Yosemite Boulevard (SR 132) Corridor Study

Draft Plan

City of Waterford

October 10, 2023

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1. Introduction

Yosemite Boulevard is a significant east-west corridor through the City of Waterford, providing local connections to schools, neighborhoods, and businesses in addition to serving as a regional transportation corridor. It is also a Caltrans facility, State Route (SR) 132, extending from I-580 in San Joaquin County to the west to SR 49 in Mariposa County to the east. Fulfilling these diverse functions requires a balance between traffic flow, safety, and access for multiple modes of transportation.

Today, the corridor is oriented primarily toward motor vehicle traffic, carrying high volumes of traffic and experiencing congestion during peak commute hours. Intermittent sidewalks and a lack of bicycle facilities create challenges for people walking and bicycling in the community, forcing people to walk on the edge of the roadway or ride mixed with heavy traffic. The community has expressed a desire for a plan to make the corridor safer and more comfortable for all modes of transportation, while addressing congestion.

Based on input from the community and guidance from local agencies and other stakeholders, this Yosemite Boulevard Corridor Study outlines a vision of transportation improvements for the corridor, documents existing conditions and challenges, and presents an implementation strategy to improve multimodal travel along Yosemite Boulevard (SR 132) from one-quarter-mile west of Eucalyptus Avenue to the eastern City Limit.

1.1 Purpose of this Plan

Creating a corridor plan that meets the needs of residential neighborhoods, businesses, schools, and regional traffic on Yosemite Boulevard requires context-sensitive solutions that adapt to the varied conditions and land uses along the corridor. The purpose of this plan is to document challenges and community input, identify safe multimodal transportation solutions, and support local businesses and neighborhoods. Goals for the corridor study include:

- Provide a strategy for implementation of continuous bicycle, pedestrian, and transit facilities
- Improve safety
- Support local and regional vehicle access for transportation and commerce

This Plan supports and implements previous plans and policies adopted by the City of Waterford, Caltrans, and other state and regional agencies. Implementation of the multimodal improvements will also support California goals related to reducing greenhouse gas emissions if future trips are shifted away from motor vehicles to active transportation modes.

1.2 Project Location

The project corridor is located in the City of Waterford, approximately eight miles east of Modesto in California's Central Valley. Yosemite Boulevard runs east-west through the southern end of the city, providing connections to local schools, residential neighborhoods, and serving as the city's Main Street. Local streets offer north-south connections to Yosemite Boulevard at controlled and uncontrolled intersections.

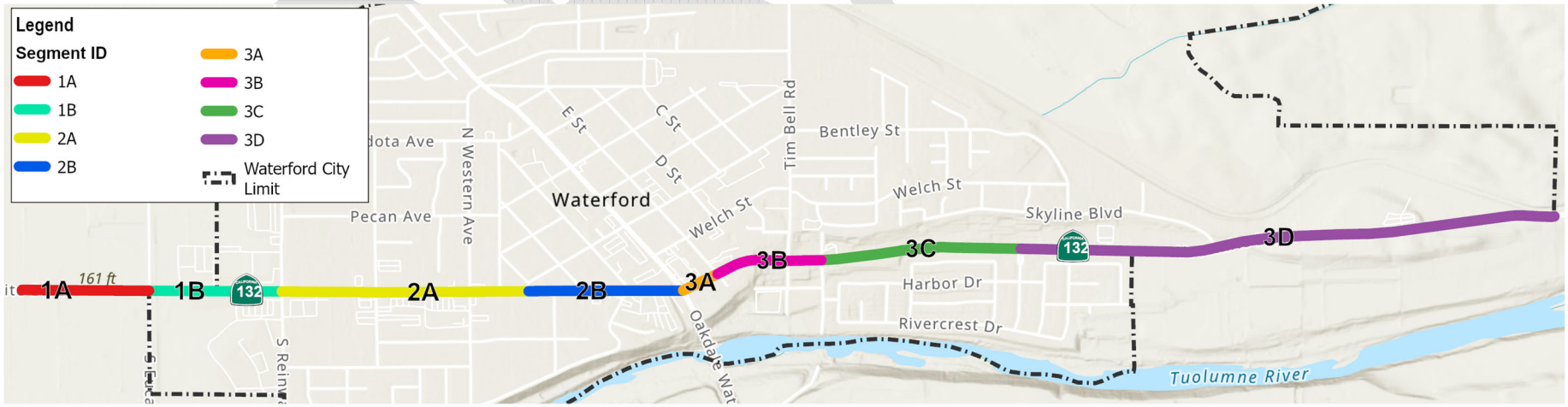
This corridor study includes approximately two miles of Yosemite Boulevard from one-quarter-mile west of Eucalyptus Avenue to the eastern City limit. The entire project corridor is a Caltrans facility, SR 132.

Based on the surrounding land uses and varying character of the street, the corridor has been divided into segments described at right.

Corridor Segments

- **Segments 1A & 1B: West of Eucalyptus Avenue to Reinway Avenue**
  Characterized by school access, with Waterford High School and Sentinel High School on the south and Lucille Whitehead Intermediate School, Richard Moon Primary School, and the Waterford Child Development Center to the north. All of these schools, as well as the Waterford Unified School District offices, are accessed via Reinway Avenue.
- **Segment 2A: Reinway Avenue to I Street**
  Characterized by core commercial uses on north and south sides.
- **Segment 2B: I Street to F Street**
  Characterized by some continued commercial uses, along with some scattered industrial/automotive uses and residential properties.
- **Segments 3A, 3B & 3C: F Street to River Pointe Drive**
  Characterized by residential frontages on the north side and side streets providing access to a large residential development on the south side.
- **Segment 3D: River Pointe Drive to eastern City Limit**
  Characterized by a residential development on the south side and a combination of single family homes, churches/commercial uses, and rural open space.

Figure 1: Project Corridor Segments



1.3 Relationship to Other Plans

This Yosemite Boulevard Corridor Study builds on a robust framework of existing plans and policy documents developed by stakeholder and partner agencies. The plan incorporates guidance and recommendations from appropriate adopted plans as well as ongoing planning and design work to develop a cohesive plan for the corridor.

Local and regional plans that inform this project include:

- City of Waterford General Plan
- City of Waterford Local Road Safety Plan
- StanCOG Non-Motorized Transportation Plan
- StanCOG Regional Transportation Plan
- Caltrans District 10 Active Transportation Plan

The City of Waterford and Stanislaus County are critical local agency partners in this effort, as is Caltrans. Caltrans has standards, plans, and policies at the state and district level that guide development of this plan, including the *Highway Design Manual*, the *Manual on Uniform Traffic Control Devices*, *Toward an Active California: State Bicycle and Pedestrian Plan*, Transportation Concept Reports, Corridor System Management Plans, and *Main Street, California—A Guide for Improving Community and Transportation Vitality*.

Smart Mobility Framework

Caltrans' *Smart Mobility Framework 2010: A Call to Action for the New Decade* provides a broad planning framework to guide multimodal and sustainable transportation planning and project development. It also provides tools to assess how plans, programs, and projects meet Smart Mobility goals throughout the state.

The Smart Mobility Framework is premised on six key objectives: Location Efficiency, Reliable Mobility, Health and Safety, Environmental Stewardship, Social Equity, and Robust Economy. These six objectives are informed through the application of seventeen candidate performance measures. Future analysis of implementation and effectiveness of the recommendations in this plan should consider these metrics.

Smart Mobility Objectives	Candidate Performance Measures
Location Efficiency	– Support for Sustainable Growth – Transit Mode Share – Accessibility and Connectivity
Reliable Mobility	– Multimodal Travel Mobility – Multimodal Travel Reliability – Multimodal Service Quality
Health and Safety	– Multimodal Safety – Design and Speed Suitability – Pedestrian and Bicycle Mode Share
Environmental Stewardship	– Climate and Energy Conservation – Emissions Reduction
Social Equity	– Equitable Distribution of Impacts – Equitable Distribution of Access and Mobility
Robust Economy	– Congestion Effects on Productivity – Efficient Use of System Resources – Network Performance Optimization – Return on Investment

The Smart Mobility Framework also establishes key planning activities and priorities based on seven “place types” that acknowledge the broad range of community contexts throughout California. Under this framework, the City of Waterford falls within the Rural and Agricultural Lands place type.

The framework notes that a Smart Mobility approach in rural towns should focus on maintaining and creating walkable rural towns with streets that are operated and designed for speeds suitable for their context and safety for all users, and on using a flexible approach to design and operation of state highways as described in Caltrans’ *Main Streets: Flexibility in Design and Operations*.

Specifically, the following priorities are noted for transportation projects and programs in Rural and Agricultural Lands:

– Inside towns, walking and bicycling facilities focused on connectivity and comfort
– Demand-responsive transit and inter-city transit connecting to major destinations such as hospitals and community colleges
– Network connectivity enhancements within towns
– Effective speed management at the transition from highway to rural town on and on main streets in rural towns accompanied by reduced speeds to maintain and create walkable rural towns in designated locations

These principles and priorities were considered by the project team during development and refinement of improvement concept alternatives, ensuring the recommendations in this plan are consistent with and advance the goals, objectives, and priorities established by the Smart Mobility Framework.

1.4 Organization of this Plan

This corridor study is organized into the following chapters:

– **Introduction** sets the planning context and objectives of this plan
– **Existing Conditions** documents the current transportation environment, related ongoing projects, and findings from technical analyses
– **Public Outreach** provides a review of community engagement activities and key feedback received
– **Recommendations** presents the improvement concept for the corridor
– **Implementation Plan** outlines a strategy to prioritize and fund the recommended improvements in this plan

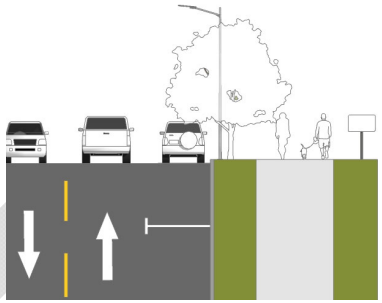
2. Existing Conditions

This chapter presents a review of existing conditions along Yosemite Boulevard based on field reconnaissance, ongoing improvement projects, and technical analyses. These findings inform the recommendations in this plan and establish a baseline against which progress can be measured.

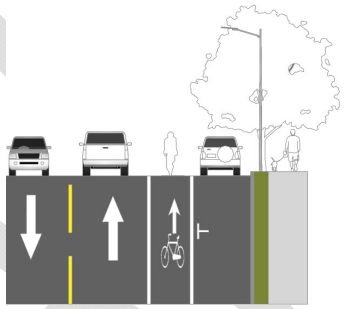
2.1 Existing Bicycle Facilities

Bikeway planning and design in California typically relies on guidelines and standards established in the Caltrans *Highway Design Manual*. There are four "classes" of bikeways that provide varying levels of separation and comfort for bicyclists, described at right.

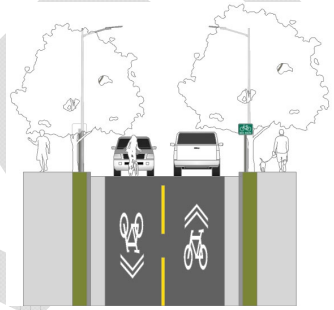
There are currently no existing bicycle facilities along Yosemite Boulevard/SR 132. While there is a striped shoulder in some locations that may be used by bicyclists, the shoulder varies in width and condition and is not consistent along the entire corridor.



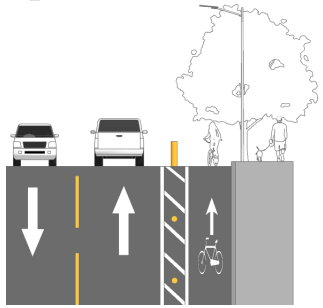
Class I Shared Use Paths are paved trails completely separate from the street. They allow two-way travel by people walking and bicycling, and are considered the most comfortable facilities for children and inexperienced bicyclists as there are few potential conflicts with people driving.



Class II Bicycle Lanes are striped preferential lanes in the roadway for one-way bicycle travel. Some bicycle lanes include a striped buffer on one or both sides of the lane to increase separation from the traffic lane or from parked cars, where people may open doors into the bicycle lane.



Class III Bicycle Routes are signed routes where people bicycling share a travel lane or shoulder with people driving. Because they are shared facilities, bicycle routes are typically appropriate only on quiet, low-speed streets with relatively low traffic volumes.



Class IV Separated Bikeways are on-street bicycle facilities that are physically separated from motor vehicle traffic by a vertical element or barrier such as a curb, bollards, or vehicle parking aisle. They can allow for one- or two-way bicycle travel on one or both sides of the roadway.

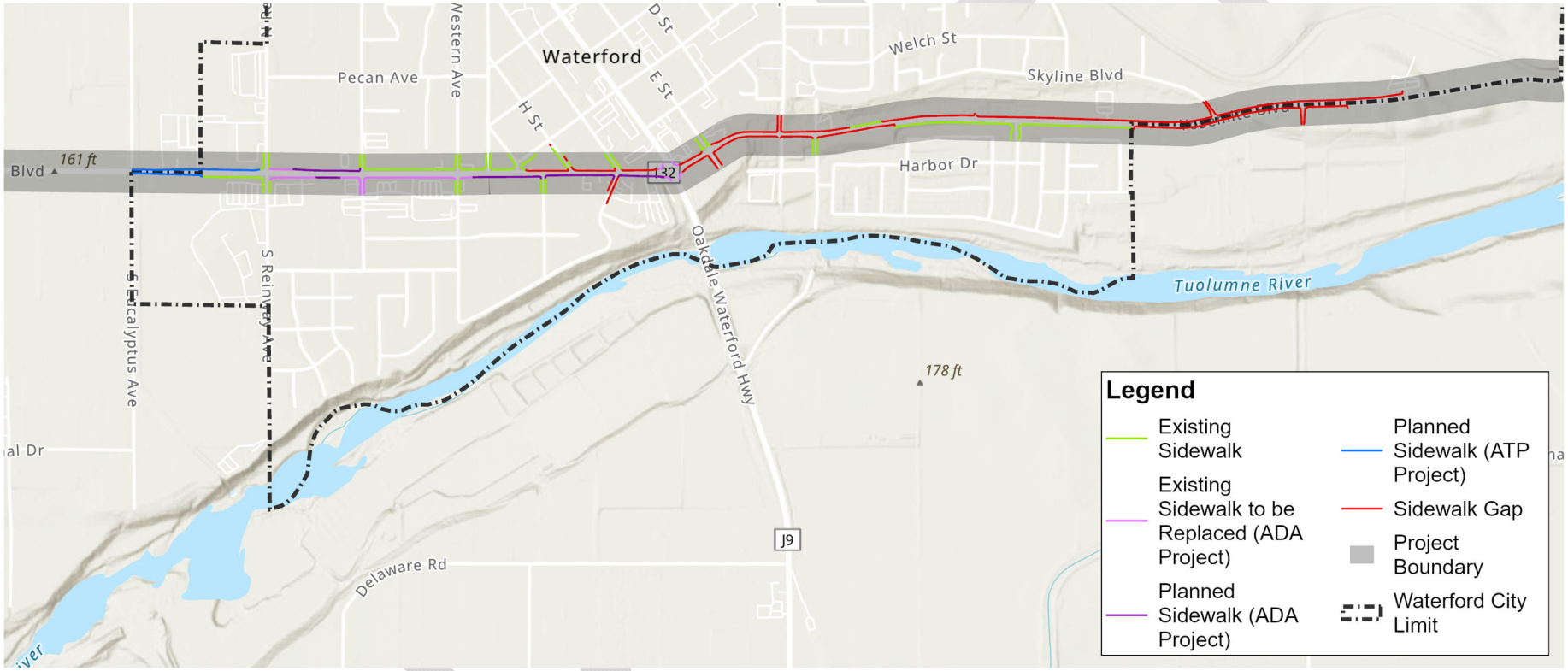
2.2 Existing Pedestrian Facilities

Pedestrian facilities like sidewalks and crossings form the foundation of a Complete Street. Users of all modes of transportation become pedestrians for at least part of their journey after parking a car, locking a bicycle, or arriving at a transit stop.

Sidewalks are present along the project corridor intermittently, with concentrations on the north and south sides of the roadway between Reinway Avenue and I Street and on the south side of the roadway east of Appling Road. Section 2.3 describes ongoing projects that are funded or underway.

See Figure 2 below for an overview of the corridor; sidewalk conditions and ongoing projects are presented segment-by-segment on the following pages.

Figure 2: Existing Sidewalk Conditions



Segments 1A & 1B

West of Eucalyptus Avenue to Reinway Avenue

Sidewalk exists today only on the eastern half of this long block on the south side of the corridor. The north side and remaining south side are planned to be installed within the next year, using a funding award from Cycle 6 of California's Active Transportation Program (ATP).

Segment 2A

Reinway Avenue to I Street

Intermittent sidewalk exists in this segment on both the north and south sides of the street. Between Pasadena Avenue and I Street on the north side, the sidewalk is relatively new and in good condition. Sidewalk gaps and poor quality sidewalks in the remainder of this segment are planned to be improved or installed as part of the ADA Improvements Project. There are multiple points of ingress and egress along this segment due to the presence of several driveways and closely spaced intersections.

Segment 2B

I Street to F Street

Sidewalks are largely absent in this segment. Curb ramps have been installed on the northern corners of the I Street intersection and at each corner of the F Street/Hickman Road intersection. The ADA Improvements Project will close the sidewalk gaps on the south side of the corridor west of F Street/Hickman Road in addition to upgrading the existing pedestrian facilities at the intersection.

Other sidewalk gaps in this segment will be addressed by recommendations in this corridor study.

