure 10b

TABLE 11
CUMULATIVE YEAR 2042 PLUS RWSP ROADWAY SEGMENT LEVELS OF SERVICE

Roadway	Location	Class	Maximum Volume (ADT)	LOS D Threshold	Year 2042 Conditions		Year 2042 Plus RWSP		
					Daily Volume (ADT)	LOS	Daily Volume (ADT)		LOS
							Project Only	Total	
McHenry Ave	Jones Rd to River Rd	2-lane Min Art	24,900	12,500	**14,000**	**E**	2,580	**16,580**	**E**
	River Rd to Coffee Rd	2-lane Arterial	10,000	5,900	**20,500**	**F**	4,750	**25,250**	**F**
	Coffee Rd to Stewart Rd	2-lane Arterial	10,000	5,900	**20,500**	**F**	6,205	**26,705**	**F**
	Stewart Rd to Ladd Rd	2-lane Arterial	10,000	5,900	**21,600**	**F**	6,220	**27,820**	**F**
McHenry Ave (SR 108)	Ladd Rd to Crawford Rd	2-lane Arterial	10,000	5,900	**17,250**	**F**	5,440	**22,690**	**F**
	Crawford Rd to Kiernan Ave	2-lane Arterial	10,000	5,900	**17,950**	**F**	5,615	**23,565**	**F**
	Kiernan Ave to Pelandale Ave	4-lane Arterial	42,520	35,720	34,250	D	4,165	**38,415**	**E**
River Road	Murphy Rd to McHenry Ave	2-lane Maj Col	24,900	12,500	8,000	D	1,740	9,740	D
	McHenry Ave to Harold Ave	2-lane Maj Col	24,900	12,500	6,000	C	435	6,435	C
Ladd Road	Stoddard Rd to Carver Rd	2-lane Arterial	10,000	5,900	**12,250**	**F**	2,625	**14,875**	**F**
	Carver Rd to McHenry Ave	2-lane Arterial	10,000	5,900	**18,400**	**F**	3,385	**21,785**	**F**
Patterson Road (SR 108)	McHenry Ave to Coffee Rd	2-lane Arterial	10,000	5,900	19,200	**F**	9,880	**19,200**	**F**
	Coffee Rd to Oakdale Rd	2-lane Arterial	15,700	14,800	**19,000**	**F**	7,845	**29,080**	**F**
	Oakdale Rd to Jackson Ave	4-lane Arterial	33,400	31500	25,300	C	5,230	30,530	D
Skittone Road	Patterson Rd to Crawford Rd	2-lane	10,000	5,900	270	A	180	450	A
Morrill Road	Coffee Rd to Oakdale Rd	2-lane Collector	12,900	11,600	9,200	D	295	9,495	D
Kiernan Ave (SR 219)	Tully Rd to McHenry Ave	4-lane EXP	62,520	52,520	42,425	C	2,280	44,705	D
Claribel Road	McHenry Ave to Coffee Rd	4-lane EXP	62,520	52,520	**55,650**	**E**	900	**56,550**	**E**
Relocated Claribel Rd	Coffee Rd to Oakdale Rd	4-lane Arterial	33,400	31,700	10,300	B	915	11,215	B
Coffee Road	Patterson Rd to Crawford Rd	2-lane Rural	10,000	5,900	5,300	C	8,930	**14,230**	**F**
	Crawford Rd to Claribel Rd	2-lane Rural	10,000	5,900	**13,000**	**F**	8,635	**21,635**	**F**
	Claribel Rd to Claratina Ave	2-lane Rural	22,500	13,280	**15,500**	**E**	6,890	**22,390**	**F**
Oakdale Road	Patterson Rd to Morrill Rd	4-lane Arterial	33,400	31,700	21,800	B	2,065	23,865	C
	Morrill Rd to Crawford Rd	2-lane Arterial	15,700	14,800	**17,500**	**F**	1,835	**19,335**	**F**
	Crawford Rd to Claribel Rd	4-lane Arterial	33,400	31,700	23,900	C	1,835	25,735	C
	Claribel Rd to Claratina Ave	2-lane Rural	22,500	13,280	**24,200**	**F**	**715**	**24,915**	**F**

BOLD values exceed minimum LOS D standard

TABLE 12
CUMULATIVE INTERSECTION LEVELS OF SERVICE

Intersection	Control	AM Peak Hour				PM Peak Hour			
		Cumulative		Cumulative Plus Project		Cumulative		Cumulative Plus Project	
		Average Delay (sec/veh)	LOS	Average Delay (Sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
McHenry Ave / River Rd	Signal	24.9	C	28.5	C	35.7	D	**61.8**	**E**
McHenry Ave / Stewart Rd	Signal	10.6	B	20.2	C	25.2	C	**65.1**	**F**
McHenry Ave (SR 108) / Ladd Rd	Signal[1]	53.3	D	**73.8**	**E**	**76.1**	**E**	**116.8**	**F**
Patterson Ave (SR 108) / SR 108	Signal[1]	**77.1**	**F**	**105.4**	**F**	43.1	D	**132.5**	**F**
McHenry Ave (SR 108) / SR 108	Signal[1]	11.7	B	13.1	B	9.3	A	31.5	C
McHenry Ave (SR 108) / Francis Ave	EB Stop	17.5	C	22.3	C	20.2	C	29.1	D
McHenry Ave (SR 108) / Crawford Rd	WB Stop	45.4	E	**110.0**	**F**	**193.7**	**F**	**>300**	**F**
McHenry Ave (SR 108) / Kiernan Ave	Single Point Interchange	19.5	B	21.5	B	22.9	B	26.6	C
Carver Rd / Ladd Rd	AWS	**163.3**	**F**	**251.5**	**F**	**89.9**	**F**	**174.1**	**F**
Patterson Rd (SR108) / Skittone Rd	NB Stop	**41.9**	**E**	**94.9**	**F**	**41.7**	**E**	**194.5**	**F**
Patterson Rd (SR 108) / Coffee Rd	NB Stop	**>300**	**F**	**>300**	**F**	**>300**	**F**	**>300**	**F**
Patterson Rd (SR 108) / Oakdale Rd	Signal	24.4	C	28.9	C	35.9	D	**74.4**	**E**
Coffee Rd / Morrill Rd	WB Stop	18.9	C	**176.1**	**F**	19.8	C	**227.1**	**F**
Coffee Rd / Crawford Rd	WB Stop	**36.4**	**E**	**>300**	**F**	**115.0**	**F**	**>300**	**F**
Coffee Rd / Claribel Rd Relocated	Signal	36.0	D	**75.0**	**E**	**58.0**	**E**	**164.4**	**F**
Coffee Rd / /Claratina Rd	Roundabout	**245.0**	**F**	**>300**	**F**	**279.2**	**F**	**>300**	**F**
Oakdale Rd / Morrill Rd	Signal	19.2	B	19.6	B	25.5	C	28.5	C
Oakdale Rd / Relocated Claribel Rd	Signal	36.4	D	37.3	D	**74.0**	**E**	**77.7**	**E**
Oakdale Rd / Claratina Rd	Signal	53.3	D	54.4	D	**67.4**	**E**	**68.2**	**E**
McHenry Ave / Coffee Rd	WB Stop	-	-	**>300**	**F**	-	-	**>300**	**F**
Patterson Rd (SR 108) / Village A	SB Stop	-	-	**198.5**	**F**	-	-	**>300**	**F**
Patterson Rd (SR 108) / MU-1 access	SB Stop	-	-	**>300**	**F**	-	-	**>300**	**F**

