TOWN OF WINDSOR

Old Redwood Highway Corridor Enhancement Plan

Town of Windsor

January 2022



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Executive Summary

The intent of the Old Redwood Highway Corridor Enhancement Plan ("ORHCEP") is to improve multimodal mobility along the corridor and to support a vibrant economy within the Town of Windsor ("Town"). The ORHCEP assesses current usage and roadway conditions, followed by recommendations for improvements to the segment of Old Redwood Highway located between Starr Road and Shiloh Road. This document will serve as a blueprint to identify and prioritize projects, and to secure funding to help implement elements of the ORHCEP.

The ORHCEP provides the Town with requisite technical information to inform a corridor plan that is compliant with federal, state, and regional funding programs, and possibly other competitive grant programs. In addition, the ORHCEP includes information in alignment with the 2018 Comprehensive Multimodal Corridor Plan Guidelines (California Transportation Commission, December 2018), and operative state and regional transportation planning goals, objectives, and policies of Sonoma County Transportation Authority (SCTA), Town of Windsor, and Caltrans District 4.

The majority of this project took place during the COVID-19 pandemic, which limited the ability to host in-person engagement events. However, the completion of the ORHCEP is a testament to the Town and community's dedication to planning for Complete Streets and the willingness of the project team to find creative ways to engage with stakeholders and collaborate to complete this important project.

Background

This ORHCEP is informed by local, regional, state, and federal guiding documents as well as analysis of traffic conditions, traffic stress, and reported collisions. Key findings from this review and analysis include:

- Intersections along the corridor are a mix of traffic signals and side-street stop controls, with two roundabouts at Windsor Road and at Market Street
- Daily traffic volumes for intersection approaches range from approximately 300 vehicles to over 21,000 vehicles
  - Highest traffic volumes were documented at intersections near the US 101 interchange between Windsor River Road and Lakewood Drive
- People bicycling experience high stress along much of the corridor
  - Highest stress segments were identified at the north and south ends of the corridor where speed limits are 40 mph and bicycle facilities do not provide adequate separation from traffic
  - Lower stress areas were identified in the center of the corridor where speed limits are 30 mph and appropriate bikeways are present; feedback from the community suggests a higher-stress experience near the US 101 interchange than the Level of Traffic Stress methodology indicates
- From 2015-2019, 171 collisions were reported along the study corridor with the largest number (28 collisions) occurring at the US 101 interchanges
  - In addition to the interchanges, higher concentrations of collisions were reported at Windsor River Road (13 collisions), Windsor Road (8), Hembree Lane (8), 3rd Street (6), and Billington Lane (6)
  - When severity of collisions is considered, intersections that may pose the greatest risk for safety are Windsor Road, 2nd Street, 3rd Street, Hembree Lane, and Billington Lane
  - There were nine collisions involving pedestrians and six collisions involving bicyclists
  - One fatal collision was reported north of Godfrey Drive, where a pedestrian was struck by a vehicle
- Several development projects are planned or anticipated to occur near the project corridor which may present opportunities to condition development with implementation of recommendations in the ORHCEP as appropriate; any conditions of approval must have a nexus to the development project

Outreach

A robust public outreach process engaged the Windsor community to ensure the ORHCEP reflects local preferences and priorities. Engagement activities included:

- A Technical Working Group composed of 11 representatives from Caltrans, Town staff from various departments, and emergency responders provided strategic guidance on development of the ORHCEP and recommendations
- Interviews with 20 stakeholders from local community groups and businesses were conducted to gather information on challenges and opportunities for improvements along the corridor
- An online survey and interactive map were circulated to collect community input on locations for improvements and insight on how the community uses the ORH corridor
- Two virtual community workshops were held to introduce the project to the community and review findings from analyses completed for the ORHCEP
- A pop-up event at the Town Green farmers market shared information about different types of pedestrian and bicycle facilities and gathered input on community preferences

Overall, the community expressed a desire for:

- Complete, connected bicycling and walking facilities
- Bicycling and walking facilities that are highly visible, with separation from vehicle traffic
- Safer pedestrian crossings of ORH, including Rectangular Rapid Flashing Beacons (RRFBs) where appropriate
- Safety improvements near the US 101 interchanges
- Improved transit accessibility
- Green markings in bicycle lanes, especially at driveways and other potential conflict points
- Increased maintenance of roadway surfaces and sweeping to keep bicycle lanes free of debris
- Aesthetic and placemaking improvements, including pedestrian-scaled lighting
- Traffic calming measures to reduce vehicle speeds

Recommendations

Recommendations in the ORHCEP include specific bicycle and pedestrian infrastructure projects as well as broad policy and best-practice recommendations related to greening, placemaking, and stormwater. Background analysis and community engagement provided a foundation for development of these recommendations, as well as the subsequent prioritization and implementation plan presented in the final chapters. Based on differing land use and roadway contexts, the corridor recommendations are presented in four distinct segments.

Northern End of Project: Starr Road to Joe Rodota Drive

Recommendations for this segment of the project include:

- Upgrade existing Class II Bicycle Lanes to a Class IV Protected Bikeway between Starr Road and Windsor Road
- Add conflict markings in bikeways at Starr Road, Arata Lane, Miller Lane, Dawn Way, Godfrey Drive, and Woodbine Way
- Add new or enhanced crosswalks at Starr Road, Arata Lane, Rio Ruso, and Dawn Way
- Enhance bus stops at Starr Road, Evergreen Avenue, Rio Ruso, and Woodbine Way

Center of Project: Joe Rodota Drive to Bluebird Drive

Recommendations for this segment of the project include:

- Upgrade existing Class II Bicycle Lanes to Class IV Protected Bikeways from Windsor River Road to US 101 SB Onramp and from Lakewood Drive to Bluebird Drive (continuing into the next segment)
- Add a Class I Multi-Use Path from US 101 SB Onramp to Lakewood Drive, through the US 101 interchange
- Add conflict markings in bikeways at 2nd Street
- Add new or enhanced crosswalks at US 101 SB Onramp, Lakewood Drive, 3rd Street, and Bluebird Drive

Southeast of Project: Alden Lane to Pool Creek

Recommendations for this segment of the project include:

- Upgrade existing Class II Bicycle Lanes to a Class IV Protected Bikeway from Alden Lane (continuing from previous segment) to Pool Creek
- Add conflict markings in bikeways at Hembree Lane, Billington Lane, and Pool Creek
- Add new or enhanced crosswalks at Alden Lane, Thrushwing Avenue, Billington Lane, and Shamrock Court
- Enhance bus stops near Billington Lane and at Shamrock Court

Southern End of Project: Pool Creek to Esposti Park

Recommendations for this segment of the project include:

- Upgrade existing Class II Bicycle Lanes to Class II Buffered Bicycle Lanes from Pool Creek to Shiloh Road
- Add conflict markings in bikeways near Savannah Way, at Kendall Way, and near Esposti Park
- Add new or enhanced crosswalks at Tamara Way and Shiloh Road

1. Introduction

The intent of the Old Redwood Highway Corridor Enhancement Plan ("ORHCEP" or "Plan") is to improve multimodal mobility along the corridor and to support a vibrant economy within the Town of Windsor ("Town"). The ORHCEP assesses current usage and roadway conditions, followed by recommendations for improvements to the segment of Old Redwood Highway located between Starr Road and Shiloh Road. This document will serve as a blueprint to identify and prioritize projects, and to secure funding to help implement elements of the ORHCEP.

The ORHCEP provides the Town with requisite technical information to inform a corridor plan that is compliant with federal, state, and regional funding programs, and possibly other competitive grant programs. In addition, the ORHCEP includes information in alignment with the 2018 Comprehensive Multimodal Corridor Plan Guidelines (California Transportation Commission, December 2018), and operative state and regional transportation planning goals, objectives, and policies of Sonoma County Transportation Authority (SCTA), Town of Windsor, and Caltrans District 4.

The majority of this project took place during the COVID-19 pandemic, which limited the ability to host in-person engagement events. However, the completion of the ORHCEP is a testament to the Town and community's dedication to planning for Complete Streets and the willingness of the project team to find creative ways to engage with stakeholders and collaborate to complete this important project.



2. Background

Recommendations for the Old Redwood Highway corridor were informed by a review of guiding policy and planning documents as well as analysis of traffic, roadway, and collision data. This chapter presents a summary of this background information; additional detail is provided in Appendix A.

2.1 Purpose and Need

Old Redwood Highway (ORH) runs through the middle of Windsor, connecting the Town to shops, businesses, parks, Downtown, and the Town Green. In 2018, the Town adopted the Town of Windsor 2040 General Plan, which describes a vision for Old Redwood Highway to be an active, mixed-use corridor that supports multiple options for travel, including walking and biking, and provides vital connections between the Downtown, other areas of Windsor, and nearby communities. This project builds on that vision by assessing existing conditions along the Corridor between Starr Road and Shiloh Road, gathering community input, and developing recommendations for transportation improvements that will meet the long-term mobility needs of Windsor residents, businesses and visitors.

The primary objectives of the ORHCEP were developed by the Town in conceptualizing the ORHCEP and refined through public involvement during the project. These objectives include:

- Address safety challenges
- Close infrastructure gaps
- Improve user experience for travelers of all modes
- Develop “Complete Streets” recommendations for all modes of travel on Old Redwood Highway
- Support infill development

2.2 Guiding Documents

A literature review of existing plans and programs as they pertain to the Town’s circulation goals, visions, and efforts is a key first step toward developing the ORHCEP. Information applicable to the ORHCEP is summarized in Appendix A for the following documents:

- Town of Windsor 2040 General Plan
- Windsor Station Area/Downtown Specific Plan
- Connecting Central Windsor
- Local Hazard Mitigation Plan
- Sonoma County Climate Action 2020 Plan
- Sonoma County Bicycle and Pedestrian Plan
- Windsor, CA Sustainable Design Assessment: Old Red Going Green
- Town of Windsor Class I Bicycle and Pedestrian Trails Study
- Town of Windsor Bicycle and Pedestrian Master Plan
- Town of Windsor Traffic Impact Fee Study
- Parks and Recreation Master Plan Update 2030
- Storm Drain Master Plan
- Civic Center Visioning Plan
- Windsor Complete Streets Guidelines
- NACTO Urban Street Design Guidelines
- NACTO Urban Bikeway Design Guide
- Toward an Active California: State Bicycle and Pedestrian Plan

2.3 Traffic Conditions

Traffic conditions were evaluated at 33 intersections on the Old Redwood Highway corridor, including documentation of existing traffic controls, daily traffic volumes, and peak hour traffic volumes. Data for each study intersection is presented in Appendix A.

2.4 Level of Traffic Stress

Level of Traffic Stress (LTS) is a suitability rating system for bicycling and walking from the perspective of different subsets of the population, which measures the perceived comfort, safety and convenience associated with bicycling or walking in or adjacent to motor vehicle traffic. The less stressful the experience, and the lower the LTS score, the more likely bicycling is to appeal to a broader segment of the population.

LTS analysis was performed for bicyclists within the study area. The LTS analysis builds upon the gap assessment analysis previously completed by Steven Grover & Associates (SGA), subconsultant on the Project. The gap assessment provides a preliminary assessment of bicycle and pedestrian facilities along the corridor, categorizing corridor segments as “Good,” “Needs Improvement,” or “Poor or Non-existent.” The purpose of this assessment was to serve as a first step in identifying gaps in the corridor’s active transportation infrastructure, as well as provide potential solutions for addressing the identified gaps given adjacent land use, neighborhood context and existing transportation demand.

While the gap assessment provides a baseline evaluation of existing infrastructure along the corridor, the need for a more detailed analysis of the LTS was identified. Some segments categorized as “good” in the initial gap assessment performed by SGA include segments with existing infrastructure that meet minimum design standards; however, minimum design standards that are commonly implemented do not always translate to low stress facilities that support user comfort and perceived safety to the greatest extent feasible.

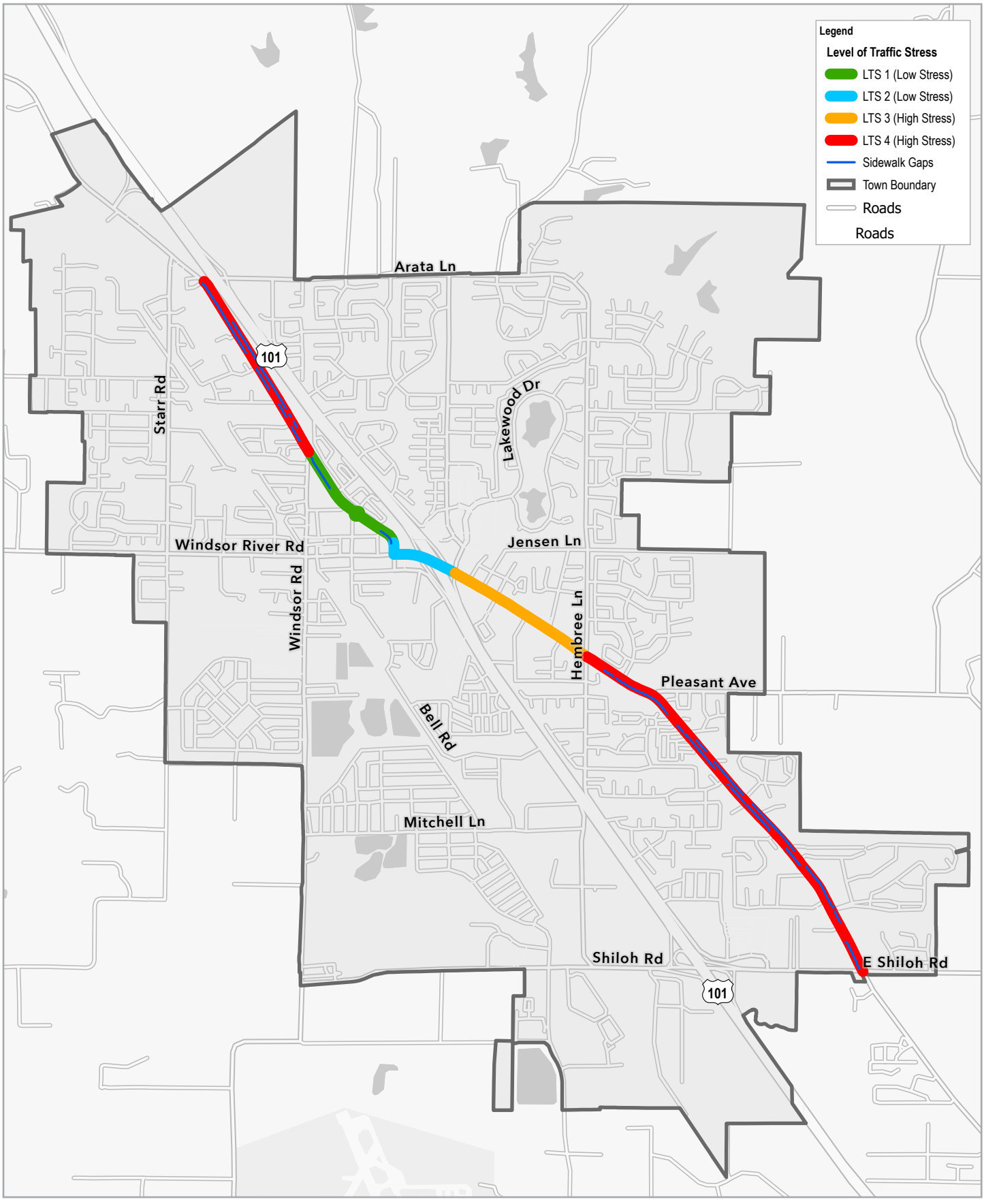
Additional detail on LTS methodology is provided in Appendix A.

2.4.1 Results

The results of the LTS analysis of the ORH corridor is presented in Figure 1. As shown, much of the corridor is considered high stress, featuring LTS scores of 3 or 4. High stress segments bookend the northern and southern sections of the corridor where speed limits are highest (40 mph), and bicycle facilities are inconsistent or do not provide adequate protection from high-volume and/or high-speed vehicular traffic. These segments are also where sidewalk gaps are the most concentrated. While there are no sidewalk gaps along the segment assigned a LTS score of 3, the 35 mph speed limit and limited separation from vehicular traffic in this location may result in high stress for pedestrian users as well.

Conversely, low traffic stress scores of 1 and 2 are seen in the middle segments of the corridor where speeds are lowest (30 mph), and bicycle facilities include improvements such as green painted bike lanes that increase the visibility of active transportation users. Similarly, there are very few sidewalk gaps along these segments. These lower-scored segments do not necessarily reflect the user experience accurately in all situations, however, as there are additional factors that may increase stress that are not captured in the LTS methodology. Based on feedback from the community, the corridor near the US 101 interchange may be a higher-stress experience than the LTS results indicate.

Taken together, the preliminary gap assessment and bicycle level of traffic stress analysis highlight areas of opportunity to upgrade the existing active transportation infrastructure, which could result in improved perceptions of safety and comfort, lower levels of traffic stress and increased levels of walking and bicycling throughout the corridor.



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Town of Windsor
Old Redwood Highway Corridor Enhancement Plan

Project No. **11213480**
Revision No. **-**
Date **Dec 2021**

Level of Traffic Stress

FIGURE 1

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Data source: Human Geography Base: Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA
Human Geography Detail: Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDATransportation
Infrastructure: SCTA. Created by: pthornton

2.5 Collision Analysis

Collision Analysis for the ORHCEP was conducted based on historical collision data within the project limits. The limits for collision analysis on this project include Old Redwood Highway between Arata Lane and Shiloh Road and US 101 interchanges in the Town of Windsor generally at Central Windsor (Lakewood Drive), Arata Lane/Los Amigos Road, and Old Redwood Highway (North of Arata Lane).

Historical data for the most recent and complete five years, a time period from January 1st, 2015 to December 31st, 2019, was collected from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS). During this period, a total of 171 collisions were reported in the project limits with 28 collisions at the US 101 interchanges. These collisions were classified based on collision location (to be roadways on ORH and US 101 interchanges). Collisions along ORH were further categorized into intersection related collisions and roadway segment related collisions.

All collisions were classified by severity, collision type, primary collision factor violation category, and pedestrian/bicycle collisions. Collisions were analyzed based on categories reported by SWITRS and were not geographically verified.

Further information on collisions per intersection and segment is included in Appendix A.

2.5.1 Collision Overview

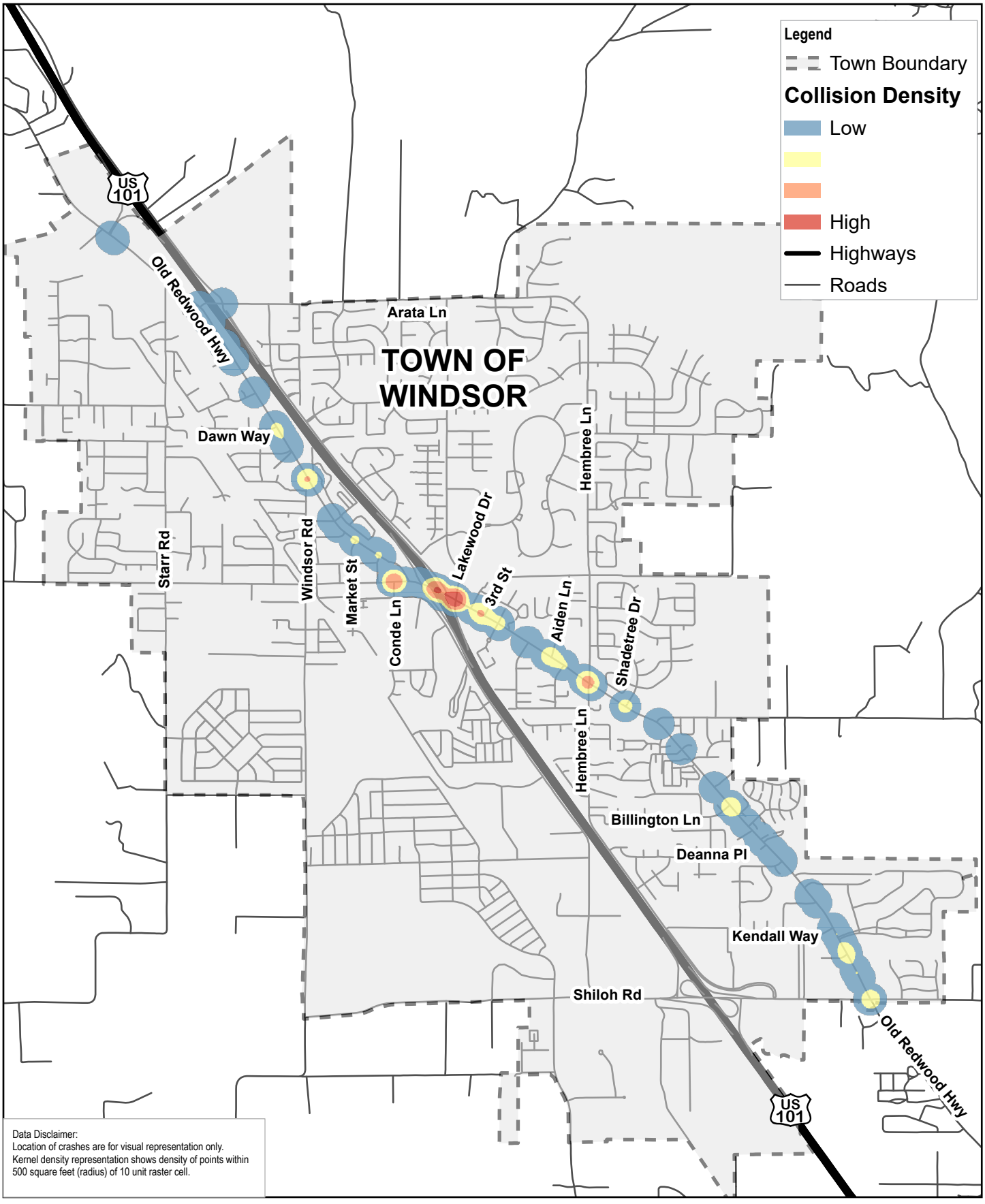
Figure 2 displays a collision density map for all of the collisions within the project area. The largest concentration of collisions is at the US 101 northbound off and on-ramps and Lakewood Drive. Other high incident locations are at Hembree Lane, Conde Lane, Walton Way, and Starr Road. Figure 3 contains a map of collision severity for all of the collisions on ORH and at the US 101 study interchanges. There were one (1) fatal collision and four (4) severe injury collisions. The fatal collision was on ORH north of Godfrey Drive, where a pedestrian was struck by a vehicle. The vehicle was traveling southbound and the pedestrian was traveling eastbound and the violation was "automobile right of way," which means another road user failed to yield the right of way to an automobile. In this area, there are residential land uses on the west side and businesses/commercial land uses on the east side of ORH.

Figure 4 and Figure 5 map the bicycle collisions and pedestrian collisions by severity and lighting conditions within the project limits. In the past five years, there were nine (9) pedestrian related collisions and six (6) bicycle related collisions.

2.5.2 Conclusion

Based on the preliminary collision analysis for the past complete five years, there were one (1) fatal and four (4) severe injury collisions for the ORH and US 101 interchanges. The fatal collision was a pedestrian-vehicle collision that occurred just north of Godfrey Drive and involved a pedestrian crossing ORH, heading east. The top locations for ORH (without interchanges) with high collision severity are Windsor Road, followed by 2nd and 3rd Streets. In further analysis of the type of collisions at ORH and Windsor Road, the main collision type was hit object and there were three (3) DUI collisions. The severe injury collision at this intersection was a single vehicle hit object DUI collision in 2017. Other top intersections on ORH were Hembree Lane and Billington Lane.

In evaluating the US 101 interchange collisions, further collision data from Caltrans would help in properly identifying the collision locations at the interchange, but was not made available to the project team during preparation of the ORHCEP. However, based on the SWITRS data, the Lakewood intersection with the US 101 northbound off and on-ramps had the highest concentration of collisions and highest collision severity. Per field observations and verification on Google Maps, the US 101 northbound on-ramp intersection is approximately 230 feet east of the Lakewood Drive/US 101 northbound off-ramp signalized intersection. This close proximity creates an interface between the two intersections. In addition, the westbound left turns queueing for the southbound US 101 on-ramp often spill back into the northbound on-ramp.



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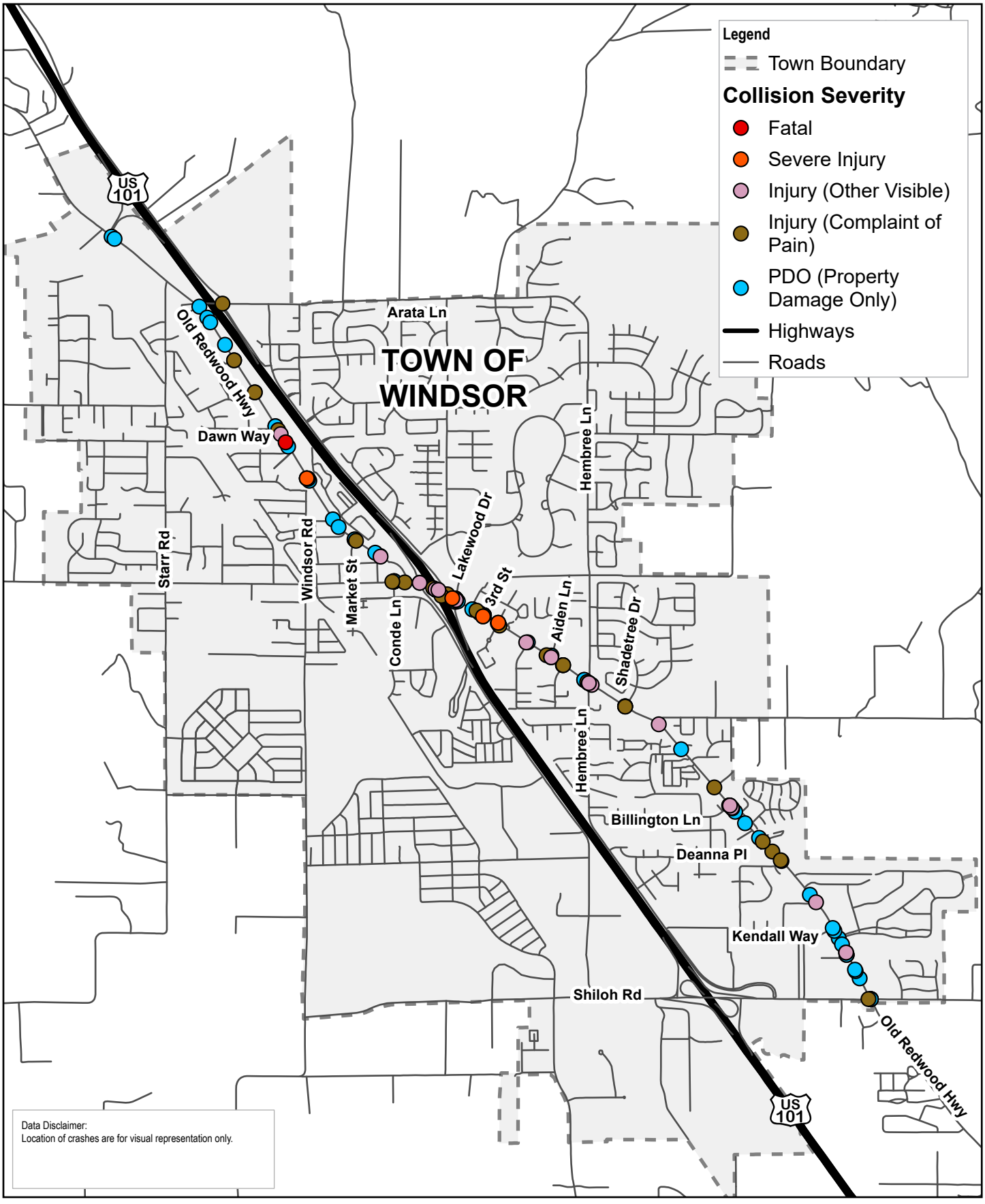
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Revision No. -
Date Jan 2022

Collision Density

FIGURE 2

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Data source: Statewide Integrated Traffic Records System (SWITRS) 2015-2019, Roads: TIGER, 2019.
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Old Redwood Highway Corridor Enhancement Plan

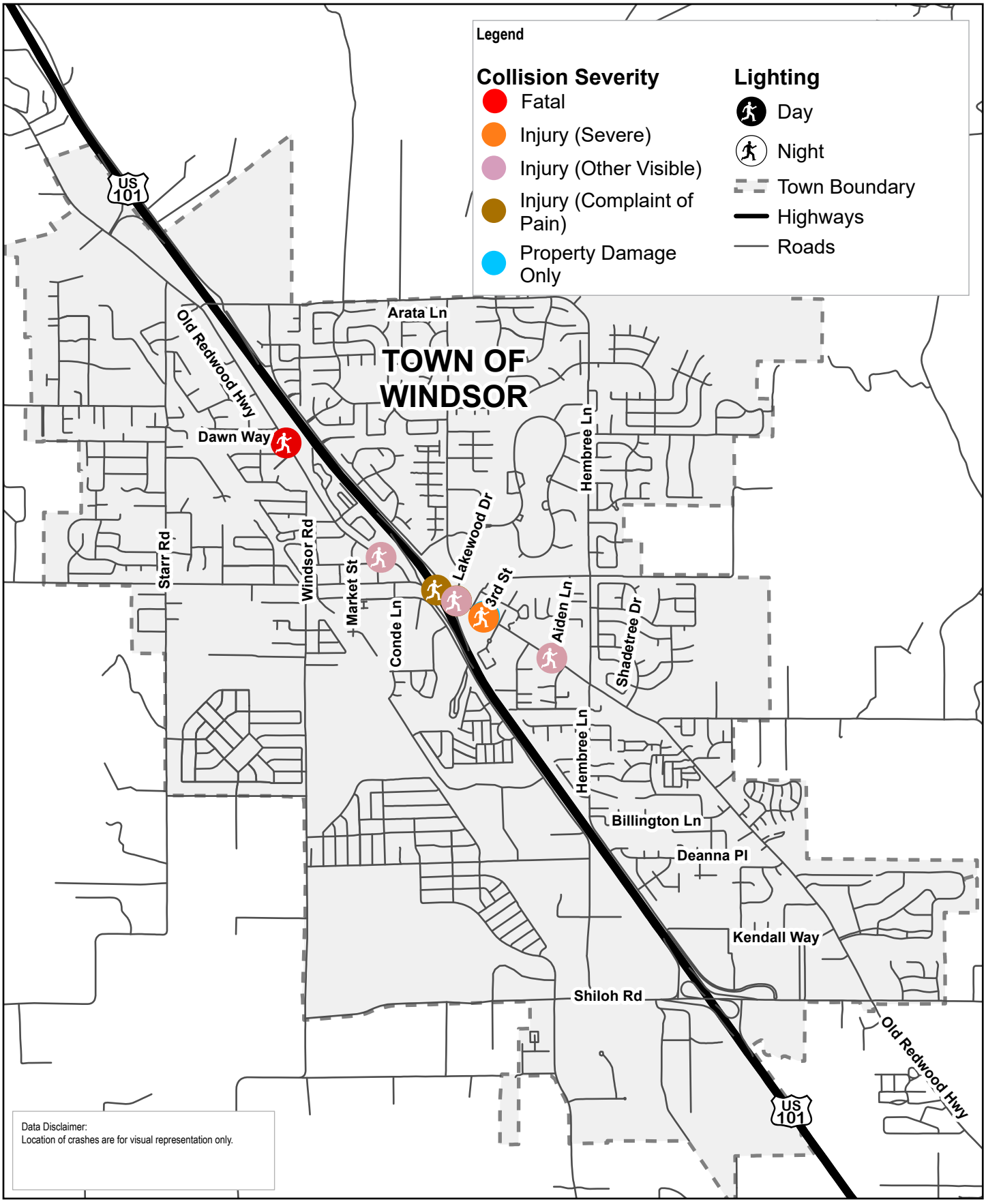
Project No. 11213480
Revision No. -
Date Jan 2022

Collision Severity

FIGURE 3

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Data source: Statewide Integrated Traffic Records System (SWITRS) 2015-2019, Roads: TIGER, 2019.
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Date Jan 2022

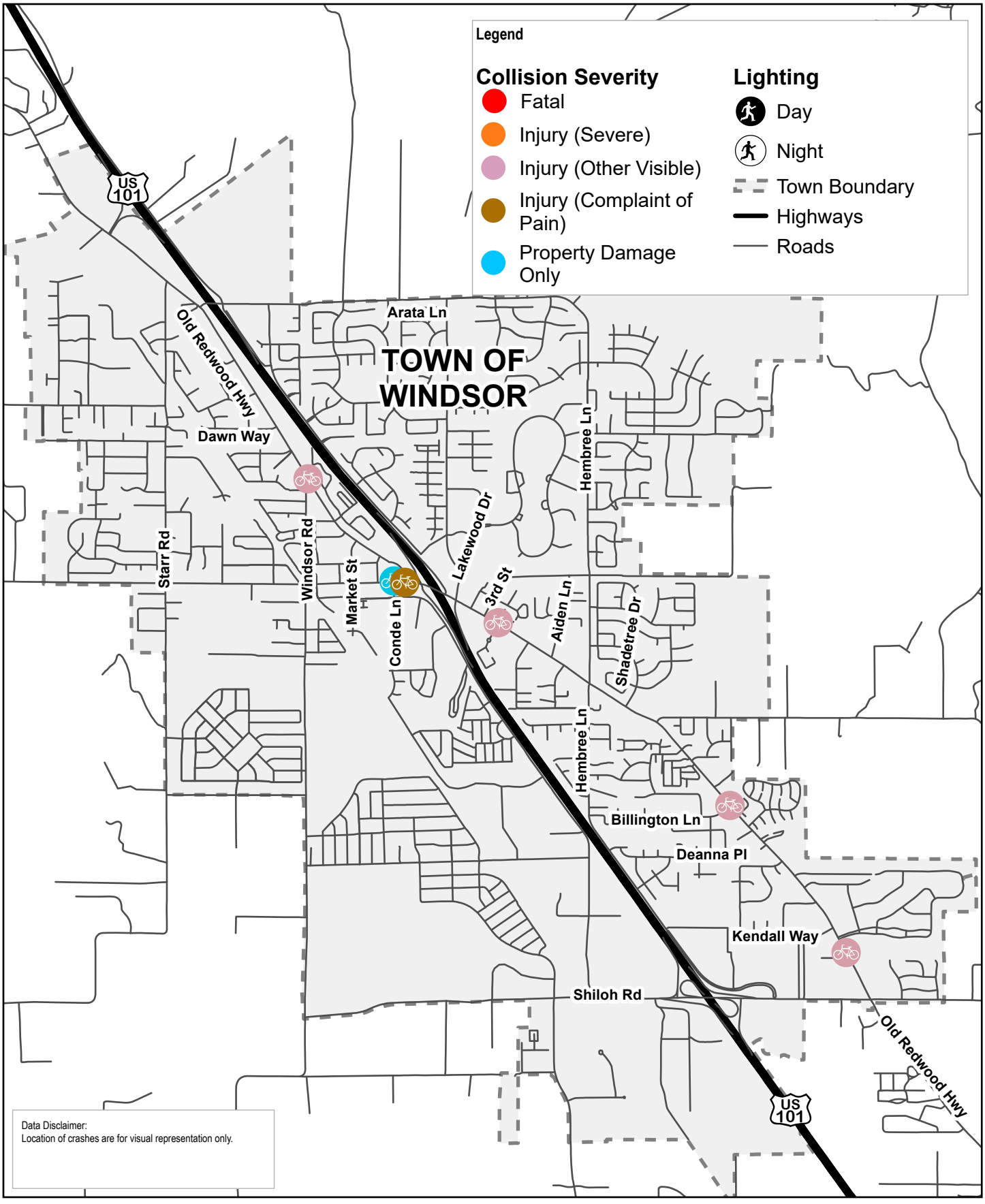
Pedestrian Collisions

FIGURE 4

\\ghdnet\ghd\US\Santa Rosa\Projects\561\11213480\GIS\Maps\Deliverables\11213480_ORHCEP\11213480_ORHCEP.aprx - Figure 4_Pedestrian Collisions_ANSI A

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Data source: Statewide Integrated Traffic Records System (SWITRS) 2015-2019, Roads: TIGER, 2019.
Created by: pthornton



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Town of Windsor
Old Redwood Highway Corridor Enhancement Plan

Project No. 11213480
Revision No. -
Date Jan 2022

Bicycle Collisions

FIGURE 5

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Data source: Statewide Integrated Traffic Records System (SWITRS) 2015-2019, Roads: TIGER, 2019.
Created by: pthornton

2.6 Planned Developments

As part of the ORHCEP, the Project team reviewed information on planned development projects along ORH, provided by the Town. Review included street frontage, site plans, and roadway improvements, if available.

The following planned development projects were identified to be within the surrounding area of the study corridor:

- Chevron
- Windsor Town Green Hotel/“The McClelland”
- Creekwalk
- Vintage Oaks on the Town Green
- 280 Arata Lane Subdivision
- 330 Arata Lane Subdivision
- 6500 and 6516 Old Redwood Hwy Subdivision
- Richardson Street Mixed-Use
- Windsor Gardens
- The Oaks
- Heritage Park Apartments
- Sky Mixed-Use / Apartments
- The Artesian of Windsor
- Shell Station
- Redwood Glen Senior Apartments (Affordable Housing)
- Redwood Views Apartments (Affordable Housing)
- Kashia/Burbank Affordable Housing/Mixed-Use Project

All other planned development was determined to be far enough from the study corridor that it would have no major impacts.

Current and future development of parcels on ORH should incorporate roadway improvements identified in the ORHCEP to the extent possible and in accordance with Town policies. Improvements may also be coordinated with other adjacent roadway improvement projects.

3. Community Outreach & Engagement

The majority of this project took place during the COVID-19 pandemic, which limited the ability to host in-person engagement events. However, the completion of the ORHCEP is a testament to the Town and community's dedication to planning for Complete Streets and the willingness of the project team to find creative ways to engage with stakeholders and collaborate to complete this important project.

3.1 Technical Working Group

A Technical Working Group (TWG) was assembled to provide feedback at key milestones throughout the project. Representatives from Town Departments as well as other agencies in Windsor were invited to participate with the purpose of bringing valuable perspective on community needs, prior efforts, and connections to other key stakeholders. The TWG was convened at the project outset to provide background information on the ORHCEP and solicit feedback, and was provided with updates at key milestones of ORHCEP development to review interim deliverables and provide feedback for their department or organization. In addition, the TWG was provided updates at each public engagement opportunity and asked to spread information about the engagement opportunity to their constituencies. The TWG included eleven representatives, listed in the following table.

Table 1: Technical Working Group

Organization	Name
Caltrans District Staff	Jacob Buffenbarger
Caltrans District Staff	Becky Frank
Town Public Works	Alejandro Perez
Town Public Works	Mona Ibrahim
Town Economic Development	Tim Ricard
Town Police Department	Ruben Martinez
Sonoma County Fire District	Cyndi Foreman
Town Community Development - Planning	Kim Jordan
Town Community Development - Planning	Kim Voge
Town Parks & Facilities	Olivia Lemen
Town Water & Environmental Management	Elizabeth Cargay

3.2 Stakeholder Interviews

Throughout January and February 2021, the ORHCEP Project Team conducted one-on-one interviews with key stakeholders, property owners, and business owners. Interviews with key stakeholders (generally, interested community members and leaders of community organizations) and property and business owners along the Old Redwood Highway were used to gather input from the community on how they use the Corridor, challenges they face when using it, and ideas for improvements. A total of 20 interviews were conducted.

Interviews are summarized briefly in this chapter; a more comprehensive record of interview responses and a list of specific recommendations from the interviews is provided in Appendix B along with a list of individuals who participated.

3.2.1 Key Stakeholder/Community Leader Interviews

Outreach was conducted to key stakeholders who have frequently engaged in prior planning processes to gather initial input on how they use this section of roadway, their opinions and attitudes about it, and their thoughts on possible improvements. These 13 interviews informed additional outreach and contributed to the development of the Pan.

Summary Findings

In general, there was strong agreement among respondents on the existing conditions and issues/impediments on the ORH corridor between Shiloh Road and Starr Road. Specifically, respondents pointed to:

- The inconsistent presence of sidewalks and bike lanes (and associated safety issues)
- Safety concerns with pedestrians crossing ORH
- Pavement/roadway conditions
- Emergency evacuation route issues
- Safety concerns with pedestrians/bicyclists traveling under the US 101 overpass
- Parking issues (primarily future)
- Safety hazard and traffic congestion caused by a lack of bus turnouts
- Some areas do not adequately accommodate buses and other large vehicles (right turn onto Shiloh Road from ORH and existing ORH roundabouts)

Interviewees also mentioned the varying nature of the built environment, ranging from some areas being more fully developed and well-maintained, to others which are less developed and "funky," to more rural sections.

3.2.2 Property and Business Owner Interviews

Numerous businesses exist along the Old Redwood Highway from Starr Road to Shiloh Road. To develop a Corridor Enhancement Plan that meets the diverse needs of the community, including the businesses along the corridor, interviews with business and property owners were conducted. A contact list of 32 business owners was developed in January 2021 and seven interviews were conducted throughout February 2021.

Summary Findings

The property and business owner interviewees identified the following as improvements to be considered in the ORHCEP:

- More green painted bike lanes
- More green conflict striping at driveways and intersection approaches
- Better connected sidewalks
- More marked crosswalks
- Crosswalks with enhanced features like Rectangular Rapid Flashing Beacons or Pedestrian Signals
- Pedestrian-scale lighting
- Enhanced overall safety for pedestrians and families with small children
- Enhance the overall look and feel of the corridor
- Implement enhancements that will bring more customers, visitors, and stable business to Windsor

Challenges that were reported by interviewees included:

- Left turns out of the Chevron near Oliver's Market can be challenging due to congestion and high speeds, which are both experienced on this corridor at varying times

- Limited parking availability in front of Oliver's can cause back-ups when drivers block traffic waiting for a spot and contribute to congestion when drivers circle the area for extended periods looking for parking
- Sidewalks are discontinuous and end abruptly
- Limited foot-traffic to businesses south of the ORH/US 101 Interchange
- Congestion near the Town Green and Oliver's Market
- Back-in parking can be challenging to use during periods of high traffic and the existing spaces in front of Oliver's Market are too narrow for comfort when backing in
- Bicycling can be particularly stressful from Lakewood Drive to Conde Lane, near the ORH/US 101 Interchange; this anecdotal evidence suggests people may experience a higher level of stress than the Bicycle LTS results indicate
- Potholes need to be repaired
- Windsor River Road at ORH is a very busy intersection for cars and pedestrians

3.3 Online Survey and Interactive Map Results

To gather community input about the ORHCEP, an online survey and interactive map were shared on the Project website. The Town circulated information about the survey on its website and via social media, and the project team sent information on the survey and map to identified stakeholders on the project contact list via email. Results of the interactive map and survey are summarized in the following section; additional detail is provided in Appendix B.

3.3.1 Interactive Map Results

Respondents were invited to pinpoint challenging locations and suggestions for improvements on the interactive map. The interactive map allowed users to identify which mode of transportation their comment was related to (bicycling, walking, driving, transit, or circulation in general) or if it was a general comment. Respondents could also 'like' or 'dislike' comments made by others. A total of 38 comments were received, including 18 pedestrian-related comments, four bicycle-related comments, six transit-related comments, three circulation related comments, three driving-related comments, and six general comments.

Some themes among comments include a desire for better connected sidewalks, wider bike lanes, more marked crosswalks, more crosswalks with Rectangular Rapid Flashing Beacons (RRFBs), and enhanced facilities and amenities at transit stops such as shade structures and benches. Commentors indicated a desire for improved multimodal access to local schools, parks, shopping, dining, and the Town Green. Commentors also indicated that speeding is a problem throughout the corridor.

3.3.2 Survey Results

With input from Town staff and the Technical Working Group (TWG), GHD developed an online survey to understand the community's concerns about challenges along the Old Redwood Highway Corridor. The survey was available from February to April of 2021. A total of 49 responses were received.

Despite some of the challenging conditions for people using active transportation and transit, people regularly walk, bike, and take transit on ORH. Nearly two-thirds of respondents indicated that they walk and bicycle along the corridor at least occasionally, and ten percent of respondents walk the corridor every day. Despite high rates of walking and biking along the corridor, respondents did not report high levels of safety or comfort when walking and biking. Only four percent of respondents said they feel 'very safe' when walking or running on ORH, and only two percent said they feel 'very safe' when bicycling on the corridor. Respondents could select multiple features of the roadway that make it feel unsafe. The features with the most responses included lack of sidewalks, traffic congestion, driver behavior, lack of bike lanes, and lack of appropriate/safe street crossings. The survey is summarized in greater detail in Appendix B.

3.4 Community Workshops

Two community workshops were held during the course of this planning effort. The first workshop was held on March 8, 2021, with a total of 20 participants from the community. The second workshop was held on April 8, 2021, with a total of 24 participants from the community. Both workshops were held virtually due to COVID-19 restrictions.

3.4.1 Workshop 1

Workshop 1 included a presentation of the project purpose and an overview of findings on existing conditions along the corridor. Community members were engaged throughout the meeting and were asked to respond to several polling questions. The polling questions were related to participants' understanding of the primary challenges facing the ORH corridor, identification of the most challenging locations along the corridor, and the ways in which they would like to see the corridor improved. Overall, responses to the polling questions indicated that community members would like to see better connections between bicycle lanes and sidewalks, improved crosswalks, a cohesive and inviting aesthetic, and reduced congestion, specifically at the US 101 interchange, along the ORH corridor. The ways in which the community would like to see the corridor improved are illustrated in the following word cloud image, where word size corresponds to occurrence of public support.

Figure 6: Word Cloud of Workshop 1 Feedback on Priorities for Corridor Improvements



3.4.2 Workshop 2

Workshop 2 included a presentation to review the project purpose and provide initial findings related to the multimodal access and experience assessment. The community members participated in "breakout groups" (smaller discussion groups) to discuss the vision for the ORH corridor related to the following topics:

- Topic 1: Urban Streetscapes: What makes a good urban streetscape? – One commenter noted in the chat that the trees along ORH define the space as a room or hallway.
- Topic 2: Rural Streetscapes: Think of the rural places you've visited that were friendly to cyclists and pedestrians. What made it work?
- Topic 3: Coherence: How can we achieve a coherent design along the different segments of ORH? One participant suggested maybe tree species contribute to that. Then presented the concept of natural, rural, suburban, urban contexts and that a mixture of those will apply to ORH, but we can still strive for coherence through colors, amenities, light posts, etc.
- Topic 4: Placemaking: Small public spaces and amenities along bicycle and pedestrian routes create a more pleasurable and inviting environment.

Community input provided in the 1st "breakout group" focused on beautifying the ORH corridor to encourage community activity, ensuring that bicycle lanes are buffered or protected from motor vehicles, and to avoid changing the rural character by removing trees to add sidewalk.

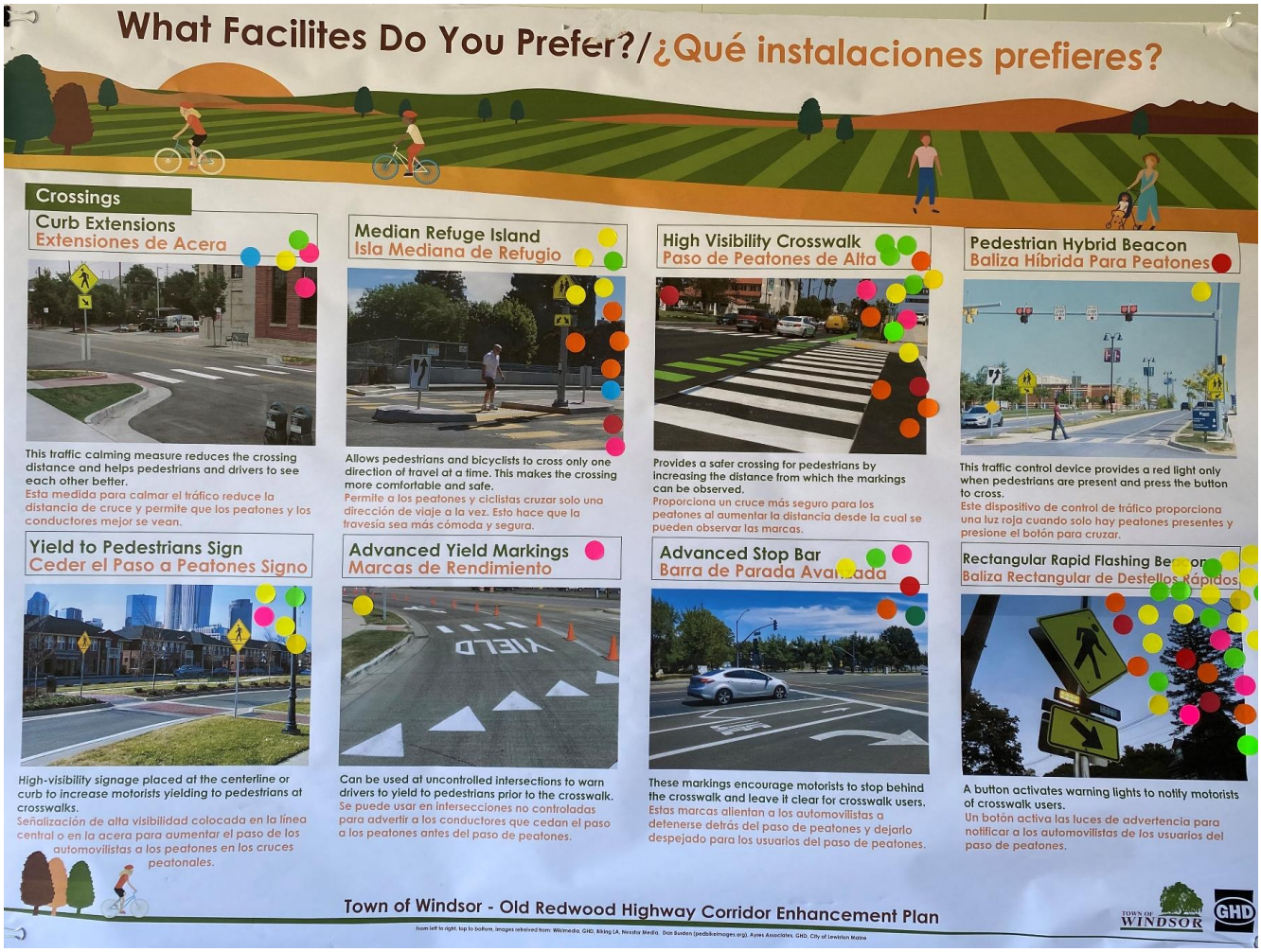
Community input provided in the 2nd "breakout group" focused on the importance of maintaining on-street parking, the desire to avoid turning the ORH corridor into a freeway, and the need for both sidewalks and streetlights.

3.5 Pop-Up Event

A Pop-Up event was held at a community farmers market located in Town Green on September 19, 2021. Project staff set up boards providing project background, and presenting bicycle and pedestrian facility types, as well as greening and placemaking concepts for review. The public was asked to show preferences for facility/concept type by placing sticky dots next to preferred concepts/facilities. The following images depict the boards with sticky dots after the conclusion of the event.

Pop-Up Board Example 1: What Facilities Do You Prefer?

As shown in the following image, the community expressed a strong desire for improved pedestrian crossings, with a majority prioritizing Rectangular Rapid Flashing Beacons (RRFBs), high visibility crosswalks, and median refuge islands.



Pop-Up Board Example 2: What Facilities Do You Prefer?

As shown in the following image, the community expressed a strong desire for a Class I (Separated Path) facility over on-street bicycle facilities. For on-street bicycle facilities, preference was given for protected bikeways or buffered bicycle lanes with visibility treatments such as green paint.



4. Plan

The focus of the ORHCEP is to reimagine and revitalize the ORH corridor to improve multimodal mobility and support a vibrant local economy. It follows a Complete Streets framework, seeking to create a roadway which is safe, convenient, connected, and accessible for people using all modes of travel including walking, bicycling, driving, public transit, and personal mobility devices. It also incorporates best practices in active transportation planning and design, including recommendations for bicycle and pedestrian. Recommendations for Old Redwood Highway within this document should be considered to be complimentary to prior studies for the corridor.

The preceding chapters of this document all contributed to development of the recommendations presented here. The first section of this chapter presents best practices and more general recommendations for Old Redwood Highway, intended to be applied along the corridor as opportunities arise moving forward. The second section describes specific recommendations for Complete Streets infrastructure projects, architectural and greening treatments, and stormwater infrastructure are outlined for each of the four corridor segments.

4.1 Best Practices and General Recommendations

This section presents information on best practices related to Complete Streets, Architecture and Greening, and Stormwater Infrastructure. Where appropriate, general recommendations are also outlined that should be applied along the corridor as a whole as opportunities present themselves.

4.1.1 Bicycling and Walking Facilities

Bicycling and walking facilities include both linear features such as bikeways and sidewalks, which extend along a corridor, as well as crossing and “spot” features that are located at a specific point.

Bicycle Facilities

Bikeway planning and design in California relies on guidelines and standards established in the Caltrans *Highway Design Manual*. There are four “classes” of bicycle facilities that provide varying levels of separation from other modes of travel and comfort for bicyclists. These classes are described on the following page.

Class I Multi-Use Path

Class I Multi-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.



Photo: www.pedbikeimages.org / Matthew Rufo

Class II Bicycle Lanes

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.



Photo: www.pedbikeimages.org / Brandon Whyte

Class III Bicycle Route

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

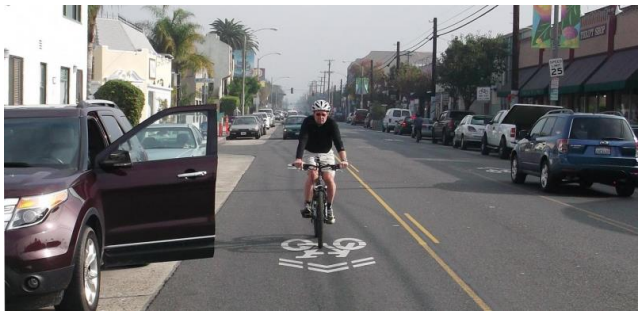


Photo: www.pedbikeimages.org / Dan Gutierrez

Class IV Separated Bikeways

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.