Figure 3: Sidewalk Conditions – Segments 1A & 1B

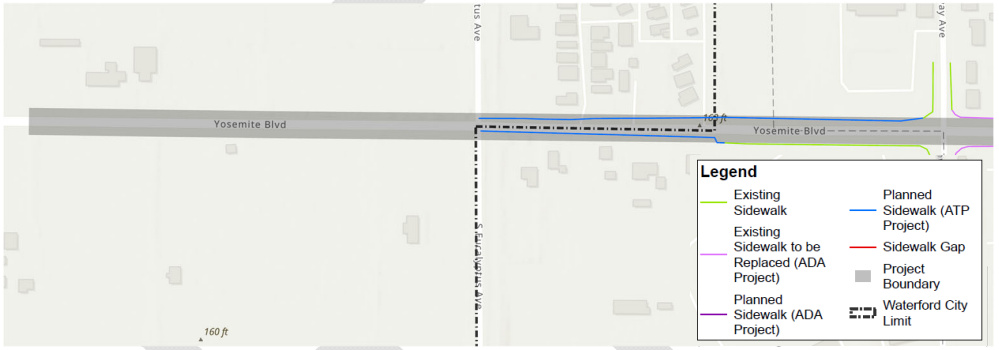


Figure 4: Sidewalk Conditions – Segment 2A

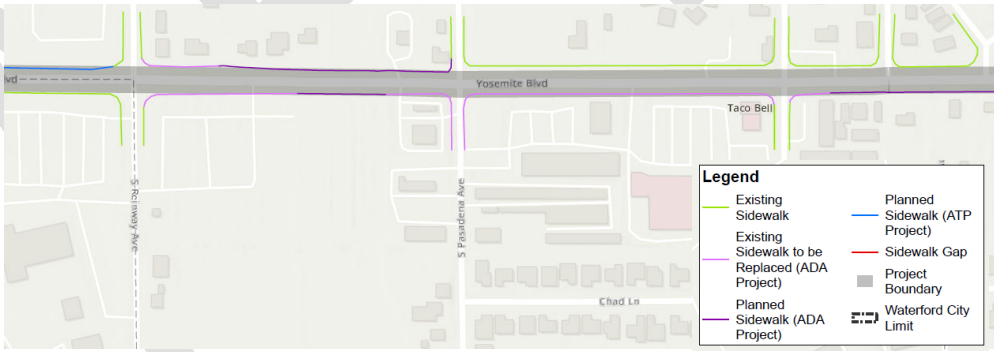
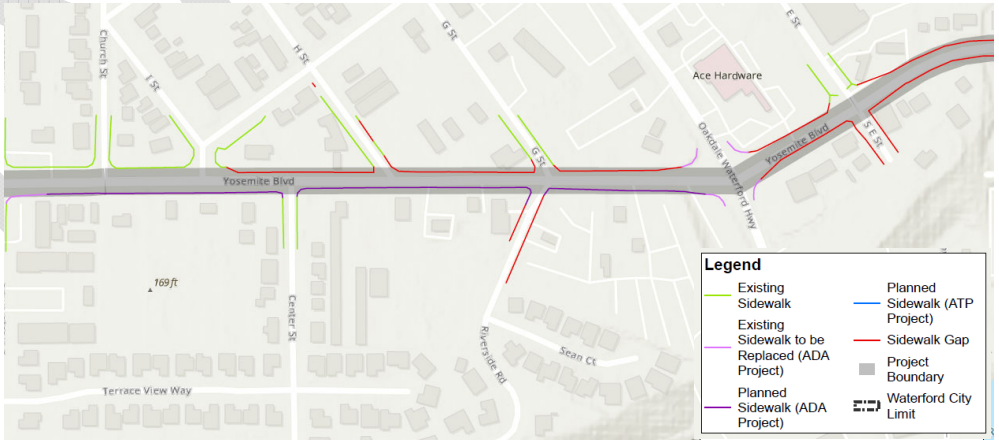


Figure 5: Sidewalk Conditions – Segment 2B



Segments 3A, 3B & 3C

F Street to River Pointe Drive

Along this corridor, sidewalk exists only on the south side along the River Pointe subdivision and a small segment on the north side in front of a group of single family homes.

Missing sidewalks in these segments will be addressed by recommendations in this corridor study.

Segment 3D

River Pointe Drive to East City Limit

Sidewalk exists only on the south side of the corridor along the River Pointe subdivision.

Missing sidewalks in this segment will be addressed by recommendations in this corridor study.

Figure 6: Sidewalk Conditions – Segments 3A, 3B, & 3C

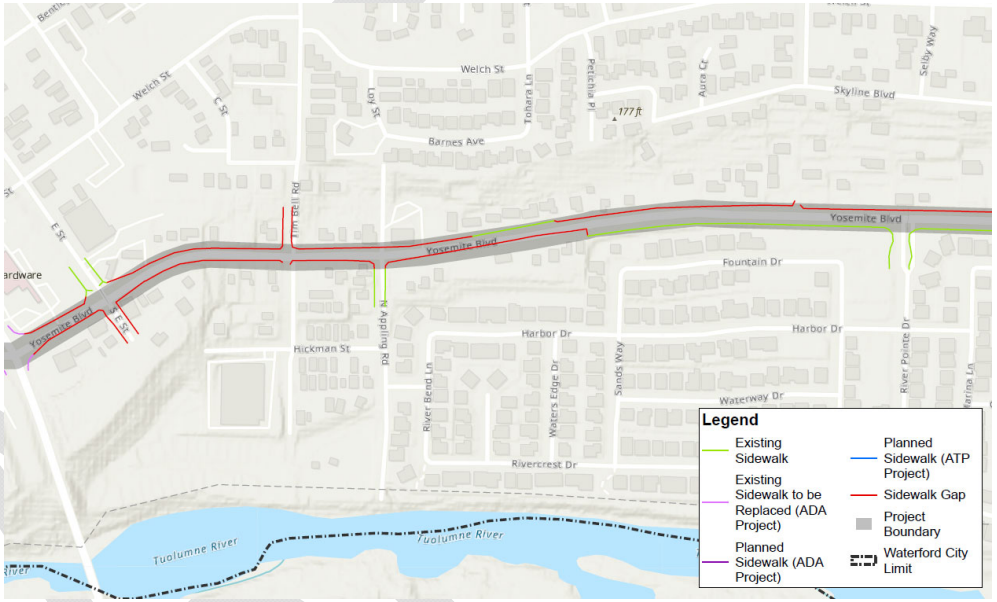
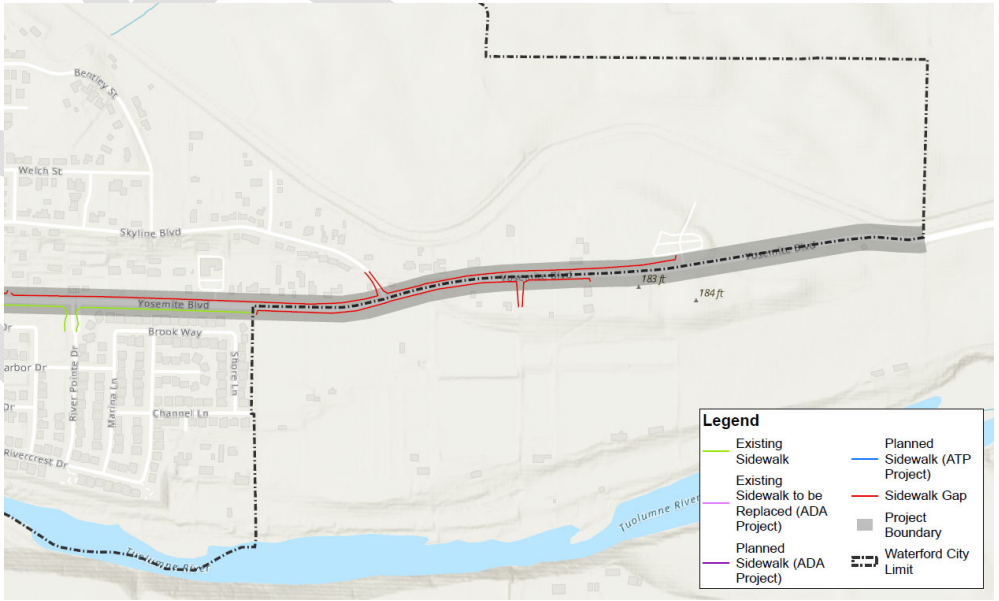


Figure 7: Sidewalk Conditions – Segment 3D



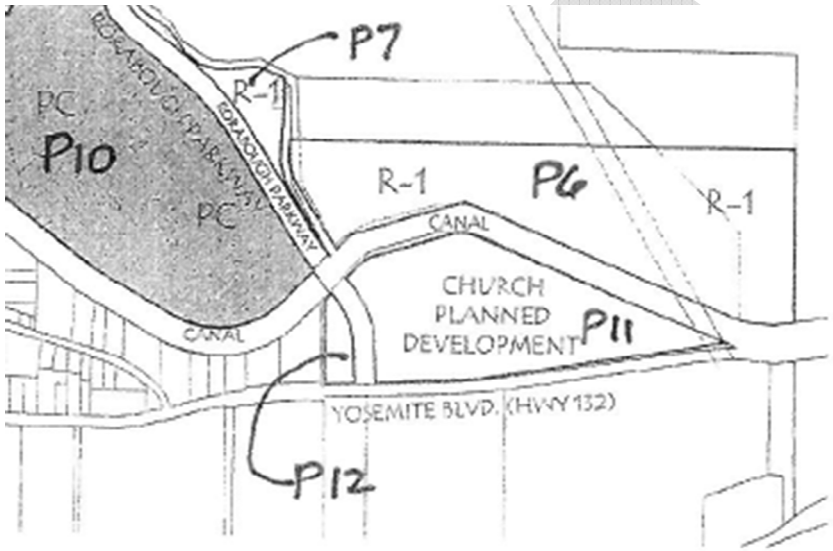
2.3 Ongoing Projects

There are several planned or ongoing projects along the Yosemite Boulevard corridor that overlap with the scope of this corridor study effort. These projects and associated improvements are described in the following section and were considered in development of the recommended improvement concept.

Lake Pointe Development Project

In 2007, the City annexed land at the northeast end of the project corridor for the Lake Pointe Development, which is anticipated to include a new residential community. The project will include a new street, Rorabaugh Parkway, which will intersect Yosemite Boulevard/SR 132 east of Skyline Boulevard (see map below). This corridor study will therefore include multimodal recommendations through the location of the future roadway connection to support future development.

Figure 8: Approximate Location of Future Rorabough Parkway



ADA Improvements Project

This project improves the continuity of Americans with Disabilities Act (ADA) pedestrian accessible facilities along SR 132 by upgrading and reconstructing existing sidewalks, driveways, and curb ramps between Reinway Avenue and F Street/Hickman Road to ADA standards. The project includes pavement widening; for the purposes of this corridor study, the new pavement width has been assumed as the 'existing condition.' Construction is planned for 2024. The locations for these improvements are shown in darker shade on the map below.

Figure 9: Limits of ADA Improvement Project

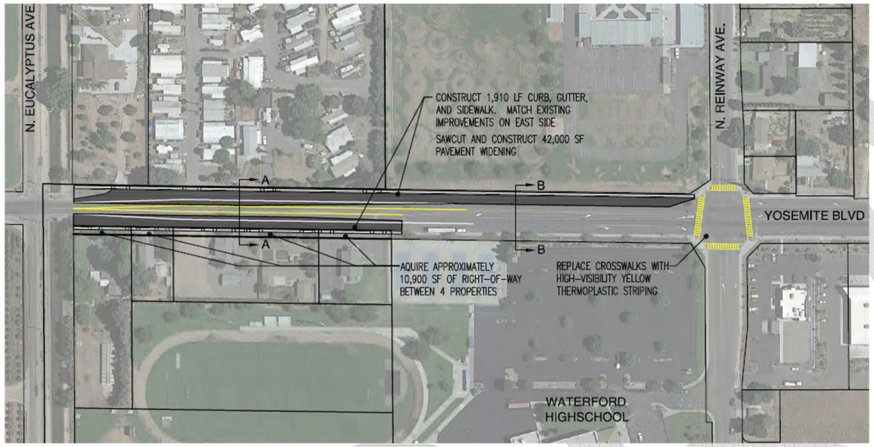
ATP, Cycle 3 Project

The City was awarded a Cycle 3 Active Transportation Program (ATP) grant to install ten Rectangular Rapid Flashing Beacons (RRFBs) at various crosswalks in the city, including one as an interim solution for the pedestrian crossing at Pasadena Avenue and Yosemite Boulevard/SR 132. These improvements were implemented in 2022. The intersection is being further upgraded this year to add a traffic signal, described later in this section.

ATP, Cycle 6 Project

The City was awarded Cycle 6 ATP funding for a pedestrian improvement project along Yosemite Boulevard/SR 132 between Eucalyptus Avenue and Reinway Avenue. This project includes completing the sidewalk on the north and south sides of the segment (see locations on the map below), widening the pavement, installing additional striping, and replacing the crosswalks at SR 132 and Reinway Avenue with high-visibility yellow crosswalks. Construction is planned for 2023 or 2024.

Figure 10: Proposed Improvements for ATP, Cycle 6 Project



Planned Transit Improvements

StanRTA has proposed changes to the existing transit Route 61 which runs eastbound through Waterford. These changes went into effect on March 6, 2023. The new Route 50 provides bidirectional bus service along Yosemite Boulevard/SR 132, connecting Waterford to Modesto. New stops were added on this route in the western part of the City.

Signal at SR 132 and Pasadena Ave

Funding was awarded through the Congestion Mitigation and Air Quality (CMAQ) Improvement program to signalize the intersection of Yosemite Boulevard/SR 132 and Pasadena Ave. Construction is tentatively planned for Spring 2024.

Local Road Safety Plan

In addition to the previously listed projects which have been funded or programmed for construction over the next few years, this corridor study evaluates the proposed countermeasures identified for Yosemite Boulevard/SR 132 in the City of Waterford's Local Road Safety Plan (LRSP). Potential countermeasures considered for inclusion in the improvement concept include:

- High friction surface treatments, upgraded fluorescent signs, and rumble strips along edge and center lines from Center Street to the eastern City Limit
- A new mini-roundabout at Tim Bell Road
- New traffic signals at Tim Bell Road and Pasadena Avenue
- Upgraded stop signs at Tim Bell Road, E Street, G Street, I Street, Center Street, and Appling Road
- Upgraded intersection markings at Tim Bell Road, E Street, F Street/Hickman Road, G Street, I Street, Center Street, and Appling Road
- Advance warning sign and beacon near Tim Bell Road
- Add a left turn lane or pocket at E Street, G Street, I Street, Center Street, and Appling Road
- Improve signal hardware at Western Avenue and F Street/Hickman Road
- Improve signal timing at Western Avenue and F Street/Hickman Road
- Leading Pedestrian Intervals (LPIs) at Western Avenue
- High friction surface treatment at Western Avenue and F Street/Hickman Road

2.4 Collisions

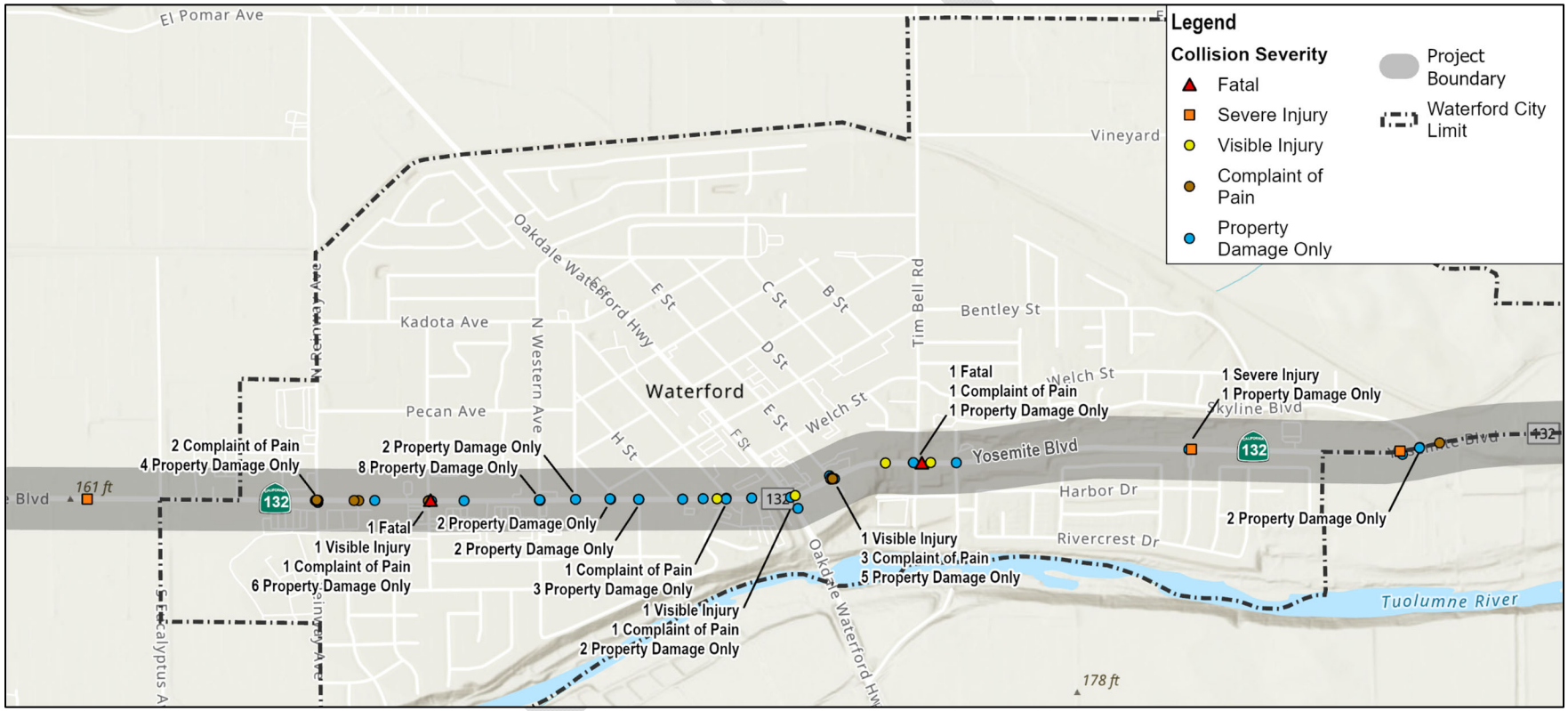
Collision report data provides insight into locations or roadway features that have higher rates of collisions, in addition to behaviors and other factors that may contribute to collisions. To assess safety along the Yosemite Boulevard/SR 132 corridor, collision data from 2015 to 2022 was reviewed and compared to statewide averages.

Data was acquired from the Statewide Integrated Traffic Records System (SWITRS), a repository for the California Highway Patrol and local law enforcement agencies to upload collision reports. Data from 2022 includes provisional reports.

Findings

A total of 63 collisions were reported along the project corridor during the study period, three of which involved pedestrians and two of which involved bicyclists. Collisions are mapped by injury severity in Figure 11.

Figure 11: Collisions



Collision Severity

As shown in Table 1, more than two-thirds of reported collisions did not result in injuries. Two collisions were fatal, and three resulted in severe injuries.

Table 1: Collisions by Injury Severity

	Number	Percent
Property Damage Only	44	69.8%
Complaint of Pain	10	15.9%
Other Visible Injury	4	6.3%
Severe Injury	3	4.8%
Fatal	2	3.2%
Total	**63**	**100%**

Road and Weather Conditions

Nearly all reported collisions occurred during daylight hours, clear weather, on dry roadways with no unusual conditions reported.

Bicycle and Pedestrian Collisions

Of the three pedestrian collisions, one occurred when the pedestrian was crossing in a crosswalk at an intersection, and one occurred when the pedestrian was not in the roadway. No detailed location was reported for the third collision.

One of the two bicyclist collisions was attributed to a failure to obey traffic signals or signs, and the other was attributed to unsafe starting or backing.

Primary Collision Factors

One-third of reported collisions on the study corridor were attributed to unsafe speeds. As listed in Table 2, other common factors that contributed to collisions included failing to yield the right of way to an automobile, driving or bicycling under the influence of drugs or alcohol, following too close, improper turning, and failing to obey traffic signals or signs.

