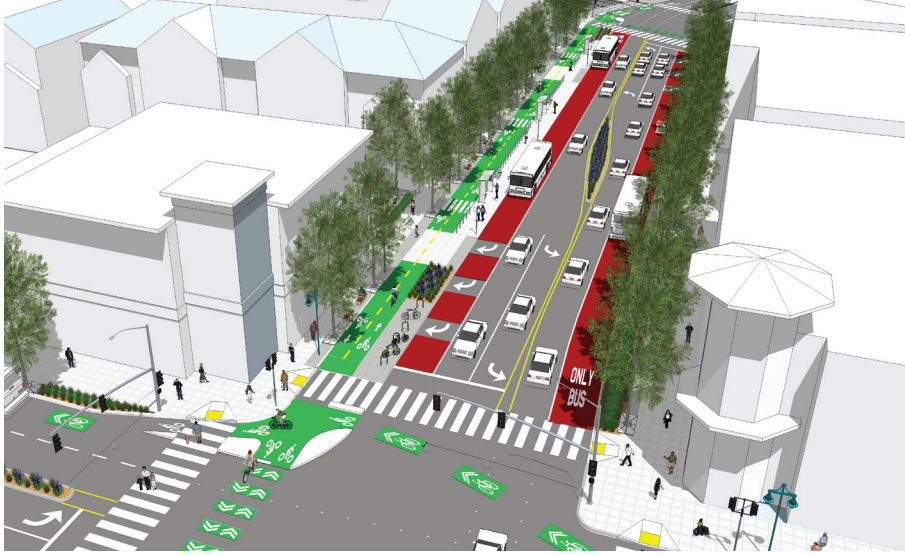
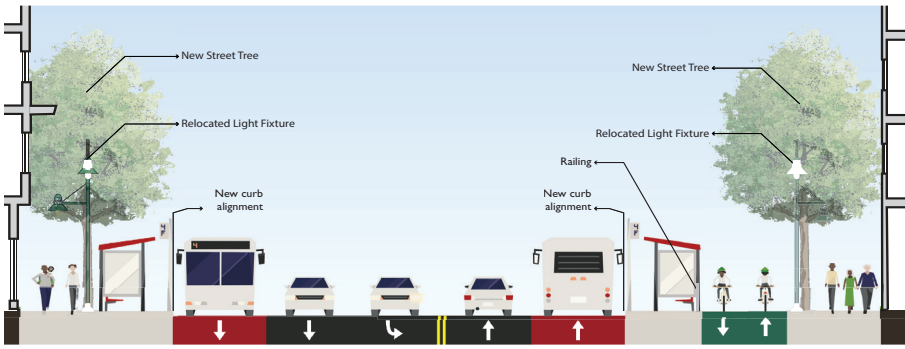
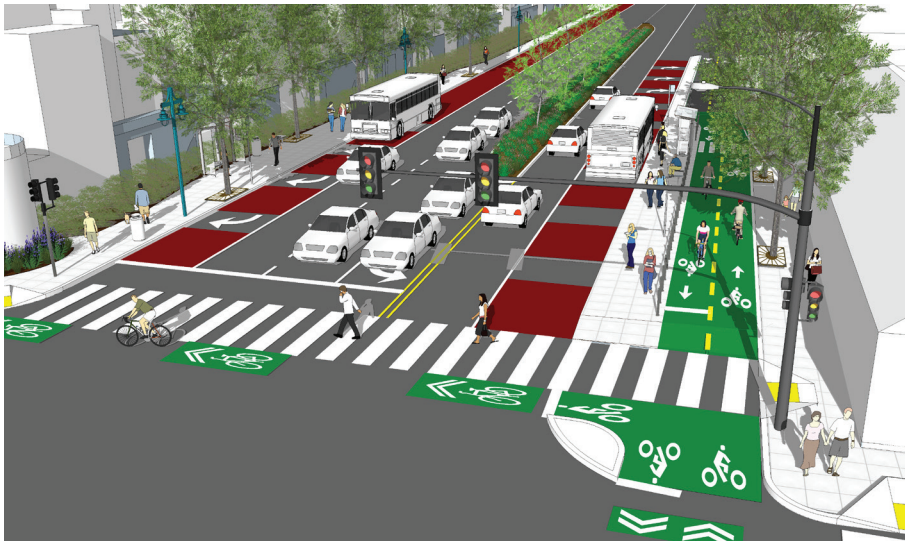
40th and San Pablo Bus Hub Project

Final Report







Prepared for:
City of Emeryville

Prepared by:
Community Design + Architecture

With:
Fehr and Peers
Arup

Approved by:
Emeryville City Council
March 3rd, 2020

40th and San Pablo Bus Hub Project Report

Final Report

1. Introduction

The Final 40th – San Pablo Bus Hub Project Report and its separate volume of appendices provide Emeryville residents, project stakeholders, City staff, and elected officials with a comprehensive record of the 40th and San Pablo Bus Hub project and detailed description of the preferred concept design for the 40th Street Bus Hub and 40th/Shellmound Street corridor between Adeline Street and IKEA Entry.

The document is organized into the following sections:

Chapter 2 – Summary of Concept Development Process provides an overview of the concept development process from inception to Council approval of the preferred design concept.

Chapter 3 – Preferred Concept Design presents the key multimodal elements of the preferred concept design and a segment-by-segment description of the proposed improvements. A plan set that illustrates the concept design is included at the end of this chapter.

Chapter 4 – Multimodal Operations Analysis presents a comparative assessment of operational performance under existing conditions and the preferred concept design.

Chapter 5 – Preliminary Cost Estimate presents an overview of the probable costs for improvements included in the preferred concept design.

Chapter 6 – Funding Strategy and Implementation Steps outlines the recommended funding approach to completing the final design and construction phases of the project.

All appendices referenced throughout the report have been consolidated into a separate volume, the 40th Street Bus Hub Project – Appendices, which includes the following documents:

Appendix A – Summary of Community Participation Process, dated August 13, 2019

Appendix B – Existing Conditions Memorandum, dated February 23, 3018

Appendix C – Initial Range of Design Concepts Memorandum, dated June 7, 2018.

Appendix D – Funding Strategy Memorandum, dated August 5, 2019

2. Summary of Concept Development Process

The City's stated goals for the project include improving the safety and comfort of pedestrians accessing transit and cyclists traveling along the 40th/Shellmound Street corridor, improving travel times for transit vehicles, and enhancing the transit passenger area throughout the bus hub and at bus stops west of San Pablo Avenue (see Appendix B – Existing Conditions Memorandum for more information)..

The process of developing concepts for multimodal improvements that would implement these goals started in the Spring of 2018 with preparation of a range of initial design concepts for the bus hub and 40th Street west of San Pablo Avenue. The development of these initial concepts was based on the review and assessment of existing conditions along the 40th/Shellmound Street Corridor (see Appendix B – Existing Conditions Memorandum). The draft concepts were summarized in the Initial Range of Design Concepts Memorandum (see Appendix C)[1] and presented to the public, transit agency staff, and elected City officials from August to October of 2018. This outreach and input gathering process included an on-line survey, pop-up event, public workshop, and a series of commission[2] and committee[3] meetings as well as a presentation to the City Council. Appendix A – Community Participation Memorandum provides a detailed description of the input received during the comprehensive community participation process throughout the duration of the project.

The initial range of design concepts presented during the outreach process included the following:

Bus Hub Design Options

- *OPTION 1: Baseline Condition (short-term improvements)* – Key features: Painting the existing transit-only lanes red, separating the through bicycle movement from the through-and-right turn lane at San Pablo Avenue by adding painted buffer with soft-hit posts and a concrete island to protect bikes, and squaring off two corners of the San Pablo Avenue intersection.

- *OPTION 2: Expanded Passenger Area with Separated Bikeway* – Key features: Eliminating existing bus-only lanes (buses would stop in the travel lanes) and eliminating the left turn lane from 40th Street onto San Pablo Avenue, adding a right turn lane from 40th Street onto San Pablo Avenue, adding a bike-only signal phase there, creating boarding areas that are separate from the existing sidewalks, adding separated bikeways[4] between boarding areas and sidewalks, and widening the sidewalk at the northbound AC Transit stop on San Pablo Avenue.

- *OPTION 3: Expanded Passenger Area with Separated Bikeway* – Key features: Similar to Option 2, but included eliminating the 40th Street median island, eliminating both left turn lanes from 40th Street (onto San Pablo Avenue and onto Adeline Street), additional widening of the northern sidewalk, and increase in area for streetscape improvements.

Multimodal Design Options for 40th Street West of San Pablo Avenue

- *OPTION 1: 40th Street with Current Number of Travel Lanes and Parking*
    - *Option 1A: Separated Bikeways in Both Directions.* Key features: westbound separated bikeway between parked cars and the sidewalk. The south side of the bikeway would be separated from the travel lane by a buffer with plastic posts. At bus stops, a raised bikeway would be located between bus stops and the sidewalk.

[1] Initial Range of Design Concepts Memorandum, dated June 7, 2018
[2] Planning Commission, Transportation Commission, and Public Art Commission
[3] Bicycle and Pedestrian Advisory Committee
[4] Separated bikeway refers to a Class IV bikeway

- *Option 1B: Buffered Bike Lane in Westbound and Separated Bikeway in Eastbound Direction*. Key features: westbound buffered bike lane between parked cars and travel lane. All other features similar to Option 1A.

- *OPTION 2: 40th Street with Bus-Only Lanes in West- and Eastbound Directions.* Key features: Eliminates parking and one westbound travel lane. Introduces two-way separated bikeway on northside of 40th Street and bus-only lanes in both directions. At bus stops, raised bikeway would go between bus stops and the sidewalk.
  - Option 2A: Two-way separated bikeway at roadway grade.
  - Option 2B: Two-way separated bikeway at sidewalk grade.

- *OPTION 3: Stop Configurations with Bus Only Lane in Eastbound Direction*. Key features: Eliminates parking and maintains two travel lanes in each direction. Introduces two-way separated bikeway on northside of 40th Street and one bus-only lane in eastbound direction. At bus stops, raised bikeway would go between bus stops and the sidewalk.
  - Option 3A: Two-way separated bikeway at roadway grade.
  - Option 3B: Two-way separated bikeway at sidewalk grade.

After four members of the Planning Commission[5] expressed significant concerns over the concepts that included a two-way separated bikeway design, a fourth option was added to the range of concept designs for 40th Street west of San Pablo:

- *OPTION 4: 40th Street with Bus-Only Lane in Eastbound Direction and two One-Way Separated Bikeways.* Key features: Eliminates parking and maintains two travel lanes in each direction. Relocates existing median and affected traffic signal heads, irrigation laterals, and drainage features to introduce one-way separated bikeways at roadway grade on both sides of the street.

Design Preferences Identified by the Public

Bus Hub Design: In the short-term, about four out of five pop-up and workshop respondents supported Option 1. With respect to long-term improvements, survey, pop-up, and workshop responses were fairly evenly split between Options 2 and 3.

40th Street West of San Pablo Avenue:

- *Parking:* Four out of five survey and workshop respondents chose to eliminate parking to create a separated bikeway and bus lane(s).
- *Bicycle Accommodation:* A raised separated bikeway with sidewalk expansion and relocated trees (as included in Options 2B and 3B) was supported by two-thirds of survey and workshop respondents. If the parking were kept (as in Option 1A/B), five out of six survey and workshop respondents supported a parking-protected bikeway on the north side (Option 1A).
- *Number of bus-only lanes:* Almost two-thirds of survey and workshop respondents chose two bus-only lanes, changing a westbound mixed flow lane to bus-only (as included in Option 2A/B).

Direction for Development of Draft Preferred Design Concept Provided by the Emeryville City Council

On October 16, 2018 the Emeryville City Council was presented with the full range of the initial design concepts outlined above, their pros and cons, and the input received from the public, the two transit agencies (AC Transit and Emeryville Transportation Management Agency), and members of the commissions and committees to which

[5] This meeting occurred after surveys, pop-up, and public workshop were conducted.

the concepts had already been presented. Following deliberation, the City Council then provided the following direction for the further development of an initial draft of a preferred concept:

1. Create a continuous two-way separated bikeway on northside of the 40th/Shellmound Street corridor from Adeline Street to IKEA[6] Entry on Shellmound Street. Include a solid vertical buffer, such as a raised side median, in the design;
2. Add an eastbound bus-only lane west of San Pablo Avenue;
3. Convert one of the two existing westbound travel lanes into a bus-only lane west of San Pablo Avenue;
4. Eliminate the existing on-street parking on the northside of 40th Street in order to accommodate the multimodal improvements listed above; and,
5. Eliminate the existing bus stops at Harlan Street in order to further enhance bus travel times along the 40th/Shellmound Street corridor.

The design concept presented in this report is based on the City Council's direction provided above and the Council's confirmation of this direction at the City Council meeting on December 19, 2018 where an initial version of the draft preferred concept design was presented, which now spanned from Adeline Street to IKEA Entry on Shellmound Street. At its December 2018 meeting, the Council confirmed that the initial draft of the concept design was representative of its intention and could proceed to being further refined for presentation during the second round of community and stakeholder input.

Input Provided by AC Transit, Emery Go-Round, and Caltrans

After an initial version of the draft preferred concept design that implemented the City Council's direction was prepared, it was presented to AC Transit and Emery Go-Round staff for input in March 2019.

Transit Agency Input:

- Configure transit stops west of 40th Street to a length of 120 feet to allow for potential future service expansions that require the simultaneous stopping of two buses at the same stop. This conditions also allows AC Transit buses to stop for boarding at stops where an Emery Go-Round bus is already engaged in wheelchair loading/unloading.
- Provide a setback of the near-side stops at Emery and Hollis Streets from the intersection to provide space for one or two right turning vehicles in front of a stopped bus, in order to reduce the conflict between vehicles attempting to make a right turn out of the through lane next to the bus-only lane and buses that are about to go straight through the intersection after having made a stop.
- Shorten the dashed segments of the bus-only lanes, which are shared with other vehicles, to the required minimum in the bus hub area.
- Make further refinements to the assignment of bus routes to specific stops within the bus hub with input from both transit agencies.

Caltrans Input:

Staff from the California Transportation Department (Caltrans District 4) were presented with the multimodal treatments proposed for the 40th/San Pablo Avenue intersection that are included in the draft concept design. Caltrans was involved because San Pablo Avenue is a designated state highway (Highway 123), which means that the 40th/San Pablo Avenue intersection falls under Caltrans' jurisdiction.

- Ensure that all curbed street corners are designed to accommodate the turning movements of trucks and fire engines.
- The curbside lane should be at least 11 feet wide.
- Coordinate all proposed changes to the signal phasing with Caltrans.

[6] This direction led to an extension of the original western end to the project area from Hubbard Street to IKEA Entry on Shellmound Street. This new segment includes the Shellmound Street bridge.

All proposed modifications to the 40th/San Pablo Avenue intersection will require Caltrans review, approval, and permits.

Approval of Concept Design by Emeryville City Council

On July 9, 2019, the City Council approved the preferred concept design. A motion was made by Council Member Bauters, seconded by Mayor Medina, to consider the following modifications to the conceptual design:

1. Add a physical island on the northwest corner of Adeline and 40th Streets in the southbound direction to provide protection on the right side of the southbound bike lane.

2. Direct staff to research the possibility of putting a bike scramble at the intersection of 40th and Adeline Street.

3. Remove the word "potential" for all the curb extensions at the side streets between San Pablo Avenue and the 40th Street/Shellmound Street bridge and making those curb extensions part of the improvements.

4. Examine the Horton and 40th Street intersection, in particular the northwest corner, for where bike signal activation would occur and also the flow of northbound bicycle traffic across 40th Street to avoid conflicts with bicycles waiting in the westbound bicycle lane and conflicts with vehicles.

5. Add signage in the middle curb to be inserted at Hubbard and 40th Street to further identify that there is no left turn allowed.

6. Move the bicycle box at the intersection between the Bay Trail, the IKEA entrance and Shellmound Street off onto the sidewalk area on the southwest side of that intersection to have bikes queue onto the Greenway itself

7. Ensure that the distance along the inside of each protected bicycle island is long enough to accommodate an extra cyclist or a bicycle with a trailer behind it[7].

8. Examine the proper location and placement for bike lockers at the 40th and San Pablo Bus and Transit hub to accommodate bike storage on the north side of the intersection.

The motion carried by the following vote: Ayes: 5 - Mayor Medina, Vice Mayor Patz, Council Member Bauters, Council Member Donahue, and Council Member Martinez.

All of the above items have been addressed and are reflected in in this Final project report and attached plan set.

[7] Due to the constrained spatial conditions at most of the intersections along 40th Street, the length needed to accommodate bike and trailer may not be able to be accommodated. During the Final Design Phase, attempts should be made to maximize the space available to cyclists at bicycle islands.

3. Preferred Concept Design

This chapter presents the preferred concept design for 40th Street between Adeline Street intersection and the Ikea Entry. It was developed following input received during the second round of the community participation process, from City of Emeryville committees and commissions as well as final direction from the City Council (as described in Chapter 2above). The preferred concept design reshapes 40th/Shellmound Street into a multimodal corridor with emphasis on transit access, transit vehicle progression, and bicycle and pedestrian safety and comfort. The following section describes the proposed improvements on a corridor-wide level. This is followed by a more detailed presentation of the improvements on a segment-by-segment basis.

3.1 Overview of Corridor-wide Improvements

Multimodal Treatments

The preferred concept design applies the following multimodal design features to the length of the 40th/Shellmound Street corridor:

1. Two-way Separated (Class IV) Bikeway: A 10- to 12-foot wide, two-way separated bikeway is consistently integrated into the design of the street on its north side, creating a safe and comfortable bike connection between Adeline Street in the east and the Bay Bridge Trail at the Ikea Entry at the western end of the project area. In its typical condition, the bikeway is designed to be at roadway grade and separated from the adjacent bus-only lane by a 4-foot wide raised side-median. Through the bus hub between Adeline Street and San Pablo Avenue and along the length of bus stops west of San Pablo Avenue, the bikeway is raised to sidewalk level (also see below).

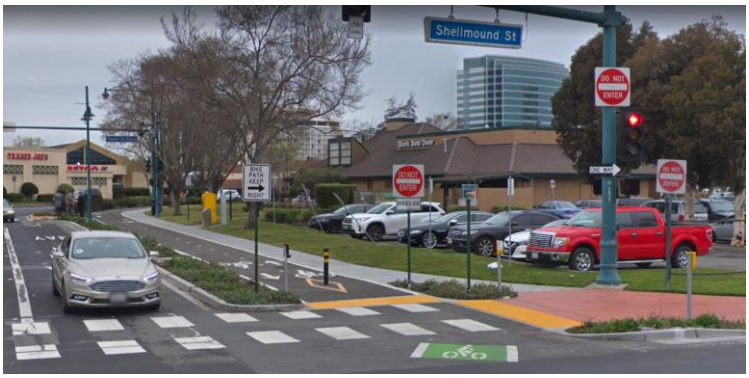


Figure 1: Example of a Two-way Separated (Class IV) Bikeway at Shellmound/Christie (Source: Google Street View)

2. East- and West-bound Bus-only Lanes: Beginning just east of the Adeline intersection, bus-only lanes are proposed for sole use by AC Transit and Emery Go-Round buses. Only near intersections, transit buses share the dedicated lane with right-turning vehicles. Emergency vehicles and other vehicles of first responders are the only other vehicles that are allowed to travel in the bus-only lanes striped solid red.

3. Multimodal Intersections Improvements: Best practices for increasing pedestrian and bicycle-safety and comfort have been applied to the design of the proposed multimodal intersection improvements. These include:
    a. High-visibility (continental) striping of all crosswalks (signalized and unsignalized);
    b. Striping of advance stop bars;
    c. Curb extensions (bulb-outs) on cross-streets for shortening of crosswalk distance (where feasible);
    d. Application of changes such as phasing and bike signal heads/phasing where applicable and "protected intersection" approach for cyclists along two-way separated bikeway on north side of 40th Street (where feasible);
    e. Application of bike boxes and green-backed sharrows to enhance bicyclists' navigation of intersections connecting to crossing bike routes.

f. Striping of dashed green pavement markings where two-way separated bikeway crosses through intersections and driveways.

Multimodal Treatments at Bus Stop Locations West of 40th Street

Transit Stop Locations: The preferred concept design proposes to eliminate the existing east- and westbound transit stops for AC Transit buses (Lines 36, 57, F, and C) located at Harlan Street in order to further improve the overall travel time for buses. All other bus stops are proposed to remain at their current near- or far-side locations. A relocation of the near-side stops[8] at westbound Hollis Street and Emery Street was not included in the design concept for the following reasons: The westbound near-side stop at Hollis Street provides convenient and direct access to the future Emeryville Arts Center, which will be located at the northeast corner of 40th and Hollis Streets. A shift of the stop to far-side would also be difficult to implement because of the spatially constrained conditions at the far-side location. Moving the eastbound near-side stop at Emery Street to a far-side location would put it in close proximity to the next stop (between San Pablo Avenue and Adeline Street) and further complicate operation of the 40th Street/San Pablo intersection where many right turns occur out of the bus-only lane.

Transit Stop Improvements: Transit stop improvements at stops west of San Pablo aim to improve the quality and safety of the transit passenger environment and to coordinate the movement of cyclists, pedestrians, and transit patrons that access bus boarding areas.

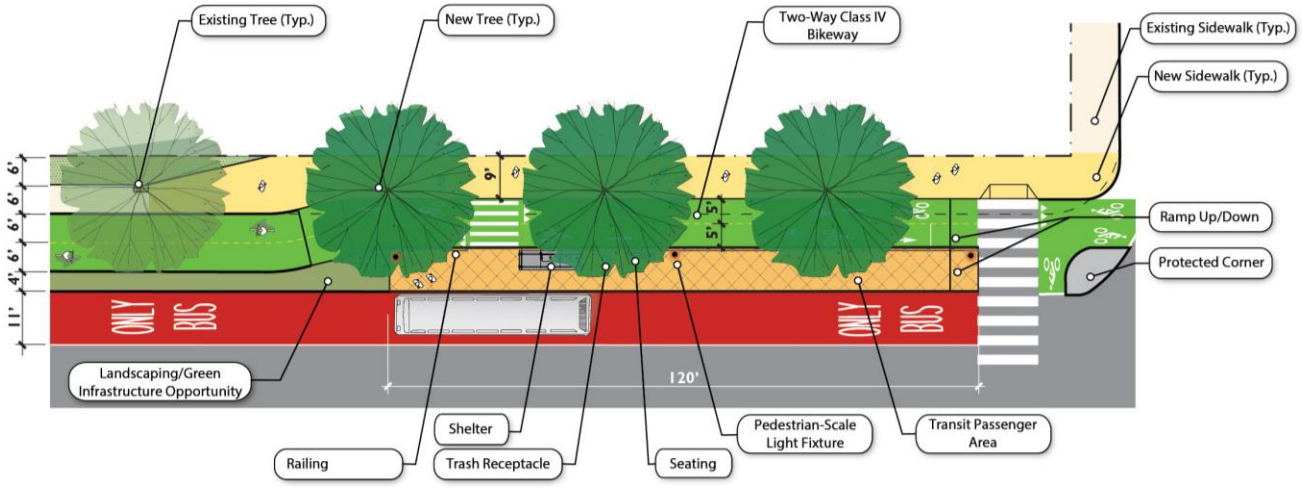


Figure 2: Bus Stop Design on northside of 40th Street (west of San Pablo Avenue)

Typical improvements at **bus stops located west of San Pablo, on the north-side of 40th Street** are illustrated in Figure 2 and include the following:

- 9-foot wide, 120-foot long transit passenger (bus boarding) areas[9]
- Transit passenger areas are:
  - Directly accessible from where the boarding area ends at the nearest crosswalk and via a marked crossing that connects boarding area and sidewalk across the two-way separated bikeway that is raised to sidewalk level along the length of the bus stop area;
  - Fitted with passenger amenities, such as a transit shelter, bench, trash receptacle, and lighting;

[8] Stops located before an intersection are called near-side stops and those located beyond an intersection far-side stops relative to the direction of travel. Transit agencies typically prefer far-side stops as these improve bus progression along a given transit route.

[9] The 120-foot length is based on the assumption that in the long-term the frequency of AC Transit and Emery Go-round buses may require the simultaneous stopping of two buses at stops along the 40th Street corridor.

- Separated from the adjacent bikeway by a continuous fence-like railing that includes an opening only at the marked crossing across the bikeway.

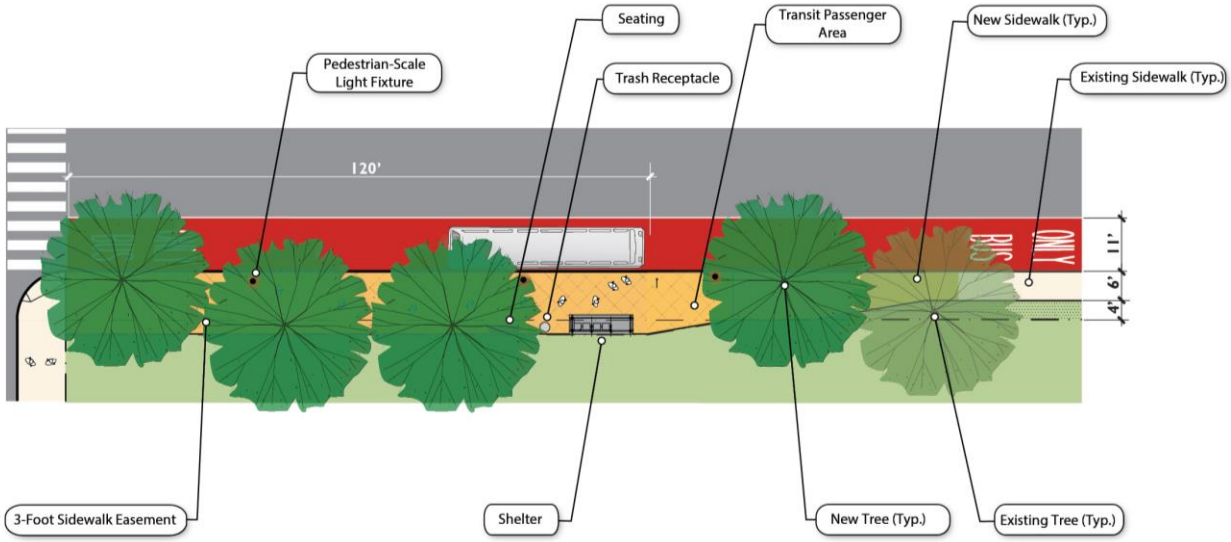


Figure 3: Bus Stop Design on southside of 40th Street (west of San Pablo Avenue)

Typical improvements at **bus stops located west of San Pablo, on the south-side of 40th Street** are illustrated in Figure 3 and include the following:

- 13 feet of shared sidewalk/transit passenger (bus boarding) areas that require acquisition of a 3-foot wide sidewalk easement from adjacent properties[10]. The easement would typically come out of a landscaped front yard .
- Transit passenger areas are:
  - Directly accessible from the sidewalk;
  - Fitted with passenger amenities, such as a transit shelter, benches, trash receptacle, and lighting.

Typical improvements **in the Bus Hub between Adeline and San Pablo** are illustrated and described in Section 3.3 – Segment-by-Segment Description of Concept Improvements below.

3.2 Streetscape Improvements, Public Art, and Green Infrastructure

Streetscape Improvements and Public Art Opportunities

The preferred design concept includes proposed streetscape improvements that can be implemented in conjunction with the multimodal treatments in order to further enhance pedestrian and bicycle safety and comfort as well as the overall experience for pedestrians, bicyclists, transit riders, and drivers who use the 40th/Shellmound Street corridor and bus hub.

Because the multimodal improvements proposed throughout the bus hub (Adeline Street to San Pablo Avenue) represent a fundamental redesign of the existing conditions, the preferred concept design also reflects a complete reconfiguration of the streetscape design throughout this block, including street trees, transit related amenities, pedestrian-scale lighting, and other treatments (see more detailed description in Section 3.3).

West of San Pablo, streetscape improvements, such as street trees, pedestrian-scale lights, or pavement treatments, are limited to locations where the proposed multimodal improvements include a realignment of existing curbs and adjacent sidewalks. Examples of this include widened/realigned sidewalks at the redesigned

[10] Under current conditions, the easement areas are typically occupied by a landscaped front yard. Relocation of some utility access points and/or their adjustment to sidewalk grade may be required.

bus stops. Opportunities for streetscape improvements have also been incorporated into the design where these can be included in new design elements, such as the raised side-median between the two-way separated bikeway and the adjacent bus-only lane in where this median is at least 4 feet wide or the curb extensions (bulb-outs) on cross streets of 40th Street, where these are used to reduce speeds and shorten crossing distances.

While the location of existing street trees along the backside of the narrow sidewalks on 40th Street was identified in the Existing Conditions Memorandum (see Appendix B) as a missed opportunity for using street trees to physically and visually buffer pedestrians from moving traffic, the preferred concept design does not propose the widening of sidewalks and reorientation of street trees along all of 40th Street west of San Pablo. The proposed concept design is, however, compatible with such improvements, should the City of Emeryville desire to undertake them in the future. A total count of the number of trees removed and added as part of this concept design is summarized in Section 3.4.

Opportunities for the Incorporation of Public Art into Multimodal and Streetscape Improvements

The City of Emeryville intends to further enhance the 40th Street bus hub and other locations along 40th Street area through its Art in Public Places Program. The following is a list of opportunities for the incorporation of public art into the proposed multimodal and streetscape improvements as well as street-facing façades along the corridor.

In general, opportunities for the integration of public art into the proposed improvements can be described as follows:

- Expansion of the already established shelter art program to new shelters installed along the 40th Street bus hub and stops west of 40th Street.
- Integration of artistic treatments into the design of functional elements such as transit shelters, railings, benches, light fixtures, trash receptacles, way-finding signage, or paving.
- Placement of artistic entry markers at entry points to the bus hub or at plazas to the Bay trail.
- Putting poetry and artist-designed interpretive signs about the plants used in landscaped areas and/or green infrastructure elements.

In order to further enhance the corridor using public art, consideration could also be given by:

- Partnering with the owner of East Bay Bridge Shopping Center to improve the plaza on the southwest corner of 40th Street and San Pablo Avenue with art or artistic elements, as well as the existing and proposed plazas at the Shellmound/IKEA Entry intersection.
- Partnering with adjacent property owners to commission murals on blank building walls west of San Pablo Avenue.

Green Infrastructure Opportunities

The project also provides the City of Emeryville with a significant opportunity to reimagine the functionality of the 40th/Shellmound Street corridor, not just from a mobility, safety, and streetscape perspective, but as part of the natural ecosystem as well. Integrating green infrastructure alongside the envisioned transit, bicycle and pedestrian improvements would enhance the resilience and enjoyability of the street by improving water and air quality, mitigating the urban heat island effect, and creating wildlife habitat.

While the proposed improvements would not constitute a C.3 regulated project under Alameda County's Countywide Clean Water Program (Program), it represents an opportunity for Emeryville to meet the jurisdiction's overall pollutant reduction goals as set by the current Municipal Regional Stormwater Permit (MRP).

As discussed in Appendix 1 in greater detail, several of the design elements reflected in the preferred concept design are suitable for green infrastructure treatments or Best Management Practice (BMP) for the capture and treatment of stormwater runoff, including the following:

- Biofiltration and/or Bioretention Planters, including:
  - Linear bioretention areas in the raised side median between the separated bikeway and adjacent bus-only lane would capture and treat runoff from the westbound roadway surface, and
  - Bulb-outs on side streets of 40th Street that are configured to capture and treat runoff from portions of side streets' roadway surface.

- Permeable Asphalt Bikeway Surface: Surfacing the two-way separated bikeway with permeable asphalt provides an opportunity to decrease the imperviousness of the corridor and reduce the rate / volume of runoff. It will capture runoff from its own footprint and the adjacent northern sidewalk. If infiltration proves to be infeasible, perforated underdrains will connect to the City's storm drain system.

- Tree Wells: Healthy street trees can intercept, transpire, and treat significant volumes of runoff. Sidewalk reconstruction is proposed on both sides of 40th Street between San Pablo Avenue and Adeline Street, providing an opportunity to plant new street trees. Tree wells using structural soil encourage tree growth and optimize stormwater management and urban heat island benefits. On either side of the street, a series of tree wells could be connected by a subsurface system to distribute runoff.

- Rain gardens: Rain gardens provide similar treatment mechanisms to bioretention planters but are depressed landscaped areas rather than contained structures.

The incorporation of green infrastructure opportunities at various specific locations along the 40th Street corridor are discussed in the description of proposed improvements in Section 3.3. The locations are illustrated on Sheets 01 through 03 of the plan set at the end of Chapter 3.

3.3 Segment-by-Segment Description of Concept Improvements

This section provides additional details with respect to proposed design approaches as they are adapted to local conditions or specific constraint. The information is provided on a segment-by-segment basis beginning with the easternmost segment, 40th Street East of Adeline Street.

40th Street East of Adeline Street

In order to facilitate a smooth and safe transition between bicycle facilities on 40th Street east of Adeline Street, currently consisting of experimental east- and westbound "super sharrows" (Figure 4) – and the proposed two-way, separated bikeway on the north-side of 40th Street west of Adeline, the preferred design concept shows modifications to the lane configuration and striping on 40th Street east of the Adeline intersection. However, only 150 feet of this eastern leg of 40th Street is located in Emeryville, beyond which the street falls under the jurisdiction of the City of Oakland. Further refinements of the concept design for this area will likely be needed during the final design stage and require coordination of Emeryville's preferred treatment with future plans developed by the City of Oakland reflected in Oakland's current draft Bike Plan Update. That document proposes the implementation of buffered bike lanes on 40th Street from the Oakland border to Howe Street.

Figure 4: Super Sharrows on 40th Street (East of Adeline Street)

40th Street Bus Hub, including 40th/Adeline and 40th/San Pablo Intersections

Improvements to the bus hub area between Adeline Street and San Pablo Avenue and the two adjacent intersections are central to the overall preferred concept design. Figure 5 illustrates the improvements proposed for this area and the two adjacent intersection, 40th /Adeline and 40th /San Pablo.

