

Basis of Design

Date: March 07, 2025

To: Shawn Knapp, Nate Levine | Town of Moraga, Andrew Dillard | CCTA

From: Joseph Paull, Brendan Pang | Sandis

Subject: Basis of Design for Moraga/Canyon Road Complete Streets Safe Streets Project

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Introduction

The Town of Moraga, California, has asked Sandis to document the design assumptions for the recommended concepts developed for the Moraga Road / Canyon Road Complete Street Project (Project).

The Town Council and the community have identified sections of Moraga Road and Canyon Road (St. Mary's Road to Sanders Drive) for desired safety improvements. A number of these improvement recommendations are listed in the 2016 Moraga Walk and Bike Plan, 2022 Moraga Local Roadway Safety Plan, and CCTA Lamorinda Action Plan.

The project set out to identify improvements to best support the project goals, priorities, and community concerns to increase pedestrian and bicycle safety and decrease vehicle speeds. Proposed improvements include new/repaired sidewalks, ADA-accessible curb ramps, traffic signal improvements, enhanced crosswalks and warnings, and buffered bike lanes. Furthermore, intersection improvements such as traffic signalization and lane modifications (addition of right turn lanes) are expected to increase vehicle safety, with little to no impacts on vehicle throughput on Moraga/Canyon Road or capacity in an evacuation event. The improvements will also complement the Smart Signal traffic system technology, allowing for easy integration.

Recommendations for design elements are grounded in a comprehensive evaluation of key factors. The existing roadway configuration and topography establishes guide rails of the project, to create a design that can be integrated seamlessly and cost-effectively into the existing area. Community input ensures that proposed changes align with local needs and priorities. The Safe Streets for All (SS4A) – Safer Roads Design Approach provides a data-driven framework for enhancing safety. Town and County policies and standards establish the foundational requirements for persistent recognizable design across town. Surrounding context, including land use and traffic patterns, informs how improvements fit within the broader network. Finally, national design guidance ensures that best practices and proven safety strategies are applied.

The Project extent along Moraga and Canyon Road are shown in **Figure 1**.

This Basis of Design documents the process and design assumptions that went into creating the 15% Conceptual Design Layout that is proposed to be the basis for more detailed design of the Project.



Figure 1: Project Location (Source: Fehr & Peers)

Safe Streets for All

The Moraga/Canyon Road Complete Streets Project is partially funded by a US Department of Transportation (USDOT) Safe Routes for All (SS4A) grant. SS4A is a federal grant program that is used to prevent roadway fatalities and injuries by improving walking, biking, and transit, and managing vehicle speeds.

The SS4A program utilizes a "Safe System Approach" to mitigate risk in our transportation system. The Safe System Approach is encapsulated by the following principles:

- Death and Serious Injuries are Unacceptable
 - A Safe System Approach prioritizes eliminating crashes that would result in death or serious injury.
- Humans Make Mistakes
 - Making mistakes and decisions that cause crashes are inevitable. Transportation systems should be designed to accommodate certain levels of human error to avoid serious injury.
- Humans are Vulnerable
 - Human centric transportation systems design and operations to accommodate the limits and physical human vulnerabilities.
- Responsibility is Shared

- Participation from all stakeholders, from the government level to the general public, are needed to prevent fatalities and serious injury on roadways.
- Safety is Proactive
 - Use proactive tools to identify and address safety concerns before accidents occur.
- Redundancy is Crucial
 - Multiple safety measures creates a more robust transportation safety system, so that if one part fails, other measures remain to provide protection.

In order to incorporate these principles into the roadway design, the following project goals have been identified and will be a guiding force in the development of the project's designs:

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Project Goals

- Safer People: Inform the public of new designs and how to maximize use and encourage safety from all road users.
- Safer Roads: New roadway layouts to help all users, including pedestrians and bicyclists feel safer and more comfortable on the Moraga Road/ Country Club Drive and prevent serious injury.
- Safer Speeds: Develop street design that induces safer vehicle speeds and provides clear warnings of upcoming pedestrian and bicycle conflict areas.
- Pedestrian Access: Improve sidewalk connectivity for pedestrian access along the corridor.