Table 2: Collisions by Primary Collision Factor

	Number	Percent
Unsafe Speed	21	33.3%
Automobile Right of Way	8	12.7%
Under the Influence	3	4.8%
Following too Close	3	4.8%
Improper Turning	3	4.8%
Failure to Obey Traffic Signals / Signs	3	4.8%
Wrong Side of Road	2	3.2%
Unsafe Starting or Backing	2	3.2%
Impeding Traffic	1	1.6%
Improper Passing	1	1.6%
Unsafe Lane Change	1	1.6%
Pedestrian Right of Way	1	1.6%
Other Improper Driving	1	1.6%
Unknown/Not Stated	13	20.6%
Total	**63**	**100%**

2.5 Bicycle Level of Traffic Stress

Traffic stress is the perceived risk or comfort level experienced by a person bicycling in or adjacent to motor vehicle traffic. Because high traffic stress is one of the most common deterrents to bicycling, providing more comfortable bikeways can encourage people to try bicycling for more trips.

Bikeways that are considered low-stress minimize potential conflicts with motor vehicles either by nature of the roadway (a quiet residential street with little traffic) or by providing greater separation between people bicycling and driving (a dedicated shared use path parallel to a busy roadway). Even low-stress streets can have stressful crossings where they intersect with higher-stress roadways, which may be the case for many side streets that cross Yosemite Boulevard.

Methodology

Bicycle Level of Traffic Stress (Bicycle LTS) is a data-driven evaluation of the comfort experienced on different streets. This analysis is based on a methodology developed by the Mineta Institute. Streets are evaluated based on a variety of characteristics:

- Posted speed limit
- Number of vehicle lanes
- Presence and type of bikeway
- Driveways and other potential conflicts

Based on this evaluation, street segments and intersection crossings are assigned a score from 1 to 4, with 1 being the most comfortable and 4 being the most stressful.

- **LTS 1** includes road segments that are likely suitable for most children, and shared use paths that are completely separate from the roadway
- **LTS 2** includes road segments that most adults would likely be comfortable bicycling on, as well as older children who are experienced riders
- **LTS 3** includes road segments that are comfortable for confident, experienced bicyclists but are likely not appealing to children and others
- **LTS 4** includes road segments tolerable only to highly skilled, fearless riders who are comfortable bicycling in high-traffic situations where they may be mixing with drivers

Types of Bicyclists

Based on their skill level and confidence, most people fall into one of four categories:

- **Strong and Fearless** bicyclists are skilled and experienced, and are comfortable riding on most roadways whether or not a designated bicycle facility is provided. They likely account for one to three percent of the population.
- **Enthusiastic and Confident** bicyclists are very comfortable riding in most situations, but would prefer streets with designated bicycle facilities. They likely account for five to ten percent of the population.
- **Interested but Concerned** bicyclists are comfortable riding on shared use paths or in bicycle lanes on lower-speed streets, and would like to bicycle more if better separation as provided. They likely account for about half the population.
- **Not Currently Interested** people are either physically unable to bicycle or very uncomfortable riding on even the most comfortable, low-stress facilities. They likely account for about a third of the population.

Figure 12: Bicycle LTS Definitions

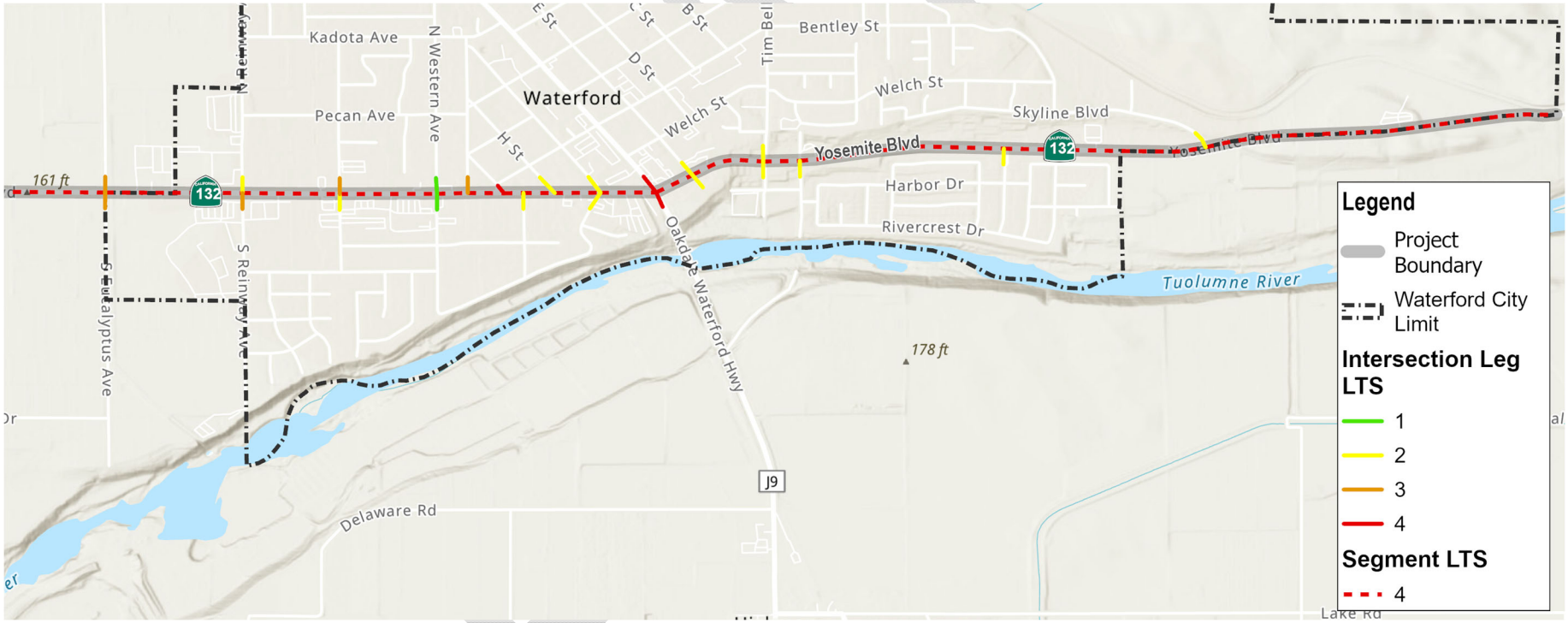
Findings

Bicycle LTS scores for Yosemite Boulevard/SR 132 roadway segments and intersection approaches are shown in Figure 13 below. In current conditions, the entire study corridor received a segment score of LTS 4, indicating high-stress conditions that are likely to discourage all but the most strong and fearless riders from bicycling along Yosemite Boulevard.

The intersection of Western Avenue and Yosemite Boulevard received a score of LTS 1 for the Western Avenue approaches, indicating a bicyclist traveling along Western Avenue would experience low stress when attempting to cross Yosemite Boulevard. This is likely due to the presence of a traffic signal at the intersection.

Most other intersections received scores of LTS 2 or 3 for the side street approaches, typically due to the lack of traffic control along Yosemite Boulevard. The intersection approaches at F Street/Hickman Road received scores of LTS 4, the highest-stress score, due to large curb radii that support vehicles making turning movements at high speeds.

Figure 13: Bicycle Level of Traffic Stress



2.6 Traffic Operations

Traffic operations are measured by Level of Service (LOS), a qualitative metric for traffic conditions. Grades A through F are assigned to intersections and represent progressively worsening traffic conditions. LOS is typically measured for AM and PM peak hours to capture the most congested conditions on the corridor.

While LOS is no longer the metric used to evaluate project impacts for environmental clearance in California, it remains a tool for assessing vehicle operations and identifying areas where local agencies may want to consider improvements.

For Yosemite Boulevard/SR 132, because it falls under Caltrans policy:

- LOS A, B, or C indicate acceptable operations with minor delays
- LOS D indicates unacceptable operations with noticeable delays
- LOS E indicates concerning levels of congestion, and drivers may frequently experience long delays
- LOS F indicates extensive congestion and severely overcapacity intersections

Traffic counts were collected on October 6, 2022 for most of the studied intersections. For the intersection at F Street/Hickman Road, traffic volumes collected for another project on December 8, 2021 were used. For all study intersections, the AM peak hour was 7:15 – 8:15 AM. The PM peak hour was selected based on a majority of the intersections showing peak volumes between 4:15 and 5:15 PM.

Traffic operations were evaluated for both the current year (2022) and the Design Year (2046) using the StanCOG model to estimate future traffic volumes. The Design Year (2046) analysis assumed the intersection at Pasadena Avenue would be converted to a traffic signal, but all other intersections and lane configurations remained the same.

Intersection level of service is shown in Table 3. Most intersections operate acceptably in both the Existing (2022) and Design Year (2046). Exceptions include:

- Reinway Ave operates unacceptably in the AM peak hour in both scenarios
- Pasadena Ave currently operates unacceptably, but operations are improved with the new signal
- G St/Riverside Rd, E St, and Tim Bell Rd/Baker St all operate unacceptably in the Design Year (2046)

Table 3: Intersection Level of Service for Existing (2022) and Design Year (2046)

ID	Intersection with Yosemite Blvd / SR 132	Peak Hour	Existing (2022)			Design Year (2046)		
			Control	Delay	LOS	Control	Delay	LOS
2	Reinway Ave	AM	Signal	**44.2**	**D**	Signal	**58.5**	**E**
		PM		18.0	B		25.7	C
3	Pasadena Ave	AM	TWSC	**71.8**	**F**	Signal	32.4	C
		PM		**32.8**	**D**		23.6	C
4	Western Ave	AM	Signal	19.6	B	Signal	33.6	C
		PM		17.4	B		22.9	C
5	Church St	AM	TWSC	10.8	B	TWSC	11.6	B
		PM		10.4	B		11.3	B
6	I St/ Bentley St	AM	TWSC	16.6	C	TWSC	23.6	C
		PM		12.3	B		14.5	B
7	Center St	AM	TWSC	11.7	B	TWSC	15.4	C
		PM		12.5	B		14.4	B
8	H St	AM	TWSC	17.9	C	TWSC	22.3	C
		PM		15.3	C		18.5	C
9	G St/ Riverside Rd	AM	TWSC	18.2	C	TWSC	**25.4**	**D**
		PM		17.3	C		23.2	C
10	F St/ Hickman Rd	AM	Signal	21.2	C	Signal	29.1	C
		PM		20.0	C		25.5	C
11	E St	AM	TWSC	18.8	C	TWSC	**26.1**	**D**
		PM		17.3	C		**25.8**	**D**
12	Tim Bell Rd/ Baker St	AM	TWSC	19.8	C	TWSC	**27.2**	**D**
		PM		22.9	C		**32.4**	**D**
13	N Appling Rd	AM	TWSC	15.2	C	TWSC	19.6	C
		PM		15.3	C		18.8	C

*Note: **BOLD RED** text indicates unacceptable LOS of D or worse*

Vehicle queues were also analyzed for each study intersection to determine where peak hour traffic leads to queues that exceed the available storage on a given leg. Results of this analysis are shown in Table 4.

In the Existing (2022) year, three intersections have queues that exceed available storage:

- Reinway Avenue
- Western Avenue
- I Street/Bentley Street

In the Design Year (2046), more than half of studied intersections have at least one queue that exceeds available storage:

- Reinway Avenue
- Pasadena Avenue
- Western Avenue
- Church Street
- I Street/Bentley Street
- G Street/Riverside Road
- F Street/Hickman Road

For almost all cases, the queues that exceed available storage are on the Yosemite Boulevard/SR 132 corridor. North- or southbound queues that exceed storage were found at Reinway Avenue and at I Street/Bentley Street in both the Existing and Design Year scenarios, and at F Street/Hickman Road in the Design Year scenario.

Table 4: 95th Percentile Queues for Existing (2022) and Design Year (2046)

Intersection/ Approach	Existing (2022) 95th Percentile Queue (ft)				Design Year (2046) 95th Percentile Queue (ft)			
	Control	AM	PM	Avail. Storage	Control	AM	PM	Avail. Storage
2 – SR 132 & Reinway Ave								
EB Left	Signal	95	65	465	Signal	135	360	465
EB Thru		200	235	1,300		255	690	1300
EB Right		55	55	450		65	330	450
WB Left		***215***	90	200		***240***	125	200
WB Thru		445	170	695		525	225	695
WB Right		180	35	200		***255***	50	200
NB Left		95	50	100		***130***	60	100
NB Thru		85	45	240		120	40	240
NB Right		80	60	100		***125***	60	100
SB Left		155	80	160		***195***	80	160
SB Thru/Right		***160***	***70***	55		***375***	***80***	55
3 – SR 132 & Pasadena Ave								
EB Left	TWSC	55	50	75	Signal	***120***	***130***	75
EB Thru		20	20	125		***415***	***855***	125
EB Right		50	5	185		100	***220***	185
WB Left		45	55	90		***125***	***130***	90
WB Thru		0	30	900		345	215	900
WB Right		0	5	75		30	20	75
NB Left/Thru/Right		70	80	900		90	95	900
SB Left/Thru/Right		90	70	200		95	105	200
4 – SR 132 & Western Ave								
EB Left	Signal	***90***	***155***	75	Signal	***145***	***220***	75
EB Thru		275	390	395		***680***	***890***	395
EB Right		70	70	135		135	***390***	135
WB Left		***95***	***105***	60		***135***	***130***	60
WB Thru		***295***	240	240		***330***	***290***	240
WB Right		40	20	250		35	20	250

Intersection/ Approach	Existing (2022) 95th Percentile Queue (ft)				Design Year (2046) 95th Percentile Queue (ft)			
	Control	AM	PM	Avail. Storage	Control	AM	PM	Avail. Storage
NB Left		45	50	105		55	55	105
NB Thru/Right		55	95	165		90	125	165
SB Left		45	35	90		50	45	90
SB Thru/Right		80	75	890		90	75	890
5 – SR 132 & Church St								
EB Left	TWSC	5	35	130	TWSC	35	45	130
EB Thru		0	0	250		40	45	250
WB Thru		25	35	235		***310***	185	235
WB Thru/Right		0	0	235		130	0	235
SB Left/Right		15	50	415		50	65	415
6 – SR 132 & I St/Bentley St								
EB Left	TWSC	85	80	240	TWSC	105	100	240
EB Thru		75	35	240		155	170	240
WB Thru/Right		40	5	165		160	30	165
SB Left		20	20	50		25	25	50
SB Right		***80***	***65***	50		***95***	***75***	50
7 – SR 132 & Center St								
EB Thru/Right	TWSC	10	0	165	TWSC	155	120	165
WB Left/Thru		20	30	260		0	70	260
NB Left/Right		50	50	575		75	80	575
8 – SR 132 & H St								
EB Left/Thru	TWSC	5	5	255	TWSC	205	190	255
WB Thru/Right		0	0	400		0	0	400
SB Left/Right		5	25	360		25	35	360
9 – SR 132 & G St/Riverside Rd								
EB Left/Thru/Right	TWSC	150	35	400	TWSC	***430***	***420***	400
WB Left/Thru/Right		35	50	425		175	90	425
NB Left/Right		40	25	395		45	35	395
SB Left/Thru/Right		40	35	650		40	60	650

Intersection/ Approach	Existing (2022) 95th Percentile Queue (ft)				Design Year (2046) 95th Percentile Queue (ft)			
	Control	AM	PM	Avail. Storage	Control	AM	PM	Avail. Storage
10 – SR 132 & F St/Hickman Rd								
EB Left	Signal	145	140	230	Signal	***320***	***310***	230
EB Thru/Right		350	265	430		***490***	***480***	430
WB Left		135	100	240		***270***	130	240
WB Thru/Right		220	165	325		320	280	325
NB Left		135	110	165		***215***	***170***	165
NB Thru		115	125	1980		265	150	1980
NB Right		65	80	170		140	95	170
SB Left		65	80	200		80	145	200
SB Thru/Right		155	140	395		130	250	395
11 – SR 132 & E St								
EB Left/Thru/Right	TWSC	80	60	325	TWSC	100	75	325
WB Left/Thru/Right		25	30	715		185	60	715
NB Left/Thru/Right		40	55	525		40	45	525
SB Left/Thru/Right		50	50	150		70	65	150
12 – SR 132 & Tim Bell Rd/Baker St								
EB Left/Thru/Right	TWSC	45	65	715	TWSC	65	90	715
WB Left/Thru/Right		0	0	315		0	0	315
NB Left/Thru/Right		35	15	315		35	20	315
SB Left/Thru/Right		70	60	320		70	75	320
13 – SR 132 & N Appling Rd								
WB Left/Thru	TWSC	0	5	1355	TWSC	10	0	1355
NB Left/Right		75	50	310		90	55	310

*Note: **BOLD RED** text indicates queues that exceed available storage*

3. Public Outreach

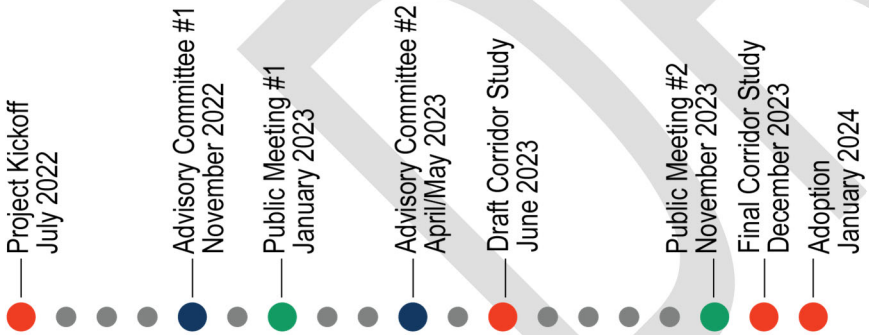
Successful plans reflect partnerships between local agencies, stakeholders, and community members. An effective community engagement program creates confidence in the planning process, promotes broad-based understanding, and reflects the interests and needs of the community. Successful implementation of the improvements recommended in this plan will require cooperation between Caltrans, the City, Stanislaus County, and the community as a whole.

The outreach effort for this corridor study was robust in its focus on reaching diverse communities, including targeted engagement using the following activities:

- Interactive Mapping Tool
- Advisory Committee Meetings
- Community Workshops
- Commission and Council Meetings

This chapter documents the input received through these various channels, which informed the improvement concept described in Chapter 4.