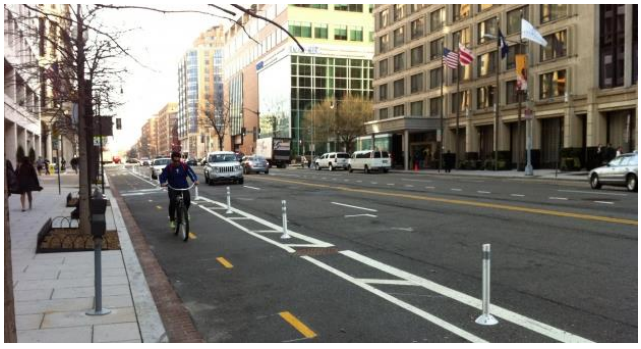


Photo: www.pedbikeimages.org / Megan Kanagy

Pedestrian Facilities

Together with Class I Multi-Use Paths, described above, sidewalks form the backbone of the pedestrian transportation network. Widths may vary by location, but along Old Redwood Highway the preferred cross section includes a six-inch curb, four-foot area with tree wells, and an eight-foot clear walkway for a total width of 12 feet six inches. At a minimum, sidewalks must be four feet wide to meet accessibility standards.

Pedestrian scaled lighting is recommended in the ORHCEP. Pedestrian-scaled lighting consists of streetlights mounted on poles 10-15 feet tall and spaced 15-30 feet apart, creating a well-lit and inviting space for pedestrians during dusk/dawn and dark hours. In addition to making the street more appealing, pedestrian scaled lighting can also reduce crime by better lighting the pedestrian environment compared to conventional street lighting that is scaled for drivers.

Crossings and Spot Improvements

In addition to linear bicycle and pedestrian facilities, the ORHCEP includes a number of “spot” improvements at crossings or other locations. Many of the items described in this section benefit both bicyclists and pedestrians, as well as drivers. Types of improvements in the ORHCEP include:

Bicycle Boxes

Bicycle Boxes are queueing areas for bicyclists that are placed in front of the vehicle queue at a traffic signal, allowing bicyclists to position themselves ahead of drivers and proceed into the intersection first when the light turns green. They reduce conflicts with turning vehicles and make it easier for bicyclists to make left turns.



Photo: www.pedbikeimages.org / Toole Design Group

Bicycle Detectors

Bicycle Detectors are systems that sense the presence of a bicyclist at a traffic signal and trigger a green phase. Common types of bicycle detection include in-pavement loops, video, infrared, and microwave. Pavement markings should be implemented that show bicyclists where to position themselves to be detected. Push-button systems that require a bicyclist to press a button to request a green phase are no longer considered best practice.



Photo: www.pedbikeimages.org / Russ Roca

Bus Stop Enhancements

Bus Stop Enhancements include pavement markings for bus turnouts, “no parking” signs or markings at bus stops, and amenities such as seating or shelters. These treatments reduce conflicts and increase the attractiveness of transit by making stops more comfortable.

See section 4.2.1 Corridor Recommendations for information on Sonoma County Transit standard shelter specifications.



Photo: www.pedbikeimages.org / Adam Coppola Photography

Conflict Markings

Conflict Markings are green sections of bicycle lanes used to highlight locations where drivers should pay extra attention to bicyclists. They are typically used where bicycle lanes cross driveways or intersections, or where vehicles are merging or turning right across a bicycle lane.



Photo: www.pedbikeimages.org / Toole Design Group

Crossing Enhancements

Crossing Enhancements include treatments at marked crossings that improve safety or comfort. They can include markings like advance stop bars, which discourage drivers from encroaching on the crosswalk, or signal adjustments like leading pedestrian intervals (LPIs) which give pedestrians a ‘head start’ into the crosswalk before vehicles get a green light, making them more visible to drivers.



Photo: www.toronto.ca / City of Toronto

Crosswalk Markings

Crosswalk Markings can be standard ‘transverse’ crosswalks that consist of two parallel lines, or high-visibility ‘continental’ markings that consist of bold crossbars placed parallel to the roadway. Transverse and continental markings may also be combined to create high-visibility ‘ladder’ crosswalks. In school areas, crosswalks are yellow.



Photo: www.nacto.org / National Association of City Transportation Officials (NACTO)

Curb Extensions

Curb Extensions increase visibility of pedestrians at crossings by expanding the sidewalk into the parking aisle. This moves pedestrians further into the field of view for drivers before the pedestrian steps off the curb into the roadway. Curb extensions also have a traffic calming effect by visually narrowing the roadway.



Photo: www.azmag.gov / Maricopa Association of Governments

Pedestrian Refuge Islands

Pedestrian Refuge Islands are raised medians placed on either side of a crosswalk, providing a safe place for pedestrians to wait and breaking a long crossing into multiple shorter crossings.



Photo: www.pedbikeimages.org / Dan Burden

Protected Intersections

Protected Intersections improve safety for people walking and bicycling at signalized intersections by providing protected waiting areas at marked crossings that are forward of the vehicle stop line, improving visibility and reducing potential turning conflicts.



Photo: www.nacto.org / National Association of City Transportation Officials (NACTO)

Rectangular Rapid Flashing Beacons

Rectangular Rapid Flashing Beacons (RRFBs) are pedestrian-activated devices used to facilitate crossings at midblock or uncontrolled locations (locations without a traffic signal or stop sign). RRFBs include bright amber rectangular lights that flash in an alternating pattern when a pedestrian pushes a button, increasing visibility of the crossing and alerting drivers that a person is about to cross. The beacon is dark when not activated.



Photo: www.pedbikeimages.org / Lara Justine

Roundabouts

Roundabouts are a type of intersection that reduces conflicts for all modes of transportation. Drivers circulate around a central island, yielding to traffic already in the circulating lane. Pedestrians have well-marked crossings set back from the circulating lane, allowing drivers to yield to a person crossing before pulling forward to enter the roundabout. Bicyclists typically have the option to either merge with drivers and travel through the roundabout as a vehicle or access a shared use path via a ramp and navigate using the path and marked crossings.



Photo: www.pedbikeimages.org / Toole Design Group

4.1.2 Architecture and Greening

In his book *Great Streets*, Allan Jacobs writes that streets should be more than conduits for traffic and treated as more than a basic utility. Beyond providing an opportunity to be outdoors, streets are places for social encounters and commercial exchange. A large proportion of the public realm is comprised of streets. Therefore, designing streets that are attractive public spaces, accessible and fulfilling for all users, and serve as community-building places would also have a large impact on the design of the broader urban environment. According to Jacobs, great streets contribute to and reflect the community, are comfortable and safe, encourage participation in civic life, balance all modes of transportation, and are memorable.

This section describes streetscape elements that support the design of great streets. Mini-places, human-scaled design features, entry features, trees and landscaping, bus stop amenities, street furniture and lighting, and hardscape elements can all work together along the ORH corridor to encourage active transportation, make walking and bicycling safer and more comfortable, provide spaces for social engagement, make small, usable public spaces along the corridor, and generally make the corridor more visually coherent.

Mini Places

Mini Places along pedestrian and bicycle pathways invite people to pause, take in a view, rest, meet, park bikes, and enjoy the outdoors. These shared spaces can be as simple as a bench under a shade tree, or a bike rack next to a wayfinding sign. They should be thoughtfully located where people might naturally pause and where different transportation modes mix. While mini places come in a variety of shapes and sizes, there are five key features that make mini places successful:

– Passive space that is easily accessible yet outside of primary circulation paths
– Protected from wheeled traffic
– Defined by elements such as edges, objects, landscaping, or hardscape
– Have seating
– Have open sight lines

Additional recommended features typically include trees or canopies that provide shade, trash receptacles, pedestrian lighting, and a point of interest such as artwork or a commemorative marker. Annotated examples of mini-places are provided on the following pages.



At the landing of the Berkeley Bike Bridge, a plaza with seating provides space for cyclists and pedestrians to rest and take in the view.



Along the Ohlone Greenway in El Cerrito, public tables and exercise equipment provide shared recreation opportunities.



Smaller spaces can serve as a place to meet or bid farewell before heading in different directions.



Seating and other pedestrian-oriented features can also be incorporated into mini places for placemaking in unique spaces.

Reference Example: **Intersection of Noe Street & 14th Street | San Francisco, CA**

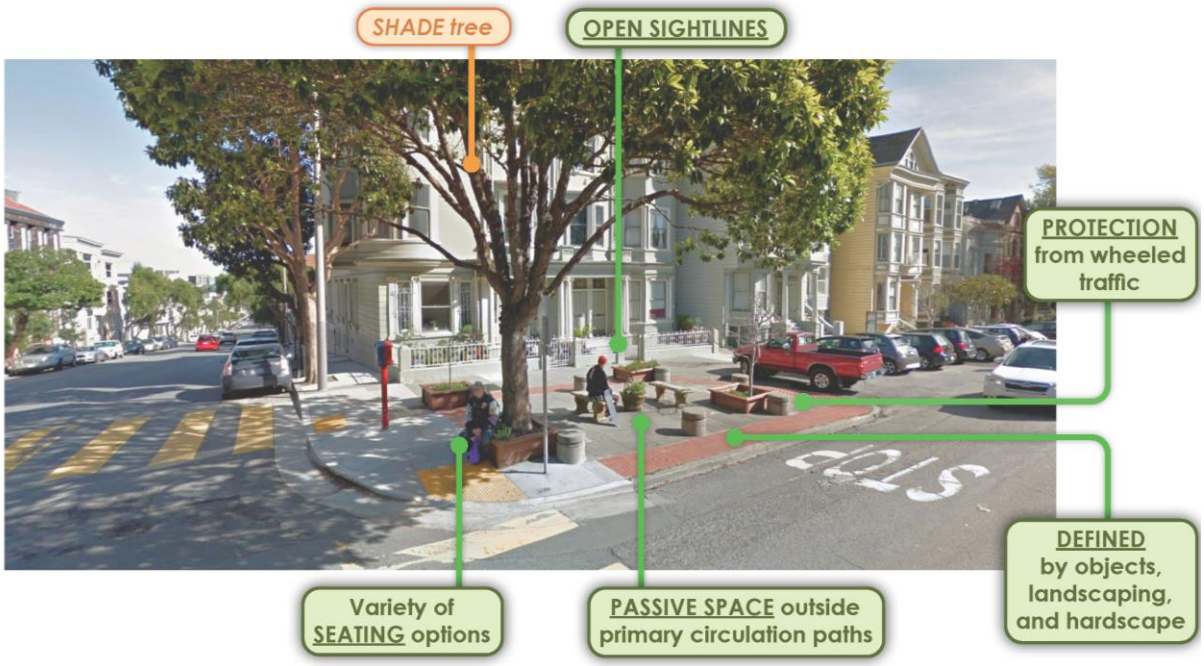


Image Source: Google

Reference Example: **Intersection of S Lake Park Avenue & E 55th Street | Chicago, IL**



Image Source: Google

Reference Example: **Mid-Block Crosswalk at 2980 Broadway | New York, NY**

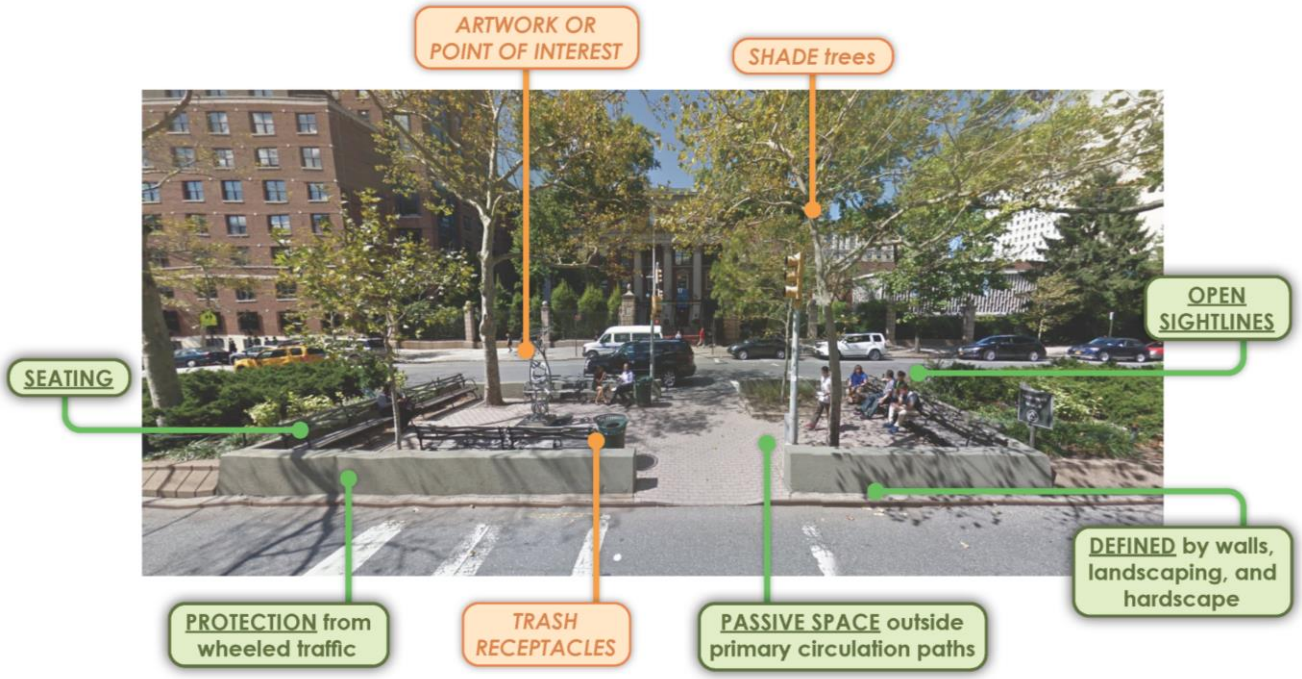


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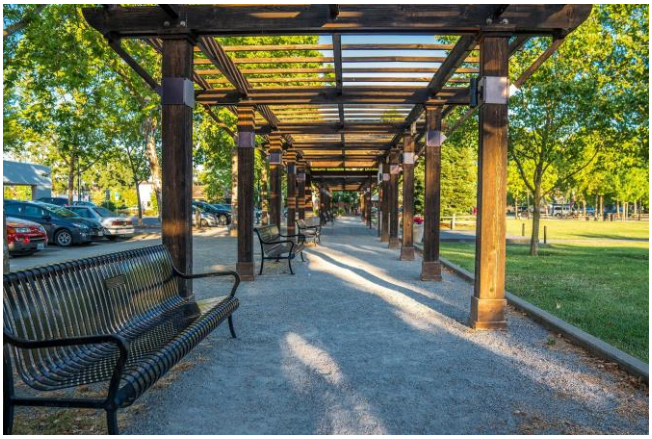
Human-Scaled Design Features

The Town Green is designed with many human-scaled architectural features that improve user experience at the ground level and spark interest. These features include place markers, plaques, pergolas, banners, benches, bike racks, fountains, textures and patterns in wood and concrete, and alleys of trees and light fixtures.







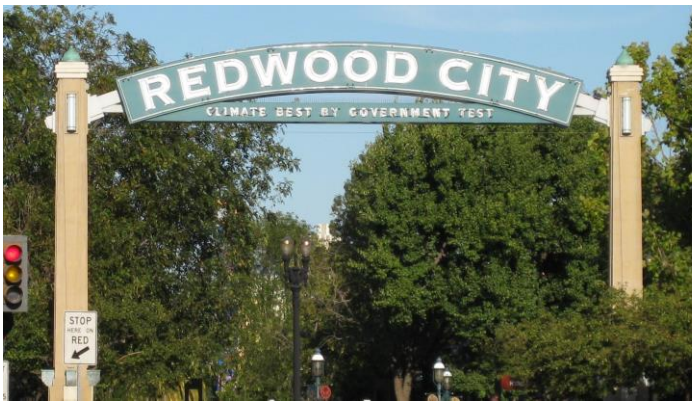


During the project's Farmers Market outreach event conducted on September 19, 2021, community members expressed that the Town Green's entry features, water feature, wooden arbors, and gazebo were the elements best associated with Windsor.

Corridor Entry Features

Entry features convey a sense of arrival and help with wayfinding. The examples illustrate how different communities have designed entry features.





As a feature to indicate that one has arrived or exited Windsor, community members expressed that an arch and signage entry feature might be more appropriate than a stone cairn or pylon signage.



Design elements included in the monument at Windsor River Road could be adapted and developed for use along the ORH Corridor.



Banners celebrating the Town's Hometown Heroes decorate light poles in the Central Windsor area.

Trees and Landscaping

Trees and landscaping reduce stormwater runoff, improve air quality, store carbon, serve as habitat for wildlife, provide shade, and reduce urban heat island effects. Trees and landscaping also provide a distinct, yet soft, visual edge to corridor spaces. Street trees with flowers and/or arching canopies can create colorful "outdoor halls," while landscaping treatments can incorporate stormwater and drainage features.

The Town acknowledges that its wide variety of native and non-native trees gives Windsor a unique visual character by being a source of beauty, providing shade and other environmental benefits, enhancing property values, creating a community identity, and generally enhancing the quality of urban life. Committed to protecting existing trees and planting new ones, the Town has adopted a Tree Preservation and Protection Ordinance, which regulates the protection, preservation, maintenance, and removal of protected trees. Where sidewalks are recommended in locations with existing trees, care should be taken to preserve trees consistent with the Town's ordinance.





Flowering trees such as cherries and jacarandas provide a splash of color while delineating a corridor.





Community members at the Farmers Market outreach event express a strong preference for trees and the natural and colorful spaces they create along a corridor, as well as bioretention or stormwater control elements that could also serve as water features.



The ORH Corridor already includes segments where trees create beautiful canopies, and this quality could be extended throughout the corridor by selecting the appropriate trees that provide canopy coverage.

Bus Stop Amenities

To the extent feasible, every bus stop along the ORH Corridor should include a standard shelter and amenities that meet guidance from Sonoma County Transit. A standard shelter includes a bus turnout with the appropriate pavement markings, including no parking signs/markings, a bench, schedule kiosk and informational signage.

See Appendix E for additional Sonoma County bus turnout specifications. Additional specifications related to ADA Accessibility can be found at https://www.ada-compliance.com/ada-compliance/810-transportation-facilities.

Recommendations for new or upgraded shelters at specific locations are listed in Section 4.2 of this chapter.



Bus stops which are outfitted with a standard shelter and appropriate amenities provide a comfortable place for riders to rest as well as protection from the weather and sun while waiting to be picked up.



Bus boarding areas feature rider orientation information, including Sonoma County Transit signage and schedule information, plus delineate curbside access for bus priority.

Street Furniture and Lighting

Street furniture includes streetscape elements such as light fixtures, banners, benches, fountains, artwork, bike racks, trash receptacles, and signage. People-oriented elements are often incorporated into mini places and allow people to rest and enjoy the atmosphere.





Street furniture can also be symbolic, conveying historical features of a corridor, such as how a series of bells identify the El Camino Real, or markers identify the Lincoln Highway.



A mini place in Menlo Park combines furniture and planters.



A mini place along ORH adjacent to Bell Village includes street furniture in the form of a bench, trash receptacle, bike rack, seat walls, wayfinding signage, bollard and pole-mounted light fixtures, and a water fountain. These amenities should be incorporated into the design of other mini places along the corridor, as appropriate.



Community members expressed a desire for distinctive light fixtures, which can create a coherent visual edge, such as shown here along an Italian Street. In Windsor, pedestrian-scaled lighting along sidewalks frequently takes the form of acorn-style pole-mounted light fixtures.

Hardscape Elements

Hardscape elements, such as particular textures and colors of concrete, gravel, and brick help define the character of a roadway corridor. Hardscape helps to establish patterns for different activity “zones.” Changes in surface textures can provide tactile interest at the human scale, while changes in pavement textures can notify drivers of the need for awareness.



At the ORH and Windsor Road roundabout, stone pavers define a special “place.”



Along ORH, exposed aggregate or pebble concrete softens the sidewalk, while a low rock wall and picket fence provide human-scaled elements to the barrier over Windsor Creek.





Texture and color can be added to intersections, crosswalks, and roadway shoulders to improve visibility and designate and/or delineate different "zones" for use.





In Central Windsor, the Town Green includes different concrete textures and colors, which convey pathway options and provide visual and tactile interest.





Along Old Redwood Highway, pavement changes in texture, color, and material highlight crosswalks and bikeways.

4.1.3 Stormwater Infrastructure Recommendations

Low Impact Development (LID) design should be incorporated into the street design from the beginning to allow for optimal placement both for water treatment and maintenance operations. Early LID design is optimal to help in determining street tree placement and spacing in order to allow for larger areas of LID facilities to be installed and reduce the number of facilities that would require maintenance.

The project is located within the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Boundary. The project is anticipated to need to incorporate permanent Storm Water Best Management Practices (BMPs), as required by the NPDES MS4 Permit when the creation or replacement of a combined total of 10,000 square feet (SF) or more of impervious area occurs. Additional requirements of hydromodification may be required if the project proposes over an acre of impervious area. Projects will be required to comply with applicable adopted standards at the time of implementation.

Runoff Reduction Measures

The LID manual lists multiple runoff reduction measures that will allow for a reduction of tributary areas if the measures are incorporated into the project.[1] The most applicable runoff reduction measure for this project will be Interceptor Trees. Credit for tributary area can be taken based on the number of new trees installed, with deciduous trees receiving a credit of 100 SF per tree and evergreen trees receiving a credit of 200 SF per tree. Coordination should occur between the stormwater and landscape design to optimize tree locations to allow for the maximum credit and largest reduction in required treatment and retention volume.

Another possible source of reduction to tributary area is receiving agreement from the Regional Water Board to remove portions of the existing roadway that will not be removed through the full thickness of the roadway base. If the Water Board is willing to allow that exclusion, those areas could be ignored in the calculations for new/replaced impervious surface.

Design Requirements and BMP Selection

Treatment and Volume Capture Requirements

The LID manual and MS4 Permit define the design storm as one that produces 1 inch of rainfall over a 24-hour period. All projects are required to treat 100% of the runoff from the project area for the design storm. An additional requirement is for Volume Capture. Projects are required at a minimum to retain the increase in volume for the design storm unless they create or replace an acre or more of impervious surface.

BMP Selection

Bioretention facilities have been determined to be the most appropriate Best Management Practice (BMP) for this project. These are facilities that combine vegetated layers to provide treatment as well as structural soil/gravel layers to provide volume capture. For examples and illustrations of types of bioretention facilities and other treatment and volume capture options, see Appendix C.

[1] LID information for the Town of Windsor may be found at https://www.townofwindsor.com/1163/LID

Maintenance Responsibilities

The Town of Windsor would need to accept maintenance responsibilities for any LID features installed as part of this project. Below is a short list of the most common responsibilities as well as their typical frequency. This list of common responsibilities is offered as an example; projects will need to comply with current LID manual and MS4 Permit guidance at the time of implementation. As the project design progresses, a more detailed maintenance plan should be established.

– Monthly: Plantings within the bioretention areas should be checked monthly. Any weeds found should be removed and dead plants replaced. Remove any debris found within the BMP area.
– Semi-Annually: Any inlet and outlet structures should be inspected twice a year to ensure they are not clogged and are functioning properly. Remove any debris that may be clogging the structures.
– Annually: BMPs should be visually inspected to determine if any plantings or mulch require replacement. If the mulch or gravel areas become inundated with sediment, the material should be removed and replaced.

4.2 Segment Recommendations

This section discusses the visual character and bike/pedestrian environment of each segment with specific examples of deficiencies and opportunities and provides design recommendations suited to the segment and specific sites. Recommendations for the Old Redwood Highway corridor are then presented in four segments:

– Northern End of Project: Starr Road to Joe Rodota Drive
– Center of Project: Joe Rodota Drive to Bluebird Drive
– Southeast of ORH/Highway 101 Interchange: Alden Lane to Pool Creek
– Southern End of Project: Pool Creek to Esposti Park

The Old Redwood Highway corridor currently includes on-street parking in some areas. With the recommendations presented, much of this parking would be retained where right-of-way width allows (see illustrative cross sections in the following section). In some cases, implementing the necessary improvements to provide a Complete Streets environment for all modes of transportation will preclude on-street parking along Old Redwood Highway. In general, there is ample parking off the corridor, including along side streets and in off-street lots. In addition, providing a Complete Streets environment should ultimately lead to an increased share of trips by walking, bicycling, and transit, reducing the need for parking.

For each segment, maps are provided that show the locations of bicycle-related recommendations and pedestrian-related recommendations, respectively. Spot improvements are included on each map as appropriate.

A detailed list of recommended projects is provided in Appendix C. Projects in the appendix are listed in two tables: linear projects such as bikeways and sidewalks (identified by reference numbers beginning with an L), and spot improvements such as crossings and bus stops (identified by reference numbers beginning with a P). Spot improvement numbers are also shown on the maps for reference.

4.2.1 Northern End of Project: Starr Road to Joe Rodota Drive

In general, the northern end of the corridor is characterized by a wide roadway, discontinuous sidewalks, and a lack of lighting and shade trees. The character of the built environment includes medium-density housing and several auto-oriented businesses, such as automotive repair shops and a self-storage facility. These uses present long frontages and facades that are unattractive to pedestrians.

The sidewalks in this area often end abruptly, requiring people to walk in the roadway shoulder or along roadside swales, and there are no crosswalks in this segment of the corridor for 0.7 miles between Arata Lane and the Windsor Road roundabout. There are also no public open spaces adjacent to this segment, although Los Robles Park is nearby and can be accessed through Rio Ruso.



Along the frontage of a self-storage facility, pedestrians experience a 400-foot-long wall.



Adjacent to automotive shops and industrial uses, the pedestrian environment lacks dedicated facilities.





Lack of sidewalks, trees, and lighting is common in this segment. The wide roadway, large setbacks, and parking lots suggest a preference for cars.

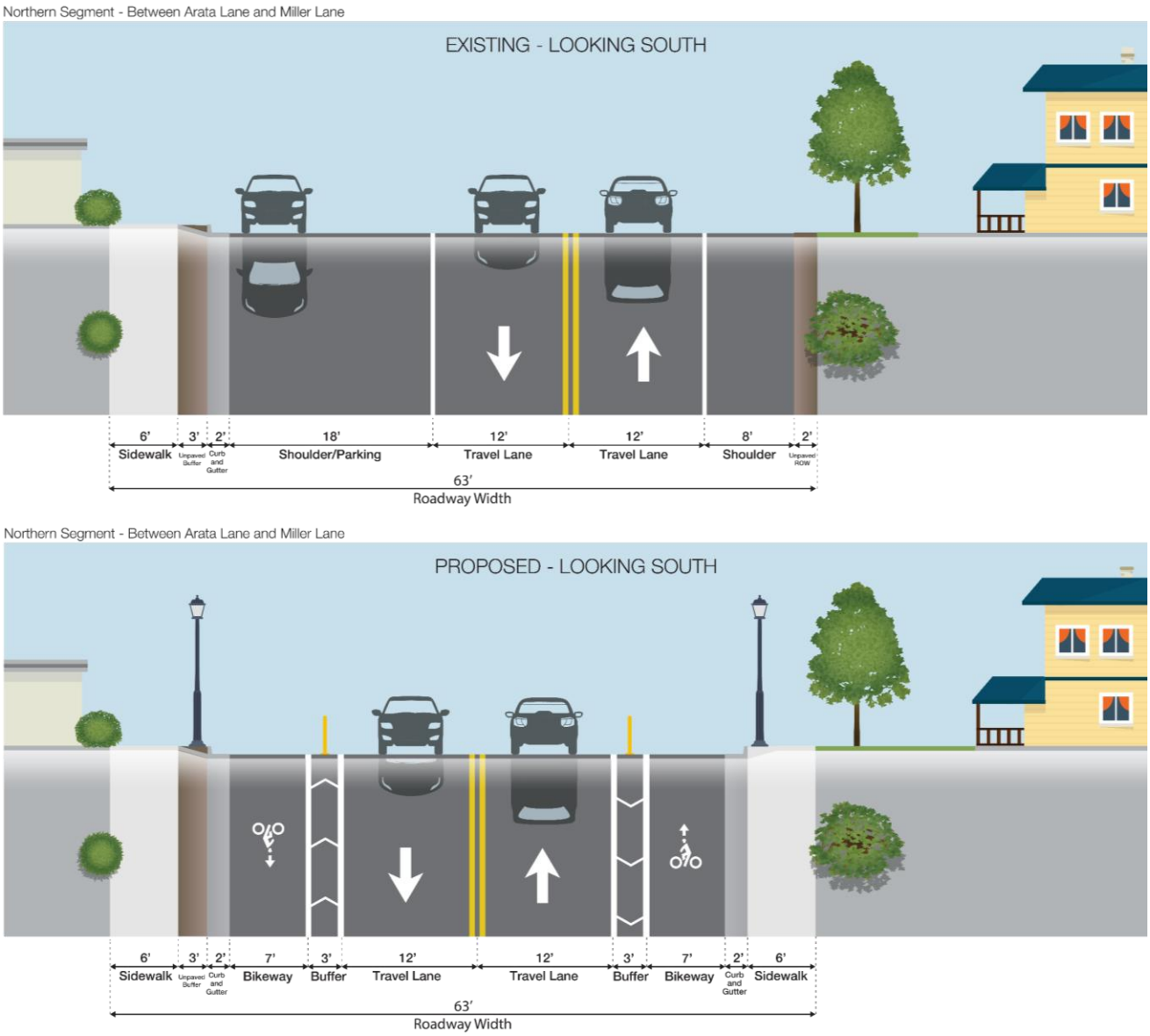




There is no sidewalk adjacent to 9600 Windsor Road, and a "desire path" near the Windsor Road roundabout indicates the preferred connection for bicyclists and/or pedestrians.

Figure 7 below shows conceptual cross sections for existing and proposed conditions on Old Redwood Highway between Arata Lane and Miller Lane. These cross sections are conceptual and may not represent all features, including street trees.

Figure 7: Conceptual Cross Section – Between Arata Lane and Miller Lane



The following elements are recommended to improve the bicycle and pedestrian environment in the northern segment of the corridor. Bicycle recommendations are mapped in Figure 8 and pedestrian recommendations are mapped in Figure 9. Full information on each recommendation is provided in Appendix C, where projects are listed with an alphanumeric identifier, such as L2 for Linear project 2, or P3 for Point project 3 (for spot and crossing recommendations.

Bicycle and Pedestrian Facilities

– (L2) Upgrade existing bicycle lanes to one-way Class IV Protected Bikeway on both sides of the corridor between Starr Road and Windsor Road
– (L1, 4-11) Install new sidewalk to close gaps in the pedestrian network on both sides of the corridor
– (L3) Install pedestrian scaled lighting the full length of the segment (continuing into the next segment)

Crossings and Spot Improvements

– New crosswalks with visibility and pedestrian safety enhancements, such as contrasting colored pavement, median refuge islands, and/or pedestrian-activated warning lights, should be added at key locations, including at:
  - (P3) **Starr Road**: Install a high visibility crosswalk on the south-east leg of Starr Road as it crosses ORH, to the existing curb ramp. Install a high visibility crosswalk across Starr Road, assessing the need for a school zone crossing.
  - (P5) **Arata Lane**: Install a new crosswalk on the south leg of the Arata Lane intersection.
  - (P9) **Rio Ruso**: Install a marked crosswalk across Rio Ruso.
  - (P11) **Dawn Way**: Install a crosswalk with Pedestrian Hybrid Beacon at Dawn Way.
– Improvements to bicycle approaches and facilities, highlighting locations where drivers should pay extra attention to bicyclists (conflict zones), should be added at:
  - (P1) **Starr Road**: Continue southbound bike lane markings through the intersection using green painted conflict zone markings.
  - (P4) **Arata Lane**: Install bike boxes and green painted approaches (on the north, south and east legs). Detectors appear to exist but may require maintenance or signage/education about how to activate them.
  - (P7) **Miller Lane**: Continue bike lane markings across Miller Lane, using green conflict zone striping.
  - (P9) **Rio Ruso**: Continue bike lane markings across Rio Ruso, using green conflict zone striping.
  - (P10) **Dawn Way**: Continue bike lane markings across Dawn Way, using green conflict zone striping
  - (P12) **Godfrey Drive**: Continue bike lane markings across the intersection, using green conflict zone striping.
  - (P14) **Woodbine Way**: Continue bike lane markings across Woodbine Way, using green conflict zone striping.
– Improvements to motorized transportation, such as the addition of roundabouts, slip lane on-ramps, improvements to signs and markings and optimizing signal timing should be added at:
  - (P2) **Starr Road**: Install a roundabout at the Starr Road intersection.

Mini Places & Bus Stop Amenities

– Mini places should be developed as part of proposed bus stop enhancements at (P6) Evergreen Avenue, (P8) Rio Ruso, and (P13) Woodbine Way.
  - To the extent feasible, every bus stop along the ORH Corridor should include a standard shelter and amenities that meet guidance from Sonoma County Transit. A standard shelter includes a bus turnout with the appropriate pavement markings, including no parking signs/markings, a bench, schedule kiosk and informational signage.

Corridor Entry Features

– An entry feature in the form of a gateway sign should be located in this segment to inform people that they are entering or exiting Windsor's ORH corridor. A location south of Arata Lane would be most appropriate for the sign so that it is visible to people entering Windsor from both directions on Highway 101.

Trees and Landscaping

– Street trees and pedestrian lighting consistent with the Town's design guidelines and Tree Preservation and Protection Ordinance should be included as part of any sidewalk gap closure project.
– Given the lack of public open spaces along ORH in this segment vacant parcels could be identified and a portion of one or more parcels could be reserved for small parks.



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California II FIPS 0402 Feet

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Town of Windsor
Old Redwood Highway Corridor Enhancement Plan

Bicycle Recommendations Northern End of Project (Starr Rd to Joe Rodota Dr)

Project No. **11213480**
Revision No. **-**
Date **Dec 2021**

FIGURE 8

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
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Town of Windsor
Old Redwood Highway Corridor Enhancement Plan

Pedestrian Recommendations Northern End of Project (Starr Rd to Joe Rodota Dr)

Project No. **11213480**
Revision No. **-**
Date **Dec 2021**

FIGURE 9

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Created by: pthornton

4.2.2 Center of Project: Joe Rodota Drive to Bluebird Drive

Today, most of the buildings in the center of the project are styled in accordance with the adopted Town Design Standards and include articulated facades, hip and gable roof forms, cupolas, and windows with pediments and false balconies. Very few blank walls or flat rooflines exist, but where they are present, the inclusion of crown molding, cornice brackets, and pergola structures provide visual interest. In Central Windsor, adjacent to the Town Green and US 101 underpass, the corridor is defined by a walkable, pedestrian-oriented commercial streetscape and Spanish Revival architectural style.



Existing development at the intersection of ORH and Windsor River Road with cupolas, a tower, and distinctive facades.



Existing development at Bell Village on ORH with overhangs, balconies, and different façade treatment materials. Pedestrian and cyclist amenities, such as benches and bike racks, are also provided.

This segment of the ORH corridor north of the US 101 underpass was improved in 2015, in conjunction with the development of the Bell Village commercial and residential community,[2] and includes many bicycle and pedestrian safety improvements such as wide sidewalks, human-scaled architectural details, street furniture, green Class II Bicycle Lanes, back-in car parking, and pedestrian lighting. The Town Green and civic center are near this segment to the west, providing public services and open space.

[2] Residential component not yet constructed.



South of the US 101 underpass, ORH includes sidewalks, street trees, acorn-style pedestrian lighting, and Class II bike lanes.



A center median along ORH provides additional greening and softening of the visual context.

The character, deficiencies, and opportunities for improvements to the bicycle and pedestrian environment in this segment have been discussed and assessed in detail in the 2018 Connecting Central Windsor Study. Discussed below, recommendations from the study include widening the bicycle and pedestrian space through the US 101 underpass and developing a pedestrian promenade along ORH adjacent to the gas stations to reconnect the historical axis of the corridor and provide a public open space for the western landing of a future bicycle and pedestrian overcrossing of US 101.





Widening the space under US 101 using new tie-back walls and adding new lighting, landscape, color, and artwork is expected to turn the US 101 at Central Windsor underpass into a friendlier and inviting gateway and improve the space under the freeway, further attracting bicyclist and pedestrian use. Images from Connecting Central Windsor.

The development of a pedestrian promenade between the Chevron and Shell gas stations, a mixing zone (an area where bicyclists transition from one facility type to another (i.e. from Class I to Class II)), and footbridge over Windsor Creek would provide a safer shortcut which avoids the busy intersections of ORH and Conde Lane, Lakewood Drive, and the US 101 ramps for bicyclists and pedestrians traveling north-south along the corridor to and from the Town Green.

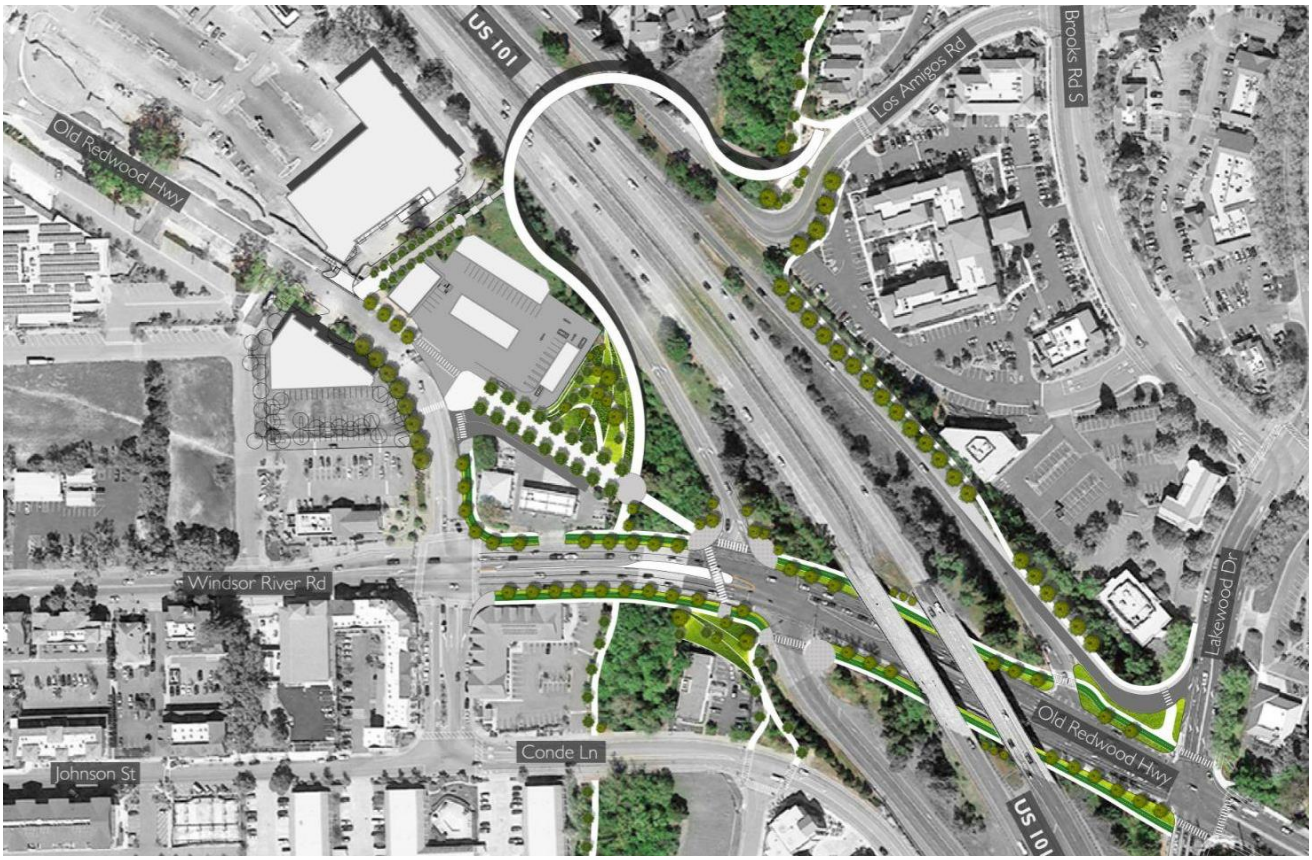




The improvements along the historical axis of ORH also enhance a tree-lined view corridor between the Town Green and ORH. The mixing zone and public open space would provide a unique opportunity for gathering, interactions, and rest, which relates to the architectural language of the Town Green, but is distinct in its location on a former auto-oriented thoroughfare.

Figure 10 below shows a proposed conceptual plan for the US 101 interchange area from the Connecting Central Windsor Plan. The addition of Class I paths, protected bikeways, and separate pedestrian sidewalks is expected to attract more bicyclist and pedestrian use by improving safety. Additional detail on the proposed improvements is available in that document.

Figure 10: Conceptual Plan for US 101 Interchange Improvements



The following elements are recommended to improve the bicycle and pedestrian environment in the center portion of the corridor. Bicycle recommendations are mapped in Figure 11 and pedestrian recommendations are mapped in Figure 12. Full information on each recommendation is provided in Appendix C, where projects are listed with an alphanumeric identifier, such as L2 for Linear project 2, or P3 for Point project 3 (for spot and crossing recommendations.

Bicycle and Pedestrian Facilities

- (L16) Upgrade bicycle lanes to Class IV Protected Bikeway between Windsor River Road and the southbound ramp intersection, and between Lakewood Drive and Bluebird Drive (continuing into the next segment)
- (L15) Install a Class I Shared Use Path through the US 101 interchange, between the southbound ramp intersection and Lakewood Drive
- (L14) Install new sidewalk on the west side of the corridor from Richardson Street to the end of the existing sidewalk north of Windsor River Road
- (L12) Install pedestrian scaled lighting from Joe Rodota Drive to Market Street (continued from previous segment)

Crossings and Spot Improvements

- New crosswalks with visibility and pedestrian safety enhancements, such as contrasting colored pavement, median refuge islands, and/or pedestrian-activated warning lights, should be added at key locations, including at:
  - (P17) **Hwy 101 SB Off-Ramp**: Square corners and install curb extensions to slow turning vehicles and shorten crossing distances for pedestrians. Provide at-grade crosswalk from the north-east to south-west corner, to connect the proposed Class I paths on both sides of ORH.
  - (P19) **Lakewood Drive**: On the north, east, and south legs (existing crosswalks) install leading pedestrian interval (LPI), high visibility crosswalks with advance stop bars, and bike boxes.
  - (P21) **3rd Street**: Install a high visibility crosswalk with RRFB and pedestrian refuge across ORH. This intersection has a history of pedestrian collisions and no marked crosswalks across ORH exist. Connect the hotel, restaurants, park and proposed apartment complex near the intersection.
  - (P24) **Bluebird Drive**: Install a crosswalk on the north leg, which will connect to the Redwood Views Apartments development on the east side of ORH across from Bluebird Drive.
- Improvements to bicycle approaches and facilities, highlighting locations where drivers should pay extra attention to bicyclists (conflict zones), should be added at:
  - (P22) **2nd Street**: Continue bike lane markings across the intersection, using green conflict zone striping.
- Improvements to motorized transportation, such as the addition of roundabouts, slip lane on-ramps, improvements to signs and markings and optimizing signal timing should be added at:
  - (P15) **Windsor River Road to US 101 SB On-Ramp**: Pavement markings and signage are needed to provide advance warning regarding motorized lane directions, including which lanes will terminate (particularly on the west-bound leg). Signal timing should be optimized. Bike boxes should be installed and crosswalk markings repainted.
  - (P16) **Hwy 101 SB Ramp**: Pavement markings and signage are needed to provide advance warning regarding motorized lane directions, including which lanes will terminate (particularly on the east-bound leg). Signal timing should be optimized. Bike boxes should be installed and crosswalk markings repainted.
  - (P18) **Lakewood Drive**: Optimize signal timing and construct a slip lane from Lakewood Drive onto north-bound Hwy 101 (bypasses the right turn movement onto ORH to access Hwy 101 from Lakewood Drive).

Mini Places

- Develop mini places as part of proposed new or enhanced crosswalks. Mini places come in a variety of shapes and sizes and are intended to be thoughtfully located where people might naturally pause and where different transportation modes mix.
- Selected Town-owned properties in Central Windsor could serve as public pedestrian-oriented open spaces and/or as mini places along pedestrian and bicyclist transportation routes.

Transit

- To the extent feasible, every bus stop along the ORH Corridor should include a standard shelter and amenities that meet guidance from Sonoma County Transit. A standard shelter includes a bus turnout with the appropriate pavement markings, including no parking signs/markings, a bench, schedule kiosk and informational signage.
- (P20) Relocate the existing northbound bus stop near 4th Street to south of the intersection. Widen the existing sidewalk and provide a SCT standard bus shelter and other amenities.
- (P23) Add new north- and southbound bus stops on ORH between Courtyard/2nd Street and Bluebird Drive, along with SCT standard bus shelters, turnouts, and other amenities.

Corridor Entry Features

- Widen the space under US 101 using new tie-back walls and adding new lighting, landscape, color, and artwork that can also serve as an entry element into the downtown area.

Street Furniture and Lighting

- Create a pedestrian promenade with street furniture and acorn-style light fixtures between the existing Shell and Chevron gas stations to serve as public open space and as a shortcut for bicyclists and pedestrians to avoid the intersection of Conde Lane and Windsor River Road as well as Lakewood Drive and the US 101 ramps.

Trees and Landscaping

- Street trees and pedestrian lighting consistent with the Town's design guidelines and Tree Preservation and Protection Ordinance should be included as part of any sidewalk gap closure project.



Note: Spot location recommendations are labelled with callout numbers, which correspond with the PlanID number in the accompanying spreadsheet of recommendations. All Class II, Class III and Class IV Bikeways are on both sides of the roadway. Previous plans include: Windsor Bicycle and Pedestrian Master Plan (2014), Windsor Class I Bicycle and Pedestrian Trails Study (2018), and Connecting Central Windsor (2018).

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
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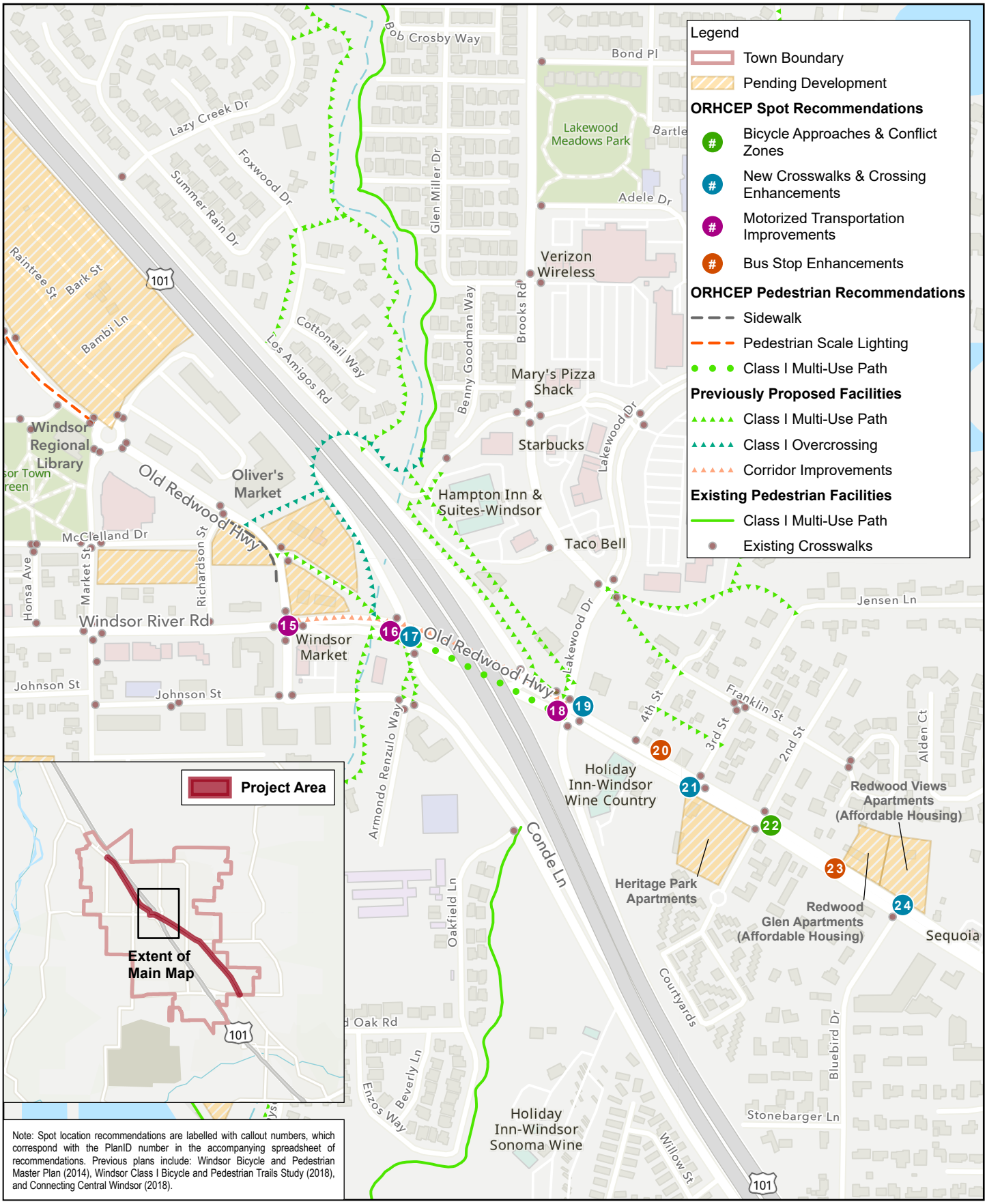
Bicycle Recommendations Center of Project (Joe Rodota Dr to Bluebird Dr)

Project No. **11213480**
Revision No. **-**
Date **Dec 2021**

FIGURE 11

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Created by: pthornton



Note: Spot location recommendations are labelled with callout numbers, which correspond with the PlanID number in the accompanying spreadsheet of recommendations. Previous plans include: Windsor Bicycle and Pedestrian Master Plan (2014), Windsor Class I Bicycle and Pedestrian Trails Study (2018), and Connecting Central Windsor (2018).

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Map Projection: Lambert Conformal Conic
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Town of Windsor
Old Redwood Highway Corridor Enhancement Plan

Pedestrian Recommendations Center of Project (Joe Rodota Dr to Bluebird Dr)

Project No. **11213480**
Revision No. **-**
Date **Dec 2021**

FIGURE 12

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Created by: pthornton

4.2.3 Southeast of ORH/Highway 101 Interchange: Alden Lane to Pool Creek

The segment southeast of the ORH/Highway 101 interchange is largely characterized by greenery and medium-density housing, with a few commercial buildings. Our Lady of Guadalupe Church and the adjacent Mary Agatha Furth Community Center are important community destinations in this area, and the bike/pedestrian environment around these destinations are more fully-developed.

Hembree Lane is a major north-south thoroughfare that crosses ORH and connects to the Town's residential neighborhoods. Similar to the large intersections found in central Windsor around the Highway 101 interchange, the curbs have large radii that facilitate turning movements and the crosswalks are long.



The intersection of Hembree Lane and ORH facilitates car movement, with large-radius curbs and long crosswalks. This auto-orientation creates an inhospitable environment for pedestrians and bicyclists.



A commemorative plaque located at the corner of Fire Station No. 1 dedicates the facility to the volunteers of the Windsor Fire Protection District.

As compared to the northern segments of the project, the ORH corridor in this segment is visually narrowed by large trees that flank the roadway and in some areas, create archways with their canopies. There are no sidewalks along most of this segment of the corridor, south of Hembree Lane, and pedestrians typically have to walk in the roadway shoulder, bike lane, or along roadside swales.



Unique to the ORH corridor, the section between Bluebird Drive and Alden Lane, along Windsor Palms Plaza, is lined with palm trees. Common to this segment of the corridor, however, are the single-arm streetlights instead of acorn-style pedestrian-scaled fixtures used to the north.



Pleasant Oak Park, adjacent to ORH, provides a large public open space, but the park is inaccessible from the corridor and the view between the park and corridor is limited. Street lighting is focused on the roadway and not scaled for bicyclists and pedestrians.



A "desire path" through the empty lot at ORH and Pleasant Avenue reveals a preferred route for pedestrians and connects to a bus stop.



Facing an abrupt end to the sidewalk at 6845 ORH (near Anish Way), pedestrians walk in the roadway shoulder, which is occasionally obstructed by parked cars and/or trash and recycling bins.

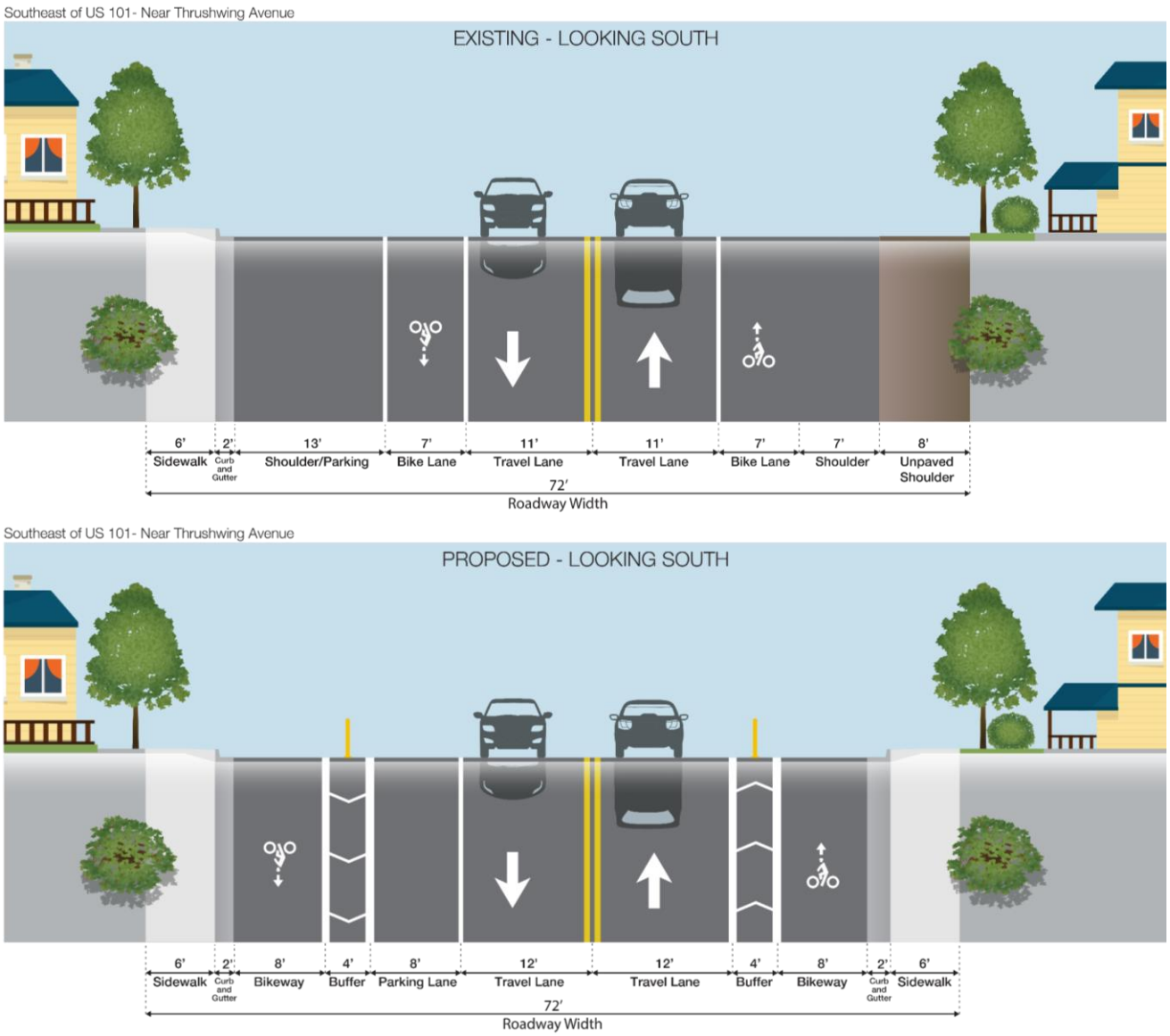




Trees and greenery line much of this segment of the corridor, and the large tree near Anish Way is particularly noticeable, as are other large oaks with arching canopies.