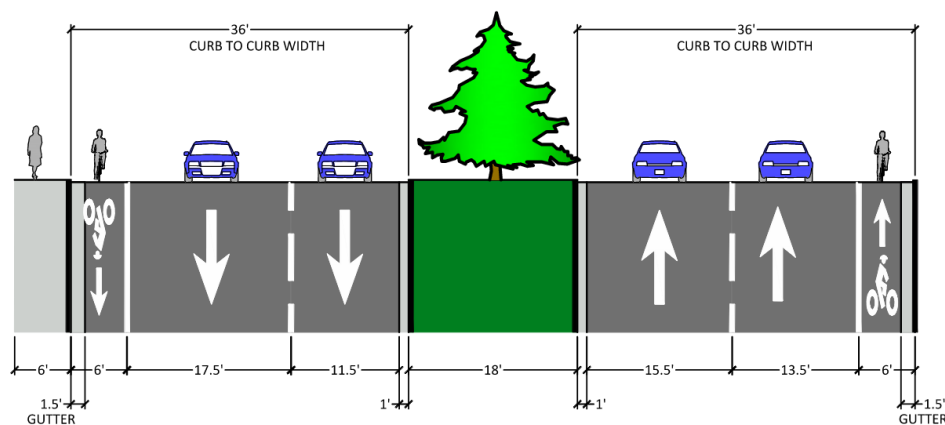
Existing Conditions

The following outlines the relevant existing conditions of the project corridor:

- **Roadway widths:**
 - Existing curb-to-curb along Canyon Rd/ Moraga Rd:
 - 74' near Sanders Dr widens to 90' at Country Club Dr
 - 90' from Country Club Dr to St Marys Rd
 - Town Right of Way (ROW):
 - 95' near Sanders Dr widens to 123' at Country Club Dr
 - 126' from Country Club Dr to Moraga Way
 - 124' that narrows to 118' from Moraga Way to Alta Mesa
 - 118' from Alta Mesa to St Marys Rd
 - The existing corridor's curb-to-curb width is approximately centered within the existing ROW.
- **Sidewalk:**
 - A sidewalk exists on the east and west side of Canyon Road from Sanders Drive to Country Club Drive
 - Width: varies from approximately 5'-6" to 7'-0"
 - A sidewalk exists on 155' of the east side and the entire west side of Canyon Road from Country Club Drive to Moraga Way
 - Width: (east) 6'-6"
 - Width: (west) 8'-0"
 - Increments of sidewalk exist on the east side of Moraga Road from Moraga Way to Alta Mesa
 - 475' near Moraga Way Intersection; Width (east): 6'-0"
 - 375' near Alta Mesa Intersection; Width (east): 5'-0"
 - A sidewalk exists on the entire west side of Moraga Road from Moraga Way to Alta Mesa
 - Width: (west) 8'-0"
 - A sidewalk on the entire east and 130' of the west side of Moraga Road from Alta Mesa to St Marys Road
 - Width: (east) 6'-0"
 - Width: (west) 8'-0"
- **Intersections:**
 - There are five intersections within the project limits, with Canyon Rd/ Moraga Drive as the major street:
 - Canyon Road at Sanders Drive
 - Minor street stop control
 - 3-way intersection
 - Canyon Road at Country Club Drive
 - Minor street stop control
 - Canyon Road/ Moraga Road at Moraga Way
 - Signalized with protected left-turns along major road
 - Moraga Road at Alta Mesa
 - Minor street stop control
 - Moraga Road at St Marys Road
 - Signalized

- **Curb ramps exist at the following locations:**
 - NW, NE, and SW corners at Canyon Road at Sanders Drive
 - No crosswalk south of intersection
 - All corners at Canyon Road at Country Club Drive
 - No crosswalk south of intersection
 - All corners at Canyon Road/ Moraga Road at Moraga Way
 - No crosswalk south of intersection
 - All corners at Moraga Road at Alta Mesa
 - No crosswalk north of intersection
 - NE and SE corners at Moraga Road at St Marys Road
 - NW corner is a flush condition with truncated domes
 - No crosswalk south or west of intersection
- **Bicycle Facilities (widths include gutter)**
 - Canyon Rd (South of Country Club Dr)
 - 5' Class II bike lane with 2' buffer
 - Canyon Rd (Between Country Club Dr and Moraga Way)
 - 6' Class II bike lane with no buffer
 - Moraga Rd (Between Moraga Way and Alta Mesa)
 - 6' Class II bike lane with no buffer
 - Moraga Rd (Between Alta Mesa and St Mary's Rd)
 - 6' Class II bike lane with no buffer
- **Parking:**
 - No parallel on-street parking is permitted along the project corridor for the entire length of the project limits.
 - There are 10 driveways connected to the western side of Moraga Road/ Canyon Road to enter the Moraga Shopping Center.