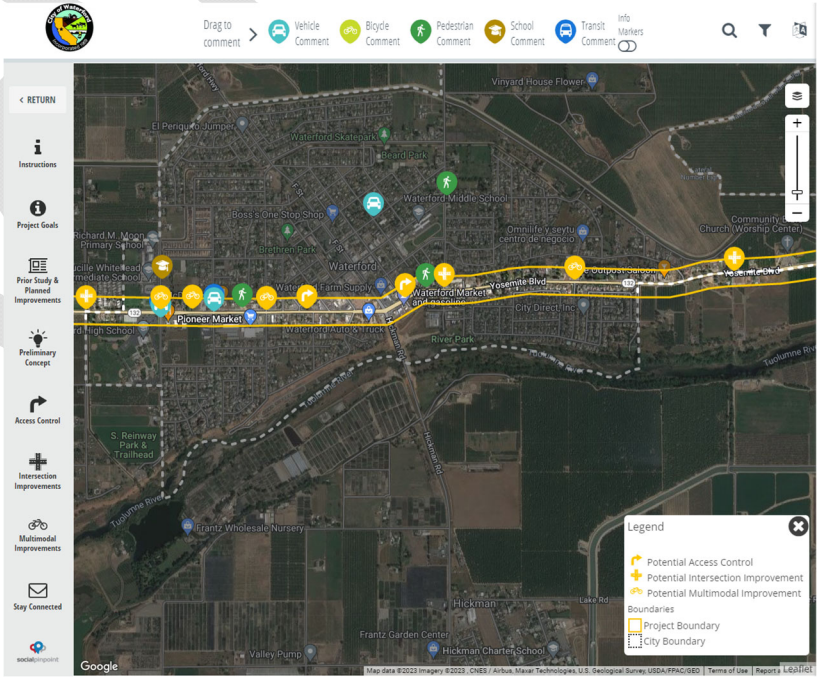
Figure 14: Project Timeline



3.1 Interactive Map

The public website for the project opened on December 12, 2022. A flyer with a link to the website was sent to residents of the City of Waterford in the December utility mailer. The website includes background on the project, proposed concepts, opportunities to comment/complete surveys, and project updates. Between the website opening and January 31, 2023, over 500 unique users visited the website, 50 unique comments were left on the interactive map, and 10 survey responses were submitted. In addition, many members of the public engaged with the comments and concepts on the website by pressing the 'like' and 'dislike' buttons.

Figure 15: Interactive Project Map



Comments submitted on the interactive map were divided on the topic of roundabouts. Some commenters were very supportive of roundabouts, noting they have worked well in nearby Modesto and on state highways in other locations and would provide benefits along Yosemite Boulevard for improved traffic operations, reduced speeds, and support for left turn movements. Other commenters expressed skepticism about trucks and other large vehicles navigating roundabouts, uncertainty about a new type of intersection, and concern over potential bottlenecks.

Other comments expressed a desire for continuous bicycling and walking facilities along the corridor, improved crossings, reduced vehicle speeds, and more turn lanes.

3.2 Advisory Committee Meetings

The Advisory Committee for this project included representatives from agencies with planning jurisdiction over portions of the project corridor and other stakeholders in the community, including:

- City of Waterford
- Waterford Police Services
- Caltrans District 10
- Waterford Unified School District
- Stanislaus Consolidated Fire Protection District
- Stanislaus Council of Governments (StanCOG)
- StanCOG Bicycle and Pedestrian Advisory Committee
- Stanislaus Regional Transit Authority (StanRTA)
- MCR Engineering
- JB Anderson Planning

Meeting #1: November 15, 2022

The first Advisory Committee meeting was held on November 15, 2022 to discuss goals for the project and provide input on development of improvement concept alternatives. Overall, committee members expressed support for multimodal improvements along the corridor including protected bikeways, shared use paths, and enhanced pedestrian crossings at key locations. They also highlighted locations and concerns to be considered during development of improvement alternatives, such as visibility around curves, turning movements of heavy vehicles, access control, emergency response routes, and maintenance of new facilities.

Meeting #2: May 10, 2023

The second Advisory Committee meeting was held on May 10, 2023 to update the committee members on the recent progress, describe the feedback received through the public meeting and project website, and discuss the most recent concept. The committee members provided input on how and where to implement access control, the effect of new development in the City on the design of the corridor, the extents of the proposed design, and locations to add additional clarification on the design. There was also discussion about SR 132 at E Street which involved dialogue about where a crosswalk should be installed, adding signage for increased safety, and restricting left turns at the intersection. Following the meeting, a request was sent to the Advisory Committee to provide any additional comments on the conceptual design to allow for thorough incorporation of the feedback into the draft corridor study.

3.3 Public Meetings

Meeting #1: January 26, 2023

The City hosted the first of two planned public meetings at Council Chambers in the Waterford City Office on January 26, 2023. The 19 attendees included Waterford residents and members of the surrounding community.

The meeting was an open house format with presentation boards that provided information on the study area, project goals and need, modern roundabouts and their benefits, bicycle treatment options, transit information, and conceptual plans. A brief presentation occurred with a question-and-answer session immediately following. Additionally, a Caltrans video about roundabouts was shown to provide further insight into the benefits of roundabouts. Attendees were invited to review materials and provide input on the following topics:

- Maps of corridor existing conditions, including collisions and bicyclist Level of Traffic Stress (LTS)
- Information on modern roundabouts, including FHWA safety information and examples from similar contexts
- Different types of bicycle facilities
- Options for transit improvements
- Draft improvement concepts for the corridor

Attendees at the meeting expressed concerns about roundabouts, which would be a new intersection type for the Waterford community. Other comments included input on walking routes used by students, locations where raised medians may not be desirable, and truck movements.

Figure 16: Public Meeting #1

Meeting #2: November 2023

[To be completed following the second public meeting]

3.4 Community Input Themes

In response to website engagement and public meeting input, a project update document was created to distribute to the public. This project update included a Frequently Asked Questions (FAQ) section that summarized and addressed many of the community input themes. To view the project update, see the Appendices.

[*To be completed once the final public meeting has occurred, summarizing key findings from the meeting*]

4. Recommendations

This chapter presents the proposed improvement concepts for Yosemite Boulevard. Based on community input, analysis of existing conditions, and the needs documented in previous chapters, these improvements are intended to create an inviting corridor that is safer and more comfortable for people walking, bicycling, using transit, and driving.

On the following pages, a walkthrough of the corridor improvement concept provides a closer look at the multimodal facilities, intersection improvements, and other features recommended for each segment along Yosemite Boulevard (SR 132).

For the majority of the corridor, buffered Class II bicycle lanes are shown as the recommended bicycle facility. This approach is intended to ensure project evaluations and benefits calculations reflect a conservative assumption of the future facility type. The proposed widths for the Class II bicycle lane and buffer are wide enough to accommodate Class IV separated bikeways, if desired, with the addition of a vertical barrier element in the buffer area. As each segment is revisited for implementation in the future, both buffered Class II and separated Class IV bikeways will be evaluated and included in the final design as appropriate based on corridor contexts and adjacent land uses at the time.

Refer to the Appendices to view the proposed plan line for the following segments.

4.1 Segment 1A: West of Eucalyptus Avenue to Eucalyptus Avenue

Eucalyptus Avenue

A new single-lane roundabout is proposed at the intersection of Yosemite Boulevard and Eucalyptus Avenue. The intersection includes approach geometry intended to reduce speeds of vehicles entering the roundabout to 25 mph, providing traffic calming and cueing eastbound drivers that they are leaving the rural roadway and entering a community.

Marked crosswalks on all legs and splitter islands with pedestrian refuges provide improved visibility and comfort for people crossing the roadways. Bicyclists will have the option of either navigating the roundabout by sharing the lane with vehicles or using new Class I paths around the outside of the roundabout.

The westbound approach will conform to the current Caltrans project constructing new sidewalks on the north and south sides of Yosemite Boulevard.

The intersection has been laid out to minimize right-of-way impacts to the developed parcels on the northeast and southeast corners, as well as avoid impacting the existing drainage culvert on the east leg.

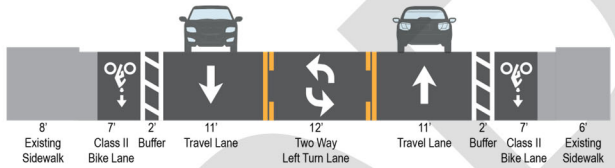
4.2 Segment 1B: Eucalyptus Avenue to Reinway Avenue

Corridor

East of Eucalyptus Avenue, the corridor will include sidewalks on both sides being constructed by the ATP Cycle 6 project described in Section 2.3. One through-lane for traffic in each direction is maintained, along with a center two way left turn lane. Buffered Class II bicycle lanes are provided on both sides of the street (see figure below).

Approaching the Reinway Avenue intersection, the proposed cross-section conforms to match the westbound approach, which is being widened as part of the Caltrans ADA Improvements Project (see Section 2.3) through the commercial areas in Segment 2A and 2B. The corridor cross-section otherwise remains the same.

Figure 17: Segment 1B Typical Cross Section



4.3 Segment 2A: Reinway Avenue to I Street

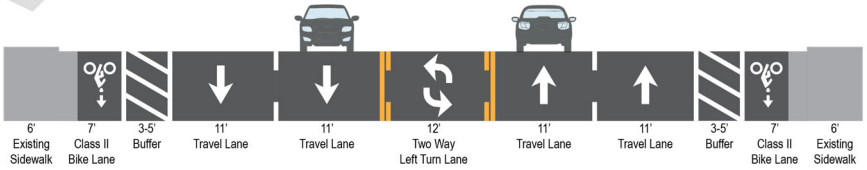
Corridor

The cross section from Segment 1 is continued into this segment, with new sidewalks and buffered bicycle lanes on both sides. The widened pavement section created by the Caltrans ADA Improvements Project (see Section 2.3) is striped to formalize two travel lanes in each direction and a two-way left turn lane, improving consistency for turning and merge movements accessing the commercial uses along this segment. This consistency makes vehicle movements more predictable, which in turn improves safety for people bicycling and walking. See Figure 18 for a typical cross section.

Sidewalks were recently installed on the north side of the corridor between Pasadena Avenue and Church Street, and most of the new facility will remain in the proposed improvement concept. A small section at the east end of the segment will be redone to better align with the desired roadway cross section.

Between Church Street and I Street, the corridor transitions from the 5-lane cross section to a 3-lane configuration, providing one through lane in each direction along with a two way left turn lane.

Figure 18: Segment 2A Typical Cross Section



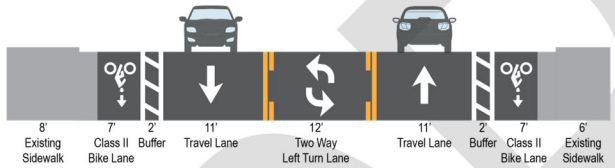
4.4 Segment 2B: I Street to F Street

Corridor

Between I Street and F Street, the corridor is three lanes (see figure below). The roadway currently narrows east of I Street, so the reduced number of lanes minimizes impacts to existing residential yards and driveways.

On the south side of the corridor, new sidewalk was recently constructed. West of Center Street, this new sidewalk is retained in the proposed improvement concept. East of Center Street, however, maintaining the new sidewalk would require shifting the roadway cross section to the north slightly and results in impacts to two existing buildings. To avoid these impacts, the sidewalk east of Center Street will be rebuilt.

Figure 19: Segment 2B Typical Cross Section



F Street/Hickman Road

The narrower cross section is maintained, including high visibility ladder-style crosswalk markings across the east and west legs of the intersection.

4.5 Segment 3A: F Street to E Street

E Street

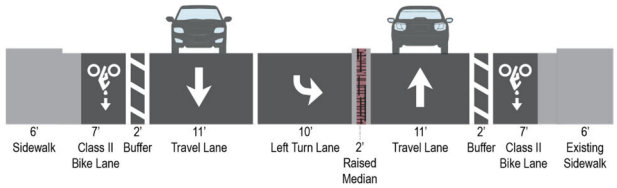
East of F Street/Hickman Road, a raised median prevents left turns from driveways and E Street.

A raised median on Yosemite Boulevard provides access control at this intersection, limiting E Street to right-in-right-out only. A new marked crosswalk on the east leg provides a safe, comfortable crossing for pedestrians, including a refuge area within the median.

Corridor

The cross section from Segment 2B is generally continued, with sidewalks, on-street buffered bicycle lanes, and two travel lanes. A raised median and left turn pocket replace the two-way center turn lane (see figure below).

Figure 20: Segment 3A Typical Cross Section

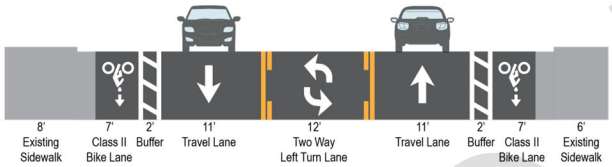


4.6 Segment 3B: E Street to Appling Road

Corridor

The cross section from Segment 3A is continued, with sidewalks, on-street buffered bicycle lanes, two travel lanes, and a two-way center turn lane (see figure below).

Figure 21: Segment 3B Typical Cross Section



Tim Bell Road

A new single-lane roundabout is proposed at the intersection of Yosemite Boulevard and Tim Bell Road. The intersection includes approach geometry intended to reduce speeds of vehicles entering the roundabout to less than 25 mph, providing traffic calming and improving safety.

Marked crosswalks on all legs and splitter islands with pedestrian refuges provide improved visibility and comfort for people crossing the roadways. Bicyclists will have the option of either navigating the roundabout by sharing the lane with vehicles or using new Class I paths around the outside of the roundabout.

The intersection has been laid out to minimize right-of-way impacts while taking the curve correction to the west into account to help improve safety.

Appling Road

The Appling Road intersection was considered as an alternative for a new roundabout to provide improved access into the west end of the River Pointe subdivision. Due to right of way impacts to private property and conflicts with residential driveways near the intersection, Tim Bell Road was ultimately determined to be the preferred location for the new roundabout.

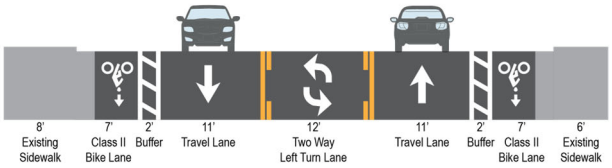
In the future, a cul-de-sac could be created at the north end of Appling Road in conjunction with improvements to Baker Street and Hickman Street to route traffic from the subdivision to the new roundabout at Tim Bell Road.

4.7 Segment 3C: Appling Road to River Pointe Drive

Corridor

The cross section from Segment 3B is continued, with sidewalks, on-street buffered bicycle lanes, two travel lanes, and a two-way center turn lane (see figure below).

Figure 22: Segment 3C Typical Cross Section

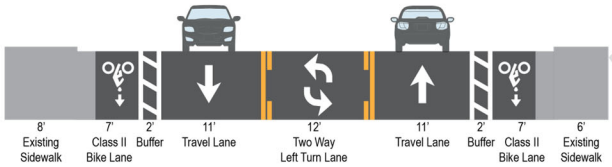


4.8 Segment 3D: River Pointe Drive to East City Limit

Corridor

The cross section from Segment 3C is continued, with sidewalks, on-street buffered bicycle lanes, two travel lanes, and a two-way center turn lane (see figure below).

Figure 23: Segment 3D Typical Cross Section



Rorabough Parkway

A new single-lane roundabout is proposed at the intersection of Yosemite Boulevard and the new Rorabough Parkway connection. The intersection includes approach geometry intended to reduce speeds of vehicles entering the roundabout to less than 25 mph, providing traffic calming and cueing westbound drivers that they are leaving the rural roadway and entering a community.

Marked crosswalks on all legs and splitter islands with pedestrian refuges provide improved visibility and comfort for people crossing the roadways. Bicyclists will have the option of either navigating the roundabout by sharing the lane with vehicles or using new Class I paths around the outside of the roundabout.

5. Implementation Plan

This chapter presents a strategy to implement the improvement concept and recommended projects outlined in Chapter 4.

The intent of evaluating the recommended improvement concept is to create a flexible framework to guide implementation of projects as compatible opportunities arise. These segments or subsegments described above will be implemented over time and do not necessarily have any higher or lower priority over another but are rather a means to provide logical termini for phased construction of improvements along the corridor. Future development, potential funding resources, or other outside influences may point to implementation of certain segments/subsegments first, or present opportunities to leverage complimentary investments to implement the recommended improvement concepts.

The final section of this plan describes federal, state, regional, and local programs that may fund implementation efforts.

5.1 Evaluation

This section presents an evaluation of the proposed improvement concept. Analyses conducted to document current conditions on the corridor were repeated to assess the effect the recommended improvements would be expected to have on various metrics. Benefits associated with improved safety, bicycle mode shift, and reduction in vehicular delay were also estimated and monetized for the improvement concept.

These analyses include:

– Safety improvement
– Bicycle Level of Traffic Stress (LTS)
– Bicycle Mode Shift
– Traffic Operations & Corridor Delay

Safety Improvement

Safety improvements were identified at intersections and along segments for the study corridor. Crash reduction factors estimate a safety improvement's potential to reduce crash rates. Crash reduction factors can apply only to bicycle and pedestrian crashes, all crashes, or other specific conditions.

The table below shows the safety improvements (countermeasures) and their associated crash reduction factors that were used to estimate the potential monetized safety benefits of the improvement concept.

Table 5: Safety Improvements (Countermeasures)

ID	Description	Crash Reduction Factor (CRF)
Intersection Countermeasures		
S01	Add intersection lighting	40%
S03	Improve signal timing	15%
NS01	Add intersection lighting	40%
NS05	Convert intersection to roundabout (from stop control on minor	Varies
NS07	Upgrade intersection pavement markings	25%
NS18	Install left-turn lane (where no left-turn lane exists)	35%
NS19PB	Install raised medians / refuge	45%
NS20PB	Install pedestrian crossing at uncontrolled locations	25%
NS21PB	Install/upgrade pedestrian crossing at uncontrolled locations	35%
Roadway Countermeasures		
R01	Add segment lighting	35%
R13	Add two-way left-turn lane (without reducing travel lanes)	30%
R32PB	Install bike lanes	35%
R34PB	Install sidewalk/pathway (to avoid walking along roadway)	80%
R35PB	Install/upgrade pedestrian crossing (with enhanced safety features)	35%

Safety benefits associated with the improvement concept were generated using the Highway Safety Improvement Program (HSIP) methodology, applying the latest economic parameters. Since safety

benefit may only be estimated where a location has a history of crashes with specific conditions (i.e., bicycle or pedestrian crashes, or night-time crashes), some corridor locations did not result in a safety benefit.

The table below summarizes the applied countermeasures by corridor location that resulted in a monetized safety benefit. No countermeasures (CM) were identified for locations without a history of applicable crash types.