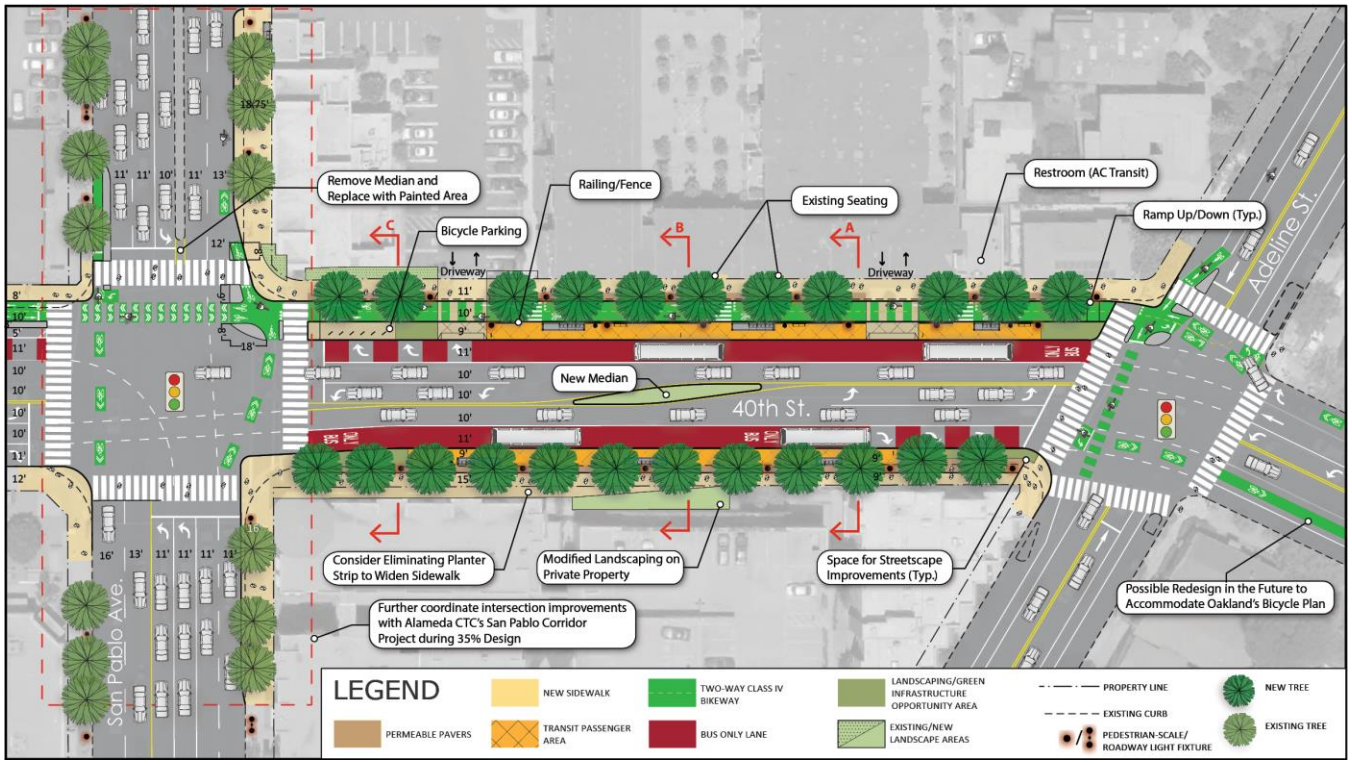


Figure 5: 40th Street Bus Hub

Adeline Street Intersection: As discussed above, the design of the 40th/Adeline Street intersection is critical to a smooth and safe transition of cyclists from the bicycle facilities on 40th Street east of Adeline Street (currently "super sharrows") and the proposed two-way, separated bikeway on the northside of 40th Street. The preferred concept design includes the following improvements to facilitate this transition while also enhancing pedestrian safety and comfort (Figure 6):

- Configuration of the northwest corner as "protected corner" for cyclists that transition from the two-way separated bikeway to the bike lanes on Adeline Street and the existing "super sharrow" bike treatment on 40th Street in Oakland.

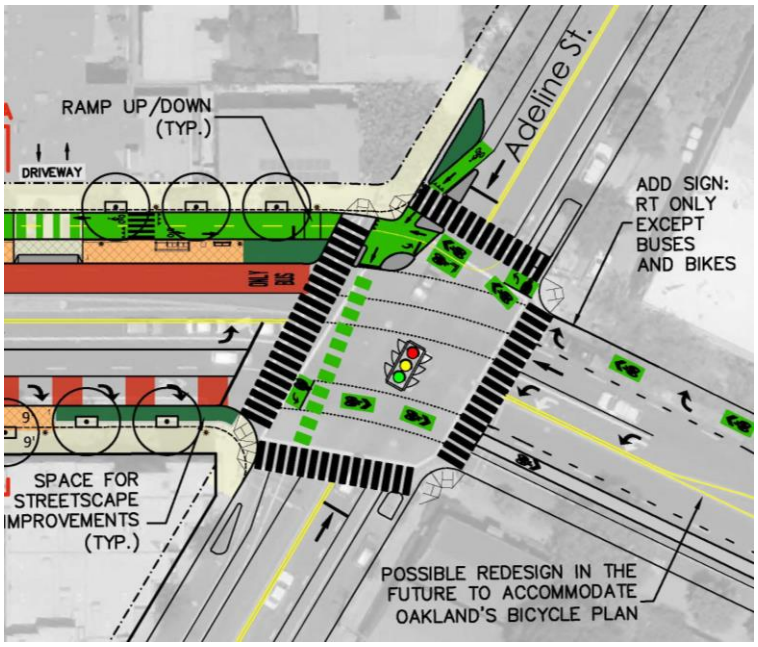


Figure 6: Adeline Street Intersection

- Application of signal changes such as phasing and/or the potential introduction of bike signal heads, bike boxes, dashed green pavement markings, and green-backed sharrows to enhance the navigation of the Adeline Street intersection by cyclists.[11]
- High-visibility crosswalk markings and advance stop bars.

40th Street Bus Hub Area: The preferred concept design for the bus hub area includes the desired continuation of the two-way separated bikeway on the northside of the street to Adeline Street, dedicated bus-only lanes (similar to the existing bus-only lanes), and dedicated bus boarding areas with an enhanced transit passenger environment. In order to accommodate these improvements, space is reallocated from the existing roadway by eliminating one travel lane in each direction and by modifying and partially eliminating the existing median.

Figure 7, Figure 8, Figure 9, Figure 10 and Sheet-03 (at the end of this section) illustrate the preferred concept design for multimodal, passenger and streetscape improvements throughout the hub area, including:

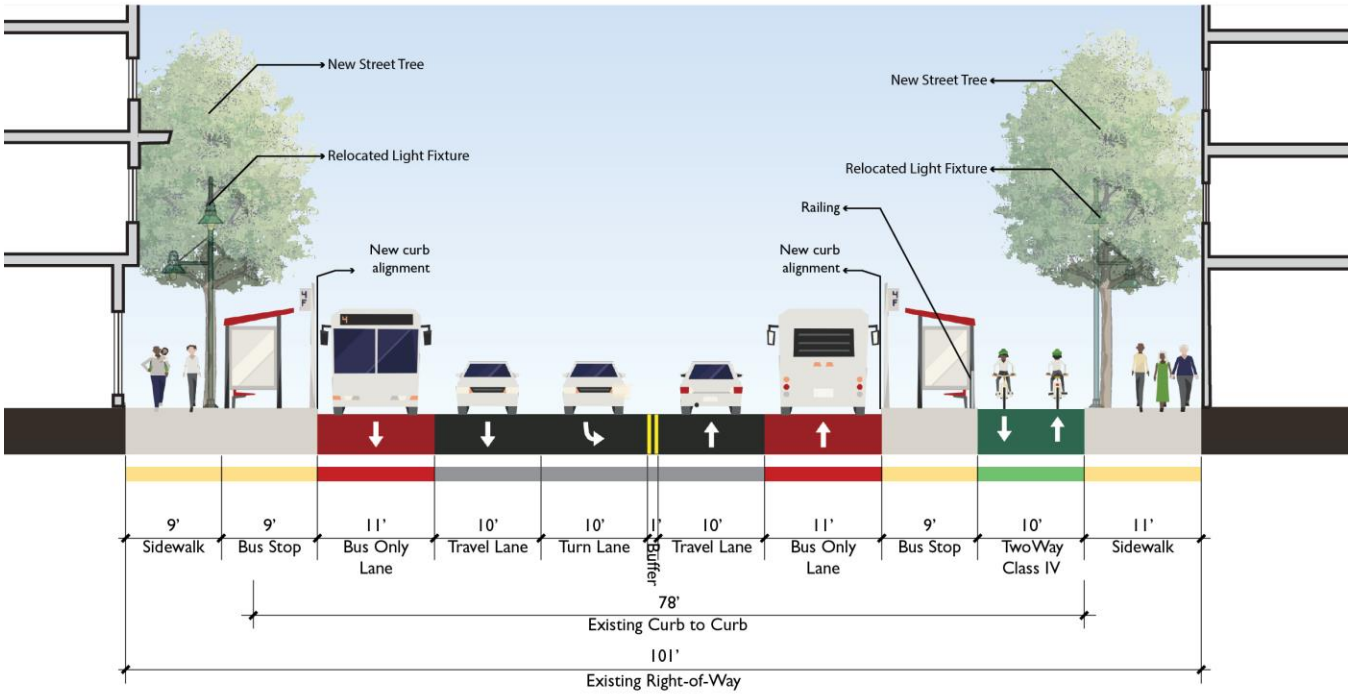


Figure 7: 40th Street bus stops at Adeline Street (looking west) – SECTION A

[11] Based on a request received during the July 2019 council session, the introduction of a "bicycle scramble"-type signal phase of the 40th/Adeline intersection was explored. Using bike signal heads, this signal phase would allow cyclists to cross the intersection diagonally in transitioning to and from the two-way separated bikeway. The use of bike signal heads is regulated by an FHWA Interim Approval, which governs new traffic control devices, such as bike signal heads, until they are formally incorporate in the MUTCD. Because "bike scrambles" with multiple directions of bike traffic receiving a green bike signal concurrently are not permitted under the FHWA Interim Approval for this device, it is not included in the list of recommended improvements for this intersection.

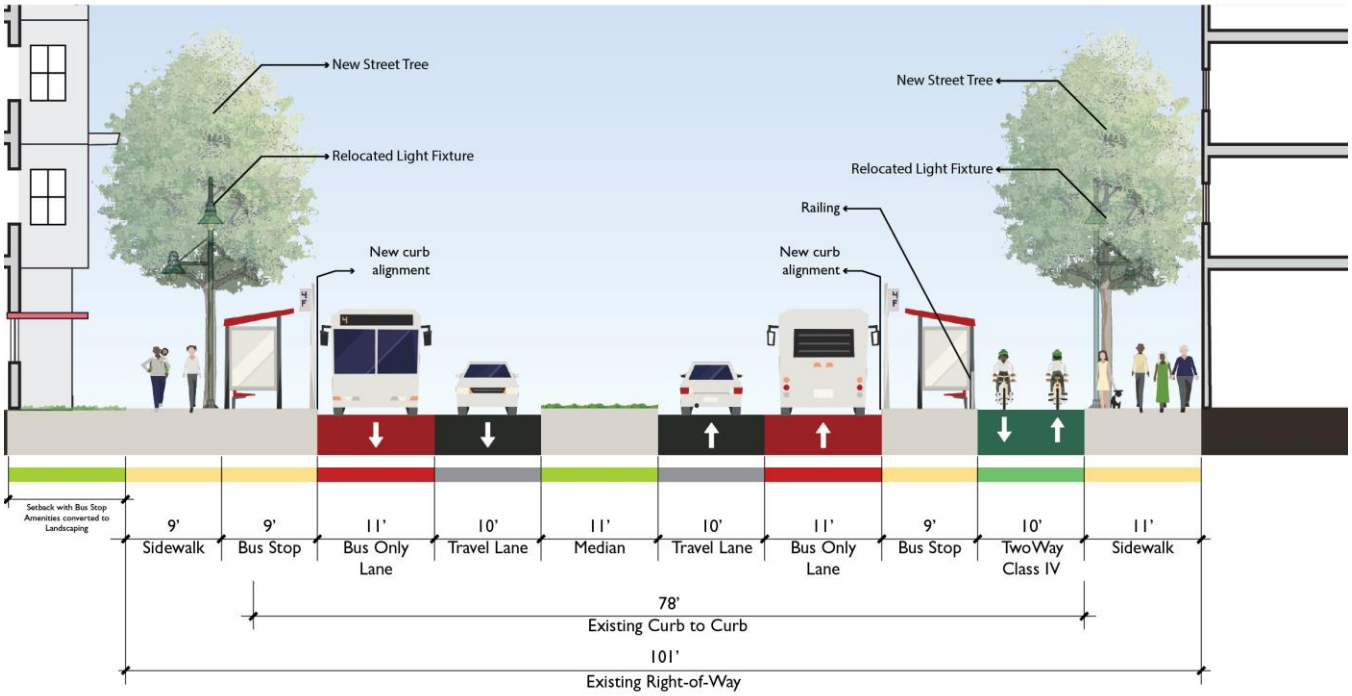


Figure 8: 40th Street between Adeline Street and San Pablo Avenue (looking west) – SECTION B

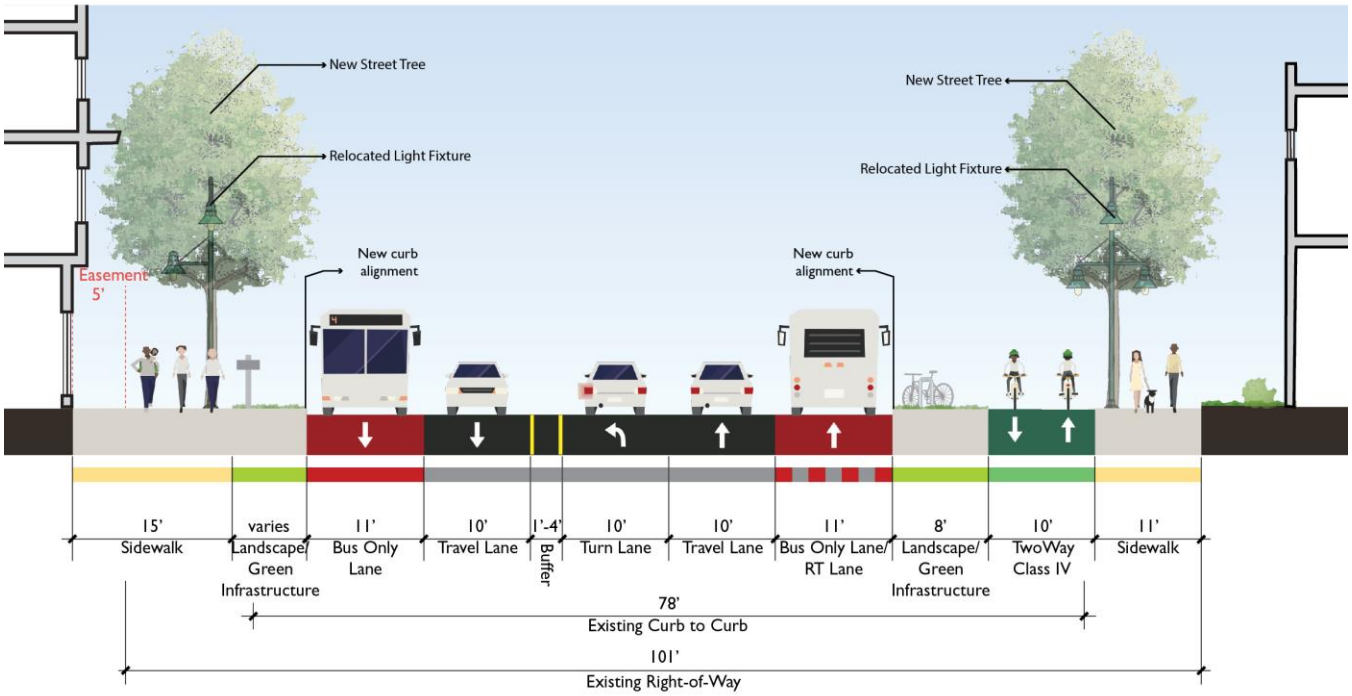


Figure 9: 40th Street at San Pablo Avenue (looking west) – SECTION C

Segment-specific Multimodal Improvements

- 10-foot wide raised (sidewalk level) two-way separated bikeway, located between sidewalk and transit passenger boarding/alighting area on the northside of 40th Street.
- 9-foot wide transit passenger boarding/alighting areas on both sides of the street. Boarding/alighting area on the northside includes a railing/fence along its edge to the raised two-way bikeway that includes gaps only at the designated crossings across the bikeway.
- 11-foot wide bus-only lanes that accommodate right-turning vehicles at their approaches to Adeline Street and San Pablo Avenue respectively.
- Reconstructed sidewalk on the northside of 40th Street to include a tree-lined and landscaped buffer area between bikeway and sidewalk.
- Reconstructed and partially widened sidewalk on the southside of 40th Street to include a new line of street trees located between boarding/alighting areas[12].
- Striping of dashed green pavement markings where two-way bikeway crosses driveways.
- Improved pedestrian circulation due to transition of bus stop function to new boarding/alighting areas.
- Opportunity to incorporate Metropolitan Transportation Commission transit hub wayfinding signage elements[13], such as wayfinding kiosks and other signage that supports transit riders in navigating the bus hub and its stops.
- Elimination of existing mid-block transit waiting area (located on private property) with poor visibility along garage frontage on south side of sidewalk 40th Street. In coordination with the property owner, the area could be reconfigured to integrate a series of bicycle lockers with appropriate landscape and hardscape treatments that allow for good visibility of the lockers and those using them.
- Potential widening of the southern sidewalk along frontage of the building located at the southwestern corner of the bus hub. Widening of the sidewalk to 15 feet would require a sidewalk easement and elimination of the existing landscape strip on private property.

[12] Trunks of existing street trees and their tree wells are located near the middle of the sidewalk and impede pedestrian circulation.

[13] For more information on the Metropolitan Transportation Commission (MTC) Hub Signage Program, see https://mtc.ca.gov/whats-happening/news/bay-area-hub-signage-program
https://mtc.ca.gov/sites/default/files/MTC_Regional_Hub_Signage_Standards_2012.pdf

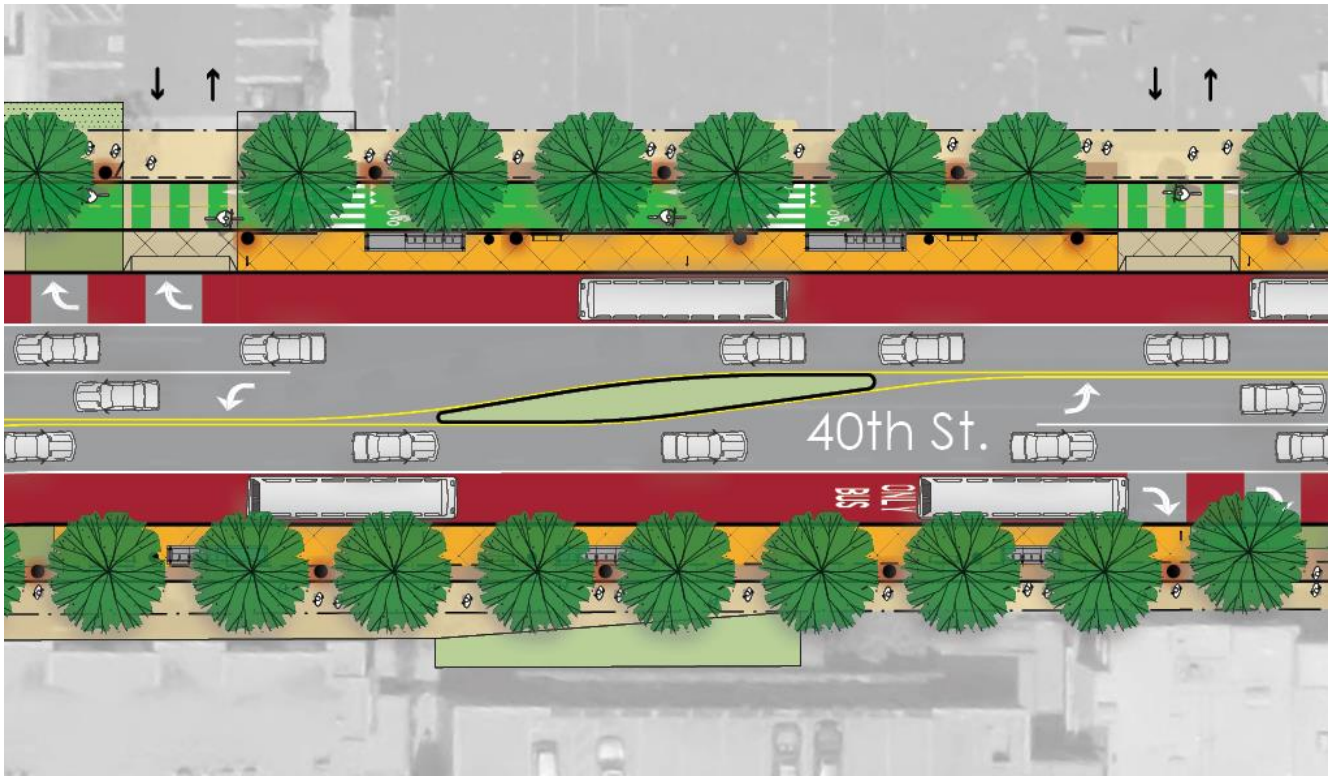


Figure 10: Bus Hub Area

Segment-specific Streetscape/Green Infrastructure/Public Art

- "Bracketing" of boarding/alighting areas on both sides of 40th Street with areas designed to include streetscape elements such as landscaping, bicycle parking, signage, and public art (also see below).
- New row of trees between two-way bikeway and sidewalk (on northside) and boarding/alighting areas and sidewalk (on southside) can be configured as "linked tree wells" with sub-surface bioretention areas (also see description of green infrastructure elements in Appendix 1).
- Placement of additional pedestrian-scale light fixtures (same style as existing) along sidewalks throughout the bus hub area.
- Design includes major opportunities for the incorporation of public art into proposed transit and streetscape improvements, including[14]:
    - Incorporation of already established shelter art into display cases of new shelters installed throughout bus hub;
    - Integration of artistic treatments into the design of functional elements: transit shelters, railing or fence between boarding area and two-way bikeway, benches, light fixtures, trash receptacles, wayfinding signage, or paving of sidewalks or boarding areas.
    - Artistic treatment of vertical markers at the entry points to the bus hub. Potential locations include the landscape/green infrastructure opportunity sites at the eastern and western ends of the boarding areas on either side of 40th Street.

[14] Incorporation of art into functional elements and/or free-standing art should occur in close coordination with the Emeryville Public Art Commission during future design phases for multimodal, streetscape, and transit passenger area improvements.

San Pablo Avenue Intersection: The concept design of the 40th/San Pablo Avenue intersection (Figure 12 and Figure 12) aims to improve the currently poor accommodation of pedestrians and bicyclists as well as transit passengers making connections between buses stopping on San Pablo Avenue and in the transit hub. The proposed improvements include:

- Configuration of the northeast corner as a "protected corner" for westbound cyclists on the two-way separated bikeway and northbound cyclists on San Pablo Avenue wanting to turn left onto 40th Street.
- Configuration of the proposed curb extension (bulbout) at the northwest corner to include a section of protected bikeway and a no turn-on-red sign to protect cyclists from vehicle traffic in the high volume of vehicles in the southbound curbside lane.
- Application of signal changes such as phasing and bike signal heads/phasing where applicable, bike boxes, dashed green pavement markings, and green-backed sharrows to enhance the navigation of the San Pablo Avenue intersection by cyclists.
- Potential installation of an internally lit No-Right Turn on Red sign for westbound vehicles approaching the San Pablo Avenue intersection.

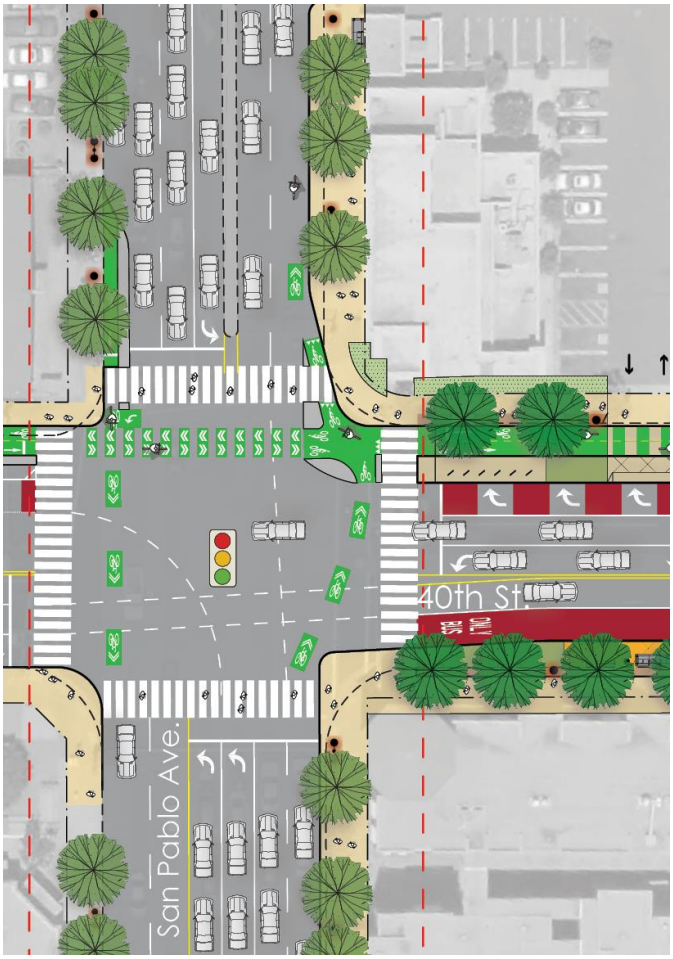


Figure 12: San Pablo Avenue Intersection

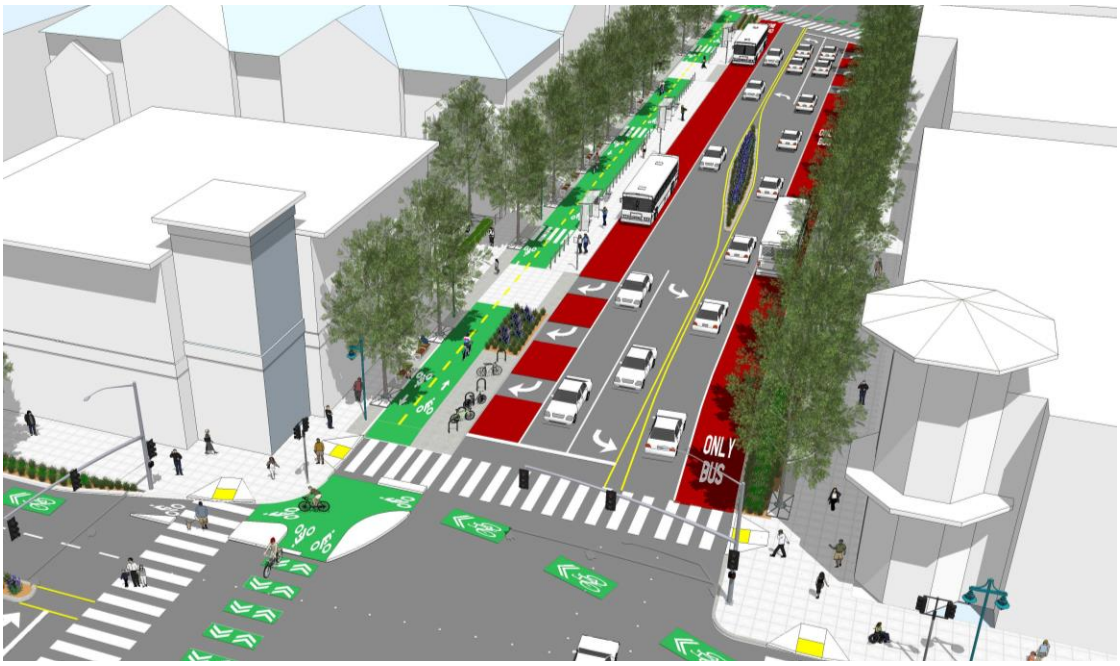


Figure 11: 3D rendering of 40th Street Bus Hub as seen from the San Pablo Avenue intersection (in the foreground)

- Realignment of the eastern curb on San Pablo Avenue north and south of the intersection in order to create a wider sidewalk and transit passenger area at the bus stop north of the intersection. The sidewalk widening is facilitated by reducing the currently extra-wide curb lane to 11 feet.
- Tightening of curb radii (where feasible) to accommodate directional curb ramps at all four street corners and to shorten crossing distances.
- High-visibility crosswalk markings and advance stop bars.

Because the intersection falls under the jurisdiction of the California Department of Transportation (Caltrans), an initial round of review and comment from Caltrans staff has been received and was incorporated into the design shown in Figure 12. It should also be noted that Alameda County Transportation Commission (Alameda CTC) is conducting a concurrent study to develop long-term concepts for multimodal improvements on the San Pablo Avenue Corridor. Further refinements of the concept design may require coordination of Emeryville's preferred treatment with future plans developed as part of the Alameda CTC study.

San Pablo Avenue to West of Emery Street

The preferred concept design for the segment of 40th Street between San Pablo Avenue and Emery Street and the 40th/Emery Street intersection is largely driven by balancing the desired introduction of bus-only lanes and two-way separated bikeway with the need to accommodate important turning movements that occur at the 40th/San Pablo Avenue and 40th Street/Emery Street intersections. These include left-turns onto San Pablo Avenue on eastbound 40th Street and left-turns into the regional shopping center in the westbound direction as well as receiving left-turning vehicles on westbound 40th Street from the two northbound left-turn lanes on San Pablo Avenue.

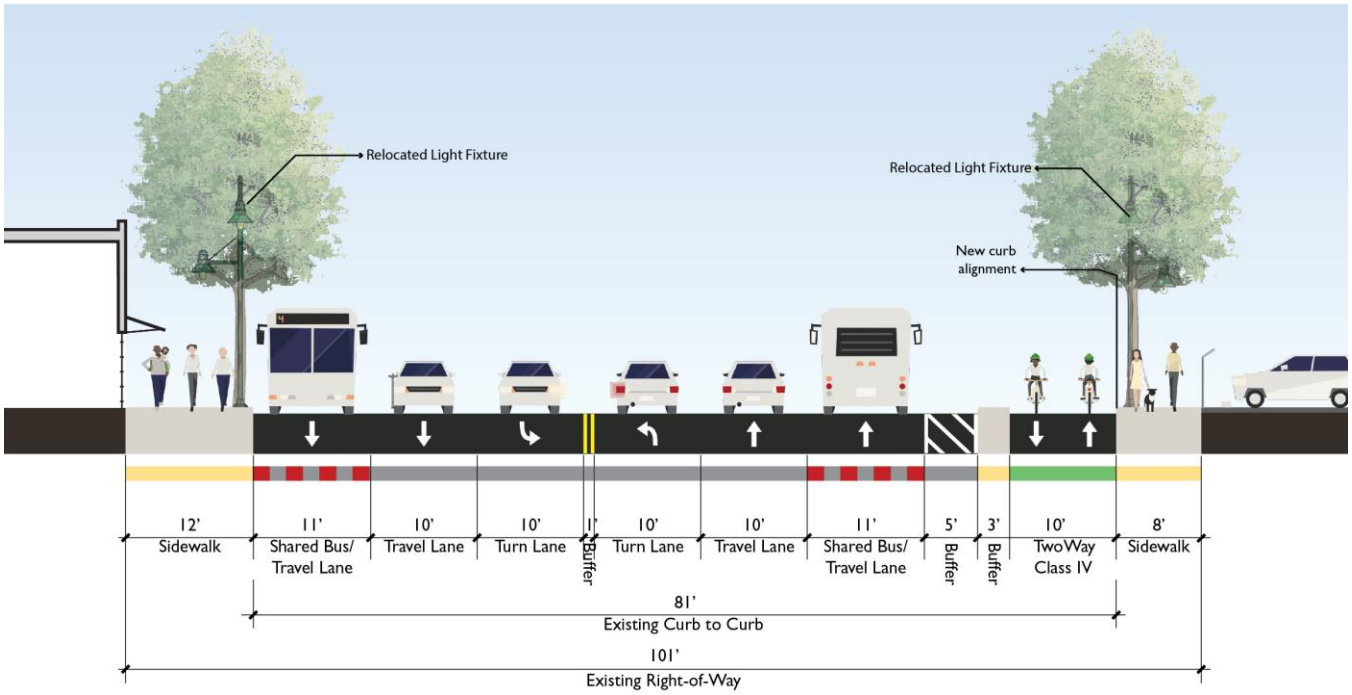


Figure 13: 40th Street between San Pablo Avenue and Emery Street (looking west) – SECTION D

Design characteristics and conditions specific to the concept design for this block include (see Figure 13 and Sheet-03 at the end of this section):

Segment-specific Multimodal Improvements

- Realignment of the eastern section of curb on the northside of the 40th Street to accommodate an 8-foot wide sidewalk and 10-foot wide two-way separated bikeway[15] through the eastern end of the block. This results in the elimination of the existing parking bay in this location.
- A 5-foot striped buffer parallels the westbound 11-foot bus-only lane near the San Pablo intersection in order to accommodate the turning radius of semi-trucks making left turns onto 40th Street from northbound San Pablo Avenue.
- Designation of the westbound curbside lane as bus-only lane. This lane also accommodates vehicles turning right at Emery Street and allows drivers having turned left from the outer of the two northbound left-turn lanes on San Pablo Avenue to transition into the single remaining through-lane on westbound 40th Street.
- Configuration of the northwest corner of the Emery Street intersection as a "protected corner" for cyclists traveling on the two-way bikeway and those turning left onto the bike lane on southbound Emery;
- Application of signal changes such as phasing and bike signal heads/phasing where applicable, bike boxes, dashed green pavement markings, and green-backed sharrows to enhance the navigation of the Emery Street intersection by cyclists.
- Configuration of the Emery Street bus stops is consistent with the typical layout for stops on the southside of the street described in Section 3.1. However, the eastbound, near-side stop is located 40 feet from Emery Street intersection to reduce conflicts between buses ready to embark from the stop and right-turning vehicles that may attempt to go around a bus during loading rather than waiting behind the bus to get to the right-turn portion of the bus-only lane.

West of Emery Street to West of Holden Street

The preferred concept design for 40th Street between Emery Street and Holden Street shows a consistent application of the desired multimodal improvements and bus stop design enhancements (see Section 3.1) throughout this core stretch of the corridor (see Figure 14). The space needed to accommodate bus-only lanes in both directions and the two-way bikeway are created by eliminating the existing parking lane along the northside of the street and by converting one westbound travel lane into a bus-only lane. At eastbound bus stops a 3-foot wide easement into the existing front yard landscaping is needed. Along the length of the east- and westbound stops at Emery and Hollis Streets, a total of eight and ten trees respectively would need to be removed and replaced in order to accommodate the widened or realigned sidewalks.

[15] Beyond the to be eliminated parking bay, the existing sidewalk and adjacent landscape buffer strip along the parking lot fence remain unchanged.

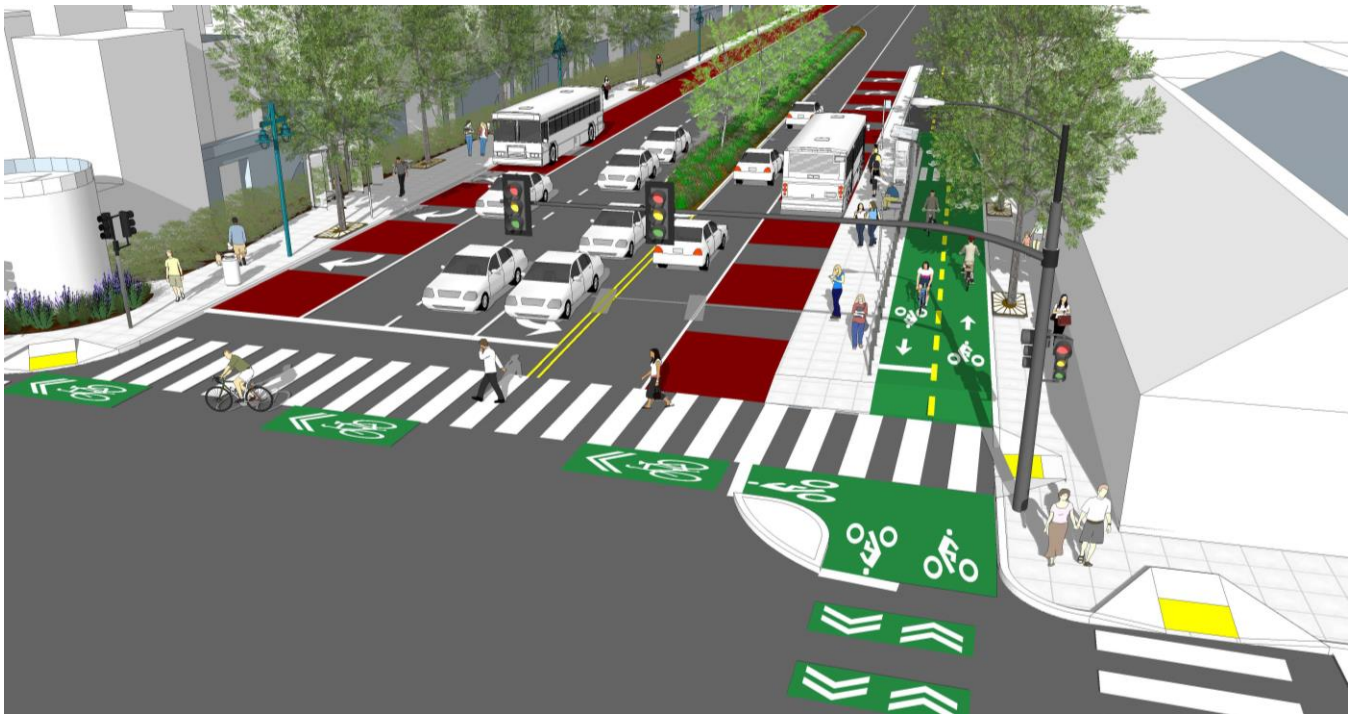


Figure 14: 3D rendering of multimodal improvements of 40th Street west of the Emery Street intersection (in the foreground).