The following figure shows the existing typical cross-section of the project corridor.



See **Appendix A** for a plan view exhibit of the existing conditions within the project area.

Traffic Data

Traffic data was collected in three separate phases to meet this projects needs. These instances included:

- Tuesday, September 17, 2024
- Wednesday, September 18, 2024
- Tuesday, January 14, 2025 (Supplemental)

The counts included the following data:

- Multimodal turning movement counts (intersections) during AM and PM Peak Hours:
 - Canyon Road @ Country Club Drive
 - Moraga Road @ Moraga Way
 - Moraga Road @ Alta Mesa
 - Moraga Road @ St. Mary's Road
- Bicycle & Pedestrian Crossing Data:
 - Canyon Road @ Sanders Drive
- ADT Volumes & Speed Data:
 - Canyon Road (s/o Sanders Drive) | ADT = 11,388 vpd
 - Canyon Road (s/o Country Club Drive) | ADT = 12,460 vpd
 - Moraga Road (n/o Alta Mesa) | ADT = 19,189 vpd
 - Alta Mesa (e/o Moraga Road) | ADT = 351 vpd

All counts were collected on weekdays with typical weather, on non-Holidays while school was in session.

These data sets were used to conduct the traffic analyses of the project, evaluate traffic control warrants, evaluate safety treatments, and assess project needs.

In addition to the traffic counts collected, historic collision data was collected for the project corridor and used in the assessment of traffic control and traffic safety recommendations.

See **Appendix B** for collected traffic and collision data.

Vehicle Speed

The travel speed for the Moraga Road / Canyon Road project corridor was assessed for three locations. These were based on 24-hour counts. Table 1 below shows the results of the corridor.

Corridor	Location	Posted Limit	Average Speed	85 th Percentile
Canyon Road	s/o Sanders Drive	35 MPH	31 MPH	38 MPH
Canyon Road	s/o Country Club Drive	35 MPH	34 MPH	39 MPH
Moraga Road	n/o Alta Mesa	35 MPH	26 MPH	32 MPH

The results of the assessment have shown that the existing posted speeds limits are appropriate based on current driver behaviors, and these speed values will be used to assess appropriate treatments for the project.

See the Traffic Analysis conducted for this project for further discussion on how these speeds have affected the preferred concept design.

Traffic Analysis

The combined team of Fehr and Peers and Sandis performed a series of traffic evaluations and assessments in order to evaluate the existing and proposed conditions for the project.

The assessments are broken down into two distinct areas of the project corridor:

- Southern Section, including Sanders Drive and Country Club Drive
- Northern Section, including Alta Mesa and St. Mary's Road

Southern Section

The Southern Section Analysis involved two separate studies:

- A traffic signal warrant analysis to evaluate whether the intersection of Country Club Drive and Canyon Road met any established warrants to justify the installation of a traffic signal.
- A crosswalk evaluation of the existing crosswalk at Sanders Drive and Canyon Road to determine whether or not the existing crosswalk was being well-utilized, evaluate if the crosswalk should remain, and if so, what recommendations would be made to make the crossing safer and more comfortable for pedestrians.

The outcomes of these assessments provided two key recommendations that guided the design development of this project:

1. The traffic signal at the intersection of Country Club Drive and Canyon Road was warranted based on existing traffic volumes.
2. The pedestrian crossing at Sanders Drive is heavily utilized for the area and is recommended to remain. Recommended improvements for safety and comfort of the crosswalk included relocating it to the south side of the intersection, enhancing it with Rectangular Rapid Flashing Beacons, and providing adequate lighting for the crosswalk at night.

It should be noted that the evaluation of the crosswalk at Sanders Drive did not include an origin-destination analysis. However, taking into consideration the surrounding neighborhood, it can be assumed that pedestrian crossing here were coming from or going to any combination of JM Middle School, Moraga Center Plaza, or crossing over to the neighborhoods on Sanders Drive or School Street. This would make the Sanders crossing a key crossing location, especially considering that the next closest crosswalk to the north is at Camino Pablo which is ~1400 feet from Sanders Drive. Removing the crosswalk at Sanders may result in pedestrians crossing at unmarked locations who are trying to reach or depart from Sanders Drive, De La Cruz Way, or Larch Avenue, all of which would not have crosswalks if the Sanders crossing was removed.