Figure 13 on the following page shows conceptual cross sections for existing and proposed conditions on Old Redwood Highway near Thrushwing Avenue. These cross sections are conceptual and may not represent all features, including street trees.

Figure 13: Conceptual Cross Section – Near Thrushwing Avenue



The following elements are recommended to improve the bicycle and pedestrian environment in the segment of the project southeast of the ORH/Highway 101 interchange. Bicycle recommendations are mapped in Figure 14 and pedestrian recommendations are mapped in Figure 15. Full information on each recommendation is provided in Appendix C, where projects are listed with an alphanumeric identifier, such as L2 for Linear project 2, or P3 for Point project 3 (for spot and crossing recommendations.

Bicycle and Pedestrian Facilities

– (L17) Upgrade bicycle lanes to Class IV Protected Bikeways on both sides of the corridor from Alden Lane to Pool Creek (continuing from previous segment)
– (L18-24) Install new sidewalk to close gaps in the pedestrian network on both sides of the corridor

Crossings and Spot Improvements

– New crosswalks with visibility and pedestrian safety enhancements, such as contrasting colored pavement, median refuge islands, and/or pedestrian-activated warning lights, should be added at key locations, including at:
  - (P25) **Alden Lane**: Upgrade crosswalks to high visibility crosswalks with advance stop bars and provide leading pedestrian interval (LPI).
  - (P31) **Thrushwing Avenue**: Install curb extensions on the south and east legs of the intersection and install an RRFB on the south leg (ORH crossing). Ensure curb extensions provide clearance for the bike lane and don't impact the bus stop.
  - (P34) **Billington Lane**: Install a high visibility crosswalk with RRFB and bulb outs. Connect the east side of ORH and the proposed SCTA Class I Trail to Billington Land and Robbins Park. Install curb extensions for traffic calming.
  - (P36) **Shamrock Circle**: Install a high visibility crosswalk for people accessing the bus stops on either side of the road, the gym, animal hospital and services in the CopperStone building.
– Improvements to bicycle approaches and facilities, such as widening bridges and highlighting locations where drivers should pay extra attention to bicyclists (conflict zones), should be added at:
  - (P28) **Hembree Lane**: Upgrade bicycle detectors from loops to another technology. Include signage/education about how to activate them ('to request green, wait on" sign).
  - (P33) **Billington Lane**: Continue bike lane markings across the intersection, using green conflict zone striping.
  - (P38) **Pool Creek**: Widen the existing bridge to close the gap in existing bicycle lanes on either side of the bridge and bring the proposed Class I trail across the creek.
– Improvements to motorized transportation, such as the addition of roundabouts, slip lane on-ramps, improvements to signs and markings and optimizing signal timing should be added at:
  - (P27) **Hembree Lane**: Install a roundabout at ORH and Hembree Lane.
  - (P30) **Pleasant Avenue**: Install a roundabout at ORH and Pleasant Ave.

Mini Places & Bus Stop Amenities

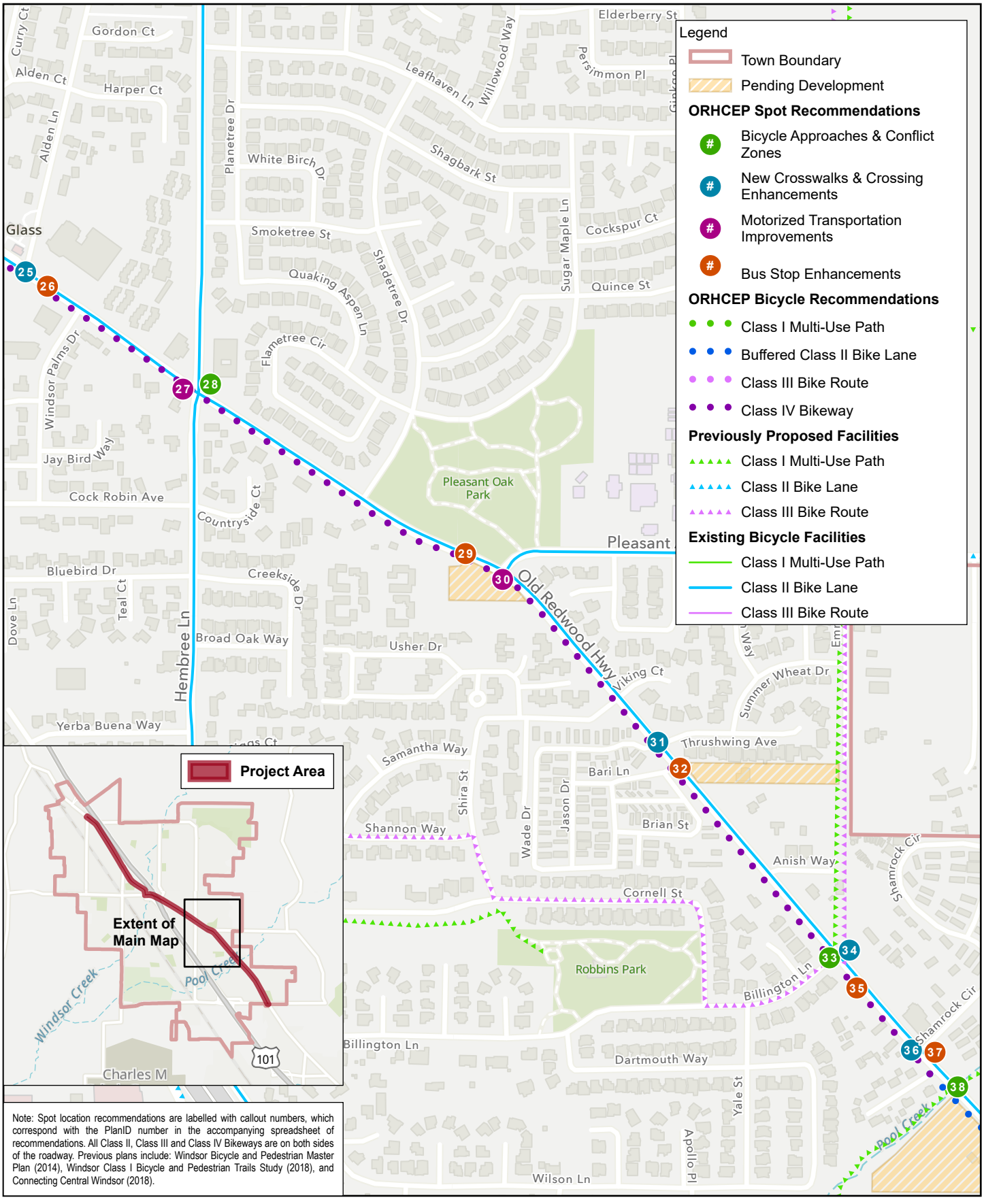
– A mini place could be developed near the corner of Hembree Lane, to enhance the connection between the corridor, community, and Fire District.
– Mini places should be developed as part of proposed bus stop enhancements at Billington Lane and at Shamrock Circle, where street furniture could be used by members in the adjacent Shamrock Retirement Community.
  - To the extent feasible, every bus stop along the ORH Corridor should include a standard shelter and amenities that meet guidance from Sonoma County Transit. A standard shelter includes a bus turnout with the appropriate pavement markings, including no parking signs/markings, a bench, schedule kiosk and informational signage.

Trees and Landscaping

– Street trees and pedestrian-scaled lighting consistent with the Town's design guidelines and Tree Preservation and Protection Ordinance should be included as part of any sidewalk gap closure project.

Placemaking

– Given the large intersection at Hembree Lane and ORH, aesthetic pavement markings could reduce traffic speeds and increase visibility of bicyclists and pedestrians.
– Easier physical and visual access should be made between the corridor and Pleasant Oak Park, so that the community can see and connect to the activities taking place at the park. This could include direct bicycle and pedestrian connections, wayfinding, and vegetation maintenance or reconfiguration to reduce visual obstructions.



Note: Spot location recommendations are labelled with callout numbers, which correspond with the PlanID number in the accompanying spreadsheet of recommendations. All Class II, Class III and Class IV Bikeways are on both sides of the roadway. Previous plans include: Windsor Bicycle and Pedestrian Master Plan (2014), Windsor Class I Bicycle and Pedestrian Trails Study (2018), and Connecting Central Windsor (2018).

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California II FIPS 0402 Feet

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Town of Windsor
Old Redwood Highway Corridor Enhancement Plan

Bicycle Recommendations Southeast of ORH/Hwy 101 Interchange (Alden Ln to Pool Creek)

Project No. **11213480**
Revision No. **-**
Date **Dec 2021**

FIGURE 14

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Created by: pthornton



Note: Spot location recommendations are labelled with callout numbers, which correspond with the PlanID number in the accompanying spreadsheet of recommendations. Previous plans include: Windsor Bicycle and Pedestrian Master Plan (2014), Windsor Class I Bicycle and Pedestrian Trails Study (2018), and Connecting Central Windsor (2018).

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Map Projection: Lambert Conformal Conic
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Town of Windsor
Old Redwood Highway Corridor Enhancement Plan

Pedestrian Recommendations Southeast of ORH/Hwy 101 Interchange (Alden Ln to Pool Creek)

Project No. **11213480**
Revision No. **-**
Date **Dec 2021**

FIGURE 15

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Created by: pthornton

4.2.4 Southern End of Project: Pool Creek to Esposti Park

Generally, the southern end of the corridor is characterized by natural scenic resources such as heritage trees and tree-lined viewsheds. There are more undeveloped parcels in this segment than in other segments and sidewalks are discontinuous. The character of the built environment is primarily low-density and medium-density housing, with one small commercial center containing a few businesses.

This segment includes only one crosswalk, located at the southern end, connecting the Esposti Park Apartments with Esposti Park and the bus stop on the east side of ORH. Although this segment does not include much lighting, when it is provided, the fixtures could take one of several forms: a pole-mounted lamp-style fixture found in central Windsor around the Windsor Road roundabout; a single-arm standard streetlight, used alone or mounted to an electrical pole; or a pedestrian-scaled acorn-style fixture.



Street trees characterize most of this segment's visual context.



The large oak near Tamara Court is especially noticeable, particularly because the ORH corridor heading south appears to bend because of it.





Where ORH crosses Pool Creek and Faught Creek, the roadway narrows considerably and no shoulder is provided. In these sections, bicyclists and pedestrians must travel with or immediately adjacent to passing cars.



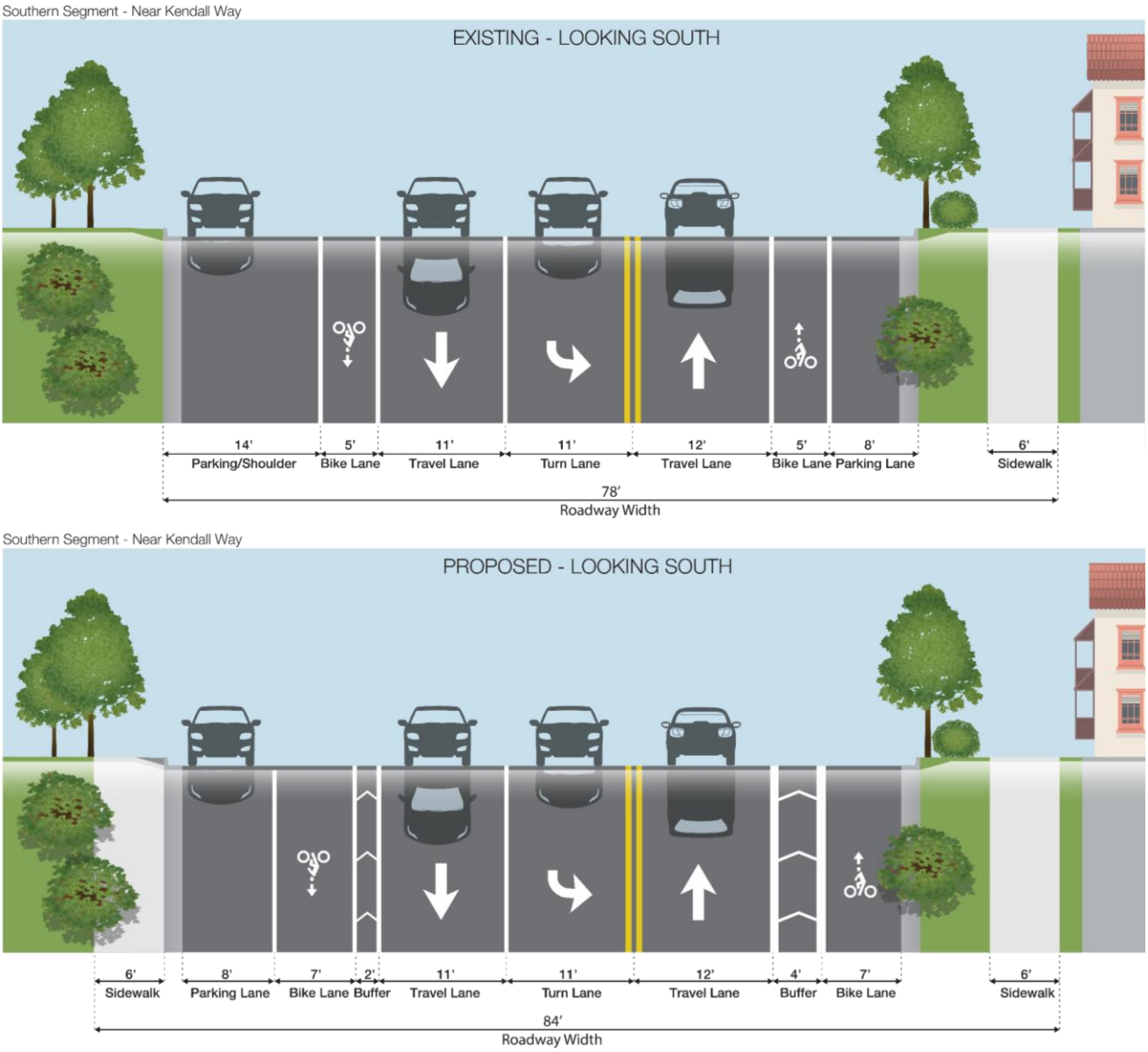
The single crosswalk in this segment is located at the southern end, allowing people to cross between the Esposti Park Apartments and the park and bus stop.



Esposti Park, immediately accessible and visible from ORH at the southern end of this segment, provides a large public open space with sports facilities.

Figure 16 below shows conceptual cross sections for existing and proposed conditions on Old Redwood Highway near Kendall Way. These cross sections are conceptual and may not represent all features, including street trees. While the location of this cross section shows removal of parking on one side of the street, on-street parking only exists in a small portion of this segment. Removal of parking should not be considered typical for this segment or the corridor overall.

Figure 16: Conceptual Cross Section – Near Kendall Way



The following elements are recommended to improve the bicycle and pedestrian environment in the southern segment of the corridor. Bicycle recommendations are mapped in Figure 17 and pedestrian recommendations are mapped in Figure 18. Full information on each recommendation is provided in Appendix C, where projects are listed with an alphanumeric identifier, such as L2 for Linear project 2, or P3 for Point project 3 (for spot and crossing recommendations.

Bicycle and Pedestrian Facilities

– (L26, 31) Upgrade bicycle lanes to Class II Buffered Bicycle lanes on both sides of the corridor the full length of the segment
– (L25, 27-30, 32) Install new sidewalk to close gaps in the pedestrian network on both sides of the corridor

Crossings and Spot Improvements

– New crosswalks with visibility and pedestrian safety enhancements, such as contrasting colored pavement, median refuge islands, and/or pedestrian-activated warning lights, should be added at key locations, including at:
  - (P42) **Tamara Way**: Install a high visibility crosswalk on the north leg to connect pedestrians to the shopping and services in the strip commercial on the west side of ORH. Install ADA compliant curb ramps, an RRFB, and a pedestrian refuge. Currently, there are only four marked crosswalks in a 1.6 mile segment.
  - (P45) **East Shiloh Road**: Implement a protected intersection with high visibility crosswalks, leading pedestrian interval (LPI), and green painted bicycle approaches and conflict markings for all bicycle lanes approaching the intersection. Aim to minimize the effective turning radii. As an interim solution, add a bike box on the southbound approach.
– Improvements to bicycle approaches and facilities, such as widening bridges and highlighting locations where drivers should pay extra attention to bicyclists (conflict zones), should be added at:
  - (P40) **Savannah Way**: Widen the existing bridge to close the gap in existing bicycle lanes on either side of the bridge. Changes to the bridge should consider the Class I Fraught Creek Trail (pending development west of ORH), which will ultimately connect to a proposed Class I trail to the east.
  - (P43) **Kendall Way**: Continue bike lane markings across the intersection, using green conflict zone striping.
  - (P44) **150 feet to 300 feet north of Shiloh Road**: Fill the gap in the bike lane on the south-bound approach to Shiloh Road and use conflict zone markings.
– Improvements to motorized transportation, such as the addition of roundabouts, slip lane on-ramps, improvements to signs and markings and optimizing signal timing should be added at:
  - (P46) **Shiloh Road**: Install a roundabout at ORH and Shiloh Road.

Mini Places & Bus Stop Amenities

– If the bus stops at (P39) Deanna Place and (P41) Anna Drive are enhanced, the designs should include mini places to provide community members with places to pause, take in a view, rest, meet and enjoy the outdoors. To the extent feasible, every bus stop along the ORH Corridor should include a standard shelter and amenities that meet guidance from Sonoma County Transit. A standard shelter includes a bus turnout with the appropriate pavement markings, including no parking signs/markings, a bench, schedule kiosk and informational signage.

Corridor Entry Features

– An entry feature in the form of a gateway sign should be located in this segment to inform people that they are entering or exiting Windsor's ORH corridor. A location just north of Shiloh Road would be most appropriate.

Trees and Landscaping

– Street trees and pedestrian lighting consistent with the Town's design guidelines and Tree Preservation and Protection Ordinance should be included as part of any sidewalk gap closure project. Given the various light fixture styles already in use in this segment, it may be appropriate to install lamp-style fixtures where pedestrian crossings occur, while acorn-style fixtures should be used along sidewalks.



Paper Size ANSI A

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California II FIPS 0402 Feet

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GHD

Town of Windsor
Old Redwood Highway Corridor Enhancement Plan

Bicycle Recommendations Southern End of Project (Pool Creek to Esposti Park)

Project No. **11213480**
Revision No. **-**
Date **Dec 2021**

FIGURE 17

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Print date: 08 Dec 2021 - 16:17

Basemap: Esri World Topo Map (Esri Community Maps Contributors, Sonoma County, Esri, HERE, Garmin, SafeGraph, INCREMENT P, MEI/NASA, USGS, BLM, EPA, NPS, US Census, USDA) with custom vector tile edits from GHD. SCTA Bicycle Facilities and Existing Bicycle Facilities: SCTA. ORHCEP Recommendations: GHD. City Boundary: TIGER, Pending Development: Town of Windsor
Created by: pthornton



Note: Spot location recommendations are labelled with callout numbers, which correspond with the PlanID number in the accompanying spreadsheet of recommendations. Previous plans include: Windsor Bicycle and Pedestrian Master Plan (2014), Windsor Class I Bicycle and Pedestrian Trails Study (2018), and Connecting Central Windsor (2018).

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US Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California II FIPS 0402 Feet

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Town of Windsor
Old Redwood Highway Corridor Enhancement Plan

Pedestrian Recommendations Southern End of Project (Pool Creek to Esposti Park)

Project No. 11213480
Revision No. -
Date Dec 2021

FIGURE 18

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Basemap: Esri World Topo Map (Esri Community Maps Contributors, Sonoma County, Esri, HERE, Garmin, SafeGraph, INCREMENT P, MEI/ NASA, USGS, BLM, EPA, NPS, US Census, USDA) with custom vector tile edits from GHD. SCTA Bicycle Facilities and Existing Bicycle Facilities: SCTA. ORHCEP Recommendations: GHD. City Boundary: TIGER, Pending Development: Town of Windsor
Created by: pthornton

5. Implementation

This chapter presents a strategy toward implementation of the infrastructure projects to prioritize investment of limited resources, pursue grant funding, and leverage future development to implement the vision outlined in the ORHCEP.

5.1 Phased Implementation Approach

Given the large number of recommended improvement projects for the Old Redwood Highway corridor compared to available Town resources, the ORHCEP recognizes that a phased implementation approach will be necessary to balance competing agency priorities and limited funding. The Project Prioritization described in Section 5.2 offers objective evaluations of relative benefits related to implementation of certain projects or corridor segments. This tool will be valuable as the Town seeks to implement the recommendations in the ORHCEP in a strategic, thoughtful manner. While the recommendations are ultimately intended to be complementary and together create a cohesive, transformative experience for people traveling along and across the Old Redwood Highway, individual projects or segments should be pursued for implementation as opportunities arise.

In some cases, interim solutions should be considered to accelerate implementation of a project if quick action is deemed necessary while additional funding is pursued. For example, Class IV Protected Bikeways may be implemented as Class II Buffered Bicycle Lanes by restriping the corridor at relatively low cost. Vertical barrier elements can then be added within the buffer area to create a Class IV as a future improvement.

Funding sources available for transportation improvements differ in their eligibilities and evaluation criteria. Multiple sources will likely be necessary to fund improvements within each segment, as all recommended projects are unlikely to be eligible or competitive for a single funding source. The phasing of implementation will also therefore be influenced by timing of various grant funding application cycles and opportunities to identify funding from other complementary sources.

5.2 Project Prioritization

5.2.1 Methodology

Infrastructure projects will be evaluated based on the criteria listed in Table 2 and Table 3 below. Prioritization is detailed in two separate buckets, represented in the two tables, to differentiate between projects that should be considered as candidates to apply for state funding (Table 2) or for implementation using local funds (Table 3). For projects prioritized per State Funding criteria, points assigned to each criterion are weighted based on community input and agency priorities. If the criterion is met, the project will receive the points listed. No partial scores were awarded. The resulting scores are applied to the project list, and the list is ranked from highest score to lowest.

As Windsor does not include any areas designated by state definitions as Disadvantaged Communities, the typical “Equity” criterion often used in project prioritization has been omitted from the statewide funding priority list. Instead, the local prioritization includes criteria that help differentiate areas of relative disadvantage within Windsor- including areas of affordable housing, senior housing, mobile home parks, and medium-density residential. The Boulevard Commercial zoning designation is also included to help identify and prioritize connectivity to jobs and services within Windsor. For the Local Priorities section, the Town would apply the listed criteria to select projects. Projects identified as local priorities based on the criteria in Table 3 would be considered for inclusion within CIP lists, as components of larger roadway projects if available, or as part of future development.

Table 2: Prioritization Criteria—State Funding

Criteria	Description	Points Possible
Activity Generator	Projects located within ¼ mile of an activity generator such as a park, school, civic facility (library, community center, City Hall), medical services, and commercial areas	10
Safe Routes to School	Projects located within ¼ mile of a K-12 school	10
Gap Closure	Projects that close a gap between existing bicycling or walking facilities	10
Safety	Project addresses an identified safety need, including prior collision or need identified during needs assessment/public outreach	10
Low-Stress Network	Bicycle projects that result in LTS 1 or 2, and sidewalk projects	10
	Total	50

Table 3: Prioritization Criteria—Local Priorities

Criteria	Description
Existing and Planned Affordable Housing	Fill gaps between existing and proposed affordable housing developments and transit stops, services, shopping, employment centers, and other attractions.
Senior Living	Fill gaps between existing and proposed senior living facilities and transit stops, services, shopping, and other attractions.
Mobile Home Parks	Construct improvements along the frontage of existing mobile home parks that lack frontage improvements. For mobile home parks with frontage improvements, fill gaps between transit stops, services, shopping, and other attractions
Boulevard Commercial Zoning	Provide improvements in areas zoned Boulevard Commercial to support planned increases in density and intensity.

5.2.2 Results

Recommended projects were scored based on the State Funding prioritization criteria described above, with each project receiving a maximum of 50 points. Individual project scores are listed in Appendix C.

Scores for all projects in each corridor segment were then averaged to arrive at an overall prioritization score for each corridor segment. A summary of segment prioritization results is provided in Table 4 below. The Southeast of ORH/Hwy 101 Interchange segment has the highest average priority score at 32, and the Southern End of Project segment has the lowest average priority score at 25.

Table 4: Summary of Segment Prioritization Results

Corridor Segment	Number of Projects	Average Priority Score
Northern End of Project	25	28.0
Center of Project	15	32.0
Southeast of ORH/Hwy 101 Interchange	22	26.4
Southern End of Project	16	25.0

5.3 Cost Estimates

5.3.1 Unit Cost Assumptions

Table 5 presents unit cost assumptions used to calculate planning-level cost estimates for the recommended infrastructure projects in the ORHCEP. For linear projects, the unit cost method uses a single functional unit (mile or linear foot) that serves as a multiplier. The appropriate unit cost is multiplied by the length of the improvement to develop a planning-level project cost estimate.

Unit costs were developed based on recent regional project costs bid in 2018 and 2019, as well as input from Town staff. Estimates include assumed costs, as appropriate, for:

- Mobilization
- Traffic control
- Earthwork
- Materials (e.g. aggregate, asphalt, concrete)
- Signs
- Pavement delineation and markings
- Utility coordination, grading, and erosion control

In addition, estimates include 30 percent soft costs including engineering design (15 percent), administration (3 percent), and construction management (12 percent). There is also a 15 percent contingency. Cost estimates for projects are in 2021 dollars and do not include cost escalation. Project cost estimates are rounded to the nearest $100.

At the planning level, cost assumptions do not consider project-specific or location-specific factors that may affect actual costs, including acquisition of right of way or road widening. For some projects, actual costs may differ significantly from the planning-level estimates.

Table 5: Unit Cost Assumptions

Improvement	Unit	Estimated Unit Cost	Notes
Class I Shared Use Path	MI	$2,000,000	Assumes 10’ wide path and minor grading
Class II Buffered Bicycle Lanes	MI	$175,000	Both sides of street
Class III Bicycle Route	MI	$10,000	Includes signage and pavement markings
Class IV Separated Bikeway	MI	$750,000	Includes signing and striping for a one- or two-way facility with small curb separation, no roadway widening
Pedestrian Scale Lighting	MI	$4,500,000	Lights are recommended every 50-60 feet, or approximately 100 lights per mile.
Sidewalk	LF	$130	Assumes 6’ wide sidewalk with curb and gutter, note that utility relocations are not included in this cost.
Transverse Marked Crosswalk	EA	$450	White or yellow
High Visibility Marked Crosswalk	EA	$1,800	White or yellow
Advance Stop Line or Yield Markings	EA	$750	Includes sign and pavement marking
Curb Ramp	EA	$10,000	
Curb Extension	EA	$4,500	Includes each side of crosswalk
Pedestrian Refuge Island	EA	$3,000	Assume two 6’ by 4’ islands
Rectangular Rapid Flashing Beacon (RRFB)	EA	$50,000	Solar assembly, two units
Signs	EA	$600	Includes sign and pole
Green Conflict Markings	EA	$3,000	Assume 6’ by 50’, including a white edge line
Bike Box	EA	$1,100	Assume 10’ deep by 11’ wide
Bus Turnout	EA	$60,000	
Bus Stop Shelter	EA	$14,000	Standard Sonoma County Transit shelters range in cost from $12,000 to $16,000. An average cost of $14,000 is used in the ORHCEP.
Bicycle Detection – Repair Loops	EA	$2,000	Per approach, to upgrade loops from Type A to Type D
Bicycle Detection – Upgrade to Video	EA	$10,000	Per approach, to install video detection
Leading Pedestrian Interval	EA	$7,500	Assumes staff time plus new controller
Optimize Signal Timing	EA	$1,500	Assumes staff time only, for general signal timing review. Signal coordination would incur additional cost.
No Parking Zone	EA	$2,200	Includes 100 feet of red curb and two signs
Widened sidewalk	EA	$2,000	Widened sidewalk at transit stops is assumed to be 100 feet long, at $20 per linear foot to widen sidewalk
Pavement Markings	EA	$1,000	For advance warning of motorized lane directions; assumed to be $500 per lane
Protected Intersection	EA	$190,000	Includes four corner islands, high visibility crosswalks, LPI, and conflict markings for all bike lanes
Widen Bridge	EA	$800,000	Over Pool Creek and Savannah Way (two recs), to provide bicycle lanes and space for a Class I
Construct Slip Lane	EA	$2,200,000	From Lakewood Dr onto Hwy 101
Roundabout	EA	$5,000,000	Assumes a single-lane roundabout and does not include potential right of way acquisitions

5.3.2 Project Cost Estimates

Planning-level cost estimates for projects are summarized for the overall corridor as well as for each segment in Table 6 below. Recommended projects for the corridor overall are estimated to cost a total of approximately $38 million. Total project cost estimates for the four segments range from approximately $6.8 million to approximately $12.5 million.

Table 6: Summary of Project Cost Estimates

Project Type	Number	Length	Estimated Cost
Northern End of Project			
Class IV Protected Bikeway	1	0.87 mi	$650,400
Sidewalk	9	6,975 ft	$906,800
Pedestrian Scale Lighting	1	1.05 mi	$4,744,400
Bicycle Approaches & Conflict Zones	6		$33,300
New Crosswalks & Crossing Enhancements	4		$58,900
Motorized Transportation Improvements	1		$5,000,000
Bus Stop Enhancements	3		$200,000
		Northern End of Project Total	**$11,594,400**
Center of Project			
Class I Multi-Use Path	1	0.16 mi	$4,000,000
Class III Bicycle Route	1	0.12 mi	$1,200
Class IV Protected Bikeway	1	0.38 mi	$283,400
Sidewalk	1	338 ft	$44,000
Pedestrian Scale Lighting	1	0.09 mi	$395,600
Bicycle Approaches & Conflict Zones	1		$6,000
New Crosswalks & Crossing Enhancements	4		$82,800
Motorized Transportation Improvements	3		$2,214,700
Bus Stop Enhancements	2		$44,000
		Center of Project Total	**$7,071,700**
Southeast of ORH/Hwy 101 Interchange			
Class IV Protected Bikeway	1	1.06 mi	$793,800
Sidewalk	7	4,143 ft	$538,500
Bicycle Approaches & Conflict Zones	3		$843,000
New Crosswalks & Crossing Enhancements	4		$134,800
Motorized Transportation Improvements	2		$10,000,000
Bus Stop Enhancements	5		$226,000
		Southeast of ORH/Hwy 101 Interchange Total	**$12,536,100**

Project Type	Number	Length	Estimated Cost
Southern End of Project			
Class II Buffered Bicycle Lanes	2	0.73 mi	$128,500
Sidewalk	6	4,113	$534,800
Bicycle Approaches & Conflict Zones	3		$815,000
New Crosswalks & Crossing Enhancements	2		$264,800
Motorized Transportation Improvements	1		$5,000,000
Bus Stop Enhancements	2		$148,000
		Southern End of Project Total	**$6,891,100**
Corridor Total			
Class I Multi-Use Path	1	0.16 mi	$311,000
Class II Buffered Bicycle Lanes	2	0.73 mi	$128,500
Class III Bicycle Route	1	0.12 mi	$1,200
Class IV Protected Bikeway	3	2.30 mi	$15,444,200
Sidewalk	23	15,570 ft	$2,024,100
Pedestrian Scale Lighting	2	1.14 mi	$5,140,000
Bicycle Approaches & Conflict Zones	13		$1,697,300
New Crosswalks & Crossing Enhancements	14		$541,300
Motorized Transportation Improvements	7		$14,214,700
Bus Stop Enhancements	12		$618,600
		Corridor Total	**$38,093,300**

5.4 Funding Sources

A variety of existing transportation funding sources as well as those more specifically aligned with bicycle and pedestrian implementation exist. Most are limited to new construction, though some may offer funds for maintenance of existing facilities. Capital projects like those recommended in the ORHCEP are typically funded through a combination of sources, and not one single source.

Where possible, frontage improvement conditions for new development should include relevant projects identified in the ORHCEP.

Local and Regional Funding Sources

Transportation Funds for Clean Air

The Transportation Funds for Clean Air program, established by Assembly Bill (AB) 434, is funded by a $4 vehicle registration surcharge in the nine Bay Area counties. Eligible projects include those that reduce vehicle emissions, active transportation projects, and others. Funds may also be used as a match for competitive state or federal programs. This program is administered by the Bay Area Air Quality Management District (BAAQMD) and the Sonoma County Transportation Authority (SCTA).

Bicycle Facilities Grant Program

The Bicycle Facilities Grant Program funds bicycle projects that reduce emissions from on-road vehicles and improve air quality. Both on-street facilities and amenities such as bicycle parking are eligible. This program is administered by the BAAQMD.

One Bay Area Grants

One Bay Area funds are administered by SCTA in Sonoma County. The funding program prioritizes projects within Priority Development Areas as defined by MTC and in line with housing and land use goals.

Transportation Development Act Article 3 (TDA 3)

TDA 3 funds bicycle and pedestrian projects each year, with two percent of all TDA funds collected in the county going toward TDA 3 projects. MTC requires all projects be reviewed by a Bicycle and Pedestrian Advisory Commission or similar group before approval. Funds are administered locally by SCTA.

Measure M (2004)

Measure M in 2004 established a one-quarter cent sales tax in Sonoma County to fund transportation projects, including maintenance and safety projects. Four percent of funds are allocated to bicycle and pedestrian projects. This program is administered by SCTA.

State and Federal Funding Sources

Active Transportation Program (ATP)

The ATP was created by SB 99 to encourage increased use of active modes of transportation, such as walking and biking. ATP consolidated various transportation programs into a single program and was originally funded at about $123 million a year from a combination of state and federal funds. Senate Bill 1 (SB 1) directed an additional $100 million annually to the ATP (see SB 1 – Road Repair and Accountability Act, below). The goals of the ATP include, but are not limited to, increasing the proportion of trips accomplished by walking and biking, increasing the safety and mobility of non-motorized users, advancing efforts of regional agencies to achieve greenhouse gas (GHG) reduction goals, enhancing public health, and providing a broad spectrum of projects to benefit many types of users including disadvantaged communities. Application cycles occur approximately every two years, typically in late spring or summer. Funding is awarded at both the state level though the Californian Transportation Commission (CTC) and at the regional level through the Metropolitan Transportation Commission (MTC).

Affordable Housing and Sustainable Communities Program (AHSC)

The Affordable Housing Sustainable Communities (AHSC) Program funds land-use, housing, transportation, and land preservation projects to support infill and compact development that reduce GHG emissions. The program assists project areas by providing grants and/or loans, or any combination thereof, that will achieve GHG emissions reductions and benefit Disadvantaged Communities through increasing accessibility of affordable housing, employment centers, and key destinations via low-carbon transportation resulting in fewer vehicle miles traveled through shortened or reduced trip length or mode shift from single occupancy vehicle use to transit, bicycling, or walking. The three Project Area types include:

– Transit Oriented Development Project Areas
– Integrated Connectivity Project Areas
– Rural Innovation Project Areas

SB 1 – Road Repair and Accountability Act

The “Road Repair and Accountability Act” of 2017 (SB 1) invests $54 billion over a decade to repair roads, improve traffic safety, and expand public transit systems across California, with funds split equally between state and local investments. SB 1 directs $100 million annually to the ATP to fund infrastructure projects, program implementation, and plan development to increase bicycling and walking. SB1 funds come to the Town either directly or through one of several competitive programs.

Highway Safety Improvement Program

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance.

Local Roadway Safety Plan

A Local Road Safety Plan (LRSP) identifies and analyzes systemic safety problems and makes recommendations for safety improvements. The process of preparing an LRSP facilitates the development of local agency partnerships and results in a prioritized list of improvements and actions that can be used to apply for federal and State funds. Beginning in 2022, an LRSP or equivalent document will be required for an agency to be eligible for HSIP funds. Agencies can apply for State funding to assist with the development of their LRSP. Windsor has recently completed and adopted the Windsor LRSP in November 2021.

Local Highway Bridge Program (HBP)

The Local Highway Bridge Program (HBP) replaces or rehabilitates public highway bridges over waterways, other topographical barriers, other highways, or railroads when the State and the Federal Highway Administration (FHWA) determine that a bridge is significantly important and qualifies under the HBP program guidelines. Reimbursable scopes of work include replacement, rehabilitation, painting, scour countermeasures, and preventative maintenance activities.

Sustainable Transportation Planning Grants

Caltrans Sustainable Transportation Planning Grants are available to communities for planning, study, and design work to identify and evaluate projects, including conducting outreach or improving pilot projects. Communities are typically required to provide an 11.47 percent local match, with staff time or in-kind donations both eligible to be used towards the match.

5.5 Next Steps

The ORHCEP is not the conclusion of this project—it is a beginning. This document outlines technical analysis, community input, and the desires of local and regional stakeholder agencies to present a vision for improvements along the Old Redwood Highway corridor.

To make this vision a reality, these improvements will require additional approvals, analysis, and funding before construction can occur. Some improvements or segments 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 the ORHCEP in the countywide transportation plan and MTC's Regional Transportation Plan/Sustainable Community Strategy
- Conduct Intersection Control Evaluation (ICE) analyses at necessary locations
- Develop more detailed engineering design for improvements to determine right of way needs, utility conflicts or necessary relocations, and additional studies needed
- Complete additional studies or analysis required to secure necessary permits from the Regional Water Control Board, Caltrans, and other agencies
- Develop and certify an environmental document that captures anticipated impacts and required mitigation measures for proposed improvements
- Secure funding for preconstruction, design, and construction activities

Appendix A

Background

Guiding Documents

Town of Windsor 2040 General Plan

The Windsor 2040 General Plan, adopted in 2018, includes nine policies aimed at improving connectivity, cohesiveness, and functionality of the 100-year-old Old Redwood Highway. Three mixed-use nodes are designated along the corridor, aimed at spurring the revitalization of ORH. The General Plan outlines the following vision for ORH:

> *Old Redwood Highway is an active mixed-use corridor that supports multiple options for travel, including walking and bicycling, and provides vital connections between the Downtown and other areas of Windsor as well as nearby communities.*

To achieve this vision, the General Plan emphasizes providing Complete Streets with facilities and amenities that meet the needs of all users regardless of their age or ability, or whether they are walking, bicycling, taking transit, or driving. The Plan's Transportation and Mobility Element includes 10 overall goals related to: Multimodal Circulation System, Complete Streets, Streets and Roadway, Walkable and Bikeable Community, Public Transit, Parking, Aviation, Goods Movement, Funding Mechanisms, and Regional Coordination.

General Plan policies related to circulation specific to ORH include the following:

- Enhance the north and south entrances into the Town with distinctive gateways and streetscaping.
- Create wide sidewalks, bicycle lanes, consistent landscaping and wayfinding signs.
- Existing driveways should be consolidated and new driveways and curb cuts should be limited as much as possible.

Windsor Station Area/Downtown Specific Plan ("Station Area Plan")

The Station Area/Downtown Specific Plan (adopted in 2012, amended in 2013) seeks to establish a cohesive transit-oriented community with links to the Downtown core and the region. The Circulation and Access chapter of the Station Area Plan focuses on fostering a well-defined and safe network for pedestrians and bicyclists. Specific focus areas include:

- Pedestrian and Bicycle Connections
- Station and Transit Access
- Street Network
- Parking and Transportation Demand Management

Connectivity goals of the Station Area Plan include:

- Ensure that the street network is well connected.
- Ensure that streets continue to operate at levels of service that are acceptable for Windsor's multimodal Downtown core.
- Balance parking needs with the desire to promote transit, walking and biking.
- Reduce transportation demand by promoting alternative modes of transportation and ridesharing.
- Foster an accessible and safe street environment for bicyclists.
- Improve pedestrian and bicycle connectivity to transit, housing, employment, and major destinations.

Along ORH, the Station Area Plan calls for "distinct intersection configurations" at two intersections: Windsor Road and Windsor River Road. These intersections should serve as visual gateways to Downtown and incorporate distinctive plantings, public art, signage and lighting; the Station Area Plan also recommends incorporating roundabouts. On-street parking should be avoided along ORH and gaps in the pedestrian and

bicycle network should be filled. The roadway segment between Windsor Road and Windsor River Road is a key location for planned pedestrian and bicycle improvements.

Connecting Central Windsor

The 2018 Connecting Central Windsor Plan aims to address deficiencies of the aging US Highway 101 at Central Windsor underpass on ORH and work towards the Town's goal of creating a more cohesive and walkable downtown area. Connecting Central Windsor incorporates a transportation planning study for Central Windsor, a beautification study for the US 101 underpass on Old Redwood Highway, and five engineering feasibility studies. Integrating public input, urban planning and design, architecture, and engineering, the study evaluates and develops design solutions that achieve community goals.

The Study analyzes existing challenges and then develops alternative solutions to:

- Improve the existing US 101/ORH crossing and create a new dedicated bicycle and pedestrian crossing.
- Improve connectivity and walkability by making it easier, safer, and more inviting to walk and bike in Central Windsor in the vicinity of the US 101/ORH underpass.
- Improve urban coherence through placemaking and pathmaking and by identifying unifying active transportation design strategies.
- To achieve the overall vision of creating a more cohesive and walkable downtown area, the Connecting Central Windsor Plan makes specific recommendations for improvements along ORH.
- Improve bicyclist safety by adding bi-directional protected bike lanes on both sides of ORH between Conde Lane and Lakewood Drive.
- Make the US 101 at Central Windsor underpass a friendlier and more inviting gateway that attracts bicyclists and pedestrians by widening the space under US 101 using new tie-back walls and adding lighting, landscaping, color, and artwork.
- Reduce traffic delay on ORH by adding a slip lane to US 101 north at the intersection of Lakewood Drive and ORH.
- Accommodate expected increases in pedestrian traffic by adding a pedestrian crossing warning sign and pedestrian activated flashing LEDs at the existing US 101 northbound on-ramp at ORH.
- Develop a pedestrian promenade, mixing zone, and public open space between the Chevron and Shell gas stations and provide a footbridge over Windsor Creek for cyclists and pedestrians traveling north-south to avoid the busy intersection at ORH and Conde Lane. Connecting Central Windsor also recommends a wetland delineation report be completed prior to development.

Local Hazard Mitigation Plan

The 2017 Local Hazard Mitigation Plan (LHMP) outlines Windsor's strategy to reduce the impacts of natural hazards. The LHMP outlines four phases of emergency management: response, recovery, mitigation, and preparedness, with hazard mitigation as the primary focus.

The LHMP has five general goals:

- Provide a safe and healthy environment for all Windsor residents, businesses, employees, and visitors.
- Minimize the risks to lives and properties due to hazards.
- Maintain a high level of emergency preparedness to respond to human-caused or natural disasters.
- Provide for rapid resumption of impacted economic activity and community services.
- Ensure the effective procurement of grants and other funding sources.

The primary evacuation route in Windsor is US Highway 101, which runs diagonally through the town and provides access to Sonoma County and Mendocino County to the north and Sonoma County, Marin County, and San Francisco to the south. ORH runs parallel to US 101 and is the primary surface street that can serve as an evacuation route.

Sonoma County Climate Action 2020 Plan

The Sonoma County Climate Action 2020 Plan, adopted in 2016[3], is a collaborative effort among all nine cities and the County of Sonoma to address greenhouse gas (GHG) emissions and respond to the threats of climate change. The countywide goal for GHG emissions is to be 80 percent below 1990 levels by 2050. This document presents a community GHG emissions profile for each of the nine cities, including the Town of Windsor. The chart displaying Windsor 2010 Community GHG Inventory by Source data illustrates that the majority of emissions (57 percent) are from transportation, due to fossil fuel combustion in personal and light duty vehicles.

The Climate Action 2020 Plan outlines 10 measures for the Town of Windsor to achieve the goal of reducing emissions related to transportation:

Measure 5-R1 Improve and increase transit service: Look for opportunities to increase bus service, implement bus preferential treatments, implement bus rapid transit (BRT) and/or express service, improve transit marketing, and improve transit amenities.

Measure 5-R2 Support transit measures: Work with Sonoma County Transit and other transit service providers to amend routes to serve unmet needs, locations, improve frequencies and hours within each community. Look for cross-jurisdictional grant opportunities to fund transit studies and improvements. Support system-wide roll-out of real-time bus arrival information at bus stops, online, and via mobile devices for all transit agencies serving the county.

Measure 5-R3 Sonoma-Marin Area Rail Transit: Ensure policies support the Sonoma-Marin Area Rail Transit (SMART) corridor, such as transit-oriented development at planned SMART stations, future local transit planning for SMART, and pedestrian and bicycle facilities to connect to SMART stations.

Measure 5-R4 Trip Reduction Ordinance: Support employer-based transportation demand management (TDM) program efficiency. Look for opportunities for small businesses to share resources and/or create transportation management associations. Consider district-wide TDM programs in specified business districts. Support development of municipal-specific TDM programs. Consider recommendations to local agencies for TDM program requirements for new developments such as transit subsidies or parking cash-out.

Measure 5-R5 Supporting measures for the Transportation Demand Management program: The jurisdictions may develop a TDM program for employers which may include the strategies mentioned above and assist interested employers in implementing strategies, and may offer financial incentives for employers.

Measure 5-R6 Reduced cost transit passes: Where subsidized transit pass provision is not a mandatory requirement, it is nonetheless encouraged.

Measure 5-R7 Alternative travel marketing and optimize online services: Ensure projects comply with any adopted requirements for marketing alternative transportation services.

Measure 5-R8 Safe Routes to School: Ensure projects comply with adopted safe routes to school requirements.

Measure 5-R9 Car sharing program: RCPA/SCTA would be the lead agency to implement this measure, and would work with the Sonoma County Air Resources Team and find funding for or subsidize mobile device infrastructure needed to implement a car sharing program.

Measure 5-R10 Bike sharing program: SCTA would be the lead agency to implement the development of a bike sharing program. SCTA and each community would need to coordinate to find funding sources to implement a bike-share program and to identify the most appropriate service areas. BAAQMD and/or Northern Sonoma County Air Quality District could be a source of funding for such a program.

[3] The Town of Windsor did not adopt the Sonoma County Climate Action 2020 Plan because the Environmental Impact Report (EIR) for the project was not certified.

Sonoma County Bicycle and Pedestrian Plan

The 2010 Sonoma County Bicycle and Pedestrian Plan (SCBPP) was a major update to the prior version adopted in 1997, and is based on the following vision:

> *Establish a viable transportation alternative to the automobile for residents of Sonoma County through a safe and convenient bicycle and pedestrian transportation network, well integrated with transit, that will reduce greenhouse gas emissions, increase outdoor recreational opportunities, and improve public health.*

To achieve this vision, the SCBPP outlines nine key objectives, which are:

> Objective 1: Design, construct and maintain a comprehensive Bikeways Network that links the County's cities, unincorporated communities, and other major activity centers including, but not limited to, schools, public facilities, commercial centers, recreational areas and employment centers.
>
> Objective 2: Reduce Sonoma County's greenhouse gas emissions by achieving a non-motorized trips mode share of 5% for all trips and 10% for trips under five miles long by 2020.
>
> Objective 3: Encourage pedestrian, bicycle, and transit-oriented development.
>
> Objective 4: Increase use of non-motorized modes for commute trips by providing safe, convenient routes and adequate end of trip facilities at workplaces, with an emphasis on facilities that have potential to close gaps in the network and/or reduce shorter trips.
>
> Objective 5: Provide incentives for business and government to increase the use of walking and bicycling by employees for both commuting and daily operations.
>
> Objective 6: Reduce bicycle and pedestrian accidents per mile traveled by at least 2% per year.
>
> Objective 7: Provide a diverse range of recreational opportunities through a well-designed network of bikeways, multi-use trails, sidewalks, and related support facilities.
>
> Objective 8: Increase the safety, convenience, and comfort of all pedestrians and bicyclists, by eliminating the potential obstacles to this mode choice that is associated with the lack of continuous and well-connected pedestrian walkways and bicycle facilities, and the lack of safe crossing facilities, especially focusing on short trips that could result in a decrease in automobile travel.
>
> Objective 9: Develop alternative mode trip and accident databases, to improve safety, allow regional coordination of improvements, and travel model development to improve the level of quantitative evaluation.

Windsor, CA Sustainable Design Assessment: Old Red Going Green

The 2008 Sustainable Design Assessment (SDAT): Old Red Going Green Report aims to move Windsor toward a sustainable future that achieves a balance between culture, environment, and economic systems. Goals and strategies related to transportation are outlined in the Connectivity and Land Use chapter as well as the Mobility and Transportation chapter of the report. Key transportation goals identified in the report include:

Strengthen connectivity: Utilize the natural stream network to incorporate scenic and functional creekside trails. Expand and improve non-motorized connections to abundant recreation resources and natural landscapes, which attract tourists. Expand bicycle and pedestrian connections to the SMART commuter rail. Close gaps between existing sidewalks and bicycle facilities.

"Green" the existing transportation network: Create a transit and pedestrian friendly community that is safe and enjoyable to use. Re-allocate road space for bicycling and walking and continue expanding space dedicated to non-motorized travel. Encourage walking and biking to school. Use roundabouts to enhance the greenway concept.

The report also makes specific recommendations for ORH:

– Develop a series of greenways with separated bike lanes that link open spaces and shopping districts along ORH.
– Improve transit along ORH by increasing the frequency of stops, improving the design of bus stops, and educating community members about transit at special events like the 4th of July celebration and summer events at Town Green.
– Manage downtown parking.

Town of Windsor Class I Bicycle and Pedestrian Trails Study

The 2018 Class I Bicycle and Pedestrian Trails Study provides guidance on trail improvements and provides recommendations for new trails within Windsor's Town Limits and surrounding areas, with a focus on Class I multi-use paths that improve connectivity to local destinations. The Study builds on the Town's 2014 Bicycle and Pedestrian Master Plan and the 2017 Parks and Recreation Master Plan to provide an overall vision for trails within the Town and provides an in-depth focus on existing and proposed Class I trails. The Study discusses design considerations including Americans with Disabilities Act (ADA) accessibility, trail surface and sustainability, environmental considerations, implementation costs, and other features essential to a community trails network. The goal of the study is to implement a network of trails to serve the bicycling and walking needs of a healthy community.

Town of Windsor Bicycle and Pedestrian Master Plan

Sonoma County Transportation Authority developed the Windsor Bicycle and Pedestrian Master Plan (WBPMP) during the development of the Countywide Bicycle and Pedestrian Master Plan. The WBPMP was adopted in 2014. It serves as a standalone document for the Town of Windsor to implement local projects as well as a countywide document to improve coordination for bicycle and pedestrian planning. The principal goal of the WBPMP is:

> *To develop and maintain a comprehensive countywide bicycle and pedestrian transportation system, which includes projects, programs, and policies that work together to provide safe and efficient transportation opportunities for bicyclists and pedestrians.*

Because the WBPMP was developed as a component of the Countywide Plan, it adopts the same set of nine objectives that are listed under the County Plan summary.

Town of Windsor Traffic Impact Fee Study

The Town of Windsor Traffic Impact Fee Study was adopted in 2020. Developing the updated Traffic Impact Fee (TIF) involved four key tasks, including a list of projects, project costs, trip generation, and cost per trip. TIFs are typically paid prior to the issuance of a building permit and are used to regulate land use and mitigate the transportation impacts associated with new development. A list of 25 projects was assembled for the TIF, which were based on the prior TIF, General Plan, and the Capital Improvement Program.

Out of the 25 projects identified in the TIF, 13 are located along Old Redwood Highway:

1. Arata Ln Interchange (Project 1.2): Replacing the Highway 101 overcrossing to provide lane capacity and enhanced bicycle and pedestrian facilities. The western limits of the project intersect ORH.
2. Downtown Bike and Pedestrian Crossing of US 101 Phase 1 (Project 3.1): Widening the space under US 101 and including lighting, landscape, and color to make a more inviting entryway. The project includes bike lanes and a pedestrian path.
3. Downtown Bike and Pedestrian Crossing of US 101 Phase 2 (Project 3.2): Constructing a pedestrian overcrossing from ORH to Los Amigos Rd.
4. Old Redwood Highway, from Hembree Ln to Shiloh Rd (Project 5): Widening the road to add a two-way turn lane, parking on both sides of the road, and a bike lane.

5. Old Redwood Highway, from Town Limits to Windsor Rd (Project 6): Widening the roadway and improvements to sidewalk, curb, gutter, storm drainage, traffic striping and signal modifications.
6. Old Redwood Highway Bridge Crossing, Soyotome Creek (Project 11.1): Replacing the bridge on ORH at the Soyotome Creek crossing to widen it and improve safety.
7. Old Redwood Highway Bridge Crossing, Pool Creek (Project 11.2): Replacing the bridge on ORH at the Pool Creek crossing to widen it and improve safety.
8. Old Redwood Highway Bridge Crossing, Faught Creek (Project 11.3): Replacing the bridge on ORH at the Faught Creek crossing to widen it and improve safety.
9. Old Redwood Highway at Starr Rd (Project 13): Reconfiguring the intersection to add a second northbound turn lane on ORH and a second westbound receiving lane on Starr Rd.
10. Old Redwood Highway at Shiloh Rd (Project 15): Reconfiguring the intersection to add a second northbound turn lane on ORH and a second westbound receiving lane on Shiloh Rd.
11. Lakewood Drive at Old Redwood Highway (Project 17): Widening the north side of ORH to provide a right turn lane to northbound Lakewood Dr, widening the west side of Lakewood Dr to provide an additional right turn lane to westbound ORH, and adding a traffic signal at the on-ramp intersection.
12. ADA Compliant Ramps (Project 18): Modifying approximately 430 pedestrian ramps throughout the Town to be ADA compliant.
13. Class I Bicycle/Pedestrian Facilities (Project 19): Constructing Class I trails for pedestrian and bicycle use throughout the Town.