Table 6: Improvement Concept Safety Benefits

Location	CM1	CM2	CM3	Total Benefit
Intersections				
SR 132 & Reinway Ave	S01	S03		$ 72,420
SR 132 & Pasadena Ave	NS07	NS20PB	NS01	$ 6,571,385
SR 132 & Western Ave	S01	S03	S01	$ 101,856
SR 132 & Church St	NS07	NS01		$ 28,310
SR 132 & I St/Bentley St	NS07	NS20PB	NS18	$ 51,405
SR 132 & Center St	NS07	NS20PB	NS18	$ 51,405
SR 132 & H St	NS07	NS20PB	NS18	$ 25,703
SR 132 & G St/Riverside Rd	NS07	NS20PB	NS18	$ 77,108
SR 132 & F St/Hickman Rd	S01	S03		$ 320,832
SR 132 & E St	NS16	NS19PB	NS20PB	$ 796,516
SR 132 & Tim Bell Rd/Baker St	NS05	NS01		$ 2,547,257
SR 132 & N Appling Rd	NS07	NS01		$ 7,450
Total				***$ 10,651,646***
Roadway Segments				
0.25mi E of Eucalyptus Ave to Eucalyptus Ave	R01			$ 3,445,400
Eucalyptus Ave to Reinway Ave	R01	R13		$ -
Reinway Ave to Pasadena Ave	R01			$ 127,260
Pasadena Ave to Western Ave	R01			$ 20,860
Western Ave to Church St	R01			$ -
Church St to I St	R01	R13		$ -
I St to Center St	R01	R13		$ -
Center St to H St	R01	R13		$ -
H St to G St	R01	R13		$ 381,064
G St to F St/Hickman Rd	R01	R13		$ 17,880
F St/Hickman Rd to E St	R01	R13		$ -
E St to Tim Bell Rd/Baker St	R01	R13		$ 209,760
Tim Bell Rd/Baker St to N Appling Rd	R01	R13		$ 348,582
N Appling Rd to River Pointe Dr	R01	R13		$ -
River Pointe Dr to Skyline Blvd	R01	R13		$ 2,971,080
Skyline Blvd to E City Limit	R01	R13		$ 141,562
Total				***$ 7,663,448***

Bicycle Level of Traffic Stress

Level of Traffic Stress (LTS) on corridor segments and at intersections or crossings without the improvement concept is primarily high stress. With the addition of buffered bike lanes along the entire corridor, the corridor segment LTS could be reduced to LTS 2 for segments with a posted speed limit of 35 mph and LTS 3 for segments with a posted speed limit of 45 mph, for both two or four-lane roadways.

At intersections that are converted from stop control to a traffic signal or roundabout with dedicated crosswalks, the LTS could be reduced to LTS 1. For the mid-block crossings with a median refuge island proposed at E Street, the LTS would be maintained at LTS 2 given the low existing volumes (< 3,000 daily vehicles) that travel on that segment.

The proposed plan line contains a minimum 2-foot buffer for bicyclists. In areas with minimal access points, adding vertical separation in this buffer space would create Class IV separated bikeway facilities. Class IV facilities will help to reduce the LTS along the corridor, but evaluation prior to implementation is recommended. Potential locations for Class IV facilities include the following.

- Eastbound SR 132 from Pasadena Avenue to the main entrance of the Waterford Plaza Pioneer Market
- Eastbound SR 132 from the main entrance of the Waterford Plaza Pioneer Market to Western Avenue
- Eastbound SR 132 from Reinway Avenue to the entrance of Auto Zone
- Eastbound SR 132 from Ram's Tire Shop to eastern City Limits
- Westbound SR 132 from eastern City Limits to the Skyline Boulevard turnoff sign
- Westbound SR 132 from F Street to G Street

Bicycle Mode Shift

The National Cooperative Highway Research Program (NCHRP) 552 methodology was applied to estimate bicycle benefits. The analysis quantifies the induced mode shift associated with the proposed improvements and monetizes the annualized mobility, health, recreation, and decreased auto use benefits provided by the projected mode shift at high, moderate, and low estimates.

Based on the research cited in National Cooperative Highway Research Program (NCHRP) Report 552, Guidelines for Analysis of Investment in Bicycle Facilities[1], the bicycle facilities proposed in The Yosemite Boulevard (SR 132) Corridor Study may result in induced bicycling demand for the new facilities among both existing and new bicyclists.

Benefits are shown in the table to the right for the following categories:

Mobility Benefit reflects time savings when people are able to bicycle instead of some other mode of transportation.

Health Benefit is based on reduced healthcare costs due to increased physical activity.

Recreation Benefit is based on reduced cost for other outdoor recreation activities as bicycling becomes more appealing.

Decreased Auto Use Benefit reflects both personal savings accrued from lower gas and vehicle maintenance costs as well as societal savings related to reduced pollution and traffic congestion.

The following table presents a combined summary of the annualized benefits associated with the top-10 benefits-producing projects proposed across the Plan area, representing the estimated mobility, health, recreation, and decreased auto use benefits associated with the proposed bicycle facilities discussed in previous sections. For the purposes of this analysis, the moderate estimate is used for a conservative approach to assessing induced demand benefits.

Table 7: Annual Mode Shift Benefits

Benefit Type	Annual Monetized Benefits
Annual Mobility Benefits	$58,385
Annual Health Benefit	
High Estimate	$14,336
Moderate Estimate	$11,648
Low Estimate	$8,064
Annual Recreation Benefit	
High Estimate	$386,900
Moderate Estimate	$310,250
Low Estimate	$208,050
Annual Decreased Auto Use Benefits	$130
TOTALS:	
Total Annual Benefit, High	$459,751
Total Annual Benefit, Moderate	$380,413
Total Annual Benefit, Low	$274,629

1 Methodology utilized here in based on National Cooperative Highway Research Program (NCHRP) Report 552, Guidelines for Analysis of Investments in Bicycle Facilities, Transportation Research Board of the National Academies (2006), as well as the supplemental White Paper titled "Translating Demand and Benefits Research into Guidelines," available here, which was adapted from the demands and benefits outlined in the original NCHRP 552 report. The methodology described in the White Paper was used in the development of an online tool (no longer supported) created by the NCHRP 552 research authors.

Traffic Operations

Intersection Level of Service (LOS) was calculated for Existing (2022) and Existing (2022) Plus Improved Concept conditions. Under existing corridor conditions, the intersections on SR 132 at Reinway Avenue and Pasadena Avenue operate at unacceptable (LOS D or worse) conditions. With the improvement concept, the addition of one through lane in both the eastbound and westbound direction from Reinway Avenue to Church Street, these two intersections would have improved LOS. (Note: The intersection of SR 132 and Pasadena would still operate at LOS D in the PM peak hour under its current stop control; however, a traffic signal is currently proposed and is anticipated to reduce intersection delay to acceptable levels.)

Operations at other intersections remain acceptable, at or below LOS D, or improve slightly. Intersection LOS was not calculated for future Design Year (2045) conditions.

The following table compares intersection LOS under Existing conditions with and without the improvement concept.

Table 8: Intersection LOS With and Without the Improvement Concept

ID	Intersection with Yosemite Blvd / SR 132	Peak Hour	Existing (2022)			Existing (2022) with Improvement Concept		
			Control	Delay	LOS	Control	Delay	LOS
2	Reinway Ave	AM	Signal	**44.2**	**D**	Signal	31.7	C
		PM		18.0	B		16.1	B
3	Pasadena Ave	AM	TWSC	**71.8**	**F**	TWSC*	38.6	E
		PM		**32.8**	**D**		**26.0**	**D**
4	Western Ave	AM	Signal	19.6	B	Signal	15.3	B
		PM		17.4	B		15.5	B
5	Church St	AM	TWSC	10.8	B	TWSC	10.8	B
		PM		10.4	B		10.3	B
6	I St/ Bentley St	AM	TWSC	16.6	C	TWSC	16.1	C
		PM		12.3	B		11.8	B
7	Center St	AM	TWSC	11.7	B	TWSC	11.4	B
		PM		12.5	B		12.1	B
8	H St	AM	TWSC	17.9	C	TWSC	14.0	B
		PM		15.3	C		12.8	B
9	G St/ Riverside Rd	AM	TWSC	18.2	C	TWSC	18.2	C
		PM		17.3	C		17.3	C
10	F St/ Hickman Rd	AM	Signal	21.2	C	Signal	21.8	C
		PM		20.0	C		20.7	C
11	E St	AM	TWSC	18.8	C	TWSC	12.4	B
		PM		17.3	C		13.1	B
12	Tim Bell Rd/ Baker St	AM	TWSC	19.8	C	Round about	6.3	A
		PM		22.9	C		7.2	A
13	N Appling Rd	AM	TWSC	15.2	C	TWSC	15.2	C
		PM		15.3	C		15.3	C

**Future traffic signal improvement is not included in this plan.*

Vehicular operations benefits associated with the proposed plan were based on changes in AM and PM peak hour delay for eastbound and westbound travel on the corridor. Existing conditions were used to estimate the related difference in delay along the corridor with the improvement concept. As various project segments are programmed for detailed design and implementation, further analysis of LOS and an evaluation of vehicle miles traveled (VMT) reductions should be completed that reflect development, land use, and traffic volume conditions at that time. Table 9 below summarizes the changes in delay with and without the improvement concept.

Table 9: Improvement Concept Delay Reduction

Scenario	Peak Hour	Segment Delay (seconds)	
		Eastbound	Westbound
Existing (2022)	AM	107.4	83.6
	PM	70.6	62.5
Existing (2022) With Improvement Concept	AM	97.8	66.8
	PM	58.8	54.5
Difference	AM	-9.6	-16.8
	PM	-11.8	-8.0

Benefits were calculated by converting average intersection delay per vehicle into hours of delay per person, assuming a vehicle occupancy rate of 1.48. Annualization was based on 260 working days. The cost per person hour of delay was based on the 2022 Cal-BC Federal Comparison rates of $17.80 for automobiles and $32.00 for trucks. A weighted average rate was calculated using the corridor's average 10.8% truck percentage, resulting in a "blended" cost of $19.33. Benefits associated with delay reduction along the corridor are summarized in Table 10 below.

Vehicle delay reduction can result in air quality and emissions benefits. Furthermore, bicycle mode shift can result in VMT reductions. Potential emissions reductions were estimated via the SB1 Emissions Calculator, a component of the Cal B/C suite, developed by the California Transportation Commission (CTC). However, the emissions reductions that could be estimated were not significant and therefore were not included in the benefit calculations.

Table 10: Improvement Concept Corridor Delay Reduction Benefit

EASTBOUND Direction of Travel							
	Corridor Delay (sec)						
	Existing (2022)	**W/ Improvement Concept**	**Delay Reduction (sec)**	**Volume**	**Person Hours of Delay (Annualized)**	**Monetized Annual Benefit**	**Monetized Life Cycle Benefit (20 Years)**
AM Peak Hour	107.40	97.80	-9.60	394	323.44	$6,253.21	$91,236.32
PM Peak Hour	70.60	58.80	-11.80	580	585.24	$11,314.76	$165,086.02
WESTBOUND Direction of Travel							
	Corridor Delay (sec)						
	Existing (2022)	**W/ Improvement Concept**	**Delay Reduction (sec)**	**Volume**	**Person Hours of Delay (Annualized)**	**Monetized Annual Benefit**	**Monetized Life Cycle Benefit (20 Years)**
AM Peak Hour	83.60	66.80	-16.80	558	801.62	$15,498.11	$226,122.49
PM Peak Hour	62.50	54.50	-8.00	383	262.01	$5,065.52	$73,907.59

Benefit/Cost Results

Based on the results of the benefit assessment and the monetization of the benefits, a total corridor benefit for the improvement concept has been calculated. (Note: Other benefits that were not estimated in this plan could be monetized for the proposed corridor improvements.)

Table 11: Improvement Concept Monetized Benefit

Benefit Type	Annual Benefit, rounded	Life Cycle Benefit (20 Years), rounded
Safety Improvement	n/a	$18,315,000
Bicycle Mode Shift (Low Estimate)	$274,600	$5,493,000
Vehicle Delay Reduction	$38,100	$556,000
Total		**$24,364,000**

Using the planning-level cost estimates for the proposed improvements for segments 1, 2A, 2B, 3A, and 3B, the table below presents a benefit/cost value of 1.05.

Table 12: Improvement Concept Benefit/Cost Ratio

Total Project Life Cycle Cost	Total Project Life Cycle Benefit
$23,300,000	$24,364,000
Total B/C	**1.05**

5.2 Funding Strategy

A variety of sources exist to fund the corridor improvements recommended in Chapter 4. Funding programs that can be used for construction or maintenance of multimodal corridor improvements are described on the following pages. State and federal funding programs are listed first, followed by regional and local programs.

State and Federal Programs

Highway Safety Improvement Program

The Highway Safety Improvement Program (HSIP) is a federal program that emphasizes reducing traffic fatalities and serious injuries on all public roads, including both state facilities and non-state-owned roads. Applications to this program require data-drive, strategic approaches to improving safety with a focus on performance.

Infrastructure Investment and Jobs Act

The Infrastructure Investment and Jobs Act (IIJA) is a bipartisan infrastructure law that funds a broad range of eligible projects, including transportation as well as energy, internet, water, and more. This funding can be accessed by local agencies through formula funds, suballocations from the State, and competitive grant opportunities. California is anticipated to receive $1.8-$2 billion per year through FY 2026.

State Highway Operation and Protection Program

The State Highway Operation and Protection Program (SHOPP) funds rehabilitation and reconstruction of state highways and bridges. It includes a set-aside for Complete Streets projects, including bicycle and pedestrian facilities, and the SHOPP Minor Program is an additional set-aside for small projects (under $1.25 million) that allows for more efficient implementation of small-scale projects.

State Transportation Improvement Program

The State Transportation Improvement Program (STIP) is the biennial five-year plan adopted by the California Transportation Commission (CTC) for future allocations of state transportation funds.

Active Transportation Program

California's Active Transportation Program (ATP) funds bicycle and pedestrian projects that support program goals of increasing active transportation, improving public health, and addressing air quality concerns. Pavement rehabilitation and roadway widening projects that add vehicle capacity are typically ineligible and/or may not be competitive under this program.

Additional Grant Programs

Additional grant programs that may fund active transportation or multimodal transportation improvements like those included in this plan include:

- Affordable Housing and Sustainable Communities Program
- Clean Mobility Options
- Congestion Mitigation and Air Quality Improvement
- Local Partnership Program
- Local Streets and Roads Program
- Solutions for Congested Corridors
- Sustainable Transportation Equity Project
- Transformative Climate Communities
- Transit and Intercity Rail Capital Program
- Transportation Development Act funding
- Urban Greening

Regional and Local Programs

Regional Transportation Improvement Program

Federal transportation funding is administered by StanCOG in Stanislaus County. Eligible projects are included in a Transportation Improvement Program (TIP) to program four years of available funding for transportation projects and programs. Many of the funding sources allocated in this way require state or local matching funds, often asking for 20 percent of the total capital cost.

Measure L Funding

Measure L is a half-cent sales tax in Stanislaus County that funds transportation improvement projects and programs, including street maintenance, Safe Routes to School, safety projects, and traffic congestion reduction efforts. Funds are administered by StanCOG and used to fund local transportation efforts or as matching funds to leverage state or federal funding opportunities.

5.3 What Happens Next

This plan is not the conclusion of this project—it is a beginning. This report documents technical analysis, community input, and the desires of local and regional stakeholders to present a vision for multimodal improvements along the Yosemite Boulevard/SR 132 corridor.

To make this vision a reality, these improvements will require additional approvals, analysis, and funding before construction can occur. Some improvements may be prioritized over others, as opportunities arise. Other improvements may be revised if further analysis or changing circumstances reveal new needs or information.

While this is not an exhaustive list, some of the next steps toward implementation are:

- Include the recommended improvements in this plan in the countywide transportation plan and StanCOG's Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)
- Develop a Project Initiation Document (PID), the first step to implement improvements on a Caltrans facility
- Conduct an Intersection Safety Operations Assessment Process (ISOAP, formerly known as Intersection Control Evaluation (ICE)) analyses at necessary locations
- Coordinate with Caltrans to incorporate improvements into complementary SHOPP projects

Appendix A

Project Update

PROJECT UPDATE #1

Yosemite Blvd (SR 132) Corridor Study

City of Waterford

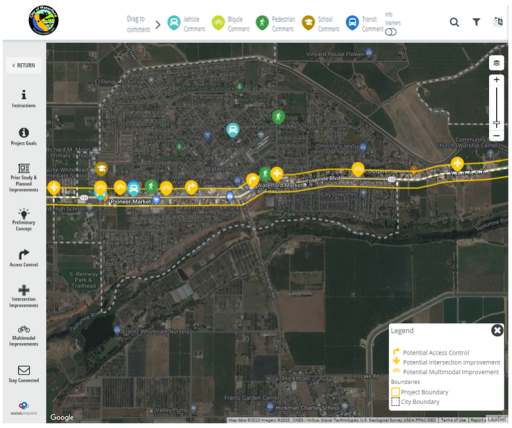
PUBLIC MEETING #1

The first Public Meeting for the Yosemite Blvd (SR 132) Corridor Study was held on January 26, 2023. Approximately twenty (20) members of the public, as well as staff representing the City of Waterford and the design consultant (GHD) attended. Many of the attendees arrived between 6:00PM and 6:30PM and the meeting ended at 7:30PM.

The meeting was an open house format with presentation boards that provided information on the study area, project goals and need, modern roundabouts and their benefits, bicycle treatment options, transit information, and conceptual plans. A brief presentation occurred with a question-and-answer session immediately following. Additionally, a Caltrans video about roundabouts was shown to provide further insight into the benefits of roundabouts.

At the meeting, the public seemed to understand the need for the plan, specifically at select intersections such as SR 132 and Tim Bell Road. While some aspects of the project were well received, many community members presented their concerns with roundabouts. Some of the comments related to roundabouts included concerns about how large trucks navigate roundabouts without overturning, the required space needed to construct a roundabout, costs of roundabouts in comparison to other intersection alternatives, and speeds approaching roundabouts. After the presentation, question-and-answer period, and Caltrans video, it appeared that several in attendance started to have a more positive perspective about the proposed roundabouts. Some attendees proposed locations where they would like to see roundabouts implemented.

PROJECT WEBSITE



The public website for the project opened on December 12, 2022. A flyer with a link to the website was sent to residents of the City of Waterford in the December utility mailer. The website includes background on the project, proposed concepts, opportunities to comment/complete surveys, and project updates. Between the website opening and January 31, 2023, over 500 unique users visited the website, 50 unique comments were left on the interactive map, and 10 survey responses were submitted. In addition, many members of the public engaged with the comments and concepts on the website by pressing the ‘like’ and ‘dislike’ buttons. Approximately one in four people pressed “like” on the roundabout concepts presented.

FREQUENTLY ASKED QUESTIONS

Through both the current website engagement and public meeting input, many questions arose concerning roundabouts. A summary of the Frequently Asked Questions related to the project are listed below.

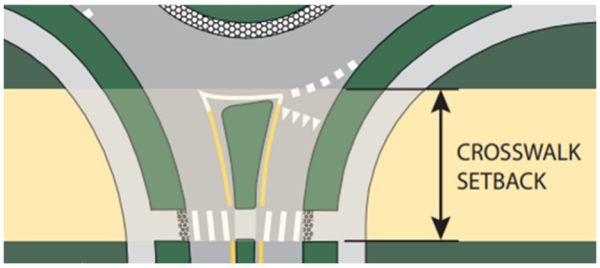
Q: How do large vehicles (low-boy trucks, farm equipment, buses, etc.) navigate roundabouts without overturning and/or crashing?