Northern Section

The northern section analysis likewise involved two separate studies:

- A traffic signal warrant analysis to evaluate whether the intersection of Alta Mesa and Moraga Road met any established warrants to justify the installation of a traffic signal.

- An operational analysis to evaluate whether modifying the Northbound and Southbound lane on Moraga Road between Alta Mesa and St. Mary's Road (~300 feet) would result in any safety concerns for the intersection of Alta Mesa.

The results of the analysis revealed the following outcomes that impacted the design development of this project:

1. A traffic signal warrant was met at the intersection of Alta Mesa and Moraga Road. However, upon further inspection, the analysis revealed that Warrant 2, Four-Hour Vehicular Volume, was only triggered because of the PM Peak Hour traffic volumes coming from the commercial driveway of Moraga Center Plaza (a commercial access point), and would not be triggered if you only considered the volumes on Alta Mesa (which is a public road), or other times of the day. For this reason, a traffic signal is not recommended here at this time but is recommended to be studied further in the future as the Town has conversations with the ownership of Moraga Center Plaza about meeting their access goals. Changes to driveway locations and use would impact the need or justification of a signal, meaning that a transportation master planning effort for the area is recommended.
2. The operational analysis did show an increase in delay, for the Alta Mesa approach but a less-than significant impact on queuing. Reviewing the outcomes of the analysis, the team has determined that any added delays will likely be mitigated by trip planning and the removal of the travel lanes will provide more of a safety improvement (in the form of reducing conflict points) than provide safety concerns.

The proposed lane configuration is recommended to enhance safety for all users of the corridor. The proposed lane configuration reduces the north and southbound approaches of Alta Mesa and Moraga Road to a single through lane, and highlights bicyclists with green thermoplastic conflict striping and preemptive bike lane transitions to better alert right-turning vehicles of bicyclists prior to beginning their turning movements. This configuration also reduces the number of conflict points between vehicles, bicyclists, and pedestrians in the unsignalized, RRFB enhanced crosswalk at Alta Mesa. Impacts of the lane reduction to existing traffic patterns are anticipated to be minimal since there is an existing lane drop north of St Mary's Road.

See **Appendix C** for the Traffic Studies in their entirety.

Public Engagement and Community Survey

Public engagement was conducted for the project to allow members of the community to help identify needs and desires for the project corridor.

Community outreach and engagement occurred in three phases:

- Phase 1: Confirm Project Need
- Phase 2: Preliminary Concept Share
- Phase 3: Confirm and Refine Concept

The public engagement process included one (1) public pop-up event at Canyon Club Brewery along the project corridor, one (1) in person community meeting held at JM Middle School, one (1) virtually held public meeting, and one (1) online survey.

The results of the public outreach efforts showed a high level of interest and support for the overall project. The results of the online survey showed that the largest priority for the project corridor was Bicycle and Pedestrian Safety, followed by Speeding Vehicles, and Bicycle and Pedestrian Comfort. Complimenting those concerns, the priorities for the project were identified as Bicycle Safety, Crosswalk Safety, and Slowing Vehicles Down. The graphics below illustrate the full range of concerns and priorities identified in the survey.



These priorities and concerns were largely echoed during the public meetings and pop-up events. The majority of participants showed support for the buffered bike lanes and asked the Town to investigate the feasibility of providing vertical protection in those buffer areas (discussed in the next section). Additionally there was support shown for adding the traffic signal at Country Club Drive and Canyon Road in an effort to improve pedestrian access at that intersection, and support for the lane removals between Alta Mesa and St. Mary's Road as shown on the concept plans in an effort to reduce conflict points for turning vehicles.

This input from the public continued to evolve the development of the project's preferred Concept Design, which emphasized the public's main concerns and priorities as a guiding force for the project's development.

The outcome of the outreach efforts showed a strong public support for the project and a desire for the project team to continue to investigate enhancing the project with elements such as class IV buffer treatments and protected intersection treatments.

See **Appendix D** for the Outreach Summary Report prepared for this project.

Bikeway Treatment Selection

The Community voiced a desire for a separated bikeway along the Project extent, opposed to a buffered bike lane which was initially identified in previous planning efforts and the SS4A grant. As such, the project team evaluated the option.

Buffered Vs. Separated Bikeways

The two primary bikeway facilities being considered for the SS4A project are buffered bike lanes and separated bike lanes.