Windsor Parks and Recreation Master Plan

The Windsor Parks and Recreation Master Plan was adopted in 2017 and outlines a vision to be implemented through 2030. The Master Plan aims to create an integrated network of parks and open space which will serve the evolving needs of residents and enhance their quality of life. The Master Plan provides a long-term vision for the Town's parks system and specific policies and standards to guide short-term decisions. In addition to parks, it also makes recommendations for trails. The northwest and southeast areas of Town are identified as priority areas to improve park access because they are currently underserved. Another priority is to maximize the usability of Windsor's parks, which entails expanding the uses and amenities provided, such as those for bicyclists and pedestrians like bike lockers and water fountains.

Storm Drain Master Plan

The 2017 Storm Drain Master Plan is an analysis of the Town's major storm drainage facilities, which includes the existing storm drain pipeline network, open channels, and the primary creeks and their tributaries located within the Town's watershed. Projects listed are intended to improve storm drainage, reduce flood hazard, and repair or replace drainage related facilities. Several of the recommended storm drainage improvement projects (SDIPs) are along or near creeks or adjacent to areas that have potential Class I trails.

Civic Center Visioning Plan

The 2017 Civic Center Visioning Plan is the guiding document for the development of Downtown Windsor. It provides guidance on future growth and urban form, recommendations for fiscal implementation and improving the retail environment, and addresses mobility and parking challenges. The document outlines three key objectives related to its vision for the circulation network:

– Critical axes establish the visual aesthetic view of the corridors that connect the Civic Center, Town Green, and the downtown. The critical axes create the basis for the network of streets and pedestrian paths within the Civic Center.
– Ensure that the existing street network from the neighborhoods west of the Civic Center is continued, for improved connectivity with the new development on the east.
– Identify opportunities for introducing gateway elements and landmarks in the Study Area, Town Green and Downtown.

Windsor Compete Streets Guidelines

Windsor's 2013 Complete Streets Guidelines outline a roadway design standard so that streets accommodate all users in the Town, including pedestrians, bicyclists, transit riders, drivers of passenger vehicles, buses, and trucks. The street design guidelines are intended to serve the following purposes:

– Provide designers with the information they need to complete their designs and provide staff with the criteria they will use to review project submittals.
– Establish one set of street design guidelines so that everyone involved in Windsor Street design is utilizing the same principles and standards of design rather than differing or conflicting guidelines.
– Implement the General Plan policies relative to the design and function of streets within the Town of Windsor.
– Incorporate "Complete Streets" concepts into public and private street designs to create equality in travel for all users, including pedestrians, bicyclists, transit riders, and motorists.
– Comply with the California Complete Streets Act of 2008, which requires jurisdictions to consider all modes of transportation when revising their General Plan Circulation Element.

NACTO Urban Street Design Guidelines

The National Association of City Transportation Officials (NACTO) Urban Street Design Guidelines are meant to serve as a blueprint for designing 21st century streets, focusing on city streets and public spaces. The Guide outlines a vision for Complete Streets and a roadmap for how to create them. The guidelines are broken into six sections, including Streets, Street Design Elements, Interim Design Standards, Intersections, Intersection Design Elements, and Design Controls. For the topics and treatments that are covered, three levels of guidance are provided:

– Critical Features are elements for which there is a strong consensus of absolute necessity.
– Recommended Features are elements for which there is a strong consensus of added value.
– Optional Features are elements that may vary across cities and may add value, depending on the situation.

NACTO Urban Bikeway Design Guide

The NACTO Urban Bikeway Design Guide is based on the experience of the best-designed bicycling cities around the world. The primary objective of the guide is to provide cities with "state-of-the-practice" solutions that can help create Complete Streets that are safe and enjoyable for bicyclists. Similar to the Urban Street Design Guidelines, the Guide provides three levels of guidance, including required features, recommended features, and optional features. The Guide is divided into six sections, including Bike Lanes, Cycle Tracks, Intersections, Signals, Signing and Marking, and Bicycle Boulevards.

Toward an Active California State Bicycle and Pedestrian Plan

Toward an Active California (2017) is the first statewide bicycle and pedestrian plan and aims to support travel by bicyclists and pedestrians through objectives, strategies, and actions. It outlines the following vision:

> *By 2040, people in California of all ages, abilities, and incomes can safely, conveniently, and comfortably walk and bicycle for their transportation needs.*

Four key objectives guide Toward an Active California, including:

– Safety - Reduce the number, rate, and severity of bicycle and pedestrian involved collisions.
– Mobility - Increase walking and bicycling in California.
– Preservation - Maintain a high-quality active transportation system.
– Social Equity - Invest resources in communities that are most dependent on active transportation and transit.

Traffic Conditions

Study Intersections

The below table lists the study intersections and their control type. The intersection list was compiled using the intersections from the Collisions Report. Intersections used for ADT analysis were selected from the list below.

Table A-1: Study Intersections

Intersection	Traffic Control
1. Old Redwood Hwy & US 101 SB Ramps	Signal
2. Old Redwood Hwy & Starr Rd	Signal
3. Old Redwood Hwy & Arata Ln	Signal
4. Old Redwood Hwy & Miller Ln	TWSC
5. Old Redwood Hwy & Rio Ruso Dr	TWSC
6. Old Redwood Hwy & Dawn Way	TWSC
7. Old Redwood Hwy & Windsor Rd	RNDBT
8. Old Redwood Hwy & Bark St	TWSC
9. Old Redwood Hwy & Market St	RNDBT
10. Old Redwood Hwy & Richardson St	TWSC
11. Old Redwood Hwy & Windsor River Rd	Signal
12. Old Redwood Hwy & US 101	Signal
13. Old Redwood Hwy & Lakewood Dr	Signal
14. Old Redwood Hwy & 3rd St	TWSC
15. Old Redwood Hwy & Courtyards E	TWSC
16. Old Redwood Hwy & Bluebird Dr	TWSC
17. Old Redwood Hwy & Aiden Ln	Signal
18. Old Redwood Hwy & Windsor Palms Dr	TWSC
19. Old Redwood Hwy & Hembree Ln	Signal
20. Old Redwood Hwy & Shadetree Dr	TWSC
21. Old Redwood Hwy & Viking Ct	TWSC
22. Old Redwood Hwy & Anish Way	TWSC
23. Old Redwood Hwy & Billington Ln	TWSC
24. Old Redwood Hwy & Deanna Pl	TWSC
25. Old Redwood Hwy & Anna Dr	TWSC
26. Old Redwood Hwy & Tamara Way	TWSC
27. Old Redwood Hwy & Merner Dr	TWSC
28. Old Redwood Hwy & Kendall Dr	TWSC
29. Old Redwood Hwy & Shiloh Rd	Signal
30. Shiloh Rd & US 101	Signal
31. Arata Ln & US 101	Signal
32. Old Redwood Hwy & 4th St	TWSC
33. Old Redwood Hwy & Pleasant Ave	Signal

Average Daily Traffic (ADT) Counts

The Average Daily Traffic (ADT) data was collected from the Sonoma County Transportation Authority (SCTA) travel demand model. ADT data was collected for daily, AM peak hour, and PM peak hour volumes for both 2015 and 2040. All study intersections are included in the tables below; however, some intersections did not have available data.

Table A-2: 2015 Average Daily Traffic Volume

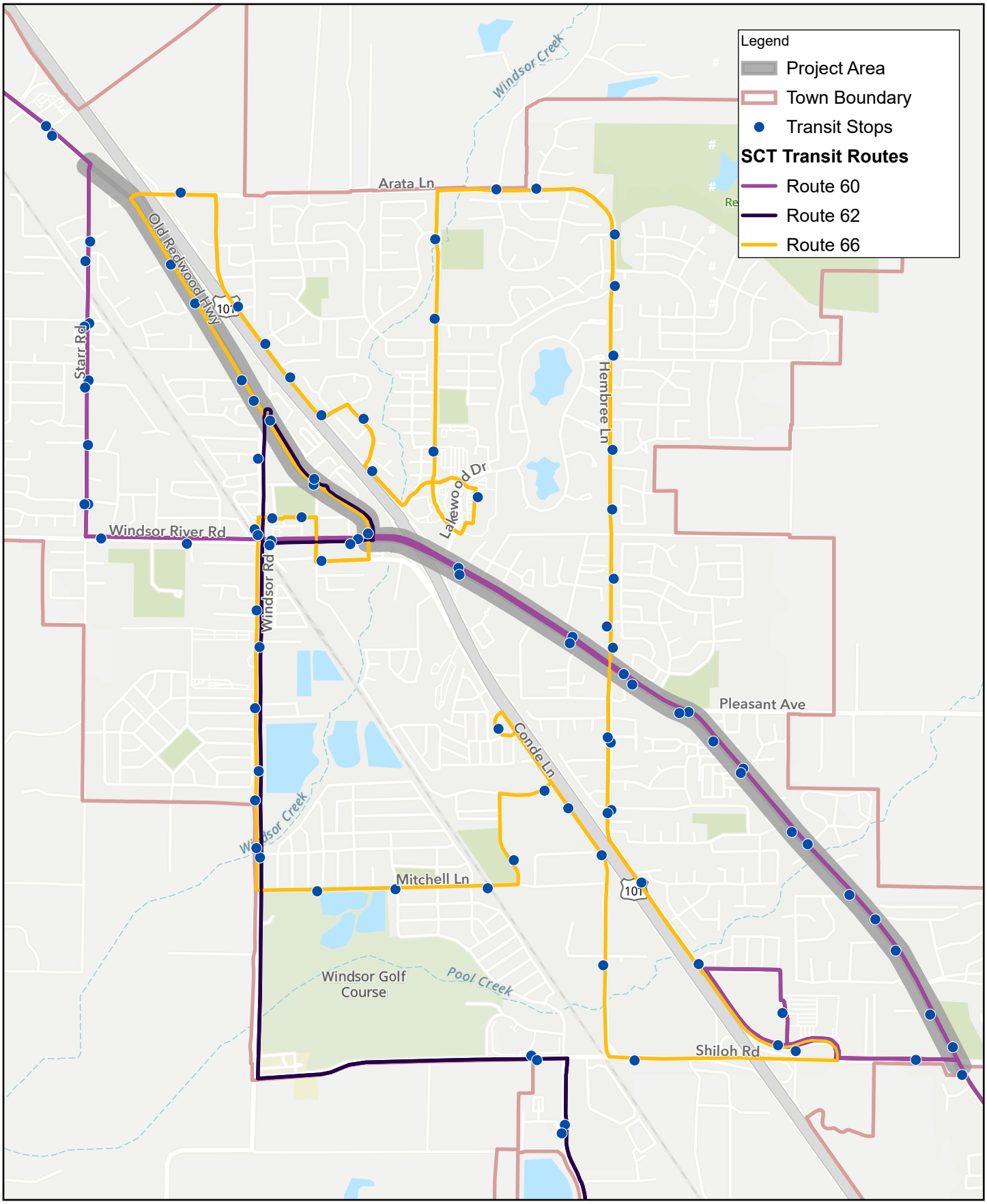
Intersection	NB	SB	EB	WB
1. Old Redwood Hwy & US 101 SB Ramps	3,000	817		4,443
2. Old Redwood Hwy & Starr Rd	3,979	4,794		3,812
3. Old Redwood Hwy & Arata Ln	4,318	5,767		2,217
4. Old Redwood Hwy & Miller Ln				
5. Old Redwood Hwy & Rio Ruso Dr				
6. Old Redwood Hwy & Dawn Way				
7. Old Redwood Hwy & Windsor Rd	1,959		2,985	3,690
8. Old Redwood Hwy & Bark St				
9. Old Redwood Hwy & Market St	342	2,111	2,195	4,886
10. Old Redwood Hwy & Richardson St				
11. Old Redwood Hwy & Windsor River Rd	4,474	3,194	13,119	5,345
12. Old Redwood Hwy & US 101		3,471	10,899	21,083
13. Old Redwood Hwy & Lakewood Dr	17,594	11,405	6,940	6,760
14. Old Redwood Hwy & 3rd St				
15. Old Redwood Hwy & Courtyards E				
16. Old Redwood Hwy & Bluebird Dr				
17. Old Redwood Hwy & Aiden Ln				
18. Old Redwood Hwy & Windsor Palms Dr				
19. Old Redwood Hwy & Hembree Ln	353	4,769	3,535	5,903
20. Old Redwood Hwy & Shadetree Dr				
21. Old Redwood Hwy & Viking Ct				
22. Old Redwood Hwy & Anish Way	3,311	4,085		
23. Old Redwood Hwy & Billington Ln				
24. Old Redwood Hwy & Deanna Pl				
25. Old Redwood Hwy & Anna Dr				
26. Old Redwood Hwy & Tamara Way	3,978	4,752		
27. Old Redwood Hwy & Merner Dr				
28. Old Redwood Hwy & Kendall Dr				
29. Old Redwood Hwy & Shiloh Rd	5,256	5,430	2,369	78
30. Shiloh Rd & US 101	9,087		3,145	5,799
31. Arata Ln & US 101	3,606	728	5,339	3,097
32. Old Redwood Hwy & 4th St				
33. Old Redwood Hwy & Pleasant Ave	3,31	4,309		268

Table A-3: Peak Hour Volumes

Intersection	AM Peak Hour				PM Peak Hour			
	NB	SB	EB	WB	NB	SB	EB	WB
1. Old Redwood Hwy & US 101 SB Ramps	799	214		718	976	452		687
2. Old Redwood Hwy & Starr Rd	902	702		683	888	946		841
3. Old Redwood Hwy & Arata Ln	673	819		730	688	977		718
4. Old Redwood Hwy & Miller Ln								
5. Old Redwood Hwy & Rio Ruso Dr								
6. Old Redwood Hwy & Dawn Way								
7. Old Redwood Hwy & Windsor Rd	197		632	554	258		579	513
8. Old Redwood Hwy & Bark St								
9. Old Redwood Hwy & Market St	119	243	456	700	354	296	432	698
10. Old Redwood Hwy & Richardson St								
11. Old Redwood Hwy & Windsor River Rd	471	554	611	1,637	672	694	754	1,608
12. Old Redwood Hwy & US 101		411	1,259	1,458		578	1,671	1,434
13. Old Redwood Hwy & Lakewood Dr	1,779	952	570	985	2,236	1,129	1,083	841
14. Old Redwood Hwy & 3rd St								
15. Old Redwood Hwy & Courtyards E								
16. Old Redwood Hwy & Bluebird Dr								
17. Old Redwood Hwy & Aiden Ln								
18. Old Redwood Hwy & Windsor Palms Dr								
19. Old Redwood Hwy & Hembree Ln	33	608	571	659	103	502	1,139	517
20. Old Redwood Hwy & Shadetree Dr								
21. Old Redwood Hwy & Viking Ct								
22. Old Redwood Hwy & Anish Way	563	410			477	671		
23. Old Redwood Hwy & Billington Ln								
24. Old Redwood Hwy & Deanna Pl								
25. Old Redwood Hwy & Anna Dr								
26. Old Redwood Hwy & Tamara Way	416	643			602	681		
27. Old Redwood Hwy & Merner Dr								
28. Old Redwood Hwy & Kendall Dr								
29. Old Redwood Hwy & Shiloh Rd	932	801	403	29	1,219	777	909	23
30. Shiloh Rd & US 101	1,123		428	720	941		502	1,072
31. Arata Ln & US 101	577	116	689	964	478	57	916	986
32. Old Redwood Hwy & 4th St								
33. Old Redwood Hwy & Pleasant Ave	563	434		107	477	776		55

Existing Transit Routes and Stops

The Old Redwood Highway corridor is served by several Sonoma County Transit routes offering local and regional connections. The figure on the following page shows existing routes and stops in the study area.



Paper Size ANSI A

0 500 1,000 1,500 2,000

US Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California II FIPS 0402 Feet

N

GHD

Town of Windsor
Old Redwood Highway Corridor Enhancement Plan

Existing Transit Service

Project No. 11213480
Revision No. -
Date Dec 2021

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Basemap: Esri World Topo Map (Esri, Garmin, HERE, Intermap, increment P, NGA, NASA, USGS, BLM, EPA/NPS, US Census, USDA) with custom vector tile edits from GHD. Previously Proposed and Existing Bicycle Facilities: SCTA. ORHCEP Recommendations: GHD. City Boundary: TIGER.
Created by: pthornton

Level of Traffic Stress Methodology

Level of Traffic Stress (LTS) analysis is based upon methodology described in the Oregon Department of Transportation (ODOT) "Analysis Procedures Manual Version 2, Chapter 14, Multimodal Analysis," (October 2020). The ODOT Bicycle LTS methodology is adapted from methodology reported in *Low Stress Bicycling and Network Connectivity,* Report 11-19, published by the Mineta Transportation Institute (MTI) (May 2012). The LTS methodology as reported by ODOT's latest Multimodal Analysis Procedure Manual includes updates to the methodology that was originally published by MTI. The updated methodology includes analysis criteria for new bicycle facility types that have become more popularly used since the original report was published and considers additional infrastructure types not analyzed under the MTI methodological approach.

LTS methodology includes an approach for analyzing the traffic stress of roadway segments, intersection crossings and intersection approaches. For the purposes of the Project, only Segment LTS was analyzed to provide a comparison against the preliminary gap assessment. While an inventory of infrastructure at intersection approaches and crossings was completed during the data collection phase, a more detailed examination of the characteristics of intersection crossings and approaches occurred during the recommendation phase that followed. In the LTS analysis, segments categorized as "good" in the preliminary gap assessment were analyzed first to mitigate the immediate inconsistencies between the gap assessment and the level of traffic stress of the existing infrastructure. The final LTS analysis presented herein includes an assessment of the whole ORH corridor.

While the LTS analysis does not analyze pedestrian facilities, the results of the LTS analysis can serve as a proxy for assessing the level of traffic stress of pedestrian facilities in some capacity. The LTS analysis highlights roadway characteristics that can result in high stress circumstances for both bicyclists and pedestrians, such as roadway width and speed. Locations with gaps in the existing bicycle infrastructure, or those with infrastructure in poor condition can exhibit similar characteristics in pedestrian infrastructure based on existing roadway characteristics and the surrounding land use context.

The bicycle level of traffic stress methodology considers a variety of roadway infrastructure characteristics to determine the LTS score of a roadway, including:

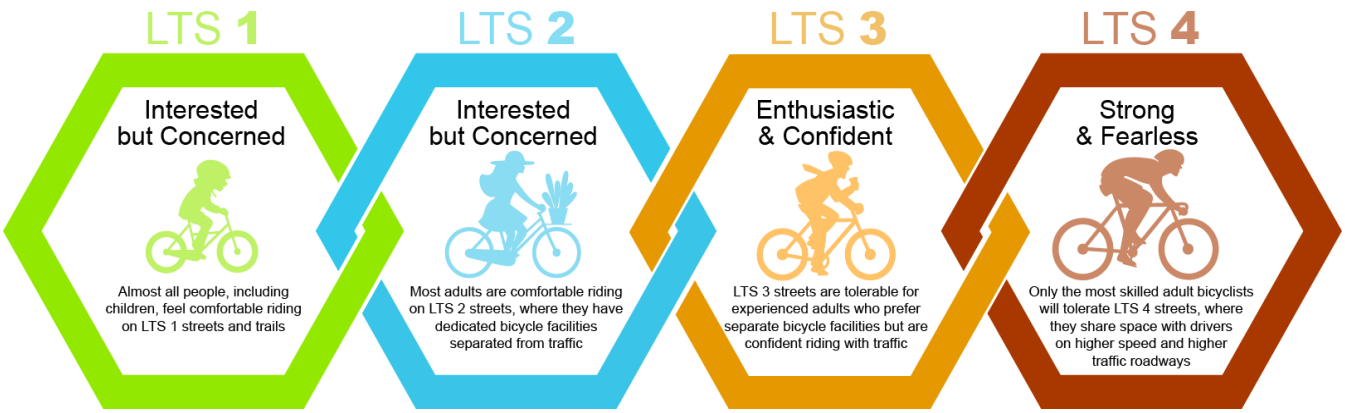
- separation from vehicular traffic
- street width (number of lanes), and daily traffic volumes or functional classification
- presence and width of bike lanes, parking lanes, medians or turn lanes
- frequency of bike lane blockage
- speed limit or prevailing speed of adjacent street or street being crossed
- intersection control type

Level of traffic stress scores are governed by the worst-case principle, meaning that the highest stress score associated with analyzed criteria will determine the LTS score of the overall segment, with LTS 1 being the lowest stress and LTS 4 being the highest stress. LTS generally analyzes roadway segments, intersection approaches and intersection crossings. However, intersection approaches are analyzed at approaches featuring dedicated right turn lanes, or at approaches with left turn lanes where routes require left turn movements, and the bicyclist typically uses the vehicle lane rather than a two-stage movement to continue along the route using the left turn.

To determine the traffic stress score of the overall segment, the worst score among the three analysis categories governs. For example, if a roadway segment that receives an LTS score of 1 intersects with an intersection crossing that is ascribed an LTS score of 4, that segment link will take on the higher score of the high stress intersection crossing, and the overall score would be LTS 4.

The graphic below describes each LTS score by bicycle user type or category. Studies have shown that most of the population will be deterred from bicycling or walking if an active transportation facility features high levels of traffic stress and they will only choose the routes with the highest levels of perceived safety, with 60 percent of the population falling within the "interested but concerned" LTS 1 or LTS 2 categories.[4]

Level of Traffic Stress by User Category



Segments

The criteria for analyzing LTS is broken into three categories:

– physically separated paths or lanes, such as Class I multi-use paths or Class IV bikeways
– streets with standard bicycle lanes, such as Class II or Class II buffered bicycle lanes
– streets without standard bicycle lanes, referred to as mixed traffic, which also includes roadways with Class III bicycle routes

Physically separated paths or lanes are assigned LTS scores of 1 due to the greater separation from vehicular traffic, while the LTS scores associated with the other two categories are determined by roadway infrastructure conditions.

The criteria for analyzing the segment LTS of streets with Class II bicycle lanes are presented in Table A-4 and Table A-5, which are separated by segments that feature an adjacent parking lane, and those that do not. As shown, the segment BLTS score considers bicycle lane width, presence and parking lane width, speed and lanes per direction.

Table A-4: LTS Criteria for Segment with Bike Lane and Adjacent Parking Lane

Prevailing or Posted Speed	1 Lane per direction			≥2 lanes per direction	
	≥ 15' bike lane + parking	14' – 14.5' bike lane + parking	13' bike lane + parking or Frequent blockage[1]	≥ 15' bike lane + parking	≤ 14.5' bike lane + parking or Frequent blockage[1]
≤25 mph	LTS 1	LTS 2	LTS 3	LTS 2	LTS 3
30 mph	LTS 1	LTS 2	LTS 3	LTS 2	LTS 3
35 mph	LTS 2	LTS 3	LTS 3	LTS 3	LTS 3
≥40 mph	LTS 2	LTS 4	LTS 4	LTS 3	LTS 4

1 Typically occurs in urban areas (i.e., delivery trucks, parking maneuvers, stopped buses).

[4] "Four Types of Transportation Cyclists in Portland," Geller, 2006

Table A-5: LTS Criteria for Segment with Bike Lane, no Adjacent Parking Lane

Prevailing or Posted Speed	1 Lane per direction				≥2 lanes per direction	
	≥ 7' bike lane (buffered bike lane)	5.5' – 7' bike lane	≤ 5.5' bike lane	Frequent bike lane blockage[1]	≥ 7' bike lane (buffered bike lane)	< 7' bike lane or frequent blockage[1]
≤30 mph	LTS 1	LTS 1	LTS 2	LTS 3	LTS 1	LTS 3
35 mph	LTS 2	LTS 3	LTS 3	LTS 3	LTS 2	LTS 3
≥40 mph	LTS 3	LTS 4	LTS 4	LTS 4	LTS 3	LTS 4

1 Typically occurs in urban areas (i.e., delivery trucks, parking maneuvers, stopped buses).

Table A-6 and Table A-7 presents the criteria for analyzing segments without bicycle lanes that require a bicyclist to ride with mixed traffic. If daily traffic volume is available, then that data should be considered in the analysis. If existing daily volume data is not available, functional classification should be analyzed in place of daily traffic volumes. For the traffic studies associated with the ORHCEP, existing volumes were estimated by forecasting existing volumes had the COVID-19 pandemic not occurred. Because forecasted volumes rather than observed volumes were available, functional classification was utilized in this analysis. Functional classification of roadways within the study area were obtained from Caltrans' California Road System Functional Classifications web map.

As shown in Table A-6 and Table A-7, lower speed roadways and higher speed roadways are analyzed differently. However, both categories consider presence of a marked centerline, number of through lanes per direction, daily traffic volume or functional classification, and speed. The presence of a marked centerline is assumed to constrict vehicles as they approach and pass a bicyclist, while an unmarked centerline is assumed to provide more room for passing vehicles to comfortably navigate around the bicyclist. The number of through lanes per direction and functional classification is utilized to indicate the volume of vehicles an adjacent bicyclist will be required to travel alongside, assuming a greater number of through lanes per direction and/or higher functional classification of the roadway translates to a greater number of daily vehicles and higher levels of traffic stress.

Table A-6: LTS Criteria for Segments in Mixed Traffic - 30 mph or less

Number of Lanes	ADT (Average Daily Traffic)	Functional Class	Posted or Prevailing Speed (mph)		
			≤20	25	30
Unmarked Centerline	≤750	Local	LTS 1	LTS 1	LTS 2
	750 - ≤1,500	Local/Collector	LTS 1	LTS 1	LTS 2
	1,500 - ≤3,000	Collector	LTS 2	LTS 2	LTS 2
	>3,000	Arterial	LTS 2	LTS 3	LTS 3
1 through lane per direction	≤750	Local	LTS 1	LTS 1	LTS 2
	750 - ≤1,500	Local/Collector	LTS 2	LTS 2	LTS 2
	1,500 - ≤3,000	Collector	LTS 2	LTS 3	LTS 3
	>3,000	Arterial	LTS 3	LTS 3	LTS 3
2 through lanes per direction	≤8,000	Arterial	LTS 3	LTS 3	LTS 3
	>8,000	Arterial	LTS 3	LTS 3	LTS 4
3+ through lanes per direction	Any ADT	Arterial	LTS 3	LTS 3	LTS 4

Table A-7: LTS Criteria for Segments in Mixed Traffic - 35 mph or more

Number of Lanes	ADT (Average Daily Traffic)	Functional Class	Posted or Prevailing Speed (mph)		
			35	40	>45
Unmarked Centerline	≤750	Local	LTS 2	LTS 3	LTS 3
	750 - ≤1,500	Local/Collector	LTS 3	LTS 3	LTS 4
	1,500 - ≤3,000	Collector	LTS 3	LTS 4	LTS 4
	>3,000	Arterial	LTS 3	LTS 4	LTS 4
1 through lane per direction	≤750	Local	LTS 2	LTS 3	LTS 3
	750 - ≤1,500	Local/Collector	LTS 3	LTS 3	LTS 4
	1,500 - ≤3,000	Collector	LTS 3	LTS 4	LTS 4
	>3,000	Arterial	LTS 3	LTS 4	LTS 4
2 through lanes per direction	≤8,000	Arterial	LTS 3	LTS 4	LTS 4
	>8,000	Arterial	LTS 4	LTS 4	LTS 4
3+ through lanes per direction	Any ADT	Arterial	LTS 4	LTS 4	LTS 4

Collision Data

Collision Analysis for the ORHCEP was conducted based on historical collision data within the project limits. The limits for collision analysis on this project include Old Redwood Highway between Arata Lane and Shiloh Road and US 101 interchanges in the Town of Windsor generally at Central Windsor (Lakewood Drive), Arata Lane/Los Amigos Road, and Old Redwood Highway (North of Arata Lane).

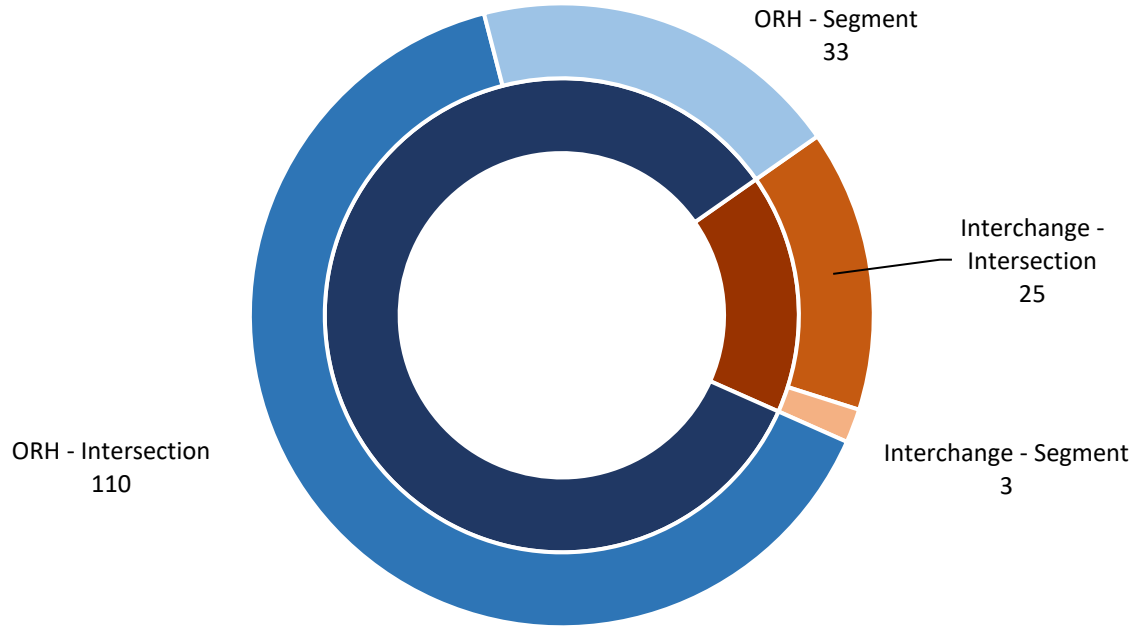
Historical data for the most recent and complete five years, a time period from January 1st, 2015 to December 31st, 2019, was collected from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS). In addition, a public records request was made on August 20, 2020 to Caltrans for the intersection and segment collision data from the Traffic Accident and Surveillance Analysis System (TASAS) for the US 101 interchanges. The response received from Caltrans was the traffic safety unit does not provide accident information related to projects and to contact the Caltrans Project Manager. Therefore, US 101 interchange collisions were quantified based on the SWITRS collision data.

During this period, a total of 171 collisions were reported in the project limits with 28 collisions at the US 101 interchanges. These collisions were classified based on collision location (to be roadways on ORH and US 101 interchanges). Collisions along ORH were further categorized into intersection related collisions and roadway segment related collisions.

All collisions were classified by severity, collision type, primary collision factor violation category, and pedestrian/bicycle collisions. Collisions were analyzed based on categories reported by SWITRS and were not geographically verified.

The chart on the following page shows the breakdown of ORH collisions versus US 101 interchange collisions. Any location on ORH that had a US 101 ramp terminal as part of the intersection is captured under US 101 interchange collisions. ORH intersection collisions had the majority of collisions in the past 5 years with 110 of a total of 171 collisions.

Old Redwood Highway vs. US 101 Interchanges



Old Redwood Highway Collisions

Collisions on Old Redwood Highway were classified as intersection and non-intersection collisions. All ramp terminal intersections with US 101 along Old Redwood Highway are captured separately in the following section.

Intersection Analysis

Table A-8 presents a summary of the intersection-related collisions on Old Redwood Highway. The majority of collisions were due to vehicles travelling at an unsafe speed (27.5 percent) or improper turning (25.0 percent). Rear end and sideswipe collisions were the most common collision types at 30.9 percent and 25.5 percent, respectively. In addition, there were no fatalities and three (3) severe injury collisions. The three severe injury collisions were at the intersections with Windsor Road, 2nd Street, and 3rd Street. The severe injury collision at Windsor Road occurred in 2017 and was a single vehicle hitting an object collision, with the driver traveling north and incident cited as a DUI collision. The severe injury collision at 2nd Street occurred in 2017 and involved a motorcycle and was a broadside collision. The severe injury collision at 3rd Street occurred in 2018 and was a vehicle/pedestrian collision where the pedestrian was in the crosswalk. The violation was “pedestrian right of way.”

Table A-8: Summary of Intersection Collisions on Old Redwood Highway

Collision Severity	Number of Collisions	Percent of Total
Fatal	0	0.0%
Injury (Severe)	3	2.7%
Injury (Other Visible)	13	11.8%
Injury (Complaint of Pain)	25	22.7%
Property Damage Only	69	62.7%

Collision Type	Number of Collisions	Percent of Total
Head On	7	6.4%
Sideswipe	28	25.5%
Rear End	34	30.9%
Broadside	18	16.4%
Hit Object	18	16.4%
Overturned	1	0.9%
Vehicle/Pedestrian	4	3.6%
Other	0	0.0%
Not Stated	0	0.0%

Pedestrian/Bicycle Collision	Number of Collisions
Pedestrian	4
Bicycle	4

Violation Category	Number of Collisions	Percent of Total
Unknown/Not Stated	3	3.8%
DUI/BUI	7	8.8%
Unsafe Speed	22	27.5%
Following Too Closely	0	0.0%
Wrong Side of Road	3	3.8%
Improper Passing	1	1.3%
Unsafe Lane Change	2	2.5%
Improper Turning	20	25.0%
Automobile Right of Way	11	13.8%
Pedestrian Right of Way	3	3.8%
Pedestrian Violation	1	1.3%
Traffic Signals and Signs	5	6.3%
Hazardous Parking	0	0.0%
Other Hazardous Violation	2	2.5%
Other Than Driver (Or Pedestrian)	0	0.0%
Unsafe Starting/ Backing	0	0.0%
Other Improper Driving	0	0.0%

Per the Caltrans *Local Roadway Safety Manual,* it is recommended to rank locations with higher severity as higher focus. The Highway Safety Manual (HSM) methodology of Equivalent Property Damage Only (EPDO) rating assigns a weight to collisions in capturing the relative severity in equivalent property damage only (PDO =1). Table A-9 provides the comprehensive collision costs and EPDO weights that were used in ranking the collisions. Collision costs include both direct and indirect costs. Direct crash costs include ambulance service, police and fire services, property damage, insurance, and other costs directly related to the crashes. Indirect collision costs account for the value society would place on pain and suffering or loss of life associated with the crash. Table A-10 and Table A-11show the top 5 intersections based on EPDO and total collisions. Old Redwood Highway at Windsor Road had the highest EPDO rating, and Old Redwood Highway at Windsor River Road had the highest total number of collisions. In addition, 3rd Street was in the top 5 for EPDO ranking and total collisions.

Table A-9: Comprehensive Collisions Costs and EPDO Weights

Severity	Comprehensive Costs	EPDO Weight
Fatal (K)	$6,418,400	544
Severe Injury (A)	$345,800	30
Minor Injury (B)	$126,500	11
Non-Visible Injury (C)	$71,900	6
PDO (O)	$11,800	1

Based on Table 7-1, Highway Safety Manual, 2010, Adjusted to 2018 dollars.

Table A-10: Top 5 Intersections based on EPDO

Primary Road	Secondary Road	EPDO
Old Redwood Hwy	Windsor Rd	62
Old Redwood Hwy	2nd St	48
Old Redwood Hwy	3rd St	40
Old Redwood Hwy	Hembree Ln	38
Old Redwood Hwy	Billington Ln	36

Table A-11: Top 5 Intersections based on Total Collisions

Primary Road	Secondary Road	Total Collisions
Old Redwood Hwy	Windsor River Rd	13
Old Redwood Hwy	Windsor Rd	8
Old Redwood Hwy	Hembree Ln	8
Old Redwood Hwy	3rd St	6
Old Redwood Hwy	Billington Ln	6

Segment Analysis

The top violation category for the non-intersection-related collisions along ORH was improper turning. The most common collision type was a hit object and the majority of collisions were property damage only. Table A-12 presents a summary of the non-intersection-related collisions on ORH, excluding interchange intersections along ORH.

Table A-12: Summary of Non-Intersection Collisions

Collision Severity	Number of Collisions	Percent of Total
Fatal	1	3.0%
Injury (Severe)	0	0.0%
Injury (Other Visible)	2	6.1%
Injury (Complaint of Pain)	8	24.2%
Property Damage Only	22	66.7%

Collision Type	Number of Collisions	Percent of Total
Head On	6	18.2%
Sideswipe	6	18.2%
Rear End	5	15.2%
Broadside	6	18.2%
Hit Object	8	24.2%
Overturned	0	0.0%
Vehicle/Pedestrian	1	3.0%
Other	0	0.0%
Not Stated	1	3.0%

Pedestrian/Bicycle Collision	Number of Collisions
Pedestrian	1
Bicycle	1

Violation Category	Number of Collisions	Percent of Total
Unknown/Not Stated	6	9.5%
DUI/BUI	5	7.9%
Unsafe Speed	16	25.4%
Following Too Closely	0	0.0%
Wrong Side of Road	2	3.2%
Improper Passing	1	1.6%
Unsafe Lane Change	1	1.6%
Improper Turning	18	28.6%
Automobile Right of Way	9	14.3%
Pedestrian Right of Way	0	0.0%
Pedestrian Violation	0	0.0%
Traffic Signals and Signs	4	6.3%
Hazardous Parking	1	1.6%
Other Hazardous Violation	0	0.0%
Other Than Driver (Or Pedestrian)	0	0.0%
Unsafe Starting/ Backing	0	0.0%
Other Improper Driving	0	0.0%

Each non-intersection was grouped into a segment based on location. The top 5 segments based on EPDO and total number of collisions are shown in Table A-13 and Table A-14. The segment with the highest EPDO and the second highest number of collisions was ORH between Dawn Way and Godfrey Drive.

Table A-13: Top 5 Segments based on EPDO

Street	From	To	EPDO
Old Redwood Hwy	Dawn Way	Godfrey Dr	562
Old Redwood Hwy	US 101	Lakewood Dr	45
Old Redwood Hwy	Conde Ln	US 101	17
Old Redwood Hwy	Pan Abode Ct	Deanna Pl	13
Old Redwood Hwy	Pleasant Ave	Shira St	11

Table A-14: Top 5 Segments based on Total Collisions

Street	From	To	Total Collisions
Old Redwood Hwy	US 101	Lakewood Dr	6
Old Redwood Hwy	Dawn Way	Godfrey Dr	4
Old Redwood Hwy	Pan Adobe Ct	Deanna Pl	3
Old Redwood Hwy	4th St	3rd St	3
Old Redwood Hwy	Kendall Way	Shiloh Rd	3

US 101 Interchange Collisions

Based on the US 101 interchange data from SWIRTS, there were some collisions where it was difficult to assess the exact location due to the incomplete fields (especially at the Central Windsor interchange with the closely spaced intersections for the northbound off-ramp, northbound on-ramp, and southbound ramps). Therefore, the tabular assessment of the interchanges was quantified to the following three locations:

1. US 101 Interchange at Old Redwood Highway, North of Arata Lane
   Includes southbound US 101 on and off-ramps at Arata Lane Exit/Old Redwood Highway
2. US 101 Interchange at Arata Lane/Los Amigos Road
   Includes northbound US 101 off-ramp at Arata Lane/Los Amigos Road
3. US 101 Interchange at Central Windsor
   Includes northbound US 101 off-ramp at Old Redwood Highway/Lakewood Drive and northbound US 101 on-ramp at Old Redwood Highway and southbound US 101 on and off-ramps at Old Redwood Highway

Table A-15 presents a summary of the US 101 interchange-related collisions. There is one severe injury collision that occurred in 2017 at the US 101 northbound off-ramp/Lakewood Drive intersection. It was a motorcycle collision of the “other” collision type, with a primary collision factor of “other than driver or pedestrian.”

Table A-15: Summary of Interchange-Related Collisions

Collision Severity	Number of Collisions	Percent of Total
Fatal	0	0.0%
Injury (Severe)	1	0.5%
Injury (Other Visible)	7	3.8%
Injury (Complaint of Pain)	9	4.9%
Property Damage Only	25	13.5%

Collision Type	Number of Collisions	Percent of Total
Head On	0	0.0%
Sideswipe	7	3.8%
Rear End	13	7.0%
Broadside	13	7.0%
Hit Object	4	2.2%
Overturned	0	0.0%
Vehicle/Pedestrian	4	2.2%
Other	1	0.5%
Not Stated	0	0.0%

Pedestrian/Bicycle Collision	Number of Collisions
Pedestrian	0
Bicycle	0

Violation Category	Number of Collisions	Percent of Total
Unknown/Not Stated	0	0.0%
DUI/BUI	0	0.0%
Unsafe Speed	7	3.8%
Following Too Closely	1	0.5%
Wrong Side of Road	0	0.0%
Improper Passing	0	0.0%
Unsafe Lane Change	0	0.0%
Improper Turning	2	1.1%
Automobile Right of Way	0	0.0%
Pedestrian Right of Way	0	0.0%
Pedestrian Violation	0	0.0%
Traffic Signals and Signs	2	1.1%
Hazardous Parking	0	0.0%
Other Hazardous Violation	0	0.0%
Other Than Driver (Or Pedestrian)	2	1.1%
Unsafe Starting/ Backing	0	0.0%
Other Improper Driving	0	0.0%

The interchange with the highest EPDO rate and total number of collisions was ORH (Central Windsor) at US 101 ramps. The total number of interchange-related intersection collisions and EPDO are shown in Table A-16.

Table A-16: Total Interchange-Related Collisions and EPDO

Interchange Name	Route	EPDO	Total Collisions
Old Redwood Hwy/Central Windsor	US 101	146	41
Arata Ln/Los Amigos Rd	US 101	6	1
Old Redwood Hwy (North of Arata Ln)	US 101 SB Ramps	1	1

Collisions at Selected Intersections

Intersection #	Primary Road	Secondary Road	Severity					Type								Pedestrian	Bicycle	Year							
			Fatal	Injury (Severe)	Injury (Other Visible)	Injury (Complaint of Pain)	Property Damage Only	Head-on	Sideswipe	Rear End	Broadside	Hit Object	Overturned	Vehicle/ Pedestrian	Other/Not Listed			2015	2016	2017	2018	2019	EPDO	Fatal + Injury	Total
1	Old Redwood Hwy	US 101 SB Ramps					1		1											1			1	0	1
4	Old Redwood Hwy	Arata Ln					1			1												1	1	0	1
5	Old Redwood Hwy	Miller Ln				2			1		1							1		1			12	2	2
6	Old Redwood Hwy	Rio Ruso Dr				2		1		1												2	12	2	2
7	Old Redwood Hwy	Dawn Way					2		1	1												2	2	0	2
8	Old Redwood Hwy	Windsor Rd		1	2	1	4	1		1	1	4	1				1		1	3	4		62	4	8
9	Old Redwood Hwy	Bark St					1					1						1					1	0	1
10	Old Redwood Hwy	Market St				1	2	1		1		1							1		2		8	1	3
11	Old Redwood Hwy	Richardson St			1		2			1		1		1		1				2		1	13	1	3
12	Old Redwood Hwy	Windsor River Rd				1	12		4	5	3	1					1	1	3	4	3	2	18	1	13
13	Old Redwood Hwy	US 101			2	3	11		1	6	6	1		1		1		1	4	2	4	5	51	5	16
14	Old Redwood Hwy	Lakewood Dr			4	6	15	1	8	9	2	2		3		3		4	7	7	3	4	95	10	25
15	Old Redwood Hwy	3rd St		1		1	4	1	1		2			2		2		1	1	3	1		40	2	6
16	Old Redwood Hwy	Courtyards E		1	1	1	1		1	1	2						1	1		1	1	1	48	3	4
17	Old Redwood Hwy	Bluebird Dr			1		1		1		1							1		1			12	1	2
18	Old Redwood Hwy	Aiden Ln			1	1	3		1	2		1		1		1		1		1	1	2	20	2	5
19	Old Redwood Hwy	Windsor Palms Dr				1	2		3									1			2		8	1	3
20	Old Redwood Hwy	Hembree Ln			2	2	4		3	3	2							4		1	2	1	38	4	8
21	Old Redwood Hwy	Shadetree Dr				1	3		2		1	1						1	1	1	1		9	1	4
22	Old Redwood Hwy	Viking Ct					1		1												1		1	0	1
23	Old Redwood Hwy	Anish Way				1				1										1			6	1	1
24	Old Redwood Hwy	Billington Ln			2	2	2	1	1	3	1						1	1	3			2	36	4	6
25	Old Redwood Hwy	Deanna Pl				2				1	1									1	1		12	2	2
26	Old Redwood Hwy	Anna Dr			1							1							1				11	1	1
27	Old Redwood Hwy	Tamara Way					1	1												1			1	0	1
28	Old Redwood Hwy	Merner Dr					1					1						1					1	0	1
29	Old Redwood Hwy	Kendall Dr			1	1	3		1	2	1	1					1		1		3	1	20	2	5
30	Old Redwood Hwy	Shiloh Rd				1	5		1	1	1	3						3	2		1		11	1	6
32	Arata Ln	US 101				1					1								1				6	1	1
33	Old Redwood Hwy	4th St					1			1										1			1	0	1
Total			0	3	18	31	83	7	32	41	26	19	1	8	0	8	5	23	26	32	30	24	-	-	135

Collisions at Selected Segments

Segment #	Road	From	To	Severity					Type								Pedestrian	Bicycle	Year							Total
				Fatal	Injury (Severe)	Injury (Other Visible)	Injury (Complaint of Pain)	Property Damage Only	Head-on	Sideswipe	Rear End	Broadside	Hit Object	Overturned	Vehicle/ Pedestrian	Other/Not Listed			2015	2016	2017	2018	2019	EPDO	Fatal + Injury	
1	Old Redwood Hwy	Redwood Ct	Starr Rd					1					1						1					1	0	1
3	Old Redwood Hwy	Arata Ln	Miller Ln					3			1	1	1							2			1	3	0	3
4	Old Redwood Hwy	Dawn Way	Godfrey Dr	1		1	1	1	1		1	1			1		1			1		1	2	562	3	4
5	Old Redwood Hwy	Bark St	Market St					1					1									1		1	0	1
6	Old Redwood Hwy	Market St	Richardson St																					0	0	0
7	Old Redwood Hwy	Conde Ln	US 101			1	1					2						1	1		1			17	2	2
8	Old Redwood Hwy	US 101	Lakewood Dr		1		2	3		2	2	1				1				1	2	2	1	45	3	6
9	Old Redwood Hwy	4th St	3rd St				1	2	1	1			1							1		1	1	8	1	3
10	Old Redwood Hwy	Bluebird Dr	Aiden Ln				1			1										1				6	1	1
11	Old Redwood Hwy	Aiden Ln	Hembree Ln					3		2		1							1		1	1		3	0	3
12	Old Redwood Hwy	Hembree Ln	Pleasant Ave																					0	0	0
13	Old Redwood Hwy	Pleasant Ave	Shira St			1			1										1					11	1	1
14	Old Redwood Hwy	Billington Ln	Shamrock Dr					2	1				1									1	1	2	0	2
15	Old Redwood Hwy	Pan Adobe Ct	Deanna Pl				2	1	1				1			1				1	2			13	2	3
16	Old Redwood Hwy	Savannah Way	Anna Dr					1					1						1					1	0	1
17	Old Redwood Hwy	Tamara Way	Merner Dr					1					1									1		1	0	1
18	Old Redwood Hwy	Merner Dr	Kendall Way					1	1														1	1	0	1
19	Old Redwood Hwy	Kendall Way	Shiloh Rd					3			1	1	1									2	1	3	0	3
Total				1	1	3	8	23	6	6	5	7	9	0	1	2	1	1	5	7	6	10	8	-	-	36

Appendix B

Stakeholder and Public Input

Stakeholder Interviews

Throughout January and February 2021, the ORHCEP Project Team conducted one-on-one interviews with key stakeholders, property owners, and business owners. Interviews with key stakeholders (generally, interested community members and leaders of community organizations) and property and business owners along the Old Redwood Highway were used to gather input from the community on how they use the Corridor, challenges they face when using it, and ideas for improvements. A total of 20 interviews were conducted.

The following pages include summaries of each set of interviews, including a description of the process and findings. A comprehensive summary of findings and a list of specific recommendations from the interviews is provided in Appendix B.

Key Stakeholder/Community Leader Interviews

Outreach was conducted to key stakeholders who have frequently engaged in prior planning processes to gather initial input on how they use this section of roadway, their opinions and attitudes about it, and their thoughts on possible improvements. These interviews informed additional outreach and contributed to the development of the Pan.

During the month of January 2021, Data Instincts conducted one-on-one interviews with 13 Old Redwood Highway stakeholders/community/affinity group representatives. Appendix B includes a list of interviewees, in addition to interviewee locations, usage, and support levels for potential enhancement elements. Although a pre-established set of questions was utilized as a guide, the interviews were conducted in a conversational manner to provide for a more relaxed, open discussion and to elicit the most informative and productive input. As a result, not all subjects answered all of the questions directly.

The ORHCEP Key Stakeholder Interviewees included the following:

- Joella Olsen; Member, Senior Citizen Advisory Commission
- Bette Fleischacker; Senior and Active Community Member
- Julian Cohen; Active Community Member
- Michael Freedman; Resident near ORH and Bicyclist
- Lorene Romero; President/CEO, Windsor Chamber of Commerce
- Joanie Ransom; Senior; Commissioner, Windsor Parks & Recreation Commission
- Meredith Rennie; Commissioner, Windsor Parks and Recreation Commission
- Cindy Foreman; Fire Marshal, Sonoma County Fire District
- Matt Gustafson; Battalion Chief, Sonoma County Fire District
- Bryan Albee; Transit Systems Manager, Sonoma County Transit
- John Riley; Project Manager, SMART Windsor Extension
- Ross McClure; Windsor Unified School District School Bus Driver, and Instructor
- Laurie Tuxhorn; Director, Oliver's Market

Summary Findings

In general, there was strong agreement among respondents on the existing conditions and issues/impediments on the ORH corridor between Shiloh Road and Starr Road. Specifically, respondents pointed to:

- The inconsistent presence of sidewalks and bike lanes (and associated safety issues)
- Safety concerns with pedestrians crossing ORH
- Pavement/roadway conditions

– Emergency evacuation route issues
– Safety concerns with pedestrians/bicyclists traveling under the US 101 overpass
– Parking issues (primarily future)
– Safety hazard and traffic congestion caused by a lack of bus turnouts
– Some areas do not adequately accommodate buses and other large vehicles (right turn onto Shiloh Road from ORH and existing ORH roundabouts)

Interviewees also mentioned the varying nature of the built environment, ranging from some areas being more fully developed and well-maintained, to others which are less developed and "funky," to more rural sections.

Safety Features

When asked about some specific enhancements/safety features that should be considered, there was consistent support for:

– Continuous sidewalks
– Continuous bike lanes
– Additional ADA-compliant crosswalks
– Additional crosswalks with flashing lights

A somewhat lesser level of support, although still strong, was voiced for the green 'conflict' striping on bike lanes, with a few respondents suggesting that a bike lane separation or barrier system would be preferred. There was only minimal support noted for more traffic signals, traffic calming measures, roundabouts, and back-in parking.

Aesthetics

When it comes to improving the landscaping or aesthetics, one commenter offered that it will be difficult to link the different communities along that corridor with a single unifying aesthetic or theme. Rather, an inviting and cohesive suite of aesthetic improvements should consider area-specific variations to reflect the identity of diverse communities along the corridor. Another commenter noted that improving landscaping will be challenging because much of the existing vegetation is on private property.

Property and Business Owner Interviews

Numerous businesses exist along the Old Redwood Highway from Starr Road to Shiloh Road. To develop a Corridor Enhancement Plan that meets the diverse needs of the community, including the businesses along the corridor, interviews with business and property owners were conducted. A contact list of 32 business owners was developed in January 2021 and interviews were conducted throughout February 2021.

Prospective interviewees were contacted first via email, if one was available. Emails included a brief description of the project and an invitation to participate in a 15-minute interview. Prospective interviewees were also contacted by phone if a phone number was available. By the end of February, seven interviews were completed for a response rate of 22 percent.

The ORHCEP property and business owner interviewees included the following:

– Peter Van Alyea, Chevron, Applicant/Developer
– Tom Birdsall, Windsor Town Green Hotel/"The McClelland," Applicant/Developer
– Doug Sloan, Windsor Animal Hospital, Veterinary Medical Doctor and hospital building owner
– Robert Lanier, Farmer's Insurance, Business Owner
– Marcos, the Gentleman's Barbershop, Business Owner
– Shift Manager, Round Table Pizza
– Employee, Thumbs Up Burgers and Deli

Summary Findings

The property and business owner interviewees identified the following as improvements to be considered in the ORHCEP:

- More green painted bike lanes
- More green conflict striping at driveways and intersection approaches
- Better connected sidewalks
- More marked crosswalks
- Crosswalks with enhanced features like Rectangular Rapid Flashing Beacons or Pedestrian Signals
- Pedestrian-scale lighting
- Enhanced overall safety for pedestrians and families with small children
- Enhance the overall look and feel of the corridor
- Implement enhancements that will bring more customers, visitors, and stable business to Windsor

Challenges that were reported by interviewees included:

- Left turns out of the Chevron off of ORH near Oliver's Market can be challenging due to congestion and high speeds
- Limited parking availability in front of Oliver's can cause back-ups when drivers block traffic waiting for a spot and contribute to congestion when drivers circle the area for extended periods looking for parking
- Sidewalks are discontinuous and end abruptly
- Limited foot-traffic to businesses south of the ORH/US 101 Interchange
- Congestion near the Town Green and Oliver's Market
- Back-in parking can be challenging to use during periods of high traffic and the existing spaces in front of Oliver's Market are too narrow for comfort when backing in
- Bicycling can be particularly stressful from Lakewood Drive to Conde Lane, near the ORH/US 101 Interchange
- Potholes need to be repaired
- Windsor River Road at ORH is a very busy intersection for cars and pedestrians

Speeds and Traffic Calming

Many interviewees commented that people travel at high speeds along ORH. In addition to discontinuous sidewalks, this can create additional challenges to people walking and biking along the corridor. One respondent suggested that he might like to see speed bumps implemented to encourage people to slow down. In general, traffic calming measures to slow speeds and improve conditions for walking and biking were well-supported by several participants.

Congestion

Congestion was reported near Oliver's Market and the ORH/US 101 interchange. One respondent reported they intentionally avoid the area surrounding the Town Green and Oliver's Market because of the congestion.

Parking

Back-in parking, when mentioned by respondents specifically, was not well-liked. One respondent said he and his wife frequently shop at Oliver's Market and the surrounding area. When traveling there by car, his wife refuses to use the back-in parking and it makes him very nervous when he does opt to use it. Respondents reported that in theory it may work well in other areas, but in practice, traffic along that segment of ORH is too congested or travels too fast to comfortably or safely back in. One respondent also reported the spaces were too narrow.