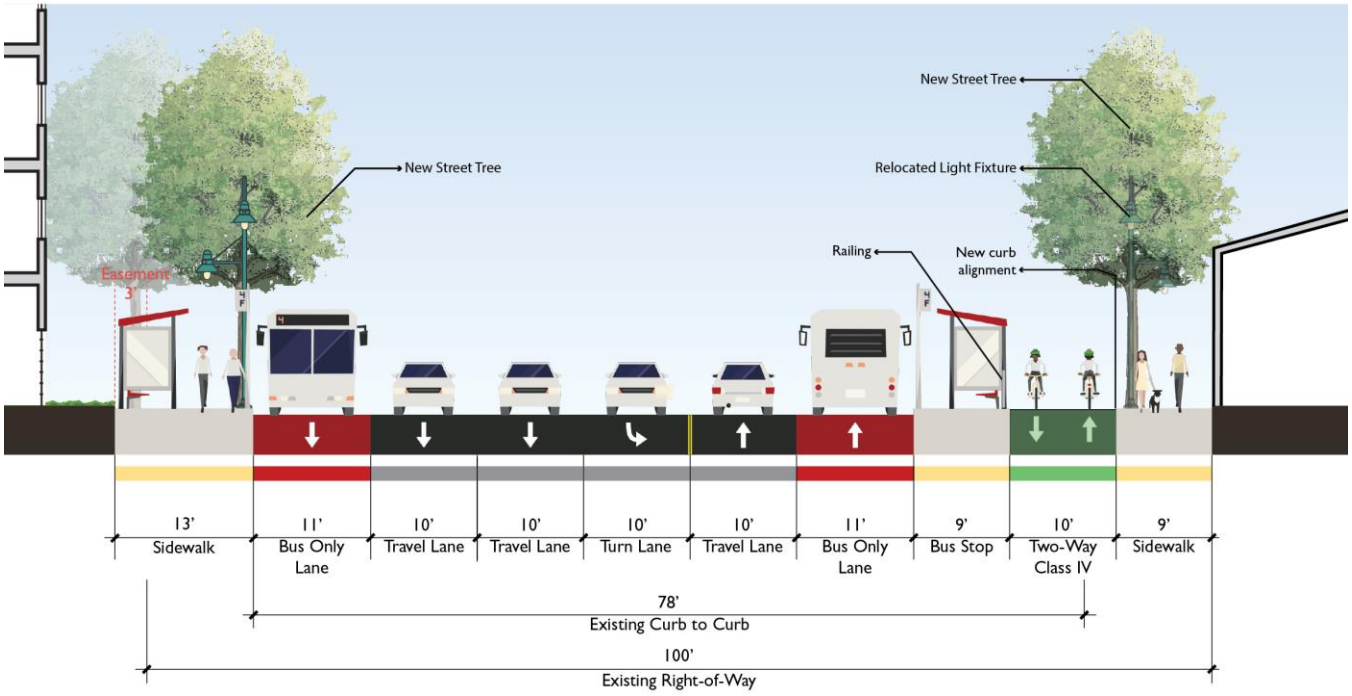


Figure 15: 40th Street at bus stops located at Emery Street (looking west) – SECTION E

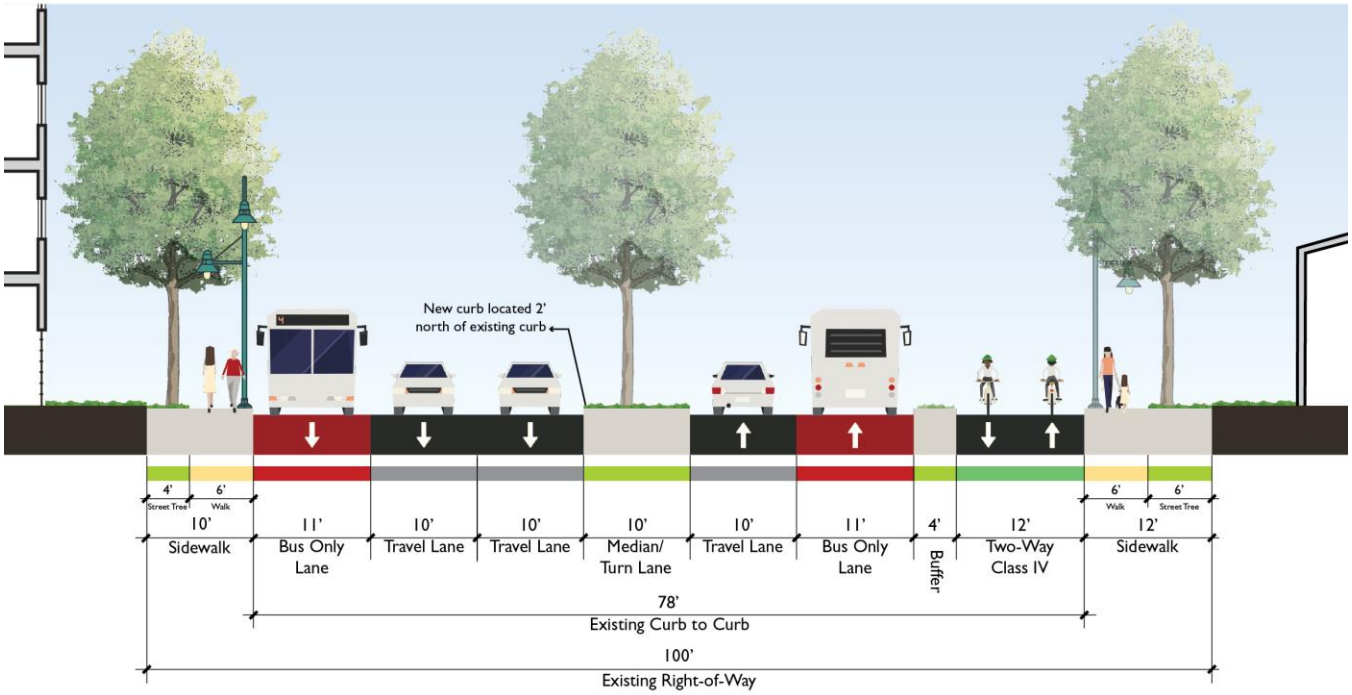


Figure 16: 40th Street between Emery Street and Holden Street (looking west) – Typical Mid-block Condition – SECTION F

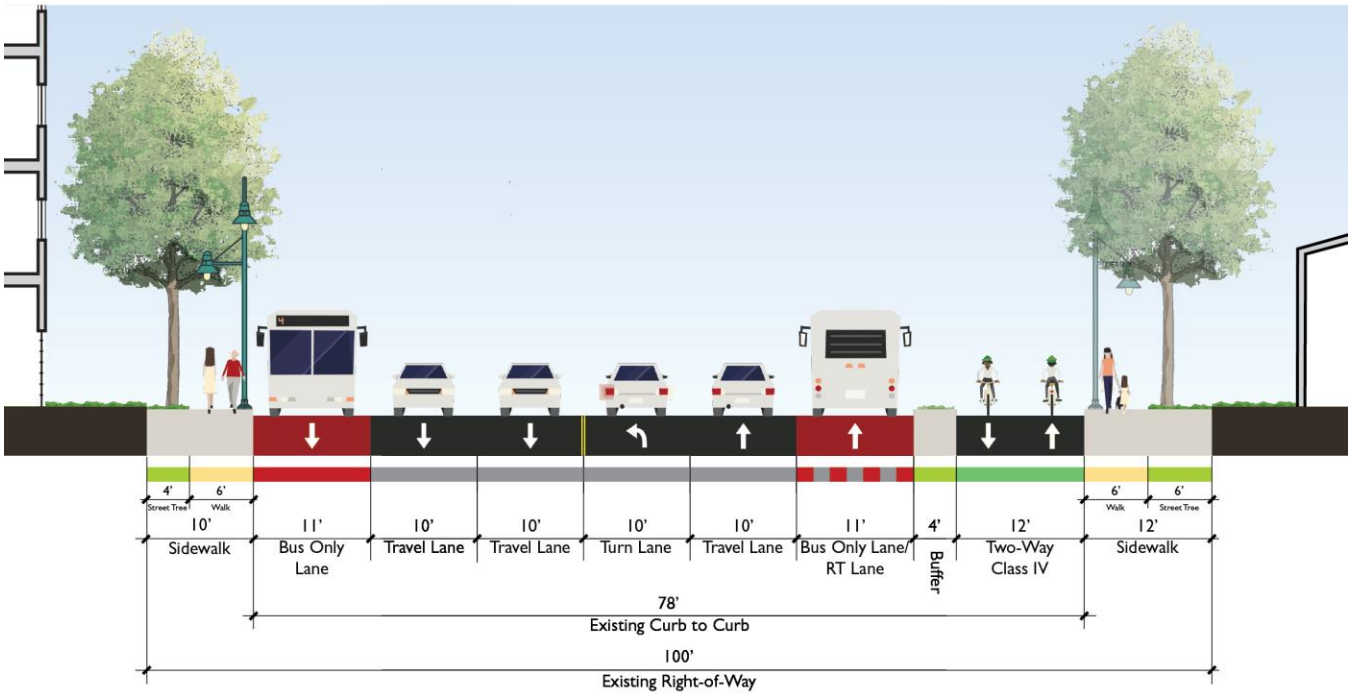


Figure 17: 40th Street between Emery Street and Holden Street (looking west) – Typical Intersection Condition – SECTION G

Design characteristics and conditions specific to the preferred concept design for this block include (see Figure 15 through Figure 17 and Sheet-02 and Sheet-03 at the end of this section):

Segment-specific Multimodal Improvements

- Reconfiguration of the westbound roadway between existing curbs to include[16]:
  - 12-foot wide two-way separated bikeway buffered from the adjacent travel lane by a 4-foot wide raised side median[17].
  - A 11-foot-wide westbound bus-only lane.
  - A 10-foot wide travel lane for through traffic.
  - 10-foot wide turn lanes for left turns at signalized intersections (like under existing conditions).
- Reconfiguration of the eastbound roadway between existing curbs to include[18]:
  - Designation of the curbside lane as bus-only lane.
  - Two 10-foot travel lanes for through traffic.
  - 10-foot wide turn lanes for left turns at signalized intersections (like under existing conditions).
  - Narrowing of existing median by 2 feet on the south side to accommodate three vehicle lanes.
- Application of signal changes such as phasing and bike signal heads/phasing where applicable as well as bike boxes, dashed green pavement markings, and green-backed sharrows to enhance navigation of the Hollis Street intersection by cyclists traveling on the two-way bikeway and those arriving on or switching to the bike lanes located on Hollis Street north and south of the intersection.
- Replacement of existing sidewalk and street trees with new sidewalk and replacements trees along the length of stops.
- Design of bus stops at Emery and Hollis Streets consistent with typical layouts described in Section 3.1.

Segment-specific Streetscape/Green Infrastructure/Public Art

- Planting of corner bulb-outs at intersections (where shown in concept design) and 4-foot wide side median with drought-tolerant landscaping or configuration as bioretention areas (also see description of green infrastructure elements in Attachment 1).
- Bus stops include new street trees as per the typical bus stop designs illustrated in Section 3.1.

West of Holden Street to West of Hubbard Street

The preferred concept design for the corridor segment between west of Holden Street and west of Hubbard Street continues the proposed multimodal design improvements already described in the previous section. Proposed improvements specific to this segment include emergency and visitor access to the senior housing facility located at the northeast corner of the 40th/Horton Street intersection, the transition of the westbound transit-only lane to a mixed-flow lane on the bridge over the railroad tracks, and two potential options for controlling access between the Target parking lot and 40th Street. The westernmost of the existing trees along the 40th Street frontage of the senior living building will need to be removed to accommodate the needed jog of the two-way bikeway toward the alignment of its crossing at the Horton Street intersection.

[16] Reconfiguration eliminates the existing on-street parking.
[17] At bus stop locations, the two-way bikeway narrows to 10 feet, is raised to sidewalk level, and has no side median (see Section 2.1).
[18] Reconfiguration includes narrowing existing medians from 12 to 10 feet.

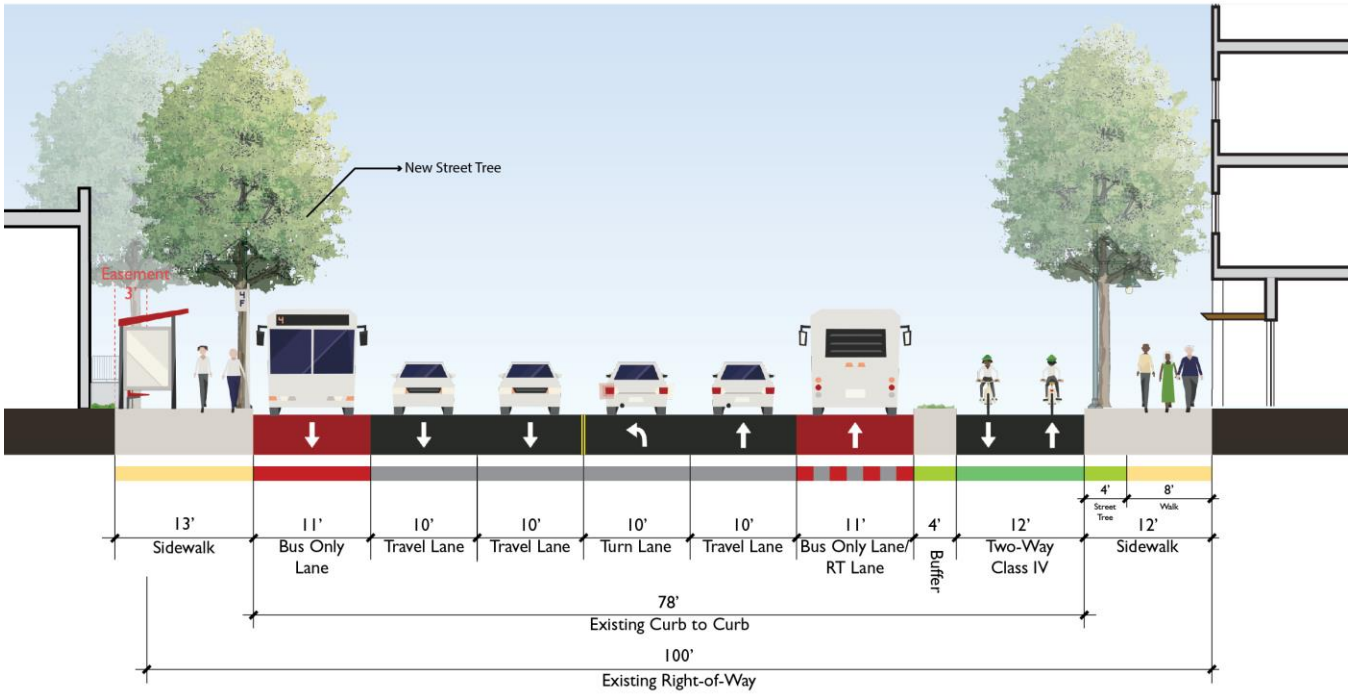


Figure 18: 40th Street at eastbound bus stop located at Horton Street (looking west) – SECTION H

Design characteristics and conditions specific to the preferred concept design for this block include (see Figure 18 and Sheet-02 and Sheet-03 at the end of this section):

Segment-specific Multimodal Improvements

- Reconfiguration of the west- and eastbound roadways as described in the previous section. Except:
  - Transition of the westbound transit-only lane to a 11-foot wide mixed-flow travel lane west of Hubbard Street.
  - 4-foot wide side median between two-way bikeway and adjacent travel lane narrows to 2 feet west of Hubbard Street.
- Configuration of the northwestern and northeastern corners of the Horton Street intersection as "protected corners" for cyclists traveling on the two-way bikeway and those arriving on or switching to the bike lanes located on Horton Street south of the intersection[19].
- Introduction of bike boxes on Horton Street that allow cyclists to set up to either transition to the two-way separated bikeway by following the green-backed sharrows or travel straight through the intersection onto the northbound Bicycle Boulevard or existing southbound bike lanes.
- Application of signal changes such as phasing and bike signal heads/phasing where applicable, bike boxes, dashed green pavement markings, and green-backed sharrows to enhance the navigation of the Horton Street intersection by cyclists.
- Design of bus stops at Horton Street consistent with the typical layouts described in Section 3.1.
- Replacement of existing sidewalk and street trees (five) along length of westbound stop with 9-foot wide sidewalk to edge of building and replacements trees.
- Lengthening the eastbound left-turn pocket onto Horton Street to 100 feet in order to accommodate turn volumes expected at this intersection.

[19] During the final design phase, the need for supplemental signage should be assessed, such as internally lit signs that signal No Right-Turn-on-Red or flashing signs that remind right-turning drivers of the presence of crossing cyclists and pedestrians.

Emergency Vehicle and Visitor Access to Senior Living Building

The proposed introduction of the two-way separated bikeway and protected corner at the 40th/Horton Street intersection require modifications to the existing access conditions at the Watermark senior living building. In order to accommodate emergency vehicle and visitor access needs at the building, the concept design proposes the following (also see Figure 19):

- Incorporation of a 20-foot wide, bollarded break in the proposed side median where it crosses in front of the main entrance to the senior living building and the fence gate through which reuse and recycling containers are wheeled out to 40th Street on collection day. Bollards are spaced at 10 feet in order to prevent vehicles from entering the two-way bikeway.
- Emergency vehicles stop in the bus-only lane and emergency responders transport gurneys through the level surface of the side-median break, across the bikeway (at roadway grade) and up onto the sidewalk.

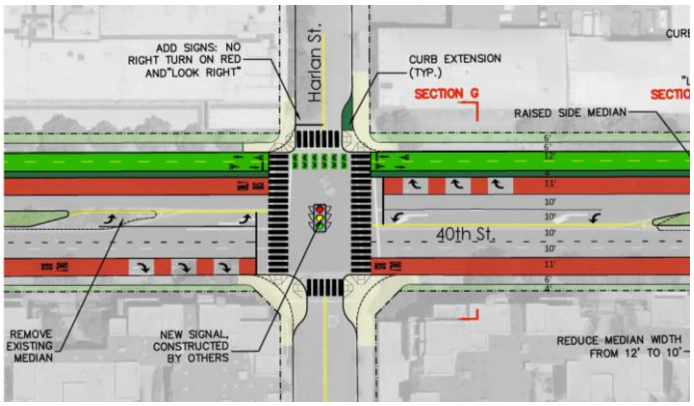


Figure 19: Bollards installed at Senior Living Building

- Relocation of the existing bikeshare station on Horton Street to the other side of the street as illustrated in Figure 19). Relocating the station to this area would eliminate about four parking spaces along southbound Horton Street.
- Dedication of the length of curb currently occupied by the bikeshare station for the loading and unloading of visitor cars and Watermark vans. Occupants of these vehicles would access the building through the existing Horton Street door, which has direct access to the building lobby.

Segment-specific Streetscape/Green Infrastructure/Public Art

- Planting of the raised side median with drought-tolerant landscaping where its width equals or exceeds 4 feet or configuration as a linear bioretention area (also see description of green infrastructure elements in Attachment 1).
- Bus stops include new street trees as per the typical bus stop design illustrated in Section 3.1.

Target Parking Lot Access

Target is in the process of implementing a reconfiguration of its surface parking lot and parking lot circulation. The preferred concept design includes improvements to the existing westbound left turn pocket that complement improvements at the 40th Street parking lot entry/exit proposed by Target in order to address the following safety concerns under the currently existing conditions:

- Frequent illegal left turns from the Target driveway onto the westbound travel lane of 40th Street toward the Shellmound Street bridge were occurring on a regular basis.
- Accidents between vehicles turning into and out of the parking lot and eastbound bicyclists and pedestrians traveling on the southside of 40th Street.

The approved Target parking lot redesign improves the parking lot's internal circulation to the 40th Street entry/exit, which now includes a marked "right turn only" lane onto 40th Street. It also includes the conversion of the street-like, asphalted entry/exit into a continuous sidewalk with a commercial driveway-type access point.

In addition, the 40th and San Pablo Bus Hub Project proposes:

- To eliminate the conflict point between bicyclists traveling east on 40th Street and vehicles exiting/entering the Target parking lot by moving the eastbound bike lane to the two-way bikeway's location on the north side of the street.
- The installation of raised curb elements along portions of the northern and southern edges of the left-turn pocket. In addition, the curb element should include a "No Left Turn" sign placed to be clearly visible for drivers exiting the Target parking lot. This treatment is intended address the current concerns over illegal left turns out of the parking lot while avoiding operational impacts that could result from an outright elimination of the left-turn[20] pocket on 40th Street.

West of Hubbard Street to Ikea Entry

The preferred concept design for the corridor segment west of Hubbard Street includes a continuation of the two-way separated bikeway across the Shellmound Street bridge to the existing signalized Shellmound/IKEA Entry intersection where southbound bicyclists on Shellmound Street connect to the two-way separated bikeway. The segment also includes two connections to the Bay Bridge Trail, one at the existing ped/bike plaza located west of the IKEA intersection and one at the proposed new ped/bike plaza located south of the IKEA intersection on the east-side of the street. The eastbound bus only lane would begin at IKEA Entry and continue over the bridge and onto 40th Street. Westbound buses would have a merge lane just west of Hubbard, and transition into a single mixed-flow lane with other vehicles west of Hubbard Street and over the bridge to the IKEA entry.

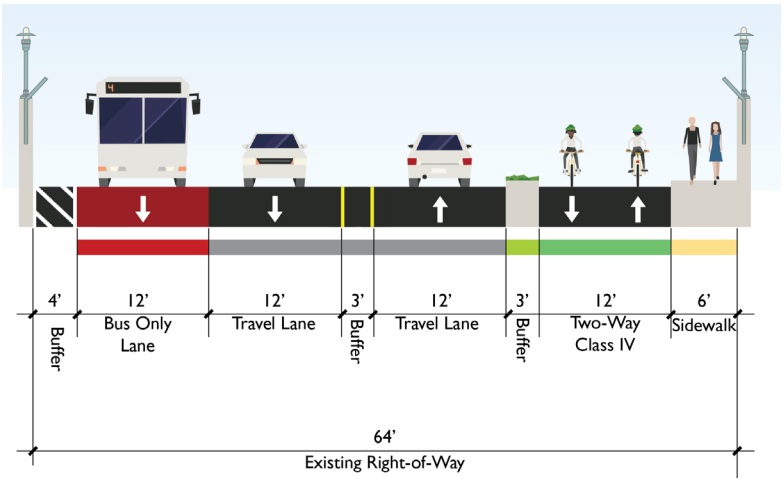


Figure 20: Shellmound Street Bridge (looking west) – SECTION I

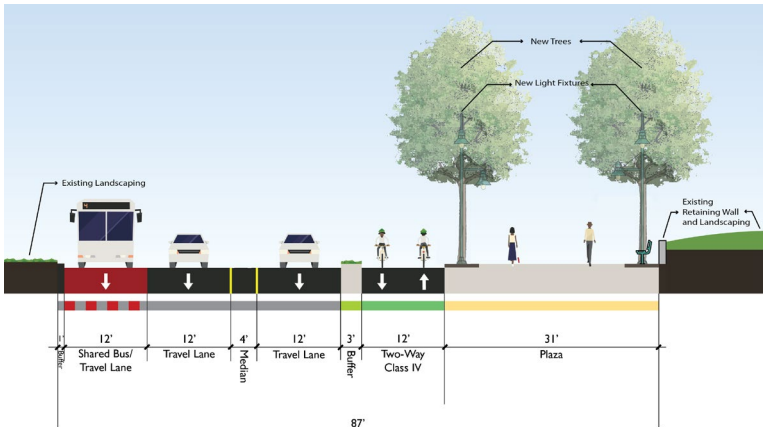


Figure 21: Shellmound Street at the new plaza (looking north) – SECTION J

Design characteristics and conditions specific to the preferred concept design for this segment of the 40th/Shellmound Street corridor include (see **Error! Reference source not found.**, Figure 21, and Sheet-01 and Sheet-02 at the end of this section):

[20] Impacts could include increased eastbound right-turn, westbound left-turn, and northbound volumes. Increased eastbound right-turn volumes could lead to backups that would delay buses in the bus-only lane. In addition, increased volumes at the Horton Street parking lot entry/exit could cause congestion impacting both Mandela Parkway and 40th Street and the turn movements could impact bicycle safety on bike lanes on Horton south of the intersection.

Segment-specific Multimodal Improvements

- Reconfiguration of the roadway to include:
  - Removal of the existing eastbound Class 2 bikeway and elimination of the second northbound traffic lane.
  - Introduction of a 10 to 12-foot wide two-way separated bikeway buffered from the adjacent travel lane by a 2 to 4-foot wide raised side median;
  - Designation of the eastbound outside lane as a bus-only lane, beginning at the Shellmound/IKEA Entry intersection.

Shellmound/IKEA Entry Intersection Improvements and Existing Ped/Bike Plaza at Bay Trail Connection (West)

- Restriping of the crosswalk across Shellmound Street with separate crossings for pedestrians and bicyclists, in order to safely connect southbound cyclists on Shellmound Street to the new two-way bikeway.
- Widening of the existing sidewalk on the east-side of the street in order to improve pedestrian access to the enhanced crossing from the relocated merge point of the Bay Bridge Trail (East) and proposed new plaza (also see below).
- Termination of the existing southbound Class 2 bikeway at the existing ramp just north of the intersection in order to guide cyclists to:
  - The westbound section of the Bay Trail
  - The enhanced crossing at the Shellmound/IKEA Entry intersection and the eastbound two-way bikeway (see Figure 22)
  - Discourage cyclists from riding eastbound across the bridge where the existing Class 2 bikeway has been removed.
- Reconfiguration of the seat walls in the existing plaza, including extension of the eastern wall and shortening of the western wall segments. The seat wall modifications are needed to better accommodate the path of travel of cyclists headed toward the enhanced crossing while maintaining space usable by pedestrians (along the eastern wall).
- Closing of the no longer needed existing eastbound connector from the Bay Bridge Trail onto Shellmound Street. This area is proposed to be incorporated into the surrounding landscaping. Removal of the connector also allows for the existing jogging trail (made of decomposed granite, commonly referred to as DG) to be extended to the edge of the plaza.
- Bicycle wayfinding signage on the approaches to the plaza should provide multi-use trail users and bicyclists traveling southbound on Shellmound Street with information related to routing options and destinations.

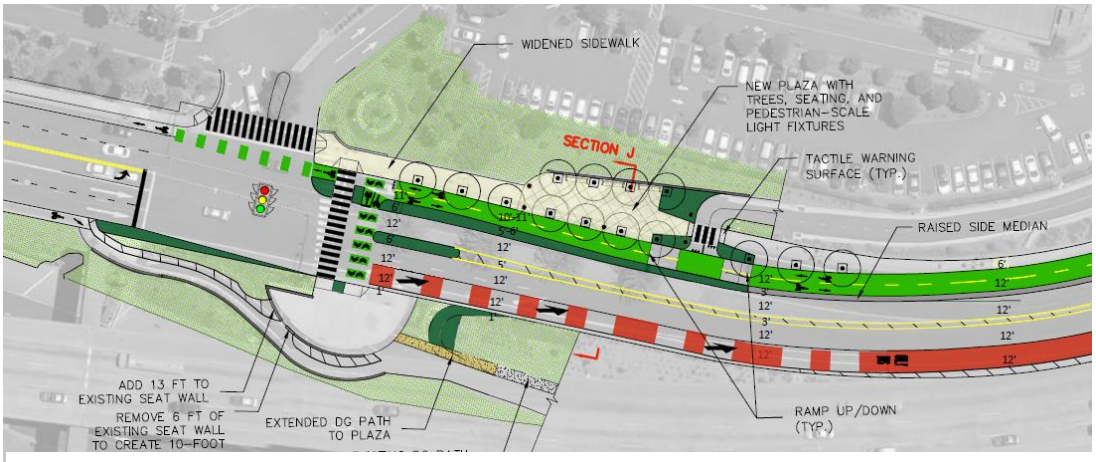


Figure 22: Modefied eastern and new western pedestrian/bicycle plazas; modified Shellmound Street/IKEA Entry intersection

Proposed New Ped/Bike Plaza at Bay Trail Connection (East)

- Similar to the existing pedestrian/bicycle plaza on the west-side of the Shellmound/IKEA Entry intersection, the preferred concept design proposes to construct a new plaza at the eastern merge point between the Bay Bridge Trail and the new two-way, separated bikeway (see Figure 22).
- The proposed plaza design relocates the merge point between Bay Bridge Trail (East) and Shellmound Street south by about 90 feet. This creates a more convenient connection for cyclists traveling east toward Adeline Street.
- In order to manage the speed of northbound cyclists on the two-way bikeway approaching the merge point with the Bay Bridge Trail, the concept design proposes to raise the two-way bikeway ahead and beyond the merge point to the same level as the sidewalk. Pedestrians cross the trail connection using a marked crossing. A refuge located between two-way bikeway and sidewalk provides cyclists connecting between bikeway and trail to pause for pedestrians in the crossing.
- North of the merge point, a pedestrian plaza includes trees for shade, seating elements, and pedestrian-scale light fixtures.
- Wayfinding signage on the approaches to the plaza should be located and designed to provide multi-use trail users, bicyclists traveling on the two-way bikeway, and pedestrians with information related to routing options and destinations.

Segment-specific Streetscape/Green Infrastructure/Public Art[21]

- Planting of the raised side median with drought-tolerant landscaping where its width equals or exceeds 4 feet or configuration as a linear bioretention area (also see description of green infrastructure elements in Attachment 1).
- The existing landscape area, located north of the bridge and between the eastern edge of Shellmound Street and the Bay Bridge Trail, represents an opportunity for converting the standard landscaping into a bioretention area (e.g. rain garden) that could treat stormwater runoff from the Shellmound bridge and roadway (also see description of green infrastructure elements in Attachment 1). Similarly, landscape areas associated with the new plazas and reconfigured landscape areas at the existing plaza could be constructed as bioretention areas (e.g. rain garden).

3.4 Street Trees

As part of the preferred concept design, a total of 58 existing trees will have to be removed at bus stops, medians and throughout the bus hub. A total of 68 new trees will be planted in locations identified on Sheets 01 to 03. The count at each block location is specified in Table 1. No change in existing street trees is proposed on the blocks between Watts and Haven Streets, between Hollis and Holden Streets, or between Hubbard Street and the proposed plaza north of the bridge.

[21] A supplemental future project could establish an off-street, multi-use pathway that creates a pedestrian/bicycle connection between 40th Street and Halleck/Beach Street using the triangular space between the northern sidewalk of 40th Street and the adjacent property (Pottery & Beyond). Such as project could include the design of this area as a bioretention area (e.g. rain garden) for the treatment of stormwater runoff from the Shellmound bridge and roadway.

Table 1
Street Trees – Removal and Addition

40th Street Block	Block Face (with respect to 40th Street)	Street Trees						
		# Existing Trees	# Retained	# Removed	Reason for Removal	# New Trees	# Total Trees	Net Change
Between Adeline Street and San Pablo Avenue	North	9	0	9	Expanding Sidewalk	11	11	2
	Median	8	0	8	Reconfiguring Median	0	0	-8
	South	11	0	11	Expanding Sidewalk	12	12	1
Between San Pablo Avenue and Emery Street	North	5	3	2	Sidewalk and Curb realignment	0	3	-2
	South	7	7	0	No Change	0	7	0
Between Emery Street and Watts Avenue	North	8	4	4	New Bus Stop	3	7	-1
	South (in front of the building next to Emery Street)	3	0	3	New Bus Stop	5	5	2
Between Haven Street and Hollis Street	North	7	1	6	New Bus Stop	5	6	-1
	South	4	1	3	New Bus Stop	4	5	1
Between Holden Street and Horton Street	North	9	8	1	Protected NE Corner	0	8	-1
	South	10	5	5	New Bus Stop	4	9	-1
Between Horton Street and Hubbard Street	North	9	4	5	New Bus Stop	3	7	-2
	Median	1	0	1	Reconfiguring Median	0	0	-1
Proposed Pedestrian Plaza to IKEA Entry	East	0	0	0	New Plaza (East)	8	8	8
					Widened Sidewalk	6	6	6
TOTAL TREES (affected blocks only)		**91**	**33**	**58**		**61**	**94**	**3**

3.5 Preliminary Assessment of Potential Utility Conflicts

Minor utility relocations are anticipated to be required for project implementation[22]. The utility relocations necessary to implement the project should be verified during detailed design, upon receipt of detailed topographic and utility surveys, and further coordination between the City of Emeryville, the City of Oakland and utility providers.

The following storm drain inlets (and lateral connections) will likely need to be adjusted to accommodate the proposed curb extensions on the northern side streets:

- Western inlet at Hubbard Street (located in the City of Oakland) (Figure 22)
- Both inlets at Holden Street (Figure 23)
- Eastern inlet at Hollis Street (Figure 23)
- Northwestern inlet at the intersection of San Pablo and 40th Street (Figure 24)

[22] Based on the City's storm drain, sewer, water and CAD files, Joint Trench record drawings provided by the City, and a site walk to visually verify approximate locations of utility appurtenances.