Buffered Bike Lanes

Buffered bike lanes are separated from a travel lane with a striped buffer area. They are considered a type of Class II bike lane facility (sometimes referred to as Class IIB, though this is not an official classification). This treatment has no vertical elements present but relies on spatial separation to provide extra comfort and safety for bicyclists travelling along the corridor. This visual separation encourages both vehicle drivers and bicycle riders to ride further away from each other, by shifting the center of their respective lanes away from each other.



Image 1. Existing Buffered Bike Lanes on Canyon Road South of the Project Area

Buffered bike lanes have been implemented across the country and are already installed on Canyon Road from Country Club Drive to Constance Place. Continuing the Class II buffered bike lanes from Country Club Drive to St. Mary's Road would provide consistency to the project corridor and user experience.

Separated Bikeways

Separated Bikeways are bike lanes with physical, vertical separation within the buffer area that separates the bikeway from the travel lanes. This is considered a Class IV bikeway according to the California Bikeway Classification system.

Vertical separation within the buffer can vary in typology from flexible delineators or bollards to movable planters or curbed medians. The most common vertical elements though are flexible delineators or bollards due to their lower installation costs.

These vertical elements offer an extra layer of comfort and protection to bicycle riders using the bikeways.



Image 2. Example of a Class IV Bikeway with Flexible Delineators

See **Attachment 1** for an evaluation Matrix identifying key considerations between the two bikeway treatments.

Standards and Guidelines

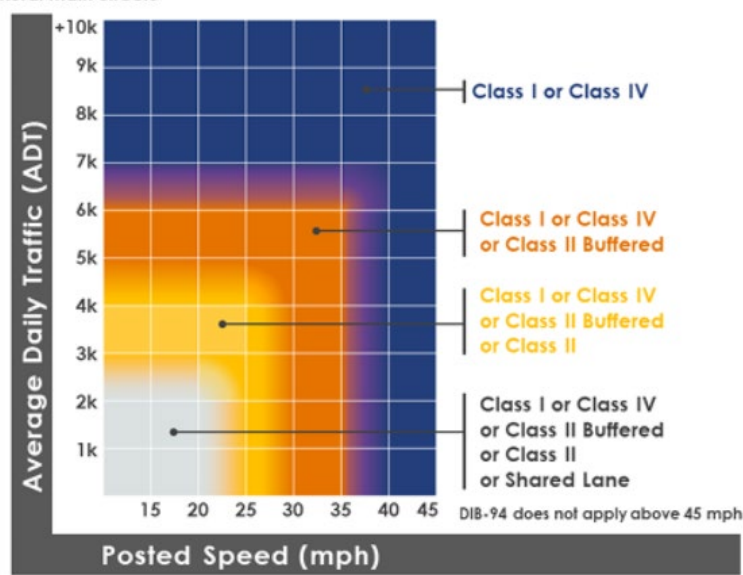
Established standards do not require the installation of one facility over another when considering Class IIB Buffered Bike Lanes and Class IV Separated Bikeways. Both facilities can be established on the project corridor based on their guiding standards documents, which includes the California Manual on Uniform Traffic Control Devices (CA MUTCD) for buffered bike lanes and Caltrans Design Information Bulletin 89 (DIB 89) for Class IV Bikeways (as denoted in the CA MUTCD). The corridor meets all necessary requirements from these documents and has adequate width to install both facilities.

Other established industry guidelines can be used to evaluate alternative installations of these two facilities, but it is important to keep in mind that guidelines do not establish requirements, and can be put aside if conflicting with one another, constraints restrict their implementation, or in favor of engineering judgement.

Some highlight of guideline recommendations are identified below:

- **FHWA Separated Bike Guide:** The FHWA Separated Bike Guide recommends installing separated bike lanes in any condition that fills network needs, offers few driveway or intersection conflicts, and is supported by the community. This would support the installation of a separated bikeway on the project corridor. However, it does note that all bikeway installations should consider a holistic context with the surrounding network, evaluate the impact of maintenance costs, and collect before and after data for evaluation.
- **Caltrans DIB 94:** Caltrans DIB 94 identifies the recommended classification of bikeway treatment for a corridor based on average daily traffic (ADT) and posted speeds. The ADT of the project corridor is greater than 10,000 vehicles and the posted speed is 35 MPH. Based on Figure 5-A of DIB 94, the recommended bikeway would be a Class I or Class IV facility. This would only be required to be adhered to though within Caltrans ROW.

Figure 5-A - Recommended Bicycle Facilities for Urban Areas, Suburban Areas, and Rural Main Streets



Segment Recommendations

Based on the above considerations, the recommendation for the project to implement the Class II Buffered Bike Lanes on the project corridor.