[1] based on SimTraffic simulation

TABLE 13
CUMULATIVE YEAR 2042 INTERSECTION QUEUES

Intersection	Lane	Storage (feet)	AM Peak Hour				PM Peak Hour			
			Cumulative		Cumulative Plus Project		Cumulative		Cumulative Plus Project	
			Volume (vph)	95th % Queue	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)
McHenry Ave (SR 108) / Ladd Rd[1]	NB left	180	33	105	40	140	80	**295**	80	**345**
	SB left	300	116	230	183	**460**	365	**455**	502	**435**
	EB left	260	109	**330**	225	**385**	210	**370**	247	**400**
	WB left	90	1	**110**	31	**120**	20	**115**	32	**135**
Patterson Rd (SR 108) / SR 108[1]	WB left	530	188	**885**	372	**930**	110	**615**	244	**940**
McHenry Ave (SR 108) / SR 108[1]	WB left	750[2]	194	195	372	250	110	125	244	195
McHenry Ave (SR 108) / Francis Ave	NB left	90[3]	9	<25	10	<25	30	<25	30	<25
McHenry Ave (SR 108) / Crawford Rd	SB thru+left		3	<25	5	<25	10	<25	10	<25
McHenry Ave (SR 108) / Kiernan Ave	NB left	220[3]	138	300	185	300	320	475	320	475
	SB left	415[3]	99	285	190	285	485	720	487	725
	EB left (2)	770	99	65	140	115	155	105	235	190
	WB left (2)	965	507	445	725	455	340	275	357	290
Patterson Rd (SR108) / Skittone Rd	WB thru+left		4	<25	11	<25	15	<25	22	<25
Patterson Rd (SR 108) / Coffee Rd	WB left	75	141		172	<25	70	<25	203	40
	EB left				210	55	0	<25	195	40
Patterson Rd (SR 108) / Oakdale Rd	NB left	140[3]	204	220	201	305	200	300	289	475
	SB left	80[3]	63	110	70	110	60	95	60	95
	EB left	535	70	140	113	175	110	165	126	200
	WB left (2)[4]	500	330	175	275	175	465	360	465	360
Patterson Rd (SR 108) / Village A	EB left	-			28	<25			90	<25
Patterson Rd (SR 108) / MU-1 Access	EB left	-			115	<25			397	150

[2] distance to Patterson Rd. [3] lane continues as TWLT lane. [4] #2 turn lane continues for 250 feet

BOLD values exceed available storage. **HIGHLIGHTED** values are significant impact under CEQA

TABLE 14
2042 PLUS RWSP TRAFFIC SIGNAL WARRANTS

Intersection	Approach	AM Peak Hour				PM Peak Hour			
		Cumulative		Cumulative Plus Project		Cumulative		Cumulative Plus Project	
		Volume (vph)	Met?	Volume (vph)	Met?	Volume (vph)	Met?	Volume (vph)	Met?
McHenry Ave (SR 108) / Francis Ave	Major	1,555	No	1,880	No	1,940	No	2,379	No
	Minor	30		39		25		36	
McHenry Ave (SR 108) / Crawford Rd	Major	1,500	No	1,821	No	2,055	No	2,055	No
	Minor	50		56		50		57	
Carver Rd / Ladd Rd	Major	1,010	**Yes**	1,190	**Yes**	1,040	**Yes**	1,271	**Yes**
	Minor	450		471		400		431	
Patterson Rd (SR108) / Skittone Rd	Major	1,925	No	2,522	No	1,840	No	1,840	No
	Minor	10		15		25		25	
Patterson Rd (SR 108) / Coffee Rd	Major	1,865	**Yes**	2,446	**Yes**	1,745	**Yes**	2,605	**Yes**
	Minor	275		644		180		543	
Coffee Rd / Morrill Rd	Major	420	**Yes**	978	**Yes**	645	**Yes**	1,318	**Yes**
	Minor	350		360		210		217	
Coffee Rd / Relocated Crawford Rd	Major	940	**Yes**	1,484	**Yes**	1,355	**Yes**	2,008	**Yes**
	Minor	205		210		155		167	
McHenry Ave / Coffee Rd	Major			1,823	**Yes**			2,555	**Yes**
	Minor			201				331	
Patterson Rd (SR 108) / Village A	Major			2,322	**Yes**			2,593	No
	Minor			95				65	
Patterson Rd / MU-1 Access	Major			2,268	**Yes**			2,365	**Yes**
	Minor			165				667	

Year 2042 Plus RWSP Conditions

Segment Volumes. As noted in Table 11, without improvements seventeen roadway segments would operate with LOS in excess of LOS D.

Intersection Levels of Service. Table 12 compares Year 2042 intersection Levels of Service with and without RWSP. As indicated, without improvements seventeen intersections are projected to operate with Levels of Service that exceed the minimum LOS D standard.

95th Percentile Queues. As noted in Table 13, queuing at the McHenry Avenue / Ladd Road / Patterson Road intersection and at the adjoining SR 108 bypass is projected to exceed available storage.

Traffic Signal Warrants. Table 14 notes that seven unsignalized intersections will carry volumes that satisfy peak hour traffic signal warrants.

IMPROVEMENTS ALTERNATIVES

This report section introduces improvements that might be made to the study area circulation system to deliver operating conditions that are consistent with requirements of the City of Riverbank's General Plan or would be part of the regional fee program.

Existing Plus Project Conditions

Roadway Segments. Table 15 identifies the study area roadway segments which were found to operate with LOS in excess of the applicable agency minimum standard, along with potential improvements. Potential improvements and deficiency locations have been separated into these categories:

1. Locations within the Riverbank General Plan area / Sphere of Influence which are subject to City GP LOS policies and are already included in City traffic impact fee program.

2. Locations outside of the Riverbank Sphere of Influence (SOI) where regional fees are in effect and would be paid by RWSP development.

3. Locations outside of Riverbank General Plan jurisdiction and improvements are not proposed.

Riverbank Improvements. **Patterson Road** needs to be widened to 4-lanes from McHenry Avenue easterly to Oakdale Road to deliver LOS meeting the City's minimum LOS D standard. This improvement is included in the City Traffic Impact Fee program and would typically be accomplished by a combination of development frontage improvements and City/Caltrans directed projects.

Coffee Road would initially need to be improved from Patterson Road to Claribel Road, and the City of Riverbank's 2-lane Arterial Street standard would deliver LOS D conditions. The extent of right of way acquisition needed to accomplish this improvement is unknown. The City of Riverbank traffic impact fee program includes widening Coffee Road to 4-lanes.

On **Oakdale Road** the 2-lane section from Morrill Road to Westgate Drive (Crawford Road) would need to be a 4-lane facility to achieve LOS D. This work is included in the City of Riverbank traffic impact fee program but is expected to be completed with the CWSP.