In the area near Oliver's Market and the Town Green, many respondents expressed that there was not enough on-street parking available. Respondents reported that on-street parking should be left alone or offset with other parking lots or options if removed. One respondent reported that they occasionally had customers reschedule appointments because they were unable to find parking.

Drivers waiting for parking spots were also reported to cause back-ups near the Town Green and Oliver's.

Roundabouts

The new roundabouts, when mentioned specifically, were well received by interviewees. Interviewees reported that they were aesthetically pleasing and enhanced safety for pedestrians and motorists.

Sidewalks

Sidewalks are discontinuous along ORH. In particular, sidewalks along the south end of the project area are not well connected to businesses. Businesses south of the US 101/ORH interchange reported that nearly all of their business arrives by motor vehicle. One respondent thought new sidewalks in the southern portion of the corridor would be well-received and used regularly by the surrounding residences.

Crossing improvements

Overall, recent enhancements to the walkability of ORH and the area surrounding Oliver's and the Town Green are well received. One interviewee reported that he would like to see more crosswalks with flashing lights (Rectangular Rapid Flashing Beacons), like the one that was recently installed near his business.

Bicycle Improvements

Respondents reported that bicycle improvements should be balanced with the needs of all types of users and they would like to see more dedicated facilities for bicyclists. One interviewee regularly bicycles along ORH and reported that he is most cautious and attentive to surrounding conditions and traffic near the US 101 interchange.

Aesthetics

Respondents did not have specific suggestions for enhancing the aesthetics throughout ORH, but there was consensus that recent aesthetic enhancements along ORH were well-liked and should be replicated. Respondents also reported that enhancements to the bicycle and pedestrian environment improved the overall look and feel of the area near Oliver's Market and the Town Green. The enhanced aesthetics and enhanced pedestrian environment are perceived to coincide with the economic improvements to the area.

Recent Improvements

Interviewees reported that recent improvements, like the ones made near Oliver's Market and the Town Green, should be implemented throughout the corridor. In particular, continuous sidewalks, dedicated bike lanes, and marked crosswalks with flashing lights were mentioned by several participants. One interviewee, a lifelong Windsor resident, responded that he thought the improvements near the Town Green really transformed the area and boosted the local economy. He said other commercial areas along the corridor frequently see businesses come and go, and he suggested that the boost in foot traffic and increase in business near Oliver's Market could be replicated elsewhere by implementing similar traffic calming improvements and enhancements to the walking and biking environment.

Online Survey and Interactive Map Results

Interactive Map Results

Respondents were invited to pinpoint challenging locations and suggestions for improvements on the interactive map. The interactive map allowed users to identify which mode of transportation their comment was related to (bicycling, walking, driving, transit, or circulation in general) or if it was a general comment. Respondents could also 'like' or 'dislike' comments made by others. A total of 38 comments were received, including 18 pedestrian-related comments, four bicycle-related comments, six transit-related comments, three circulation related comments, three driving-related comments, and six general comments.

Some themes among comments include a desire for better connected sidewalks, wider bike lanes, more marked crosswalks, more crosswalks with Rectangular Rapid Flashing Beacons (RRFBs), and enhanced facilities and amenities at transit stops such as shade structures and benches. Commentors indicated a desire for improved multimodal access to local schools, parks, shopping, dining, and the Town Green. Commentors also indicated that speeding is a problem throughout the corridor.

Comments are described in greater detail for five different project areas below. Project areas were divided into sections based on the five sections that arose from the Bicycle Level of Traffic Stress analysis.

Shiloh Road to Hembree Lane (Southern End)

Several comments received in this area emphasized closing gaps between existing sidewalks. Two comments were located near Esposti Park, specifically requesting better sidewalks, with a total of six upvotes between them. One commentor said, "please don't forget about the southeast Windsor area." Commentors indicated the area feels unsafe due to the missing sidewalks and lack of safe spaces to walk across bridges and culverts.

Transit comments in this area indicated the need for bus stop turnouts and sidewalks.

Speeding was also identified as an issue along this stretch of the corridor. One commentor specifically suggested adding a stoplight or protected crosswalk near Thrushwing Avenue for students walking to school and people accessing transit.

Bicycling related comments indicated the need for improved maintenance and street sweeping of bike lanes and the installation of bicycle detection sensors at traffic lights. One commentor noted that bicyclists often travel into the roadway because bike lanes are frequently hazardous due to debris. This comment was marked near Pleasant Avenue Park.

Hembree Lane to Lakewood Drive (Southeast of Hwy 101 Interchange)

This is a much shorter project area segment compared to Shiloh Road to Hembree Lane; there were only three comments received in this area. One comment requested to redesign access to the new Holiday Inn and make it possible to turn left into the parking lot. This particular comment received four downvotes and one upvote. A biking related comment requested wider bike lanes, which received eight upvotes and one downvote. A transit related comment suggested that the bus stop near the Holiday Inn might be better situated south of 4th Street due to the congestion near the interchange.

Lakewood Drive to Windsor River Road (Highway 101 Interchange)

This project segment is defined by the Highway 101 interchange. Congestion on ORH was identified as a challenge in the area. One comment suggested constructing another on-ramp at ORH and Arata Lane to alleviate the existing congestion and safety challenges near the existing interchange, which received six upvotes. Commenters also indicated it is challenging to see pedestrians in the crosswalk over the northbound on-ramp, and it feels dangerous for pedestrians and bicyclists to cross under Highway 101. One comment suggested the installation of a pedestrian overcrossing, which received eight upvotes. Additionally, just to the

west of Highway 101, comments suggested better traffic control signs and markings are needed to let drivers know which lanes go where and provide advance warning for lanes that end.

Windsor River Road to Windsor Road (Town Green Area)

This project segment is also relatively short and received just three comments. One commentor noted that cars can get backed up between McClelland Drive and the ORH/Market Street roundabout due to drivers waiting for parking spots to free up in the back-in parking in front of Oliver's Market. Another commentor indicated that streetlights in the area are obscured by trees, creating an uninviting environment for pedestrians, especially during the shorter daylight periods in winter months. Another commentor wondered what impacts would be created by the proposed housing developments and the proposed civic center in the area and emphasized that evacuation and congestion along ORH could be concerns in the future.

Windsor Road to Starr Road (Northern Segment)

Commentors made several comments related to walking, biking, transit, and driving in this area. Along this stretch, commentors indicated they would like to see sidewalk gaps closed, better curb and bike lane markings, and an improvement in the overall aesthetics. A request for improved sidewalk access, especially to access the Town Green, was cited and upvoted several times. Commentors also noted that this whole section is a "hostile" environment for pedestrians, with no sidewalks, poor lighting, and speeding. A midblock crosswalk is needed somewhere between Rio Russo and the ORH/Windsor Road roundabout and an additional crosswalk is needed somewhere between the Starr Road and Arata Lane intersections for people accessing services and restaurants on either side of the street. "No Parking" signs are needed at the bus stops near Woodbine Way and Miller Lane. Additionally, left turns into and out of the strip mall between Starr Road and Arata Lane have created some near misses and back-ups.

Survey Results

With input from the Town and the Technical Working Group (TWG), GHD developed an online survey to understand the community's concerns about challenges along the Old Redwood Highway Corridor. The survey was available from February to April of 2021. A total of 49 responses were received.

Despite some of the challenging conditions for people using active transportation and transit, people regularly walk, bike, and take transit on ORH. Nearly two-thirds of respondents indicated that they walk and bicycle along the corridor at least occasionally, and ten percent of respondents walk the corridor every day. Despite high rates of walking and biking along the corridor, respondents did not report high levels of safety or comfort when walking and biking. Only four percent of respondents said they feel 'very safe' when walking or running on ORH, and only two percent said they feel 'very safe' when bicycling on the corridor. Respondents could select multiple features of the roadway that make it feel unsafe. The features with the most responses included lack of sidewalks, traffic congestion, driver behavior, lack of bike lanes, and lack of appropriate/safe street crossings.

The survey is summarized in greater detail below.

Characteristics of ORH Users

Respondents were diverse in terms of the way they use the corridor and where they are located.

Direct Connection to ORH: Ten percent of respondents indicated that they live on Old Redwood Highway.

Side of Town: When asked, "where do you live," respondents were split almost evenly between the east and west side of the Town, with 52 percent of respondents indicating they live on the east side of Highway 101 in Windsor and 48 percent of respondents indicating they live on the west side of Highway 101 in Windsor.

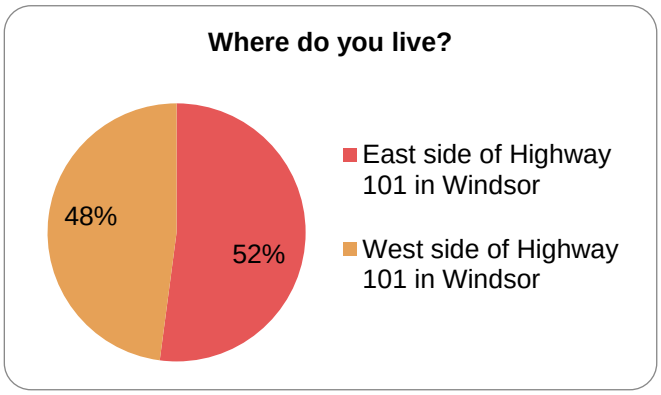
Frequency of ORH use: When asked, "how often do you travel on Old Redwood Highway," 88 percent of respondents indicated they use the corridor at least a few times per week, with 27 percent traveling along the

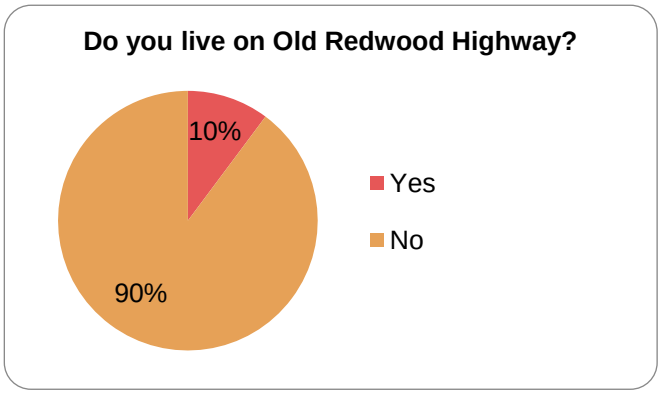
corridor multiple times per day, 27 percent traveling daily, and 34 percent traveling along the corridor a few times per week.

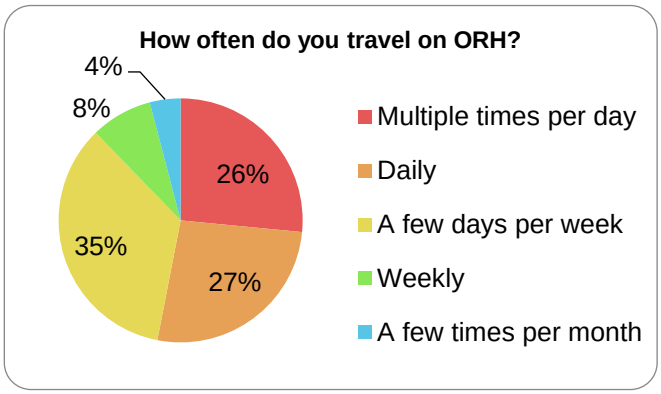
Multimodal Use: When asked, “how do you typically travel on Old Redwood Highway,” respondents could select more than one option, indicating the overall makeup of different roadway users and their multimodal transportation needs. Of the 90 responses received on this question, ‘Drive’ accounted for 53 percent, ‘Walk’ and ‘Bicycle’ accounted for 22 percent each (44 percent combined), and ‘Public Transit’ accounted for two percent.

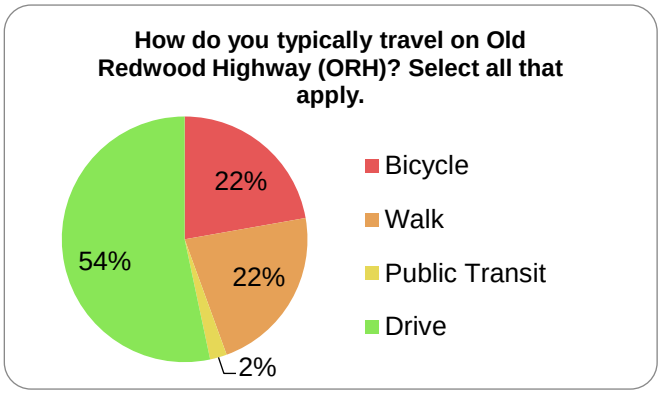
Data on characteristics of ORH users are provided in the charts on the following page.

Characteristics of ORH Users









Bicycling Trends

Frequency of ORH use for bicycling: When asked, “how frequently do you bicycle along Old Redwood Highway,” nearly two-thirds of respondents indicated they bicycle along the corridor at least occasionally, with four percent bicycling daily, 12 percent bicycling a few times per week, 33 percent bicycling a few times per month, and 14 percent bicycling ‘rarely.’

Purpose of bicycling trips: When asked, ”what was the typical purpose of your trip,” the majority of respondents (80 percent) indicated they typically bicycle for recreation or exercise, 16 percent indicated they bicycle for errands, and one respondent indicated they bicycle to take their child to school. No respondents indicated they bicycle along the corridor for their commute to work.

Level of comfort while bicycling: When asked, “how safe do you feel when bicycling along ORH,” 21 percent of respondents indicated they felt moderately safe, 23 percent indicated they felt somewhat safe and 28 percent indicated they did not feel safe. Only two percent of respondents indicated they feel very safe when bicycling along ORH (with 25 percent indicating the question was not applicable).

Walking Trends

Frequency of ORH use for walking: When asked, “how frequently do you walk along Old Redwood Highway,” nearly two thirds of respondents indicated they walk along the corridor at least occasionally. Ten percent of respondents indicated they walk along ORH daily, 12 percent walk the corridor a few times per week, 23 percent said a few times per month, and 20 percent indicated they walk on the corridor just occasionally. A slightly higher number of respondents indicated they walk daily (10 percent) than respondents that indicated they bicycle daily (four percent).

Purpose of walking trips: When asked ”what was the typical purpose of your trip,” most respondents (69 percent) indicated they typically walk for recreation or exercise, 28 percent indicated they walk for errands, and one respondent indicated they walk to take their child to school. No respondents indicated they walk along the corridor for their commute to work.

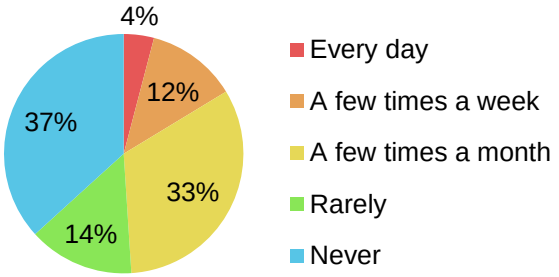
Level of comfort while walking: When asked, “how safe do you feel when walking along ORH,” 25 percent of respondents indicated they felt moderately safe, 13 percent indicated they felt somewhat safe and 29 percent indicated they did not feel not safe. Only two percent of respondents indicated they feel very safe when walking along ORH (with 29 percent indicating the question was not applicable).

Width needed: Sidewalks should be able to accommodate diverse users and groups of people walking together. To further understand pedestrian needs, respondents were asked if they typically walk with any of the following: personal mobility devices (such as wheelchairs, walkers, canes, etc.) strollers, children, dogs, and/or other people. Most respondents indicated that they do walk with other people, children, dogs, strollers, and/or personal mobility devices.

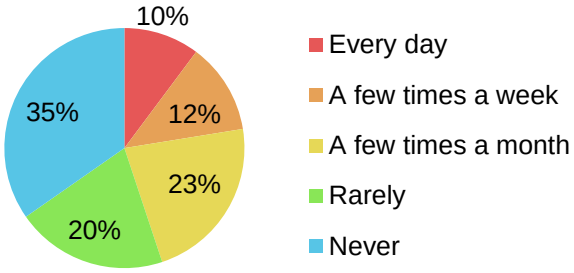
These walking and bicycling trends are visualized in the charts on the following page.

Walking and Bicycling Trends

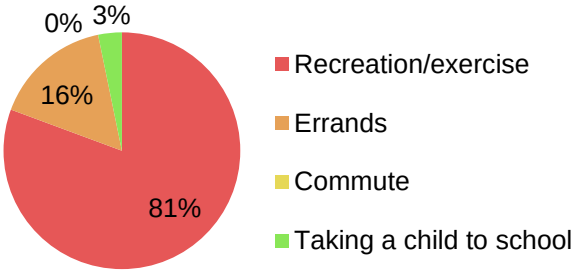
How frequently do you bicycle on ORH?



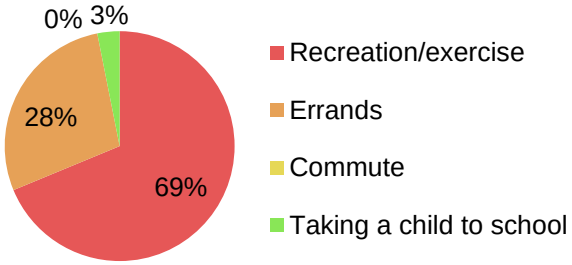
How frequently do you walk/run on ORH?



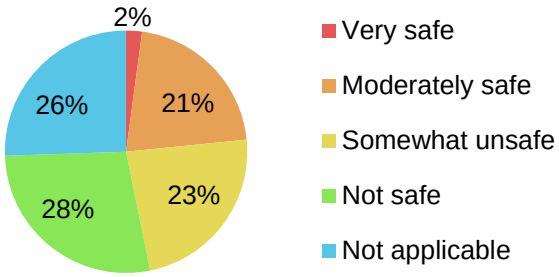
When you bicycle on ORH, what is the typical purpose?



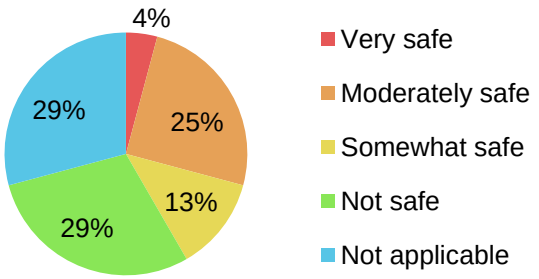
When you walk/run on ORH, what is the typical purpose?



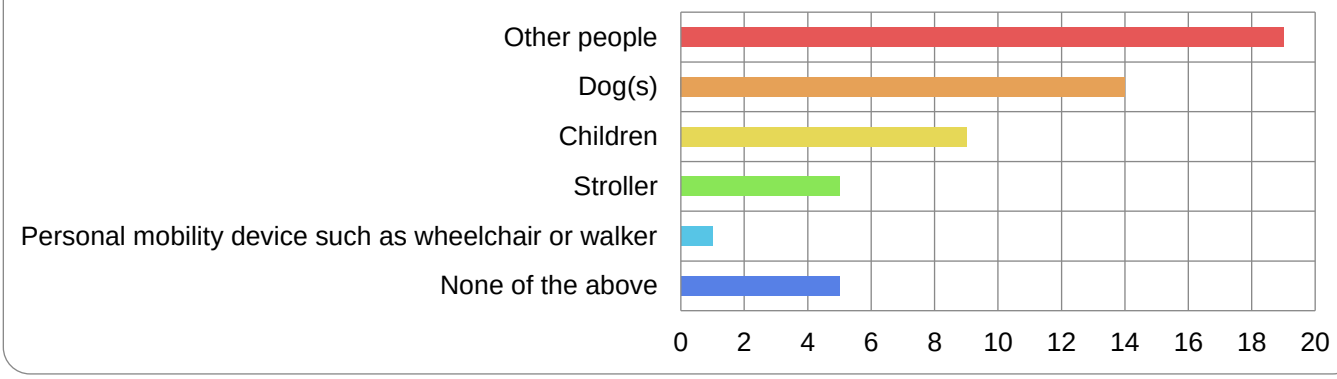
How safe do you feel when bicycling on ORH?



How safe do you feel when walking or running on ORH?



Do you typically walk/run with any of the following? Select all that apply.



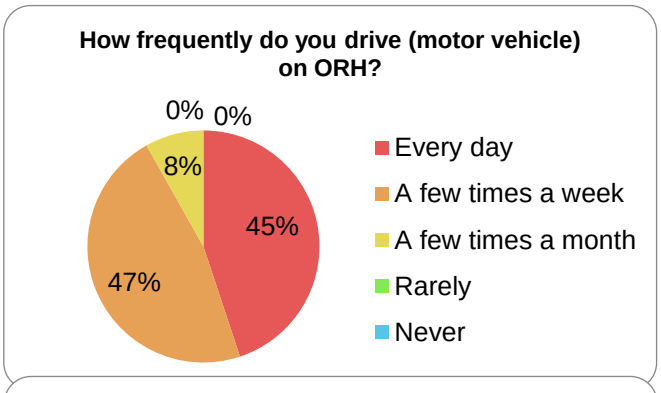
Commuting

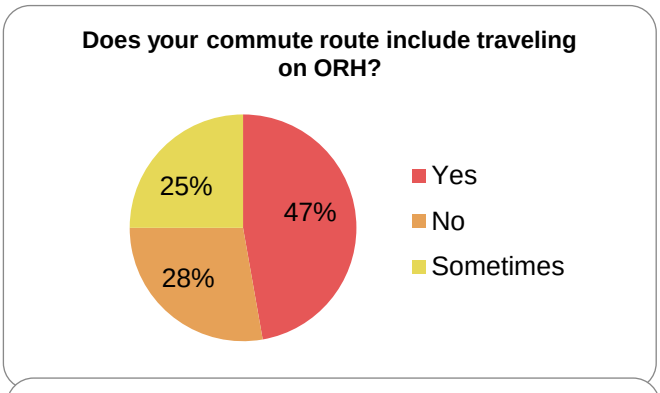
Frequency of driving on ORH: When asked, “how frequently do you drive a motor vehicle on ORH,” all respondents indicated they do so at least a few times a month, with 45 percent of respondents driving on ORH every day and 47 percent of respondents driving on the corridor a few times a week.

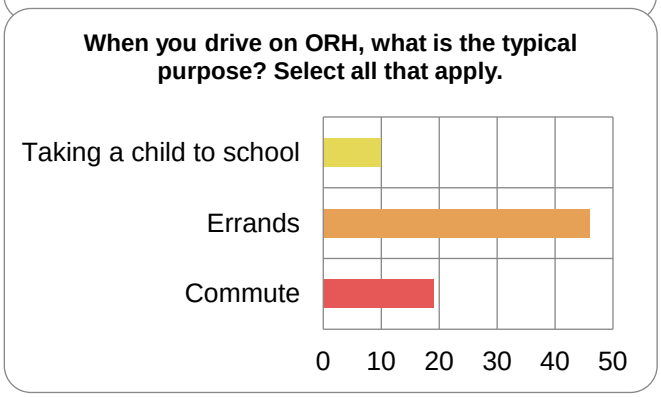
Purpose of driving trips: When asked, “when you drive on ORH, what is the typical purpose” respondents could select more than one response. Nearly every respondent indicated they drive on ORH to run errands. Slightly less than half the respondents indicated they drive on ORH for their commute and about one fifth of respondents drive on ORH to take a child to school.

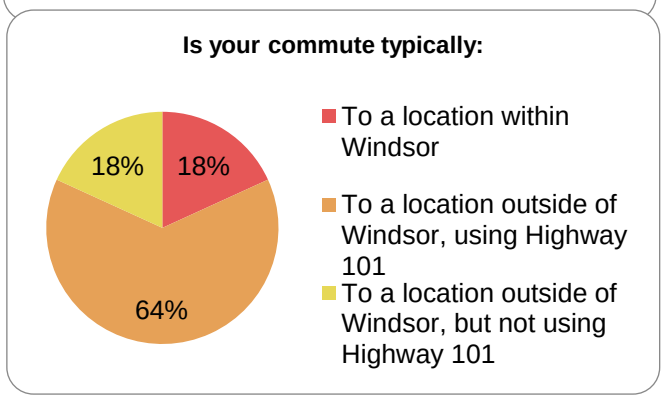
Level of comfort while driving: When asked, “how safe they feel when driving on ORH” the majority of respondents said ‘moderately safe’ (41 percent) or ‘very safe’ (35 percent). About a quarter of respondents indicated they feel ‘somewhat safe,’ and there were no respondents that selected ‘not safe.’

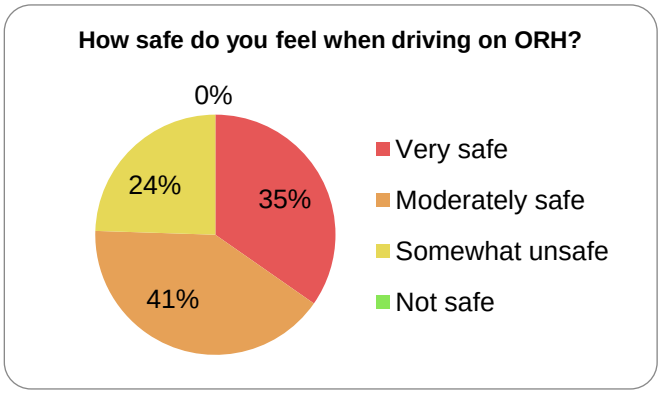
Commuting: All respondents that indicated they commute said they commute by motor vehicle. When asked, “does your commute route include traveling on ORH,” 47 percent of respondents said yes. Most respondents (64 percent) indicated their commute was to a location outside Windsor using Highway 101, 18 percent indicated they commute to a location outside of Windsor but do not use Highway 101, and 18 percent commute to a location within Windsor.





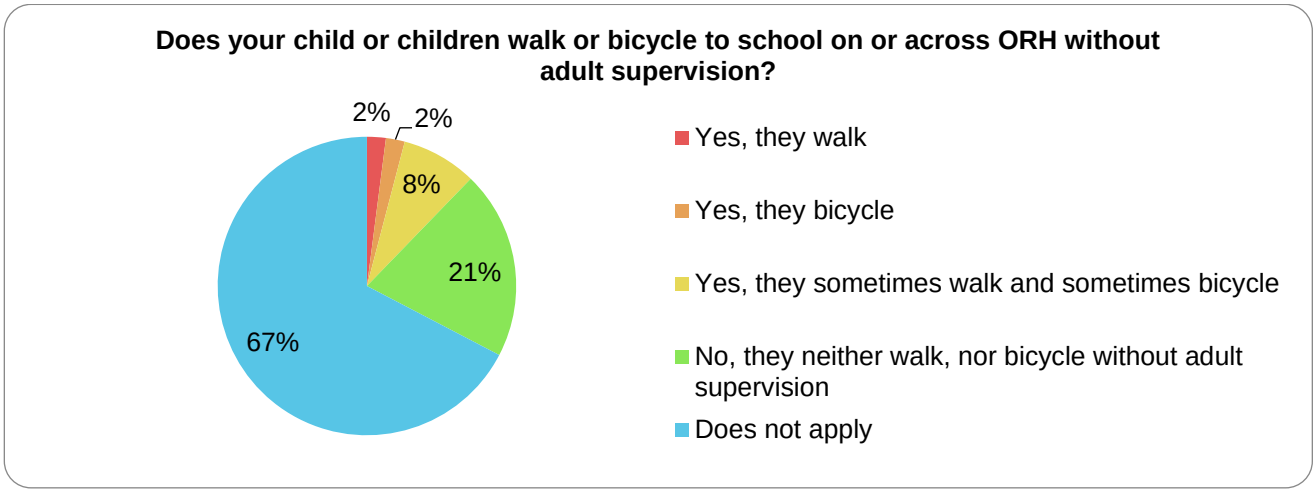






Walking and Bicycling to School

When asked, “does your child or children walk or bicycle on or across ORH without adult supervision,” most respondents selected ‘does not apply,’ which could indicate they do not have school-aged children or their school-aged children do not cross ORH. Of those that responded to the question, 21 percent indicated that their child(ren) neither walk nor bicycle without adult supervision. Eight percent indicated their child(ren) sometimes walk and sometimes bicycle to school. Just one respondent indicated their child(ren) walks and one indicated their child(ren) bicycles to school.



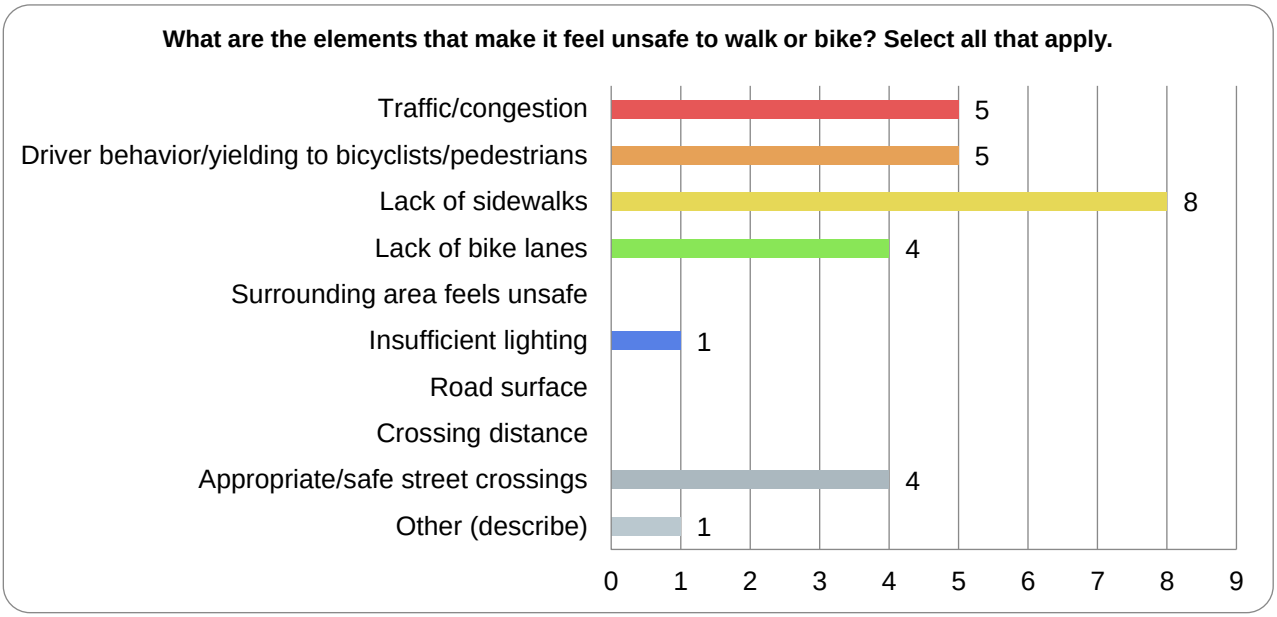
Level of Comfort

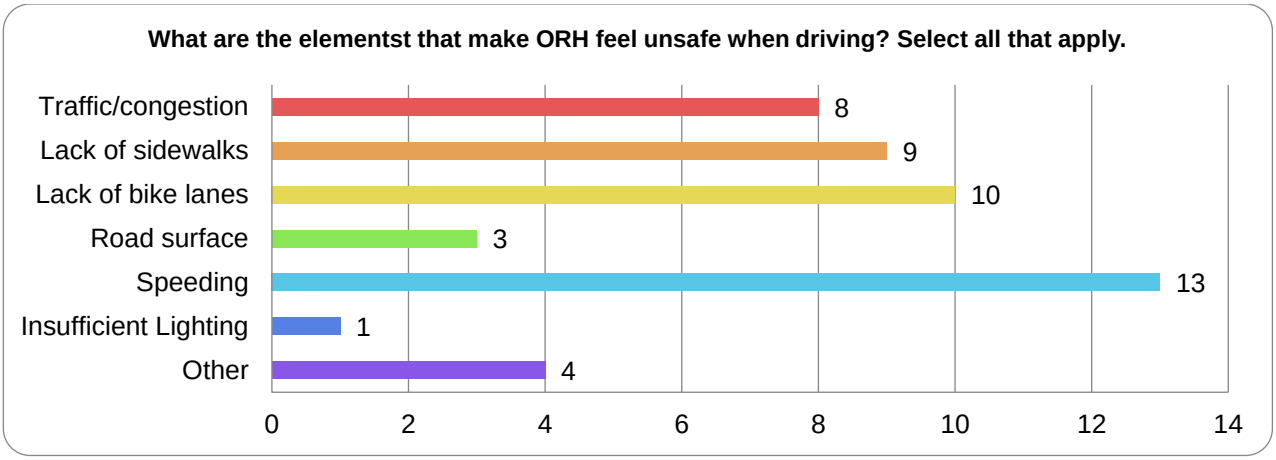
Respondents were asked what elements of ORH make it feel unsafe for walking and bicycling and were given the opportunity to select multiple characteristics. Of all roadway characteristics, ‘lack of sidewalks’ received the highest response, ‘traffic/congestion’ and ‘driver behavior/yielding to bicyclists/pedestrians’ were tied for second highest, and tied for third were ‘appropriate/safe street crossings’ and ‘lack of bike lanes.’ ‘Insufficient lighting’ was selected by one respondent, and ‘other (describe)’ was selected by one respondent who described that street parking creates visibility challenges for motorists to see pedestrians crossing the road. Three options were not selected by any respondents, which included ‘surrounding area feels unsafe,’ ‘road surface,’ and ‘crossing distance.’ Although these options were not selected by respondents, it does not necessarily indicate these roadway characteristics do not present challenges for bicyclists and pedestrians traveling on ORH.

Respondents were also asked what elements of ORH make it feel unsafe when driving on the corridor. Of all roadway characteristics, ‘speeding’ received the highest response, ‘lack of bike lanes’ received the second highest, ‘lack of sidewalks’ received the third highest, and ‘traffic/congestion’ received the fourth highest response. Three respondents selected ‘road surface,’ and one respondent selected ‘insufficient lighting.’ Four respondents also selected ‘other (describe)’ and indicated additional challenges, including lack of marked crosswalks, parked cars obscuring visibility, lack of sufficient turn lanes generally, and lack of turn lanes specifically from Shiloh Road to Pleasant Avenue.

Features of the roadway that affect respondents’ perceived safety when walking, bicycling, and driving are shown on the following page

Perceived Roadway Safety Challenges





Demographics

Demographic questions were also collected to provide detail on who may have been reached by the survey and who chose to respond; the results can indicate where gaps may exist in outreach and/or willingness to respond. About two-thirds of respondents were 45 or older and identified as female, and nearly three-quarters of respondents were white. Eight percent of respondents indicated they are Latino or Hispanic, four percent of respondents were Asian, and 14 percent selected ‘prefer not to answer.’ A majority (44%) of respondents own their place of residence, but the survey did reach some renters (eight percent). Overall, respondents were relatively diverse in terms of age, length of residence in Windsor, level of education, and household income.

Results of the Key Stakeholder/Community Leader One-on-One Interviews

Detailed Findings

The following sections contain more detailed responses from the interviewees, categorized by areas of concern (some of which overlap). Please note that some technical and operational input was provided by representatives from the Windsor Fire Department, Sonoma County Transit, and Sonoma-Marin Area Rail Transit. Where relevant, their input is folded into the overall results; the more operational comments are in a separate subsequent section.

Here are summarized comments made in each of the areas of concern raised by respondents, and other categories:

Sidewalks and Bike Lanes

- On garbage day there's no path for bicycles because all the bins are in the bike lane
- From Pleasant to Hembree, there's curb and bike lane, which is good
- Sidewalks/bike lanes seem hit and miss
- To walk ORH is very uncomfortable – there's a sidewalk only on one side
- Biggest issue is lack of sidewalks, and even where there are, some pedestrians stay in the bike lane instead of going back and forth
- Not the safest route for bikes/pedestrians; some parts are 'treacherous'
- ORH near Starr Road can be difficult to walk because of a lack of sidewalks
- From a biking standpoint ORH not a big problem except above Lakewood
- Numerous inconsistencies (sidewalks/bike lanes) along ORH
- Likes a dedicated bike lane, away from moving cars
- Boulder CO: have defined bike lanes – green/white stanchions along the edge or plastic dividers on the ground
- Having clear sidewalks and more unified would make it easier for people to transition, more modern, cleaner
- No sidewalks on that stretch of ORH from roundabouts to Starr make it difficult for pedestrians, especially seniors at mobile home park
- Dedicated bike lanes
- Add a sidewalk on south end of ORH all the way to the park-n-ride (near GNC Autobody)
- More bicyclist-type traffic signals (bikers tend to avoid ORH and take slower and less busy roads, such as Bluebird Road). Install bicyclist signals, which allow a cyclist to trigger a signal as they're approaching a crosswalk. As it currently stands cyclist must get off their bike, push the signal button, walk across the street, and then are able to get back on their bike. Using this instead of a red/green light signal.
- Be careful when planting trees. Due to the soil in this area it tends to drive roots to the surface and cause damage to the sidewalks
- When they measure for a bike lane width, should not include the gutter width – otherwise not getting the full width of the bike lane
- Used to jog on ORH, but has stopped running and biking because there is not enough sidewalk space; favors continuous sidewalks and bike lanes
- Need more green bike pathways and that they should be even more clearly-defined than they are now, it can be hard for drivers to see the bike lanes making it dangerous for cyclists

Crosswalks

- 101 divides the Town into east and west, at times people (seniors and high school students) are forced to cross under 101 to get from one side of the Town to the other, only 3 routes currently exist
- Knows of at least 1 pedestrian hit near 101 on/off ramps
- Some seniors use assistive traveling devices (electric scooters, wheelchairs, walkers, etc.) – it can be difficult and scary crossing ORH at various places. Town should consider making all crosswalks along ORH ADA compliant
- There are connectivity issues between east and west Windsor because it is difficult to cross ORH and 101. Must go into busy downtown to cross
- The lack of crosswalks makes it dangerous as people cross back and forth trying to stay on the safest walking path
- A primary concern heard from bus riders is safety when crossing ORH
- Accessibility issues for seniors and physically impaired. Individuals living at the senior community near the southern end of the corridor have expressed having a difficult time crossing ORH in this area
- By Kaiser Park – cross walk was upgraded, that should be standard for all crosswalks
- ADA crosswalks: yellow bumps are slippery when wet, and anytime when in wheelchair; some yellow, some gray, some people may have difficulty seeing the yellow color ones – need to address not only visual issues, but cane, wheelchair, other ADA issues
- Lanes would be nice ORH/Brooks/101, under the overpass people get confused as to which lane goes where
- Likes crosswalks with flashing lights, but still not safe enough
- ADA-compliant crosswalks are the best currently available, but still not effective in slowing traffic
- When crossing pedestrian path that runs through ORH to the Walmart, somewhere in that area would be a good place for a crosswalk. People use it and there are no sidewalks at this time
- Should provide a crossing option located nearer the high school
- Consider “zebra crossings;” educate drivers about pedestrian right of way
- Pedestrian measures like in Ashland OR – more relational between cars/pedestrians – they make eye contact and wave – education?
- It can be very difficult to cross ORH in this area (north of 101) - the crosswalk there has lights and noise, but drivers still do not notice it and blow through the crosswalk without stopping. Reported several Oliver’s employees nearly hit by speeding cars while crossing in the crosswalk
- Any safety measure that draws drivers’ attention to potential hazards and makes the corridor safer
- Especially in favor of the Town creating a community that is safer for children and elderly

Pavement and Roadway Conditions

- Bike path/pavement conditions are not great
- Raised crosswalk at Shell station, getting on highway my car bottoms out
- Since development has started there, delivery trucks and gravel trucks are exiting at Arata under 101 on small stretch of ORH then taking Starr to Windsor River Road – those streets are in bad shape already, impact of these vehicles are causing degradation of road

Emergency Evacuation Route Issues

- Fire evacuation – there was no place to go, how do I get out of town? How to get on the freeway? Not a lot of choices. Just stuck in traffic. Did not use ORH during that time
- Even a center lane for turns, could become through-route for evacuation?
- Accessibility to ORH during an evacuation
- During the fire evacuations Hembree became nearly impassable as people tried to get onto ORH and eventually the freeway. Town should improve the egress for eastside residents onto ORH during an

evacuation. At Hembree Road and Jensen Road there is a barricade. If that barricade could be temporarily removed during an emergency evacuation it would allow residents to travel down Jensen to ORH, causing less backup at Hembree.

- During an emergency evacuation the egress from Hembree onto ORH was considered the worst egress in Sonoma County
- Once on ORH during evacuation the stoplight should have been set to 4-way stop to allow traffic to pass through more quickly onto ORH and eventually onto the freeway. As it was, too much backup
- Take into consideration how the corridor will be used by residents as an evacuation route during a time of crisis and ensure that they have planned for people evacuating on the corridor as quickly and safely as possible

Parking Issues

- Potential parking impacts from the SMART train once it starts servicing Windsor; there are limited long-term parking options available, lack of parking near the station will cause people to park on ORH, especially with large events (49ers, Warriors, Giants games, etc.) that will cause large numbers of people to take the train
- Transit stations tend to attract parking issues. The Town should consider parking management, parking permit programs, shared parking in the station area. SMART will be building a new parking lot at their station. It will be pay-to-park, which tends to push people out
- There is not enough space in the Oliver's parking lot for its employees to park, they park in lot across ORH
- Parking is a huge issue, there is never enough parking, especially bad when there are events happening at the Town Green, parking can be a nightmare, as cars are trying to pull out several cars will wait there trying to get the spot
- Back-in parking is safer when the car is pulling out, but backing in can be difficult for some, if they're not used to it

Traffic Congestion/Speeding

- Seems to be working well – I tend to use backroads to avoid stop lights
- Traffic backup is an issue on ORH especially between Windsor Road and ORH when schools are in session
- All the residents living in north Windsor that want to take northbound 101 must head south into town to get to the central onramp, causing traffic congestion in downtown. An onramp at Arata is sorely needed and would divert this traffic impact
- Coming out of Holiday Inn seems dangerous, people make illegal U-turn in order to end up going left – this area not convenient for people to get around
- At central exit – it's ok; light at Arata at ORH needs better timing, too long when no traffic
- Make sure timing on stoplights is correct (are they 'smart?')
- Community issues – impact of future growth in Windsor – concerns residents/businesses have expressed with advent of Lytton tribe development, how traffic patterns will change once that happens
- When the development is completed (housing, conference center) that'll be the quickest way for people to access – that little strip of ORH and Starr Road (to bypass downtown)
- Should consider transit-oriented development around a transit hub
- Add a new northbound freeway onramp near Arata Lane
- Improved timing of signal lights
- Increase the width of roadway when you get to those areas (Shiloh, north of park), due to possible parallel parking, or deeper parallel parking zone
- Keep in mind how any improvements affect the commercial/stores (like for deliveries)
- ADA-compliant crosswalks are the best currently available, but still not effective in slowing traffic

- People go very fast along the entire stretch of ORH, reported several Oliver's employees nearly hit in crosswalk by speeding cars; roundabouts and better police enforcement help to slow the speeding traffic (north of 101); in favor of traffic calming measures

Turn Lanes

- Right in front of Merner Drive, there may be turn lanes but mostly not
- Even a center lane for turns, could become through-route for evacuation?
- Issues around Shell gas station, merging traffic, people get in the lane and suddenly need to get over because it becomes a turn only lane
- ORH at Windsor River Road the left turn is a small lane and can get backed up, causing traffic to back up as a result
- Add a dedicated right turn lane onto Shiloh from ORH

Character and Aesthetics

- Likes the improvements – the shopping centers, the church – then you go further and you're in the country, larger lots/acreage, some mobile home parks in area, some housing, then you have "funk" some places are questionable/funky, those that live there are lucky to get it, it's probably affordable – keep some rural appeal
- Shiloh north, to Merner Drive because of two apartments built, seems well improved. Sporadic points in that south to north on ORH where it's pretty good and others not so good
- Need to make the ORH corridor more appealing, welcoming to people coming into the town
- Housing issue – right side near Hembree heading south, 10 tiny homes for veterans put in, wondering if we get too fancy and too many enhancements, solutions like this could go away – keep it funky in some places
- When you drive up Windsor Road there's a greenway then a parallel road with that (based on 19th Avenue in SF) – kind of frontage; ORH is a major road, if there's some way to do that and incorporate bikes/pedestrians it'd be good
- From business perspective – repaving, clean it up, make it look more modern; north of roundabout and Johnson's pool,
- Small businesses near Shiloh, could be cleaned up
- Careful of 'gentrifying' the area and driving up affordable rents; keep some rural appeal
- Area north of 101 (Oliver's, Town Green) is well maintained
- Likes the rural aesthetics of ORH – prefers ORH instead of 101 to commute from/to Rincon Valley

Public Transit

- No consistency in the public transit bus stops along the ORH corridor
- The right turn onto Shiloh from ORH is very difficult to make in 40' school buses. The turn is southbound on ORH near Esposti Park. In order to make the turn the bus drivers must go into the Shiloh eastbound land (oncoming traffic) by about 4'. Multiple buses make this turn several times a day
- Shiloh to Pleasant – all stops on east side are dangerous. Blocking traffic. Becomes dangerous because the bus will be blocking both lanes as it lets children on and off. This causes impatient drivers to drive through the bus' stop sign signal. Drivers will even cross the double yellow during these times to pass the buses.
- Roundabouts not good for school buses
- The stretch near Oliver's on ORH can be dangerous because school buses cannot pull completely off the road.

- Sonoma County Transit has a fair amount of rider traffic through this area. Many SRJC students use it. Compare this corridor of ORH to Santa Rosa Ave about 25 years ago. When they widened that street, they added several bus turnouts. In areas where they had width restraints, they successfully utilized part of the bike lane to accommodate the turnout. This would be useful along this stretch of ORH
- The local Windsor shuttle would be able to use the public transit structures built/added by the county
- The Town should consider bus turnouts as a way to improve traffic flow
- Shiloh to Pleasant – widen the road and add more shoulder space to allow (school) buses to pull off, avoid blocking traffic

Potential Challenges

- One challenge may be financial: It will be hard to implement with financial hit coming up (special election costs)
- Cost has to be a factor – why offer options that you can't afford/infeasible – waste of the process
- Concern with people who are anti-civic center may be anti-this project
- Funding - similar to the challenges they had with the Bell Village development
- Trying to build big pedestrian/bike paths has been a design and right-of-way challenge for other cities
- The Town Green is a busy area and if it becomes more of a hub as a result of the new SMART station parking could become very difficult. One concern is that on busy days the station parking lot would be full and then after that there is not much available parking. Existing parking now is mostly residential
- Public Communication: With the roundabout at Windsor Road and Windsor River Road there was a lot of community pushback because people didn't understand the purpose/benefits. This could have been mitigated if the town had better communicated the benefits to residents
- Biggest challenge is that the town tends to take the piecemeal approach, even with large plans, when it comes down to project x and project y, they tend to look at them separately instead of part of whole/consistency across the decisions made, makes it difficult to execute
- Don't wait for infill to expand roads– town should do it now
- Things move slow at the Town; funds never go to transportation
- Why is the council only considering ORH from Shiloh to Starr? Should go further north and south to town limits
- Improving aesthetics could be a challenge because of the vegetation on private property that is currently along the corridor

Operational Input

Windsor Fire Department

- Near Bluebird Center is a particularly difficult intersection if you're walking
- For fire department engine to access the Holiday Inn Hotel, the engine must go against traffic
- Traffic coming out is forced to turn right but there's a median so then people make an illegal U-turn to go "left"
- Northbound offramp at Central needs a turn lane to turn right on ORH; cars can go straight on Lakewood or right on ORH, they often make a hard right over solid line
- Same location – going northbound ORH and right on Lakewood, the "broken" bike lane there needs clarity, that it's OK to use as a turn lane – people don't know or understand that, and it backs up traffic

- Hydrants are difficult for FD to without blocking traffic – indentations on the curb at hydrant location to get the engine out of the roadway lane would be ideal
- Hydrant location – dealing with existing infrastructure, if there is the opportunity, we may need hydrants on the opposite side of street for example (see fire code for standards) – bring all up to code
- FD travels on ORH 8-10 times a day on calls
- ORH is major route for FD, often making left turns
- FD has 3 engines and 5 or 6 staff vehicles
- When engines return to Hembree station, they are often half on/half off sidewalk to back into station, causes backup of traffic into intersection until the engine is all the way in; maybe flashing lights? Or a turnout to position the engine?
- Wider streets would be helpful from a public safety perspective, especially during an emergency evacuation – where we can get wider, it would help
- There have been several vehicle accidents between Shiloh and where it goes to two lanes, people stop and proceed with left turn but no turn pockets in either direction – close calls frequent, is a fairly fast road, with no turnout

Sonoma County Transit

- The agency has two bus routes that serve this corridor of ORH, with 11 or 12 bus stops
- There is a fair amount of rider traffic through this area. Many SRJC students use it
- Compare this corridor of ORH to Santa Rosa Ave about 25 years ago. When they widened that street, they added several bus turnouts which would be useful along this stretch of ORH However, in areas where they had width restraints, they need to utilize part of the bike lane to accommodate the turnout
- There is no consistency in the public transit bus stops along the ORH corridor – the Town should consider this for aesthetic purposes
- The local Windsor shuttle would be able to use the public transit structures built/added by the county
- The primary concerns that they hear about from riders is safety around crossing ORH in this area
- The Town should consider bus turnouts as a way to improve traffic flow

SMART

- Wayfinding signage for the SMART pathway and rail stations. The most urgent sign and the one they get the most feedback on would be one by the pathway pointing the way to the brewery. When possible follow MPC Regional Wayfinding Standards
- SMART will be building a new parking lot at their station. It will be pay-to-park, which tends to push people out
- Stations tend to attract parking issues. The Town should consider parking management, parking permit programs, shared parking in the station area
- Their hope is that with the new station Windsor will become a hub for residents from northern towns and counties (even as far as Mendocino/Lake County) for using SMART train. Since it will be easier to get to and is before the bad Santa Rosa traffic
- Windsor station is located downtown north of the Windsor Roundabout Project at the intersection of Windsor Road and Windsor River Road It is also near the Town/county bus depot
- Adding pedestrian/bicycle networks anywhere is good, anything that can be done, especially in the vicinity of the station
- The Town should consider a bike share program. SMART is working with Sonoma County to establish a bike share program and is talking to other regional partners/cities to establish similar programs
- The Town should consider transit-oriented development around a transit hub

- Some cities will incorporate policies like tax breaks for commuters, or transportation benefits for employees/staff
- It has turned out that building pedestrian and bicycle networks is complicated, especially when building into existing right-of-way. Trying to build big pedestrian/bike paths has been a design and right-of-way challenge for other cities
- The Town Green is a busy area and if it becomes more of a hub as a result of the station, then parking could become very difficult. One concern is that on busy days the station parking lot would be full and then after that there is not much available parking. Existing parking now is mostly residential
- Regarding pathways, the Larkspur Extension Project is a good example of how they worked with the city of San Rafael by integrating with their existing pathway network. Did this by bringing pathways in near the SMART right-of-way while also utilizing street right-of-way when needed
- Right-of-way issues can become difficult when you have multiple municipalities/agencies involved. Issues they encountered around right-of-way, funding, regulatory/environmental permits. Were able to successfully connect Caltrain, existing pathways, City of San Rafael, and Larkspur

Results of Property and Business Owner One-on-One Interviews

Detailed Findings

Speeds and Traffic Calming

Many interviewees commented that people travel at high speeds along ORH. In addition to discontinuous sidewalks, this can create additional challenges to people walking and biking along the corridor. One respondent suggested that he might like to see speed bumps implemented to encourage people to slow down. In general, traffic calming measures to slow speeds and improve conditions for walking and biking were well-supported by several participants.

Congestion

Congestion was reported near Oliver's Market and the ORH and US 101 interchange. One respondent reported they intentionally avoid the area surrounding the Town Green and Oliver's Market because of the congestion.

Parking

Back-in parking, when mentioned by respondents specifically, was not well-liked. One respondent said he and his wife frequently shop at Oliver's Market and the surrounding area. When traveling there by car, his wife refuses to use the back-in parking and it makes him very nervous when he does opt to use it. Respondents reported that in theory it may work well in other areas, but in practice, traffic along that segment of ORH is too congested or travels too fast to comfortably or safely back in. One respondent also reported the spaces were too narrow.

In the area near Oliver's Market and the Town Green, many respondents expressed that there was not enough on-street parking available. Respondents reported that on-street parking should be left alone or offset with other parking lots or options if removed. One respondent reported that they occasionally had customers reschedule appointments because they were unable to find parking.

Drivers waiting for parking spots were also reported to cause back-ups near the Town Green and Oliver's.

Roundabouts

The new roundabouts, when mentioned specifically, were well received by interviewees. Interviewees reported that they were aesthetically pleasing and enhanced safety for pedestrians and motorists.

Sidewalks

Sidewalks are discontinuous along ORH. In particular, sidewalks along the south end of the project area are not well connected to businesses. Businesses south of the US 101/ORH interchange reported that nearly all of their business arrives by motor vehicle. On the topic of sidewalks along the southern portion of the project

corridor, one respondent thought that sidewalks would be well-received and used regularly by the surrounding residencies if implemented.

Crossing improvements

Overall, recent enhancements to the walkability of ORH and the area surrounding Oliver's and the Town Green are well received. One interviewee reported that he would like to see more crosswalks with flashing lights (Rectangular Rapid Flashing Beacon), like the one that was recently installed near his business.

Bicycle Improvements

Respondents reported that bicycle improvements should be balanced with the needs of all types of users and they would like to see more dedicated facilities for bicyclists. One interviewee regularly bicycles along ORH and reported that he is most cautious and attentive to surrounding conditions and traffic near the US101 interchange.

Aesthetics

Respondents did not have specific suggestions for enhancing the aesthetics throughout ORH, but there was consensus that recent aesthetic enhancements along ORH were well-liked and should be replicated. Respondents also reported that enhancements to the bicycle and pedestrian environment improved the overall look and feel of the area near Oliver's Market and the Town Green. The enhanced aesthetics and enhanced pedestrian environment are perceived to coincide with the economic improvements to the area.

Recent Improvements

Interviewees reported that recent improvements, like the ones made near Oliver's Market and the Town Green, should be implemented throughout the corridor. In particular, continuous sidewalks, dedicated bike lanes, and marked crosswalks with flashing lights were mentioned by several participants. One interviewee, who was also a lifelong Windsor resident, responded that he thought the improvements near the Town Green really transformed the area and boosted the local economy. He said other commercial areas along the corridor frequently see businesses come and go, and he suggested that the boost in foot traffic and increase in business near Oliver's Market could be replicated elsewhere by implementing similar traffic calming improvements and enhancements to the walking and biking environment.