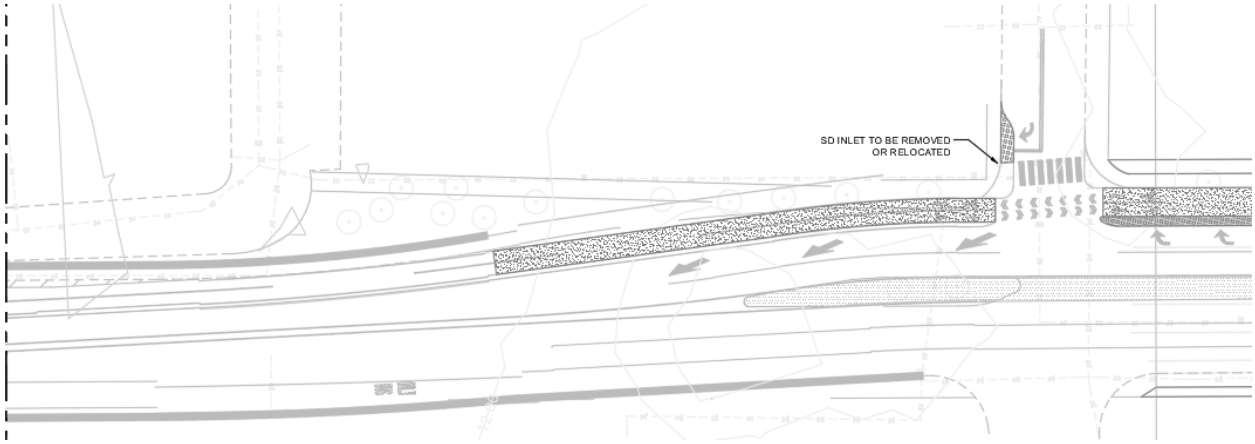


Figure 22: Western Inlet at Hubbard Street

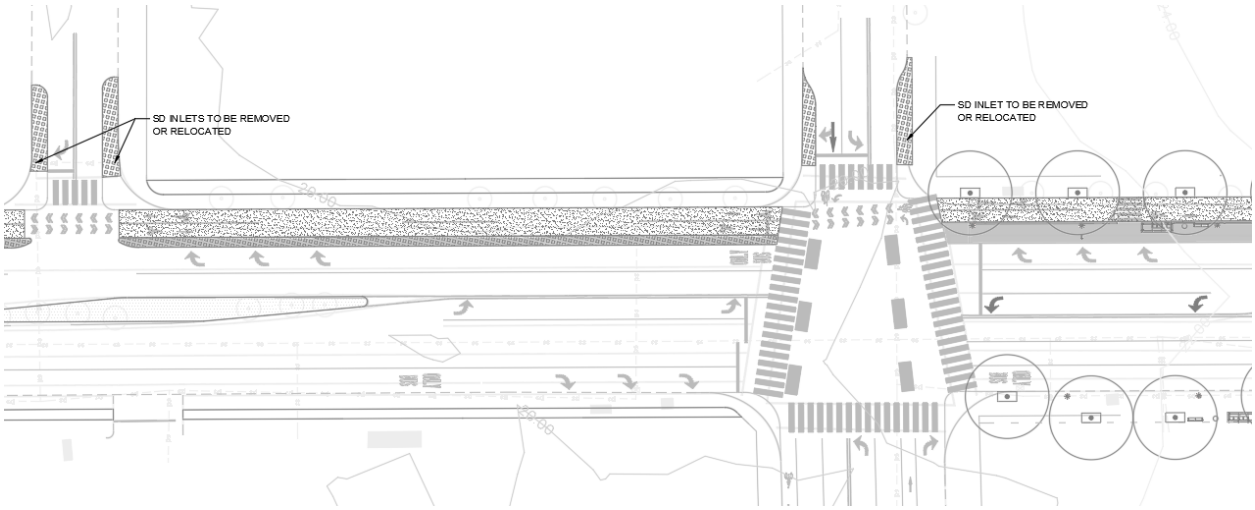


Figure 23: Both Inlets at Holden Street and Eastern Inlet at Hollis Street

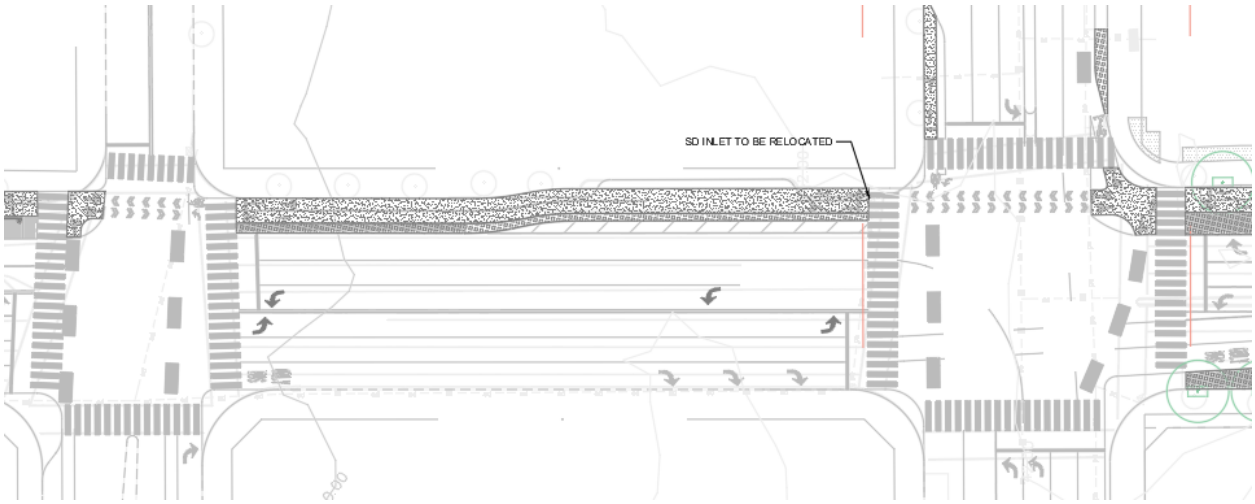


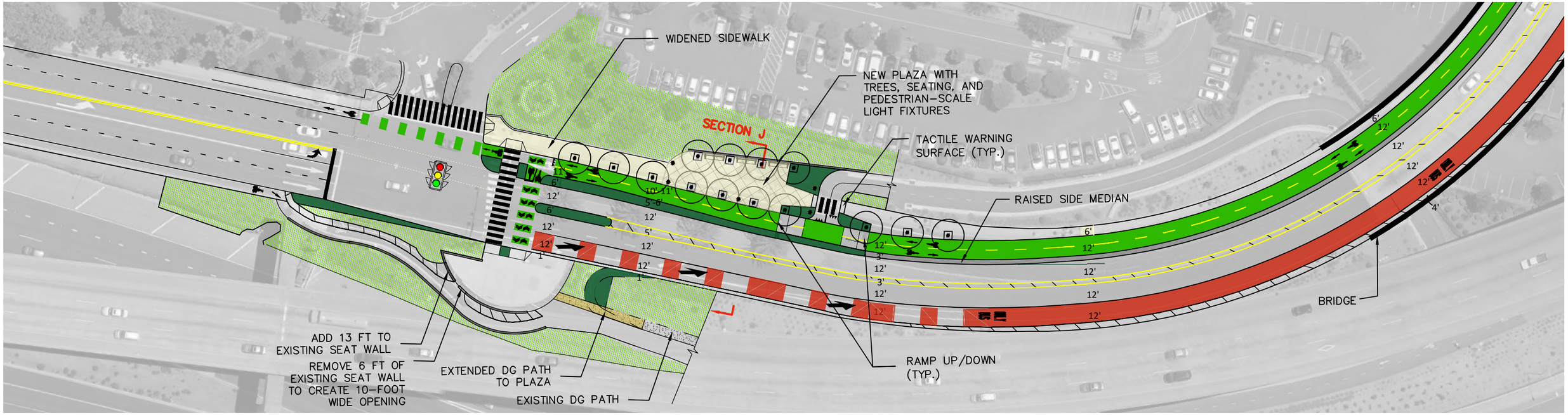
Figure 24: Northwestern Inlet at San Pablo Avenue/40th Street Intersection

The precise locations of existing fire hydrants are unknown; however visual inspection indicates that fire hydrant relocations are unlikely to be required.

Where existing trees are being replaced, it is likely that existing irrigation systems will need to be relocated or replaced.

Existing utility vault / appurtenance covers will need to be adjusted in locations where finished grade elevations are being raised, e.g. within the new bikeway and transit shelter facilities.

Dry utility joint trenches are located in the sidewalks on either side of the street. It appears feasible for these to remain in place, however this should be verified during detail design.



LEGEND:

- TRANSIT PASSENGER AREA — INCLUDES SPACE FOR BUS SHELTER, TRASH RECEPTACLE, SEATING AND RAILING
- TWO–WAY CLASS IV BIKEWAY — GREEN INFRASTRUCTURE OPPORTUNITY: CONSTRUCT BIKEWAY USING PERMEABLE ASPHALT
- BUS–ONLY LANE
- RECONSTRUCTED SIDEWALK — INCLUDES RELOCATING FIRE HYDRANT, TRAFFIC POLES, STREET LIGHTS AND OTHER UTILITIES, AS NECESSARY
- EXISTING LANDSCAPE
- NEW LANDSCAPE/ GI OPPORTUNITIES
- NEW STREET TREE
- PEDESTRIAN–SCALE LIGHT FIXTURE

40th and San Pablo Bus Hub Project

Extended 40th Street Multimodal Concept Design - Adeline Street to IKEA Entry

DRAFT FINAL CONCEPTUAL LAYOUT PLAN

0' 60'

SCALE: 1" = 60'

DATE: 01/29/2020

SHEET-01

Halleck St.
Beach St.
CURB EXTENSION (TYP.)
FUTURE GREEN INFRASTRUCTURE OPPORTUNITY: RAIN GARDEN
POSSIBLE FUTURE PATHWAY CONNECTION TO HALLECK ST.
ADD SIGNS: "LOOK RIGHT"
Hubbard St.
Emeryville Oakland
RAISED SIDE MEDIAN
ADD SIGNS: NO RIGHT TURN ON RED AND "LOOK RIGHT"
PAINT RED CURB (60')
RAMP UP/DOWN (TYP.)
Horton St.
RELOCATED BIKE SHARE STATION
REMOVE BIKE SHARE STATION
PAINT WHITE CURB (60') FOR VAN AND VISITOR PICK-UP/ DROP-OFF
SEE INSET A BELOW
40th St.
SIGN: RT ONLY
EXISTING MEDIAN TO BE REMOVED
POTENTIAL RELOCATION OF STREET LIGHT/ TRAFFIC SIGNAL POLES FROM SIDEWALK TO THIS LOCATION
EXISTING STAIRCASE AT BUILDING

CURB EXTENSION (TYP.)
ADD SIGN: "LOOK RIGHT"
Holden St.
SECTION H
RAISED SIDE MEDIAN
CONCRETE BOLLARDS
ADD SIGNS: NO RIGHT TURN ON RED AND "LOOK RIGHT"
Hollis St.
RAISED SIDE MEDIAN
FUTURE EMERYVILLE ART CENTER
RAMP UP/DOWN (TYP.)
CURB EXTENSION (TYP.)
ADD SIGN: "LOOK RIGHT"
Haven St.
40th St.
40th St.
TRANSIT STOP DESIGN REQUIRES PEDESTRIAN ACCESS EASEMENT
REDUCE MEDIAN WIDTH FROM 12' TO 10'
TRANSIT STOP DESIGN REQUIRES PEDESTRIAN ACCESS EASEMENT
REDUCE MEDIAN WIDTH FROM 12' TO 10'

LEGEND:

- TRANSIT PASSENGER AREA — INCLUDES SPACE FOR BUS SHELTER, TRASH RECEPTACLE, SEATING AND RAILING
- TWO-WAY CLASS IV BIKEWAY — GREEN INFRASTRUCTURE OPPORTUNITY: CONSTRUCT BIKEWAY USING PERMEABLE ASPHALT
- BUS-ONLY LANE
- RECONSTRUCTED SIDEWALK — INCLUDES RELOCATING FIRE HYDRANT, TRAFFIC POLES, STREET LIGHTS AND OTHER UTILITIES, AS NECESSARY
- EXISTING LANDSCAPE
- NEW LANDSCAPE/ GI OPPORTUNITIES
- NEW STREET TREE
- PEDESTRIAN-SCALE LIGHT FIXTURE

40th and San Pablo Bus Hub Project

Extended 40th Street Multimodal Concept Design - Adeline Street to IKEA Entry

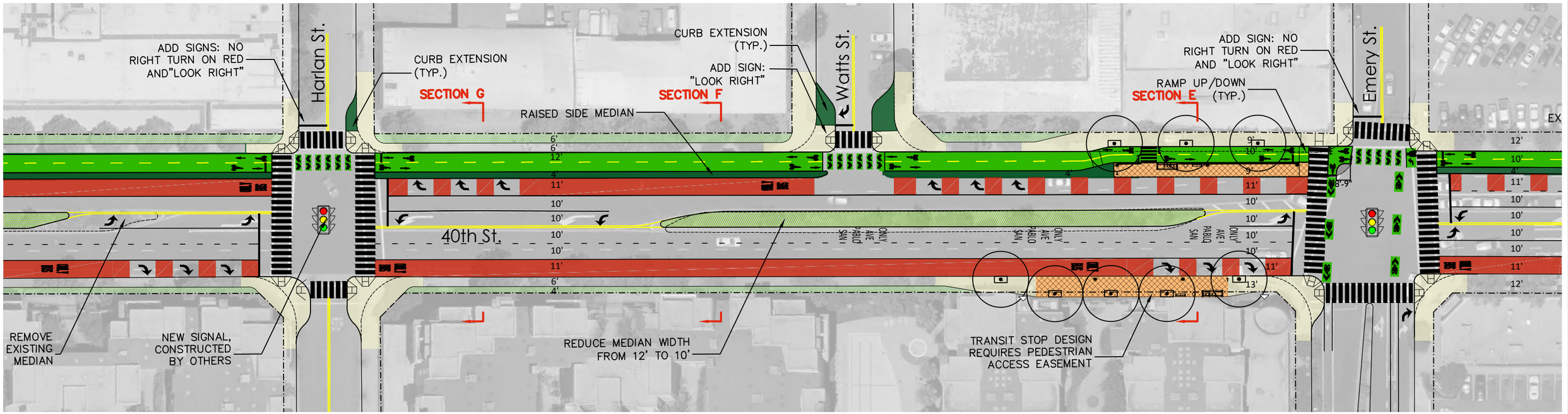
DRAFT FINAL CONCEPTUAL LAYOUT PLAN

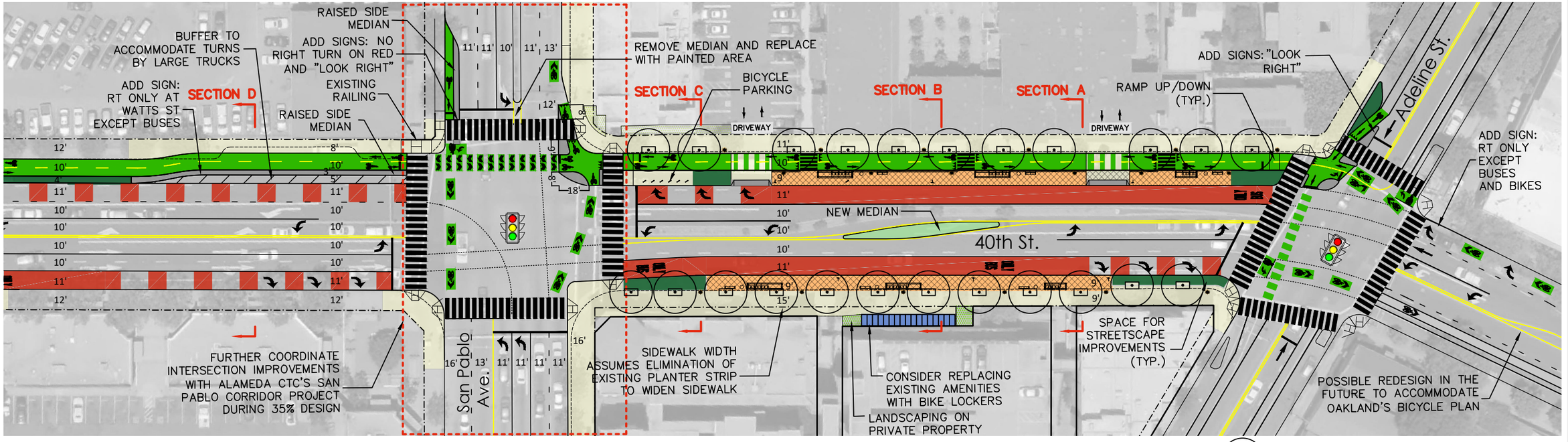
0' 60'

SCALE: 1" = 60'

DATE: 01/29/2020

SHEET-02





LEGEND:

- TRANSIT PASSENGER AREA — INCLUDES SPACE FOR BUS SHELTER, TRASH RECEPTACLE, SEATING AND RAILING
- TWO-WAY CLASS IV BIKEWAY — GREEN INFRASTRUCTURE OPPORTUNITY: CONSTRUCT BIKEWAY USING PERMEABLE ASPHALT
- BUS-ONLY LANE
- RECONSTRUCTED SIDEWALK — INCLUDES RELOCATING FIRE HYDRANT, TRAFFIC POLES, STREET LIGHTS AND OTHER UTILITIES, AS NECESSARY
- EXISTING LANDSCAPE
- NEW LANDSCAPE/ GI OPPORTUNITIES
- NEW STREET TREE
- PEDESTRIAN-SCALE LIGHT FIXTURE

40th and San Pablo Bus Hub Project

Extended 40th Street Multimodal Concept Design - Adeline Street to IKEA Entry

DRAFT FINAL CONCEPTUAL LAYOUT PLAN

0' 60'

SCALE: 1" = 60'

DATE: 01/29/2020

SHEET-03

4. Multimodal Operations Analysis of Preferred Concept Design

This chapter describes the assessment of multimodal operations along the 40th Street/Shellmound Street corridor with a particular focus on transit operations. The analysis compares operations under the preferred concept design described in Chapter 3 (also referred to here as "Plus Project") with operations under the existing conditions.

4.1 Methodology

The multimodal operations analysis was prepared using Vissim microsimulation software, which provides outputs for a range of Measures of Effectiveness (MOE). The MOEs calculated from the Vissim Model were based on an average of 10 simulation runs to account for random vehicle arrival. Existing and Plus Project conditions for weekday AM and PM commute peaks hours were modeled and the results documented.

4.2 Vissim Model

Multimodal operations for pedestrian, bicycle, motor vehicles, and transit travel modes were modeled during the AM and PM peak hours. Bicycle, pedestrian, and vehicle volumes from 2018 data were loaded into the model to simulate how individual bicycles, pedestrians, buses, trucks, and cars interact with transit along the multimodal corridor. Buses entered and exited the network according to posted bus times on AC Transit and Emery Go-Round (EGR) websites in November 2017.

The Vissim model was validated to the 2018 City of Emeryville's citywide Synchro network and field observations. Both software platforms use the methods outlined in the 2010 *Highway Capacity Manual* (HCM) to evaluate intersection operations.

The Vissim model accounts for intersections interacting with each other across the length of the corridor while the Synchro model looks at each intersection in isolation. The increase in vehicle delay is especially important at the San Pablo Avenue and 40th Street intersection where, during the peak hours, vehicle queues spill back to upstream intersections. The Vissim model captures the effect of this spillback on upstream intersection operations, leading to results that better reflect field observations.

Given the bus stop modifications analyzed with this project, special focus was placed on simulating transit operations in the corridor. At existing stops with width for cars to pass, buses were assumed to pull up to the curb and out of the travel lane, allowing vehicles to pass. This requires the bus to merge back into traffic after completing the stop, which is consistent with field observations. Bus dwell times, defined as the time when a bus is stationary with doors open at a stop, were based on field observation averages. It was observed that AC Transit buses have longer dwell times than EGR buses. This is likely because AC Transit buses require passengers to pay fares individually before boarding, which increases dwell time. EGR service does not require a fare; therefore, the boarding process is generally faster. The model used the average dwell time for AC Transit and EGR buses in the analysis[23].

Analysis Assumptions

The dwell time for all buses is constant because the objective of this analysis is to compare the location and type of stops on the corridor between existing and Plus Project conditions and their respective impact on multimodal operations. By keeping dwell time constant, the maneuvering time into and out of each stop becomes the analysis focus, which aligns with the goal of analyzing the location and type of stops on the corridor. For AC Transit buses the dwell time is 12 seconds; for EGR buses the dwell time is eight seconds.

[23] If a bus is stopped 8 – 10 minutes for wheelchair loading this would mean that the bus-only lane is blocked and buses behind the stopped bus would enter the adjacent travel lane to go around the stopped bus

All buses were assumed to stop on 40th Street at the San Pablo Avenue and Emery Street stops, while buses stop 50 percent of the time at all other stops on the corridor. This assumption provides enough data to perform a comprehensive stop analysis and captures the lower observed stop rate at the other stops on the corridor.

Project Features

The Plus Project evaluated the preferred design concept described in Chapter 3. This concept design would convert an existing motor vehicle lane in the westbound direction to a bus only lane, add a new bus only lane in the eastbound direction, and provide a two-way cycle track on the north side of 40th Street. This cross section would be accomplished by removing the on-street parking on the north side of 40th Street, adjusting the medians, and reducing the motor vehicle lane widths.

The eastbound bus only lane would start at the IKEA Entry signalized intersection via a lane drop east of the intersection and end at the Adeline Street intersection. The westbound bus only lane would start prior to the Adeline Street signalized intersection via a lane drop or a right turn only lane and end at Hubbard Street. Over the bridge, buses and other vehicles would share a single mixed-flow lane. Designing the beginning of the bus only lanes after a standard motor vehicle lane drop at a signalized intersection is the most efficient method for shifting motor vehicle traffic into a single lane.

A key feature of the concept design is the San Pablo Avenue traffic signal phasing. Due to the high volume for westbound right turning traffic, the right-turn must be protected with right-turn red, yellow, and green arrows. As a result, right turning traffic will not conflict with either bicycle or pedestrian movements crossing San Pablo Avenue, which would both go concurrently with the westbound motor vehicle through movement.

Measures of Effectiveness

Three evaluation metrics were used to develop and evaluate the project to improve transit service in the project area: bus maneuvering time into and out of stops, end-to-end travel time, and intersection level of service.

Bus Maneuvering Time

Bus maneuvering time focuses on the behavior of buses at bus stops and was calculated according to the following equation:

$$Total\ Delay = (Bus\ Travel\ Time - Free\ Flow\ Time)$$

$$Maneuvering\ Time = Total\ Delay - Dwell\ Time$$

Free flow time is the time the bus would take to travel through the bus stop area if it didn't stop at the bus stop. Free flow time was calculated based on the link segment distance that contains the bus traveling at the posted speed. Bus travel time is output by Vissim and is the actual time it takes the bus to travel the bus stop link segment distance, including time spent stationary at the curb-side bus stop and time to merge in and out of the travel lane. Total delay is the difference between bus travel time and free flow time and represents the amount of time the bus spends making the stop. Dwell time is also output by Vissim. For the purpose of this study this time was kept fixed based on field observations. Maneuvering time is the difference between total delay and dwell time and represents the amount of time the bus spends merging out of and into traffic at each bus stop.

End-to-End Travel Time

End-to-end travel time is the actual time vehicles spend in the study corridor and is a measure of travel time performance. This metric is calculated for vehicles traveling eastbound and westbound on 40th Street between the IKEA Entry intersection and Yerba Buena Avenue (intersection with 40th Street, about 650 feet east of Adeline Street), and vice versa. The following isolated vehicle classes are presented in this analysis:

- AC Transit
- Emery Go-Round
- Bus Combined (AC Transit and Emery Go-Round)
- Auto and Truck

- Auto and Truck

Level of Service

The operations of roadway facilities are typically described with the term level of service (LOS), a qualitative description of traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, which reflects free-flow conditions where there is very little interaction between vehicles, to LOS F, where the vehicle demand exceeds the intersection capacity and high levels of vehicle delay result. LOS E represents "at-capacity" operations. When traffic volumes exceed the intersection capacity, stop-and-go conditions result, and a vehicle may wait through multiple signal cycles before passing through the intersection; these operations are designated as LOS F.

4.3 Results

The following figures and tables present the identified performance metrics in the 40th Street corridor under Existing and Plus Project conditions.

Bus Maneuvering Time

Existing Conditions

Bus maneuvering time for existing conditions is presented in Figure 25 and Figure 27 by bus stop and direction for the AM and PM peak hours, respectively. Each bus stop location shows the averages for AC Transit, Emery Go-Round, and all buses combined. There are multiple bus stop locations on 40th Street near San Pablo Avenue and each stop is modeled. For simplicity, the figures present these stops as one location. Bus maneuvering out of and into traffic is influenced by vehicle congestion and vehicles queues in the vicinity of the bus stop in question. Other factors such as bus length have less influence than vehicle congestion and queues. Maneuvering time differences between AC Transit and EGR are negligible as they are within a standard deviation of the 10 simulation runs.

As shown in Figure 25 and Figure 27, 40th Street at Emery Street has long maneuvering times for the eastbound bus stop. This is due to the stop being located at the near-side of the intersection, so traffic signal related delays and queues affect the maneuvering time. The westbound bus stop on 40th Street at the near-side of San Pablo Avenue adjacent to the intersection also has large maneuvering delays because of the traffic signal delays and queues from San Pablo Avenue. AC Transit maneuvering delays on westbound 40th Street near San Pablo Avenue are longer than EGR because the AC Transit stop location is closer to the traffic signal than the EGR stop. The westbound 40th Street at Hollis Street stop has large maneuvering times due to the stop being located on the near-side and adjacent to the traffic signal. The analysis shows that near-side stops adjacent to a traffic signal have longer maneuvering times because buses have a harder time merging back into the travel lane.

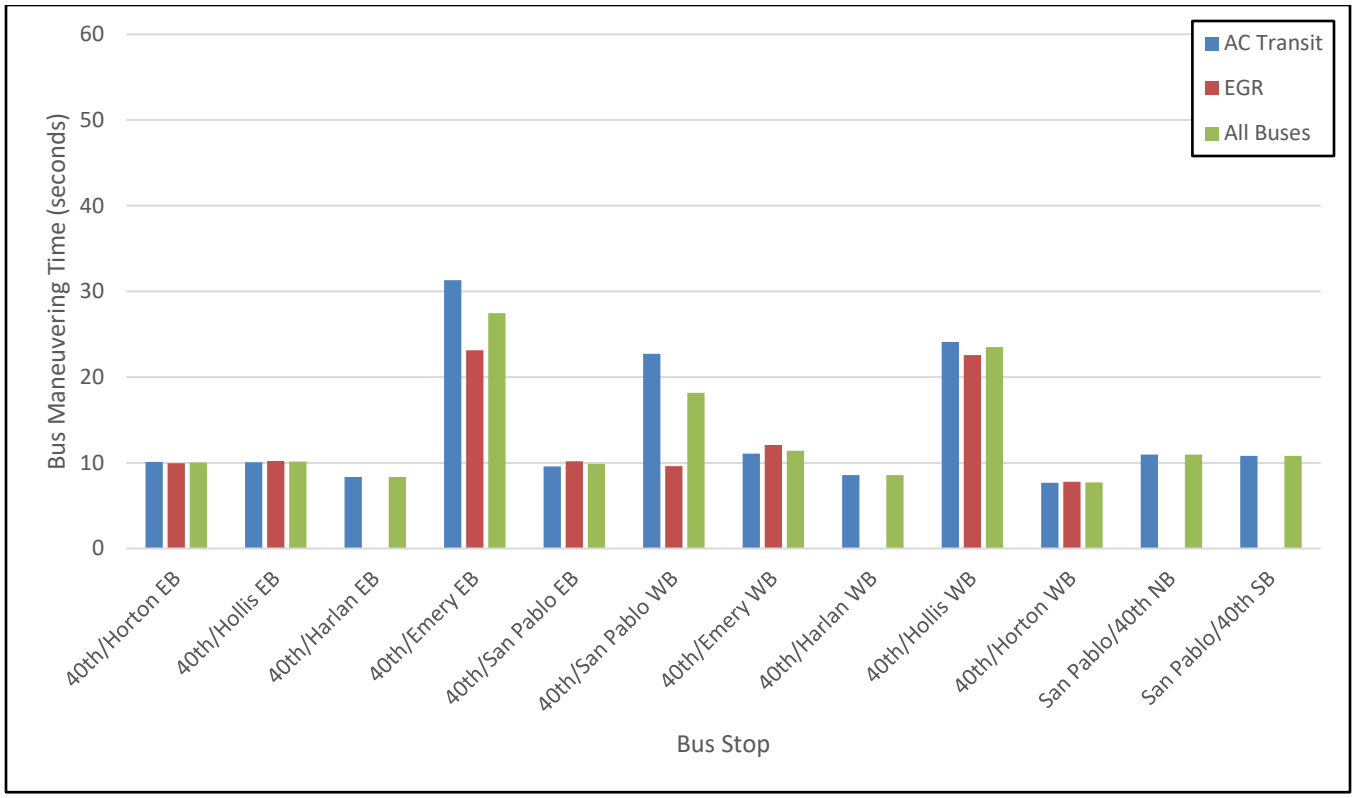


Figure 25: AM Peak Average Bus Maneuvering Time (Existing Conditions)

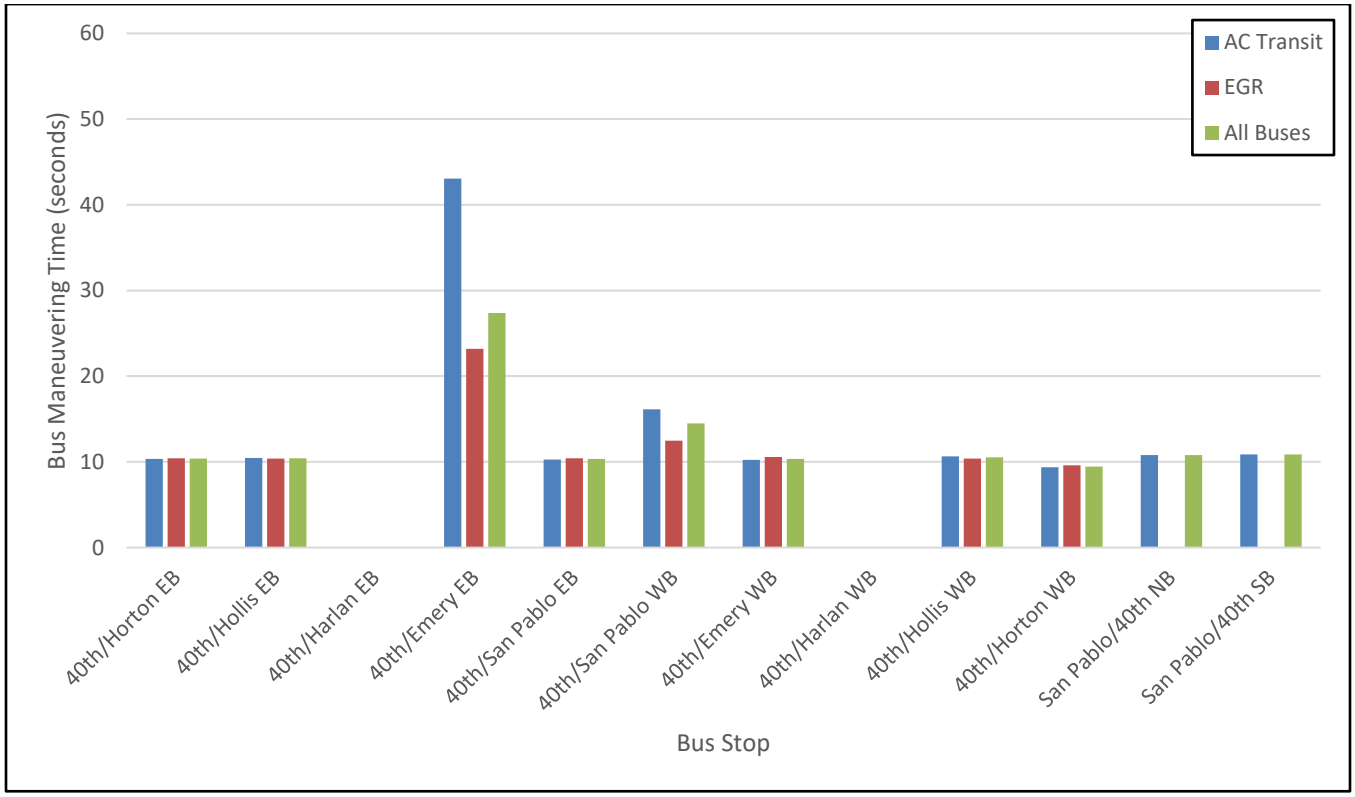


Figure 26: AM Peak Average Bus Maneuvering Time (Plus Project Conditions)

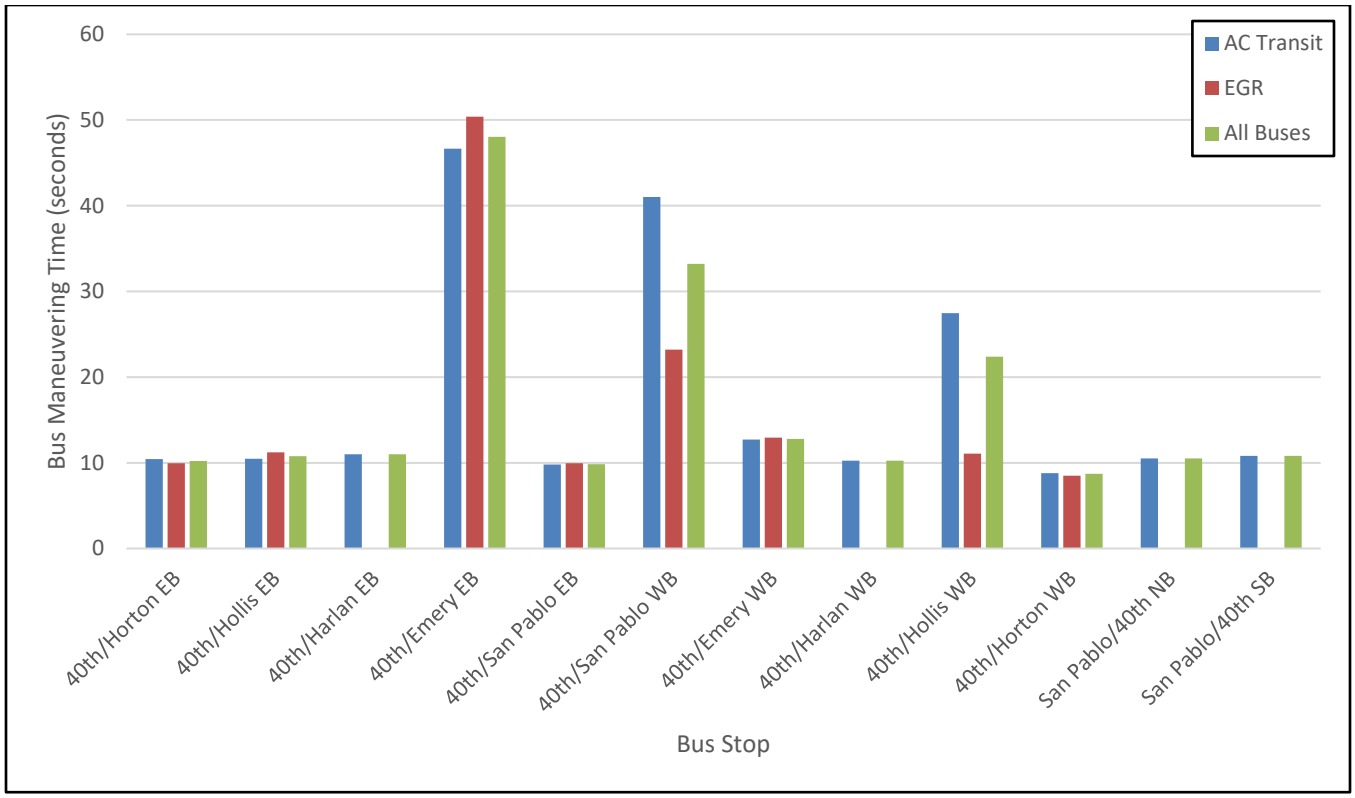


Figure 27: PM Peak Average Bus Maneuvering Time (Existing Conditions)

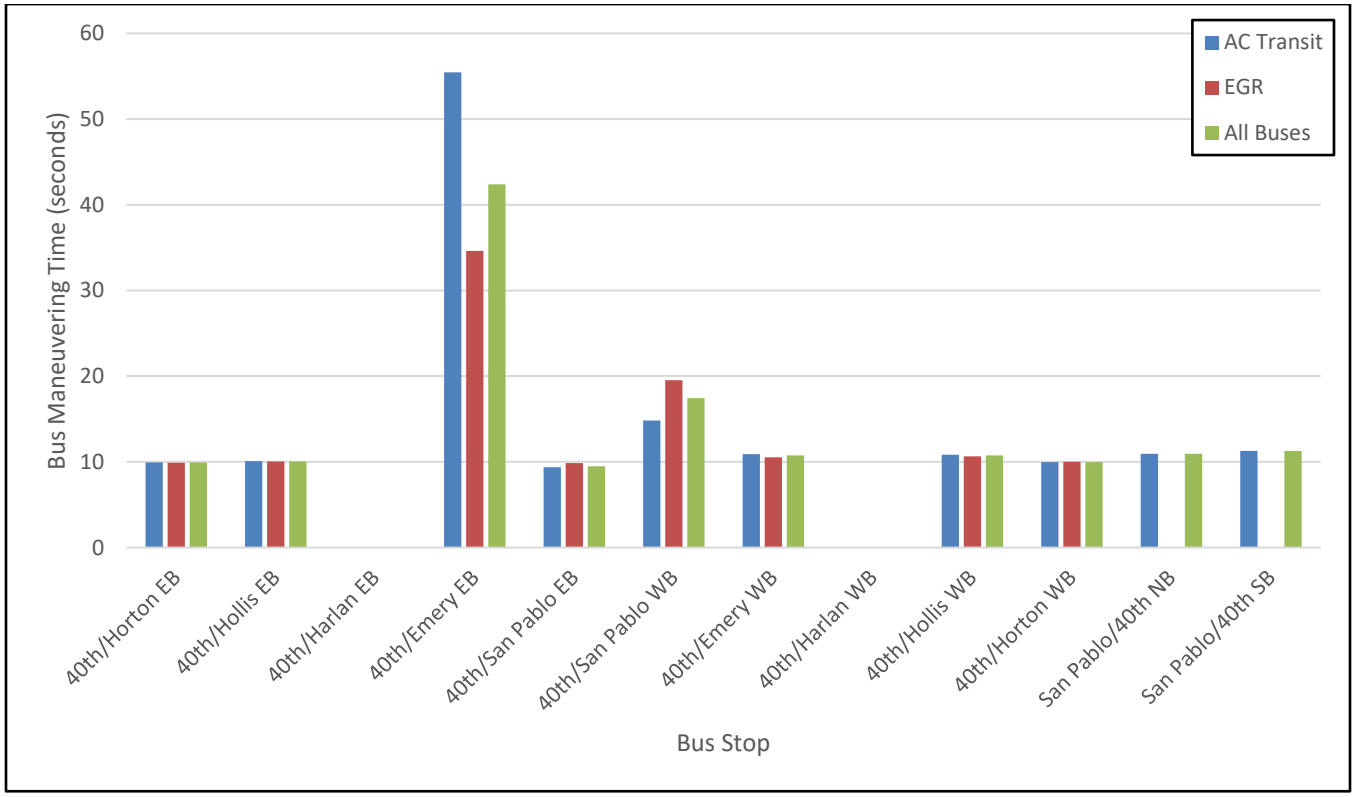


Figure 28: PM Peak Average Bus Maneuvering Time (Plus Project Conditions)

Plus Project Conditions

Similar to existing conditions, bus maneuvering time for Plus Project conditions is presented in Figure 26 and Figure 28 by bus stop and direction for the AM and PM peak hours, respectively. In the Plus Project scenario, the stops at Harlan Street would be removed. The overall eastbound travel time improves for all buses including AC Transit buses during both the AM and PM peak hours, but the delay at the eastbound bus stop approaching Emery Street increases compared to existing conditions. The degradation of service at this bus stop occurs because it is a near side bus stop, which means that buses leaving the stop may experience additional bus stop delay if the traffic signal indication is red. In the simulation modeling, more AC Transit buses were adversely impacted by the traffic signal operations than the EGR buses, illustrating the negative effects that signal operations have on near side bus stop operations. While the westbound maneuvering time at San Pablo Avenue would be reduced by the Plus Project, it would remain higher than other stops due to queue spill back from the protected westbound right-turn movement at San Pablo Avenue which must be protected so it is separated from the pedestrian and bicycle crossings. The project would reduce the westbound maneuvering delay at Hollis Street by segregating buses from through vehicular traffic. The remainder of the bus stops would maintain their maneuvering time with the new design.