Improvements Outside of the Riverbank SOI and included in Regional Fees. **McHenry Avenue** from Ladd Road north to the Stanislaus River would need to be widened to a 4-lane facility to deliver LOS D. This work is included in the Stanislaus County RTF.

Improvements Outside of Riverbanks Jurisdiction. As noted in Table 15, improvements would be needed to meet applicable minimum standards in areas beyond the City of Riverbank's jurisdiction, and no improvements are proposed at these locations. To a degree, the development

of NCC will alter regional travel patterns and improve conditions in some locations. Partial funding for NCC is included in the Stanislaus County RTF, and development in RWSP will contribute RTF fees.

In San Joaquin County, **McHenry Avenue** north of River Road would need to be a 4-lane facility. No plans exist for widening that road. In Stanislaus County, **SR 108** (McHenry Avenue) would need to be a 4-lane facility to achieve LOS D, although the implementation of the NCC would be expected to alter travel patterns on this route. In Stanislaus County **Ladd Road** carries volumes that exceed LOS D with and without the RWSP. Ladd Road improvements are not included in the RTF. Within the City of Modesto SOI, **Coffee Road** south of Claribel Road and **Oakdale Road** south of Claribel Road would both need to be improved to 4-lane facilities to deliver LOS D. This widening is in the City of Modesto's CFF program.

TABLE 15
IMPROVEMENTS APPLICABLE TO EXISTING PLUS PROJECT ROADWAY SEGMENT LEVELS OF SERVICE

Roadway	Location	Class	Maximum Volume (ADT)	LOS D Threshold	Existing Conditions		Existing Plus RWSP		
					Daily Volume (ADT)	LOS	Daily Volume (ADT)		
							Project Only	Total	LOS
McHenry Ave	Jones Rd to River Rd	2-lane Min Art	24,900	12,500	**12,930**	**E**	**2,580**	**15,510**	**E**
	River Rd to Coffee Rd	2-lane Arterial	10,000	5,900	**18,205**	**F**	**4,750**	**22,955**	**F**
		4-lane Arterial	50,000	42,000		**B**			B
	Coffee Rd to Stewart Rd	2-lane Arterial	10,000	5,900	**18,205**	**F**	**6,205**	**24,410**	**F**
		4-lane Arterial	50,000	42,000		**B**			**B**
	Stewart Rd to Ladd Rd	2-lane Arterial	10,000	5,900	**18,830**	**F**	**6,220**	**25,050**	**F**
		4-lane Arterial	50,000	42,000		B			B
McHenry Ave (SR 108)	Ladd Rd to Crawford Rd	2-lane Arterial	10,000	5,900	**14,795**	**F**	**5,440**	**20,235**	**F**
	Crawford Rd to Kiernan Ave	2-lane Arterial	10,000	5,900	**15,770**	**F**	**5,615**	**21,385**	**F**
	Kiernan Ave to Pelandale Ave	4-lane Arterial	42,520	35,720	24,505	C	4,165	28,670	C
Ladd Road	Stoddard Rd to Carver Rd	2-lane Arterial	10,000	5,900	**6,610**	**E**	**2,625**	**9,235**	**E**
	Carver Rd to McHenry Ave	2-lane Arterial	10,000	5,900	**11,640**	**F**	**3,385**	**15,025**	**F**
Patterson Road (SR 108)	McHenry Ave to Coffee Rd	2-lane Arterial	10,000	5,900	15,000	**F**	**9,880**	**24,880**	**F**
		4-lane Arterial	33,400	31,700		B			C
	Coffee Rd to Oakdale Rd	2-lane Arterial	15,700	14,800	**15,810**	**F**	**7,845**	**23,655**	**F**
		4-lane Arterial	33,400	31,700		B			C
	Oakdale Rd to Jackson Ave	4-lane Arterial	33,400	31,500	21,275	B	5,230	26,505	C
Skittone Road	Patterson Rd to Crawford Rd	2-lane Rural	10,000	5,900	270	A	180	450	A
Morrill Road	Coffee Rd to Oakdale Rd	2-lane Collector	12,900	11,600	2,475	B	295	2,770	C
Kiernan Ave (SR 219)	Tully Rd to McHenry Ave	4-lane EXP	62,520	52,520	27,595	B	2,280	29,875	B
Claribel Road	McHenry Ave to Coffee Rd	4-lane Arterial	40,000	33,600	27,870	C	900	28,770	D
	Coffee Rd to Oakdale Rd	4-lane Arterial	33,400	31,700	25,865	C	915	26,780	C
Coffee Road	Patterson Rd to Crawford Rd	2-lane Rural	10,000	5,900	3,990	C	**8,930**	**12,920**	**F**
		2-lane Arterial	15,700	14,800					D
	Crawford Rd to Claribel Rd	2-lane Rural	10,000	5,900	6,170	D	**8,635**	**14,805**	**F**
		2-lane Arterial	15,700	14,800					D-E
	Claribel Rd to Claratina Ave	2-lane Rural	22,500	13,280	12,395	D	**6,890**	**19,285**	**F**
Oakdale Road	Patterson Rd to Morrill Rd	4-lane Arterial	33,400	31,700	13,550	B	2,065	15,615	B
	Morrill Rd to Crawford Rd	2-lane Arterial	15,700	14,800	13,800	D	**1,835**	**15,635**	**E**
		4-lane Arterial	33,400	31,700		B			B
	Crawford Rd to Claribel Rd	4-lane Arterial	33,400	31,700	17,305	B	1,835	19,140	B
	Claribel Rd to Claratina Ave	2-lane Rural	22,500	13,280	**18,815**	**E**	**715**	**19,530**	**E**

BOLD values exceed minimum LOS D standard. Riverbank Fee Improvements. Areas beyond Riverbank GP policy. Regional Fee Improvements and construction announced by Stanislaus County.

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Intersections – Level of Service, 95th Percentile Queue and Traffic Signal Warrants. Table 16 identifies the study area intersections which were found to operate with LOS in excess of the applicable agency's minimum standard, that experience 95th percentile queues that exceed storage or that satisfy traffic signal warrants, and potential improvements are also noted. Potential improvements and deficiency locations have again been separated into these categories:

1. Locations within the Riverbank General Plan area / Sphere of Influence which are subject to City GP policies and City fee program
2. Locations within the Riverbank General Plan area / Sphere of Influence which are subject to City GP policies and not already in the City fee program
3. Locations outside of the Riverbank Sphere of Influence (SOI) where regional fees are in effect and would be paid by RWSP development
4. Locations outside of Riverbank General Plan jurisdiction where safety impact result.

Riverbank Intersection Improvements in City Fee Program. The **Patterson Road (SR 108) / Coffee Road intersection** would need to be improved to deliver the minimum LOS D standard with development of the project alone, and traffic signal warrants are satisfied. Alternative improvements to address this condition would include installation of a 2-lane roundabout intersection or installing a combination of developer proposed frontage improvements / auxiliary turn lanes and a traffic signal. Either alternative would deliver Level of Service that satisfies the City of Riverbank's minimum LOS D requirement. The traffic signal is included in the City or Riverbank traffic impact fee program.