This recommendation stems from three primary guiding factors:

- The installation of buffered bike lanes in this section of the corridor will extend the existing buffered bike lane facility on Canyon Road, creating a consistent and intuitive facility along the project corridor.
- The buffered bike lane alternative offers the highest level of flexibility for the project. Installing the buffered bike lanes will allow the future planned bicycle facilities outlined by the Town to be installed without having to remove vertical elements that would be installed or built with this project, rendering those elements as unusable in the future conditions. Likewise, should the future plans for the corridor be changed, and the Town pursues an alternative future condition, the Class IV elements can be added to the buffer of the buffered bike lanes at any point to create a separated Class IV bikeway facility.
- The USDOT's Safe Streets and Roads for All (SS4A) grant awarded for this project specifically identified and is intended to fund Class II Buffered Bike Lanes as the proposed treatment. A Class IV facility would require identifying additional funds or reducing other project elements. Furthermore, it would create a future maintenance obligation that would be unfunded.

However, a separated bike facility may be appropriate in future conditions and should be further considered and evaluated in the future master planning effort.

Future Town Goals

The Moraga/Canyon Road corridor is an important roadway in Moraga which provides access to local businesses, homes, schools, and parks. The roadway supports multiple modes of transportation and services as a primary connection to the community of Canyon, Orinda (via Moraga Way) and Lafayette (via St. Mary's Road) and serves as a primary evacuation route.

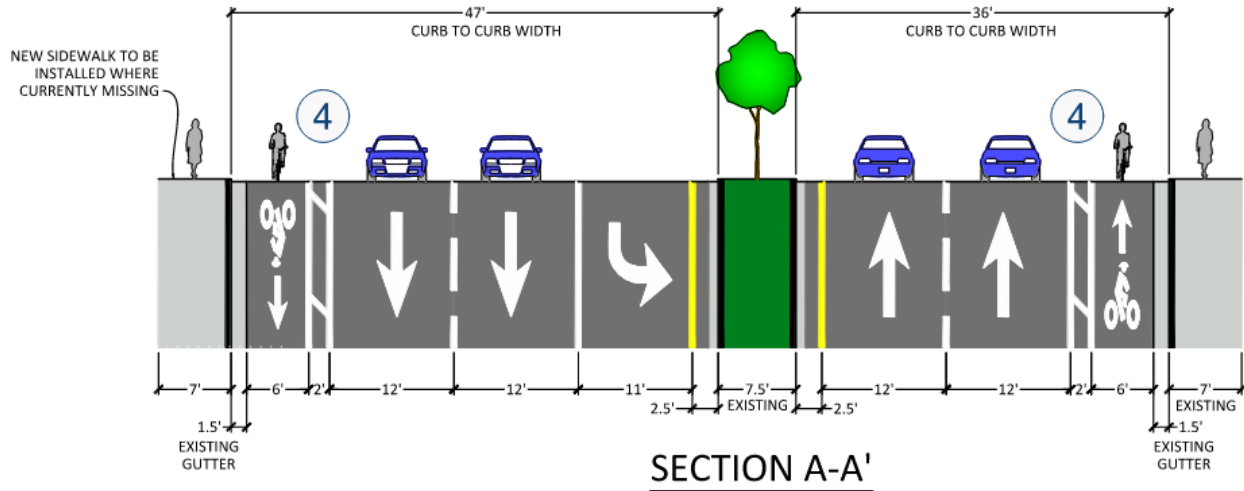
The SS4A Project is a response to specific safety concerns and is not intended to completely reconstruct and re-envision the roadway. Future needs, such as multi-purpose pathways/auxiliary lanes, changes to the Moraga Shopping Center driveways, and connection of School Street to Moraga Road are anticipated to be further studied in the future. Improvements identified in this project are intended to fit into or complement these potential future improvements and not preclude them.

The Town envisions conducting a holistic transportation master planning effort, focused on the Moraga Shopping Center and Moraga/Canyon Road. As mentioned in this Basis of Design, this master planning effort is recommended to expand further and plan for future improvements.

Final Concept

The following concepts were selected as preferred viable design options based on input received from the community, project, and Town goals, and our Team's judgment.