Key Stakeholder Interviews Additional Data and Questions

Key Stakeholder Interviewees

- Joella Olsen; Member, Senior Citizen Advisory Commission
- Bette Fleischacker; Senior and Active Community Member
- Julian Cohen; Active Community Member
- Michael Freedman; Resident near ORH and Bicyclist
- Lorene Romero; President/CEO, Windsor Chamber of Commerce
- Joanie Ransom; Senior; Commissioner, Windsor Parks & Recreation Commission
- Meredith Rennie; Commissioner, Windsor Parks and Recreation Commission
- Cindy Foreman; Fire Marshall, Windsor Fire Department
- Matt Gustafson; Battalion Chief, Windsor Fire Department
- Bryan Albee; Transit Systems Manager, Sonoma County Transit
- John Riley; Project Manager, SMART Windsor Extension
- Ross McClure; Windsor Unified School District School Bus Driver, and Instructor
- Laurie Tuxhorn; Director, Oliver's Market

Key Stakeholder Interviewees' Summary Statistics

Interviewee Location

Live on east side of 101	2
Live on west side of 101	4
Live on ORH	1
Own/operate business on ORH	1

Interviewee Usage

Mostly drive on ORH	7
Daily/multiple per day drive on ORH	6
Drive a few days per week on ORH	2
Bicycle ORH a few times a month	2
Bicycle ORH a few days per week	1
Walk ORH a few times a month	1
Walk ORH daily	1
Walk ORH a few days per week	2
Lived in Windsor 5 – 10 years	1
Lived in Windsor more than 10 years	6

Support Levels for Elements/Enhancements:

Continuous sidewalks	13
Continuous bike lanes	10
More traffic signals	4
ADA compliant cross walks	10
Traffic calming measures	4

Crosswalks w/flashers	9
Prefers embedded in street	1
Green painted bike lanes	8
Prefer barrier style bike lane	3
Roundabouts	
Like	6
Don't like	1
Back-in parking	
Neutral	5
Like	2
Don't like	3

(Note: neutrals thought it a good idea mainly to support bicycle safety, but somewhat difficult for some drivers to do)

Improve landscaping/aesthetics 1

Comment: it's difficult to link the different communities along corridor; has to reflect community – where more Latino, add murals, for example; then different for different parts

Key Stakeholder Interview Script and Interview Questions

Stakeholder Script and Interview Questions developed and vetted by Town Planning Department staff and GHD project coordinators. Stakeholder interviews were conducted by phone and/or Zoom meetings. The questions are asked conversationally, with comments noted, and later collated for a summary report.

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Windsor - Old Redwood Highway Corridor Enhancement Plan

The Town of Windsor is currently developing the Old Redwood Highway Corridor Enhancement Plan. This Plan will explore current usage, conditions, and potential improvements to the segment of Old Redwood Highway between Starr Road and Shiloh Road. As part of this Plan, the Town is gathering input from the community and from stakeholders like you, on how you use this section of roadway, your opinions and attitudes about it, and your thoughts on possible improvements to that section of Old Redwood Highway.

I would like to get your input on just a few questions that will assist the Town in gathering perspectives to create a plan that reflects the community's needs and desires about how best to utilize Old Redwood Highway in this corridor.

Some of the elements the plan can address include sidewalks, pedestrian crossings, bike lanes, road congestion, landscaping and aesthetics, safety, and overall usability.

- With those in mind, what segments of Old Redwood Highway (ORH) do you think are working well, and where are segments that you think need work? *(Describe a couple potential areas)*

- In general, what do you perceive to be the challenges to enhancing the ORH corridor between Shiloh Road and Starr Road?

- When thinking about possible enhancements to ORH, what which of these would you say are the top three priorities to explore?
    - ___ Continuous sidewalks
    - ___ Continuous bike lanes
    - ___ More traffic signals
    - ___ Improved landscaping and aesthetics
    - ___ Street level development and destinations along the corridor
    - ___ Narrower roadway

- What safety features do you think should be considered?
    - ____ Back-in parking, like that near Oliver's Market
    - ____ Green "conflict striping" for bike lanes at driveways, merge zones, etc.
    - ____ ADA-compliant cross walks
    - ____ Traffic calming measures
    - ____ Additional street lighting
    - ____ Crosswalks with flashing lights when crossing
    - ____ Other safety suggestions:_____

- Do you have other suggestions, ideas you have seen or heard, or comments for the Town in general about the ORH its roadway, bicycle, and pedestrian amenities?

I'd like to ask a few more questions about how you use and access ORH:

- Do you live on the east side or the west side of Highway 101 in Windsor?
  East side ____
  West side ____

- Do you live on ORH between Starr Road and Shiloh Road?
    - ___Yes
    - ___No

- Do you own or operate a business on ORH between Starr Road and Shiloh Road?
    - ___Yes
    - ___No

- If you answered "Yes" to #8, what kinds of improvements do you feel are needed, and what are the parts of the streetscape which seem to be successful now?
    - _____

- How do you most often travel on ORH?
    - ___ Drive
    - ___ Bicycle
    - ___ Walk

- ___ Public Transit

- How often do you travel on ORH?
  - ___ Multiple times per day
  - ___ Daily
  - ___ A few days per week
  - ___ Once a week
  - ___ A few times per month

- How frequently do you bicycle on ORH?
  - ___ Every day
  - ___ A few times a week
  - ___ A few times a month

- How frequently do you walk or jog on ORH?
  - ___ Every day
  - ___ A few times a week
  - ___ A few times a month

- How frequently do you drive a car or motorcycle on ORH?
  - ___ Every day
  - ___ A few times a week
  - ___ A few times a month

- How long have you lived in Windsor?
  - 0 - 3 years
  - 3 - 5 years
  - 5 - 10 years
  - More than 10 years

Closing:
We are talking with several people, to gain a wide set of perspectives. Is there another person, or an organization, you think we should be checking-in with about this section of the ORH corridor?

There will be a series of public workshop regarding this issue. The first one is scheduled for _____, and we hope you can participate. Thank you for your time.

Property and Business Owner Interviews Additional Data and Questions

Interviewees

- Peter Van Alyea, Chevron, Applicant/Developer
- Tom Birdsall, Windsor Town Green Hotel/"The McClelland," Applicant/Developer
- Doug Sloan, Windsor Animal Hospital, Vet Med Doctor and hospital building owner
- Robert Lanier, Farmer's Insurance, Business Owner
- Marcos, the Gentleman's Barbershop, Business Owner
- Shift Manager, Round Table Pizza
- Employee, Thumbs Up Burgers and Deli

Property/Business Owners Invitation, Script, and Questions

Stakeholder interviews would be conducted by phone and last approximately 10 to 15 minutes. The questions would be asked conversationally, with comments noted, and later tallied for a summary report.

Email Invitation

The Town of Windsor is looking for feedback from property/business owners located on or near Old Redwood Highway as it develops the Old Redwood Highway Corridor Enhancement Plan. **The Plan will explore current usage, conditions, and potential improvements to Old Redwood Highway between Starr Road and Shiloh Road.** The Plan may address sidewalks, pedestrian crossings, bike lanes, road congestion, landscaping and aesthetics, safety, and overall usability.

To understand current conditions and develop recommendations for the corridor, the project team (Town of Windsor and GHD) is conducting short interviews with property/business owners. As a property owner on or near Old Redwood Highway, your insight will help the Town develop a Plan that will best meet the needs of the community.

If you would like to participate in this brief interview and help shape ideas for the future for Old Redwood Highway, please respond to this email. I will follow up with additional scheduling information. The interview would be conducted by February 26th and last approximately 10 to 15 minutes.

We look forward to hearing from you!

Property Owner Script and Interview Questions

The Town of Windsor is currently developing the Old Redwood Highway Corridor Enhancement Plan to explore current usage, conditions, and potential improvements to the segment of Old Redwood Highway between Starr Road and Shiloh Road. As part of this Plan, the Town is gathering input from the community and from stakeholders like you, on how you use this section of roadway, your opinions and attitudes about it, and your thoughts on possible improvements to that section of Old Redwood Highway.

I would like to get your input on just a few questions that will assist the Town in gathering perspectives to create a plan that reflects the community's needs and desires about how best to utilize Old Redwood Highway in this corridor.

It will help to keep in mind some of the elements the Plan can address, which include sidewalks, pedestrian crossings, bike lanes, road congestion, landscaping and aesthetics, safety, and overall usability.

1. Can you tell me a little bit about your property and how it connects to Old Redwood Highway?

2. When accessing or exiting your property along Old Redwood Highway, what challenges do you have? For example, things like, congestion, signal timing, tricky left turns, pedestrian crossings.

    a. If a business owner: What challenges, if any, do your customers face?
    b. Have any of your neighbors discussed concerns with you regarding Old Redwood Highway? Please explain.

3. Think about a trip you make regularly using ORH - where do you go and is there anything that could be improved along your route? (*Prompt with examples if they need some help*)

4. What segments along Old Redwood Highway work well, and why? If you can't think of anything along ORH that works well, is there another example within Windsor that you think could improve Old Redwood Highway?

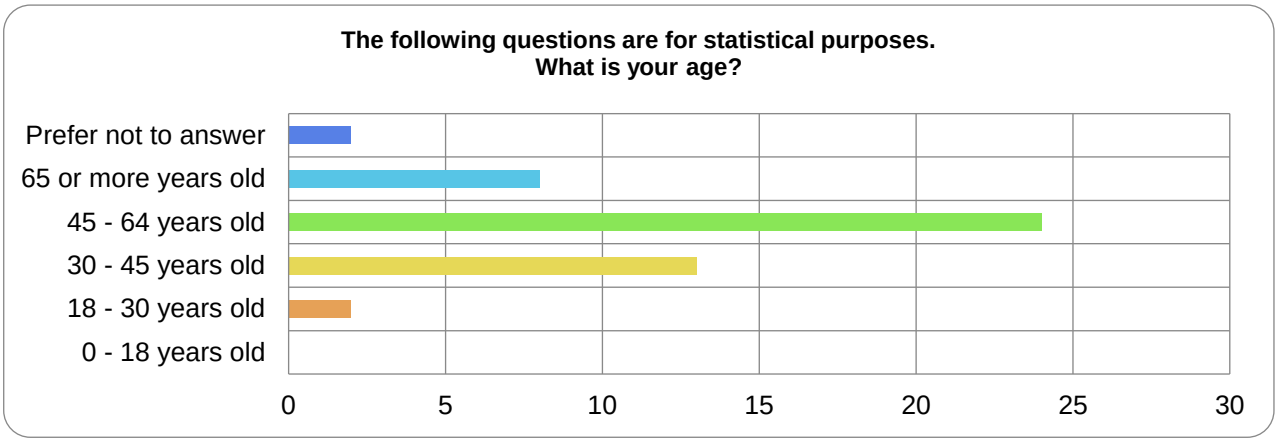
5. Are there any existing challenges or recent improvements along Old Redwood Highway that you believe affect the local economy? Or your personal business? (*If it applies)*

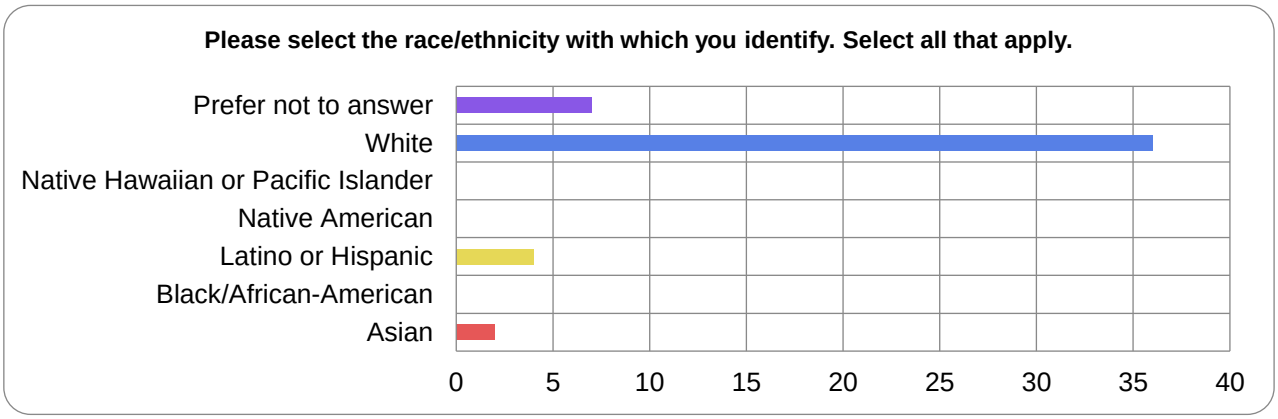
6. How do you most often travel on ORH? Do you use other modes less frequently?
    a. ___ Drive
    b. ___ Bicycle
    c. ___ Walk
    d. ___ Public Transit

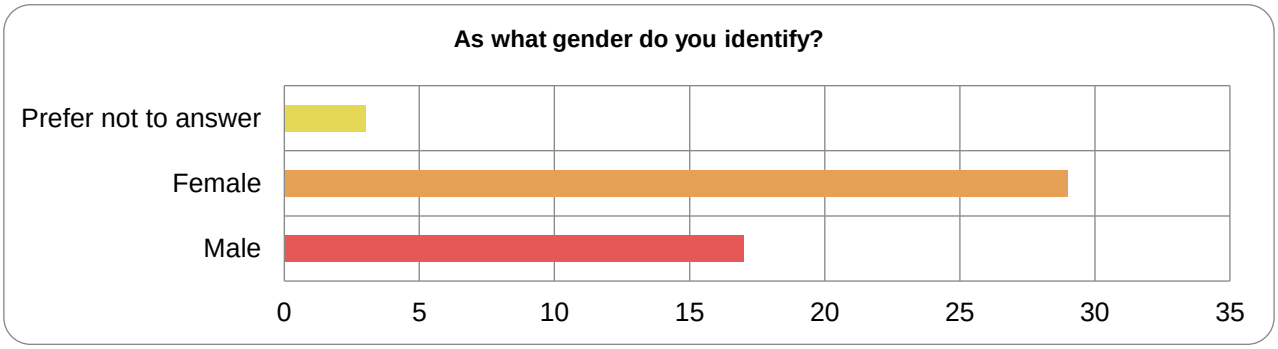
7. Do you have any comments about recent improvements, things you'd like to see more of or things that could work better: For example,
    - ____ Back-in parking, like that near Oliver's Market
    - ____ Green "conflict striping" for bike lanes at driveways, merge zones, etc.
    - ____ ADA-compliant cross walks
    - ____ Traffic calming measures
    - ____ Additional street lighting
    - ____ Crosswalks with flashing lights when crossing
    - ____ Other safety suggestions:_____

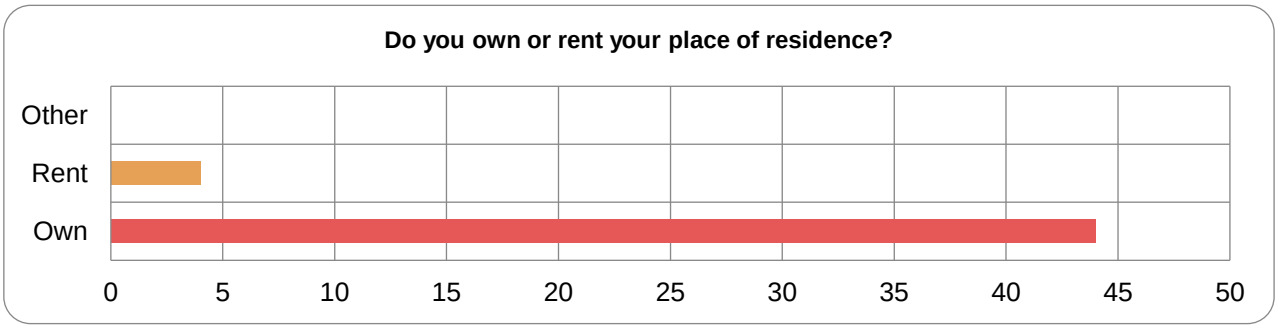
8. Do you have other suggestions, ideas you have seen or heard, or comments for the Town in general about the ORH its roadway, bicycle, and pedestrian amenities?

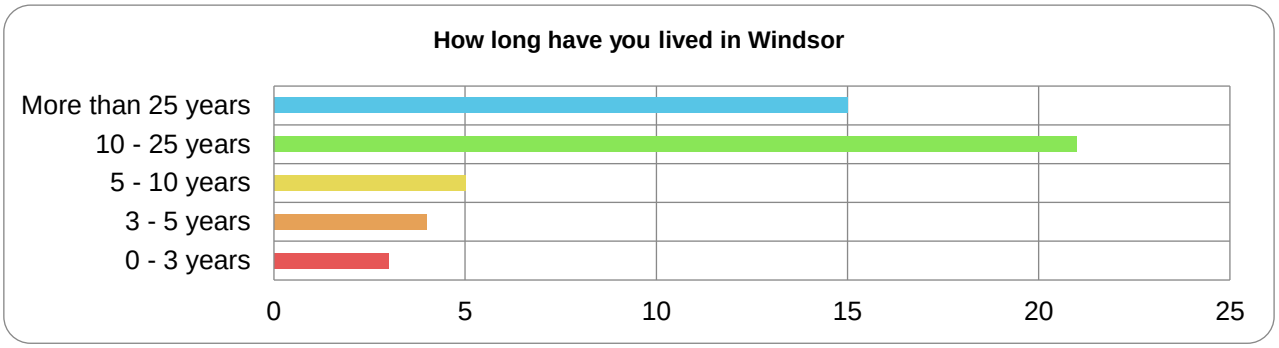
Online Survey and Interactive Map Results

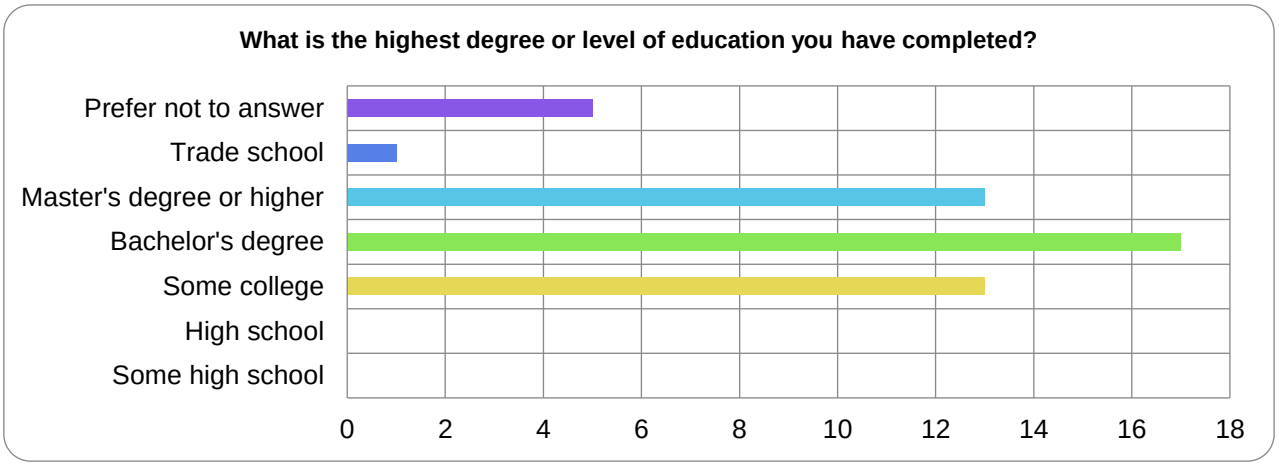


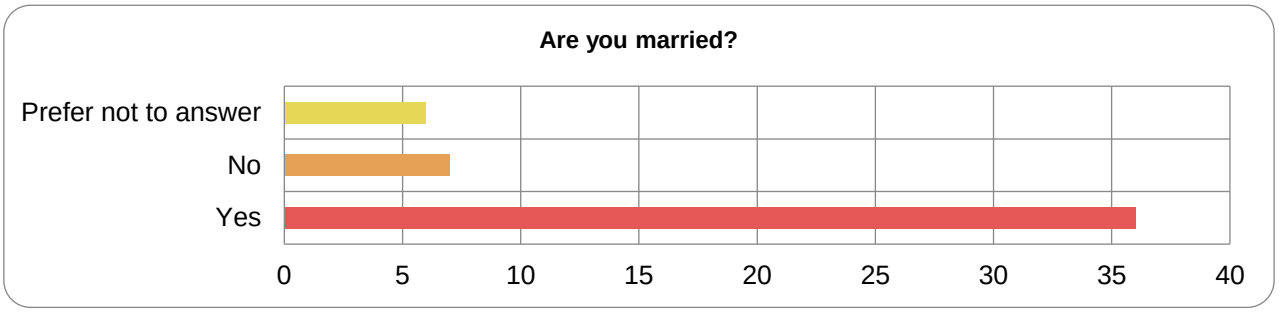


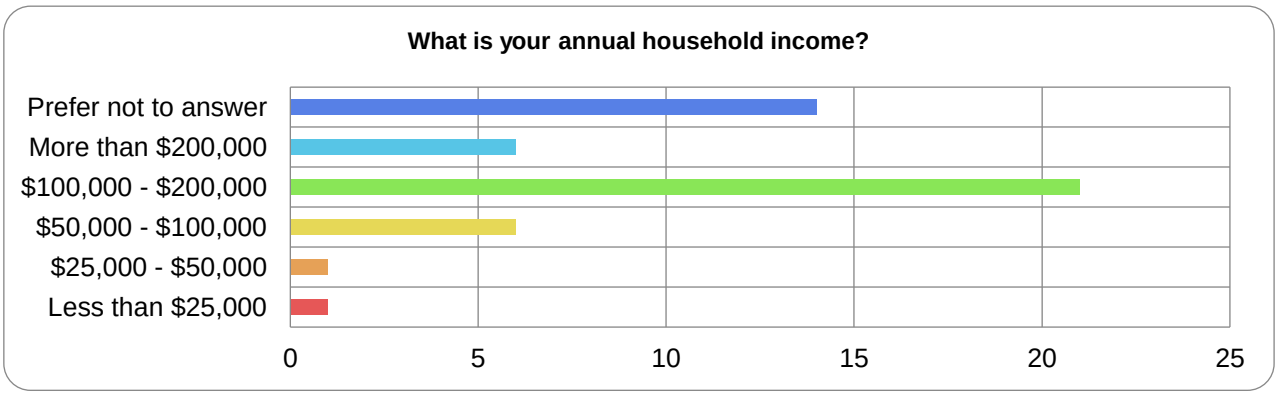


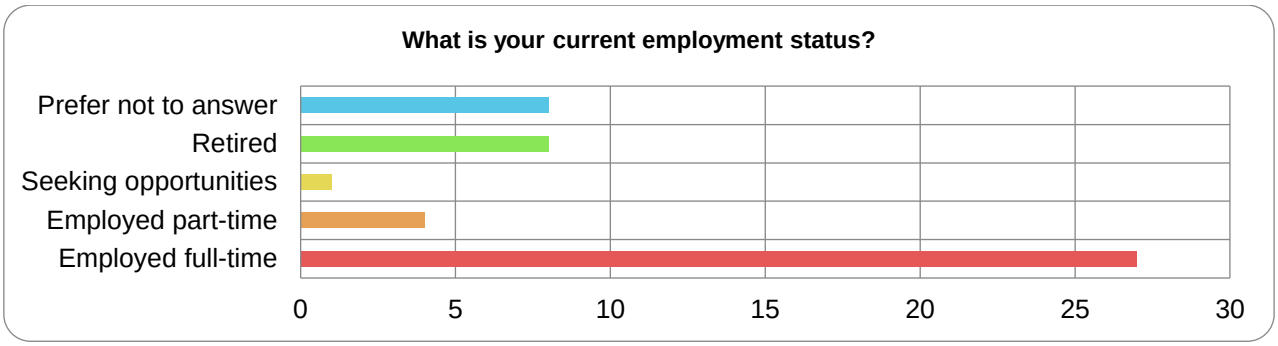


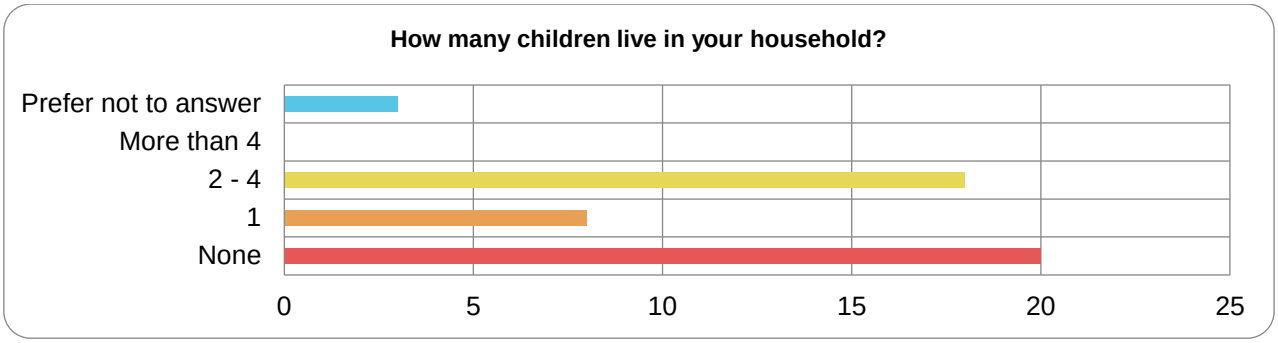

How long have you lived in Windsor
More than 25 years
10 - 25 years
5 - 10 years
3 - 5 years
0 - 3 years
0
5
10
15
20
25


What is the highest degree or level of education you have completed?
Prefer not to answer
Trade school
Master's degree or higher
Bachelor's degree
Some college
High school
Some high school
0
2
4
6
8
10
12
14
16
18


Are you married?
Prefer not to answer
No
Yes
0
5
10
15
20
25
30
35
40


What is your annual household income?
Prefer not to answer
More than $200,000
$100,000 - $200,000
$50,000 - $100,000
$25,000 - $50,000
Less than $25,000
0
5
10
15
20
25


What is your current employment status?
Prefer not to answer
Retired
Seeking opportunities
Employed part-time
Employed full-time
0
5
10
15
20
25
30


How many children live in your household?
Prefer not to answer
More than 4
2 - 4
1
None
0
5
10
15
20
25

Comment via Social Pinpoint, email, during 1/11/22 Planning Commission or 1/19 Council Meetings	Comment Type/ Plan Section	Response
I support the proposed Class I Overcrossing of Highway 101 as shown on page 41 and Figure 12. I live on the east side of Highway 101 in Windsor. This proposed overcrossing would provide a safe pedestrian/bicycle crossing of Highway 101 and encourage more pedestrians and bicyclists to travel from the east side to the west side of Windsor. It would be great to walk/bicycle to Oliver's Market or the Town Green without driving. Also, I support the proposed Class IV Bikeways along Old Redwood Highway. *(Referring to Joe Rodota Drive to Bluebird Drive segment).*	Bicycle and Pedestrian Facilities Comment	Thank you for the comment.
Figure 10 seem to show an elevated bike/pedestrian path. If path is too steep it will discourage, rather than encourage biking (especially by children and elderly) instead of encouraging it. *(Figure 10 is from Connecting Central Windsor and represents a concept for the overpass of US 101).*	Bicycle and Pedestrian Facilities Comment	ADA standards would be addressed during design.
I support improved bikeway and pedestrian markings, including contrasting pavement colors, in these areas. Bikeways color marking on the pavement (e.g. green as shown in cover drawing of report) wherever crossing car traffic alignments, is a good idea. Let bikes and cars know where they are supposed to be.	Bicycle and Pedestrian Facilities Comment	Thank you for the comment.
The bike lane and sidewalk on southbound ORH disappears on a small bridge over an un-named creek between Deanna and Savannah. This is a very dangerous situation that needs to be addressed in the plan, ideally with bridge widening, but at least with buffered conflict road markings to indicate to motorists that bicyclists and pedestrians MUST encroach on roadway in order to travel south on ORH.	Bicycle and Pedestrian Facilities Comment	This is the location of P40 in the Plan, which is a widen bridge recommendation that notes the need for closing the gap in bike infrastructure. A note was added to this recommendation that as an interim solution, signage and/or pavement markings could be considered to alert drivers that people walking or bicycling may be sharing the travel lane.
One area that wasn't addressed in the plan is sidewalks along Shiloh Road from Old Redwood Hwy to 101. This effectively continues to force residents to drive to Walmart, Home Depot and other stores. You did recommend bike lanes which is an improvement but failing to address this critical need for sidewalks is very disappointing.	Pedestrian Facilities Comment	Shiloh Road is outside the purview of this Plan. Comment provided to Town for review.
What is the boundary being formed of? I think that anything less than regularly spaced concrete bollards are insufficient and some sort of curbing would be preferential. *(Referring to vertical barrier for the Class IV bikeway*).	Bicycle Facilities Comment	The vertical barrier would be determined in the design phase. Comment noted.

Comment via Social Pinpoint, email, during 1/11/22 Planning Commission or 1/19 Council Meetings	Comment Type/ Plan Section	Response
Please review possibility of Bike Box at Old Redwood Highway and Shiloh southbound.	Bicycle Facilities Comment	Bike box added as an alternative/interim recommendation. This location already noted for protected intersection OR roundabout as long-term solutions.
We REALLY need one of those "wait here" segments at the overpass/Lakewood Drive intersection! *(Request is for bike box).*	Bicycle Facilities Comment	Recommendation for bike box added to the notes description for the existing recommendation P19 at this location.
From the 1/11/22 Planning Commission Meeting: Commission, staff, and consultant discussed the phasing of the project's implementation, criteria used to prioritize construction segments, and grant funding opportunities. The Commission supported the Old Redwood Highway Corridor Enhancement Plan with a recommendation to have an option for a protected bike lane near Kendall Way and Esposti Park without loss of street parking spaces.	Bicycle Facilities Comment	In front of the existing Esposti Apartments, there are only two on-street parking spaces on the west side of the street. The cross section showing removal of parking only impacts these two spaces. Given the recent approval of the Shiloh Terrace project further south with buffered bike lane, which allows busses to stop at curb in these locations, Class II buffered facility is maintained in this section. Class IV could be considered in the future.
P38 widen pool Creek bridge: I have biked this often and while I support all the bike marking enhancements I see in the report, this is my favorite bike improvement. For cost saving, investigate cantilevering the bike lane widening off the existing bridge - I have seen this done in other towns. *(Referring to Southeast of ORH/Highway 101 Interchange segment).*	Crossings and Spot Improvements Comment	Thank you for the comment.
P17 Squared corners for traffic calming is great but they must be marked IMMEDIATELY especially for night driving. I have been at other off-ramps in Sonoma County where reflectors were placed on traffic calming/changes only months after the concrete had been placed and dozens of cars (as evidenced by the tire and other marks) had run into them. By the time the changes were marked, most of the locals already knew about them by driving by or over them. *(Referring to Joe Rodota Drive to Bluebird Drive segment).*	Crossings and Spot Improvements Comment	Specific reflector and striping guidelines under the purview of Town Public Works. Comment logged for their review.

Comment via Social Pinpoint, email, during 1/11/22 Planning Commission or 1/19 Council Meetings	Comment Type/ Plan Section	Response
"Another possible source of reduction to tributary area is receiving agreement from the Regional Water Board to remove portions of the existing roadway that will not be removed through the full thickness of the roadway base. If the Water Board is willing to allow that exclusion, those areas could be ignored in the calculations for new/replaced impervious surface. " This paragraph speculates but what's the likelihood that the waterboard will agree? Also, it is unclear. The paragraph needs to be rewritten for clarity.	Stormwater Infrastructure Recommendations Comment	The opinion of the Water Board at the time of any given project is not something this project can address.
Over $15,000,000 for 2.3 miles of improved bike safety is incredibly excessive. Improve bike safety, but at almost $7,000,000 per mile, that is just wasteful spending.	Project Cost Estimates Comment	Opinion noted.
On page 13 this map legend has a red colored indicator for Severe Injury, I believe it should be orange as indicated on page 14 and 15?	Map Comment	Both red and orange (fatal and severe injury) are shown on all noted maps (Figures 3, 4, 5).
Overall, plan looks well researched and balanced. Fully support.	General Comment	Thank you for your comment.
We don't need to make ORH "fancy."	General Comment	Opinion noted.
I have a business in Windsor and Healdsburg (Alliance Medical Center) and I prefer commuting by bicycle and every improvement you can make to keep it safer is appreciated. The green markings make me feel so much more safe, especially near any highway entrances. Keep up the good work improving safe bicycling options in this wonderful town!	General Comment	Thank you for the comment.
I was on tonight's call regarding the Enhancement Plan of Old Redwood Highway. I do not have anything to add other than we support the direction you are moving in, especially in regards to bicycle safety. We have a lot of students who are riding their bikes to school since we were not able to offer transportation earlier in the year. We still have plenty who are riding to school even now that we have transportation services back up and running. There were no areas of concern in terms of bussing. Thank you for keeping us in the loop and asking for our feedback.	General Comment	Thank you for the comment.

Comment via Social Pinpoint, email, during 1/11/22 Planning Commission or 1/19 Council Meetings	Comment Type/ Plan Section	Response
As you review this Plan at the meeting I hope you will give consideration for and hopefully publicly comment and request the following: 1) Request the Plan factor in the town's goals/criteria into the plan's priorities: As described in the plan, the town has goals of seeking improvements in areas with higher density and affordable housing. These goals aren't reflected in the overall scoring of each section. Of particular concern is that the southern most section of the Plan from Shiloh-north scores the lowest however already contains significant affordable housing with limited pedestrian and bicycle support. In addition, it is slated to get more affordable housing which because of parking concessions that will limit well over 100 households to 1 car per unit, increases the need and urgency of these improvements. 2) Request that the philosophy behind this thoughtful design of pedestrian and bicycle improvements on this busy corridor be applied to Shiloh Road between 101 and ORH. The need for us to update the Shiloh Road plan is urgent given the increased likelihood of significant development on this frontage in the next few years. The current road plan was developed 20 years ago and supports an old style vision of bicycle and pedestrian support. The new Old Redwood Hwy Plan follows current best practices for Safe Streets. It would be a shame for us not to apply the lessons from this Plan to Shiloh Road.	General Comment	1) Scoring of the "state prioritization" reflects criteria which are likely to factor into state funding application for grants. A second, non-scored prioritization for "local priorities" addressed these local goals. No change recommended. 2) Comment provided to Town for review but is outside the scope of this project. No change recommended.
I would like to draw your attention to how other California municipalities are leveraging the recently enacted legislation that grants cities and towns to make cycling and walking safer. *https://www.sfgate.com/bayarea/article/San-Francisco-reducing-speed-limit-16773901.php* I recognize that many in Windsor will resist efforts to lower speed limits through citizen efforts to get legislation like this or to lobby for different interpretations of existing codes like I was trying to do for CVC 22358.3. However, the one place where this seed might take root is BPAC. I believe you are aware that AB43 is a step forward for safer streets. Until now California cities have had much less control than expect in setting speed limits. As I review the summary for Old Red I note that speed limits are not even listed. The fact that a street that has large numbers of people walking and biking will now be given more sway, therefore as BPAC looks at the Old Red corridor maybe this citizen driven reform should be considered.	General Comment	AB43 doesn’t take effect until possibly 2024, and only after the State develops the guidelines for special zones. This is not a tool in our toolbox quite yet. As for the Plan, the roadway is expected to be built in a context that will calm traffic, however it can’t legislate a speed limit for the corridor.

Comment via Social Pinpoint, email, during 1/11/22 Planning Commission or 1/19 Council Meetings	Comment Type/ Plan Section	Response
More type O's! Error! Reference source not found. Is the breakdown of ORH collisions versus US 101 interchange collisions. Any location on ORH that had a US 101 ramp terminal as part of the intersection is captured under US 101 interchange collisions. ORH intersection collisions had the majority of collisions in the past 5 years with 110 of a total of 171 collisions.	Plan Appendices Comment	Corrected the table reference (page 22, table A-15). No change request evident.
Please stop replacing intersections with roundabouts, on existing intersections. At $5,000,000 per roundabout and seeing the months/years of traffic impacts that are negatively impacting us as residents, it is just not a worthwhile investment. Consider them on new development, but it's wasteful and disruptive on existing. Furthermore, to allocate those funds for the intersection of ORH and Shiloh would be a very poor decision given the potential for a casino development and substantial change in traffic patterns.	Plan Appendices Comment	Comment noted.

Dear Town Council,

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My name is Collin Thoma and I am the System Change Advocate with ~~Disabilty~~Disability Services and Legal Center (DSLC). I am ~~provding~~providing public ~~commnennt~~comment the Old ~~Rewood~~Redwood Highway Corridor ~~Enhancemnet~~Enhancement Plan (item #10.3) from a disability ~~pount~~point of view so the plan can be ~~acessaible~~acesaaible and inclusive of people with ~~Disabilites~~Disabilities. While the project plan has mentioned spe~~cific~~~~ofc~~ upgrades on different part of the highway, my comments are for the ~~enterity~~entirety of the project. Sidewalks will need to be well ~~mainainted~~maintained and built where they are missing is crucial to making Old Redwood highway ~~acessaible~~acesaaible to people with ~~Disabiltes~~Disabilities. Having good maintenance is important as even the smallest crack or bump can pose a significant ~~safty~~safety issue. If someone who uses a wheelchair, scooter, walker or who use cane/crutches hits the bump or crack it could cause them to get stuck and/or fall over potentially causing injury. Building sidewalks where they are missing is important it poses a serious safety issue. If someone who mobility device has to go in the street it increases their chance of being hit by a vehicle as they may be harder to see since they are lower to the ground. These sidewalks will also need to connect to other paths i.e. trails which are ideally paved and to surrounding neighborhoods to improve access to other parts of the town.

For crosswalks to ~~acessiable~~accessible it's important that the crosswalks are highly ~~visable~~visible to both drivers and ped~~estrians~~~~ertains~~ ~~poritely times~~and adequately timed. When ~~determing~~determining the amount of time allowed to cross, it needs to be taken into account that ~~some one~~someone with a ~~mobilty~~mobility or physical disability may need 15 seconds instead of 10 seconds to safely cross. In addition, curb ramp cut outs ~~are~~are needed and will need plastic bumps ~~to provide~~to provide physical indication of the beginning/end of the crosswalk. The button to press to activate the crosswalk will need to be at a height and angle to be pressed by ~~somone~~someone in a wheelchair. The crosswalk should be an audio and touch(vibrate) ques for those that has a vision or hearing disability they know it's safe to cross. Refugee ~~ilsands~~islands or protected intersections are the next best option if the time allowed to cross can't be increased. These islands, or protected intersections will need to be big enough to ~~acomdate~~accommodate ~~peron~~pedestrians who use a wheelchair and non-disabled ~~pedestrains~~pedestrians. It would be

good to see the town build as many curb extensions as possible, to increase visibility which is a big concern for people who use a mobility device. The town should also consider adding signs to reminder drivers to look out for people who use a wheelchair or another mobility device that is lower to ground and, makes them harder to see. The sign can look just like a regular crosswalk sign but has a picture of someone using a wheelchair.

Improving bike lanes will also help make Old Redwood more acesaaible and safer for people wit disabilities. Having as many class IV separated bikeways is the best option, if other bike lane classed are created it would be good to have a physical buffer especially on busy streets. This is good as if someone who uses a mobility device needs to go into the street due to heavy foot traffic or an obstruction on the sidewalk they can do safely without worry of being hit by a vehicle. It can also allow for someone who use a specially adapted bike which may be lower to ground and harder to see, to access parts of the town they may have not been able to before.

Finally having acesaaible bus stops is also an important part of the project. An acesaaible bus stop will need to have a big enough paved waiting are to accommodate those who use a mobility device and non-disabled riders. The stop should also have a good amount of seating available for those who will need to sit while waiting. Ideally the bus stop is covered to help protect people from the elements. The stop should also have live updates on how long to the next bus, and be provided on a screen as well as an audible announcement.

Thank You,

Collin Thoma
Systems Change Advocate
Disability Services & Legal Center (DSLC)
521 Mendocino Avenue
Santa Rosa, CA 95401
(707)636-3076


DSLC
Disability Services & Legal Center

Appendix C

Recommended Projects

This appendix presents the recommended complete streets infrastructure projects in tabular form, including cost estimated and prioritization scoring. Linear and Spot Improvement projects are presented in separate tables. Within each table, projects are generally listed in order from north to south.

Linear Projects

ID	Project Type	Location	Start	End	Notes	Length	Priority Score	Estimated Cost
L1	Sidewalk	Starr Rd	ORH		Install sidewalk on West/Northwest corner of Starr Rd and ORH to connect to church, several existing businesses, dining, and residential in the area	327 ft	40	$42,500
L2	Class IV Protected Bikeway	ORH	Windsor Rd	Starr Rd	Upgrade existing Class II bike lane to Class IV Bikeway on both sides of ORH	0.87 mi	40	$650,400
L3	Pedestrian Scale Lighting	ORH	Starr Ln	Bark St	Install pedestrian scale lighting at regular intervals. Some lighting exists but is inconsistent and infrequent. Lighting near Bark Street is obscured by vegetation - ensure bike lanes and sidewalks are illuminated (Segment 1).	1.05 mi	30	$4,744,400
L4	Sidewalk	ORH	Arata Ln	Starr Rd	East side	778 ft	40	$101,200
L5	Sidewalk	ORH	200ft north of Rio Ruso	Starr Rd	West side	1,573 ft	40	$204,500
L6	Sidewalk	ORH	220ft South of Dawn Way	Self Storage of Windsor	East side	1,964 ft	30	$255,400
L7	Sidewalk	ORH	200ft north of Dawn Way	Rio Ruso	West side	460 ft	30	$59,700
L8	Sidewalk	ORH	200 ft north of Godfrey Rd	Dawn Way	West side	278 ft	30	$36,100
L9	Sidewalk	ORH	Jesse Ray Pl	Godfrey Dr	West side	311 ft	30	$40,500
L10	Sidewalk	ORH	Windsor Rd	Godfrey Dr	East side	513 ft	30	$66,700

ID	Project Type	Location	Start	End	Notes	Length	Priority Score	Estimated Cost
L11	Sidewalk	ORH	Joe Rodota Dr	Windsor Rd	Close the existing gap in sidewalks on the west side of ORH to match the existing wide cross section south of Market St RNDBT, connect existing and proposed pedestrian facilities to the north to the Town Green, government offices, and the library	771 ft	30	$100,200
L12	Pedestrian Scale Lighting	ORH	Bark St	Market St	Install pedestrian scale lighting at regular intervals. Some lighting exists but is inconsistent and infrequent. Lighting near Bark Street is obscured by vegetation - ensure bike lanes and sidewalks are illuminated (Segment 2).	0.09 mi	30	$395,600
L13	Class III Bicycle Route	McClelland Dr	ORH	Market Street	Install Class III to create a connected, low-stress route all the way to the Town Green.	0.12 mi	20	$1,200
L14	Sidewalk	ORH	Windsor River Rd	Richardson St	West side	338 ft	40	$44,000
L15	Class I Multi-Use Path	ORH	Conde Ln	Lakewood Dr	Install Bi-directional Class I Multi-Use Path on south side of ORH through the Hwy 101 Interchange area between Plan ID P35 and P35, then adjacent to Redwood Market development area to ORH connection to the northeast. Cost estimate includes relocation of retaining walls.	0.16 mi	40	$4,000,000
L16	Class IV Protected Bikeway	ORH	Conde Ln	Bluebird Dr	Install Class IV Bikeways along ORH from Plan ID location P16 to Conde Ln and Plan ID location P18 (Lakewood Dr/US 101 ramp) to end of segment at Bluebird Dr	0.38 mi	40	$283,400
L17	Class IV Protected Bikeway	ORH	Bluebird Dr	Pan Adobe Ct	Install Class IV Bikeways along ORH from Bluebird Dr to Pan Adobe Ct.	1.06 mi	40	$793,800
L18	Sidewalk	ORH	240ft north of Shira St	250ft south of Hembree Ln	West side. Close gap in pedestrian network and accommodate the demonstrated need for sidewalks indicated by informal paths created by high walking activity	1,537 ft	50	$199,800
L19	Sidewalk	ORH	Bari Ln	Shira St	West side	331 ft	40	$43,000
L20	Sidewalk	ORH	200ft north of Billington Ln	Bari Ln	West side	720 ft	40	$93,600

ID	Project Type	Location	Start	End	Notes	Length	Priority Score	Estimated Cost
L21	Sidewalk	ORH	200ft north of Anish Way	100ft south of Bari Ln	East side	283 ft	40	$36,800
L22	Sidewalk	ORH	Shamrock Cir	Anish Way	East side	835 ft	30	$108,500
L23	Sidewalk	ORH	100ft south of Billington Ln	120ft south of Billington Ln	West side. Closes the gap between the bus stop and the existing sidewalk segment that extends south from the Billington Ln at ORH intersection.	24 ft	30	$3,100
L24	Sidewalk	ORH	Pan Adobe Ct	220ft south of Billington Ln	West side	413 ft	30	$53,700
L25	Sidewalk	ORH	Deanna Pl	Pan Abode Ct	West side. Closes gap in sidewalk network	646 ft	30	$83,900
L26	Class II Buffered Bicycle Lane	ORH	Pan Abode Ct	Savannah Way	Upgrade Class II to Buffered Class II, widen and repave bike lane. The existing bike lane has a steep cross slope, inconsistent and narrow widths, and cracked pavement.	0.28 mi	30	$48,600
L27	Sidewalk	ORH	180ft north of Anna Dr	300ft south of Deanna Pl	West side. Connects neighborhoods to bus stop, regional parks, regional shopping and dining.	409 ft	30	$53,200
L28	Sidewalk	ORH	150 ft north of Savannah Way	Shamrock Cir	East side. Connects nearby neighborhoods and Shamrock Mobile Home Community to nearby destinations like bus stops, Esposti Park, shopping, and dining.	1,210 ft	30	$157,300
L29	Sidewalk	ORH	Merner Dr	200ft south of Savannah Way	East side. Connects neighborhoods to bus stop, regional parks, regional shopping	950 ft	30	$123,500
L30	Sidewalk	ORH	North side of Esposti Park	Merner Dr	East side. Close gap in sidewalk network. Sidewalk will connect Merner to Esposti Park	247 ft	30	$32,100
L31	Class II Buffered Bicycle Lane	ORH	Savannah Way	Shiloh Rd	Buffered Class II Bike Lane, both sides of ORH	0.46 mi	20	$79,900
L32	Sidewalk	ORH	Shiloh Rd	Esposti Park Apartments (300ft south of Kendall Way)	West side. Close gap in sidewalk network	652 ft	30	$84,800

Spot and Intersection Projects

ID	Project Type	Improvement	Location	Cross Street	Notes	Priority Score	Estimated Cost
P1	Bicycle	Conflict Markings	ORH	Starr Rd	Continue southbound bike lane markings through intersection using green painted conflict zone markings	30	$3,000
P2	Motorized	Roundabout	ORH	Starr Rd	Install roundabout at Starr Rd and ORH intersection	40	$5,000,000
P3	Crossing	Crosswalk	ORH	Starr Rd	Install high visibility crosswalk on SE leg across ORH to existing curb ramp. Install high visibility crosswalk across Starr (assess need for school zone crossing).	20	$3,600
P4	Bicycle	Bicycle Improvements	ORH	Arata Ln	Install bike boxes and green painted approaches (north, south, east legs). Detectors appear to exist but may require maintenance or signage/education about how to activate.	40	$18,300
P5	Crossing	Crosswalk	ORH	Arata Ln	Install a new crosswalk on the south leg of the intersection	20	$500
P6	Transit	Bus Stop Enhancement	ORH	South of Evergreen Ave	Move existing southbound stop at Miller Ln closer to Evergreen Ave due to proximity of existing stop to the stop at Rio Ruso. Add a northbound companion stop on the opposite side of the street. Install SCT standard bus pull out and shelter for both stops.	10	$28,000
P7	Bicycle	Conflict Markings	ORH	Miller Ln	Continue bike lane markings across Miller Ln, using green conflict zone striping	30	$3,000
P8	Transit	Bus Stop Enhancement	ORH	Rio Ruso	Upgrade existing southbound bus stop, and add northbound companion stop on opposite side of the street with SCT standard bus pull out and shelter at both stops. Install no-parking zone, and widened sidewalk at the existing southbound stop.	10	$154,400
P9	Crossing	Crossing Improvements	ORH	Rio Ruso	Install marked crosswalk across Rio Ruso Dr and continue bike lane markings across Rio Ruso Dr using green conflict zone striping.	30	$3,000
P10	Bicycle	Conflict Markings	ORH	Dawn Way	Continue bike lane markings across Dawn Way, using green conflict zone striping	30	$3,000
P11	Crossing	Crosswalk	ORH	Dawn Way	Install crosswalk with Pedestrian Hybrid Beacon across ORH	30	$51,800
P12	Bicycle	Conflict Markings	ORH	Godfrey Way	Continue bike lane markings across the intersection, using green conflict zone striping	20	$3,000
P13	Transit	Bus Stop Enhancement	ORH	Woodbine Way	Upgrade the existing southbound bus pullout on the west side of the street with a no-parking zone, widened sidewalk and SCT standard bus shelter.	10	$18,200

ID	Project Type	Improvement	Location	Cross Street	Notes	Priority Score	Estimated Cost
P14	Bicycle	Conflict Markings	ORH	Woodbine Way	Continue bike lane markings across Woodbine Way, using green conflict zone striping	10	$3,000
P15	Motorized	Signs and Markings, Optimize Signal Timing	ORH	Windsor River Road to Conde Lane	Pavement markings and signage needed to provide advance warning of motorized lane directions and which lanes will end (particularly on WB leg). Optimize signal timing. Install bike boxes and repaint crosswalk markings.	40	$8,700
P16	Motorized	Signs and Markings, Optimize Signal Timing	ORH	Hwy 101 SB Ramp	Pavement markings and signage needed to provide advance warning of motorized lane directions and which lanes will end (particularly on EB leg). Optimize signal timing. Install bike boxes and repaint crosswalk markings.	40	$4,500
P17	Crossing	Crosswalk	ORH	Hwy101 SB Off-Ramp	Square corners and install curb extensions to slow turning vehicles and shorten crossing distances for pedestrians. Provide at-grade crosswalk/crossbike from NE to SW corners, to connect proposed Class I paths on both sides of ORH (Rec 1c in CCW Plan).	40	$15,300
P18	Motorized	Optimize Signal Timing, Slip Lane On-Ramp	ORH	Lakewood Dr	Optimize signal timings and construct slip lane from Lakewood Dr onto NB Hwy 101 (Bypasses right turn movement onto ORH to access 101 from Lakewood).	20	$2,201,500
P19	Crossing	Crossing Enhancement	ORH	Lakewood Dr	On north, east, and south legs (existing crosswalks) install leading pedestrian interval, high visibility crosswalks with advance stop bars, and bike boxes.	30	$15,200
P20	Transit	Bus Stop Enhancement	ORH	South of 4th St	Relocate existing northbound bus stop to south of 4th Street to accommodate widened sidewalk area and SCT standard shelter.	40	$16,000
P21	Crossing	Crosswalk, RRFB	ORH	3rd St	Install high visibility crosswalk with RRFB and pedestrian refuge across ORH. Intersection has history of pedestrian collisions and no marked crosswalks exist across ORH here. Connect hotel, restaurants Park and proposed apartment complex near intersection.	40	$51,800
P22	Bicycle	Conflict Markings	ORH	2nd St	Continue bike lane markings across the intersection, using green conflict zone striping	40	$6,000
P23	Transit	Bus Stop Enhancement	ORH	Between Courtyard/2nd St and Bluebird Dr	Add new north- and southbound stops along ORH between Courtyard/2nd St and Bluebird Dr with SCT standard bus stop and shelter.	10	$28,000
P24	Crossing	Crosswalk	ORH	Bluebird	Install crosswalk on north leg. Will connect to Redwood Views Apartments (affordable housing) development on east side of ORH across from Bluebird Dr.	10	$500

ID	Project Type	Improvement	Location	Cross Street	Notes	Priority Score	Estimated Cost
P25	Crossing	Crossing Enhancement	ORH	Alden Ln	Upgrade crosswalks to high visibility crosswalks with advance stop bars. Provide leading pedestrian interval.	20	$17,700
P26	Transit	Bus Stop Enhancement	ORH	Alden Ln	Replace shelters at existing north- and southbound stops south of Alden Ln with new SCT standard shelters. Remove redundant north and southbound stops located south of Hembree Ln intersection.	10	$28,000
P27	Motorized	Roundabout	ORH	Hembree Ln	Install roundabout at ORH and Hembree Ln	30	$5,000,000
P28	Bicycle	Bicycle Detectors	ORH	Hembree Ln	Upgrade bicycle detectors from loops to another technology. Include signage/education about how to activate ('to request green, wait on' sign). High community desire for detectors at signals.	10	$40,000
P29	Transit	Bus Stop Enhancement	ORH	Pleasant Ave	Install widened sidewalk areas and SCT standard bus shelters at existing north- and southbound stops. Ensure stops remain north of Pleasant Ave and the proposed roundabout, if installed. Remove unnecessary/redundant southbound stop near Shira St.	30	$32,000
P30	Motorized	Roundabout	ORH	Pleasant Ave	Install roundabout at ORH and Pleasant Ave	40	$5,000,000
P31	Crossing	Curb Extensions	ORH	Thrushwing Ave	Install curb extensions on south and east legs of intersection, install RRFB on south leg (ORH crossing). Ensure curb extensions provide clearance for the bike lane and does not impact transit stop.	30	$59,000
P32	Transit	Bus Stop Enhancement	ORH	Thrushwing Ave	Replace old bus shelter with new SCT standard bus shelter at southbound stop at Royal Mobile Manor and install SCT standard bus shelter at northbound stop at Thrushwing Ave. Install improved and widened sidewalk areas at both stops.	20	$32,000
P33	Bicycle	Conflict Markings	ORH	Billington Ln	Continue bike lane markings across the intersection, using green conflict zone striping	30	$3,000
P34	Crossing	Crosswalk, RRFB, Curb Extensions	ORH	Billington Ln	Install a high visibility crosswalk with RRFB and bulbouts. Connect the east side of ORH and the proposed SCTA Class I Trail to Billington Ln and Robbins Park. Install curb extensions for traffic calming.	20	$56,300
P35	Transit	Bus Stop Enhancement	ORH	150ft south of Billington Ln	Install bus turnout for existing bus stop on west side of the street	10	$60,000
P36	Crossing	Crosswalk	ORH	Shamrock Cir	Install high visibility crosswalk for people accessing bus stops on either side of the road and people accessing the gym, animal hospital and services in the CopperStone building.	10	$1,800
P37	Transit	Bus Stop Enhancement	ORH	Shamrock Cir	Install bus turnout on the east side of the street and bus stop amenities (bench, shade, informational signage). Ensure curb extensions provide clearance for the bike lane and does not impact the transit stop south of Bari Ln.	10	$74,000

ID	Project Type	Improvement	Location	Cross Street	Notes	Priority Score	Estimated Cost
P38	Bicycle	Widen Bridge	ORH	Pool Creek	Widen existing bridge to close the gap in existing bicycle lanes on either side of the bridge and bring the proposed Class I trail across the creek	10	$800,000
P39	Transit	Bus Stop Enhancement	ORH	Deanna Pl	Relocate existing northbound stop located at the intersection of Savannah Way to the north closer to Deanna Pl to provide a closer companion stop for the existing southbound stop at Deanna. Stop placement should coincide with new developments and placement of future crosswalks and include SCT standard bus bull out and shelter.	10	$74,000
P40	Bicycle	Widen Bridge	ORH	Savannah Way	Widen existing bridge to close the gap in existing bicycle lanes on either side of the bridge. Changes to bridge should consider Class I Fraught Creek Trail (pending development west of ORH), will ultimately connect to a proposed Class I to the east. As an interim solution, signage and/or pavement markings could alert drivers to watch for people bicycling or walking who may be sharing the lane.	10	$800,000
P41	Transit	Bus Stop Enhancement	ORH	Anna Dr	Install new northbound companion stop with SCT standard bus pullout and shelter for existing southbound stop near Anna Dr.	10	$74,000
P42	Crossing	Crosswalk	ORH	Tamara Way	Install a high visibility crosswalk on north leg to connect pedestrians to the shopping and services in the strip commercial on the west side of ORH. Install ADA compliant curb ramps, RRFB, and Pedestrian Refuge. Only 4 marked crosswalks in 1.6 miles.	30	$74,800
P43	Bicycle	Conflict Markings	ORH	Kendall Way	Continue bike lane markings across the intersection, using green conflict zone striping	30	$6,000
P44	Bicycle	Conflict Markings	ORH	150 ft. north of Shiloh Rd to 300 ft. north of Shiloh Rd	Fill gap in bike lane on SB approach to Shiloh Rd. Use conflict zone markings.	20	$9,000
P45	Crossing	Protected Intersection	ORH	E Shiloh Rd	Implement a protected intersection with high visibility crosswalks, leading pedestrian interval, and green painted bicycle approaches and conflict markings for all bicycle lanes approaching the intersection. Minimize effective turning radii. As an interim solution, add a bike box on the southbound approach. If P45 is not selected, P46 offers an alternative for this location.	30	$190,000
P46	Motorized	Roundabout	ORH	Shiloh Rd	Install roundabout at ORH and Shiloh Rd. If P46 is not selected, P45 offers an alternative for this location.	30	$5,000,000

Appendix D

Stormwater and Low Impact Design

This Appendix presents additional information on best practices and design requirements for stormwater infrastructure and low impact development (LID) treatments. Content has been reproduced from the City of Santa Rosa LID Manual, which the Town of Windsor contributed to and adopted.