However, under current Caltrans directives, the exact nature of the needed improvement cannot be confirmed without completion of an *Intersection Control Evaluation (ICE) Report.* In addition, Caltrans typically requires a complete evaluation of all traffic signal warrants prior to installing a traffic signal.

If a signalized intersection is pursued, then the following geometry is needed under Existing Plus RWSP conditions:

- Southbound Approach (3 lanes): left turn lane, through lane and a right turn lane
- Northbound Approach (3 lanes): left turn, through and right turn lane
- Eastbound Approach (3 lanes): left turn lane, through and through+right turn lane
- Westbound Approach (3 lanes): left turn lane, through lane and through+right turn lane

Riverbank Intersection Improvements Not in Fee Program. At the **Coffee Road/ Morrill Road intersection**, the westbound approach will operate at LOS E, and peak hour traffic signal warrants are satisfied. A traffic signal will be needed.

The **Claribel Road / Coffee Road intersection** is projected to operate at LOS E with buildout of the RWSP. This intersection is eventually being improved with the NCC, and the existing east leg of the intersection would be relocated to the north when the expressway is constructed. In the meantime, adding a second southbound through lane on Coffee Road would deliver LOS D.

The RWSP access at the proposed **McHenry Avenue / Coffee Road intersection** is projected to operate at LOS F without improvements, and peak hour traffic signal warrants would be met under Existing Plus Project conditions. Improvements to address this condition would include auxiliary turn lanes and a traffic signal. The following signalized intersection geometry is needed for Existing Plus Project Conditions:

- Southbound Approach (2 lanes): left turn lane, through lane
- Northbound Approach (2 lanes): through lane and a separate right turn lane
- Westbound Approach (2 lanes); separate left turn and right turn lanes

The **Patterson Road (SR 108) / RWSP Village A Access intersection** would operate at LOS F and peak hour traffic signal warrants would be met in the a.m. peak hour. Because this intersection is located on the state highway, improvements to address this condition could include installation of a 2-lane roundabout intersection or a combination of developer proposed frontage improvements / auxiliary turn lanes, with and without a traffic signal. Widening the Village A access to provide a two-lane exit while also providing a TWLT lane on Patterson Road would deliver adequate LOS without a traffic signal. However, under current Caltrans directives, the exact nature of the needed improvement cannot be confirmed without completion of an *Intersection Control Evaluation (ICE) Report.* In addition, Caltrans typically requires a complete evaluation of all traffic signal warrants prior to installing a traffic signal.

Although the exact location of the **Patterson Road (SR 108) / RWSP MU-1 Access intersection** has not been determined the intersection is expected to operate at LOS F, and peak hour traffic signal warrants would be met. Because this intersection is located on the state highway, improvements to address this condition could include installation of a 2-lane roundabout intersection or a combination of developer proposed frontage improvements / auxiliary turn lanes with a traffic signal. The actual design of improvements is predicated on the eventual layout of the M-1 Mixed Use area, as the number of access points and their location is unknown at this time. As noted previously, under current Caltrans directives, the exact nature of the needed improvement cannot be confirmed without completion of an *Intersection Control Evaluation (ICE) Report.* In addition, Caltrans typically requires a complete evaluation of all traffic signal warrants prior to installing a traffic signal. This issue would need to be revisited when plans for developing the MU-1 are come forward.

If a single intersection serving the MU-1 area and allowing left turn access is constructed, then these improvements would be recommended under Existing plus Project conditions:

- Southbound Approach (2-3 lanes): left turn lane, through lane, right turn lane
- Northbound Approach: to be determined as applicable at final location
- Eastbound (2 lanes): one through lane and a separate left turn lane
- Westbound Approach (2 -3 lanes); left turn lane, through and combined thru+ right turn lane

Improvements at Intersections outside of the Riverbank SOI and included in Regional Fees. The **McHenry Avenue / Stewart Road intersection** would need to be widened on McHenry Avenue to add a 2nd SB through lane to deliver LOS D. Widening McHenry Avenue is included in the Stanislaus County RTF.

Safety Improvements on State Highways. There are two locations on State highways where safety improvements would be applicable as required by CEQA. **At the McHenry Avenue / Ladd Road / Patterson Road intersection,** the project will cause the queue of peak hour traffic to exceed the available storage length in the southbound left turn lane and in the eastbound left turn lane. To reduce the length of these queues the simulation analysis suggests it will be necessary to increase intersection capacity by:

- Eastbound approach: lengthen eastbound left turn lane to 300 feet
- Southbound approach: add a 2nd southbound left turn lane
- On Patterson Road add a second eastbound lane from McHenry Avenue easterly to a point 300 feet of the SR 108 connection.

The intersection would operate at LSO C in the a.m. peak hour, the impacted queues will be accommodated.

This work would theoretically occur within the limits of Patterson Road improvements addressed by the City of Riverbank's traffic impacts fee program. However, it is unlikely that the existing fee program contemplated intersection improvements.

The RWSP will add traffic on **Patterson Road (SR 108) / Skittone Road intersection** where no left turn lane exists today. A westbound left turn lane should be installed on SR 108. This work would be within the area addressed by the City of Riverbank's traffic impact fee program but is subject to Caltrans approval under an encroachment permit.

TABLE 16
IMPROVEMENTS FOR EXISTING PLUS PROJECT INTERSECTION LEVELS OF SERVICE

Intersection	Control	AM Peak Hour				PM Peak Hour			
		Existing		Existing Plus Project		Existing		Existing Plus Project	
		Average Delay (sec/veh)	LOS	Average Delay (Sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
McHenry Ave / River Rd	Signal	23.4	C	27.0	C	29.0	C	49.6	D
McHenry Ave / Stewart Rd	Signal	8.4	A	13.6	B	51.6	D	**114.9**	**F**
	Add SB lane							10.1	B
McHenry Ave (SR 108) / Ladd Rd	Signal	28.6	C	40.7	D	29.3	C	54.3	D
Patterson Ave (SR 108) / SR 108	Signal	5.1	A	6.7	A	6.1	B	11.4	B
McHenry Ave (SR 108) / SR 108	Signal	6.8	A	8.0	A	5.7	A	7.4	A
McHenry Ave (SR 108) / Francis Ave	EB Stop	14.2	B	17.8	C	16.4	C	22.2	C
McHenry Ave (SR 108) / Crawford Rd	WB Stop	23.5	C	**42.9**	**E**	**42.2**	**E**	**117.8**	**F**
McHenry Ave (SR 108) / Kiernan Ave	Signal	29.5	D	34.3	C	36.8	D	43.4	D
Carver Rd / Ladd Rd	AWS	24.3	C	**66.6**	**F**	12.1	B	18.8	C
Patterson Rd (SR108) / Skittone Rd	NB Stop	19.3	C	31.8	D	18.3	C	**35.5**	**E**
Patterson Rd (SR 108) / Coffee Rd	NB Stop	**50.1**	**F**	**>300**	**F**	**43.4**	**E**	**>300**	**F**
	Improved			51.4	D			53.6	D
Patterson Rd (SR 108) / Oakdale Rd	Signal	22.8	C	25.6	C	31.7	C	49.0	D
Coffee Rd / Morrill Rd	WB Stop	13.1	B	**41.3**	**E**	13.0	B	**37.5**	**E**
	Improved							18.6	C
Coffee Rd / Crawford Rd	WB Stop	12.5	C	23.9	C	12.7	B	27.1	D
Coffee Rd / Claribel Rd	Signal	**32.5**	**C**	**62.5**	**E**	33.3	C	**67.9**	**E**
	Improved			46.3	D			43.9	D
Coffee Rd / Claratina Rd	Roundabout	27.7	D	**69.3**	**F**	23.7	C	**75.4**	**F**
Oakdale Rd / Morrill Rd	Signal	16.5	B	16.9	B	19.3	B	20.9	C
Oakdale Rd / Claribel Rd	Signal	50.9	D	53.7	D	48.8	D	54.9	D
Oakdale Rd / Claratina Rd	Signal	32.1	C	35.5	D	13.5	B	14.7	B
McHenry Ave / Coffee Rd	WB Stop			**>300**	**F**			**>300**	**F**
	Improved			11.9	B			30.4	C
Patterson Rd (SR 108) / Village A	SB Stop			**56.3**	**F**			**>300**	**F**
	Improved			33.2	D			25.4	D
Patterson Rd / MU-1	SB stop			**>300**	**F**			**>300**	**F**
	Improved			12.6	B			42.4	D