End-to-End Travel Time

End-to-end travel time per AM and PM peak hour is presented in Table 2 and Table 3, respectively, by bus agency and direction as well as auto and truck trips. Each travel time listed is an average of all vehicles that travel eastbound and westbound on 40th Street from IKEA Entry to Yerba Buena Avenue and vice versa by vehicle class. Appendix 2.A presents the AM and PM peak hour average speed plots in the area for bus, auto, and trucks combined to visualize the low speed zones within the study corridor.

Existing Conditions

EGR travel time through the corridor is slightly shorter than AC Transit. There are two main factors that contribute to shorter travel times. The first factor is the shorter dwell times for EGR buses because no fare is collected. The second factor is that EGR does not stop on 40th Street at the Harlan Street stop while AC Transit does. During the AM peak hour, the bus combined average travel time is 5.7 minutes for westbound and 5.3 minutes for eastbound travel. During the PM peak hour, the bus combined average travel time is 5.8 minutes for westbound and 7.1 minutes for eastbound travel.

Plus Project Conditions

With project implementation, almost all combined bus travel times would improve up to 5% during the AM and PM peak hours, the exception being the combined eastbound bus travel time which would improve by up to 20% during the PM peak hour. The project benefits are noticeable because the Harlan Street bus stop is eliminated and there is improved travel time in the bus only lanes. Westbound improved bus stop efficiencies resulting from the bus only lane during the PM peak hour approaching San Pablo Avenue and Hollis Street also contribute to travel time savings. The eastbound Emery Street bus stop causes bus delays with Existing conditions, this does not substantially change under the Plus Project condition.

In contrast, the auto and truck travel times would experience up to a 30% westbound travel time increase and a 17% (AM peak hour) and 8% (PM peak hour) eastbound travel time increase with implementation of the Project. The AM peak hour westbound travel time increases are attributable to delay at the Adeline Street and San Pablo Avenue intersections. Westbound PM peak hour traffic experiences delay at the San Pablo Avenue intersection and additional delay at Hollis Street where all motor vehicle traffic is in a single lane. Eastbound travel time degradation is generally associated with the lane reduction particularly through the Emery Street and San Pablo Avenue intersections which are closely spaced making efficient signal coordination difficult to achieve.

Table 2 40TH Street Bus Travel Times – AM Peak Hour					
			Travel Time (minutes)		
Operator	Direction	Existing	Plus Project	Difference (minutes)	Difference (Percent)
AC Transit	WB	5.8	5.5	-0.3	-6%
	EB	5.8	5.2	-0.6	-10%
Emery Go-Round	WB	5.6	5.4	-0.2	-3%
	EB	4.8	5.0	+0.2	3%
Bus Combined	WB	5.7	5.5	-0.2	-5%
	EB	5.3	5.1	-0.2	-4%
Auto and Truck	WB	3.6	4.6	+1.0	29%
	EB	3.3	3.8	+0.5	17%

Source: Fehr & Peers, April 2019.

Table 3 40TH Street Bus Travel Times – PM Peak Hour					
			Travel Time (minutes)		
Operator	Direction	Existing	Plus Project	Difference (minutes)	Difference (Percent)
AC Transit	WB	6.6	6.1	-0.5	-8%
	EB	7.1	5.5	-1.6	-23%
Emery Go-Round	WB	4.6	4.5	-0.1	-1%
	EB	7.1	5.7	-1.4	-20%
Bus Combined	WB	5.8	5.5	-0.3	-6%
	EB	7.1	5.6	-1.5	-21%
Auto and Truck	WB	4.1	5.3	+1.2	30%
	EB	3.8	4.1	+0.3	8%

Source: Fehr & Peers, April 2019.

Level of Service and Delay Analysis

Vehicular AM and PM peak hour LOS and delay were calculated with data provided by the City of Emeryville in a Synchro file. The file included bicycle, pedestrian, and vehicle volumes. A global peak hour factor was used in the microsimulation analysis.

Existing Conditions

Table 4 summarizes the AM and PM peak hour Existing conditions intersection analysis results. The study intersections operate at LOS D or better during the AM and PM peak hours. Attachment 2.B provides the detailed LOS and delay calculation sheets.

Plus Project Conditions

Table 4 summarizes the AM and PM peak hour Plus Project conditions intersection analysis results. While the study intersections delay would increase with implementation of the project, the LOS would remain at D or better for all study intersections. The LOS would go from C to D at AM Adeline Street, PM Hollis Street, and PM Emery Street. Attachment 2.B provides the detailed LOS and delay calculation sheets.

Table 4
40TH Street LOS and Delay – AM Peak Hour

Number	Intersection	Control [1]	Existing		Plus Project	
			Delay [2]	LOS	Delay [2]	LOS
1	40th Street at IKEA Driveway	Signal	2.2	A	3.8	A
2	Hubbard Street at 40th Street	SSSC	1.1 (7.5)	A (A)	1.1 (7.3)	A (A)
3	Horton Street at 40th Street	Signal	27.6	C	29.8	C
4	Hollis Street at 40th Street	Signal	26.6	C	26.5	C
5	Harlan Street at 40th Street	SSSC/ Signal [3]	2.9 (12.0)	A (B)	20.2	C
6	Emery Street at 40th Street	Signal	17.8	B	17.3	B
7	San Pablo Avenue at 40th Street	Signal	37.4	D	43.2	D
8	Adeline Street at 40th Street	Signal	21.1	C	54.6	D
40TH Street LOS and Delay – PM Peak Hour						
Number	**Intersection**	**Control [1]**	**Existing**		**Plus Project**	
			Delay [2]	**LOS**	**Delay [2]**	**LOS**
1	40th Street at IKEA Driveway	Signal	6.8	A	12.2	B
2	Hubbard Street at 40th Street	SSSC	3.2 (12.8)	A (B)	2.0 (7.8)	A (A)
3	Horton Street at 40th Street	Signal	39.2	D	51.1	D
4	Hollis Street at 40th Street	Signal	32.9	C	38.4	D
5	Harlan Street at 40th Street	SSSC / Signal [3]	1.8 (13.2)	A (B)	13.9	B
6	Emery Street at 40th Street	Signal	33.7	C	38.5	D
7	San Pablo Avenue at 40th Street	Signal	42.5	D	45.6	D
8	Adeline Street at 40th Street	Signal	27.9	C	32.3	C

Notes:
1. SSSC = Side Street Stop Control, Signal = Signalized intersection.
2. For signalized intersections, average intersection delay and LOS based on the 2010 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).
3. Intersection is SSSC during Exiting conditions and Signal during Plus Project conditions.

Source: Fehr & Peers, April 2019.

5. Preliminary Cost Estimate

The preliminary statement of probable cost below is based on the measurement and pricing of quantities taken from the Conceptual Layout Plan described above, with the following notes:

- This cost estimate is based on an earlier estimate from 12/16/2019, which did not include an estimate for the proposed plaza to the south east of the Shellmound/IKEA Entry Intersection. The Total Project Price (TPP) of the plaza has been added to the December 2019 overall TPP. See Attachment 3 for additional detail. This is a "Class 5 Rough Order of Magnitude" statement of probable cost, per Association for the Advancement of Cost Engineering (AACE) International classification.
- The pricing reflects probable construction costs obtainable in the San Francisco Bay Area at the time of writing. This statement is a determination of fair market value for the construction of this project. It is not a prediction of low bid. Pricing assumes competitive bidding for every portion of the construction work for all subcontractors, i.e. four to five bids approximately. If fewer bids are received, bid prices can be expected to be higher.
- The unit rates that have been established are for budgetary purposes only and are not to be used to establish the cost of additions or deletions to the scope of work that may arise during the actual construction process.
- The statement of probable cost is not intended to set the budget for the works; the budget can only be established once the City's project description is finalized, a design solution and schedule is developed, and the forecasted costs are subsequently approved by the City.
- Construction cost unit prices include foreseeable contractor costs – labor, material, equipment and indirect costs, plus overhead and profit. See Attachment 3 for additional detail.
- Green infrastructure costs are captured under Landscaping and Trees, except for bioretention areas located in curb extensions on side streets, which are included in the total cost provided for Side Streets Curb Extensions line.

The pricing includes the following lump sum allowances:

- Mobilization – allowance was provided per guidance provided by the City at $717,000
- Traffic Control – allowance was provided per guidance provided by the City at $263,000.
- Construction information signs (2) – assumed 2 per project at $1,500 each
- Construction area signs (20), e.g. "Road Work Ahead" and "End Road Work" – assumed 20 per project at $500 each
- Stormwater Pollution Prevention Plan (SWPPP) measures - 2.5% of total construction cost.
- Project Layout - lump sum allowance at $16,000
- Excavation Safety – lump sum allowance at $10,000

The pricing is based on the following assumptions:

- Easy access to the work area with minimal constraints.
- Normal bidding climate.
- Staging area is assumed to be adjacent to the limit of work.
- All work done during normal business hours, no night or weekend work is assumed.
- Construction Contingency is assumed at 25% of Direct construction cost
- Escalation: The detailed cost breakout in Attachment 3 is based on Qtr. 2 2019 USD. An escalation of 5% on direct costs has been included to make the final costs in Qtr.1 2020 USD.

Additional project costs include the following:

- Design – assumed as 15% of Total Project Construction Price
- Construction engineering and Administration – assumed as lump sum allowance at $527,000 provided per guidance by the City

The pricing excludes the following items:

- Environmental approval (California Environmental Quality Act - CEQA)
- Owner's construction and project management cost
- Legal and accounting fees
- Financing charges
- Fire and all risk insurance
- Hazardous material mitigation
- Any off-site roadway or utility improvements
- The costs or impacts of latent environmental issues that result in litigation or development delays
- Planning and inquiry costs including legal expenses and fees
- Bid contingency
- Cost escalation beyond the date of this statement

DESCRIPTION	Total
Demolitions & Earthwork	**$ 767,000**
New Roadway Items	**$ 2,505,000**
Drainage and Utility	**$ 315,000**
Pavement Marking	**$ 956,000**
Signs	**$ 21,000**
Lighting	**$ 298,000**
Signals, Lighting and Electrical Systems	**$ 1,400,000**
Trees & Landscaping	**$ 2,254,000**
Wayfinding a signage	**$ 50,000**
Furnishing	**$ 584,000**
Side Street Curb Extension	**$ 386,000**
TOTAL DIRECT CONSTRUCTION PRICE (TDP)	**$ 9,536,000**
Construction Contingency	$ 2,385,000
Escalation	$ 478,000
SUBTOTAL DIRECT CONSTRUCTION PRICE + CONTINGENCY	**$ 12,399,000**
Additional Construction Cost	**$ 1,295,000**
Mobilization	$ 717,000
Traffic Control	$ 263,000
Constructor Informational Sign	$ 3,000
Construction Area Sign	$ 15,000
Project Identification Sign	$ 3,000
Portable Changeable Message Sign	$ 28,000
SWPPP	$ 240,000
Layout	$ 16,000
Excavation Safety	$ 10,000
TOTAL CONSTRUCTION PRICE - Qtr. 1, 2020 US$	**$ 13,694,000**
Additional Project Cost	**$ 3,109,000**
Scoping	$ -
Environmental (CEQA)	$ -
Design	$ 2,055,000
Construction Eng/Admin	$ 527,000
ROW Engineering/Acquisitions/Relocations/Land Cost	$ 527,000
TOTAL PRICE - Qtr. 1, 2020 US$	**$ 16,803,000**
TOTAL PROJECT PRICE (TPP) - Qtr. 1, 2020 US$	$ 16,803,000
Class 5 Accuracy Range	**$ 13,442,400**
	$ 25,204,500

6. Funding Strategy

This Chapter outlines a funding strategy for implementation of the 40th Street/San Pablo Bus Hub project. The strategy is based on a review of potential sources of funding for the final design and construction of the proposed multimodal and streetscape improvements available to the City. It highlights the funding sources found to be most promising and summarizes recommended next steps in the process of advancing the project toward implementation. Chapter 2 of the report identifies and reviews the potential funding sources and programs in greater detail. It also discusses their likely relevance for implementing the preferred design concept based on published goals, selection criteria, and limitations associated with each funding source.

6.1 Introduction

The 40th-San Pablo Transit Hub project includes multimodal and streetscape improvements that enhance both safety and comfort aspects of the bicycling, walking, and transit passenger experience along a one-mile long stretch of 40th Street-Shellmound Street, including landscape elements and green infrastructure that can provide stormwater quality and climate change resilience benefits. Specifically, the project:

- Improves bus transit travel times and reliability through the area by providing bus-only lanes and transit boarding islands along 1-mile stretch of the 40th Street-Shellmound Street corridor.
- Enhances pedestrian and bicycle safety on a street identified by Alameda County Transportation Commission's 2019 Active Transportation Plan as being part of the pedestrian and bicycle "high injury networks". Improvements include:
    - Enhanced crosswalk safety, including narrowing the crossing distance (striping and signalization);
    - Protection of bicycle lane from motor vehicle and bus conflicts with Class IV separated bikeway design; and,
    - Protected signal phasing to reduce bicycle conflicts with turning autos at intersections.
- Enhances access to local and regional (Trans Bay Bus, BART) transit for people walking and cycling.
- Enhances local and regional access to the Bay Trail.
- Increases accessibility, safety, comfort, and functionality of bus passenger transit stop areas.
- Benefits city-wide east-west bike and transit connectivity in Emeryville and North Oakland, including for disadvantaged communities located in the City of Oakland to the south and east of the project.
- Implements the City's General Plan goal of enhancing the "Major Transit Hub" at 40th Street/San Pablo Avenue to make the use of transit more attractive and convenient.
- Includes streetscape improvements focused on areas used by transit riders, bicyclists, and pedestrians in order to further enhance the use of non-motorized and transit travel.
- Includes sustainable stormwater management features that mimic natural processes providing stormwater quality and climate change resilience benefits.

This comprehensive "complete streets" approach to the improvements will allow various aspects of the project to score favorably under most of the funding programs and sources discussed above. However, based on the conducted review of federal, state, regional, and local funding programs (see Section 2) and on the assumption that it is the City of Emeryville's preference to implement the complete project in the near-term (3-5 years), the timeliest and most resource-efficient path toward implementation is to submit the project to the Alameda County Transportation Commission (Alameda CTC) for inclusion in its Comprehensive Investment Plan. Doing so creates an opportunity for the project to access not a single – and potentially limited – funding program, but rather a range of programs managed by Alameda CTC. The CIP application process will include an initial projection of which funding sources may be matched to which phase of the project. Such sources may include discretionary

funds from local and other funding sources managed by the Alameda CTC and funding for which the City[24] will apply to competitive grant funding programs, such as the state and regional Active Transportation Program (ATP), state and regional One Bay Area Grant (OBAG), and others. The use of local discretionary funds is advantageous in that they are less onerous to manage compared to federal funds, which require a significant level of administrative effort with respect to the use of funds, project delivery timelines, and reporting. A key advantage of the CIP process is that it allows funds from different sources to be programmed under the CIP, resulting in the implementation of the project as a single project and following a coordinated schedule of phases and funding allocations (also see Attachment 3 of Appendix D).

By comparison, an implementation of the project through City-led applications to multiple funding sources outside of Alameda CTC's CIP process would be time consuming, require significant administrative effort, and be challenging based on the fact that some programs and grants limit their funding to particular types of projects or improvements – e.g. bicycle and pedestrian improvements under the state and regional ATPs. This would make the simultaneous implementation of pedestrian, bicycle, transit, and streetscape improvements as a single project significantly more complex from a design and construction timeline and funding perspective. However, as to not lose opportunities, consideration should be given to concurrently pursuing supplemental funding outside the Alameda CTC CIP process, including sources for the funding of landscape and green infrastructure improvements as well as matching funds.

7. Recommended Implementation Steps

Alameda CTC's next call for projects for inclusion in the CIP is expected to be issued in the Fall of 2020. While project screening and prioritization criteria will be developed later this year, it is likely that the projects will need to reflect the goals that have been developed for the draft Countywide Transportation Plan Update, which include:

- Accessible, Affordable, and Equitable
- Safe, Healthy, Clean
- High Quality and Modern
- Economic Vitality

An initial review of Alameda CTC's current selection criteria[25] (see Appendix 2 for more details) indicates that the project already meets most of the listed criteria. It appears realistic for the City to address the remaining to-do items identified below before Alameda CTC's call for project:

A. Readiness Delivery Criteria Overview: The project has a well-defined funding plan, budget and schedule; implementation of the project phase is feasible; governing body approval and community support are demonstrated; and the agency has the ability to coordinate among internal and external agencies, as applicable.

40th-San Pablo Bus Hub Project: Has a budget, identified feasible implementation phases (Final Design (PS&E)/Right-of-Way Acquisition and Support/Construction Capital and Support), City Council approval of the project and demonstrated community support. City staff is prepared to engage in continued project coordination with AC Transit, Emery Go-Round, Caltrans, and City of Oakland staff. Still requires development of a funding plan and schedule.

[24] Potentially in partnership with AC Transit and Emery Go-Round.

[25] As approved by the Alameda County Transportation Commission in 2015.

B. Needs and Benefits Criteria Overview: The project need is clearly defined and demonstrates how the transportation improvements will benefit intended users by increasing connectivity, improving access, supporting well maintained transportation facilities/equipment (as applicable); promotes innovation and a multimodal system; improves safety and supports a clean environment and strong economy.

40th-San Pablo Bus Hub Project: Project need can be clearly identified through the City's General Plan (i.e. Emeryville's goals for multimodal transportation system, "Major Transit Center"), Alameda CTC's Active Transportation Plan (i.e. 40th Street is on pedestrian and bicycle high injury networks), Oakland's 2019 Bike Plan – Let's Bike Oakland (recommends buffered bike lanes on 40th Street east of Adeline, up to and beyond McArthur BART station) and AC Transit's Major Corridors Study (i.e. a segment of the Adeline/40th Street Corridor). Project improves multimodal access to transit, employment, businesses, promotes a multimodal system, and improves pedestrian and bicycle safety as well as access to transit, including for persons with disabilities. Projects includes sustainability features (i.e. green infrastructure, shade trees).

C. Project/Program Sustainability Criteria Overview: Project demonstrates the ability to be maintained beyond project completion.

40th-San Pablo Bus Hub Project: Meeting this criterion will require the City's commitment to take on the long-term maintenance responsibilities for the proposed improvements.

D. Matching and Leveraging Funds Criteria Overview: The project has secured funding from other sources or demonstrates how it will leverage other funds for use on the project.

40th-San Pablo Bus Hub Project: This funding strategy is a first step to identifying funding programs/sources the City intends to leverage. The most likely funding sources the City could leverage for funds include STP, CMAQ, STIP, statewide and regional ATP, regional OBAG, and potentially Proposition 1 and Proposition 68 funding for the project's green infrastructure treatments. In addition, the City will explore statewide competitive programs funded through SB 1 and California Climate Investments (cap-and-trade revenue). Some of the supplemental funding sources may be used to fund local match requirements (e.g. TDA 3, Measure B and BB or VRF Direct Local Distributions).

E. Other Funding Features: As applicable, the project incorporates complete streets and other requirements mandated by other funding sources/programs.

40th-San Pablo Bus Hub Project: The project is a complete streets project and implements the City's Complete Streets Policy. Specific requirements associated with funding programs the City intends to leverage will be addressed in the application as applicable.
If accepted, the 40th-San Pablo Bus Hub project would be successively matched with funding programs appropriate for the respective implementation phase. Of the project delivery phases identified in Alameda CTC's CIP, the following are relevant for the 40th-San Pablo Bus Hub Project:

- Final Design (PS&E),
- Right-of-Way Acquisition and Support,
- Construction Capital and Support,
- Post-Construction Activities, and
- Project Closeout.

Commencing with the Final Design (PS&E) phase requires that environmental approval of the project has been completed. Since the City considers the project as categorically exempt under CEQA, no environmental study phase is listed above. Because the proposed improvements at bus stops on the south side of 40th Street, west of

San Pablo require the acquisition of 3-foot wide sidewalk easements, right-of-way acquisition is a necessary step in the implementation of the project. In the interest of a timely project implementation, it is recommended that the City explore with Alameda CTC staff if the Right-of-Way Acquisition phase and Final Design (PS&E) can be funded as a coordinated single phase rather than two successive phases with separate funding allocations. This phase should also include the required close coordination with Caltrans District 4 regarding the proposed improvements proposed at the Caltrans-controlled 40th Street/San Pablo Avenue (Highway 123) intersection, including the agency's requirements for an encroachment permit and associated review and approval timelines. In preparation of a successful submittal to Alameda CTC for the agency's inclusion of the project in its next CIP, it is recommended that the City of Emeryville undertake the following steps:

1. Establish a nexus between local planning and the Alameda CTC's regional planning documents[26]. This includes:
    a. Developing a narrative that highlights policies and objectives in the General Plan, Pedestrian and Bicycle Plan, Sustainable Transportation Plan, and Capital Improvement Program that designate the street as a transit street and bikeway and call for bicycle and pedestrian safety and comfort improvements along the corridor and at the 40th/San Pablo intersection. In addition, the designation as a transit hub should be emphasized.
    b. Identifying 40th Street as a two-way, separated bikeway (Class IV) in future updates of the City's General Plan and Pedestrian and Bicycle Plan.
    c. Identifying 40th Street-Shellmound Street as a transit corridor with bus-only lanes between Adeline Street and Ikea Entry in future updates of the City's General Plan.

2. Discuss with Alameda CTC staff the City's intention to apply for inclusion of the project in the 2020 CIP and how to reflect any updated designations for 40th Street/Shellmound Street in Alameda CTC's 2020 Countywide Transportation Plan (CTP) Update, which will serve as the county's input into the next iteration of MTC's Regional Transportation Plan (RTIP)[27].

3. Prepare any documentation needed to qualify the project as a categorical exemption under CEQA.

4. Meet with AC Transit and Emery Go-Round to discuss potential partnering in the request for funding and delivery of transit related improvements included in the project.

5. Meet with Caltrans District 4 to discuss Caltrans' support in the request for funding and delivery of improvements overall and to coordinate the timing of plans and permits needed from Caltrans for the implementation of improvements at the Caltrans-controlled intersection of 40th Street/San Pablo Avenue (Highway 123).

6. Meet with the City of Oakland to discuss potential partnering on implementing and funding bicycle improvements along the 40th Street corridor east and west of Adeline Street as a multi-city bike corridor connecting BART and Bay trail. Coordinate the transition between bicycle and transit improvements in Oakland (i.e. proposed buffered bike lanes) and Emeryville (two-way separated bikeway, bus-only lanes).

7. Identify which funding sources the City will use as local matching funds, such as the minimum 11.47 percent (11.47%) match required by Alameda CTC for capital and program operation funds requested during a given request for funding.

[26] Such as the Countywide Transportation Plan (CTP), multi-modal plans (Transit, Goods Movement, and Arterials), and Active Transportation Plan.

[27] The City of Emeryville included "Road Diet and Bus-Only Lanes on 40th Street" for Alameda CTC's submittal of regionally significant non-exempt projects for the draft Regional Transportation Plan (RTP).

8. Monitor the development of project selection and prioritization criteria for Alameda CTC's next call for projects.

9. Review and complete application materials required by Alameda CTC under its CIP call-for projects, including (see Appendix 3 for sample worksheets from the CIP):
    a. Project milestone schedule by phase
    b. Project cost by phase
    c. Project funding by phase

10. Submit the project to Alameda CTC for inclusion of the project in the next iteration of the agency's Comprehensive Investment Plan (CIP).

11. Discuss with Alameda CTC, the potential for funding the Final Design (PS&E) phase from local discretionary funds managed by Alameda CTC.

12. If accepted into the CIP, execute funding agreement(s) with Alameda CTC.

13. Submit – or co-submit with AC Transit/Emery Go-Round as partners – applications to prospective competitive grant programs to leverage federal, state, regional and local funds.

Attachment 1 – Green Infrastructure Feasibility

Introduction

Stormwater runoff from the 40th Street corridor currently discharges into San Francisco Bay via traditional gray infrastructure (drainage inlets and pipes) with limited or no water quality treatment. The street currently consists mainly of impermeable pavement that negatively impacts the natural hydrological cycle by increasing runoff and concentrating pollutants.

Stormwater regulations now require new development and redevelopment projects to install facilities to treat and reduce runoff. As we face increasing frequency, duration, and intensity of storm events, and more persistent drought conditions, it is also time to ask more of our streets.

This project provides the City of Emeryville with a significant opportunity to reimagine the functionality of the 40th/Shellmound Street corridor, not just from a mobility, safety, and streetscape perspective, but as part of the natural ecosystem as well. Integrating green infrastructure alongside the envisioned transit, bicycle and pedestrian improvements would enhance the resilience and enjoyability of the street by improving water and air quality, mitigating the urban heat island effect, and creating habitat.

The concept plan presents the following green infrastructure Best Management Practice (BMP) opportunities within the 40th Street corridor (refer to Sheets 01 through 03 at the end of Chapter 3):

- Biofiltration and/or bioretention planters
- Permeable asphalt bikeway surface
- Tree wells
- Rain garden

Preliminary sizing assumes that BMP areas are approximately 4% of the contributing watershed. Based on geological maps in the area, the underlying soils are highly variable with moderate permeability, and water bearing gravel lenses may be encountered. Geotechnical investigations during detail design will confirm whether infiltration of runoff is feasible, which will verify the sizing and detailing of the BMPs.

Biofiltration / Bioretention Planters

Planters are typically constructed with vertical walled sides, a flat bottom area and a large surface area. Water is treated as it filters downward through the soil media. Should infiltration be feasible, bioretention planters will likely be preferred due to their ability to infiltrate runoff and reduce the rate and volume of water entering the City's storm drain system. The planter walls need to be engineered to assure stability and protect adjacent pavements from water ingress.

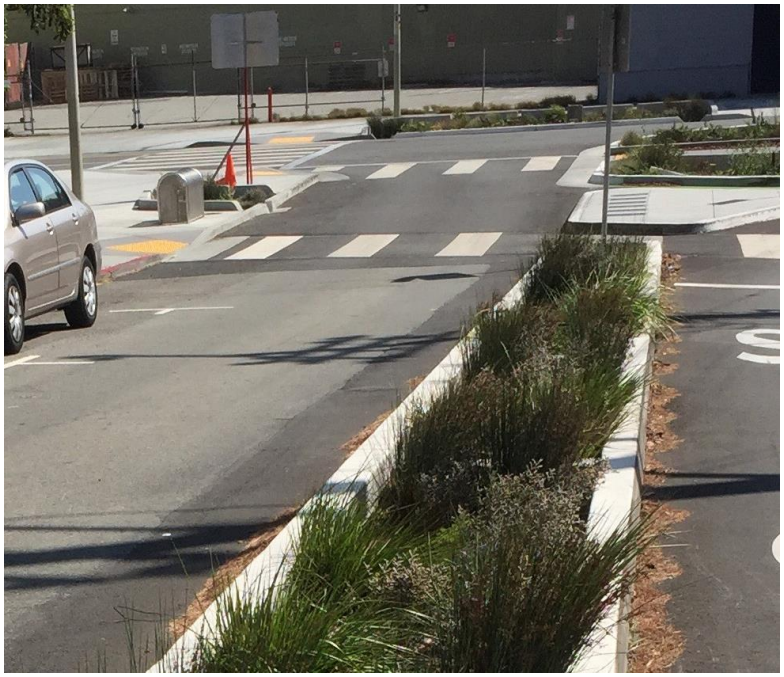
If infiltration is not feasible, biofiltration planters should be utilized. These would include either a concrete base or a liner attached to all sides, and perforated underdrains that connect to the City's storm drain system.

The corridor provides several biofiltration planter opportunities, located:

- Within the buffer of the protected bikeway
- At curb extensions on the northern side streets along 40th Street
- At select locations adjacent to transit passenger environments

Protected Bikeway Buffer

The planters in the 4-ft wide protected bikeway buffer will treat water from the westbound travel lanes. Assuming 6-inch thick walls, the internal width of the planter will be 3-feet. Specific consideration should be given to the selected plant species due to the relatively narrow width of the soil media.



Curb Extensions

Curb extensions on the side streets to the north of 40th Street offer an opportunity to treat stormwater and direct pedestrians safely towards reduced width crosswalks. These planters will treat water from the side streets, creating additional benefits beyond the immediate footprint of the project. Inlets should be located upstream of catch basins. Plants less than 24-inches tall should be used to maintain adequate sightlines at intersections. Using curb return angles between 30 and 60 degrees will facilitate street sweeping.

Adjacent to transit passenger environments

Opportunities exist at the ends of the transit passenger environments for curbside planters at the transit hub between San Pablo Avenue and Adeline Street. Pedestrian activity will be high in these areas, so 10ft to 12ft wide sidewalk is provided for circulation, resulting in a 5ft wide curbside planter. Seating, signage or other features could be placed around the planters to improve pedestrian safety and enhance the streetscape.

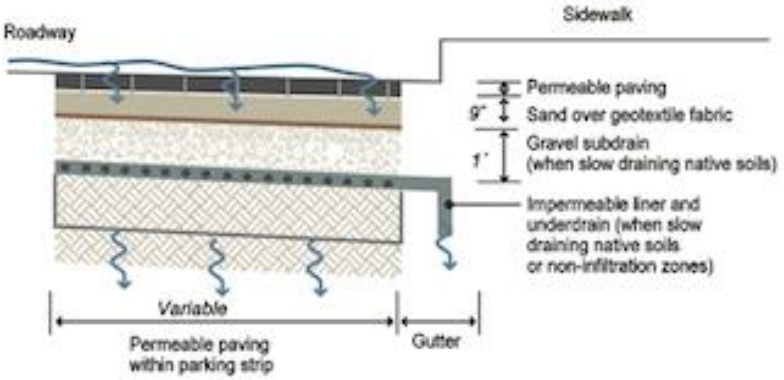
Permeable Asphalt Pavement

The bikeway provides an opportunity to decrease the imperviousness of the corridor and reduce the rate / volume of runoff. It will capture runoff from its own footprint and the adjacent northern sidewalk. If infiltration proves to be infeasible, perforated underdrains will connect to the City's storm drain system.

The pavement section will include a gravel storage layer, currently assumed to be 8" thick (to be confirmed during detailed design). Consideration should be given to bringing the permeable pavement to the face of curb, to avoid water bypassing the permeable pavement in the gutter. To optimize comfort for cyclists, a mix with smaller voids should be considered. All storage media should use clean, washed, open-graded crushed stone.

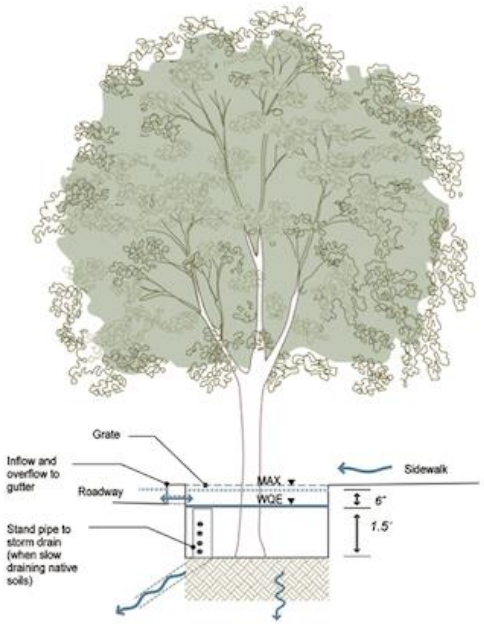
Permeable paving requires regular maintenance to remain effective, which may include sweeping, washing or vacuuming to remove sediment, greases and oils.