Project Description and Site Constraints

Project Location and Description

The project site is located along the Old Redwood Highway corridor between Shiloh Road and Starr Road in Windsor, CA. The intent of this project is to plan and execute a design that will revitalize this corridor to enhance vehicular, bicyclist, and pedestrian safety and add 'Complete Street' provisions to all areas along this portion of Old Redwood Highway. While the focus of this project leans more toward the traffic planning and infrastructure portion of the design, necessary stormwater facilities are being discussed and evaluated in order to provide as many feasible design options as possible.

Currently, there is a mixture of commercial and residential uses along the corridor along with varying roadway configurations and infrastructure. Due to the age of the development along this roadway, there are no stormwater Low Impact Development (LID) features present. Redeveloping the corridor as a whole will allow for greater integration throughout the full length of the project.

The project is in the early planning stages and on-site field investigations have not been conducted. According to the Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS), soils in the project vicinity are primarily Huichica Loam (HtA, HtC, HuB, HvC), which are classified as moderately well drained and consisting primarily of loam and sandy clay loam, along with some areas of Cole silty clay (CoA), which are described as somewhat poorly drained.

The project is located within then National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Boundary. The project is anticipated to need to incorporate permanent Storm Water Best Management Practices (BMPs) as required by the NPDES MS4 Permit as a result of creating or replacing a combined total of 10,000 square feet (SF) or more of impervious area. Additional hydromodification may be required if the project proposes over an acre of impervious area.

Opportunities and Constraints for Stormwater Control

The project is fortunate that existing constraints for stormwater control are minimal due to the project area being redesigned as a whole, with opportunities for drainage upgrades as needed. As the design progresses, a geotechnical investigation will be required to determine if high groundwater or soil contamination may be present in areas of the project. Presence of either of those items would create restrictions for location and depth of LID facilities.

LID design should be incorporated into the street design from the beginning to allow for optimal placement both for water treatment and maintenance operations. Early LID design is optimal to aid in street tree placement and spacing that will allow for larger areas of LID facilities to be installed and reduce the number of facilities requiring maintenance.

Another factor to consider in the early stages of design will be run-off from non-project areas. Any stormwater that mixes with runoff from the project will be required to be treated and retained. Allowing off-site water to drain toward the project increases the volume of water that the project will become responsible for.

Runoff Reduction Measures

The LID Manual lists multiple runoff reduction measures that will allow for a reduction of tributary areas if the measures are incorporated into the project. The most applicable runoff reduction measure for this project will be Interceptor Trees. Credit for tributary area can be taken based on the number of new trees installed with deciduous trees receiving a credit of 100 SF per tree and evergreen trees receiving a credit of 200 SF per tree. Coordination will occur between the stormwater and landscape design to optimize tree locations to allow for the maximum credit and largest reduction in required treatment and retention volume. Another possible source of reduction to tributary area is receiving agreement from the North Coast Regional Water Quality Control Board (Water Board) to exclude portions of the existing roadway that will not be removed through the full thickness of the roadway base. If the Water Board is willing to allow that exclusion, those areas could be ignored in calculations for new/replaced impervious surface.

Design Requirements and BMP Selection

Treatment and Volume Capture Requirements

The LID manual and MS4 Permit define the design storm as one that produces 1 inch of rainfall over a 24-hour period. All projects are required to treat 100% of the runoff from the project area for the design storm. An additional requirement is for Volume Capture. Projects are required at a minimum to retain the increase in volume for the design storm unless they create or replace an acre or more of impervious surface.

BMP Selection

Bioretention facilities have been determined to be the most appropriate Best Management Practice (BMP) for this project. These are facilities that combine vegetated layers to provide treatment as well as structural soil/gravel layers to provide volume capture.

There are multiple design options for bioretention facilities based on site grading specifics and drainage patterns. One option that has proved successful in other LID designs is inflow/outflow curb cuts with bioretention facilities designed in curb extension locations. For this design, the bioretention area would be sunk down typically 3-6 inches below gutter grade. Curb cuts would be provided to allow water to flow into the bioretention area on the high side, and an overflow curb cut would be provided on the low side to allow water from larger storms to exit. Maintenance would be provided manually in vegetation management and trash removal.

Another option for landscape strips and other linear features is bioretention areas with pervious gutter. In this option, the majority of the water enters the bioretention area through pervious gutters with some entering from surface flow off sidewalks. In larger storm events where the bioretention features are full, runoff would bypass these features and continue to flow along the gutter. This design will require some manual maintenance in the landscape area with the majority of the maintenance in the pervious gutter occurring through routine street sweeping.

In areas where bioretention is not feasible, proprietary units (specifically tree wells) are an alternate BMP. These are not a Priority 1 or Priority 2 BMP, and would require approval from the Water Board. Numerous manufacturers offer options for this style of BMP, which typically incorporates a filter media and storage chamber with one tree planted per well. Maintenance responsibilities differ depending on model and manufacturer.

Trash Capture

The LID manual and MS4 Permit also outline requirements for trash capture to prevent trash from entering the storm drain network. Projects are required to provide trash capture that will filter out debris of 100 microns and larger. Once BMPs are designed and selected for the site, specific trash capture measures can be evaluated for applicability.

Description of Maintenance Responsibilities

The Town of Windsor would need to accept maintenance responsibilities for any LID features installed as part of this project. Below is a short list of the most common responsibilities as well as their typical frequency. As the project design progresses, a more detailed maintenance plan will be established.

Monthly: Plantings within the bioretention areas should be checked monthly. Any weeds found should be removed and dead plants replaced. Remove any debris found within the BMP area.

Semi-Annually: Any inlet and outlet structures should be inspected twice a year to ensure they are not clogged and are functioning properly. Remove any debris that may be clogging the structures.

Annually: BMPs should be visually inspected to determine if any plantings or mulch require replacement. If the mulch or gravel areas become inundated with sediment, the material should be removed and replaced.

Bioretention Fact Sheet and Detail

Bioretention facilities are also known as street rain gardens, roadside bioretention, and bioretention cells.







Description

The bioretention area BMP functions as a soil and plant-based filtration and infiltration feature that removes pollutants through a variety of natural physical, biological, and chemical treatment processes.

Advantages

- Achieves both water quality and volume capture objectives
- Provide stormwater treatment that enhances the quality of downstream water bodies by using natural processes
- Vegetation provides shade and wind breaks, absorbs noise, reduces heat island effects, and improves an area's landscape
- Provides habitat for birds and attracts other pollinators like butterflies and bees
- Does not interrupt utility installation
- Does not interfere with tree planting

Limitations

- Not recommended for areas where street slopes exceed 10%
- Should not be used in areas of known contamination; if soil and/or groundwater contamination is present on the site or within a 100-foot radius of the proposed BMP location, the Water Board will need to be contacted and the site reviewed
- Should not be used in areas of high groundwater; in general, a minimum of 2 feet of clearance should be provided between the bottom of the bioretention cell and seasonal high groundwater
- Should not be used in areas of slope instability where infiltrated stormwater may cause failure; slope stability should be determined by a licensed geotechnical engineer
- Do not use in locations that can negatively impact building foundations or footings; locations should be approved by a licensed geotechnical engineer

Key Design Features

Soil

Structural soil should be used within the bioretention area requiring load bearing capacity (adjacent to roadways and/or buildings). Structural soil shall be installed as described in Reference Document E of the Santa Rosa LID Manual.

Some BMPs may not require the use of structural soil, and a more organic type planting soil and/or treatment media may be used in its place. It may be possible in some cases to use native soil or to amend the native soil so that it is suitable. Use of non-structural soil will depend on evaluation of the criteria in “Chapter 4 – Site Assessment” of the Santa Rosa LID Manual as well as consideration of structural needs and may require evaluation by a licensed geotechnical engineer.

Native soil should remain uncompacted to preserve infiltration capacity. Fence off the area during construction to protect it from compaction. The bottom of the bioretention facility should be unlined to allow infiltration into native soil. A moisture barrier must be installed to protect the road sub-base and any trenches adjacent to the bioretention area.

Gutter

If used, pervious concrete shall be designed and installed as described in Appendix G of the Santa Rosa LID Manual. If used, porous gutter must be protected during construction to prevent sediment loading. If a porous gutter design option is used, additional trach and sediment capture BMPs may be required.

A curb opening type design may be used in place of porous gutter if appropriate for the project.

Plants

Bioretention areas shall be planted with plants from the approved plant and tree list included in Appendix F of the Santa Rosa LID Manual and shall be planted to achieve 51% cover.

Bypass

All bioretention areas shall be designed with a designated high flow bypass inlet for storms larger than the design storm.

Perforated Pipe

6-inch perforated pipe should be installed at a depth of 6 inches below the road structural section. Perforated pipe shall be installed in straight runs. The volume below the perforated pipe must be sufficient to hold and infiltrate the design volume.

Sizing Design Goal and Requirements

The design goal for all bioretention areas is to capture (infiltration and/or reuse) 100% of the volume of runoff generated by the 85th percentile 24-hour storm event. This is a retention requirement. If 100% volume capture is achieved, no additional treatment is required.

If the design goal is not achievable, then the bioretention area sizing requirement is:

- **Water Quality Treatment** of 100% of the flow generated by the 85th percentile 24-hour storm event, as calculated using the Rational Method and a known intensity of 0.20 inches per hour, **and**
- **Volume Capture** (infiltration and/or reuse) of the increase in volume of storm water due to development generated by the 85th percentile 24-hour storm event. This is a retention requirement.

All calculations shall be completed using the "Storm Water Calculator" available at www.srcity.org/stormwaterLID

Inspection and Maintenance Requirements

A maintenance plan should be developed prior to implementation of stormwater and LID features. The maintenance plan shall include recommended maintenance practices, state the parties responsible for maintenance and upkeep, specify the funding source for ongoing maintenance with provisions for full replacement when necessary, and provide site specific inspection checklists.

At a minimum, maintenance shall include the following:

- Dry street sweeping upon completion of construction
- Dry street sweeping annually, and
  - When water is observed flowing in the gutter during a low intensity storm
  - Algae is observed in the gutter
  - Sediment/debris covers 1/3 of the gutter width or more
- Inspect twice annually for sedimentation and trash accumulation in the gutter; obstructions and trash shall be removed and properly disposed of
- Inspect twice during the rainy season for ponded water
- Pesticides and fertilizers shall not be used in the bioretention area
- Plants should be pruned, weeds pulled, and dead plants replaced as needed

Planter Strip Bioretention Checklist

Date of Inspection: _____ BMP ID #: _____

Inspector(s): _____ Property Owner: _____

Location Description: _____

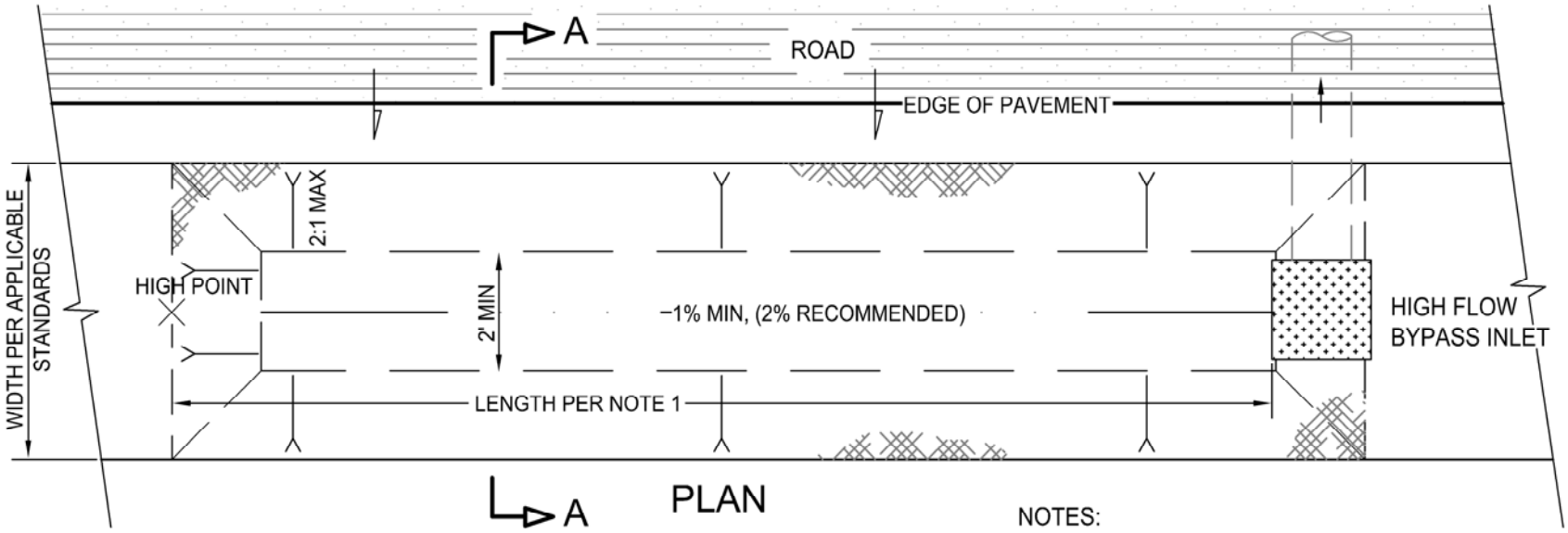
Type of Inspection: Pre-rainy Season (PRS) Rainy Season (RS) After-rainy Season (ARS)

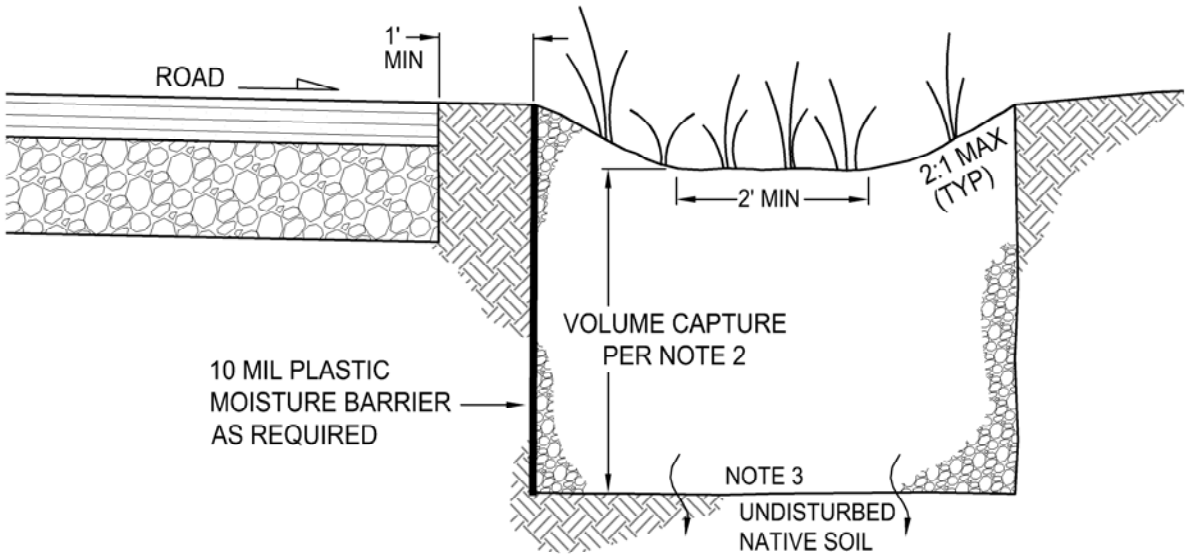
This Inspection and Maintenance Checklist is to be used in conjunction with its corresponding LID Fact Sheet and Maintenance Plan. Please review these documents before performing the field inspection.

When to Inspect	**Maintenance Issue**	**Is the Issue Present?**	**Require Maintenance**	**Comments** (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)
Drainage				
RS	Is there standing or pooling of water in the Bioretention Area after 3 days of dry weather? Is water not draining into catch basin from the overflow pipe during a high intensity storm?		– Check perforated pipe outlet for obstruction or damage* – Flush perforated pipe to remove obstructions/ sediment* – Remove and replace the first few inches of topsoil – Remove soil and inspect perforated pipe; repair or replace perforated pipe, replace with new soil, and regrade	
PRS RS ARS	Is there sediment visible in the gutter?		– In dry weather, use a Vactor truck to clean gutter pan	
Erosion				
RS ARS	Is there under cutting or washouts along the sidewalks and/or curbs abutting the planter strip?		– Fill in eroded areas and regrade	
RS ARS	Is there channelization (gully) forming along the length of the planter area?		– Fill in eroded areas and regrade	
RS ARS	Is there accumulation of sediment (sand, dirt, mud) in the planter?		– Remove sediment and check the grading – Add replacement soil and/or mulch	
PRS RS ARS	Is the mulch unevenly distributed in the planter area?		– Redistribute and add additional mulch if needed – Regrade planter area	
PRS RS ARS	Are there voids or deep holes present? Is there sediment present in the catch basin and overflow pipe?		– Check the perforated pipe for damage*	

When to Inspect	Maintenance Issue	Is the Issue Present?	Require Maintenance	**Comments** (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)
PRS RS ARS	Is there evidence of animal activity such as holes or dirt mounds from burrowing?		– Repair and fill in damage areas – Rodent control activities must be in accordance with applicable laws and must not affect any protected species	
Vegetation				
PRS RS ARS	Is the vegetation clogging the inlet flow areas?		– Trim and/or remove the excess vegetation	
PRS RS ARS	Is the mulch distributed evenly throughout the planter area?		– Redistribute and add additional mulch if needed – Regrade planter area	
PRS RS ARS	Are there dead or dry plants/weeds? Is the vegetation overgrown?		– Remove dead and/or dry vegetation; replace as needed – Remove or trim any vegetation that is causing a visual barrier, trip, and/or obstruction hazard	
BMP General				
PRS RS ARS	Is there debris/trash in the planter area?		– Remove all trash and debris	
PRS RS ARS	Is graffiti present?		– Remove all graffiti from the area	
PRS RS ARS	Are there missing or disturbed aesthetic features?		– Replace and/or reposition aesthetic features to original placement – Placement should not disrupt flow characteristics/design	
PRS RS ARS	Is the vegetation irrigation functional?		– Repair broken or missing spray/drip emitters – Reposition and/or adjust to eliminate overspray and/or over watering	
PRS RS ARS	Are the aesthetic features firmly secured in place?		– Repair and/or replace loose or damaged features	
PRS RS ARS	Check for damaged sidewalk, curb, gutter, and catch basin including uplift and settling.		– Remove and replace damaged areas	

*If perforated pipe is present





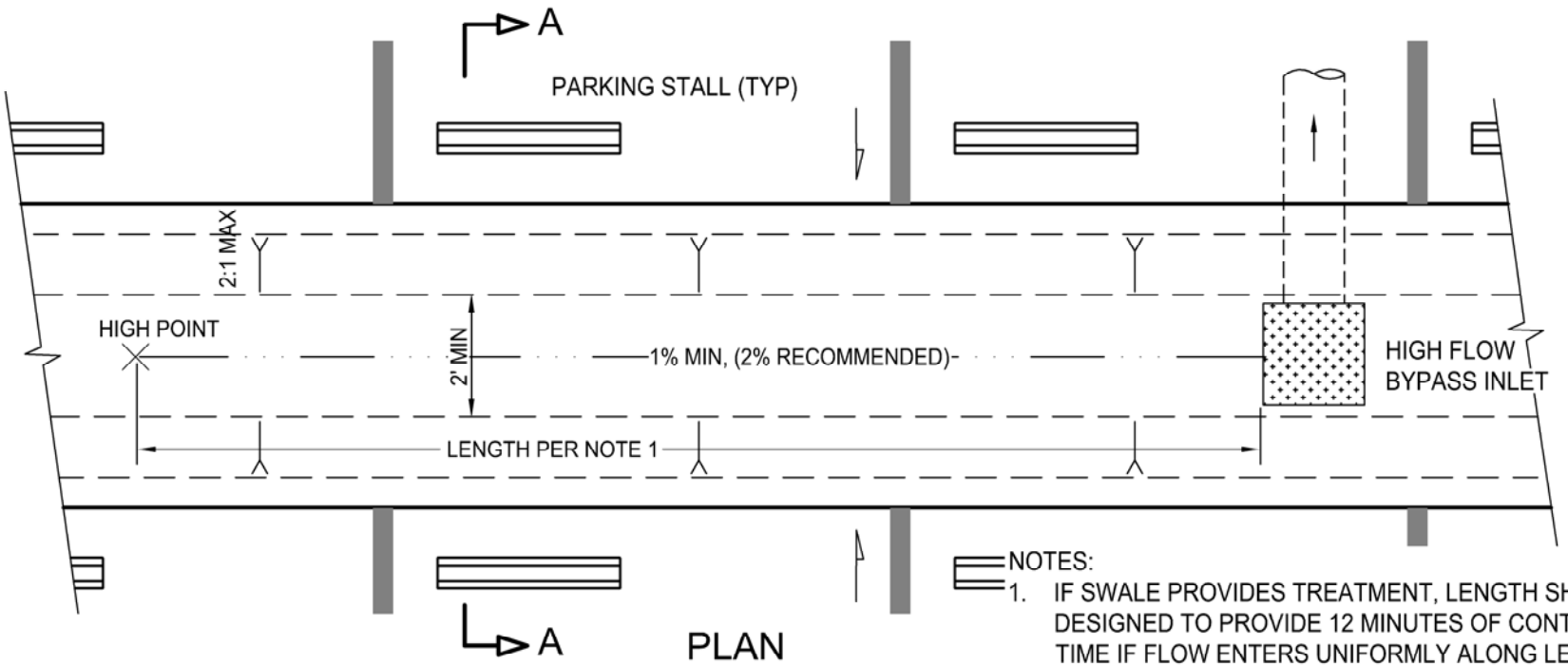
SECTION A-A

NOTES:

1. IF SWALE PROVIDES TREATMENT, LENGTH SHALL BE DESIGNED TO PROVIDE 12 MINUTES OF CONTACT TIME IF FLOW ENTERS UNIFORMLY ALONG LENGTH. LENGTH SHALL PROVIDE 5 MINUTES OF CONTACT TIME IF 90% OR MORE OF THE FLOW ENTERS AT THE UPSTREAM END. IF SUBSURFACE BIORETENTION AREA PROVIDES 100% VOLUME CAPTURE - HIGH FLOW BYPASS INLET MUST BE 0.25' ABOVE SWALE FLOWLINE. ALL PONDED WATER MUST DRAIN WITHIN 72 HOURS.
2. SOIL TO BE SPECIFIED BY DESIGN ENGINEER TO PROVIDE VOLUME CAPTURE AND MEET GOVERNING AGENCY REQUIREMENTS. IF NON STRUCTURAL SOIL IS SELECTED A CUTOFF WALL IS REQUIRED IN PLACE OF A MOISTURE BARRIER.
3. BOTTOM OPEN TO ALLOW INFILTRATION INTO NATIVE SOIL.
4. SWALE MUST CONVEY HIGH FLOWS PER GOVERNING AGENCY DESIGN STANDARDS.

PRIORITY 1 ROADSIDE BIORETENTION - NO CURB AND GUTTER		
SCALE: *NONE*	DATE: *12/14/11*	
DWN. *DIT* CHK. *HH*		P1–02

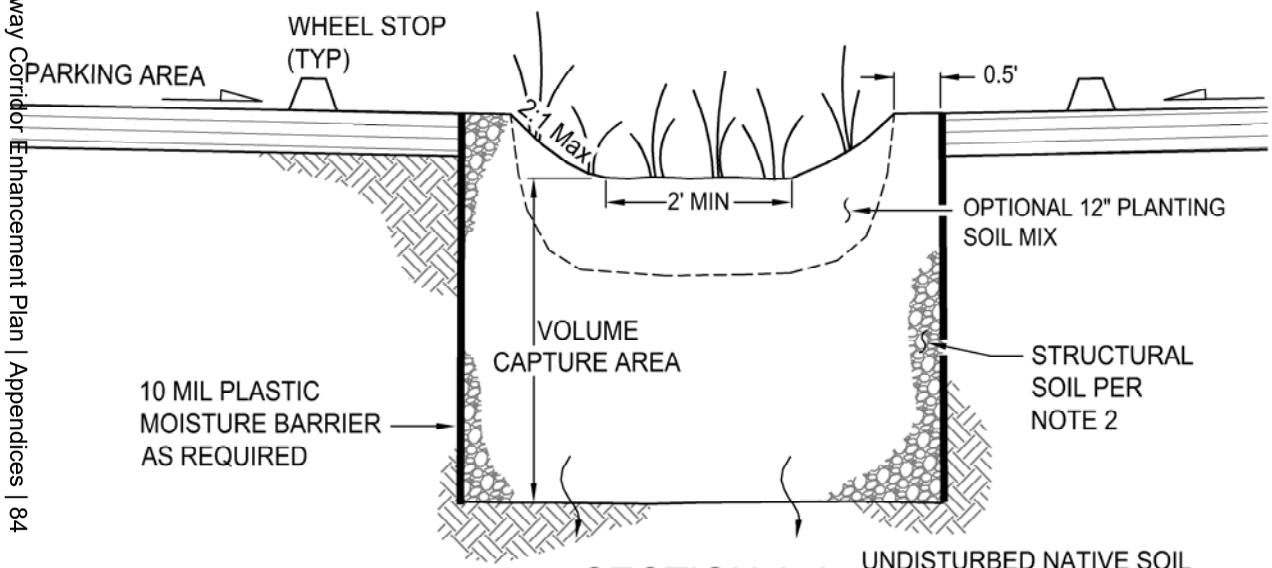
Not to Scale



PLAN

NOTES:

1. IF SWALE PROVIDES TREATMENT, LENGTH SHALL BE DESIGNED TO PROVIDE 12 MINUTES OF CONTACT TIME IF FLOW ENTERS UNIFORMLY ALONG LENGTH. LENGTH SHALL PROVIDE 5 MINUTES OF CONTACT TIME IF 90% OR MORE OF THE FLOW ENTERS AT THE UPSTREAM END. IF SUBSURFACE BIORETENTION AREA PROVIDES 100% VOLUME CAPTURE - HIGH FLOW BYPASS INLET MUST BE 0.25' ABOVE SWALE FLOWLINE. ALL PONDED WATER MUST DRAIN WITHIN 72 HOURS.
2. STRUCTURAL SOIL UNLESS OTHERWISE APPROVED BY GEOTECHNICAL ENGINEER AND ACCEPTED BY GOVERNING AGENCY.
3. SWALE MUST CONVEY DESIGN FLOWS PER GOVERNING AGENCY DESIGN STANDARDS.
4. PARKING ISLAND WIDTH PER APPLICABLE GOVERNING AGENCY STANDARDS.

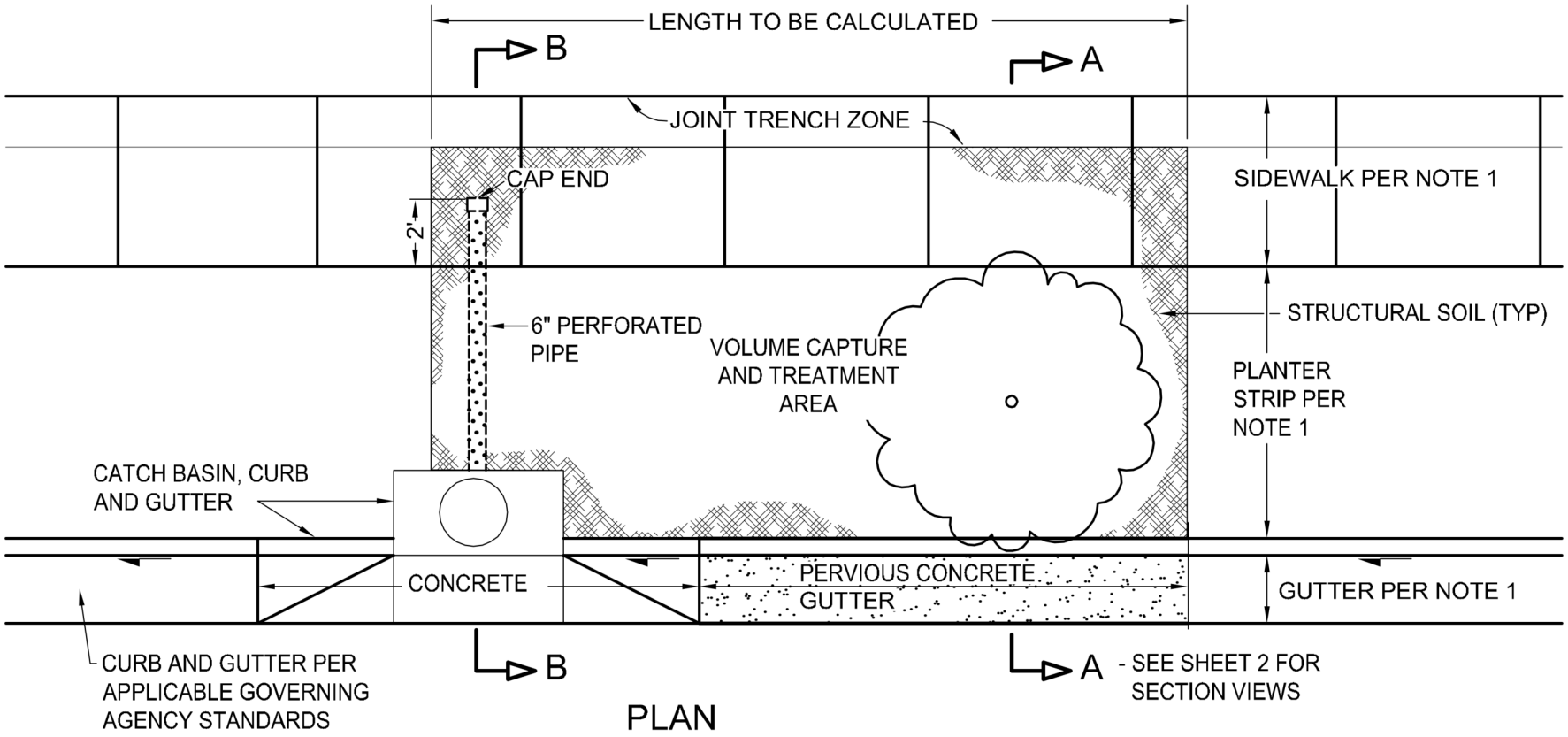


SECTION A-A

Not to Scale

PRIORITY 1
SWALE WITH BIORETENTION

SCALE: *NONE*	DATE: *12/14/11*	
DWN. *DIT* CHK. *HH*	SHEET 1 of 1	P1–06



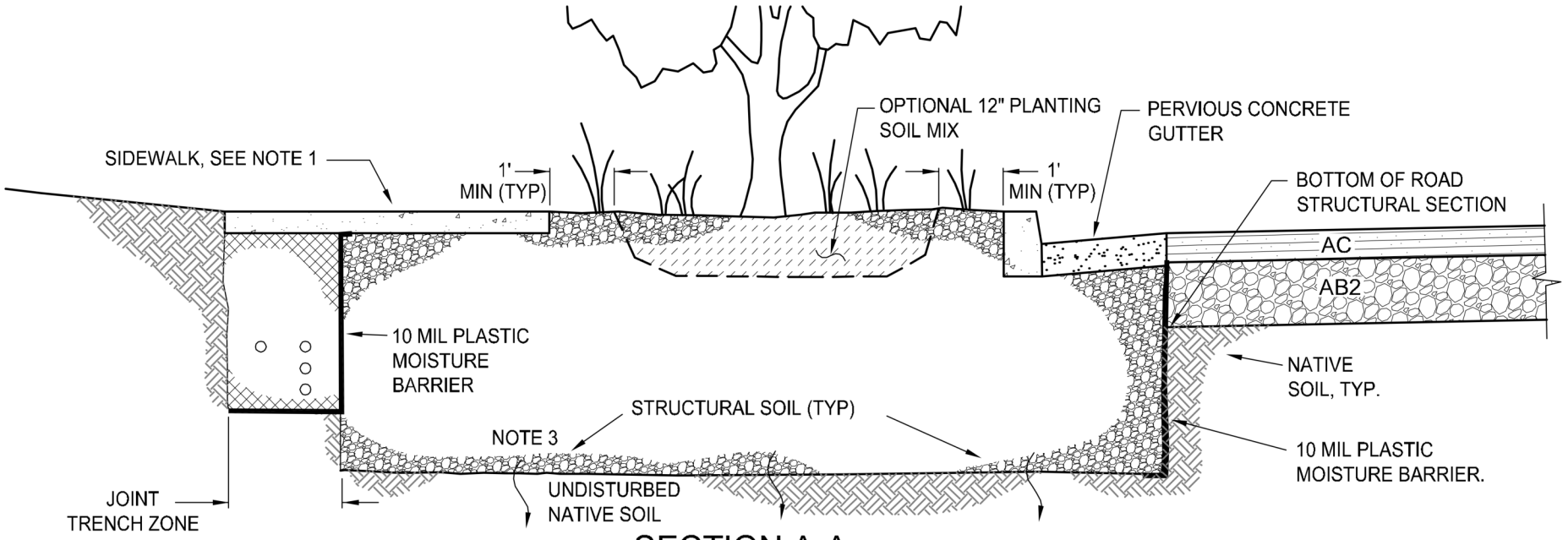
PLAN

NOTES:

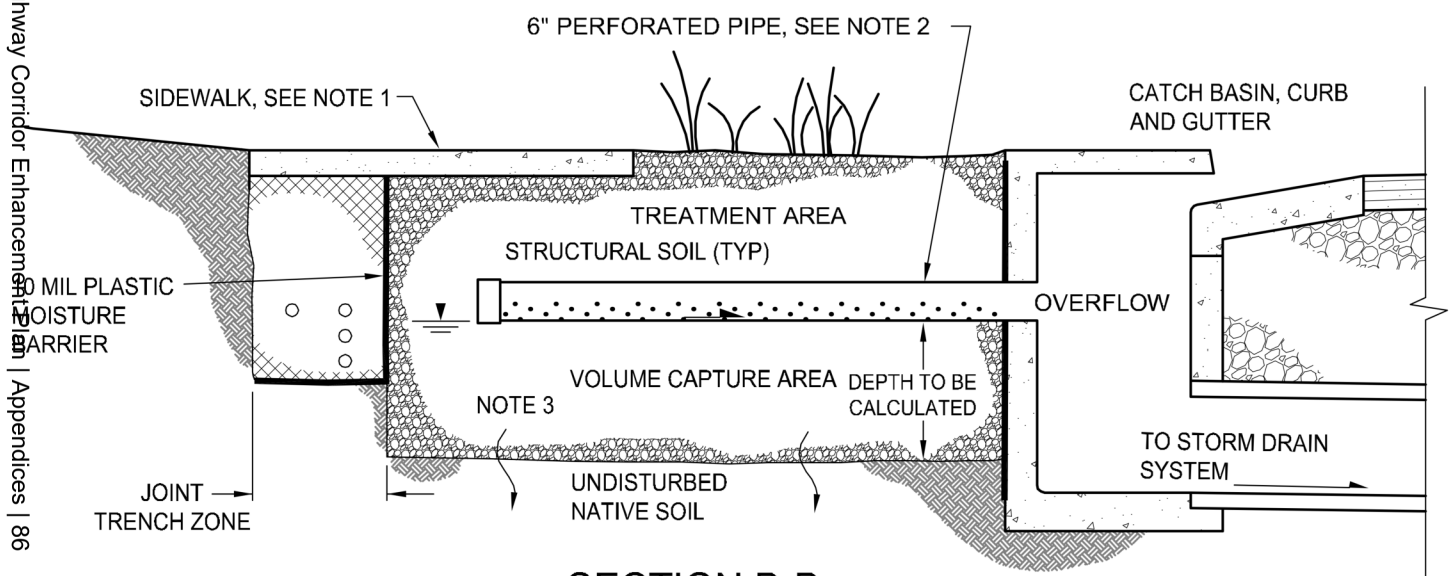
1. SIDEWALK AND PLANTER WIDTHS PER APPLICABLE GOVERNING AGENCY STANDARDS (TYP).

Not to Scale

PRIORITY 2 ROADSIDE BIORETENTION - FLUSH DESIGN		
SCALE: *NONE*	DATE: *05/10/11*	
DWN. *DIT* CHK. *HH*	SHEET 1 of 2	P2–02



SECTION A-A



SECTION B-B

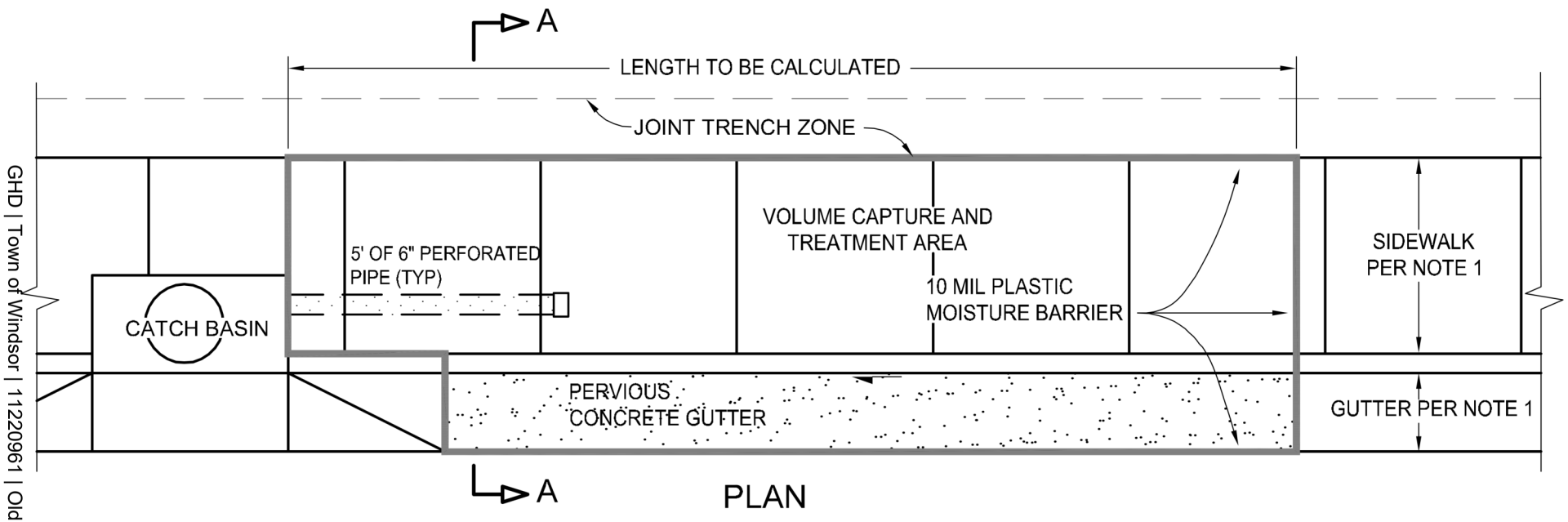
NOTES:

1. SIDEWALK AND PLANTER WIDTHS PER APPLICABLE GOVERNING AGENCY STANDARDS (TYP).
2. TOP OF 6" PERFORATED PIPE TO BE SET 6" BELOW BOTTOM OF ROAD STRUCTURAL SECTION.
3. BOTTOM OPEN TO ALLOW INFILTRATION INTO NATIVE SOIL.

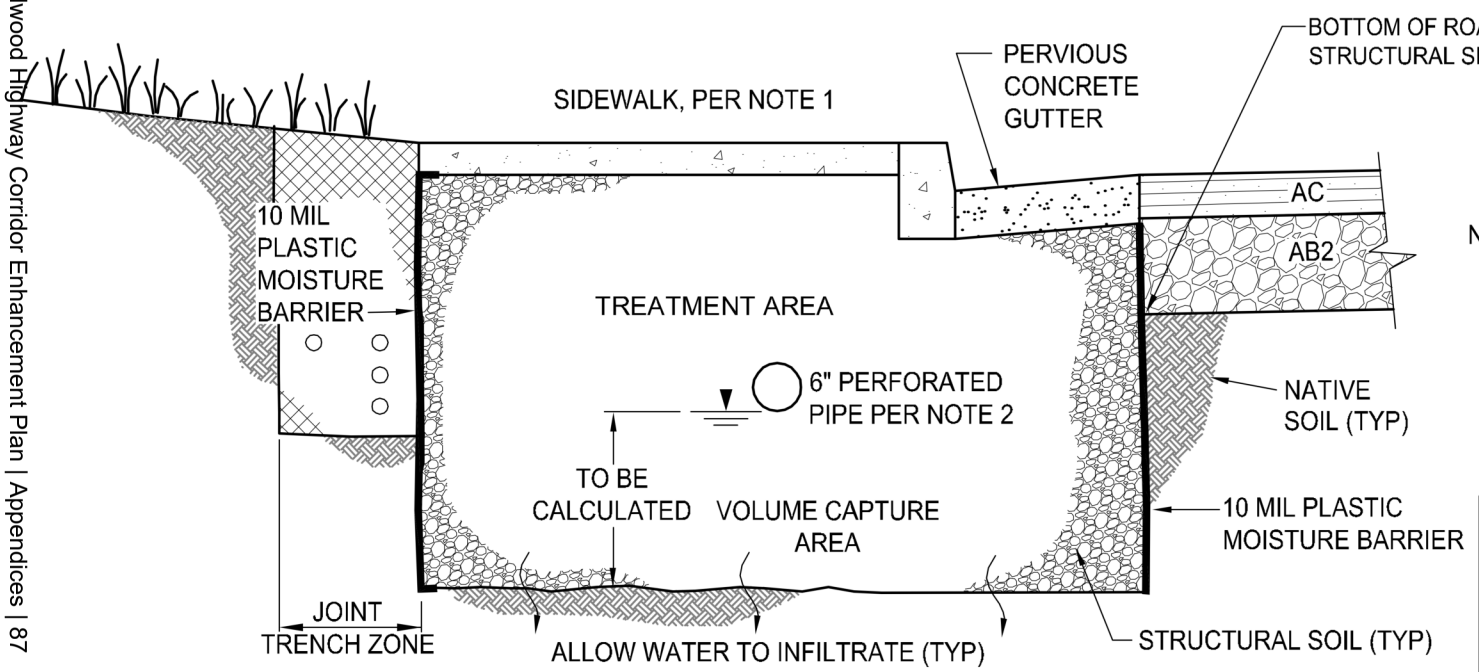
Not to Scale

PRIORITY 2
ROADSIDE BIORETENTION
- FLUSH DESIGN

SCALE: *NONE*	DATE: *05/10/11*	
DWN. *DIT* CHK. *HH*	SHEET 2 of 2	P2–02



PLAN



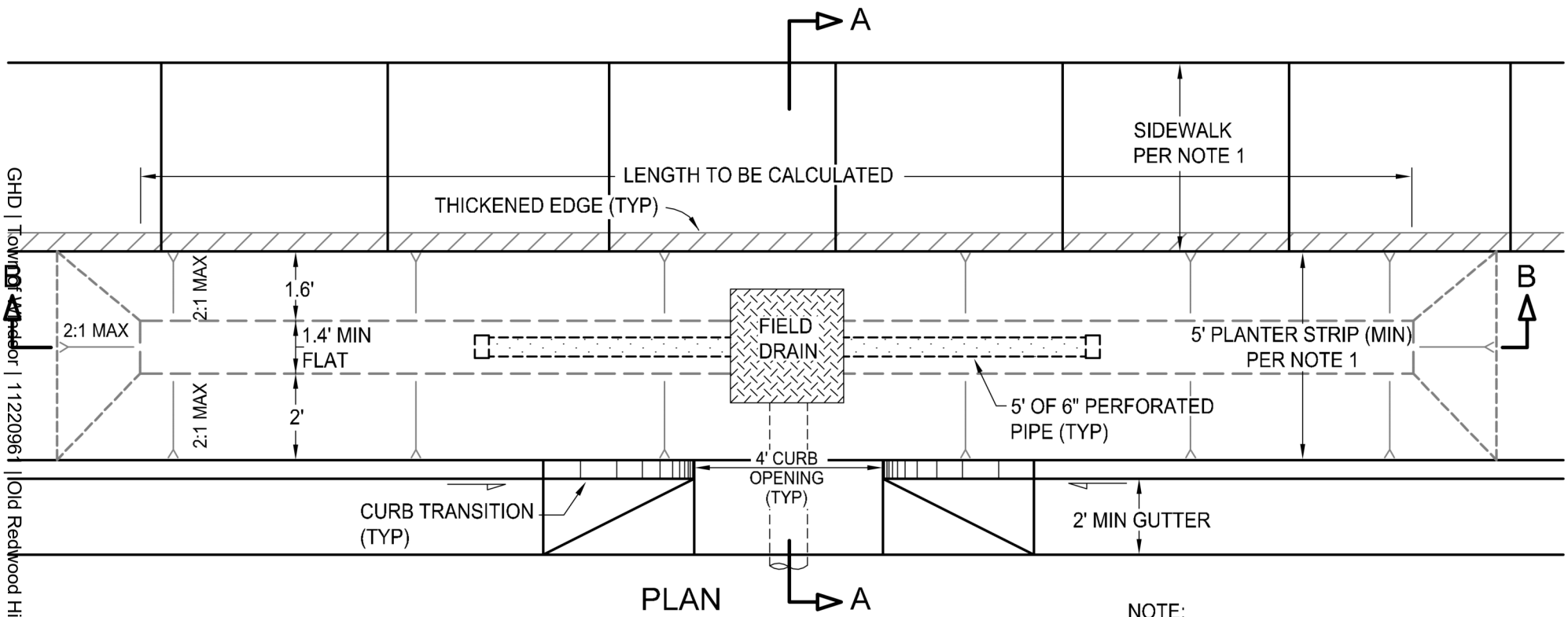
SECTION A-A

NOTE:
1. SIDEWALK AND CURB AND GUTTER WIDTHS PER APPLICABLE GOVERNING AGENCY STANDARDS (TYP).
2. TOP OF 6" PERFORATED PIPE TO BE SET 6" BELOW BOTTOM OF ROAD STRUCTURAL SECTION.

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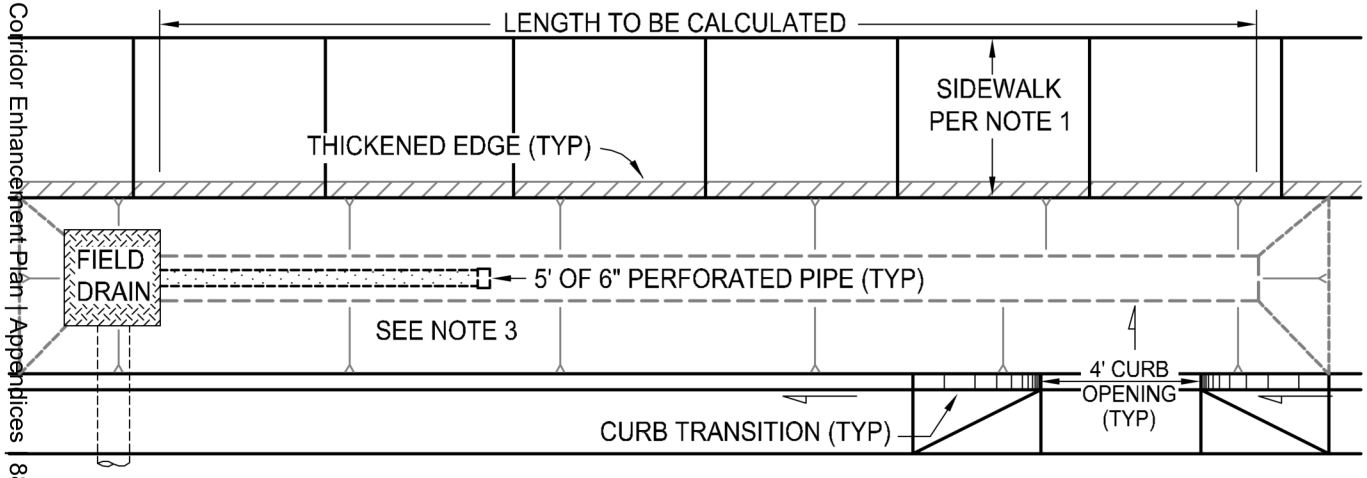
PRIORITY 2
ROADSIDE BIORETENTION
- CONTIGUOUS SIDEWALK

SCALE: *NONE*	DATE: *05/10/11*	
DWN. *DIT* CHK. *HH*	SHEET 1 of 1	P2–03



PLAN

TYPE A - CURB OPENING AT LOW POINT



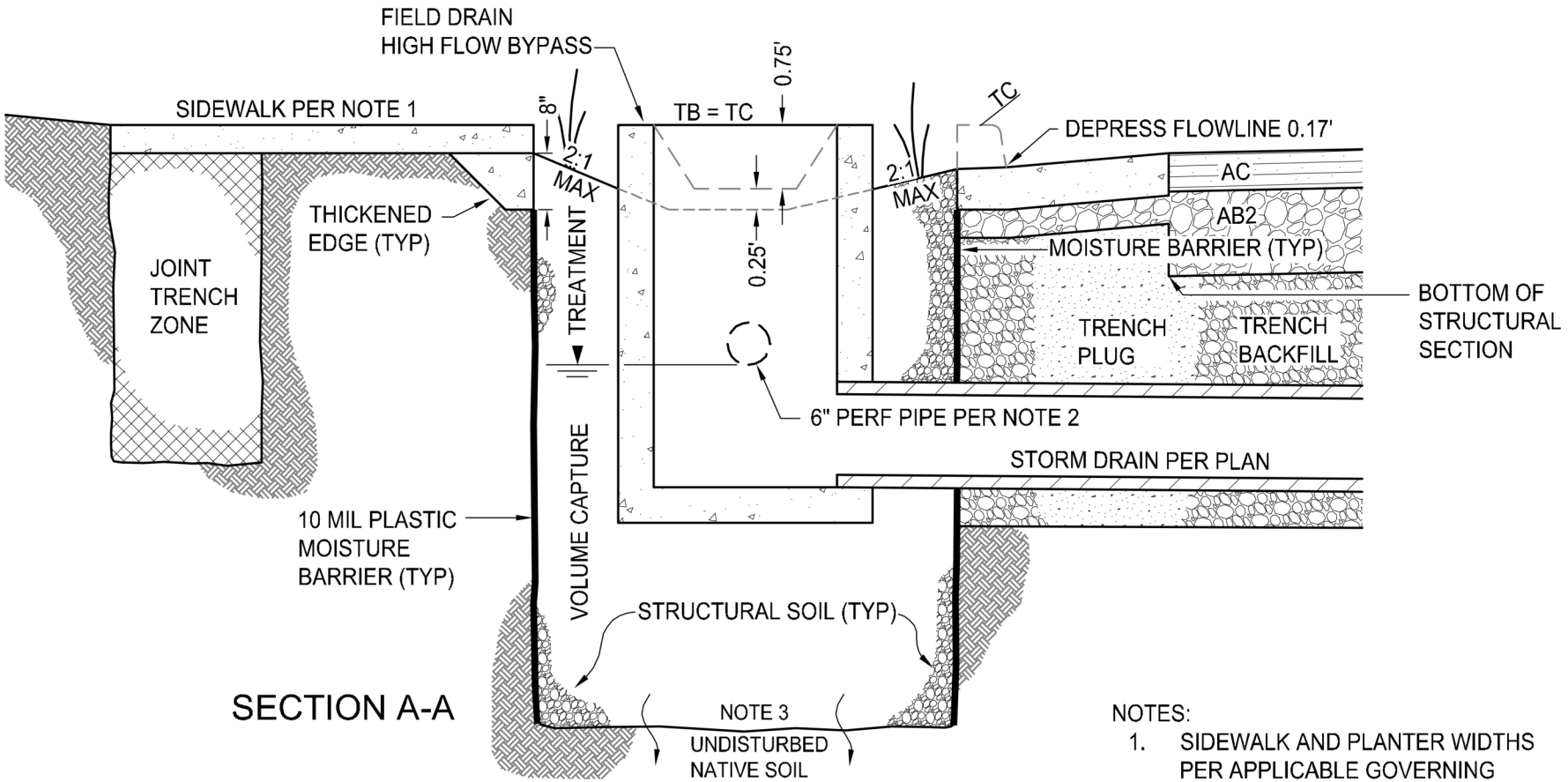
TYPE B -CURB OPENING ALONG A SLOPE

Not to Scale

NOTE:

1. SIDEWALK AND PLANTER WIDTHS PER APPLICABLE MUNICIPAL STANDARDS (TYP).
2. TOP OF 6" PERFORATED PIPE TO BE SET 6" BELOW ROAD STRUCTURAL SECTION.
3. TYPE A MINIMUM DIMENSIONS AND GRADES APPLY TO TYPE B.
4. BIORETENTION AREA PLANTS TO BE SELECTED FROM APPROVED PLANT LIST.