BOLD values exceed minimum LOS D standard. Riverbank Fee Improvements. Areas beyond Riverbank GP policy. Regional Fee Improvement and construction announced by Stanislaus County

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EPAP plus RWSP Improvements

Roadway Segments. Table 17 identifies locations with improvements to study area roadway segments under EPAP plus RWSP conditions. The improvements to Patterson Road (SR 108) and to McHenry Avenue remain the same as those previously discussed under Existing Plus RWSP. However, with the development of approved projects, **Coffee Road between Patterson Road and Claribel Road** would need to be improved to a four-lane section. This improvement is included in the City of Riverbank's traffic impact fee program.

Intersections – Level of Service, 95th Percentile Queue and Traffic Signal Warrants. Table 18 identifies locations with intersection improvements under EPAP plus RWSP conditions.

Riverbank intersection Improvements in City Fee Program. The **Patterson Road (SR 108) / Coffee Road intersection** would need to be improved to deliver the minimum LOS D standard under EPAP plus RWSP conditions, and traffic signal warrants are satisfied. Conceptually, the same alternatives are available as were discussed under Existing Plus project condition, and the same Caltrans requirements apply.

If a signalized intersection is pursued, then the following geometry is needed under EPAP Plus RWSP conditions:

- Southbound Approach (3 lanes): left turn lane, through lane and a through+right turn lane
- Northbound Approach (3 lanes): left turn lane, through and through+ right turn lane
- Eastbound Approach (3 lanes): left turn lane, through lane and through+right turn lane
- Westbound Approach (3 lanes): left turn lane, through lane and through+right turn lane

Riverbank Intersection Improvements Not in Fee Program. At the **Coffee Road/ Morrill Road intersection**, the westbound approach will operate at LOS F, and peak hour traffic signal warrants are satisfied. A traffic signal will be needed, and the CWSP is conditioned to participate in the cost of this improvements.

A traffic signal is needed at the **Coffee Road / Relocated Westgate Drive (Crawford Road) intersection** accompanying CWSP. CWSS is also conditioned to contribute to the cost of this improvement.

The **Claribel Road / Coffee Road intersection** is projected to operate at LOS F with buildout of the RWSP and other approved projects. This intersection is eventually being improved with the NCC, and the existing east leg of the intersection would be relocated to the north when the expressway is constructed. In the meantime, adding a second southbound and northbound through lane on Coffee Road along with a 2nd westbound left turn lane and northbound right turn lane would improve operating conditions but would not deliver LOS D.

The **Oakdale Road / Claribel Road intersection** is projected to operate at LOS F if no improvements are made. This location will be affected by the construction of NCC but in the interim the following improvements anticipated with CWSP would be needed to improve conditions but would not yield LOS D:

- Eastbound Approach (4 lanes): left turn lane, two through lanes, right turn lane
- Westbound Approach (4 lanes): left turn lane, two through lanes, right turn lane
- Northbound Approach (4 lanes): left turn lane, two through lanes, right turn lane
- Southbound Approach (4 lanes): left turn lane, two through lanes, right turn lane

The improvements to the RWSP access at the proposed **McHenry Avenue / Coffee Road intersection** would be the same as those identified under Existing Plus Project conditions.

At the **Patterson Road (SR 108) / RWSP Village A Access intersection** the improvement options would still require Caltrans approvals, and a 2-lane roundabout intersection or a combination of developer proposed frontage improvements / auxiliary turn lanes and traffic signal would be needed.

- Southbound Approach (2 lanes): left turn lane, right turn lane
- Westbound Approach (2 lanes): through lane and a through+right turn lane
- Eastbound Approach (2 lanes); separate left turn and through lanes

The issues associated with the **Patterson Road (SR 108) / RWSP MU-1 Access intersection** are as indicated under Existing Plus Project Conditions and would need to be revisited when plans for developing the MU-1 come forward. The geometry required for EPAP Plus Project conditions is:

- Southbound Approach (2-3 lanes): left turn lane, through lane, right turn lane
- Northbound Approach: to be determined as applicable at final location
- Eastbound (2 lanes): one through lanes and a separate left turn lane
- Westbound Approach (2 -3 lanes); left turn lane, through and combined thru+ right turn lane

Improvements at Intersections outside of the Riverbank SOI and included in Regional Fees. The **McHenry Avenue / Stewart Road intersection** would need to be widened on McHenry Avenue as noted under Existing Plus Project conditions to add a 2nd SB through lane. Widening McHenry Avenue is included in the Stanislaus County RTF.

Safety Improvements on State Highways. There same two locations on State highways where safety improvements would be applicable as required by CEQA are affected under EPAP plus Project conditions. The same improvements noted at the **McHenry Avenue / Ladd Road / Patterson Road intersection** and **Patterson Road / SR 108 bypass intersection** under Existing Plus Project conditions remain needed.

The RWSP will add traffic on **Patterson Road (SR 108) / Skittone Road intersection** where no left turn lane exists today. A westbound left turn lane should be installed on SR 108, as noted under Existing Plus Project conditions. The lane should continue as a receiving / TWLT lane to reduce side street delay, and with that change to intersection would operate at LOS D.