Permeable Paving Detail - Street BMP E

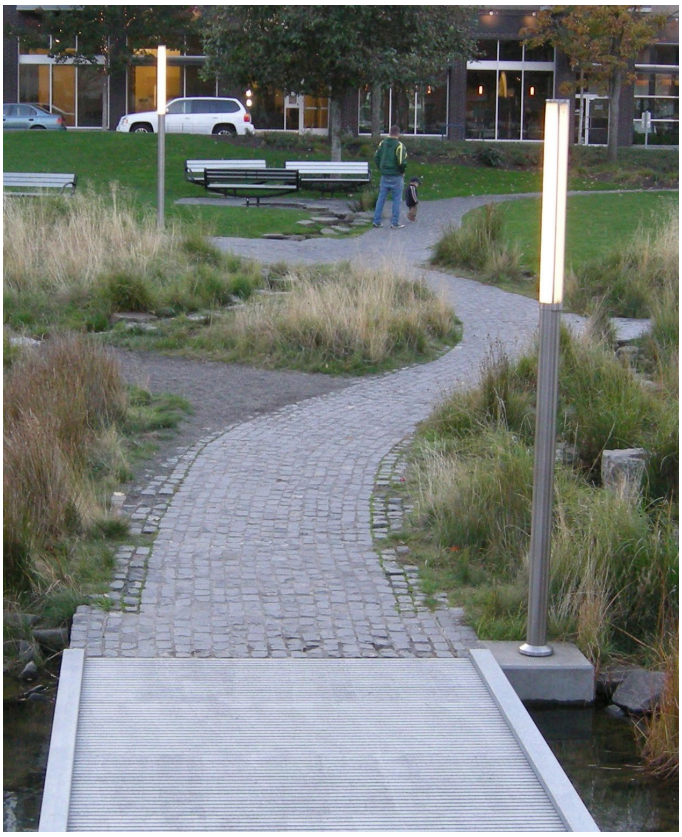


Tree Wells

Healthy street trees can intercept, transpire, and treat significant volumes of runoff. Sidewalk reconstruction is proposed on both sides of 40th Street between San Pablo Avenue and Adeline Street, providing an opportunity to plant new street trees. Tree wells using structural soil are proposed to encourage tree growth and optimize stormwater management and urban heat island benefits. On either side of the street, a series of wells would be connected by a subsurface system to distribute runoff.



Rain Gardens



Rain gardens provide similar treatment mechanisms to bioretention planters but are depressed landscaped areas rather than contained structures. A rain garden could potentially be located on the north side of Shellmound at the existing landscaped area that connects to Halleck Street. The area is located within the City of Oakland, however the feasibility of creating a pocket park featuring a rain garden could be further explored during detail design. A detailed topographic survey is required to verify the contributing watersheds, which appear to include a portion of the Shellmound Street ramps and Halleck Street.

For more information regarding green infrastructure typologies and technical considerations, refer to:

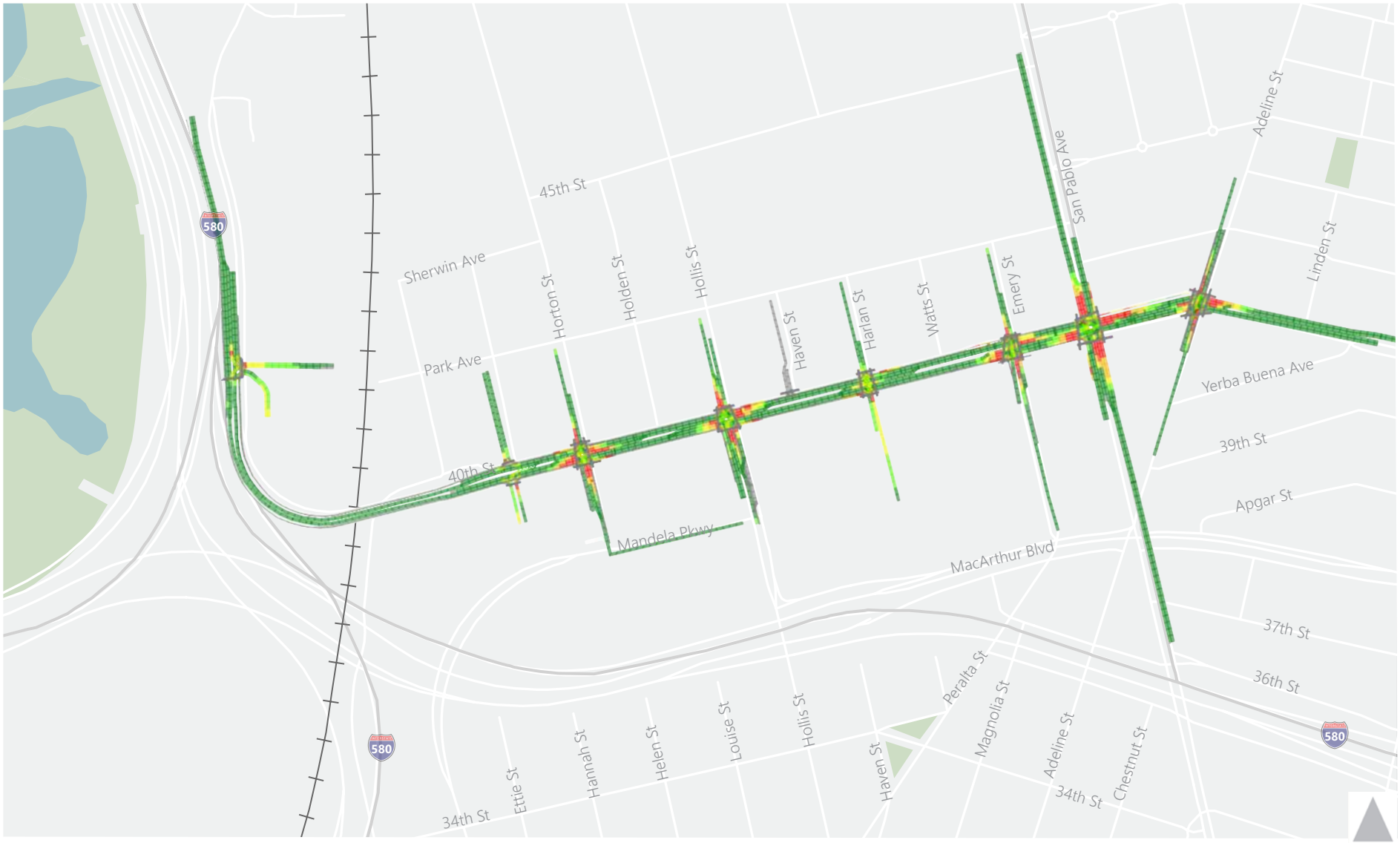
- National Association of City Transportation Official's (NACTO) Urban Street Stormwater Guide
- Alameda County C3 Technical Guidance Manual, 2017
- San Francisco Stormwater Management Requirements and Guidelines, including Typical Standard Details and Specifications (https://www.sfwater.org/index.aspx?page=1007)

Preliminary costing for the green infrastructure elements is included in Chapter 5 of this report. The costs assume that infiltration is not feasible and that underdrains connect the green infrastructure systems to the City of Emeryville's storm drains.

Attachment 2 – Multimodal Operations Analysis of Preferred Concept Design

Attachment 2.A – AM and PM 15-Minute Average Speed Plots

Attachment 2.B – LOS and Delay Calculation Worksheets



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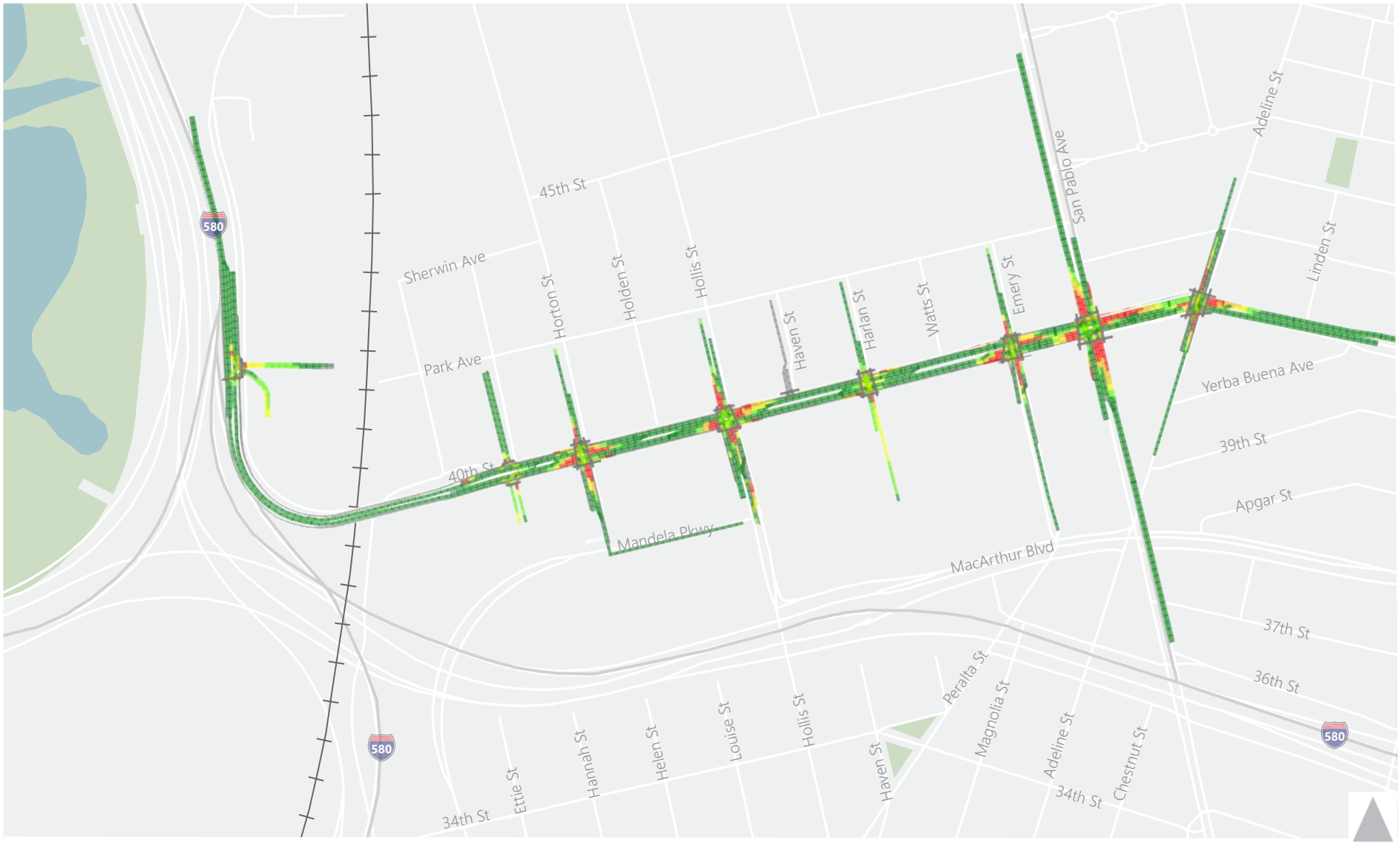
Existing Conditions - Average Motor Vehicle and Bus
7:30 AM - 7:45 AM



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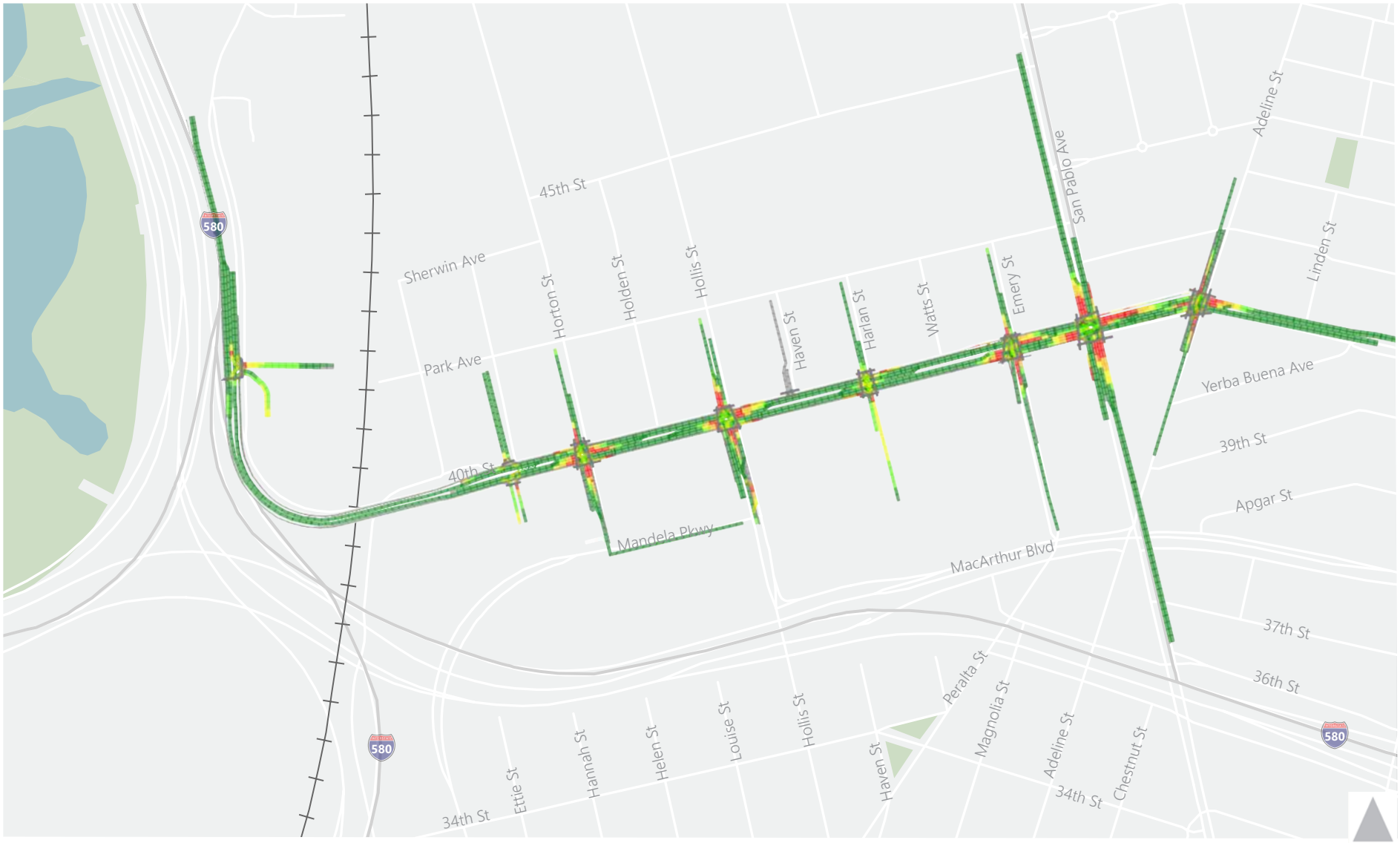
7:45 AM - 8:00 AM



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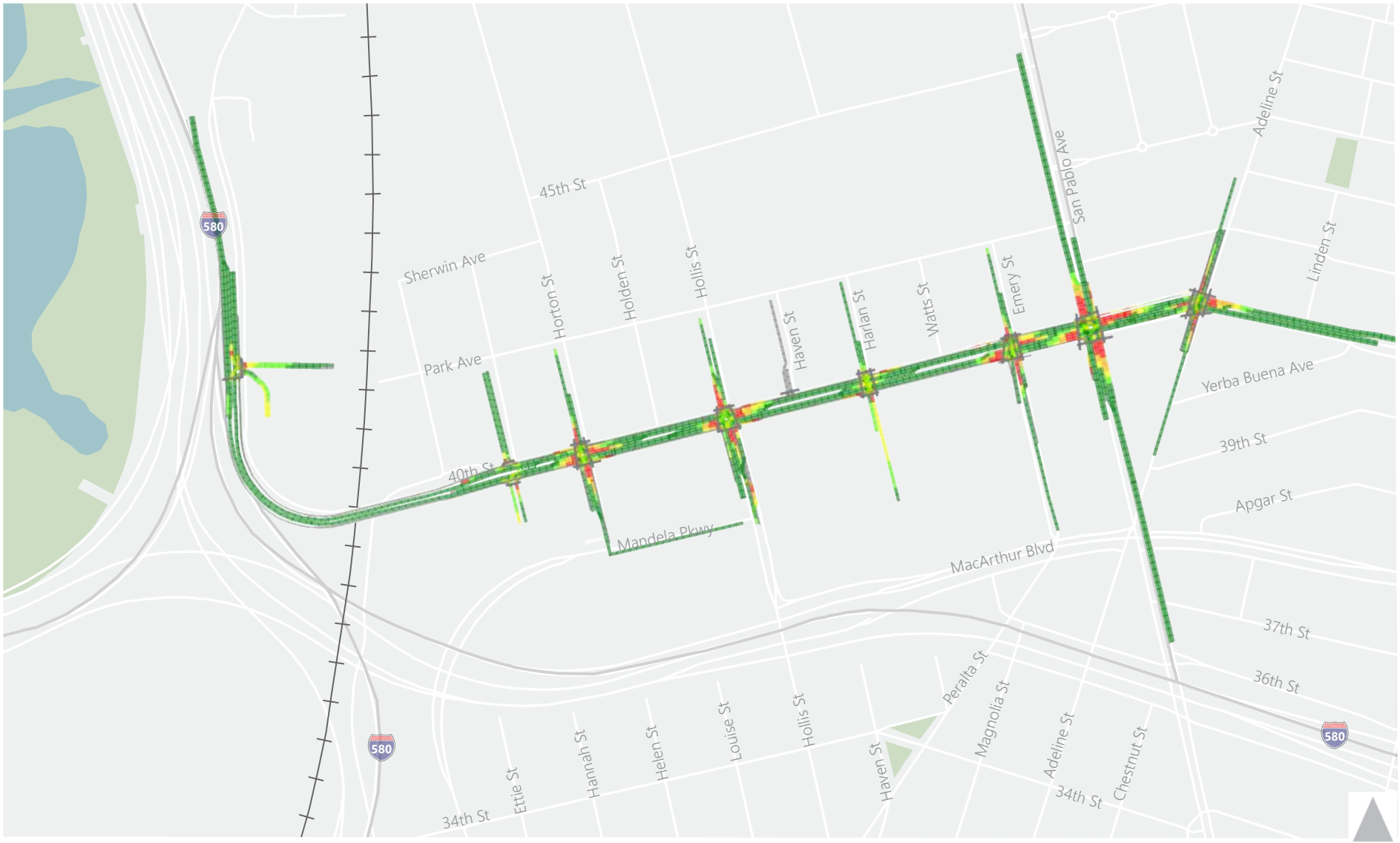
8:00 AM - 8:15 AM



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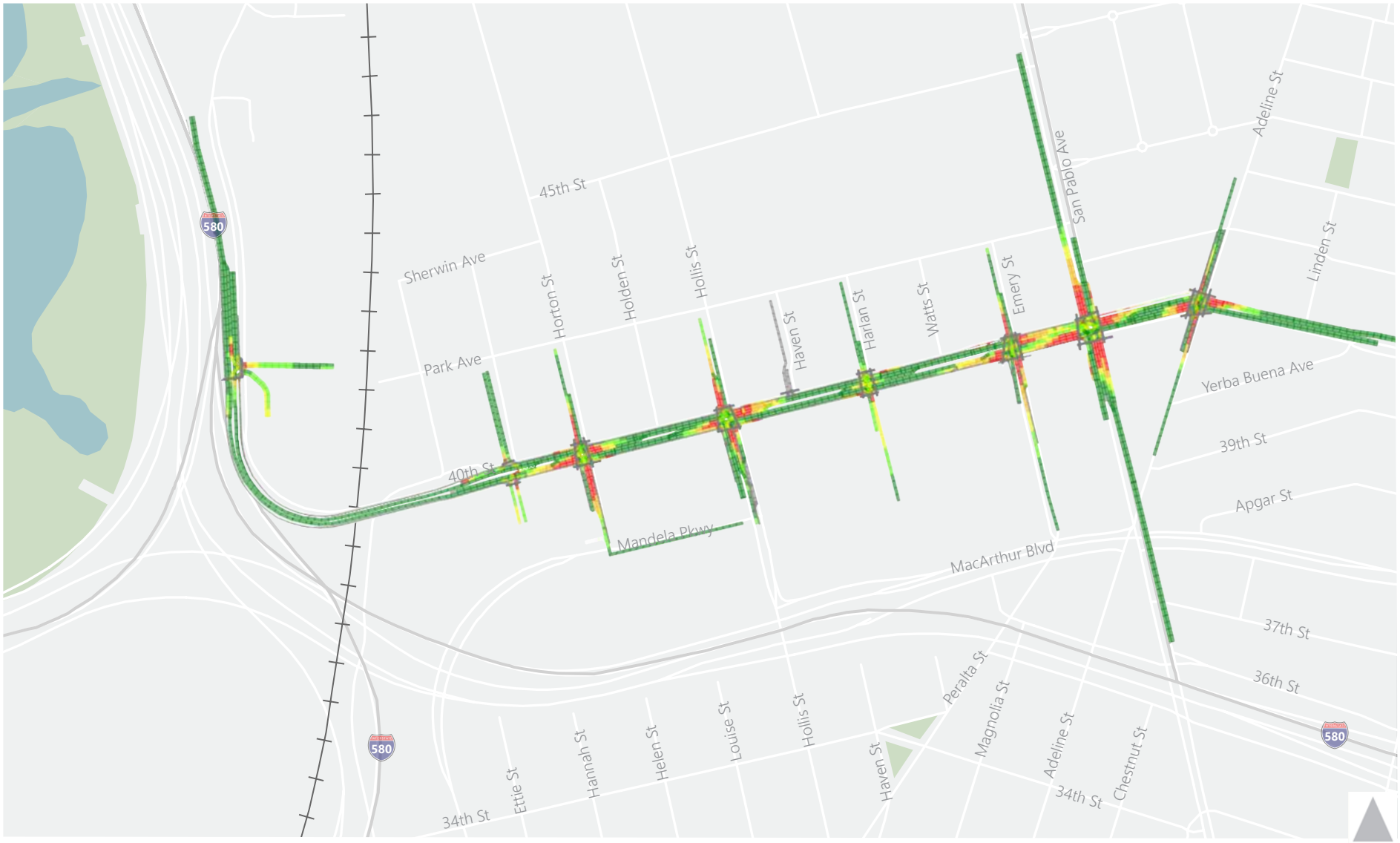

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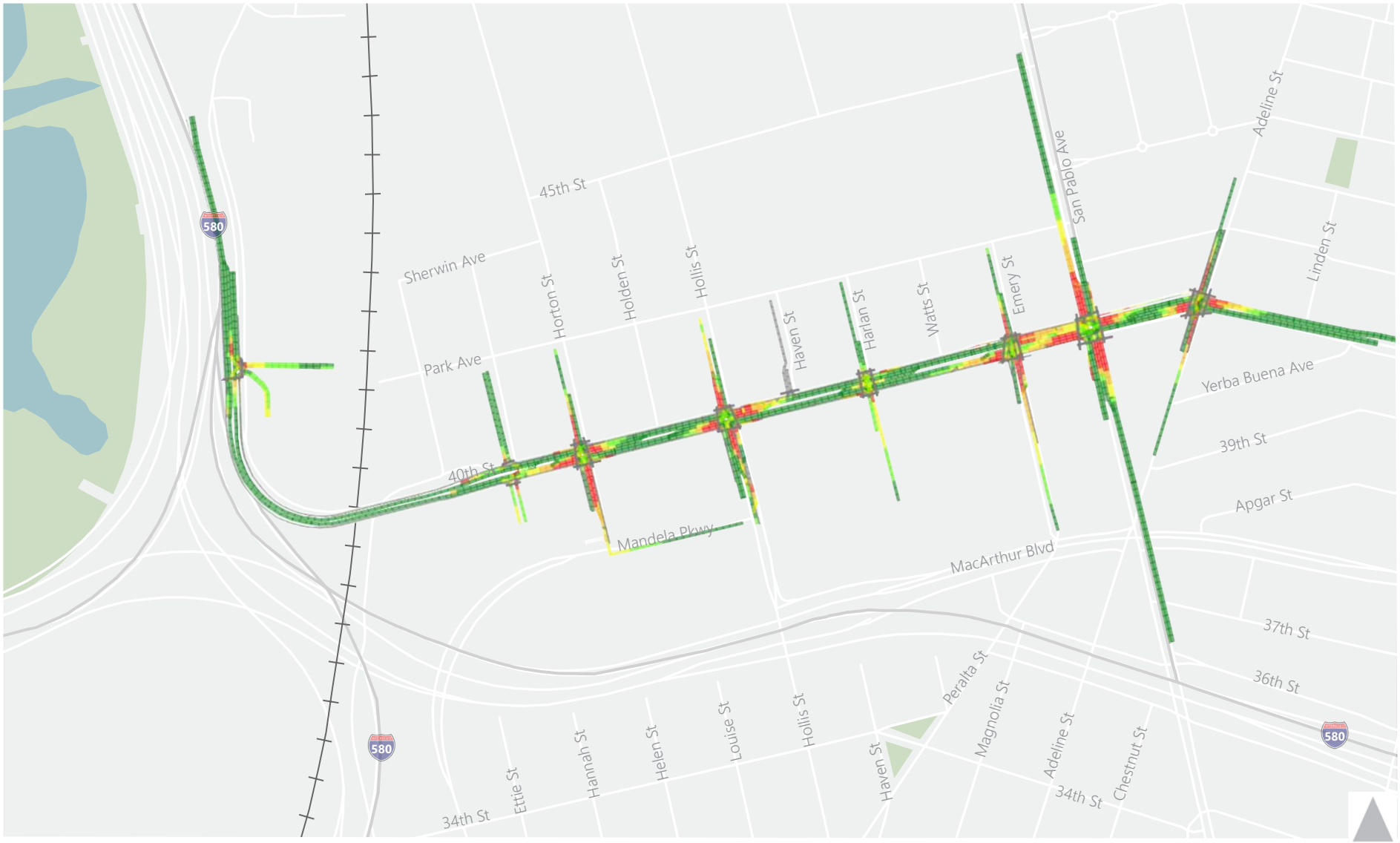
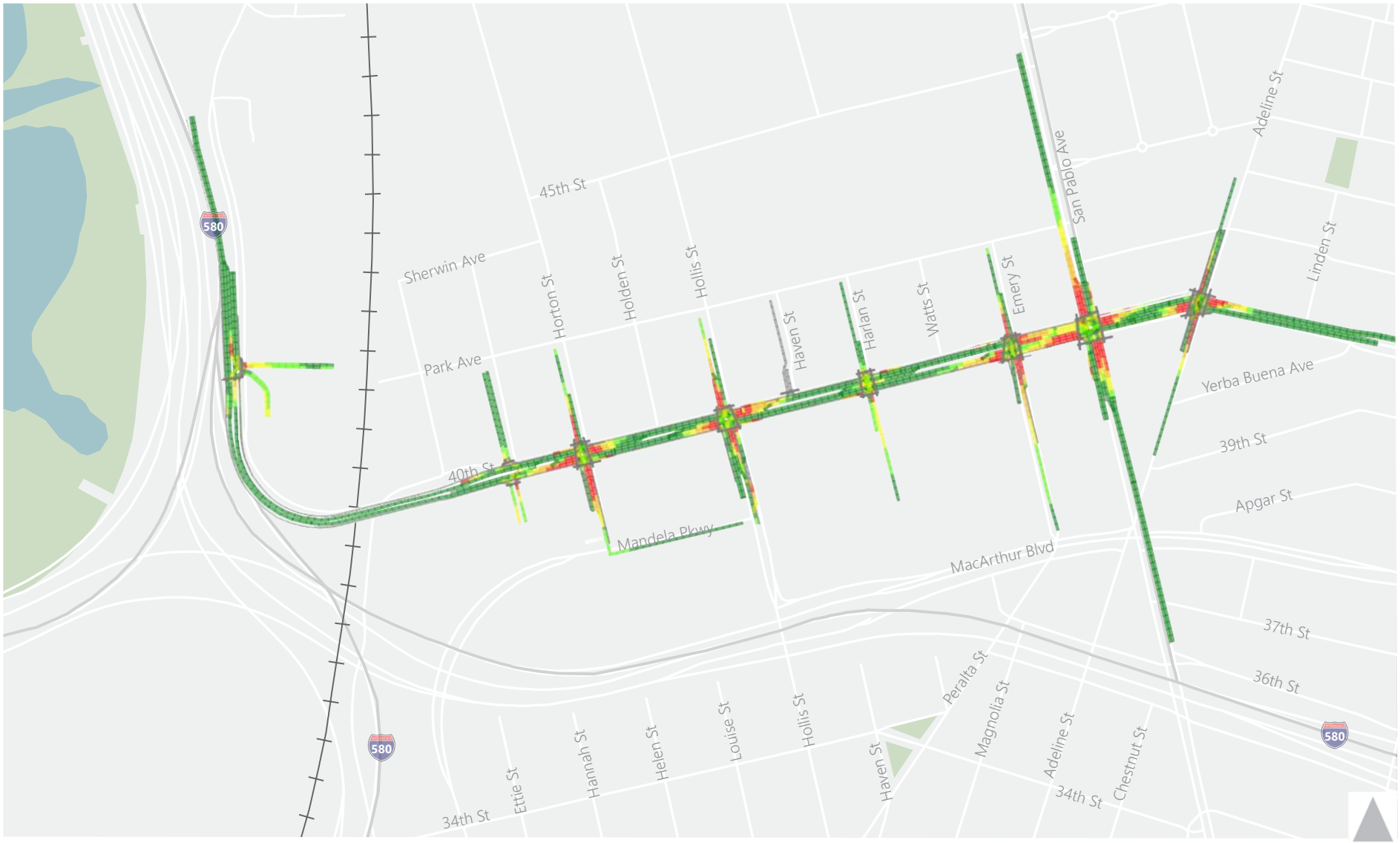
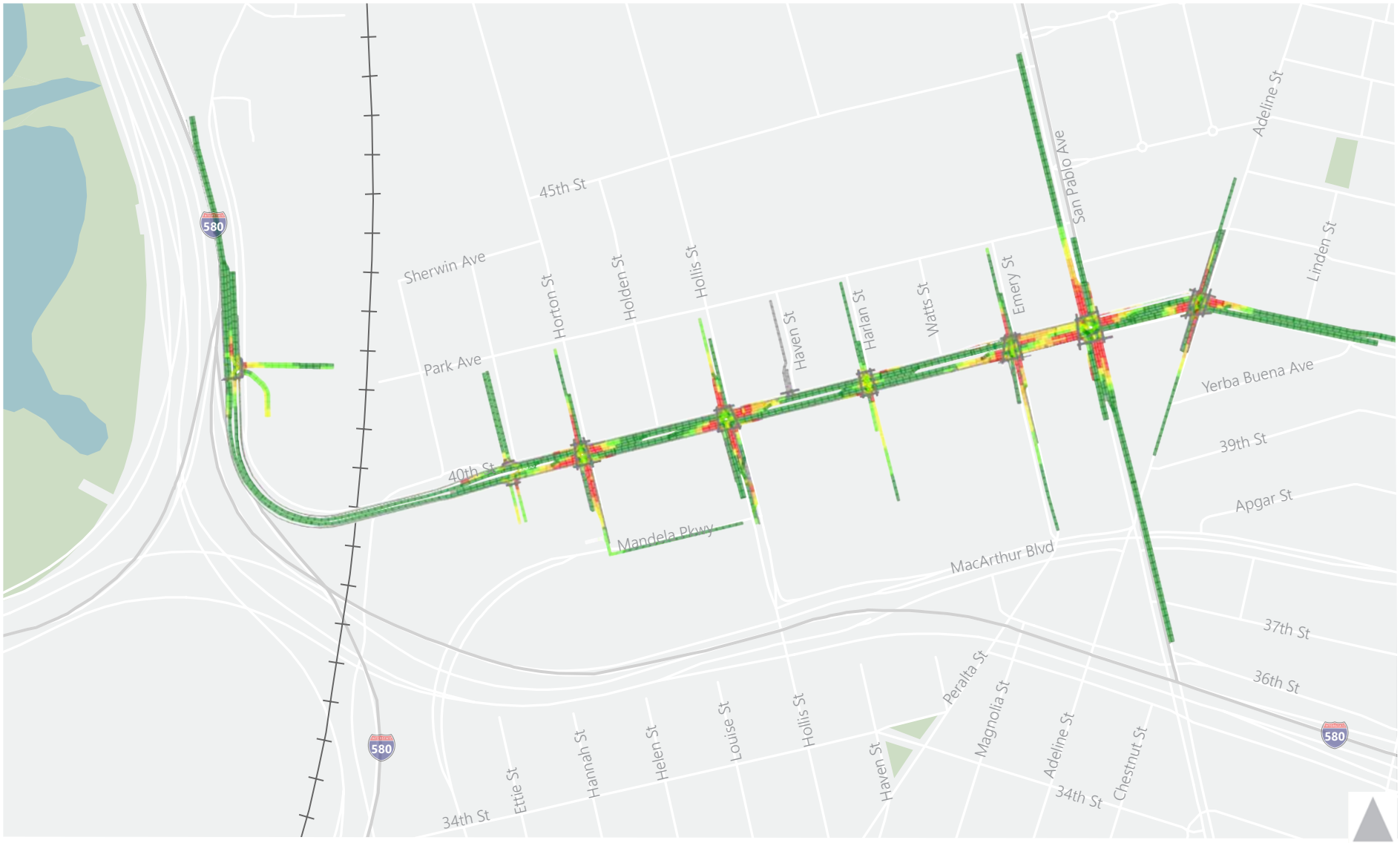
Existing Conditions - Average Motor Vehicle and Bus
5:00 PM - 5:15 PM