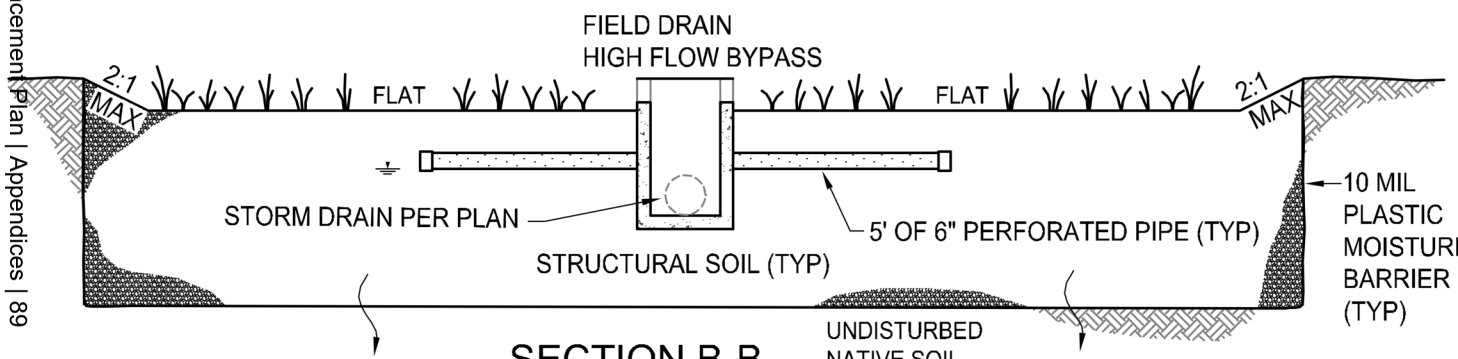
PRIORITY 2 ROADSIDE BIORETENTION - CURB OPENING		
SCALE: *NONE*	DATE: *05/10/11*	
DWN. *DIT* CHK. *HH*	SHEET 1 of 2	P2–04



SECTION A-A

NOTES:

1. SIDEWALK AND PLANTER WIDTHS PER APPLICABLE GOVERNING AGENCY STANDARDS (TYP).
2. TOP OF 6" PERFORATED PIPE TO BE SET 6" BELOW BOTTOM OF ROAD STRUCTURAL SECTION.
3. BOTTOM OPEN TO ALLOW INFILTRATION INTO NATIVE SOIL.

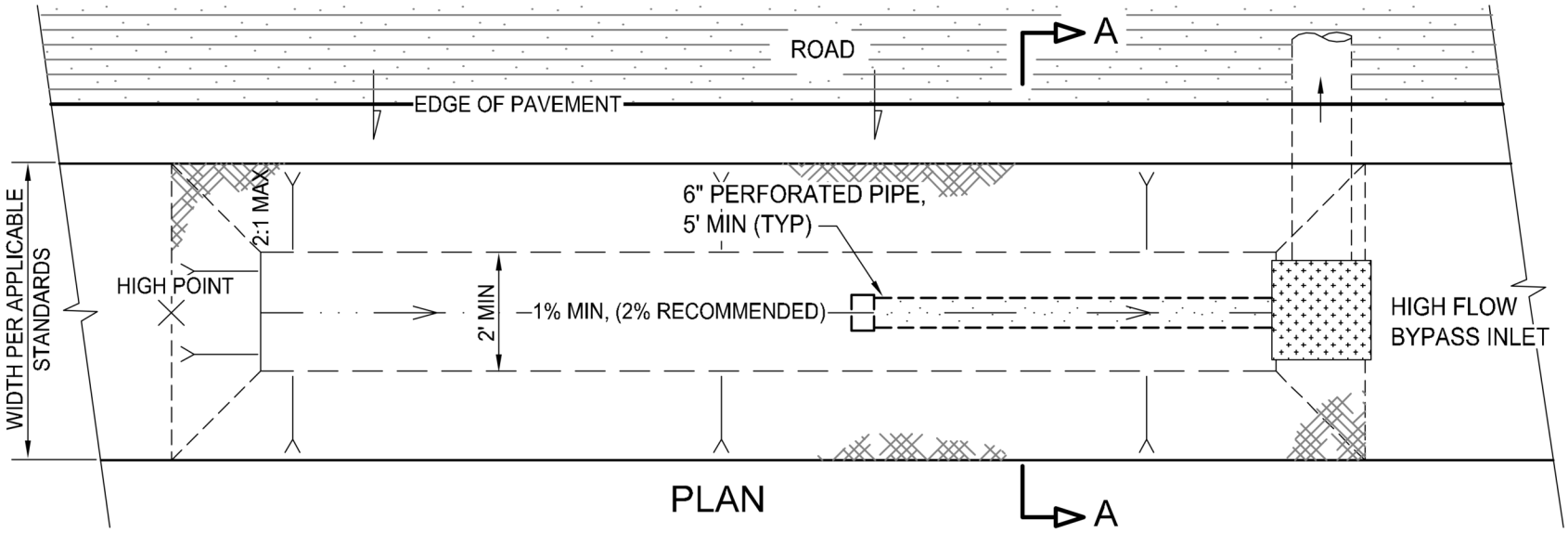


SECTION B-B

Not to Scale

PRIORITY 2
ROADSIDE BIORETENTION
- CURB OPENING
SECTION A-A & B-B

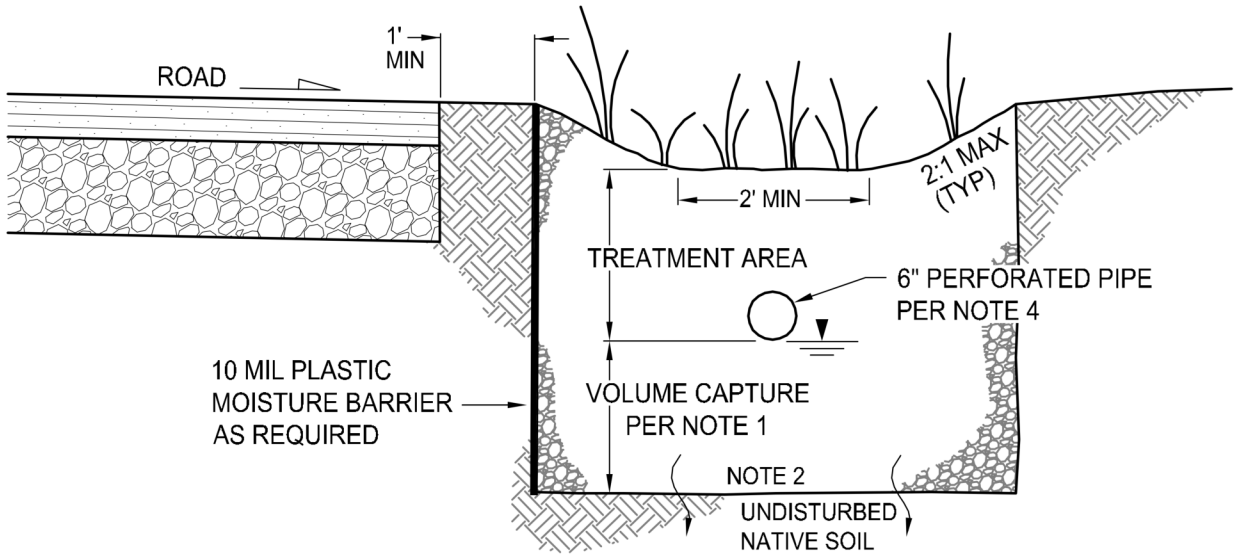
SCALE: *NONE*	DATE: *05/10/11*	
DWN. *DIT* CHK. *HH*	SHEET 2 of 2	P2–04



PLAN

NOTES:

1. SOIL TO BE SPECIFIED BY DESIGN ENGINEER TO PROVIDE VOLUME CAPTURE AND MEET GOVERNING AGENCY REQUIREMENTS. IF NON STRUCTURAL SOIL IS SELECTED A CUTOFF WALL IS REQUIRED IN PLACE OF A MOISTURE BARRIER.
2. BOTTOM OPEN TO ALLOW INFILTRATION INTO NATIVE SOIL.
3. SWALE MUST CONVEY DESIGN FLOWS PER GOVERNING AGENCY DESIGN STANDARDS.
4. TOP OF 6" PERFORATED PIPE TO BE SET 6" BELOW BOTTOM OF ROAD STRUCTURAL SECTION.

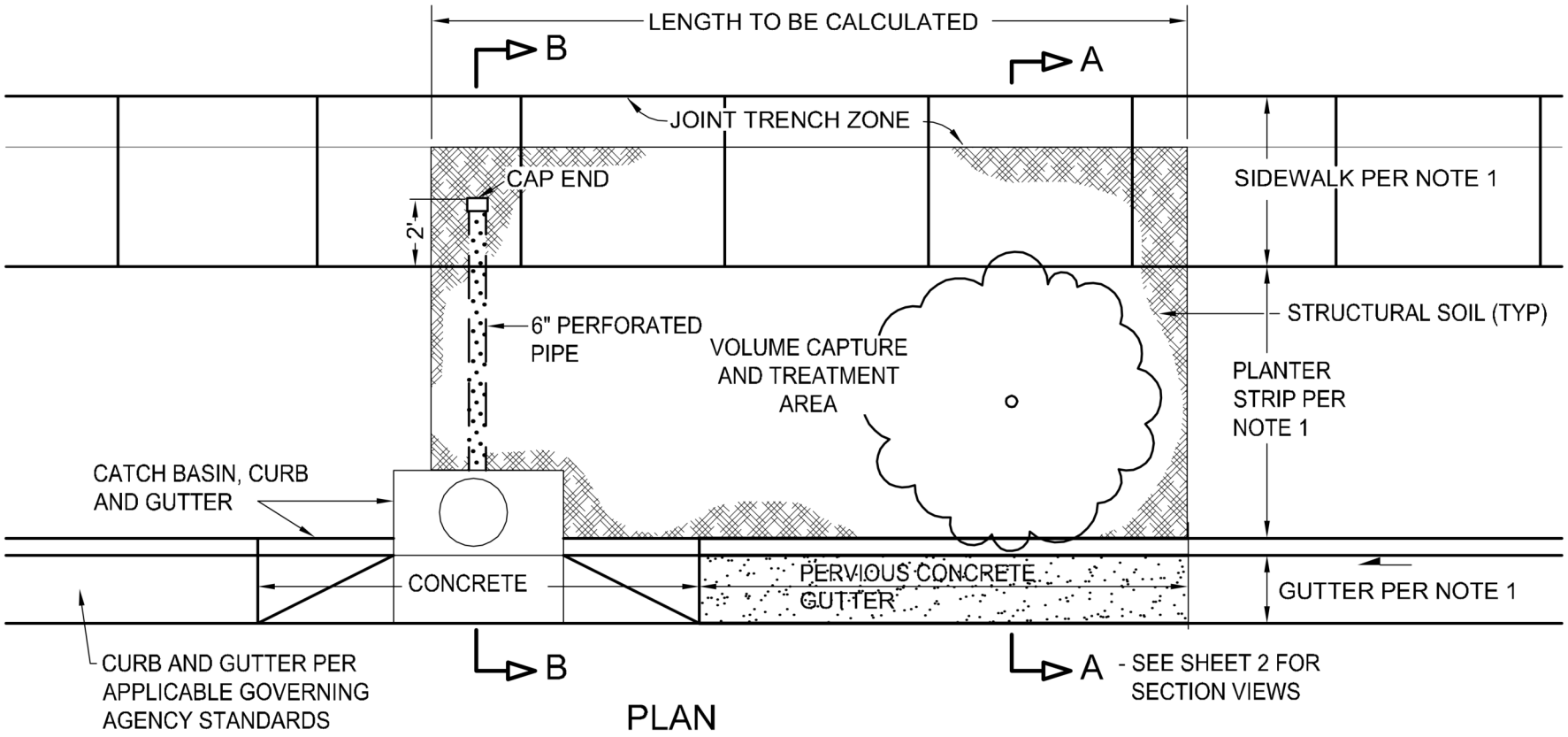


SECTION A-A

SIMILAR TO P1-02 WITH A PERFORATED DRAIN PIPE

Not to Scale

PRIORITY 2 ROADSIDE BIORETENTION - NO CURB AND GUTTER		
SCALE: *NONE*	DATE: *05/10/11*	
DWN. *DIT* CHK. *HH*		P2–05



PLAN

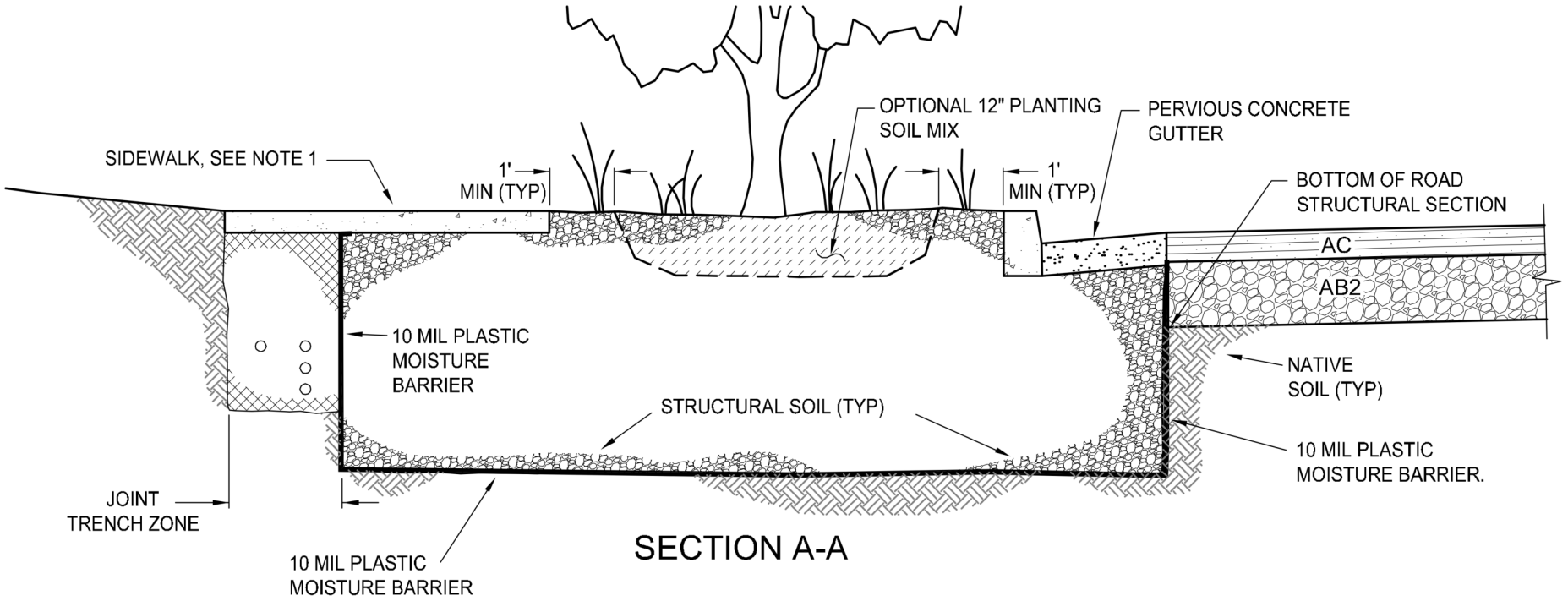
SIMILAR TO P2-02 WITH A MOISTURE BARRIER LINER, NO INFILTRATION.

NOTES:

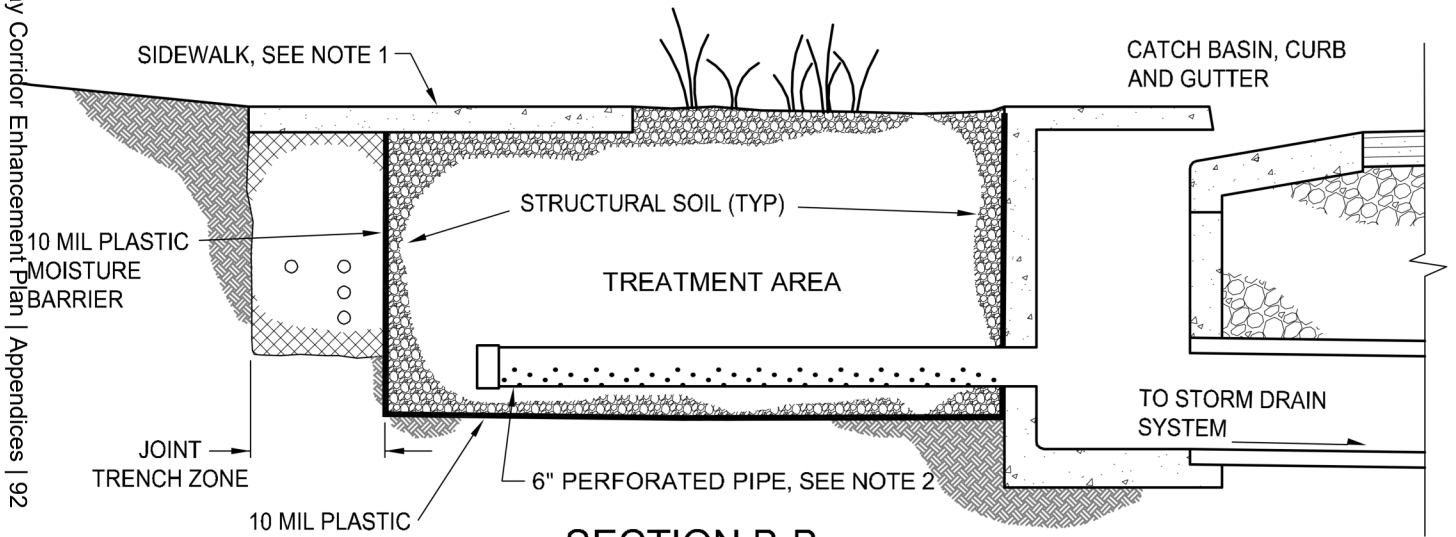
1. SIDEWALK AND PLANTER WIDTHS PER APPLICABLE GOVERNING AGENCY STANDARDS (TYP).

Not to Scale

PRIORITY 3 ROADSIDE BIORETENTION - FLUSH DESIGN		
SCALE: *NONE*	DATE: *05/10/11*	
DWN. *DIT* CHK. *HH*	SHEET 1 of 2	P3–02



SECTION A-A



SECTION B-B

NOTES:

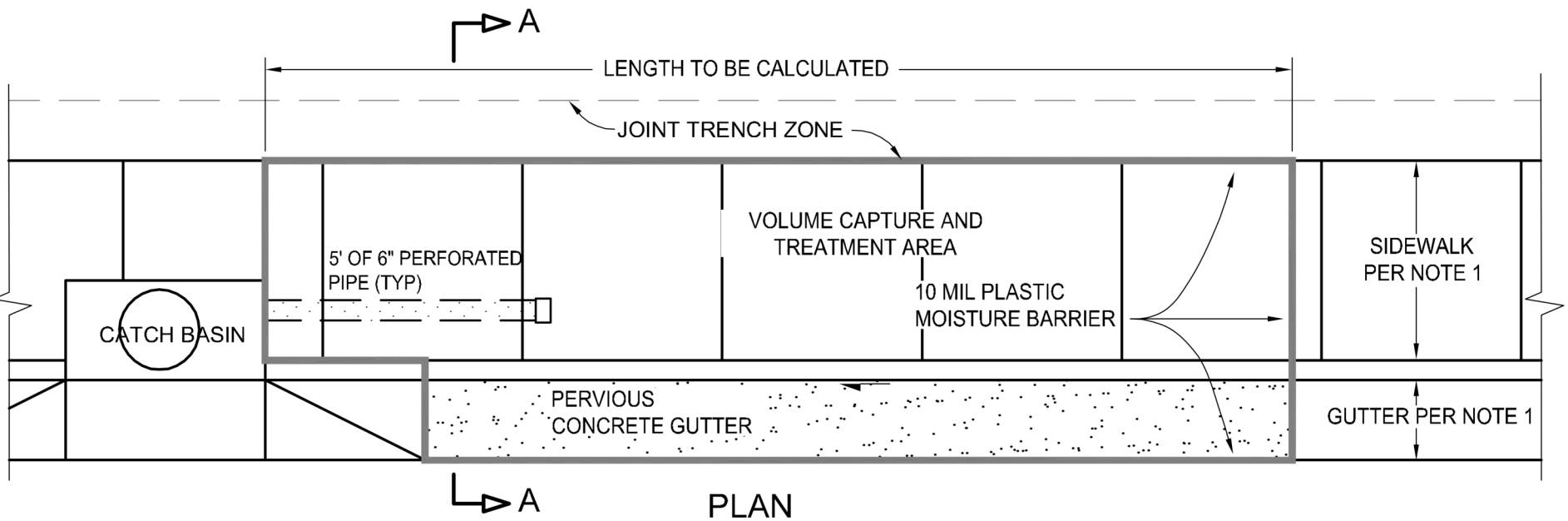
1. SIDEWALK AND PLANTER WIDTHS PER APPLICABLE GOVERNING AGENCY STANDARDS (TYP).
2. 6" PERFORATED PIPE TO BE SET IN BOTTOM OF TREATMENT AREA TO ENSURE DRAINAGE.

SIMILAR TO P2-02 WITH A MOISTURE BARRIER LINER, NO INFILTRATION.

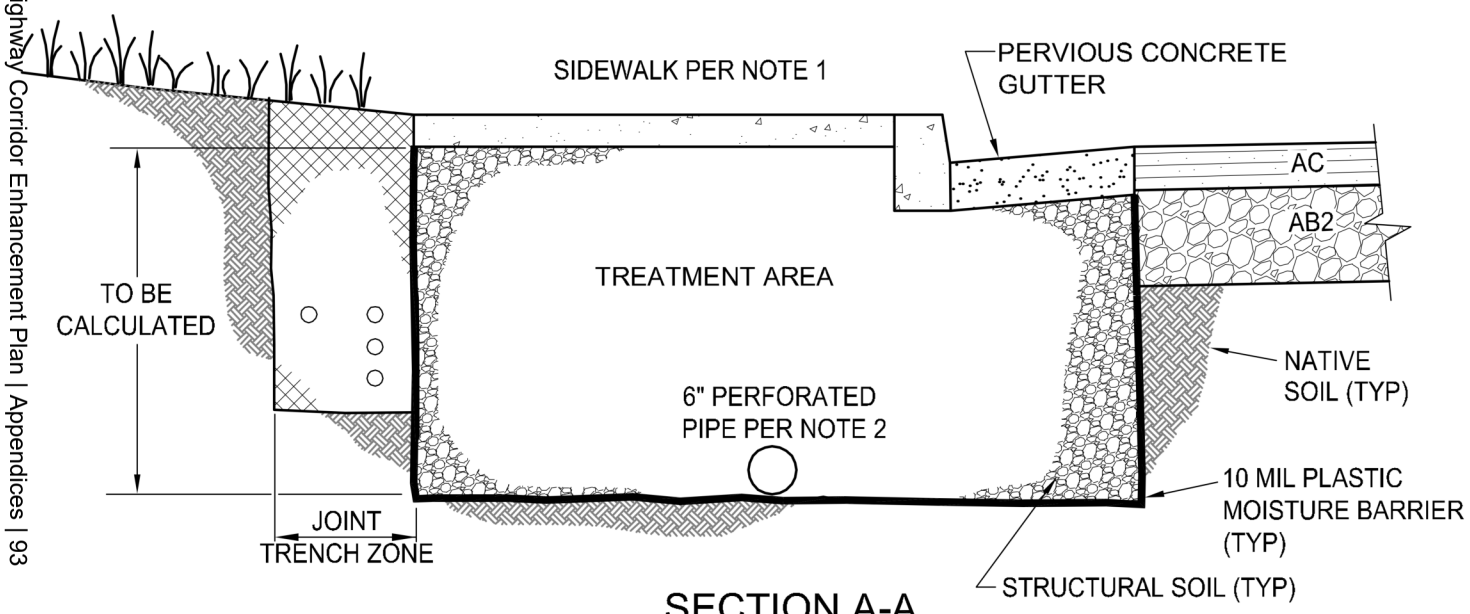
Not to Scale

PRIORITY 3
ROADSIDE BIORETENTION FLUSH DESIGN

SCALE: *NONE*	DATE: *05/10/11*	
DWN. *DIT* CHK. *HH*	SHEET 2 of 2	P3–02



PLAN



SECTION A-A

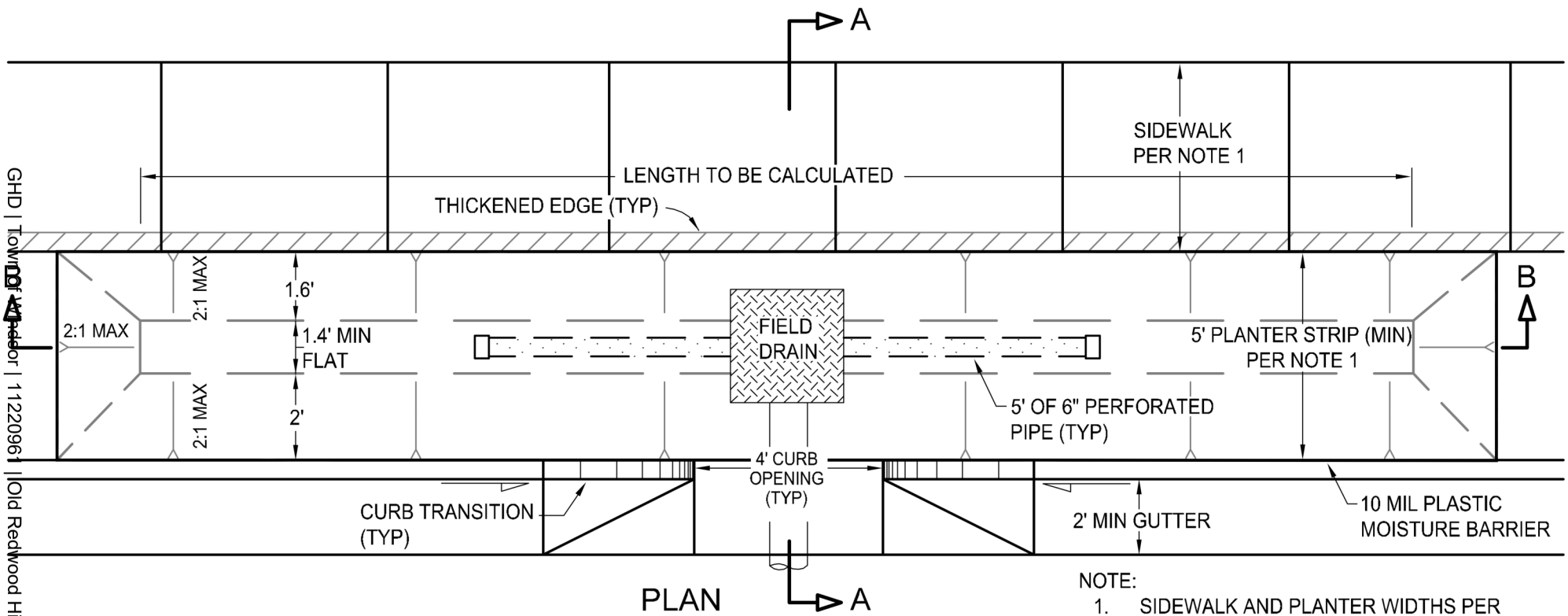
Not to Scale

NOTE:

1. SIDEWALK AND CURB AND GUTTER WIDTHS PER APPLICABLE GOVERNING AGENCY STANDARDS (TYP).
2. 6" PERFORATED PIPE TO BE SET IN BOTTOM OF TREATMENT AREA TO ENSURE DRAINAGE.

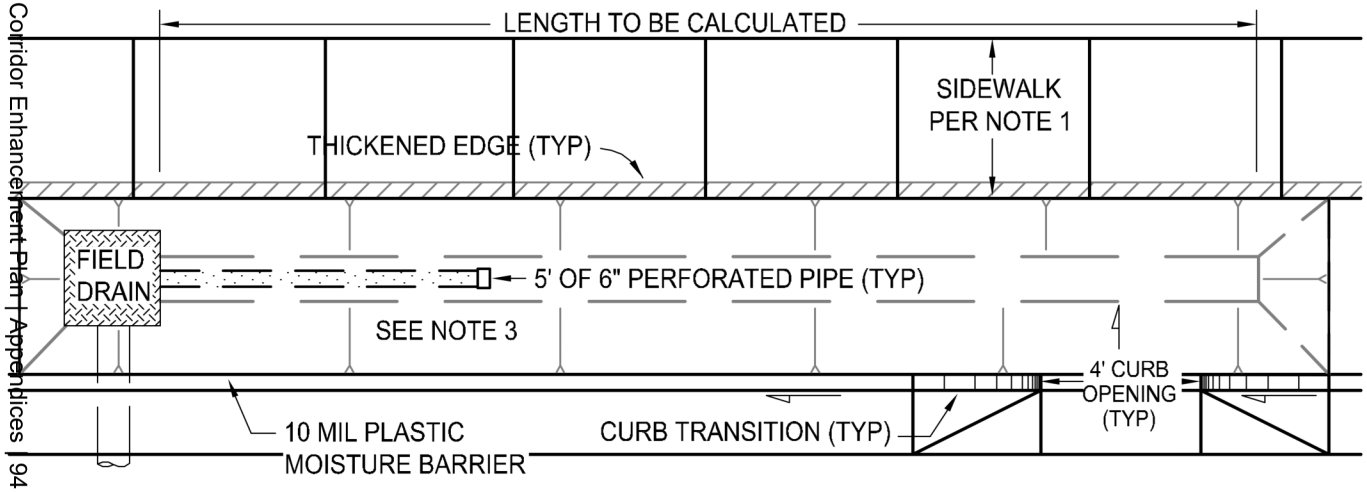
SIMILAR TO P2-03 WITH A MOISTURE BARRIER LINER, NO INFILTRATION.

PRIORITY 3 ROADSIDE BIORETENTION - CONTIGUOUS SIDEWALK		
SCALE: *NONE*	DATE: *05/10/11*	
DWN. *DIT* CHK. *HH*	SHEET 1 of 1	P3–03



PLAN

TYPE A - CURB OPENING AT LOW POINT



TYPE B -CURB OPENING ALONG A SLOPE

NOTE:

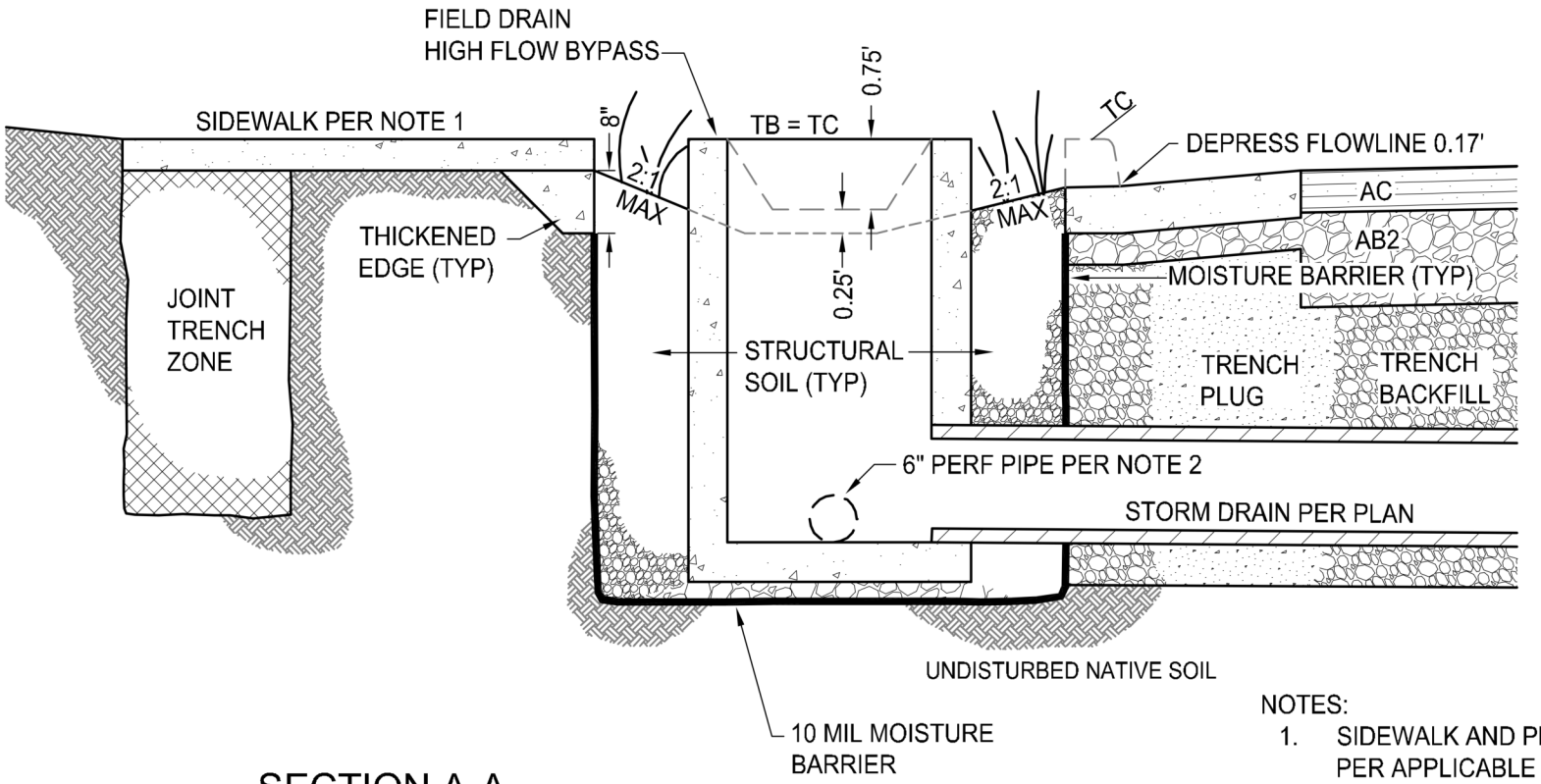
1. SIDEWALK AND PLANTER WIDTHS PER APPLICABLE GOVERNING AGENCY STANDARDS (TYP).
2. 6" PERFORATED PIPE TO BE SET IN BOTTOM OF TREATMENT AREA TO ENSURE DRAINAGE.
3. TYPE A MINIMUM DIMENSIONS AND GRADES APPLY TO TYPE B.
4. BIORETENTION AREA PLANTS TO BE SELECTED FROM APPROVED PLANT LIST.

SIMILAR TO P2-04 WITH A MOISTURE BARRIER LINER, NO INFILTRATION.

Not to Scale

PRIORITY 3 ROADSIDE BIORETENTION - CURB OPENING		
SCALE: *NONE*	DATE: *05/10/11*	
DWN. *DIT* CHK. *HH*	SHEET 1 of 2	P3–04

GHD | Town of Windsor | 11220961 | Old Redwood Highway Corridor Enhancement Plan | Appendices | 94

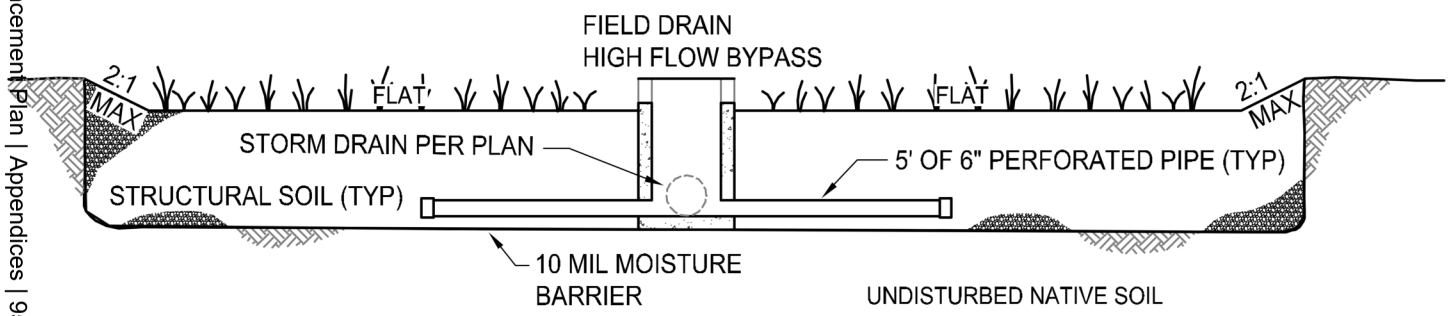


SECTION A-A

NOTES:

1. SIDEWALK AND PLANTER WIDTHS PER APPLICABLE GOVERNING AGENCY STANDARDS (TYP).
2. 6" PERFORATED PIPE TO BE SET IN BOTTOM OM TREATMENT AREA TO ENSURE DRAINAGE.

SIMILAR TO P2-04 WITH A MOISTURE BARRIER LINER, NO INFILTRATION.

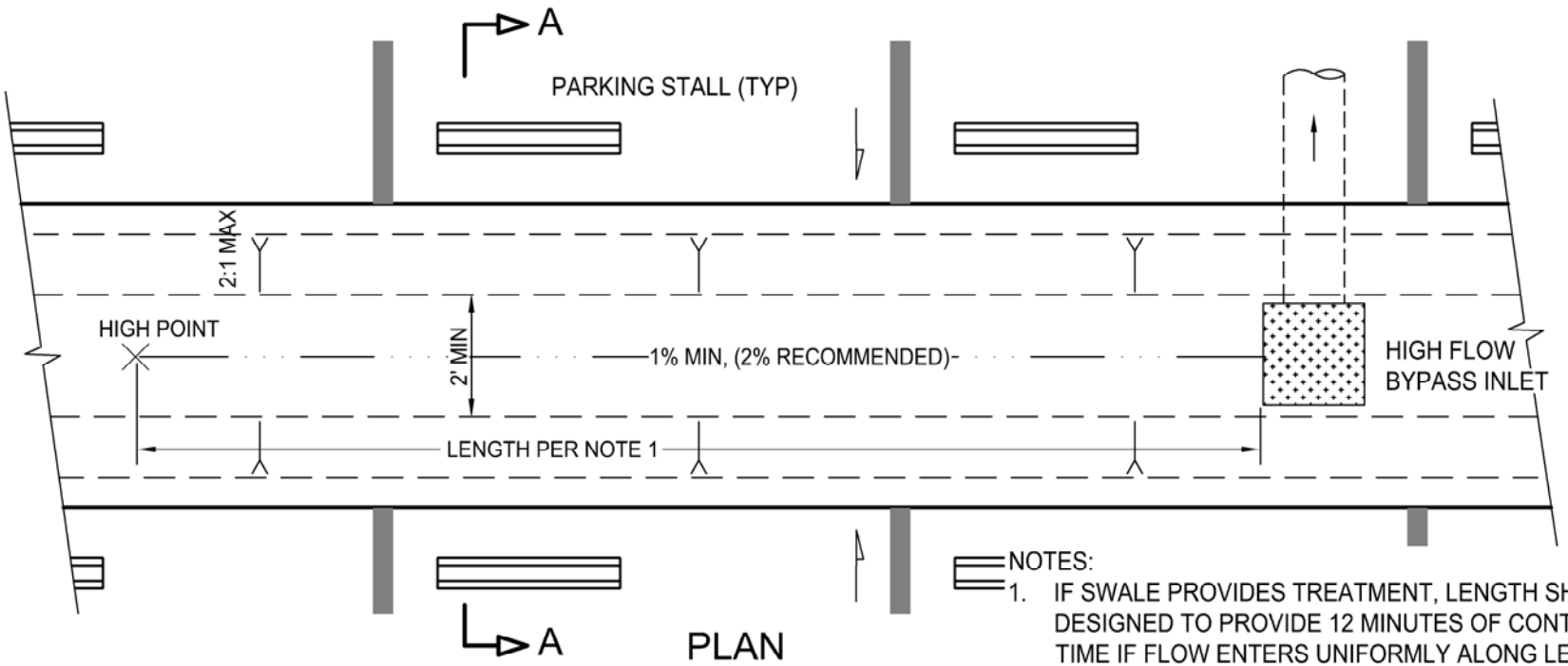


SECTION B-B

Not to Scale

PRIORITY 3
ROADSIDE BIORETENTION
- CURB OPENING
SECTION A-A & B-B

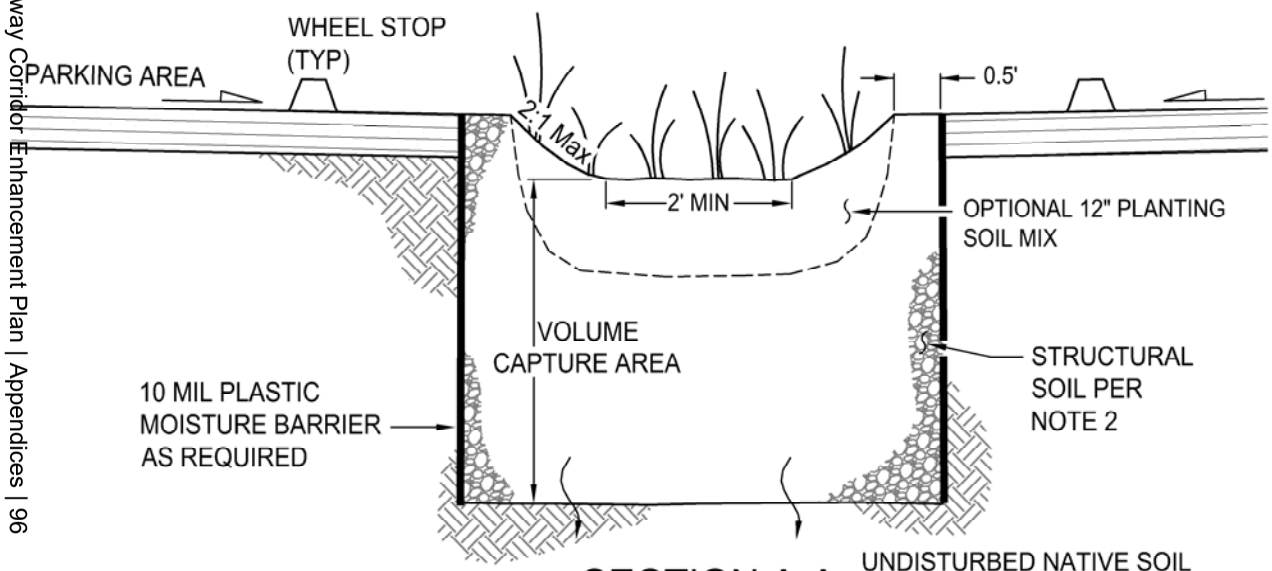
SCALE: *NONE*	DATE: *05/10/11*	
DWN. *DIT* CHK. *HH*	SHEET 2 of 2	P3–04



PLAN

NOTES:

1. IF SWALE PROVIDES TREATMENT, LENGTH SHALL BE DESIGNED TO PROVIDE 12 MINUTES OF CONTACT TIME IF FLOW ENTERS UNIFORMLY ALONG LENGTH. LENGTH SHALL PROVIDE 5 MINUTES OF CONTACT TIME IF 90% OR MORE OF THE FLOW ENTERS AT THE UPSTREAM END. IF SUBSURFACE BIORETENTION AREA PROVIDES 100% VOLUME CAPTURE - HIGH FLOW BYPASS INLET MUST BE 0.25' ABOVE SWALE FLOWLINE. ALL PONDED WATER MUST DRAIN WITHIN 72 HOURS.
2. STRUCTURAL SOIL UNLESS OTHERWISE APPROVED BY GEOTECHNICAL ENGINEER AND ACCEPTED BY GOVERNING AGENCY.
3. SWALE MUST CONVEY DESIGN FLOWS PER GOVERNING AGENCY DESIGN STANDARDS.
4. PARKING ISLAND WIDTH PER APPLICABLE GOVERNING AGENCY STANDARDS.



SECTION A-A

Not to Scale

PRIORITY 1
SWALE WITH BIORETENTION

SCALE: *NONE*	DATE: *12/14/11*	
DWN. *DIT* CHK. *HH*	SHEET 1 of 1	P1–06

Proprietary Units Fact Sheet

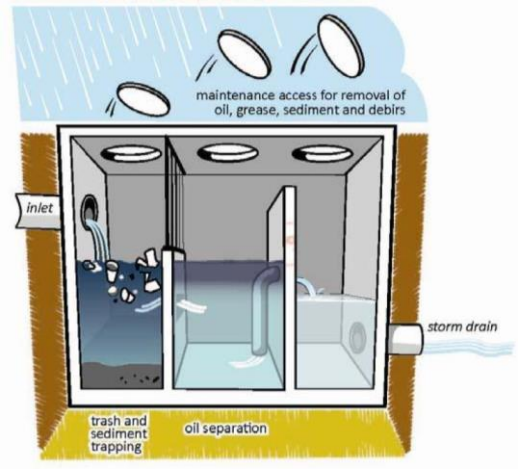
Proprietary Units are also known as Structural Units, Physical Separators, Prefabricated Units, and Manufactured Units.

Description

Proprietary units, or manufactured units, vary in design and use to serve a wide variety of storm water quality needs. They are generally constructed offside and are installed as a unit. Some are designed to target a particular pollutant, such as hydrocarbons, while others remove multiple pollutants. Proprietary units can be very useful when a particular pollutant needs to be removed as part of pretreatment or where space is limited as part of a treatment train. Proprietary units typically provide treatment but do not provide volume capture.

General Inspection and Maintenance Requirements

A maintenance plan should be developed prior to implementation of stormwater and LID features. The maintenance plan shall include the manufacturer's recommended maintenance practices, designation of parties responsible for maintenance and upkeep, specify the funding source for ongoing maintenance with provisions for full replacement when necessary and provide site specific inspection checklist.



Chambered Separator Units

Chambered separator units use the properties of different pollutants to remove each in a separate chamber. As such, these units tend to be larger. They can either be inline with the storm drain system or offline.

An access point must be provided to each chamber for maintenance purposes. These units must be maintained with a vacuum truck.



Trash Excluders

Trash excluders use screens or other physical filtration to prevent trash from entering the storm drain system. The collected trash can either be stored in a portion of the inlet or in the curb. High flow bypass must be provided to prevent clogging and backup.

These units must be maintained with a vacuum truck.



Filter Inserts

Filter inserts use bags and/or fabric or other physical filtration to filter out trash, sediment, and/or hydrocarbons. Some filter inserts are designed to remove particular pollutants. High flow bypass must be provided to prevent backup.



Centrifugal Separator Units

Centrifugal separator units use curved baffles to direct storm water so that centrifugal force drops sediment and debris to the bottom of the chamber, and usually use screens to collect floatable material. These units can be either inline with the storm drain system or offline.

These units must be maintained with a vacuum truck.

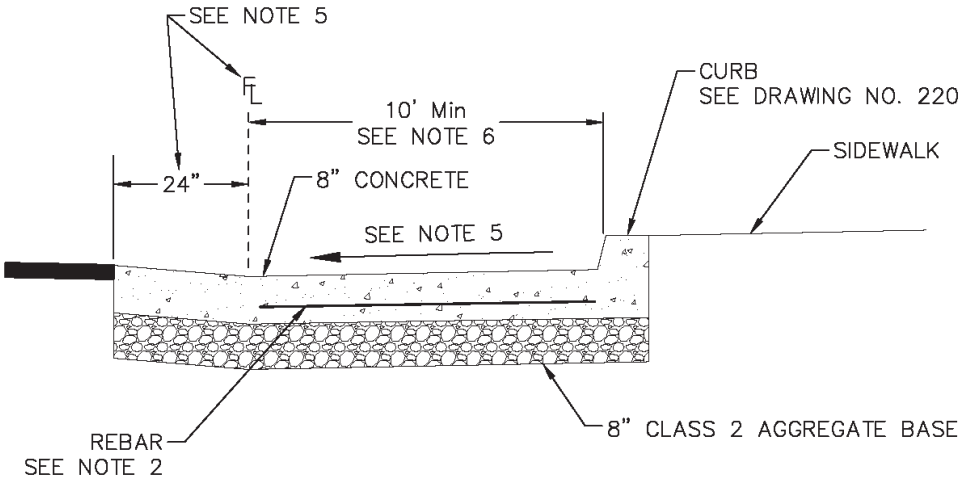


Tree Filter Units

Tree filter units are combination units that use both structural and biological elements to clean storm water. They generally consist of a concrete vault filled with a special soil mix that a tree or shrub is planted in. Storm water is directed into the unit, filtered through the soil, and collected in a perforated pipe and conveyed to the storm drain system. High flow bypass must be provided for high intensity rain events.

Appendix E

Sonoma County Transit Bus Turnout Specifications



NOTES:

1. CONCRETE SHALL BE MINOR CONCRETE.
2. PLACE REBAR IN CONCRETE PAD AS FOLLOWS:
   #4 AT 12" ON CENTER EACH WAY, OR
   #5 AT 16" ON CENTER EACH WAY.
   REBAR SHALL BE PLACED 3" FROM BOTTOM OF CONCRETE SLAB.
3. CONSTRUCT EXPANSION JOINTS AND WEAKENED PLANE JOINTS PER DRAWING NO. 222.
4. CLASS 2 AGGREGATE BASE SHALL BE COMPACTED TO 95% RELATIVE COMPACTION.
5. SEE APPROVED PLANS FOR SLAB DRAINAGE DETAILS.
6. 12' WHERE DIRECTED BY SONOMA COUNTY TRANSIT; REFER TO APPROVED PLANS.
7. CONSTRUCTION SHALL CONFORM TO SONOMA COUNTY TRANSIT LAYOUT REQUIREMENTS AND THE APPROVED PLANS.

COUNTY OF SONOMA
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS

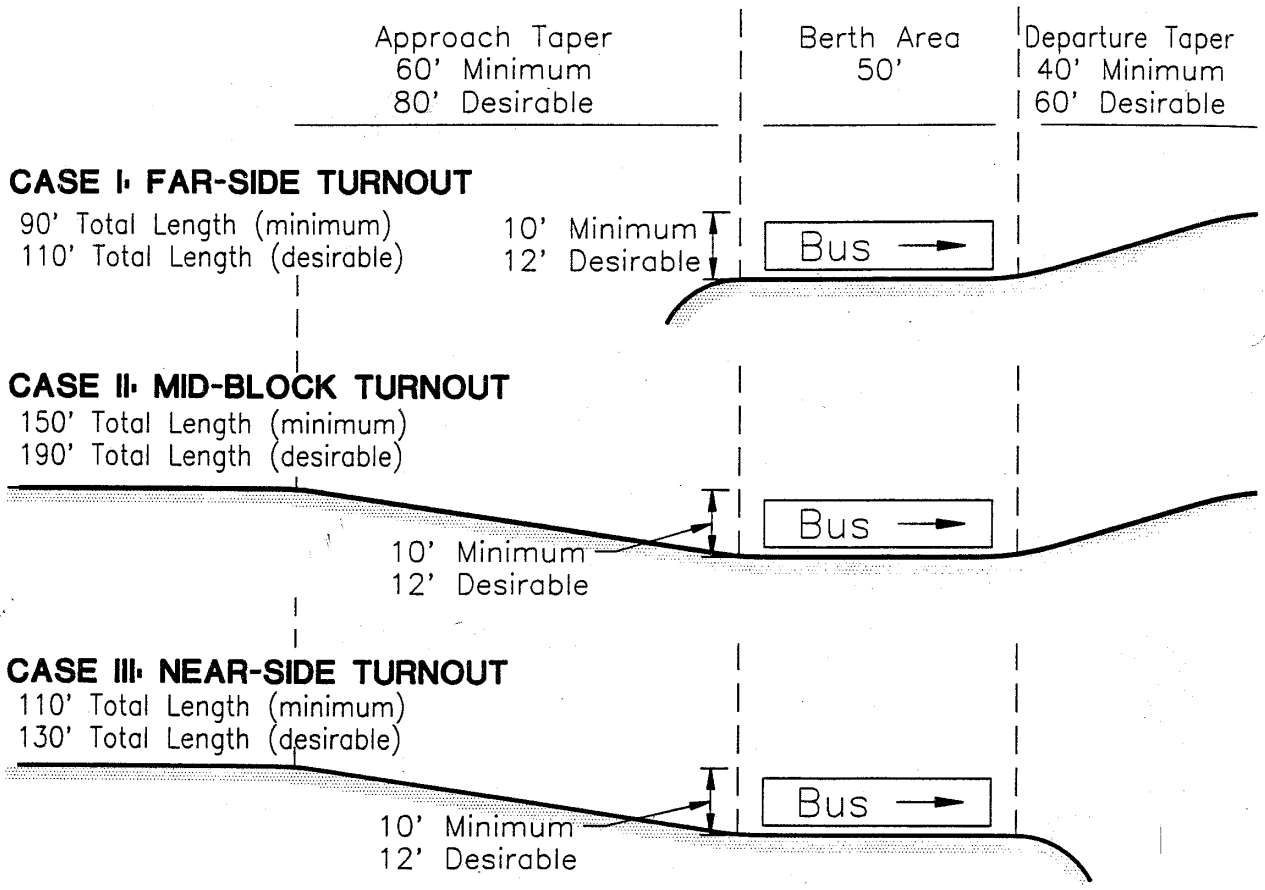
BUS STOP TURNOUT
TYPICAL SECTION
(URBAN)

DATE: AUG. 2018	REVISED:	
APPROVED BY:	SCALE: NONE	DRAWING NO. 216R

Xrefs:
Path: S:\ENGINEERING\Traffic\STAFF FOLDERS\Chet\Draft Revised Standards\Revised_County Standards_Master.dwg Plot Date: Sep 26, 2018 at 09:11

BUS TURNOUTS

Scale 1" = 30'



Approach Area Note:

Dimensions of taper assume that buses will decelerate mostly in the approaching travel lane.

Berth Area Notes:

- Add 20' to length of berth area if articulated buses will use turnout; add 70' more for each additional articulated bus expected to use the turnout at the same time.
- Add 50' for each additional standard bus expected to use the turnout at the same time.

Departure Area Note:

Dimensions of taper assume that buses will accelerate mostly in the departing travel lane.

Sonoma County Transit
355 W. Robles Avenue
Santa Rosa CA 95407



ghd.com

The Power of Commitment