A: The design of any roundabout along SR 132 will need to adhere to Caltrans standards, since it is a state highway. These standards require that the roundabout is designed to accommodate large vehicles. Truck aprons will be incorporated where needed to allow a mountable surface for the rear tires of large vehicles when needed (see picture on the right for an example). The curb of the apron will be placed to have a 1" vertical difference at the front that gradually increases to a maximum height of 3" over a 12" width. Based on a study done by the Transportation Research Board in 2013, this is well under the 3"-4" instantaneous curb height change that low-boy trucks have difficulty handling. To view large trucks navigating a roundabout in Central California, see the following Caltrans video: https://www.youtube.com/watch?v=JqjX7jN0eaY.

Q: Can traffic flow efficiently through a roundabout?

A: Roundabouts are typically associated with less vehicle delay (better efficiency) than more traditional traffic controls. Vehicles need to yield at roundabouts, rather than coming to a complete stop, which often allows more vehicles to enter the intersection.

Q: How is pedestrian safety affected by roundabouts?



A: Crosswalks are set back from the intersection at a roundabout, which allows for a shorter crossing distance for pedestrians than at a typical intersection. This also allows drivers to focus on pedestrians before they attempt to merge into the circulatory roadway. In addition, the crosswalks have a pedestrian refuge in the middle which allows for pedestrians to cross the crosswalk in two stages. As a result, pedestrians only need to cross one direction of vehicular traffic at a time.

Lower vehicle speeds at roundabout approaches also allow drivers increased time to react to the presence of a pedestrian at the intersection. Slower speeds are typically correlated with lower crash severity.

Q: What measures are being evaluated to ensure safety of pedestrians along SR 132, particularly along the eastern end near the River Pointe community?

A: Sidewalk gaps are being closed and Class I paths are being studied to provide continuous pedestrian paths, giving people a safe place to walk out of the roadway.

Enhanced crossings will also be considered at key locations to provide connections across SR 132, including measures like pedestrian beacons, high visibility markings, or pedestrian refuges to provide additional safety and comfort for people crossing.

Q: The intersection of SR 132 and Tim Bell Road is on a slope, with road curvature on the approaches. Can roundabouts be constructed at locations with physical constraints like this?

A: If properly designed, roundabouts can be created on a hill or steep slope. The intersection of S Auburn Street and the I-80 westbound ramps is an example of a single-lane roundabout constructed on a grade (see picture on the left). Other roadway features, including signage, can be incorporated on the roundabout approaches to alert drivers of the roundabout in advance.

Q: Are turn lanes being evaluated along the corridor?

A: A center turn lane is being evaluated for the western and central portions of the project corridor to facilitate left-turn access to side streets and driveways.

On-street bicycle lanes are also being implemented throughout the corridor, which provide space for drivers turning right to pull out of the vehicle lane before completing their turn.

Q: Since highways are typically associated with higher speeds, how will vehicles slow down in enough time to navigate a roundabout safely?

A: The Federal Highway Administration (FHWA) provides the following information related to vehicle speeds approaching roundabouts on rural highways.

> *"High-speed approaches to roundabouts include advance signing, pavement markings and raised channelization. With proper design, drivers adjust their speeds, slow on approach, and navigate the roundabout safely.*
>
> *Researchers compared traffic speeds of approaches to roundabouts and stop-controlled intersections. At 100 feet before the yield or stop lines, the speed of traffic at the roundabouts was 2.5 mph lower than at the stop-controlled locations."*
>
> *Source: Roundabouts & Rural Highways, FHWA, July 2020*

Q: What is the cost comparison between a roundabout and a signal?

A: While roundabouts are often considered to have a higher upfront cost, they tend to have lower maintenance costs than signals. Higher up-front roundabout costs are due to more substantial curb and raised island work, but unlike signals, roundabouts do not rely on electronic equipment that requires ongoing maintenance and monitoring.

Q: Are pedestrian bridges or overcrossings being considered over SR 132?

A: Pedestrian safety and accessibility are being considered for the SR 132 corridor. As a result, various infrastructure improvements are being evaluated. However, pedestrian bridges and overcrossings in a corridor like this can be a visual impact and are typically associated with high costs. As such, these are not being evaluated at this time.

Please visit the public website to share your input and view updated information on the Yosemite Blvd (SR 132) Corridor Study.

lrsp.mysocialpinpoint.com/yosemite

Appendix B

Plan Line Concepts

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GHD

CITY OF WATERFORD
YOSEMITE Blvd (SR 132) CORRIDOR STUDY

SEGMENT 1
1 OF 2

Project No. **12578643**
Date **7/11/23**

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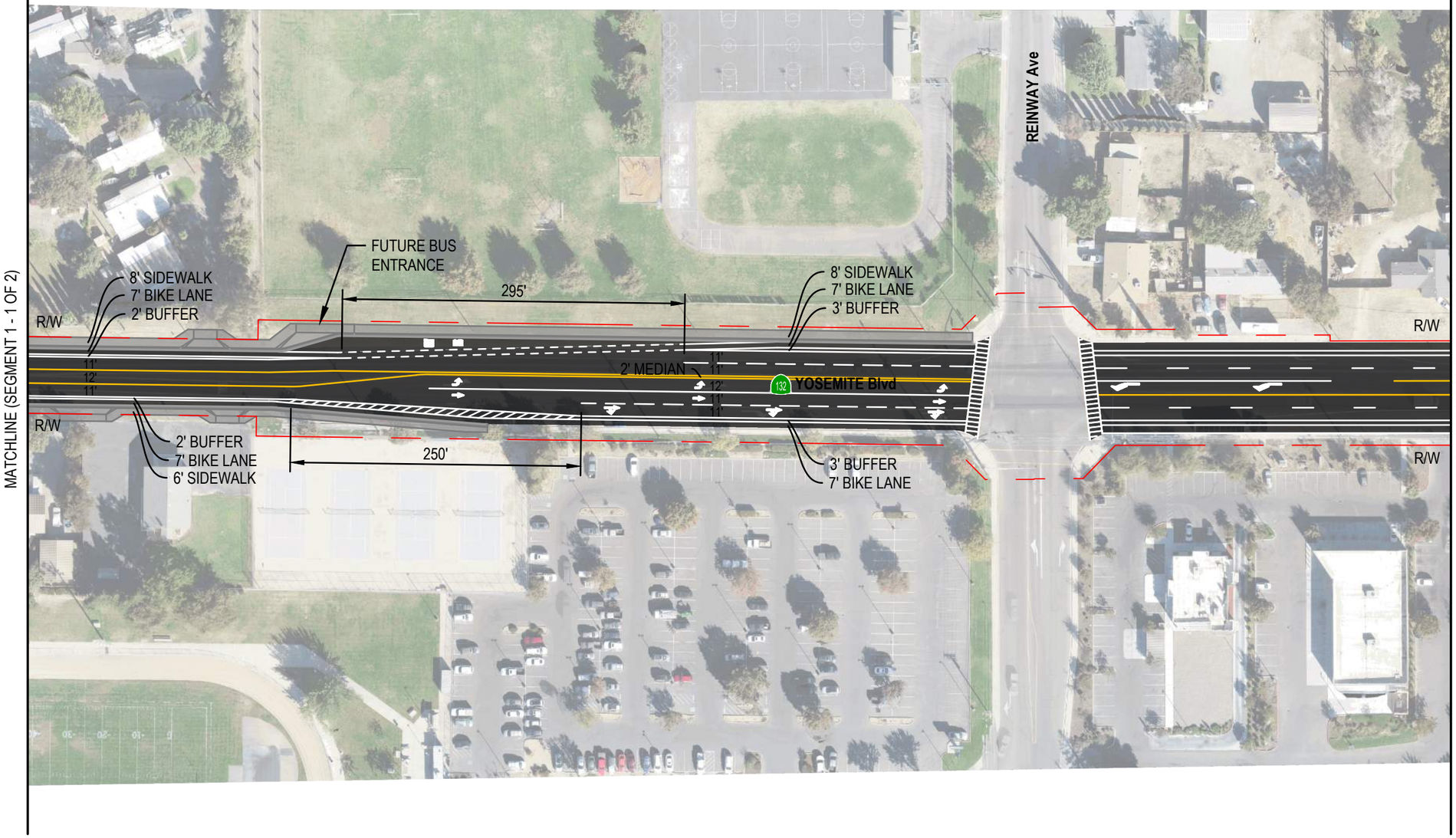

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CITY OF WATERFORD
YOSEMITE Blvd (SR 132) CORRIDOR STUDY

SEGMENT 1
2 OF 2

Project No. **12578643**
Date **7/11/23**

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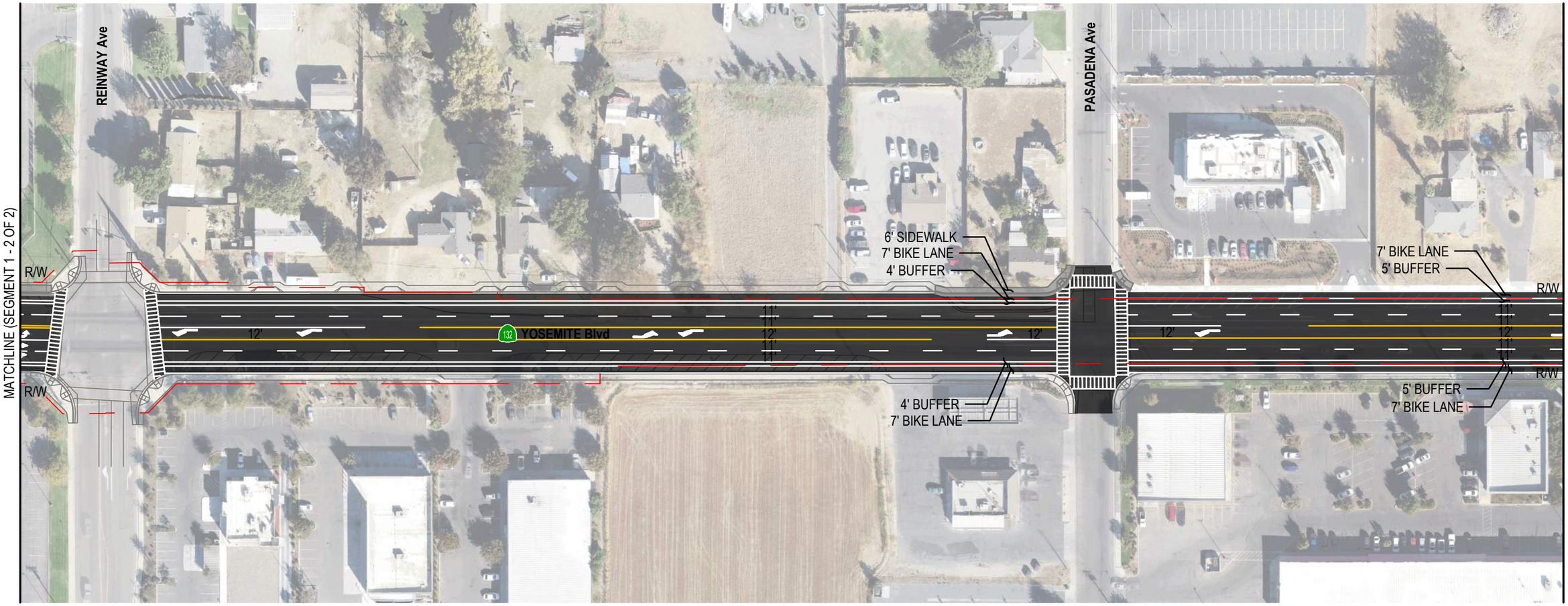

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CITY OF WATERFORD
YOSEMITE Blvd (SR 132) CORRIDOR STUDY

SEGMENT 2
1 OF 3

Project No. **12578643**
Date **7/11/23**

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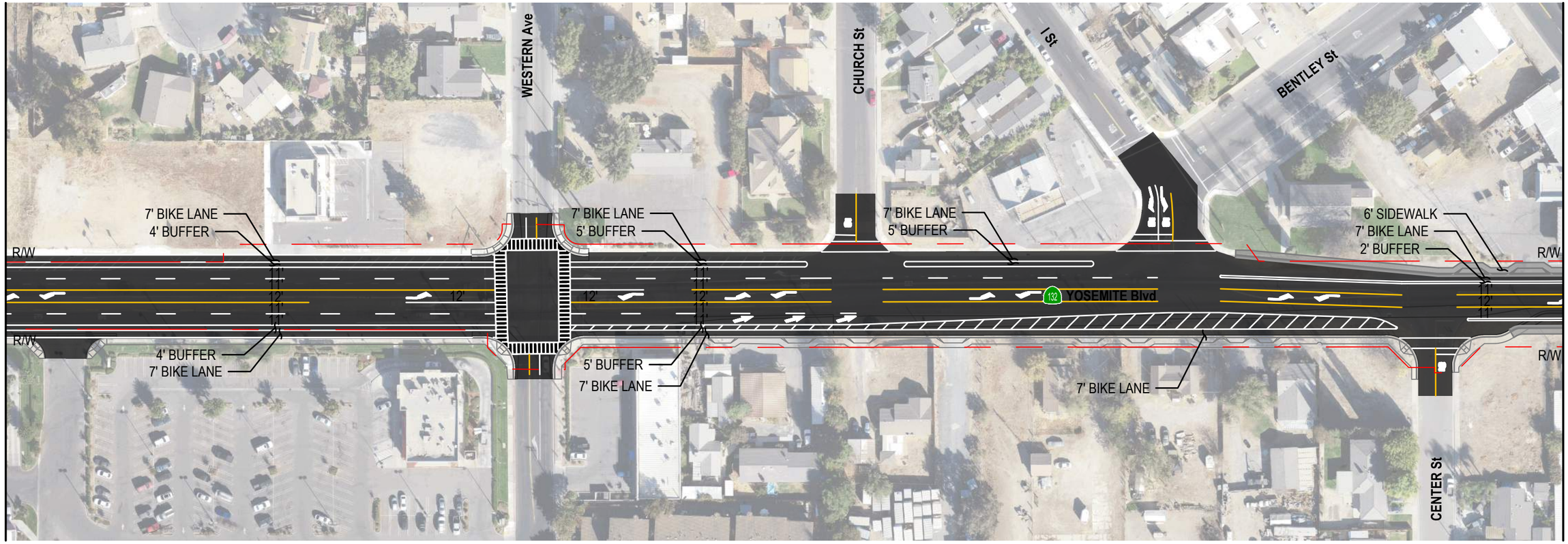

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CITY OF WATERFORD
YOSEMITE BLVD (SR 132) CORRIDOR STUDY

SEGMENT 2
2 OF 3

Project No. 12578643
Date 7/11/23

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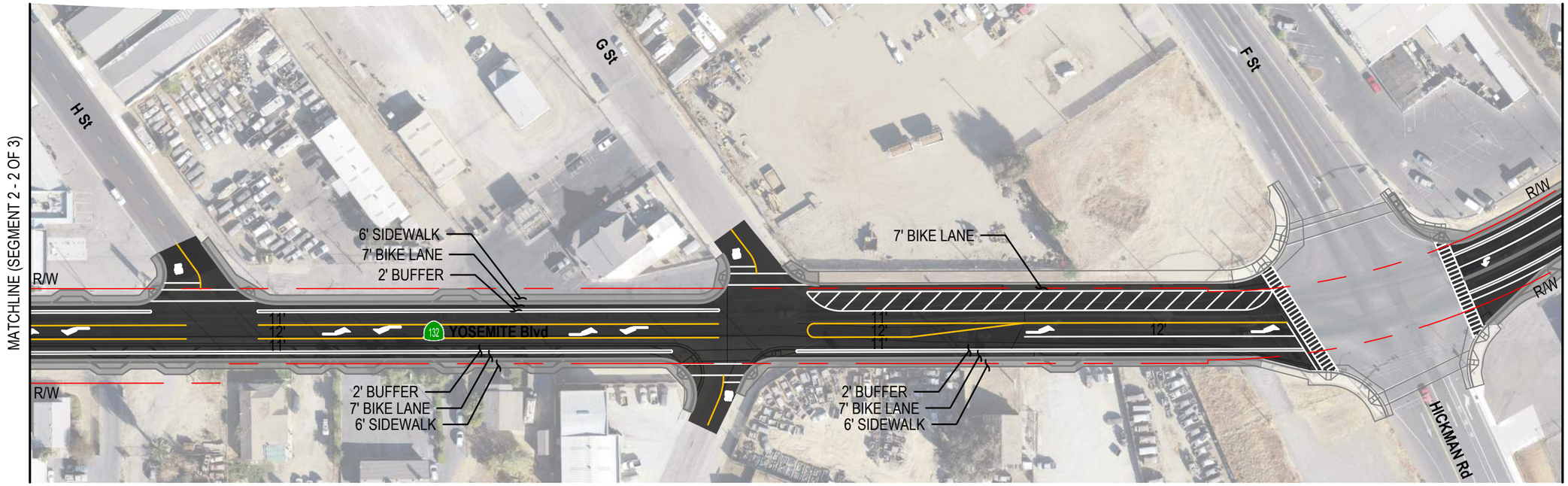

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CITY OF WATERFORD
YOSEMITE BLVD (SR 132) CORRIDOR STUDY

SEGMENT 2
3 OF 3

Project No. 12578643
Date 7/11/23

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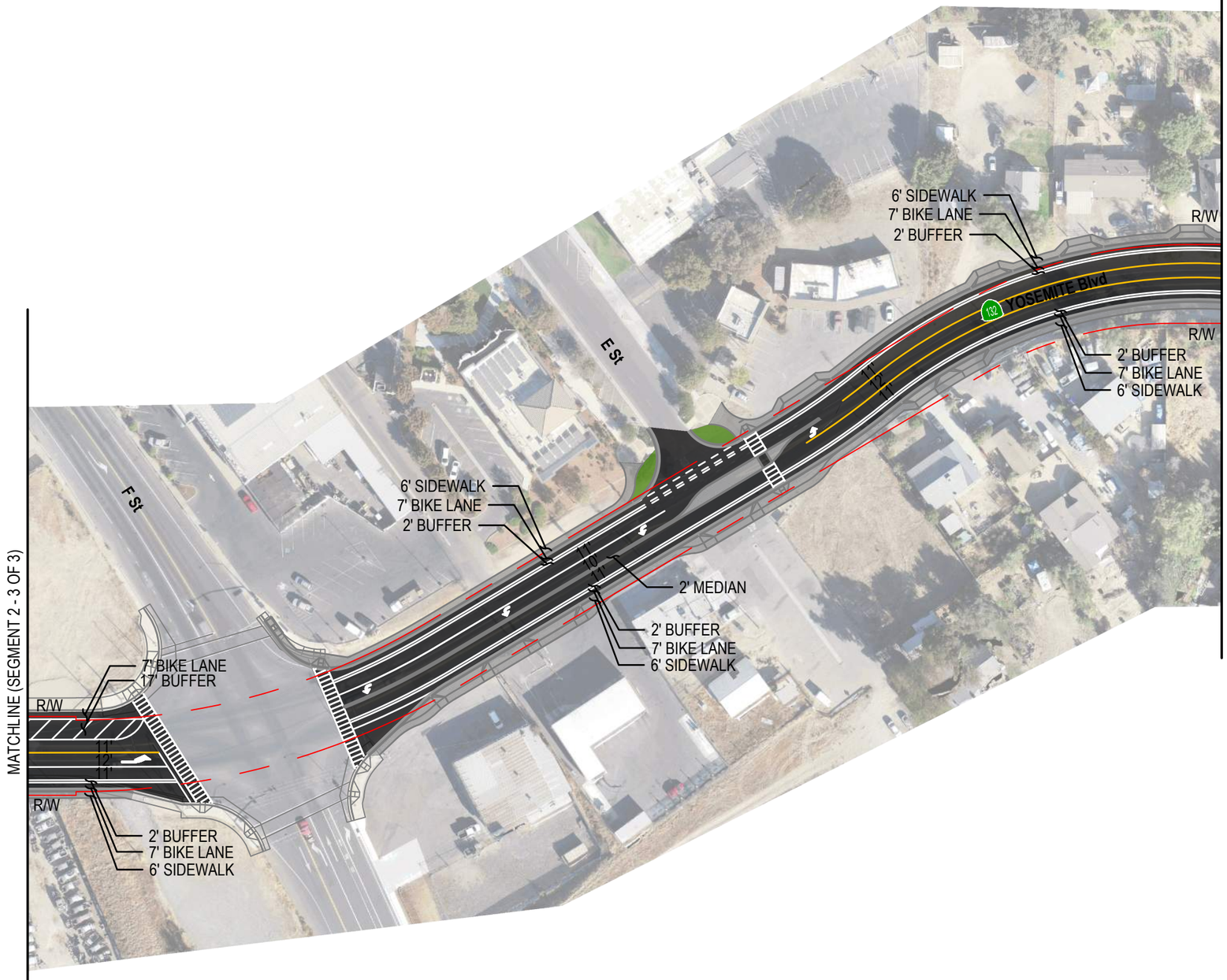