TABLE 17
IMPROVEMENTS FOR EPAP PLUS RWSP ROADWAY SEGMENT LEVELS OF SERVICE

Roadway	Location	Class	Maximum Volume (ADT)	LOS D Threshold	EPAP Conditions		EPAP Plus RWSP		
					Daily Volume (ADT)	LOS	Daily Volume (ADT)		LOS
							Project Only	Total	
McHenry Ave	Jones Rd to River Rd	2-lane Min Art	24,900	12,500	**13,150**	**E**	2,580	**15,730**	**E**
	River Rd to Coffee Rd	2-lane Arterial	10,000	5,900	**18,725**	**F**	4,750	**23,475**	**F**
		4-lane Arterial	50,000	42,000					B
	Coffee Rd to Stewart Rd	2-lane Arterial	10,000	5,900	**18,725**	**F**	6,205	**24,930**	**F**
		4-lane Arterial	50,000	42,000					B
	Stewart Rd to Ladd Rd	2-lane Arterial	10,000	5,900	**19,150**	**F**	6,220	**25,370**	**F**
		4-lane Arterial	50,000	42,000					C
McHenry Ave (SR 108)	Ladd Rd to Crawford Rd	2-lane Arterial	10,000	5,900	**14,890**	**F**	5,440	**20,330**	**F**
	Crawford Rd to Kiernan Ave	2-lane Arterial	10,000	5,900	**15,865**	**F**	5,615	**21,480**	**F**
	Kiernan Ave to Pelandale Ave	4-lane Arterial	42,520	35,720	24,405	C	4,165	28,570	C
River Road	Murphy Rd to McHenry Ave	2-lane Maj Col	24,900	12,500	7,480	C	1,740	9,220	D
	McHenry Ave to Harold Ave	2-lane Maj Col	24,900	12,500	5,350	C	435	5,785	C
Ladd Road	Stoddard Rd to Carver Rd	2-lane Arterial	10,000	5,900	**7,120**	**E**	2,625	**9,745**	**E**
	Carver Rd to McHenry Ave	2-lane Arterial	10,000	5,900	**12,610**	**F**	3,385	**15,995**	**F**
Patterson Road (SR 108)	McHenry Ave to Coffee Rd	2-lane Arterial	10,000	5,900	16,575	**F**	9,880	**25,455**	**F**
		4-lane Arterial	33,400	31,700					C
	Coffee Rd to Oakdale Rd	2-lane Arterial	15,700	14,800	**16,105**	**F**	7,845	**23,950**	**F**
		4-lane Arterial	33,400	31,700					C
	Oakdale Rd to Jackson Ave	4-lane Arterial	33,400	31,700	23,475	C	5,230	28,705	C
Skittone Road	Patterson Rd to Crawford Rd	2-lane Rural	10,000	5,900	270	A	180	450	A
Morrill Road	Coffee Rd to Oakdale Rd	2-lane Collector	12,900	11,600	6,230	C	295	6,525	C
Kiernan Ave (SR 219)	Tully Rd to McHenry Ave	4-lane EXP	62,520	52,520	34,955	C	2,280	37,235	C
Claribel Road	McHenry Ave to Coffee Rd	4-lane Arterial	40,000	33,600	37,890	D	900	38,790	D
	Coffee Rd to Oakdale Rd	4-lane Arterial	33,400	31,700	**38,140**	**F**	915	**39,055**	**F**
Coffee Road	Patterson Rd to Crawford Rd	2-lane Rural	10,000	5,900	**6,605**	**E**	8,930	**15,535**	**F**
		4-lane Arterial							B
	Crawford Rd to Claribel Rd	2-lane Rural	10,000	5,900	**8,785**	**E**	8,635	**17,420**	**F**
		4-lane Arterial							B
	Claribel Rd to Claratina Ave	2-lane Rural	22,500	13,280	**16,120**	**E**	6,890	**23,010**	**F**
Oakdale Road	Patterson Rd to Morrill Rd	4-lane Arterial	33,400	31,700	16,325	B	2,065	18.390	B
	Morrill Rd to Crawford Rd	2-lane Arterial	15,700	14,800	**19,260**	**F**	1,835	**21,095**	**F**
		4-lane Arterial	33,400	31,700					B
	Crawford Rd to Claribel Rd	4-lane Arterial	33,400	31,700	27,420	D	1,835	29,255	D
	Claribel Rd to Claratina Ave	2-lane Rural	22,500	13,280	**24,345**	**F**	715	**25,060**	**F**

BOLD values exceed minimum LOS D standard. Riverbank Fee Improvements. Areas beyond Riverbank GP policy. Regional Fee Improvement and construction announced by Stanislaus County

TABLE 18
IMPROVEMENTS FOR EPAP PLUS RWSP INTERSECTION LEVELS OF SERVICE

Intersection	Control	AM Peak Hour				PM Peak Hour			
		Existing Plus Approved Projects		EPAP Plus Project		Existing Plus Approved Projects		EPAP Plus Project	
		Average Delay (sec/veh)	LOS	Average Delay (Sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
McHenry Ave / River Rd	Signal	24.2	C	27.8	C	31.6	C	**55.7**	**E**
McHenry Ave / Stewart Rd	Signal	8.7	A	14.8	B	**60.8**	**E**	**125.3**	**F**
	2nd SB lane							10.5	B
McHenry Ave (SR 108) / Ladd Rd	Signal[1]	26.2	C	34.6	C	35.7	D	54.2	D
Patterson Ave (SR 108) / SR 108	Signal[1]	14.2	B	37.0	D	15.3	B	34.5	C
McHenry Ave (SR 108) / SR 108	Signal[1]	8.6	A	10.4	B	8.6	A	10.6	B
McHenry Ave (SR 108) / Francis Ave	EB Stop	14.3	B	18.0	C	16.5	C	22.4	C
McHenry Ave (SR 108) / Crawford Rd	WB Stop	23.9	C	**43.7**	**E**	**43.4**	**E**	**124.5**	**F**
McHenry Ave (SR 108) / Kiernan Ave	Signal	39.0	D	47.6	D	**113.4**	**F**	**125.2**	**F**
Carver Rd / Ladd Rd	AWS	**52.7**	**F**	**117.1**	**F**	14.1	B	**26.7**	**F**
Patterson Rd (SR108) / Skittone Rd	NB Stop	24.4	C	42.8	D	21.8	C	**45.8**	**E**
	Improved							29.5	D
Patterson Rd (SR 108) / Coffee Rd	NB Stop	**>300**	**F**	**>300**	**F**	**>300**	**F**	**>300**	**F**
	Improved			49.8	D			45.4	D
Patterson Rd (SR 108) / Oakdale Rd	Signal	23.4	C	26.7	C	52.7	D	**72.3**	**E**
Coffee Rd / Morrill Rd	WB Stop	**44.3**	**E**	**>300**	**F**	**41.4**	**E**	**>300**	**F**
	Signal			29.1	C			39.4	D
Coffee Rd / Relocated Crawford Rd	WB Stop	15.6	C	33.7	D	17.7	C	**46.3**	**E**
	Signal							21.2	C
Coffee Rd / Claribel Rd	Signal	**78.0**	**E**	**100.8**	**F**	**154.4**	**F**	**189.7**	**F**
	Improved			**72.2**	**E**			**73.1**	**E**
Coffee Rd / Claratina Rd	Roundabout	**49.7**	**E**	**103.8**	**F**	**87.5**	**F**	**152.4**	**F**
Oakdale Rd / Morrill Rd	Signal	21.0	C	22.1	C	30.1	C	35.0	D
Oakdale Rd / Claribel Rd	Signal	**98.4**	**F**	**107.8**	**F**	**128.9**	**F**	**148.2**	**F**
	Improved			**82.5**	**F**			**60.7**	**E**
Oakdale Rd / Claratina Rd	Signal	**57.3**	**E**	**62.2**	**E**	36.1	D	**40.5**	**D**
McHenry Ave / Coffee Rd	WB Stop			**>300**	**F**			**>300**	**F**
	Improved			13.0	B			34.2	C
Patterson Rd (SR 108) / Village A	SB Stop			**99.8**	**F**			**>300**	**F**
	Improved			9.3	A			19.4	B
Patterson Rd (SR 108) / MU-1 access	SB Stop			**>300**	**F**			**268.0**	**F**
	Improved			18.1	B			24.6	C

[1] based on SimTraffic Simulation Riverbank Fee Improvements. Areas beyond Riverbank GP policy . Regional Fee Improvement and construction announced by Stanislaus County

Year 2042 plus RWSP Improvements

Roadway Segments. Table 19 identifies locations with improvements to study area roadway segments under Year 2042 plus RWSP conditions with NCC implemented. The improvements to Patterson Road (SR 108) and to McHenry Avenue remain the same as those previously discussed under EPAP Plus RWSP conditions.