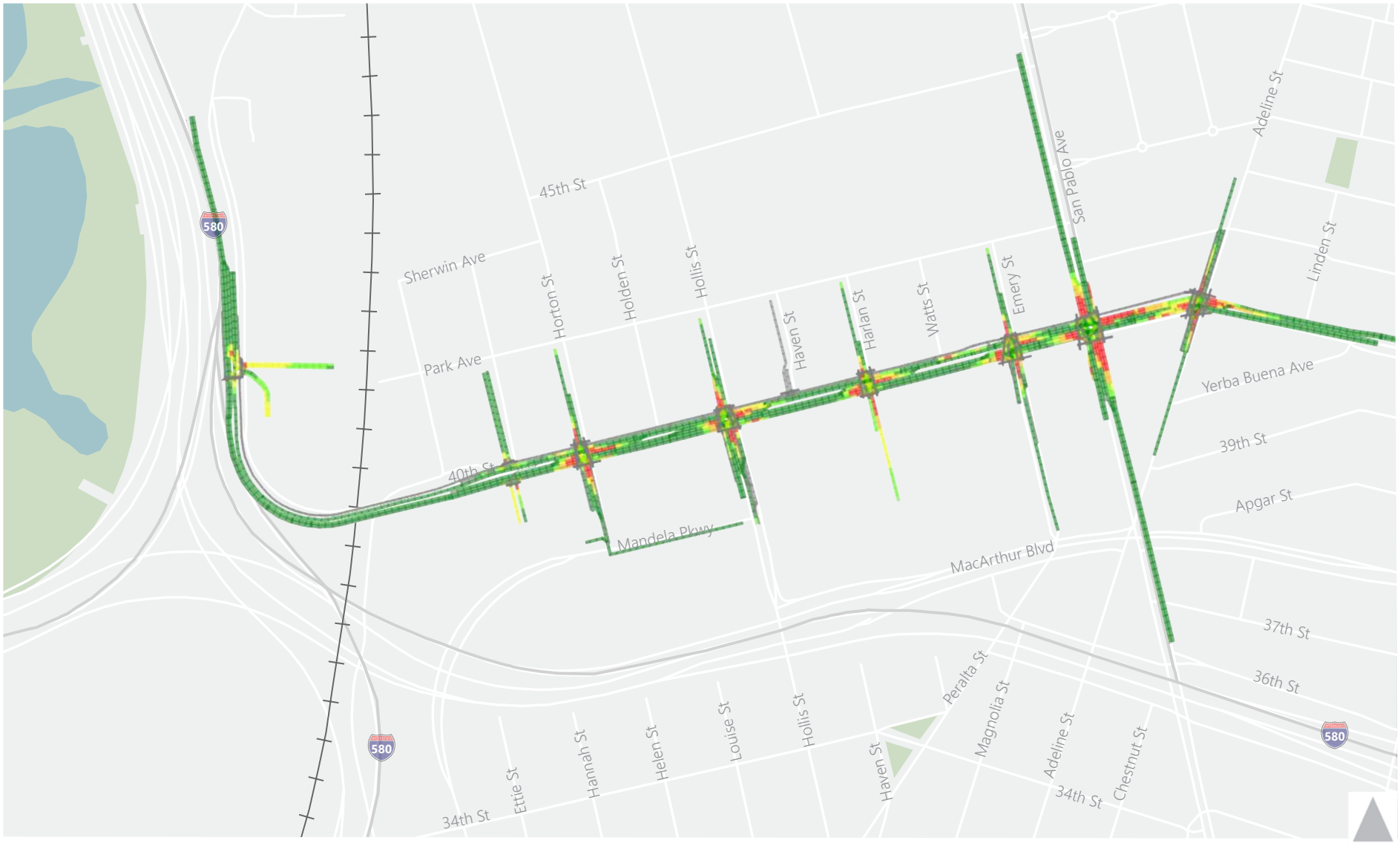
Existing Conditions - Average Motor Vehicle and Bus
5:15 PM - 5:30 PM



Existing Conditions - Average Motor Vehicle and Bus
5:30 PM - 5:45 PM



Existing Conditions - Average Motor Vehicle and Bus
5:45 PM - 6:00 PM



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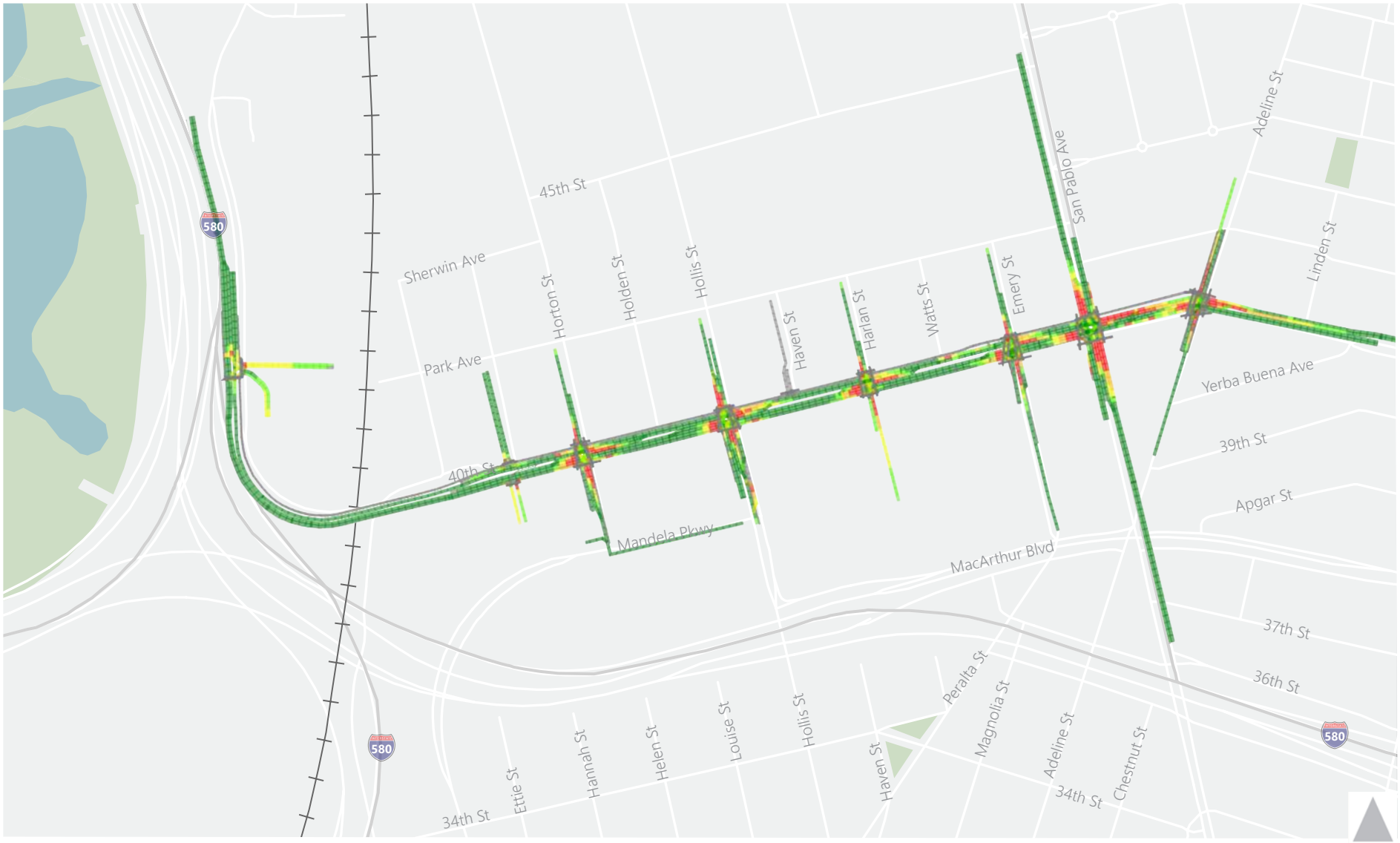
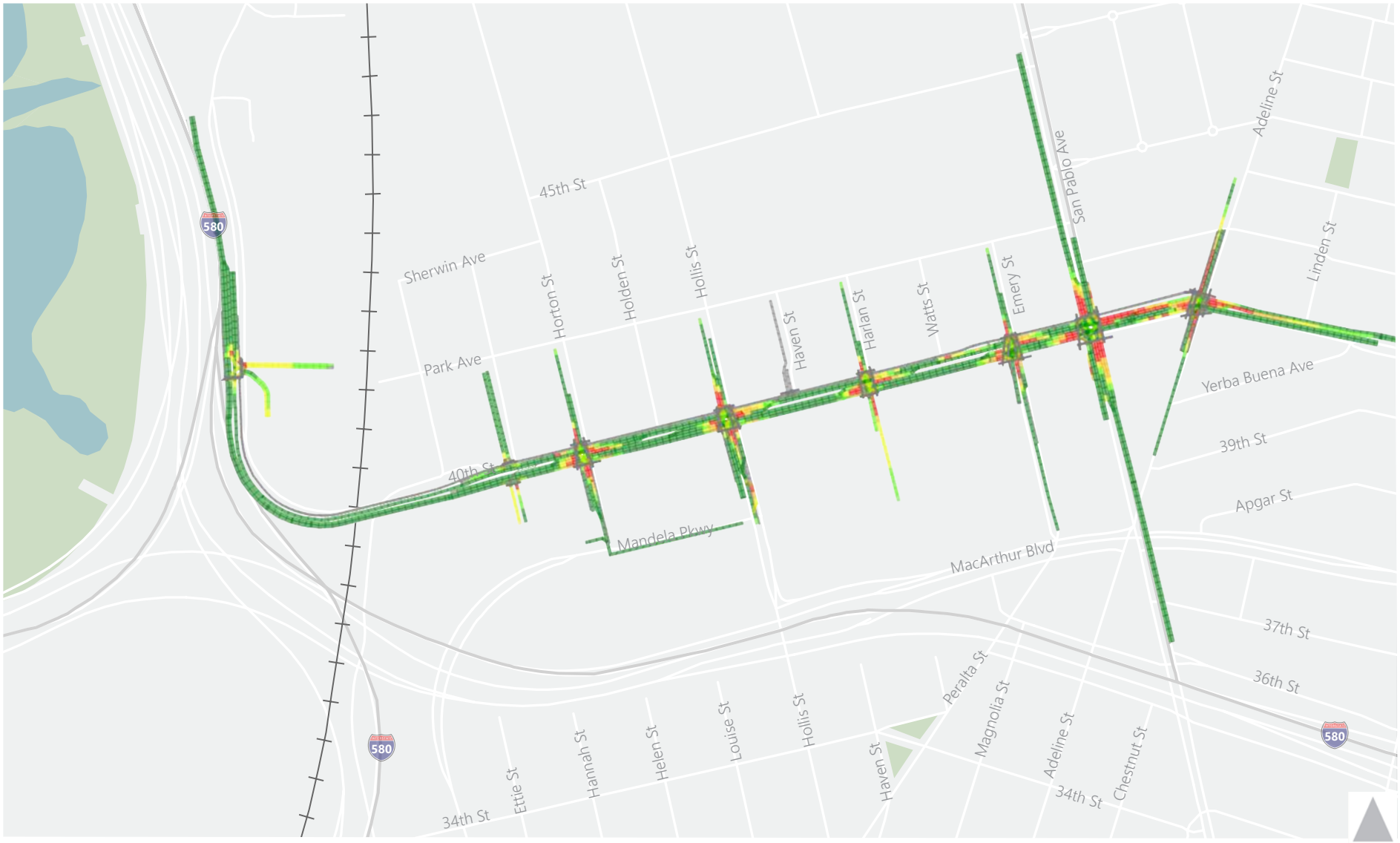
Existing Plus Project - Average Motor Vehicle and Bus
7:30 AM - 7:45 AM



0 mph - 5 mph
5 mph - 10 mph
10 mph - 15 mph
15 mph - 20 mph
>20 mph

Existing Plus Project - Average Motor Vehicle and Bus
7:45 AM - 8:00 AM



0 mph - 5 mph
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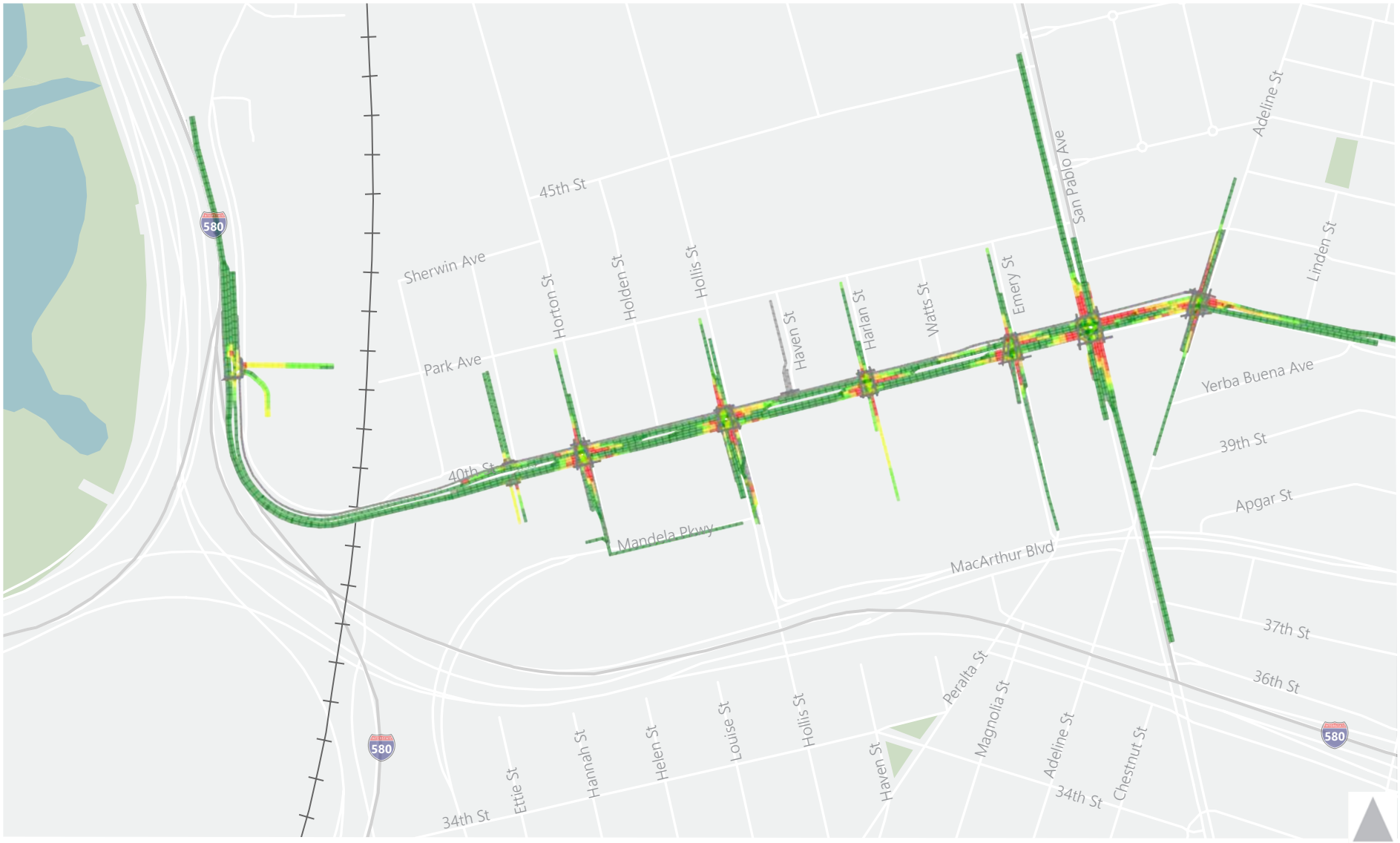
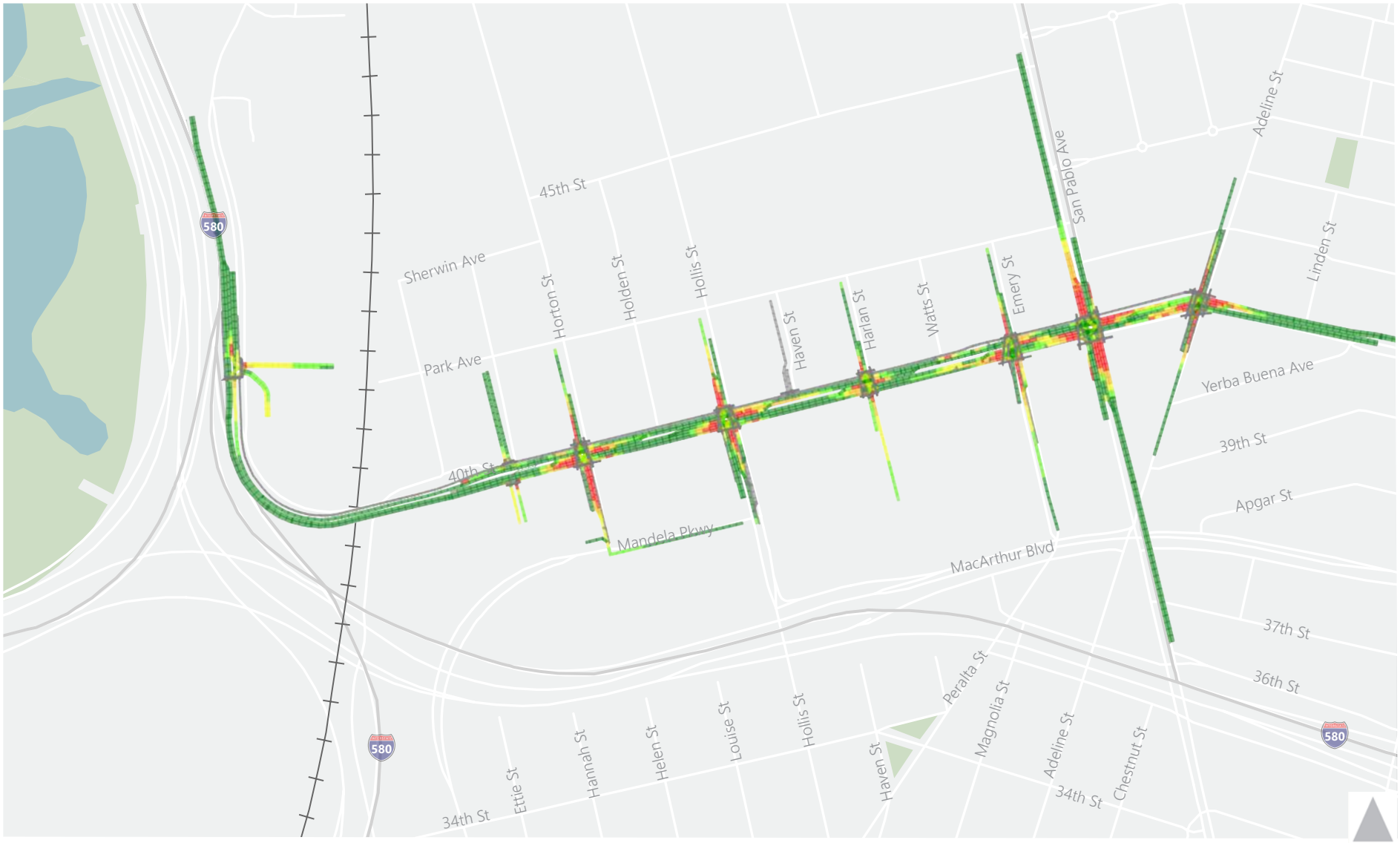
15 mph - 20 mph
>20 mph

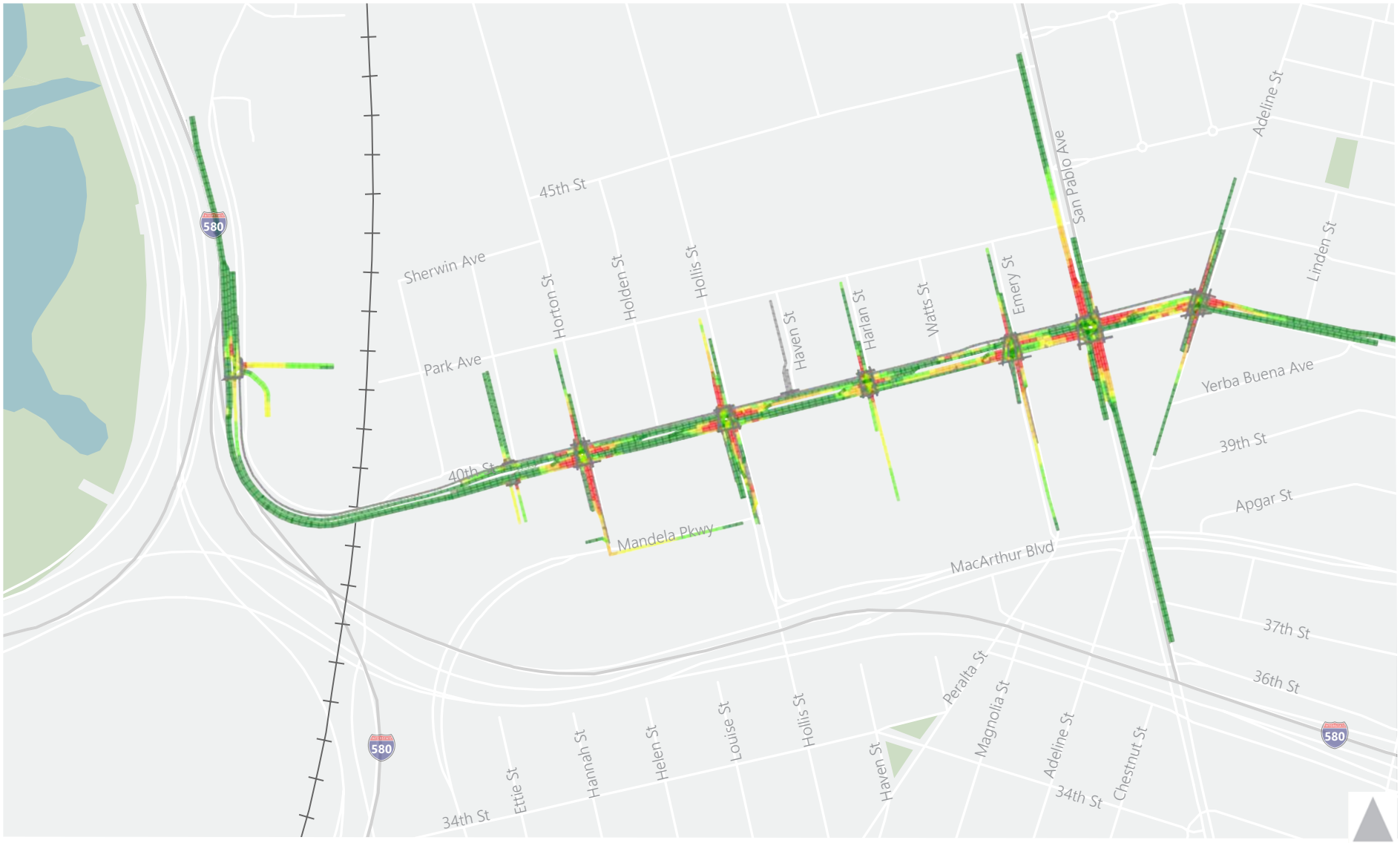
Existing Plus Project - Average Motor Vehicle and Bus
8:00 AM - 8:15 AM



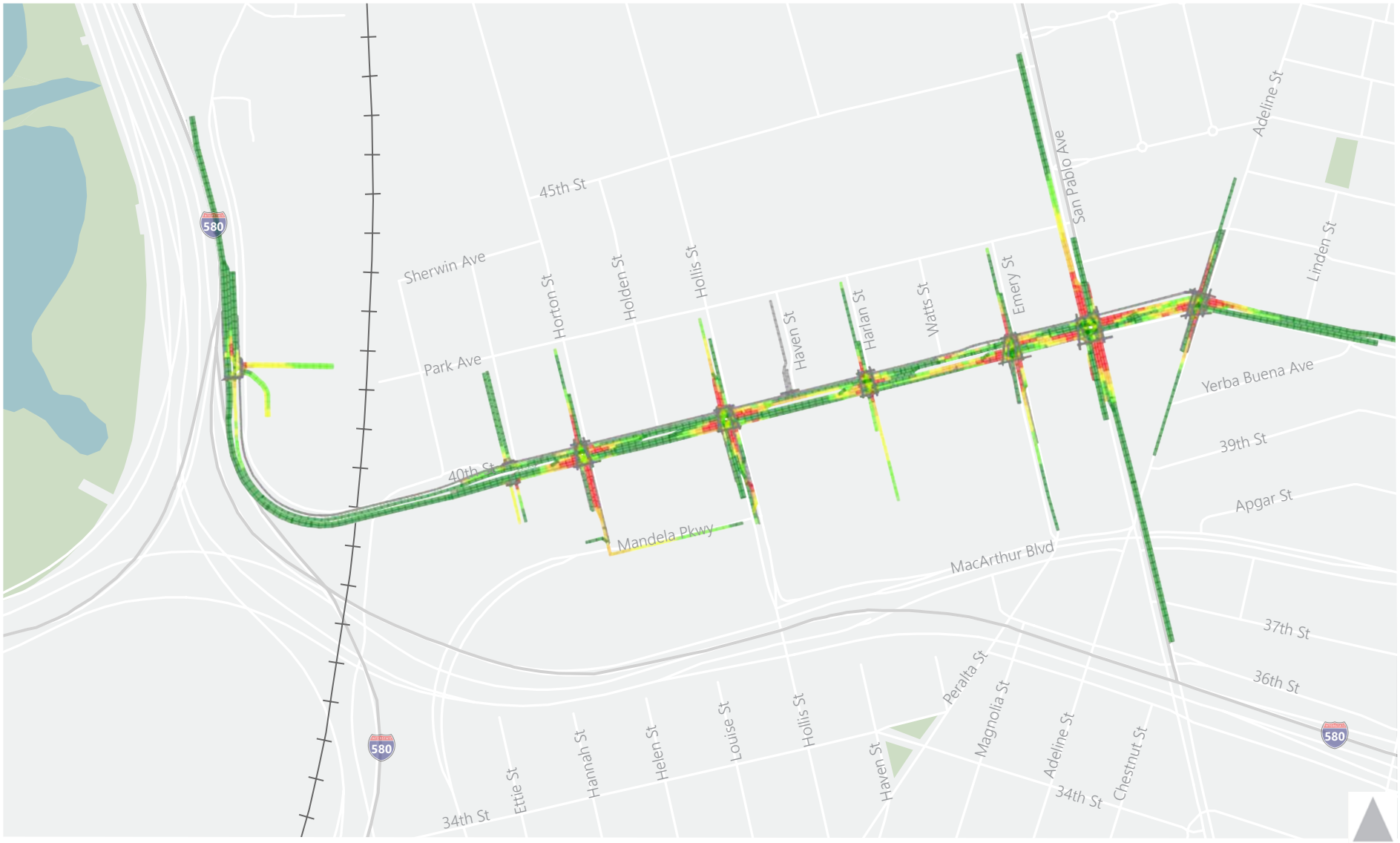
Existing Plus Project - Average Motor Vehicle and Bus
8:15 AM - 8:30 AM



Existing Plus Project - Average Motor Vehicle and Bus
5:00 PM - 5:15 PM

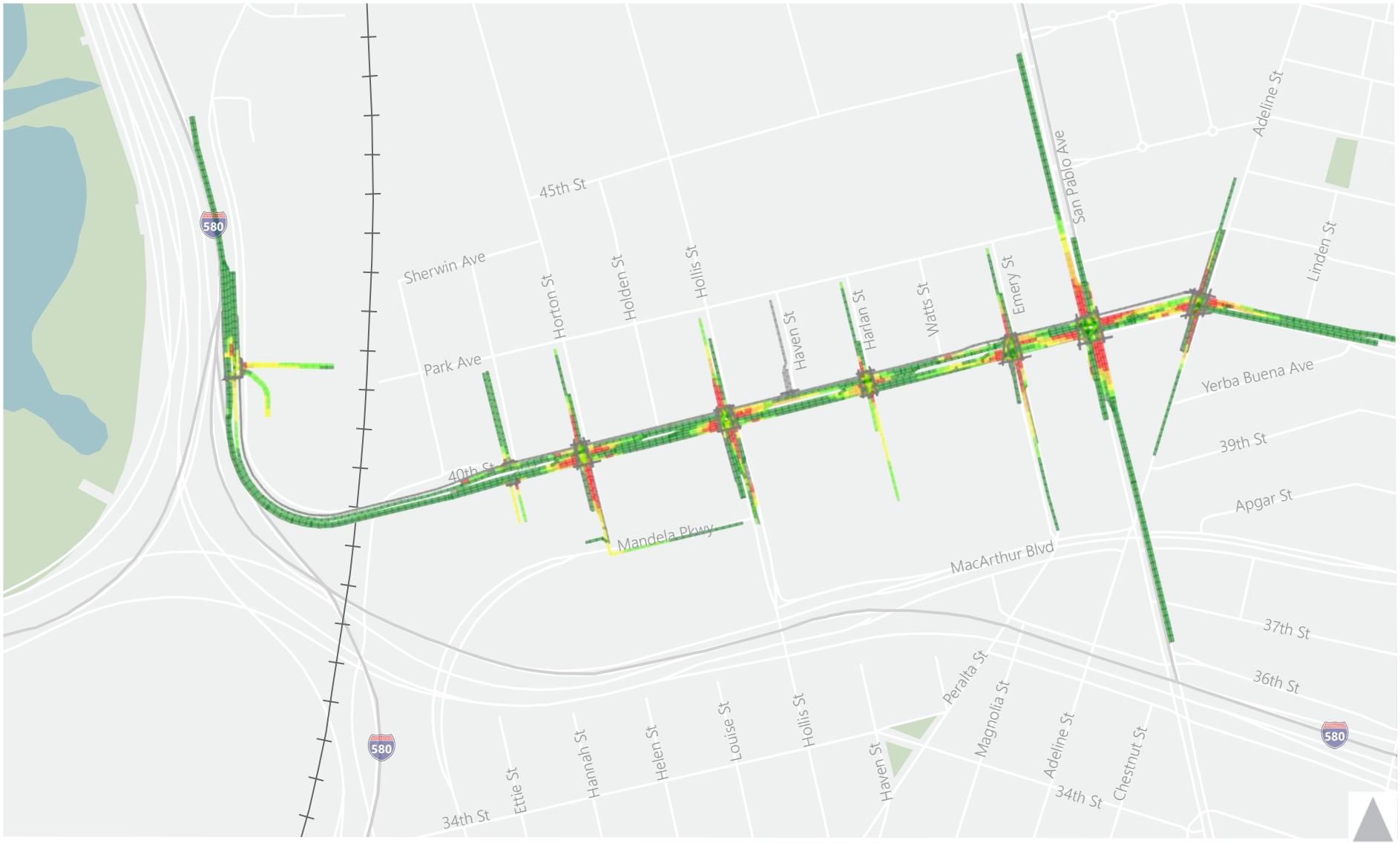


Existing Plus Project - Average Motor Vehicle and Bus
5:15 PM - 5:30 PM



0 mph - 5 mph
5 mph - 10 mph
10 mph - 15 mph
15 mph - 20 mph
>20 mph

Existing Plus Project - Average Motor Vehicle and Bus
5:30 PM - 5:45 PM



0 mph - 5 mph
5 mph - 10 mph
10 mph - 15 mph
15 mph - 20 mph
>20 mph

Existing Plus Project - Average Motor Vehicle and Bus
5:45 PM - 6:00 PM

Vissim Post-Processor **40th San Pablo Transit Hub**
Average Results from 10 Runs **Existing Conditions**
Volume and Delay by Movement **AM Peak Hour**

Intersection 1 **40th St/IKEA** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	283	278	98.4%	2.0	0.8	A
	Right Turn	20	22	107.5%	1.6	1.5	A
	Subtotal	303	300	99.0%	2.0	0.7	A
SB	Left Turn	11	11	99.1%	27.7	15.1	C
	Through	298	295	99.1%	0.5	0.6	A
	Right Turn						
	Subtotal	309	306	99.1%	1.8	0.9	A
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	2	4	195.0%	33.4	24.4	C
	Through						
	Right Turn	1	3	330.0%	3.4	1.8	A
	Subtotal	3	7	240.0%	22.8	15.5	C
Total		615	613	99.7%	2.2	0.8	A

Intersection 2 **Hubbard St/40th St** **Uncontrolled**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn	24	21	87.9%	7.5	1.3	A
	Subtotal	24	21	87.9%	7.5	1.3	A
SB	Left Turn						
	Through						
	Right Turn	5	8	160.0%	4.6	0.1	A
	Subtotal	5	8	160.0%	4.6	0.1	A
EB	Left Turn						
	Through	256	253	98.7%	1.1	0.2	A
	Right Turn	44	46	104.5%	1.6	1.0	A
	Subtotal	300	299	99.5%	1.2	0.1	A
WB	Left Turn	29	27	91.4%	1.9	1.0	A
	Through	298	294	98.8%	0.3	0.1	A
	Right Turn	8	11	133.8%	1.1	0.7	A
	Subtotal	335	332	99.0%	0.5	0.1	A
Total		664	659	99.3%	1.1	0.1	A

Intersection 3 **Horton St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	78	77	99.1%	43.7	10.3	D
	Through	120	117	97.7%	43.3	6.4	D
	Right Turn	69	65	94.5%	28.8	4.9	C
	Subtotal	267	260	97.3%	39.6	5.1	D
SB	Left Turn	7	7	100.0%	47.5	36.4	D
	Through	66	65	98.2%	42.5	5.3	D
	Right Turn	6	5	86.7%	13.0	17.4	B
	Subtotal	79	77	97.5%	41.8	5.4	D
EB	Left Turn	18	18	97.8%	38.1	19.2	D
	Through	165	160	97.2%	21.7	5.3	C
	Right Turn	97	98	101.0%	15.6	4.6	B
	Subtotal	280	276	98.6%	20.7	5.1	C
WB	Left Turn	112	114	101.4%	63.5	7.9	E
	Through	251	249	99.2%	7.6	2.3	A
	Right Turn	78	74	95.1%	4.3	2.0	A
	Subtotal	441	437	99.0%	22.3	4.8	C
Total		1,067	1,049	98.4%	27.7	2.9	C

Intersection 4 **Hollis St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	33	30	91.5%	51.2	10.3	D
	Through	153	153	99.9%	39.1	5.6	D
	Right Turn	44	40	91.4%	7.5	3.8	A
	Subtotal	230	223	97.1%	35.2	3.4	D
SB	Left Turn	52	50	96.2%	50.0	7.9	D
	Through	142	138	97.2%	40.5	5.8	D
	Right Turn	22	23	105.9%	29.5	14.1	C
	Subtotal	216	211	97.8%	41.6	5.3	D
EB	Left Turn	34	32	95.3%	53.1	17.2	D
	Through	184	180	97.9%	17.6	4.8	B
	Right Turn	23	22	94.3%	12.3	5.4	B
	Subtotal	241	234	97.2%	21.2	5.4	C
WB	Left Turn	42	43	102.1%	62.5	9.6	E
	Through	386	382	98.9%	15.6	3.1	B
	Right Turn	201	212	105.5%	19.4	3.8	B
	Subtotal	629	637	101.2%	20.2	3.0	C
Total		1,316	1,305	99.2%	26.6	1.5	C

Vissim Post-Processor **40th San Pablo Transit Hub**
Average Results from 10 Runs **Existing Conditions**
Volume and Delay by Movement **AM Peak Hour**

Intersection 5 **Harlan St/40th St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	100	102	101.5%	11.4	1.9	B
	Through	5	5	104.0%	12.0	8.8	B
	Right Turn	71	70	99.0%	4.9	1.2	A
	Subtotal	176	177	100.6%	8.9	1.6	A
SB	Left Turn	10	10	96.0%	5.5	5.7	A
	Through	5	5	96.0%	3.8	5.9	A
	Right Turn	59	58	97.8%	0.9	0.5	A
	Subtotal	74	72	97.4%	1.6	1.2	A
EB	Left Turn	10	11	106.0%	2.0	1.7	A
	Through	252	242	96.1%	0.4	0.2	A
	Right Turn	18	16	90.6%	0.8	0.7	A
	Subtotal	280	269	96.1%	0.5	0.3	A
WB	Left Turn	143	138	96.5%	3.1	1.4	A
	Through	470	472	100.4%	1.9	0.4	A
	Right Turn	250	248	99.4%	3.5	0.9	A
	Subtotal	863	858	99.5%	2.5	0.5	A
Total		1,393	1,377	98.8%	2.9	0.4	A