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CITY OF WATERFORD
YOSEMITE Blvd (SR 132) CORRIDOR STUDY

SEGMENT 3
1 OF 8

Project No. 12578643
Date 7/11/23

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CITY OF WATERFORD
YOSEMITE Blvd (SR 132) CORRIDOR STUDY

SEGMENT 3
2 OF 8

Project No. 12578643
Date 7/11/23

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CITY OF WATERFORD
YOSEMITE Blvd (SR 132) CORRIDOR STUDY

SEGMENT 3
3 OF 8

Project No. 12578643
Date 7/11/23

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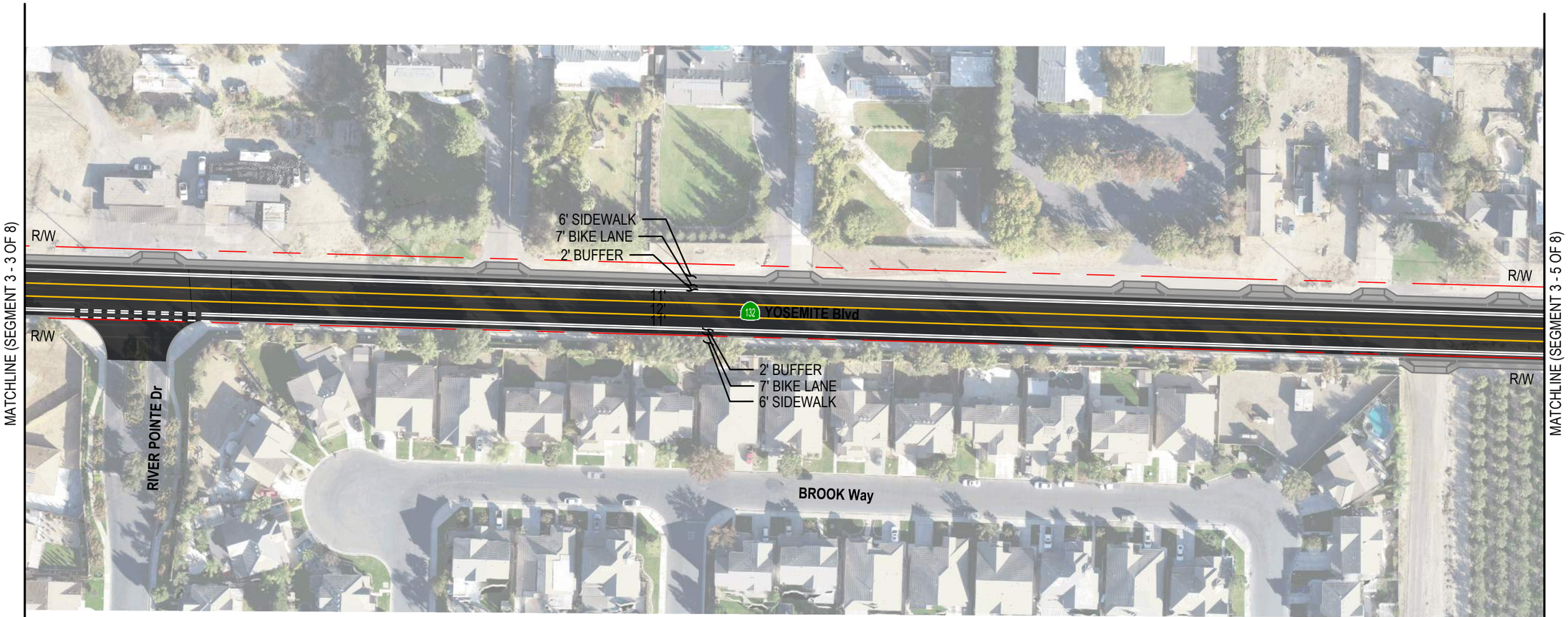

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CITY OF WATERFORD
YOSEMITE Blvd (SR 132) CORRIDOR STUDY

SEGMENT 3
4 OF 8

Project No. 12578643
Date 7/11/23

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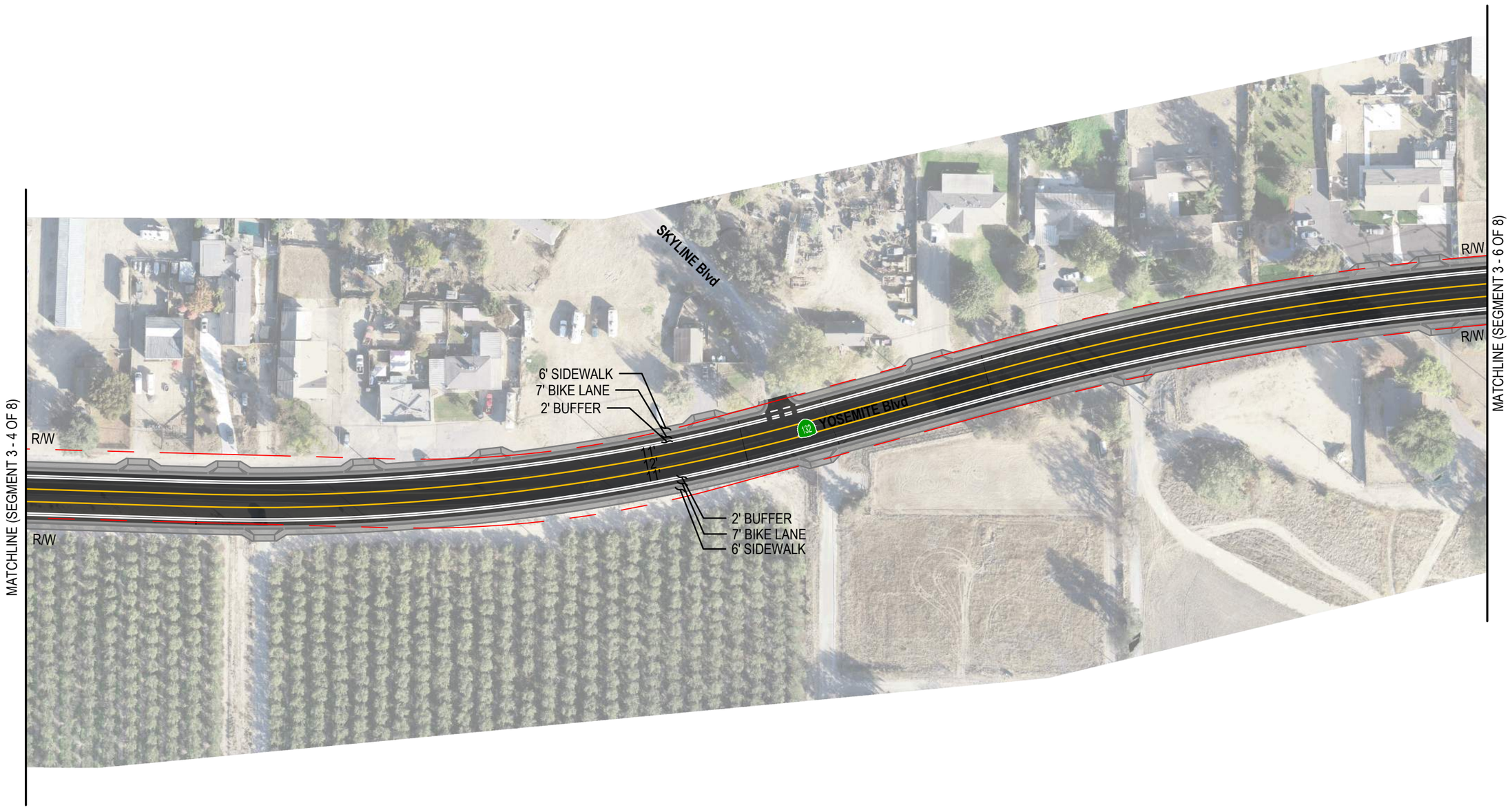

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CITY OF WATERFORD
YOSEMITE Blvd (SR 132) CORRIDOR STUDY

SEGMENT 3
5 OF 8

Project No. 12578643
Date 7/11/23

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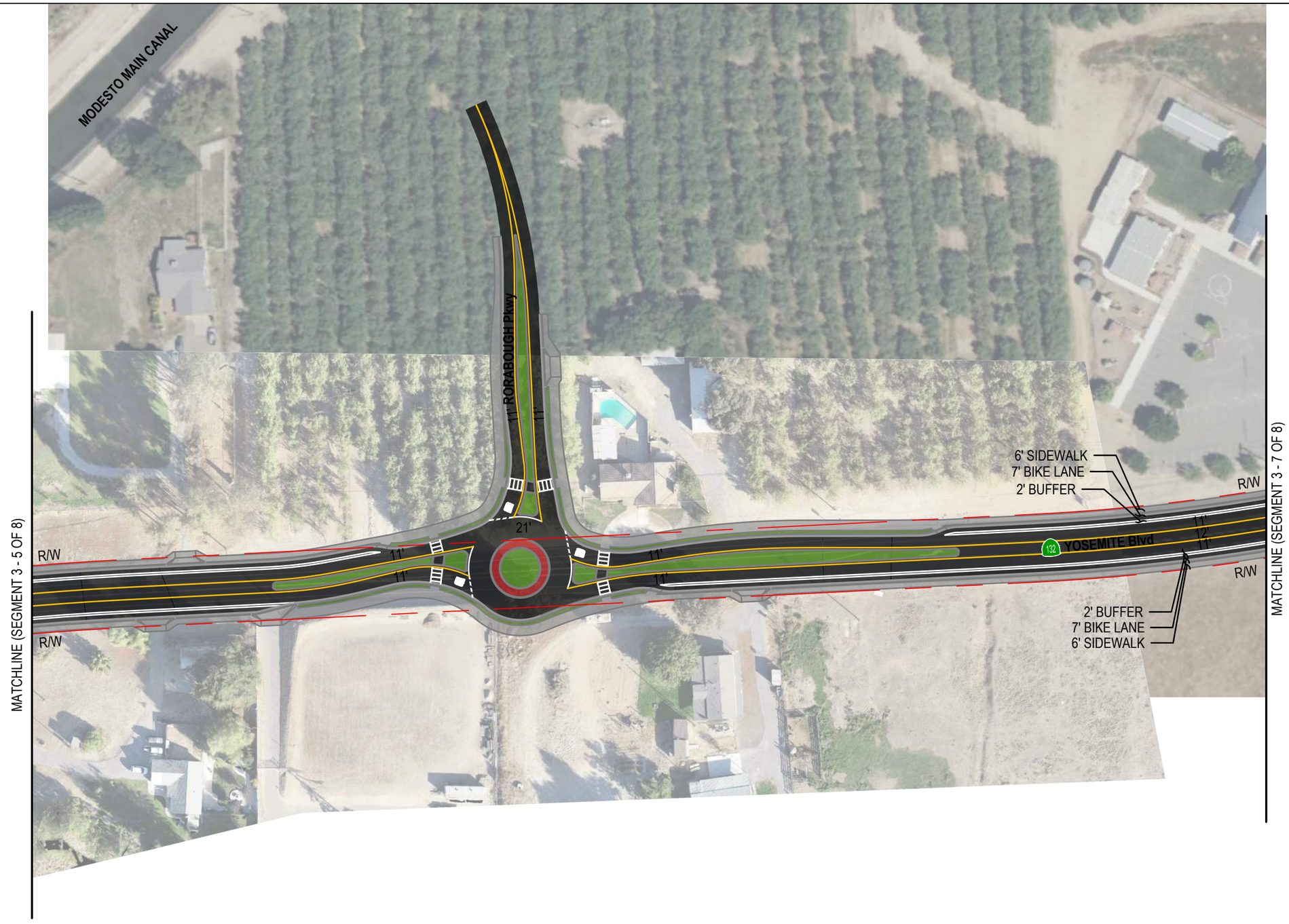

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CITY OF WATERFORD
YOSEMITE Blvd (SR 132) CORRIDOR STUDY

SEGMENT 3
6 OF 8

Project No. 12578643
Date 7/11/23

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CITY OF WATERFORD
YOSEMITE Blvd (SR 132) CORRIDOR STUDY

SEGMENT 3
7 OF 8

Project No. **12578643**
Date **7/11/23**

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CITY OF WATERFORD
YOSEMITE Blvd (SR 132) CORRIDOR STUDY

SEGMENT 3
8 OF 8

Project No. **12578643**
Date **7/11/23**

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Appendix C

Preliminary Cost Estimates

Preliminary Opinion of Costs (Capital & Support)

Yosemite Blvd (SR 132) Corridor Study: *Segment 1A* ***- Roundabout at Eucalyptus***

City of Waterford 8/4/2023

Construction Costs

No.	*Item Description*	*Units*	*Quantity*	*Unit Cost*	*Total*
1	Traffic Control	LS	1	$500,000.00	$500,000.00
2	Hot Mix Asphalt (Type A)	TON	600	$155.00	$93,000.00
3	Class 2 Aggregate Base	CY	0	$100.00	$0.00
4	Pavement Delineation	LS	1	$25,000.00	$25,000.00
5	Minor Concrete (Sidewalk)	SQFT	1,600	$18.00	$28,800.00
6	Minor Concrete (Curb and Gutter)	LF	1,300	$15.00	$19,500.00
7	Minor Concrete (Curb Ramp)	EA	12	$10,000.00	$120,000.00
8	Minor Concrete (Driveway)	EA	1	$15,000.00	$15,000.00
9	Minor Concrete (Raised Median)	SQFT	0	$10.00	$0.00
10	Planting and Irrigation	SQFT	8,500	$8.00	$68,000.00
11	Warning Signage Package	EA	1	$25,000.00	$25,000.00
12	Construct Roundabout	LS	1	$5,000,000.00	$5,000,000.00
13	Remove Sidewalk	LF	0	$25.00	$0.00
14	Signal Upgrades	LS	0	$250,000.00	$0.00
15	Clearing and Grubbing	LS	1	$20,000.00	$20,000.00
16	Adjust Utilities to Grade	LS	1	$20,000.00	$20,000.00
17	Lighting	LS	1	$250,000.00	$250,000.00
18	Drainage	LS	1	$750,000.00	$750,000.00
19	Minor/Supplemental Items	LS	10%	$693,430.00	$693,430.00
20	Mobilization	LS	10%	$693,430.00	$693,430.00
	Subtotal (Construction Costs)				**$8,321,160.00**
	Contingency for Construction Costs			**35%**	**$2,912,406.00**
	Total Construction Costs				**$11,233,566.00**
	Total Construction Budget (Rounded)				**$11,240,000.00**

Right of Way (Capital) and Utility Relocation Costs

1	Right of Way	SQFT	6,325	$15.00	$94,875.00
2	Utility Relocation (by Utility Owner)	LS	1	$220,000.00	$220,000.00
	Total Right of Way (Capital) and Utility Relocation Costs				**$314,875.00**
	Total Project Capital Cost				**$ 11,554,875.00**

Project Support Costs

1	Environmental Clearance (CEQA/NEPA)	LS	Con. Costs	10%	$1,124,000.00
2	PS&E	LS	Con. Costs	10%	$1,124,000.00
3	Right of Way Engineering & Acquisition	LS	Right of Way	25%	$23,800.00
4	Construction Support and Management	LS	Con. Costs	12%	$1,348,800.00
	Total Project Support Costs				**$ 3,620,600.00**
	Total Estimated Project Costs				**$ 15,175,475.00**
	Rounded				**$ 15,200,000.00**

Note that medians, ag base, etc. costs are included in overall roundabout

Preliminary Opinion of Costs (Capital & Support)

Yosemite Blvd (SR 132) Corridor Study: *Segment 1B* ***- Imprvts from Eucalyptus to Reinway***

City of Waterford 8/4/2023

Construction Costs

No.	*Item Description*	*Units*	*Quantity*	*Unit Cost*	*Total*
1	Traffic Control	LS	1	$50,000.00	$50,000.00
2	Hot Mix Asphalt (Type A)	TON	1,400	$155.00	$217,000.00
3	Class 2 Aggregate Base	CY	80	$100.00	$8,000.00
4	Pavement Delineation	LS	1	$25,000.00	$25,000.00
5	Minor Concrete (Sidewalk)	SQFT	2,000	$18.00	$36,000.00
6	Minor Concrete (Curb and Gutter)	LF	2,000	$15.00	$30,000.00
7	Minor Concrete (Curb Ramp)	EA	0	$10,000.00	$0.00
8	Minor Concrete (Driveway)	EA	10	$15,000.00	$150,000.00
9	Minor Concrete (Raised Median)	SQFT	0	$10.00	$0.00
10	Planting and Irrigation	SQFT	0	$8.00	$0.00
11	Warning Signage Package	EA	0	$25,000.00	$0.00
12	Construct Roundabout	LS	0	$0.00	$0.00
13	Remove Sidewalk	LF	0	$25.00	$0.00
14	Signal Upgrades	LS	1	$50,000.00	$50,000.00
15	Clearing and Grubbing	LS	1	$10,000.00	$10,000.00
16	Adjust Utilities to Grade	LS	1	$50,000.00	$50,000.00
17	Lighting	LS	0	$0.00	$0.00
18	Drainage	LS	1	$75,000.00	$75,000.00
19	Minor/Supplemental Items	LS	10%	$70,100.00	$70,100.00
20	Mobilization	LS	10%	$70,100.00	$70,100.00
	Subtotal (Construction Costs)				**$841,200.00**
	Contingency for Construction Costs			**35%**	**$294,420.00**
	Total Construction Costs				**$1,135,620.00**
	Total Construction Budget (Rounded)				**$1,136,000.00**