Intersections – Level of Service, 95th Percentile Queue and Traffic Signal Warrants. Table 20 identifies locations with intersection improvements under Year 2042 plus RWSP conditions.

Riverbank Intersection Improvements in City Fee Program. The **Patterson Road (SR 108) / Coffee Road intersection** would need to be improved to deliver the minimum LOS D standard under EPAP plus RWSP conditions, and traffic signal warrants are satisfied. Conceptually, the same alternatives are available as were discussed under Existing Plus project condition, and the same Caltrans requirements apply.

If a signalized intersection is pursued, then the following minimum geometry is needed under Year 2045 Plus RWSP conditions:

- Southbound Approach (3 lanes): left turn lane, through lane and right turn lane
- Northbound Approach (3 lanes): left turn, through and right turn lane
- Eastbound Approach (4 lanes): left turn lane, through lanes and through and right turn lanes
- Westbound Approach (4 lanes): left turn lane, two through lanes and right turn lanes

If Coffee Road south of SR 108 is widened to 4-lanes, then the NB and SB right turn lanes would be designed to convert to through+right turn lanes.

Riverbank Intersection Improvements Not in Fee Program.

At the **Coffee Road/ Morrill Road intersection**, a traffic signal remains needed.

A traffic signal remains needed at the **Coffee Road / Relocated Westgate Drive (Crawford Road) intersection.**

At the **Relocated Claribel Road / Coffee Road intersection** the intersection geometry identified with NCC would need to be modified to provide:

- Eastbound (3 lanes): separate left, through and right turn lanes
- Westbound (2 lanes): left turn and combined through +right turn lane
- Northbound (3 lanes): left turn, through and through+right turn lanes
- Southbound (3 lanes): left turn, through and through+right turn lanes

At the **Oakdale Road / Claribel Road intersection** it would be necessary to add a 2nd northbound left turn lane, as was identified in the CWSP EIR.

The improvements to the RWSP access at the proposed **McHenry Avenue / Coffee Road intersection** would now include a traffic signal, the 2nd northbound and southbound through travel lanes and a southbound left turn lane, as well as separate left turn and right turn lanes on the RWSP exit.

At the **Patterson Road (SR 108) / RWSP Village A Access intersection** the improvement options would still require Caltrans approvals, and a 2-lane roundabout intersection or a combination of developer proposed frontage improvements / auxiliary turn lanes and traffic signal would be needed.

- Southbound Approach (2 lanes): left turn lane, right turn lane
- Westbound Approach (2 lanes): through lane and a through+right turn lane
- Eastbound Approach (3 lanes); separate left turn and two through lanes

The issues associated with the **Patterson Road (SR 108) / RWSP MU-1 Access intersection** area was indicated previously under other scenarios and would need to be revisited when plans for developing the MU-1 area come forward. The required geometry with a traffic signal under Year 2042 Plus RWSP conditions increases to:

- Southbound Approach (2-3 lanes): left turn lane, through lane, right turn lane
- Northbound Approach: to be determined as applicable at final location
- Eastbound (4 lanes): dual left turn lanes and two through lanes
- Westbound Approach (3-4 lanes): left turn lane, two through and a right turn lane

Improvements at Intersections outside of the Riverbank SOI and included in Regional Fees. The **McHenry Avenue / Stewart Road intersection** would need to be widened on McHenry Avenue to add a 2nd SB through lane and a 2nd NB through lane. Widening McHenry Avenue is included in the Stanislaus County RTF.

Safety Improvements on State Highways. There same two locations on State highways where safety improvements would be applicable as required by CEQA are affected under EPAP plus Project conditions. However, the improvements at the **McHenry Avenue / Ladd Road / Patterson Road intersection** and **Patterson Road / SR 108 bypass intersection** would become more extensive.

To reduce the length of these queues it will be necessary to increase intersection capacity by:

- Eastbound approach: lengthen eastbound left turn lane to 400 feet, and add a 2nd through lane
- Southbound approach: add a 2nd southbound left turn lane, that is 600 feet long
- Westbound approach: add a 2nd through lane that originates at the SR 108 bypass

- Modify the intersection to create a northbound receiving lane for westbound right turns
- On Patterson Road add a second eastbound lane from McHenry Avenue easterly to a point 300 feet of the SR 108 connection
- Lengthen westbound left turn lane at Patterson Road bypass to 800 feet

These improvements may not be feasible as they would require ROW acquisition and may affect the large utility poles along Ladd Road west of McHenry Avenue.

The RWSP will add traffic on **Patterson Road (SR 108) / Skittone Road intersection,** and the same left turn lane / TWLT lane should be installed on SR 108, as noted previously.