Intersection 6 **Emery St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	124	126	101.6%	47.1	5.6	D
	Through	36	36	98.6%	44.4	8.8	D
	Right Turn	99	98	98.8%	6.1	1.1	A
	Subtotal	259	259	100.1%	30.8	4.7	C
SB	Left Turn	13	12	90.0%	42.5	20.5	D
	Through	31	31	98.7%	44.1	12.5	D
	Right Turn	3	4	136.7%	26.9	44.6	C
	Subtotal	47	46	98.7%	44.7	10.3	D
EB	Left Turn	3	3	113.3%	12.7	21.3	B
	Through	302	291	96.5%	19.5	2.0	B
	Right Turn	28	26	91.4%	10.8	6.5	B
	Subtotal	333	320	96.2%	18.7	2.0	B
WB	Left Turn	118	115	97.2%	55.7	3.9	E
	Through	736	728	99.0%	5.2	1.2	A
	Right Turn	38	35	93.2%	4.2	3.1	A
	Subtotal	892	878	98.5%	12.4	1.5	B
Total		1,531	1,505	98.3%	17.8	1.7	B

Intersection 7 **San Pablo Ave/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	278	276	99.3%	44.0	3.6	D
	Through	783	793	101.3%	28.2	2.5	C
	Right Turn	7	7	101.4%	22.2	12.4	C
	Subtotal	1,068	1,077	100.8%	32.0	2.4	C
SB	Left Turn	98	108	109.7%	52.8	8.4	D
	Through	528	521	98.6%	30.1	2.6	C
	Right Turn	67	66	98.4%	27.4	6.2	C
	Subtotal	693	694	100.1%	32.9	3.0	C
EB	Left Turn	80	74	92.6%	60.1	7.0	E
	Through	262	254	97.1%	22.7	4.3	C
	Right Turn	72	69	96.0%	15.4	4.5	B
	Subtotal	414	398	96.0%	28.7	4.1	C
WB	Left Turn	24	25	103.3%	69.1	14.8	E
	Through	547	534	97.7%	55.6	8.1	E
	Right Turn	110	113	102.6%	54.3	12.3	D
	Subtotal	681	672	98.7%	55.8	8.5	E
Total		2,856	2,840	99.4%	37.4	2.6	D

Intersection 8 **Adeline St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	15	14	94.7%	23.1	16.8	C
	Through	141	140	99.4%	27.9	3.8	C
	Right Turn	30	30	100.0%	17.4	6.4	B
	Subtotal	186	184	99.1%	26.1	2.9	C
SB	Left Turn	38	38	98.7%	34.3	5.9	C
	Through	153	152	99.2%	32.3	3.3	C
	Right Turn	79	79	100.0%	26.3	3.4	C
	Subtotal	270	268	99.4%	30.6	2.6	C
EB	Left Turn	48	45	94.0%	72.5	7.2	E
	Through	306	313	102.3%	2.6	0.9	A
	Right Turn	13	10	80.0%	4.4	4.7	A
	Subtotal	367	369	100.4%	10.0	2.7	B
WB	Left Turn	28	30	105.4%	67.6	18.2	E
	Through	587	584	99.5%	19.9	3.2	B
	Right Turn	45	49	108.0%	20.2	5.4	C
	Subtotal	660	662	100.4%	21.8	3.5	C
Total		1,483	1,484	100.0%	21.1	2.2	C

Vissim Post-Processor **40th San Pablo Transit Hub**
Average Results from 10 Runs **Existing Conditions**
Volume and Delay by Movement **PM Peak Hour**

Intersection 1 **40th St/IKEA** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	798	790	99.0%	8.1	1.3	A
	Right Turn	91	89	98.2%	7.3	2.7	A
	Subtotal	889	879	98.9%	8.0	1.4	A
SB	Left Turn	87	85	97.7%	32.8	6.3	C
	Through	746	747	100.1%	1.1	0.4	A
	Right Turn						
	Subtotal	833	832	99.8%	4.8	1.2	A
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	17	15	90.0%	38.7	18.0	D
	Through						
	Right Turn	18	18	97.2%	5.3	1.1	A
	Subtotal	35	33	93.7%	21.5	9.8	C
Total		1,757	1,744	99.2%	6.8	1.3	A

Intersection 2 **Hubbard St/40th St** **Uncontrolled**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn	63	58	91.3%	12.8	4.4	B
	Subtotal	63	58	91.3%	12.8	4.4	B
SB	Left Turn						
	Through						
	Right Turn	64	66	103.6%	5.8	0.8	A
	Subtotal	64	66	103.6%	5.8	0.8	A
EB	Left Turn						
	Through	637	637	100.0%	4.2	1.2	A
	Right Turn	126	124	98.0%	3.8	1.7	A
	Subtotal	763	761	99.7%	4.1	1.3	A
WB	Left Turn	22	23	103.2%	6.9	3.2	A
	Through	825	818	99.1%	1.3	0.4	A
	Right Turn	12	11	94.2%	0.7	0.1	A
	Subtotal	859	852	99.2%	1.5	0.5	A
Total		1,749	1,736	99.3%	3.2	0.8	A

Intersection 3 **Horton St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	302	301	99.8%	67.5	9.4	E
	Through	177	181	102.3%	70.9	12.1	E
	Right Turn	148	143	96.4%	56.5	11.0	E
	Subtotal	627	625	99.7%	66.3	9.5	E
SB	Left Turn	33	34	103.9%	41.9	7.8	D
	Through	165	160	96.8%	45.4	5.8	D
	Right Turn	22	23	105.0%	35.3	15.0	D
	Subtotal	220	217	98.7%	43.3	5.2	D
EB	Left Turn	17	14	84.7%	75.0	20.3	E
	Through	458	452	98.6%	30.2	3.5	C
	Right Turn	225	230	102.0%	25.0	4.8	C
	Subtotal	700	696	99.4%	29.3	3.6	C
WB	Left Turn	79	77	97.2%	73.0	11.2	E
	Through	535	527	98.5%	12.6	2.3	B
	Right Turn	32	32	100.0%	8.8	7.1	A
	Subtotal	646	636	98.4%	19.8	2.7	B
Total		2,193	2,174	99.1%	39.2	3.3	D

Intersection 4 **Hollis St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	83	82	98.3%	58.7	8.7	E
	Through	277	274	98.8%	42.5	6.6	D
	Right Turn	89	91	102.7%	11.3	3.2	B
	Subtotal	449	447	99.5%	39.3	5.4	D
SB	Left Turn	77	73	95.2%	73.8	8.9	E
	Through	312	312	100.0%	44.5	7.6	D
	Right Turn	59	64	108.6%	41.8	7.5	D
	Subtotal	448	449	100.3%	49.1	7.2	D
EB	Left Turn	39	38	97.7%	48.2	14.5	D
	Through	508	497	97.8%	20.6	4.5	C
	Right Turn	92	94	102.1%	12.9	5.2	B
	Subtotal	639	629	98.4%	21.5	4.4	C
WB	Left Turn	106	101	95.4%	53.8	14.9	D
	Through	504	492	97.5%	22.7	4.0	C
	Right Turn	98	101	103.1%	24.2	4.8	C
	Subtotal	708	694	98.0%	27.5	4.9	C
Total		2,244	2,219	98.9%	32.9	2.9	C

Vissim Post-Processor **40th San Pablo Transit Hub**
Average Results from 10 Runs **Existing Conditions**
Volume and Delay by Movement **PM Peak Hour**

Intersection 5 **Harlan St/40th St** **Side-street Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	20	19	94.0%	11.6	5.8	B
	Through	5	5	102.0%	13.2	8.6	B
	Right Turn	50	50	100.0%	2.9	1.7	A
	Subtotal	75	74	98.5%	5.6	1.9	A
SB	Left Turn	29	27	93.4%	6.2	5.2	A
	Through	5	6	120.0%	0.9	1.9	A
	Right Turn	29	29	98.6%	1.1	1.7	A
	Subtotal	63	62	97.9%	3.3	2.8	A
EB	Left Turn	10	11	113.0%	4.7	3.8	A
	Through	646	633	97.9%	0.9	0.3	A
	Right Turn	18	18	98.3%	1.8	1.9	A
	Subtotal	674	662	98.2%	1.0	0.3	A
WB	Left Turn	40	38	94.5%	4.7	2.5	A
	Through	659	647	98.2%	1.6	0.4	A
	Right Turn	100	99	99.0%	2.7	0.3	A
	Subtotal	799	784	98.1%	1.9	0.4	A
Total		1,611	1,581	98.1%	1.8	0.3	A

Intersection 6 **Emery St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	114	117	102.5%	64.7	20.9	E
	Through	148	145	98.1%	69.0	24.1	E
	Right Turn	316	317	100.2%	45.0	22.7	D
	Subtotal	578	579	100.1%	54.6	22.3	D
SB	Left Turn	54	51	93.9%	50.4	7.7	D
	Through	78	79	101.5%	49.7	7.5	D
	Right Turn	7	6	88.6%	29.7	20.2	C
	Subtotal	139	136	97.9%	49.1	6.9	D
EB	Left Turn	10	9	86.0%	88.7	19.2	F
	Through	630	614	97.4%	25.0	5.1	C
	Right Turn	85	86	101.4%	22.8	7.1	C
	Subtotal	725	708	97.7%	25.4	5.2	C
WB	Left Turn	102	108	105.5%	53.2	10.5	D
	Through	678	664	97.9%	20.0	4.9	C
	Right Turn	44	45	103.0%	19.6	8.0	B
	Subtotal	824	817	99.1%	24.3	4.4	C
Total		2,266	2,240	98.8%	33.7	6.2	C

Intersection 7 **San Pablo Ave/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	362	358	98.8%	53.5	4.5	D
	Through	754	756	100.2%	32.6	3.1	C
	Right Turn	20	19	94.5%	31.7	16.1	C
	Subtotal	1,136	1,132	99.7%	39.1	2.8	D
SB	Left Turn	176	180	102.0%	93.2	8.9	F
	Through	824	817	99.2%	45.1	7.8	D
	Right Turn	110	109	99.0%	45.4	10.4	D
	Subtotal	1,110	1,106	99.6%	53.1	7.7	D
EB	Left Turn	211	204	96.8%	48.7	11.3	D
	Through	446	434	97.2%	32.6	5.8	C
	Right Turn	343	341	99.5%	36.4	7.3	D
	Subtotal	1,000	979	97.9%	37.6	5.8	D
WB	Left Turn	65	62	95.1%	66.0	10.2	E
	Through	352	349	99.3%	34.9	5.5	C
	Right Turn	157	157	99.9%	25.2	4.9	C
	Subtotal	574	568	99.0%	35.4	4.4	D
Total		3,820	3,785	99.1%	42.5	2.7	D

Intersection 8 **Adeline St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	14	14	97.1%	43.0	20.3	D
	Through	299	293	98.1%	35.9	4.6	D
	Second Right						
	Subtotal	365	362	99.2%	35.8	4.7	D
SB	Left Turn	47	48	102.3%	40.4	8.8	D
	Through	160	157	98.0%	36.8	3.4	D
	Second Right						
	Subtotal	305	300	98.4%	36.3	3.8	D
EB	Left Turn	120	114	95.3%	40.1	6.6	D
	Through	493	489	99.1%	16.4	1.7	B
	Second Right						
	Subtotal	642	630	98.2%	20.4	1.8	C
WB	Left Turn	37	40	107.6%	64.3	17.1	E
	Through	462	458	99.2%	24.4	3.2	C
	Second Right						
	Subtotal	589	589	100.0%	27.5	4.0	C
Total		1,901	1,881	98.9%	27.9	1.3	C

Intersection 1 **40th St/IKEA** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	283	275	97.1%	3.9	1.7	A
	Right Turn	20	20	101.0%	3.7	3.0	A
	Subtotal	303	295	97.3%	3.9	1.7	A
SB	Left Turn	11	12	107.3%	32.1	17.3	C
	Through	298	294	98.8%	2.1	1.3	A
	Right Turn						
	Subtotal	309	306	99.1%	3.2	1.0	A
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	2	4	190.0%	34.2	23.2	C
	Through						
	Right Turn	1	3	340.0%	4.8	3.4	A
	Subtotal	3	7	240.0%	25.5	14.9	C
Total		615	608	98.9%	3.9	1.1	A

Intersection 2 **Hubbard St/40th St** **Uncontrolled**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn	24	21	87.5%	7.3	0.9	A
	Subtotal	24	21	87.5%	7.3	0.9	A
SB	Left Turn						
	Through						
	Right Turn	5	8	160.0%	4.6	0.4	A
	Subtotal	5	8	160.0%	4.6	0.4	A
EB	Left Turn						
	Through	256	253	98.7%	1.2	0.3	A
	Right Turn	44	45	101.4%	1.5	0.7	A
	Subtotal	300	297	99.1%	1.3	0.3	A
WB	Left Turn						
	Through	298	288	96.5%	0.3	0.1	A
	Right Turn	8	12	146.3%	0.9	0.6	A
	Subtotal	306	299	97.8%	0.4	0.1	A
Total		635	626	98.5%	1.1	0.1	A

Intersection 3 **Horton St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	78	74	94.5%	42.1	4.4	D
	Through	120	117	97.8%	48.6	7.1	D
	Right Turn	69	67	97.1%	31.7	8.5	C
	Subtotal	267	258	96.7%	42.0	5.3	D
SB	Left Turn	7	8	111.4%	34.5	30.0	C
	Through	66	67	101.5%	42.2	8.8	D
	Right Turn	6	3	48.3%	5.2	9.2	A
	Subtotal	79	78	98.4%	41.3	8.8	D
EB	Left Turn	18	17	92.2%	60.6	24.9	E
	Through	165	161	97.6%	23.7	5.0	C
	Right Turn	97	98	100.8%	7.8	2.2	A
	Subtotal	280	275	98.4%	19.5	3.6	B
WB	Left Turn	141	137	97.1%	64.1	10.0	E
	Through	222	223	100.3%	11.6	3.4	B
	Right Turn	78	80	102.4%	5.1	1.6	A
	Subtotal	441	439	99.6%	27.3	3.5	C
Total		1,067	1,051	98.5%	29.9	2.8	C

Intersection 4 **Hollis St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	33	31	92.4%	48.4	12.8	D
	Through	153	149	97.2%	39.9	3.7	D
	Right Turn	44	43	98.0%	6.2	0.9	A
	Subtotal	230	222	96.7%	34.9	3.0	C
SB	Left Turn	52	51	98.5%	48.5	8.7	D
	Through	142	137	96.6%	38.2	4.3	D
	Right Turn	22	22	99.5%	27.5	16.8	C
	Subtotal	216	210	97.4%	39.8	4.5	D
EB	Left Turn	34	34	100.9%	56.2	12.1	E
	Through	184	184	100.2%	17.4	3.6	B
	Right Turn	23	20	85.7%	4.5	2.0	A
	Subtotal	241	238	98.9%	21.7	4.2	C
WB	Left Turn	42	42	100.5%	64.2	11.5	E
	Through	386	385	99.8%	19.6	4.0	B
	Right Turn	201	205	102.1%	12.9	3.6	B
	Subtotal	629	633	100.6%	20.6	3.9	C
Total		1,316	1,304	99.1%	26.5	2.4	C

Intersection 5 **Harlan St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	100	101	100.6%	42.2	6.2	D
	Through	5	5	108.0%	24.2	18.4	C
	Right Turn	71	71	100.6%	25.5	5.0	C
	Subtotal	176	177	100.8%	35.0	5.5	C
SB	Left Turn	10	9	88.0%	36.5	27.5	D
	Through	5	6	114.0%	34.5	26.4	C
	Right Turn	59	58	97.6%	12.8	3.7	B
	Subtotal	74	72	97.4%	18.4	6.4	B
EB	Left Turn	10	11	112.0%	50.8	20.2	D
	Through	252	247	98.0%	16.2	2.9	B
	Right Turn	18	17	93.9%	7.6	3.3	A
	Subtotal	280	275	98.2%	17.3	2.5	B
WB	Left Turn	143	135	94.1%	63.6	5.8	E
	Through	470	472	100.4%	10.5	2.9	B
	Right Turn	250	249	99.5%	8.8	2.8	A
	Subtotal	863	855	99.1%	18.5	3.9	B
Total		1,393	1,380	99.0%	20.3	2.2	C

Intersection 6 **Emery St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	124	128	103.2%	49.8	6.3	D
	Through	36	34	95.6%	46.2	12.5	D
	Right Turn	99	98	99.1%	7.9	1.4	A
	Subtotal	259	261	100.6%	33.6	5.3	C
SB	Left Turn	13	13	101.5%	39.8	22.0	D
	Through	31	29	92.6%	44.3	14.7	D
	Right Turn	3	5	156.7%	31.2	42.2	C
	Subtotal	47	47	99.1%	42.8	11.6	D
EB	Left Turn	3	4	136.7%	35.9	38.5	D
	Through	302	297	98.2%	14.9	4.4	B
	Right Turn	28	26	93.6%	8.9	5.7	A
	Subtotal	333	327	98.2%	15.0	3.9	B
WB	Left Turn	118	116	98.3%	52.7	5.5	D
	Through	736	723	98.2%	5.6	1.2	A
	Right Turn	38	33	87.1%	3.5	2.8	A
	Subtotal	892	872	97.8%	12.3	1.2	B
Total		1,531	1,506	98.4%	17.3	1.5	B

Intersection 7 **San Pablo Ave/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	278	276	99.2%	51.1	6.5	D
	Through	783	793	101.2%	28.6	3.2	C
	Right Turn	7	8	107.1%	28.4	20.4	C
	Subtotal	1,068	1,076	100.7%	34.7	3.7	C
SB	Left Turn	98	106	108.0%	48.9	6.2	D
	Through	528	522	98.8%	29.3	3.7	C
	Right Turn	67	69	102.7%	27.7	9.5	C
	Subtotal	693	696	100.5%	31.8	3.3	C
EB	Left Turn	80	75	93.6%	56.1	6.8	E
	Through	262	259	98.8%	29.2	6.3	C
	Right Turn	72	71	98.5%	13.4	4.6	B
	Subtotal	414	405	97.8%	31.6	4.5	C
WB	Left Turn	24	25	105.4%	91.5	19.3	F
	Through	547	529	96.7%	68.3	7.8	E
	Right Turn	110	107	97.0%	103.0	20.7	F
	Subtotal	681	661	97.0%	75.2	10.0	E
Total		2,856	2,838	99.4%	43.2	2.9	D

Intersection 8 **Adeline St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	15	15	98.7%	79.8	56.9	E
	Through	141	140	99.5%	48.8	30.2	D
	Right Turn	30	29	97.0%	45.3	39.2	D
	Subtotal	186	184	99.0%	51.0	31.2	D
SB	Left Turn	38	38	99.7%	90.0	61.9	F
	Through	153	154	100.5%	84.2	49.5	F
	Right Turn	79	77	97.1%	99.1	49.1	F
	Subtotal	270	268	99.4%	88.8	50.3	F
EB	Left Turn	48	44	91.9%	67.8	9.9	E
	Through	306	314	102.6%	8.2	2.4	A
	Right Turn	13	11	80.8%	5.5	4.4	A
	Subtotal	367	369	100.5%	15.9	2.6	B
WB	Left Turn	28	30	107.1%	110.1	31.0	F
	Through	587	576	98.2%	62.8	23.9	E
	Right Turn	45	48	107.1%	17.8	13.2	B
	Subtotal	660	655	99.2%	61.5	22.4	E
Total		1,483	1,476	99.5%	54.6	17.6	D

Intersection 1 **40th St/IKEA** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through	798	801	100.3%	17.1	5.6	B
	Right Turn	91	90	99.3%	16.9	7.9	B
	Subtotal	889	891	100.2%	17.1	5.7	B
SB	Left Turn	87	88	100.7%	30.8	3.5	C
	Through	746	746	99.9%	2.8	1.0	A
	Right Turn						
	Subtotal	833	833	100.0%	6.0	1.3	A
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	17	16	95.9%	44.1	12.3	D
	Through						
	Right Turn	18	17	92.2%	6.3	2.3	A
	Subtotal	35	33	94.0%	24.6	7.9	C
Total		1,757	1,757	100.0%	12.3	3.7	B

Intersection 2 **Hubbard St/40th St** **Uncontrolled**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn	63	58	92.4%	7.8	0.8	A
	Subtotal	63	58	92.4%	7.8	0.8	A
SB	Left Turn						
	Through						
	Right Turn	64	66	102.8%	5.0	0.3	A
	Subtotal	64	66	102.8%	5.0	0.3	A
EB	Left Turn						
	Through	637	633	99.3%	2.8	0.3	A
	Right Turn	126	127	100.5%	3.2	0.4	A
	Subtotal	763	759	99.5%	2.9	0.2	A
WB	Left Turn						
	Through	825	821	99.5%	0.5	0.1	A
	Right Turn	12	11	94.2%	0.9	0.2	A
	Subtotal	837	833	99.5%	0.5	0.1	A
Total		1,727	1,716	99.4%	2.0	0.1	A

Intersection 3 **Horton St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	302	297	98.3%	105.1	41.6	F
	Through	177	178	100.3%	126.9	46.9	F
	Right Turn	148	146	98.5%	113.0	50.3	F
	Subtotal	627	620	98.9%	113.6	45.3	F
SB	Left Turn	33	34	102.1%	42.3	9.0	D
	Through	165	162	98.3%	48.5	7.1	D
	Right Turn	22	23	102.3%	45.3	15.6	D
	Subtotal	220	218	99.3%	47.4	7.1	D
EB	Left Turn	17	17	97.6%	47.0	20.3	D
	Through	458	451	98.5%	31.5	3.0	C
	Right Turn	225	223	99.2%	15.6	7.8	B
	Subtotal	700	691	98.7%	27.0	3.0	C
WB	Left Turn	101	95	94.1%	67.6	6.7	E
	Through	513	513	100.0%	15.7	3.5	B
	Right Turn	32	31	97.2%	6.6	3.6	A
	Subtotal	646	639	99.0%	23.4	2.6	C
Total		2,193	2,169	98.9%	51.1	11.7	D

Intersection 4 **Hollis St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	83	81	97.8%	58.0	7.5	E
	Through	277	277	99.9%	38.4	4.2	D
	Right Turn	89	88	98.5%	8.5	2.3	A
	Subtotal	449	446	99.3%	35.4	3.1	D
SB	Left Turn	77	81	105.2%	69.0	14.6	E
	Through	312	307	98.5%	43.1	6.0	D
	Right Turn	59	60	102.0%	37.8	6.9	D
	Subtotal	448	449	100.1%	46.9	5.4	D
EB	Left Turn	39	37	93.8%	59.2	15.1	E
	Through	508	506	99.5%	27.2	5.1	C
	Right Turn	92	90	97.9%	9.5	6.7	A
	Subtotal	639	632	98.9%	26.6	5.0	C
WB	Left Turn	106	99	93.4%	92.7	11.3	F
	Through	504	496	98.4%	39.7	3.8	D
	Right Turn	98	101	103.1%	27.0	6.6	C
	Subtotal	708	696	98.3%	45.5	4.4	D
Total		2,244	2,223	99.0%	38.4	2.5	D

Intersection 5 **Harlan St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	20	20	100.5%	48.7	11.4	D
	Through	5	5	92.0%	44.2	32.6	D
	Right Turn	50	50	99.8%	19.4	9.0	B
	Subtotal	75	75	99.5%	30.9	9.3	C
SB	Left Turn	29	28	95.2%	55.9	13.3	E
	Through	5	7	130.0%	21.7	23.4	C
	Right Turn	29	28	97.2%	26.0	15.7	C
	Subtotal	63	62	98.9%	41.1	11.9	D
EB	Left Turn	10	11	113.0%	76.6	31.4	E
	Through	646	645	99.9%	10.2	7.0	B
	Right Turn	18	18	97.8%	6.8	5.5	A
	Subtotal	674	674	100.0%	11.1	6.8	B
WB	Left Turn	40	43	107.3%	68.1	8.1	E
	Through	659	649	98.5%	9.5	4.5	A
	Right Turn	100	101	101.4%	7.4	2.5	A
	Subtotal	799	793	99.3%	12.4	4.2	B
Total		1,611	1,605	99.6%	14.0	4.3	B

Intersection 6 **Emery St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	114	109	95.4%	83.4	41.6	F
	Through	148	145	98.0%	77.9	39.3	E
	Right Turn	316	322	102.0%	43.8	35.8	D
	Subtotal	578	576	99.7%	59.9	37.8	E
SB	Left Turn	54	50	92.4%	47.5	10.1	D
	Through	78	78	100.5%	51.4	11.2	D
	Right Turn	7	8	118.6%	32.1	24.8	C
	Subtotal	139	137	98.3%	49.4	7.4	D
EB	Left Turn	10	10	97.0%	103.4	80.0	F
	Through	630	624	99.1%	49.0	17.7	D
	Right Turn	85	85	100.5%	39.2	20.5	D
	Subtotal	725	719	99.2%	48.5	17.5	D
WB	Left Turn	102	103	101.2%	71.7	9.7	E
	Through	678	677	99.9%	7.0	2.1	A
	Right Turn	44	48	108.6%	6.2	3.8	A
	Subtotal	824	828	100.5%	14.6	3.5	B
Total		2,266	2,260	99.7%	38.5	6.1	D

Intersection 7 **San Pablo Ave/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	362	364	100.5%	58.4	2.7	E
	Through	754	747	99.0%	36.5	2.7	D
	Right Turn	20	23	114.5%	45.9	7.5	D
	Subtotal	1,136	1,133	99.8%	43.6	1.6	D
SB	Left Turn	176	178	100.9%	101.6	10.5	F
	Through	824	820	99.5%	52.5	7.8	D
	Right Turn	110	109	98.9%	51.5	8.7	D
	Subtotal	1,110	1,106	99.7%	60.2	7.9	E
EB	Left Turn	211	212	100.5%	43.7	6.4	D
	Through	446	435	97.6%	19.6	2.7	B
	Right Turn	343	348	101.3%	13.2	3.9	B
	Subtotal	1,000	995	99.5%	22.6	3.0	C
WB	Left Turn	65	64	97.8%	86.0	25.9	F
	Through	352	356	101.1%	36.8	20.4	D
	Right Turn	157	145	92.0%	102.9	32.0	F
	Subtotal	574	564	98.2%	59.1	23.3	E
Total		3,820	3,798	99.4%	45.6	4.8	D

Intersection 8 **Adeline St/40th St** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	14	13	89.3%	29.7	20.1	C
	Through	299	297	99.3%	36.1	3.6	D
	Right Turn	52	54	103.5%	29.7	6.6	C
	Subtotal	365	363	99.5%	35.1	3.0	D
SB	Left Turn	47	48	101.3%	43.2	18.1	D
	Through	160	161	100.4%	37.0	5.5	D
	Right Turn	98	95	96.9%	34.4	7.0	C
	Subtotal	305	303	99.4%	37.0	6.8	D
EB	Left Turn	120	117	97.3%	41.1	6.0	D
	Through	493	490	99.4%	18.2	2.3	B
	Right Turn	29	28	97.9%	13.8	5.5	B
	Subtotal	642	635	98.9%	22.5	2.4	C
WB	Left Turn	37	38	103.8%	82.5	24.7	F
	Through	462	458	99.1%	38.0	23.4	D
	Right Turn	90	89	98.8%	20.3	5.1	C
	Subtotal	589	585	99.4%	38.5	20.3	D
Total		1,901	1,887	99.3%	32.3	6.8	C

Attachment 3 – Concept-Level Cost Estimate (Details)

CLASS 5 ROUGH ORDER OF MAGNITUDE STATEMENT OF PROBABLE COST
EMERYVILLE 40TH AND SAN PABLO BUS HUB PROJECT

Draft ROM

6/20/2019

	DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	$ SUBTOTAL	% OF TDC
	Demolitions and Earthwork				**$ 594,000**	**6.6%**
10	Remove Concrete Sidewalk	8334	SF	$ 10	$ 83,340	
11	Remove Concrete Bus Pad	6020	SF	$ 12	$ 72,240	
12	Remove Concrete Curb	3489	LF	$ 20	$ 69,780	
13	Remove Concrete Median Curb	2520	LF	$ 30	$ 75,600	
14	Remove dirt from median	620	CY	$ 20	$ 12,400	
15	Allowance for street furnishing removal	1	Allowance	$ 25,000	$ 25,000	
16	Remove Bus Shelter	1	EA	$ 5,000	$ 5,000	
17	Remove Pavement Marking	32000	SF	$ 6	$ 192,000	
18	Cold Plane Asphalt Concrete Pavement	3870	SY	$ 15	$ 58,050	
	New Roadway Items				**$ 2,385,000**	**26.4%**
19	Concrete Pavement - transit island (Platform)	14050	SF	$ 20	$ 281,000	
20	Concrete Sidewalk	8817	SF	$ 20	$ 176,342	
21	Center Median Curb	2550	LF	$ 30	$ 76,500	
22	Concrete Side Median (Buffer Zone) Curb	4772	LF	$ 30	$ 143,174	
23	Concrete Site Median on Bridge (4'+2')	4389	SF	$ 20	$ 87,774	
24	Concrete Curb	1796	LF	$ 30	$ 53,871	
25	Concrete Bus Pad	14050	SF	$ 35	$ 491,750	
26	Concrete Curb Ramp	42	EA	$ 2,500	$ 105,000	
27	Tactile Domes Warning System Pavers	12	EA	$ 150	$ 1,800	
28	Asphalt pavement with roadway foundation	570	SY	$ 50	$ 28,500	
29	Permeable Asphalt Bikelane	37551	SF	$ 25	$ 938,769	
	Drainage and Utility				**$ 300,000**	**3.3%**
30	Drainage Inlet	1	Allowance	$ 100,000	$ 100,000	
31	Relocate Utilities	1	Allowance	$ 200,000	$ 200,000	
	Pavement Marking				**$ 938,000**	**10.4%**
32	Traffic Striping - 6" White Thermoplastic	30100	LF	$ 2	$ 60,200	
33	Triple Four crosswalks (12" White Thermoplastic)	33300	SF	$ 10	$ 333,000	
34	Pavement Marking (White Thermoplastic)	1000	SF	$ 15	$ 15,000	
35	Pavement Coating	75570	SF	$ 7	$ 528,990	
	Signs				**$ 21,000**	**0.2%**
36	Roadside Signs, relocate and reset	1	Allowance	$ 20,250	$ 20,250	
	Lighting				**$ 258,000**	**2.9%**
37	Relocate Street Lights	1	Allowance	$ 50,000	$ 50,000	
39	Pedestrian Light Fixtures	26	EA	$ 8,000	$ 208,000	

CLASS 5 ROUGH ORDER OF MAGNITUDE STATEMENT OF PROBABLE COST
EMERYVILLE 40TH AND SAN PABLO BUS HUB PROJECT

Draft ROM

6/20/2019

	DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	$ SUBTOTAL	% OF TDC
	Signals, Lighting and Electrical Systems				**$ 1,400,000**	**15.5%**
40	Traffic Signal Modification	5	EA	$ 200,000	$ 1,000,000	
41	Traffic Signal Modification at San Pablo	1	EA	$ 400,000	$ 400,000	
	Trees and Landscaping				**$ 2,148,000**	**23.7%**
42	Remove Tree	35	EA	$ 3,000	$ 105,000	
43	Tree Protection	1	LS	$ 20,000	$ 20,000	
44	Tree Planting 36" Box	47	EA	$ 2,000	$ 94,000	
45	Soil Preparation	16098	SF	$ 2	$ 32,197	
46	Structural Soil for New Tree Planting		LS		$ 800,000	
47	Landscape Grading	16098	SF	$ 1	$ 16,098	
48	Median Landscaping	2938	SF	$ 20	$ 58,760	
49	Wood Mulch	16098	SF	$ 1	$ 16,098	
50	Irrigation	16098	SF	$ 10	$ 160,985	
51	Landscape Establishment	1	Allowance	$ 30,000	$ 30,000	
52	Bioretention/Biofiltration Planters Curb Extensions	797	SF	$ 75	$ 59,795	
53	Bioretention/Biofiltration Planters Buffer Zone	6177	SF	$ 75	$ 463,298	
54	Bioretention/Biofiltration Planters Bus Zone	1649	SF	$ 75	$ 123,661	
55	Rain Garden	3352	SF	$ 50	$ 167,582	
	Wayfinding and Signage				**$ 50,000**	**0.6%**
56	Wayfinding Signage	1	LS	$ 50,000	$ 50,000	
	Furnishing				**$ 567,000**	**6.3%**
57	Install Bus Shelter (Standard Type)	12	EA	$ 30,000	$ 360,000	
58	Railing at Bus Stops	500	LF	$ 150	$ 75,000	
59	Trash Receptacles	12	EA	$ 2,000	$ 24,000	
60	Benches	18	EA	$ 3,000	$ 54,000	
61	Bicycle Parking	10	EA	$ 1,000	$ 10,000	
62	Bollards	22	EA	$ 2,000	$ 44,000	
	Side Street Curb Extesion				**$ 386,000**	**4.3%**
63	Remove Concrete Sidewalk	2133	SF	$ 10	$ 21,330	
64	Remove Concrete Curb	711	LF	$ 20	$ 14,220	
65	Allowance for street furnishing removal	1	Allowance	$ 25,000	$ 25,000	
66	Concrete Sidewalk	2773	SF	$ 20	$ 55,458	
67	Concrete Curb	924	LF	$ 30	$ 27,729	
68	Concrete Curb Ramp	10	EA	$ 2,500	$ 25,000	
69	Tactile Domes Warning System Pavers	12	EA	$ 150	$ 1,800	
70	Drainage Inlet	1	Allowance	$ 20,000	$ 20,000	

CLASS 5 ROUGH ORDER OF MAGNITUDE STATEMENT OF PROBABLE COST
EMERYVILLE 40TH AND SAN PABLO BUS HUB PROJECT

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6/20/2019

		DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	$ SUBTOTAL	% OF TDC
71		Relocate Utilities	1	Allowance	$ 25,000	$ 25,000	
72		Roadside Signs, relocate and reset	1	Allowance	$ 16,750	$ 16,750	
73		Pedestrian Light Fixtures	8	EA	$ 8,000	$ 64,000	
74		Bioretention/Biofiltration Planters Curb Extensions	1185	SF	$ 75	$ 88,908	
TOTAL DIRECT CONSTRUCTION PRICE (TDC)						**$ 9,047,000**	**100%**
		Construction Contingency		%	25.00%	$ 2,262,000	
	Additional Construction Cost					**$ 1,219,000**	
1		Mobilization	1	LS		$ 680,000	
2		Traffic Control	1	LS		$ 250,000	
3		Constructor Informational Sign	2	EA	$ 1,500	$ 3,000	
4		Construction Area Sign	20	EA	$ 500	$ 10,000	
5		Project Identification Sign	2	EA	$ 1,500	$ 3,000	
6		Portable Changeable Message Sign	10	EA	$ 2,000	$ 20,000	
7		SWPPP	1	LS	2.50%	$ 226,175	
8		Layout	1	LS	$ 16,000	$ 16,000	
9		Excavation Safety	1	LS	$ 10,000	$ 10,000	
TOTAL PROJECT CONSTRUCTION PRICE (TPP) - Qtr. 1, 2019 US$						**$ 12,528,000**	

		Additional Project Cost					
		Scoping		%	-	$ -	
		Environmental (CEQA)		%	-	$ -	
		Design		%	15.00%	$ 1,879,200	
		Construction Engineering and Administration		LS	-	$ 500,000	
		Public Art		%	1.50%	$ 187,920	
		Right of Way/Engineering/Acquisitions/Relocations/Land Cost		LS	-	$ 500,000	
TOTAL PROJECT PRICE (TPP) - Qtr. 1, 2019 US$						**$ 15,595,200**	

TOTAL PROJECT PRICE (TPP) - Qtr. 1, 2019 US$			$ 15,595,200
Class 5 Accuracy Range	**Low**	**(20%)**	**$ 12,476,200**
	High	**50%**	**$ 23,392,800**