Section 1: Moraga Road - between Country Club Dr and Moraga Way

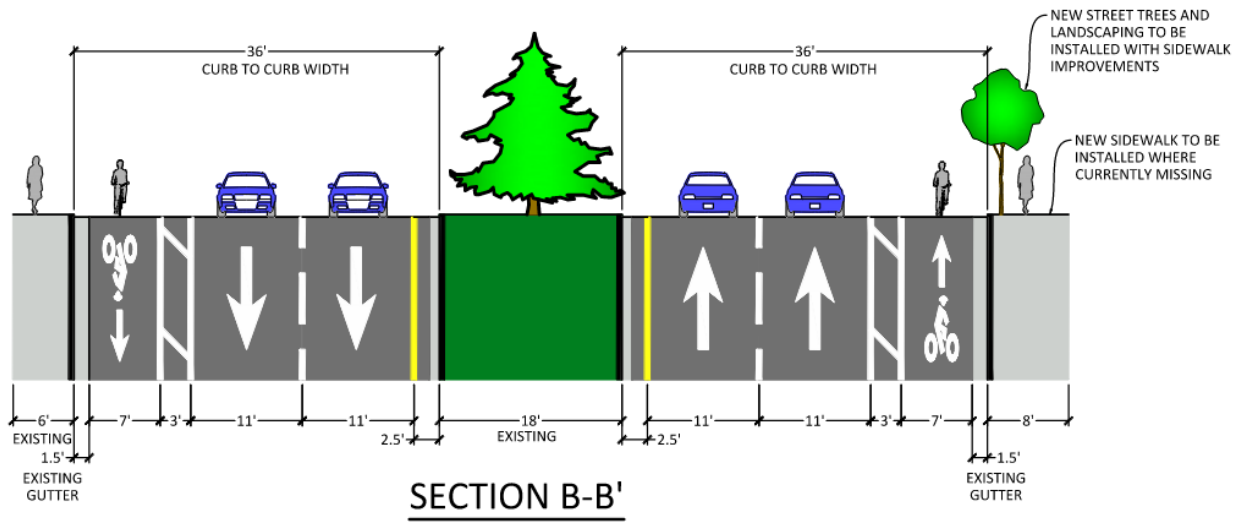


The proposed improvement maintains the existing 90.5' curb-to-curb width of the corridor. This condition would remain as a two vehicle lane and single bike lane configuration for both directions, separated by a median planter. The proposed condition will redistribute the width of the roadways to widen the bike lane and provide a 2' buffer between the bicycle lane and vehicle lanes.

Additionally, a 7' wide concrete sidewalk will be constructed as part of a future project along the eastern side of the corridor to complete the 200' long sidewalk gap closure.

This section of roadway will include a pavement rehabilitation of the entire roadway.

Section 2: Moraga Road - between Moraga Way and Alta Mesa



The proposed improvement maintains the existing 90' curb-to-curb width of the corridor. The northbound approach will be restriped to left turn lane and thru-right lane, with the addition of buffers and conflict striping for bicyclist thru movements. The southbound approach will maintain two thru lanes, with the addition of buffers and a widened bike lane.

Additionally, 125' length of the existing 8' wide concrete sidewalk will be reconstructed along the western side of the corridor to fix damaged sidewalk and bring it up to ADA conformance.

This section of roadway will include a pavement rehabilitation of the entire roadway.

Typical Proposed Dimensions and Treatments

Improvements for this project were selected in accordance with the standards outlined in the SS4A grant application guidelines, and further refined through public outreach and traffic analyses.

- **Rectangular Rapid Flashing Beacon (RRFB)**
 - Crosswalk analysis of Sanders Dr and Canyon Rd concludes that pedestrian volumes still warrant having a crosswalk at this intersection.
 - Due to the vehicle speed and geometry of Canyon Rd, the crosswalk analysis recommends relocating the crosswalk south of the intersection, installing RRFBs, and adding a median refuge island to enhance pedestrian visibility and safety.
 - Highly supported during public outreach
- **Median Refuge**
 - Decreases the level of exposure of pedestrians to traffic, and allows pedestrians to cross one direction of traffic at a time.
 - Highly supported during public outreach
- **High Visibility Crosswalks**
 - Based on the high pedestrian volumes along the corridor, high visibility crosswalks are recommended to enhance pedestrian safety.
 - Highly supported during public outreach
- **Class II Buffered Bike Lanes**
 - Physical separation between vehicles and bicyclists increases the bicyclists' confidence, and extending the existing Canyon Rd Class II buffered bike lane along Moraga Rd provides better bike facility continuity.
 - Added bicyclist conflict striping with green thermoplastic through intersections to emphasize bicycle travel was also well received by the public.
 - Highly supported during public outreach
- **Radar Speed Feedback**
 - To address concerns of vehicle speeding that was echoed during public outreach, radar speed feedback signs to be installed to regulate speed and discourage speeding.
- **Corner Bulb-out**
 - Collision history from 2014-2023 indicates accidents that have occurred at Moraga Rd and Moraga Way due to improper turning.
 - A bulb out and bike buffer with delineators approaching the intersection will deter vehicles from preemptively turning through and blocking the bike lane at the northwest corner, shorten the pedestrian crossing distance, and call attention to pedestrians.