Right of Way (Capital) and Utility Relocation Costs

1	Right of Way	SQFT	3,050	$15.00	$45,750.00
2	Utility Relocation (by Utility Owner)	LS	1	$100,000.00	$100,000.00
	Total Right of Way (Capital) and Utility Relocation Costs				**$145,750.00**
	Total Project Capital Cost				**$ 1,281,750.00**

Project Support Costs

1	Environmental Clearance (CEQA/NEPA)	LS	Con. Costs	10%	$113,600.00
2	PS&E	LS	Con. Costs	20%	$227,200.00
3	Right of Way Engineering & Acquisition	LS	Right of Way	25%	$11,500.00
4	Construction Support and Management	LS	Con. Costs	20%	$227,200.00
	Total Project Support Costs				**$ 579,500.00**
	Total Estimated Project Costs				**$ 1,861,250.00**
	Rounded				**$ 1,870,000.00**

Preliminary Opinion of Costs (Capital & Support)

Yosemite Blvd (SR 132) Corridor Study: *Segment 2A -* ***Imprvts from Reinway to I St***

City of Waterford 8/4/2023

Construction Costs

No.	*Item Description*	*Units*	*Quantity*	*Unit Cost*	*Total*
1	Traffic Control	LS	1	$200,000.00	$200,000.00
2	Hot Mix Asphalt (Type A)	TON	3,400	$155.00	$527,000.00
3	Class 2 Aggregate Base	CY	200	$100.00	$20,000.00
4	Pavement Delineation	LS	1	$35,000.00	$35,000.00
5	Minor Concrete (Sidewalk)	SQFT	170	$18.00	$3,060.00
6	Minor Concrete (Curb and Gutter)	LF	180	$15.00	$2,700.00
7	Minor Concrete (Curb Ramp)	EA	2	$10,000.00	$20,000.00
8	Minor Concrete (Driveway)	EA	0	$15,000.00	$0.00
9	Minor Concrete (Raised Median)	SQFT	0	$10.00	$0.00
10	Planting and Irrigation	SQFT	0	$8.00	$0.00
11	Warning Signage Package	EA	0	$25,000.00	$0.00
12	Construct Roundabout	LS	0	$0.00	$0.00
13	Remove Sidewalk	LF	160	$25.00	$4,000.00
14	Signal Upgrades	LS	1	$50,000.00	$50,000.00
15	Clearing and Grubbing	LS	1	$20,000.00	$20,000.00
16	Adjust Utilities to Grade	LS	1	$130,000.00	$130,000.00
17	Lighting	LS	1	$50,000.00	$50,000.00
18	Drainage	LS	1	$250,000.00	$250,000.00
19	Minor/Supplemental Items	LS	10%	$131,176.00	$131,176.00
20	Mobilization	LS	10%	$131,176.00	$131,176.00
	Subtotal (Construction Costs)				**$1,574,112.00**
	Contingency for Construction Costs			**35%**	**$550,939.20**
	Total Construction Costs				**$2,125,051.20**
	Total Construction Budget (Rounded)				**$2,130,000.00**

Right of Way (Capital) and Utility Relocation Costs

1	Right of Way	SQFT	29,150	$15.00	$437,250.00
2	Utility Relocation (by Utility Owner)	LS	1	$160,000.00	$160,000.00
	Total Right of Way (Capital) and Utility Relocation Costs				**$597,250.00**
	Total Project Capital Cost				**$ 2,727,250.00**

Project Support Costs

1	Environmental Clearance (CEQA/NEPA)	LS	Con. Costs	10%	$213,000.00
2	PS&E	LS	Con. Costs	15%	$319,500.00
3	Right of Way Engineering & Acquisition	LS	Right of Way	10%	$43,800.00
4	Construction Support and Management	LS	Con. Costs	16%	$340,800.00
	Total Project Support Costs				**$ 917,100.00**
	Total Estimated Project Costs				**$ 3,644,350.00**
	Rounded				**$ 3,650,000.00**

Preliminary Opinion of Costs (Capital & Support)

Yosemite Blvd (SR 132) Corridor Study: *Segment 2B* ***- Imprvts from I St to F St***

City of Waterford 8/4/2023

Construction Costs

No.	*Item Description*	*Units*	*Quantity*	*Unit Cost*	*Total*
1	Traffic Control	LS	1	$150,000.00	$150,000.00
2	Hot Mix Asphalt (Type A)	TON	2,700	$155.00	$418,500.00
3	Class 2 Aggregate Base	CY	600	$100.00	$60,000.00
4	Pavement Delineation	LS	1	$20,000.00	$20,000.00
5	Minor Concrete (Sidewalk)	SQFT	2,200	$18.00	$39,600.00
6	Minor Concrete (Curb and Gutter)	LF	2,200	$15.00	$33,000.00
7	Minor Concrete (Curb Ramp)	EA	6	$10,000.00	$60,000.00
8	Minor Concrete (Driveway)	EA	11	$15,000.00	$165,000.00
9	Minor Concrete (Raised Median)	SQFT	0	$10.00	$0.00
10	Planting and Irrigation	SQFT	0	$8.00	$0.00
11	Warning Signage Package	EA	0	$25,000.00	$0.00
12	Construct Roundabout	LS	0	$0.00	$0.00
13	Remove Sidewalk	LF	1,365	$25.00	$34,125.00
14	Signal Upgrades	LS	1	$100,000.00	$100,000.00
15	Clearing and Grubbing	LS	1	$20,000.00	$20,000.00
16	Adjust Utilities to Grade	LS	1	$120,000.00	$120,000.00
17	Lighting	LS	1	$75,000.00	$75,000.00
18	Drainage	LS	1	$150,000.00	$150,000.00
19	Minor/Supplemental Items	LS	10%	$144,522.50	$144,522.50
20	Mobilization	LS	10%	$144,522.50	$144,522.50
	Subtotal (Construction Costs)				**$1,734,270.00**
	Contingency for Construction Costs			**35%**	**$606,994.50**
	Total Construction Costs				**$2,341,264.50**
	Total Construction Budget (Rounded)				**$2,342,000.00**

Right of Way (Capital) and Utility Relocation Costs

1	Right of Way	SQFT	51,850	$15.00	$777,750.00
2	Utility Relocation (by Utility Owner)	LS	1	$0.00	$0.00
	Total Right of Way (Capital) and Utility Relocation Costs				**$777,750.00**
	Total Project Capital Cost				**$ 3,119,750.00**

Project Support Costs

1	Environmental Clearance (CEQA/NEPA)	LS	Con. Costs	10%	$234,200.00
2	PS&E	LS	Con. Costs	15%	$351,300.00
3	Right of Way Engineering & Acquisition	LS	Right of Way	10%	$77,800.00
4	Construction Support and Management	LS	Con. Costs	16%	$374,800.00
	Total Project Support Costs				**$ 1,038,100.00**
	Total Estimated Project Costs				**$ 4,157,850.00**
	Rounded				**$ 4,160,000.00**

Preliminary Opinion of Costs (Capital & Support)

Yosemite Blvd (SR 132) Corridor Study: *Segment 3A* ***- Imprvts from F St through E St***

City of Waterford 8/4/2023

Construction Costs

No.	*Item Description*	*Units*	*Quantity*	*Unit Cost*	*Total*
1	Traffic Control	LS	1	$150,000.00	$150,000.00
2	Hot Mix Asphalt (Type A)	TON	370	$155.00	$57,350.00
3	Class 2 Aggregate Base	CY	0	$100.00	$0.00
4	Pavement Delineation	LS	1	$15,000.00	$15,000.00
5	Minor Concrete (Sidewalk)	SQFT	940	$18.00	$16,920.00
6	Minor Concrete (Curb and Gutter)	LF	1,015	$15.00	$15,224.75
7	Minor Concrete (Curb Ramp)	EA	4	$10,000.00	$40,000.00
8	Minor Concrete (Driveway)	EA	4	$15,000.00	$60,000.00
9	Minor Concrete (Raised Median)	SQFT	1,800	$10.00	$18,000.00
10	Planting and Irrigation	SQFT	2,000	$8.00	$16,000.00
11	Warning Signage Package	EA	1	$25,000.00	$25,000.00
12	Construct Roundabout	LS	0	$0.00	$0.00
13	Remove Sidewalk	LF	0	$25.00	$0.00
14	Signal Upgrades	LS	0	$0.00	$0.00
15	Clearing and Grubbing	LS	1	$10,000.00	$10,000.00
16	Adjust Utilities to Grade	LS	1	$170,000.00	$170,000.00
17	Lighting	LS	1	$50,000.00	$50,000.00
18	Drainage	LS	1	$150,000.00	$150,000.00
19	Minor/Supplemental Items	LS	10%	$79,349.47	$79,349.47
20	Mobilization	LS	10%	$79,349.47	$79,349.47
	Subtotal (Construction Costs)				**$952,193.70**
	Contingency for Construction Costs			**35%**	**$333,267.79**
	Total Construction Costs				**$1,285,461.49**
	Total Construction Budget (Rounded)				**$1,290,000.00**

Right of Way (Capital) and Utility Relocation Costs

1	Right of Way	SQFT	10,050	$15.00	$150,750.00
2	Utility Relocation (by Utility Owner)	LS	1	$100,000.00	$100,000.00
	Total Right of Way (Capital) and Utility Relocation Costs				**$250,750.00**
	Total Project Capital Cost				**$ 1,540,750.00**

Project Support Costs

1	Environmental Clearance (CEQA/NEPA)	LS	Con. Costs	10%	$129,000.00
2	PS&E	LS	Con. Costs	15%	$193,500.00
3	Right of Way Engineering & Acquisition	LS	Right of Way	10%	$15,100.00
4	Construction Support and Management	LS	Con. Costs	16%	$206,400.00
	Total Project Support Costs				**$ 544,000.00**
	Total Estimated Project Costs				**$ 2,084,750.00**
	Rounded				**$ 2,090,000.00**

Preliminary Opinion of Costs (Capital & Support)

Yosemite Blvd (SR 132) Corridor Study: *Segment 3B* ***- Imprvts from East of E St to Appling***

City of Waterford 8/4/2023

Construction Costs

No.	Item Description	Units	Quantity	Unit Cost	Total
1	Traffic Control	LS	1	$500,000.00	$500,000.00
2	Hot Mix Asphalt (Type A)	TON	1,300	$155.00	$201,500.00
3	Class 2 Aggregate Base	CY	250	$100.00	$25,000.00
4	Pavement Delineation	LS	1	$35,000.00	$35,000.00
5	Minor Concrete (Sidewalk)	SQFT	2,710	$18.00	$48,779.95
6	Minor Concrete (Curb and Gutter)	LF	2,750	$15.00	$41,250.00
7	Minor Concrete (Curb Ramp)	EA	12	$10,000.00	$120,000.00
8	Minor Concrete (Driveway)	EA	17	$15,000.00	$255,000.00
9	Minor Concrete (Raised Median)	SQFT	0	$10.00	$0.00
10	Planting and Irrigation	SQFT	11,000	$8.00	$88,000.00
11	Warning Signage Package	EA	1	$25,000.00	$25,000.00
12	Construct Roundabout	LS	1	$3,000,000.00	$3,000,000.00
13	Remove Sidewalk	LF	0	$25.00	$0.00
14	Signal Upgrades	LS	0	$0.00	$0.00
15	Clearing and Grubbing	LS	1	$50,000.00	$50,000.00
16	Adjust Utilities to Grade	LS	1	$200,000.00	$200,000.00
17	Lighting	LS	1	$250,000.00	$250,000.00
18	Drainage	LS	1	$300,000.00	$300,000.00
19	Minor/Supplemental Items	LS	10%	$513,952.99	$513,952.99
20	Mobilization	LS	10%	$513,952.99	$513,952.99
	Subtotal (Construction Costs)				**$6,167,435.94**
	Contingency for Construction Costs			**35%**	**$2,158,602.58**
	Total Construction Costs				**$8,326,038.52**
	Total Construction Budget (Rounded)				**$8,327,000.00**

Right of Way (Capital) and Utility Relocation Costs

1	Right of Way	SQFT	12,100	$15.00	$181,500.00
2	Utility Relocation (by Utility Owner)	LS	1	$320,000.00	$320,000.00
	Total Right of Way (Capital) and Utility Relocation Costs				**$501,500.00**
	Total Project Capital Cost				**$ 8,828,500.00**

Project Support Costs

1	Environmental Clearance (CEQA/NEPA)	LS	Con. Costs	10%	$832,700.00
2	PS&E	LS	Con. Costs	10%	$832,700.00
3	Right of Way Engineering & Acquisition	LS	Right of Way	15%	$27,300.00
4	Construction Support and Management	LS	Con. Costs	12%	$999,300.00
	Total Project Support Costs				**$ 2,692,000.00**
	Total Estimated Project Costs				**$ 11,520,500.00**
	Rounded				**$ 11,530,000.00**

Preliminary Opinion of Costs (Capital & Support)

Yosemite Blvd (SR 132) Corridor Study: *Segment 3C* ***- Imprvts from Appling to River Pointe***

City of Waterford 8/4/2023

Construction Costs

No.	*Item Description*	*Units*	*Quantity*	*Unit Cost*	*Total*
1	Traffic Control	LS	1	$500,000.00	$500,000.00
2	Hot Mix Asphalt (Type A)	TON	2,100	$155.00	$325,500.00
3	Class 2 Aggregate Base	CY	330	$100.00	$33,000.00
4	Pavement Delineation	LS	1	$35,000.00	$35,000.00
5	Minor Concrete (Sidewalk)	SQFT	3,300	$18.00	$59,400.00
6	Minor Concrete (Curb and Gutter)	LF	4,200	$15.00	$63,000.00
7	Minor Concrete (Curb Ramp)	EA	2	$10,000.00	$20,000.00
8	Minor Concrete (Driveway)	EA	17	$15,000.00	$255,000.00
9	Minor Concrete (Raised Median)	SQFT	0	$10.00	$0.00
10	Planting and Irrigation	SQFT	0	$8.00	$0.00
11	Warning Signage Package	EA	0	$25,000.00	$0.00
12	Construct Roundabout	LS	0	$0.00	$0.00
13	Remove Sidewalk	LF	0	$25.00	$0.00
14	Signal Upgrades	LS	0	$0.00	$0.00
15	Clearing and Grubbing	LS	1	$40,000.00	$40,000.00
16	Adjust Utilities to Grade	LS	1	$20,000.00	$20,000.00
17	Lighting	LS	1	$100,000.00	$100,000.00
18	Drainage	LS	1	$300,000.00	$300,000.00
19	Minor/Supplemental Items	LS	10%	$175,090.00	$175,090.00
20	Mobilization	LS	10%	$175,090.00	$175,090.00
	Subtotal (Construction Costs)				**$2,101,080.00**
	Contingency for Construction Costs			**35%**	**$735,378.00**
	Total Construction Costs				**$2,836,458.00**
	Total Construction Budget (Rounded)				**$2,837,000.00**

Right of Way (Capital) and Utility Relocation Costs

1	Right of Way	SQFT	12,900	$15.00	$193,500.00
2	Utility Relocation (by Utility Owner)	LS	1	$0.00	$0.00
	Total Right of Way (Capital) and Utility Relocation Costs				**$193,500.00**
	Total Project Capital Cost				**$ 3,030,500.00**

Project Support Costs

1	Environmental Clearance (CEQA/NEPA)	LS	Con. Costs	10%	$283,700.00
2	PS&E	LS	Con. Costs	10%	$283,700.00
3	Right of Way Engineering & Acquisition	LS	Right of Way	15%	$29,100.00
4	Construction Support and Management	LS	Con. Costs	15%	$425,600.00
	Total Project Support Costs				**$ 1,022,100.00**
	Total Estimated Project Costs				**$ 4,052,600.00**
	Rounded				**$ 4,060,000.00**

Preliminary Opinion of Costs (Capital & Support)

Yosemite Blvd (SR 132) Corridor Study: *Segment 3D* ***- Imprvts from River Pointe to City Limits***

City of Waterford 8/4/2023

Construction Costs

No.	Item Description	Units	Quantity	Unit Cost	Total
1	Traffic Control	LS	1	$500,000.00	$500,000.00
2	Hot Mix Asphalt (Type A)	TON	4,600	$155.00	$713,000.00
3	Class 2 Aggregate Base	CY	230	$100.00	$23,000.00
4	Pavement Delineation	LS	1	$70,000.00	$70,000.00
5	Minor Concrete (Sidewalk)	SQFT	10,500	$18.00	$189,000.00
6	Minor Concrete (Curb and Gutter)	LF	11,500	$15.00	$172,500.00
7	Minor Concrete (Curb Ramp)	EA	11	$10,000.00	$110,000.00
8	Minor Concrete (Driveway)	EA	23	$15,000.00	$345,000.00
9	Minor Concrete (Raised Median)	SQFT	0	$10.00	$0.00
10	Planting and Irrigation	SQFT	11,200	$8.00	$89,600.00
11	Warning Signage Package	EA	1	$25,000.00	$25,000.00
12	Construct Roundabout	LS	1	$4,000,000.00	$4,000,000.00
13	Remove Sidewalk	LF	0	$25.00	$0.00
14	Signal Upgrades	LS	0	$0.00	$0.00
15	Clearing and Grubbing	LS	1	$40,000.00	$40,000.00
16	Adjust Utilities to Grade	LS	0	$0.00	$0.00
17	Lighting	LS	1	$250,000.00	$250,000.00
18	Drainage	LS	1	$350,000.00	$350,000.00
19	Minor/Supplemental Items	LS	10%	$687,710.00	$687,710.00
20	Mobilization	LS	10%	$687,710.00	$687,710.00
	Subtotal (Construction Costs)				**$8,252,520.00**
	Contingency for Construction Costs			**35%**	**$2,888,382.00**
	Total Construction Costs				**$11,140,902.00**
	Total Construction Budget (Rounded)				**$11,141,000.00**

Right of Way (Capital) and Utility Relocation Costs

1	Right of Way	SQFT	22,700	$15.00	$340,500.00
2	Utility Relocation (by Utility Owner)	LS	1	$240,000.00	$240,000.00
	Total Right of Way (Capital) and Utility Relocation Costs				**$580,500.00**

Total Project Capital Cost	**$**	**11,721,500.00**

Project Support Costs

1	Environmental Clearance (CEQA/NEPA)	LS	Con. Costs	10%	$1,114,100.00
2	PS&E	LS	Con. Costs	10%	$1,114,100.00
3	Right of Way Engineering & Acquisition	LS	Right of Way	25%	$85,200.00
4	Construction Support and Management	LS	Con. Costs	12%	$1,337,000.00
	Total Project Support Costs			**$**	**3,650,400.00**

Total Estimated Project Costs	**$**	**15,371,900.00**
Rounded	**$**	**15,380,000.00**