TABLE 19
IMPROVEMENTS FOR CUMULATIVE YEAR 2042 PLUS RWSP ROADWAY SEGMENT LEVELS OF SERVICE

Roadway	Location	Class	Maximum Volume (ADT)	LOS D Threshold	Year 2042 Conditions		Year 2042 Plus RWSP		
					Daily Volume (ADT)	LOS	Daily Volume (ADT)		LOS
							Project Only	Total	
McHenry Ave	Jones Rd to River Rd	2-lane Min Art	24,900	12,500	**14,000**	**E**	2,580	**16,580**	**E**
	River Rd to Coffee Rd	2-lane Arterial	10,000	5,900	**20,500**	**F**	4,750	**25,250**	**F**
		4-lane Arterial	50,000	42,000					C
	Coffee Rd to Stewart Rd	2-lane Arterial	10,000	5,900	**20,500**	**F**	6,205	**26,705**	**F**
		4-lane Arterial	50,000	42,000					C
	Stewart Rd to Ladd Rd	2-lane Arterial	10,000	5,900	**21,600**	**F**	6,220	**27,820**	**F**
		4-lane Arterial	50,000	42,000					C
McHenry Ave (SR 108)	Ladd Rd to Crawford Rd	2-lane Arterial	10,000	5,900	**17,250**	**F**	5,440	**22,690**	**F**
	Crawford Rd to Kiernan Ave	2-lane Arterial	10,000	5,900	**17,950**	**F**	5,615	**23,565**	**F**
	Kiernan Ave to Pelandale Ave	4-lane Arterial	42,520	35,720	34,250	D	4,165	**38,415**	**E**
River Road	Murphy Rd to McHenry Ave	2-lane Maj Col	24,900	12,500	8,000	D	1,740	9,740	D
	McHenry Ave to Harold Ave	2-lane Maj Col	24,900	12,500	6,000	C	435	6,435	C
Ladd Road	Stoddard Rd to Carver Rd	2-lane Arterial	10,000	5,900	**12,250**	**F**	2,625	**14,875**	**F**
	Carver Rd to McHenry Ave	2-lane Arterial	10,000	5,900	**18,400**	**F**	3,385	**21,785**	**F**
Patterson Road (SR 108)	McHenry Ave to Coffee Rd	2-lane Arterial	10,000	5,900	**19,200**	**F**	9,880	**29,080**	**F**
		4-lane Arterial	50,000	42,000					**C**
	Coffee Rd to Oakdale Rd	2-lane Arterial	15,700	14,800	**19,000**	**F**	7,845	**26,845**	**F**
		4-lane Arterial	33,400	31,700					C
	Oakdale Rd to Jackson Ave	4-lane Arterial	33,400	31700	25,300	C	5,230	30,530	D
Skittone Road	Patterson Rd to Crawford Rd	2-lane	10,000	5,900	270	A	180	450	A
Morrill Road	Coffee Rd to Oakdale Rd	2-lane Collector	12,900	11,600	9,200	D	295	9,495	D
Kiernan Ave (SR 219)	Tully Rd to McHenry Ave	4-lane EXP	62,520	52,520	42,425	C	2,280	44,705	D
Claribel Road	McHenry Ave to Coffee Rd	4-lane EXP	62,520	52,520	**55,650**	**E**	900	**56,550**	**E**
Relocated Claribel Rd	Coffee Rd to Oakdale Rd	4-lane Arterial	33,400	31,700	10,300	B	915	11,215	B
Coffee Road	Patterson Rd to Crawford Rd	2-lane Rural	10,000	5,900	5,300	C	8,930	**14,230**	**F**
		4-lane Arterial	33,400	31,700					B
	Crawford Rd to Claribel Rd	2-lane Rural	10,000	5,900	**13,000**	**F**	8,635	**21,635**	**F**
		4-lane Arterial	33,400	31,700					B
	Claribel Rd to Claratina Ave	2-lane Rural	22,500	13,280	**15,500**	**E**	6,890	**22,390**	**F**
Oakdale Road	Patterson Rd to Morrill Rd	4-lane Arterial	33,400	31,700	21,800	B	2,065	23,865	C
	Morrill Rd to Crawford Rd	2-lane Arterial	15,700	14,800	**17,500**	**F**	1,835	**19,335**	**F**
		4-lane Arterial							B
	Crawford Rd to Claribel Rd	4-lane Arterial	33,400	31,700	23,900	C	1,835	25,735	C
	Claribel Rd to Claratina Ave	2-lane Rural	22,500	13,280	**24,200**	**F**	**715**	**24,915**	**F**

BOLD values exceed minimum LOS D standard Riverbank Fee Improvements. Areas beyond Riverbank GP policy . Regional Fee Improvement and announced by Stanislaus County

TABLE 20
IMPROVEMENTS FOR CUMULATIVE YEAR 2042 INTERSECTION LEVELS OF SERVICE

Intersection	Control	AM Peak Hour				PM Peak Hour			
		Cumulative		Cumulative Plus Project		Cumulative		Cumulative Plus Project	
		Average Delay (sec/veh)	LOS	Average Delay (Sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
McHenry Ave / River Rd	Signal	24.9	C	28.5	C	35.7	D	**61.8**	**E**
McHenry Ave / Stewart Rd	Signal	10.6	B	20.2	C	25.2	C	**65.1**	**F**
	2nd NB/SB lanes			6.5	A			**9.1**	**A**
McHenry Ave (SR 108) / Ladd Rd	Signal[1]	53.3	D	**73.8**	**E**	**76.1**	**E**	**116.8**	**F**
Patterson Ave (SR 108) / SR 108	Signal[1]	**77.1**	**F**	**105.4**	**F**	43.1	D	**132.5**	**F**
McHenry Ave (SR 108) / SR 108	Signal[1]	11.7	B	13.1	B	9.3	A	31.5	C
McHenry Ave (SR 108) / Francis Ave	EB Stop	17.5	C	22.3	C	20.2	C	29.1	D
McHenry Ave (SR 108) / Crawford Rd	WB Stop	45.4	E	**110.0**	**F**	**193.7**	**F**	**>300**	**F**
McHenry Ave (SR 108) / Kiernan Ave	Single Point interchange	19.5	B	21.5	B	22.9	B	26.6	C
Carver Rd / Ladd Rd	AWS	**163.3**	**F**	**251.5**	**F**	**89.9**	**F**	**174.1**	**F**
Patterson Rd (SR108) / Skittone Rd	NB Stop	**41.9**	**E**	**94.9**	**F**	**41.7**	**E**	**194.5**	**F**
	Improved			23.0	C			34.8	D
Patterson Rd (SR 108) / Coffee Rd	NB Stop	**>300**	**F**	**>300**	**F**	**>300**	**F**	**>300**	**F**
				47.1	D			36.8	D
Patterson Rd (SR 108) / Oakdale Rd	Signal	24.4	C	28.9	C	35.9	D	**74.4**	**E**
Coffee Rd / Morrill Rd	WB Stop	18.9	C	**176.1**	**F**	19.8	C	**227.1**	**F**
	Improved			18.5	B			22.8	C
Coffee Rd / Crawford Rd	WB Stop	**36.4**	**E**	**>300**	**F**	**115.0**	**F**	**>300**	**F**
	Improved			14.3	B			34.8	C
Coffee Rd / Claribel Rd Relocated	Signal	36.0	D	**75.0**	**E**	**58.0**	**E**	**164.4**	**F**
	Improved			31.5	C			50.9	D
Coffee Rd / /Claratina Rd	Roundabout	**245.0**	**F**	**>300**	**F**	**279.2**	**F**	**>300**	**F**
Oakdale Rd / Morrill Rd	Signal	19.2	B	19.6	B	25.5	C	28.5	C
Oakdale Rd / Claribel Rd	Signal	36.4	D	37.3	D	**74.0**	**E**	**77.7**	**E**
	Improved			34.4	C			41.4	D
Oakdale Rd / Claratina Rd	Signal	53.3	D	54.4	D	**67.4**	**E**	**68.2**	**E**
McHenry Ave / Coffee Rd	WB Stop			**>300**	**F**			**>300**	**F**
	Improved			10.1	B			14.4	B
Patterson Rd (SR 108) / Village A	SB Stop			**198.5**	**F**			**>300**	**F**
	Improved			10.2	B			10.0	B
Patterson Rd (SR 108) / MU-1 access	SB Stop			**>300**	**F**			**>300**	**F**
	improved			12.2	B			29.5	C

[1] based on SimTraffic simulation Riverbank Fee Improvements. Areas beyond Riverbank GP policy. Regional Fee Improvement and announced by Stanislaus County

TECHNICAL APPENDIX
(under separate cover)