Community Outreach Board



The following typical dimensions, treatments, and features shall be utilized as design standards, preferences, and guidelines throughout the project corridor.

- Travel lane widths: 12'-0" preferred when travel lane is adjacent to a curb, 10'-0" minimum
- Travelled-way widths: 32'-0" minimum
- Bike lane widths: 7' width preferred, 6' minimum, not including the gutter width.
 - Buffer: 4' preferred, 2' minimum
- High-visibility, ladder crosswalk markings shall be used at each crosswalk location in the project limits.
- Existing signs and pavement markings that are not in conflict with proposed conditions and are still easily legible to roadway users shall be maintained in place.

Intersection Treatments

- Curb Ramps:
 - Curb ramps shall be provided at both ends of all marked crosswalks within the
 - New curb ramps shall be Case A ramps from Caltrans Standard Plan A88A where feasible.
 - Where installing Case A curb ramps is not feasible due to the spatial or topographic constraints of the existing conditions, Case C ramps shall be prioritized.
- Crosswalks:
 - All new crosswalks installed as part of the project shall be high visibility crosswalks with advanced limit lines or yield lines (depending on the form of control at the crosswalk).
 - Existing crosswalks shall be refreshed.

- Intersection controls:
 - Existing intersection controls shall be maintained at all project intersections except for the following:
 - The intersection of Canyon Road and Country Club Drive shall be signalized per the traffic signal warrant study conducted and based upon the recommendations of the consulting team to enhance access, safety, and efficiency for all roadway users at this intersection.
 - This option was presented to the public during the outreach process and was largely supported.
- Intersection Approaches
 - Stop-controlled intersection approaches shall have 'STOP' pavement markings and 50 linear feet of double yellow pavement striping installed in advance of the stop bar, or the crosswalk where no stop bar is present.
 - Advance stop bars shall be installed at all stop-controlled approaches that have a crosswalk on the approach unless the inclusion of an advance stop bar would result in insufficient sight lines.

See **Appendix E** for the Preferred Concept Designs prepared for this project.

Utility Impacts

All existing utilities within the project limits will be protected in place, have access maintained for future maintenance considerations, and will be avoided in the alignments of the proposed improvements.

Where conflicts with utilities cannot be avoided, but the utility structure in question can be maintained in its existing location and be made flush to the proposed facilities, the utilities will be adjusted to the finished grade. Other utilities that cannot be avoided and are not flush to the finished grade will be relocated and the relocation shall be coordinated with the utilities' owner during the project's design phase.

Landscaping Impacts

New tree planters are proposed to be added along the new western sidewalk between Alta Mesa and St Marys Road. Species to be determined and confirmed by the Town of Moraga.

Where existing landscaping within the median shall be maintained. If any landscaping is disturbed beyond the limits of work, it shall be replaced in kind.

Trees within the limits of work shall be protected in place during construction unless identified in plans to be removed. Any trees that are considered for removal shall be identified and expressed to Town staff in the design phase of the project and assessed by a certified arborist.

Conclusion

This project will revitalize the roadway with enhanced traffic control, safety upgrades, and measures to promote safer driving speeds and access. The recommended project elements address the Town's identified needs and goals for the corridor and were developed following SS4A best practices and application of a Safe Systems Approach. New sidewalk links will improve pedestrian access and connectivity along the corridor serving facilities and destinations, including the Moraga Center Plaza, the Moraga Farmer's Market, Moraga Commons Park, the Lafayette/Moraga Regional Trail, local schools, and the surrounding community. Bicycle facility enhancements include the extension of existing bicycle buffer treatments, wider bike lanes, and high-visibility conflict striping that will provide cyclists with increased security and comfort while traveling along Moraga Road.

The project is expected to reduce previous safety concerns that have identified. The project has also identified further needs in the area that should be considered in conjunction with an area transportation master plan and development of the Shopping Center and School Street.