Barrio Logan Community Plan Update

Mobility Assessment

September 2021

Prepared for
The City of
SAN DIEGO

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1.0 Introduction

1.1 Study Background and Purpose

The Barrio Logan Community Plan was approved in 1978, with two amendments incorporated since its adoption. A 2013 Draft Community Plan (2013 Draft CPU) was developed but rescinded as the Barrio Logan Planning Group (BLPG) Ad-Hoc Committee (including members of the Environmental Health Coalition, the shipbuilding and ship repair industry, and the BLPG) agreed that the mixing of industrial and residential uses in the Barrio Logan community has proven to be unhealthy. The 2021 Community Plan Update (Proposed Plan) seeks to remedy this situation for the future. The Proposed Plan builds upon the 2013 Draft CPU by identifying land uses consistent with the General Plan, addressing mobility and access, and providing design guidance for new development that celebrates the community's arts and culture. The Proposed Plan also addresses the issues of the previous plan and serves to eliminate future land use/zoning conflicts, establish village areas for housing opportunities, create a "Transition Zone" to buffer industrial and residential uses, and maintain the waterfront's unique role in the community.

The associated Barrio Logan Community Plan Update Final Program Environmental Impact Report (PEIR) (2013) of the 2013 Draft Plan is certified and remains in effect, but due to new CEQA guidelines, a Transportation Impact Study Addendum has been conducted to disclose any new environmental impacts. On September 27, 2013, Governor Edmund G. Brown, Jr. signed SB 743 into law, starting a process that fundamentally changes the way transportation impact analysis is conducted under CEQA. Related revisions to the State's CEQA Guidelines include elimination of auto delay, level of service (LOS), and similar measurements of vehicular roadway capacity and traffic congestion as the basis for determining significant impacts. Under Section 15064.3, vehicle miles traveled (VMT), which includes the amount and distance of automobile traffic attributable to a project, is identified as the "most appropriate measure of transportation impacts". To provide additional information on transportation benefits and impacts associated with the Proposed Plan, the Transportation Impact Study Addendum (September 2021) evaluated VMT consistent with goals of SB 743 and the City's updated *Transportation Study Manual* (September 2020). The PEIR was used in this Proposed Plan to determine which of the previously proposed transportation mitigation measures would still be pertinent in this community to improve vehicular operations and provide a comprehensive mobility network. Therefore, several mitigations from the PEIR were evaluated and incorporated into the Proposed Plan.

This Mobility Assessment summarizes the physical and operational conditions of the planned mobility system outlined in the Barrio Logan Mobility Element. This report focuses on the changes in the proposed transportation network compared to the 2013 Draft CPU. A comprehensive multimodal transportation analysis was not conducted; instead, a summary of the proposed transportation network updates is provided, and a traffic operations analysis was conducted of mobility element roadways and key intersections within the community. The report also describes the analysis methodologies.

The Proposed Plan is a strategy to address existing and forecast deficiencies related to a balanced mobility system within the Barrio Logan community. The mobility networks are comprised of pedestrian and bicycle infrastructure, public transit, and roadway and freeway systems. Each of these transportation modes is discussed in the following chapter.

1.2 Study Location

The Barrio Logan planning area includes approximately 1,000 acres and is positioned between Downtown San Diego to the north, Interstate 5 to the east, the Unified Port of San Diego and United States Naval Base San Diego along San Diego Bay to the west, and National City to the south. The Port of San Diego and Naval San Diego comprise approximately half of the land area contained within the planning area, which the City does not have authority over.

Figure 1.1 displays the Barrio Logan community planning area within the San Diego region.

1.3 Proposed Land Use

The Proposed Plan includes an updated Land Use Element of the currently approved 1978 Barrio Logan Community Plan to address future growth and developments in the Barrio Logan community. This Proposed Plan builds on the 2013 Draft CPU's following land use goals:

- Eliminate future residential/industrial conflict through land use and zoning;
- Establish a village area and increase housing opportunities;
- Incorporate a "Transition Zone" to buffer industry and residences; and
- Retain the waterfront's employment role.

The primary land use changes in the Proposed Plan compared to the 2013 Draft CPU include new land use designations within an approximately 65-acre area of the community and the addition of a Community Plan Implementation Overlay Zone (CPOIZ). The CPIOZ is intended to tailor uses within the central area of Barrio Logan to establish a transition between industrial uses within the Port of San Diego and the residential community. The remaining 935 acres of the community planning area, outside of the CPIOZ, would maintain the land use designations and zoning identified in the 2013 Draft CPU. Buildout of the Proposed Plan is anticipated to result in allowed development of approximately 4,000 total additional residential dwelling units in the community; with the proposed land use changes accounting for approximately 200 of those total units. The Proposed Plan's focus area of change is bounded by Evans Street on the west, Newton Avenue and Boston Avenue on the north, Chollas Creek on the east, and Main Street and Harbor Drive on the south. The land uses within the focus area include maritime commercial, community commercial, neighborhood commercial (residential permitted), and multi-family residential. **Figure 1.2** displays the focus area of change, and the proposed lands uses, and **Figure 1.3** displays the Proposed Plan's land use for the Barrio Logan community.

1.4 Report Organization

Following this introductory chapter, *Chapter 2.0: Barrio Logan Proposed Network* presents the Proposed Plan recommended improvements for the Barrio Logan community and provides an overview of the traffic operations analysis for key roadway segments and intersections in the study area.

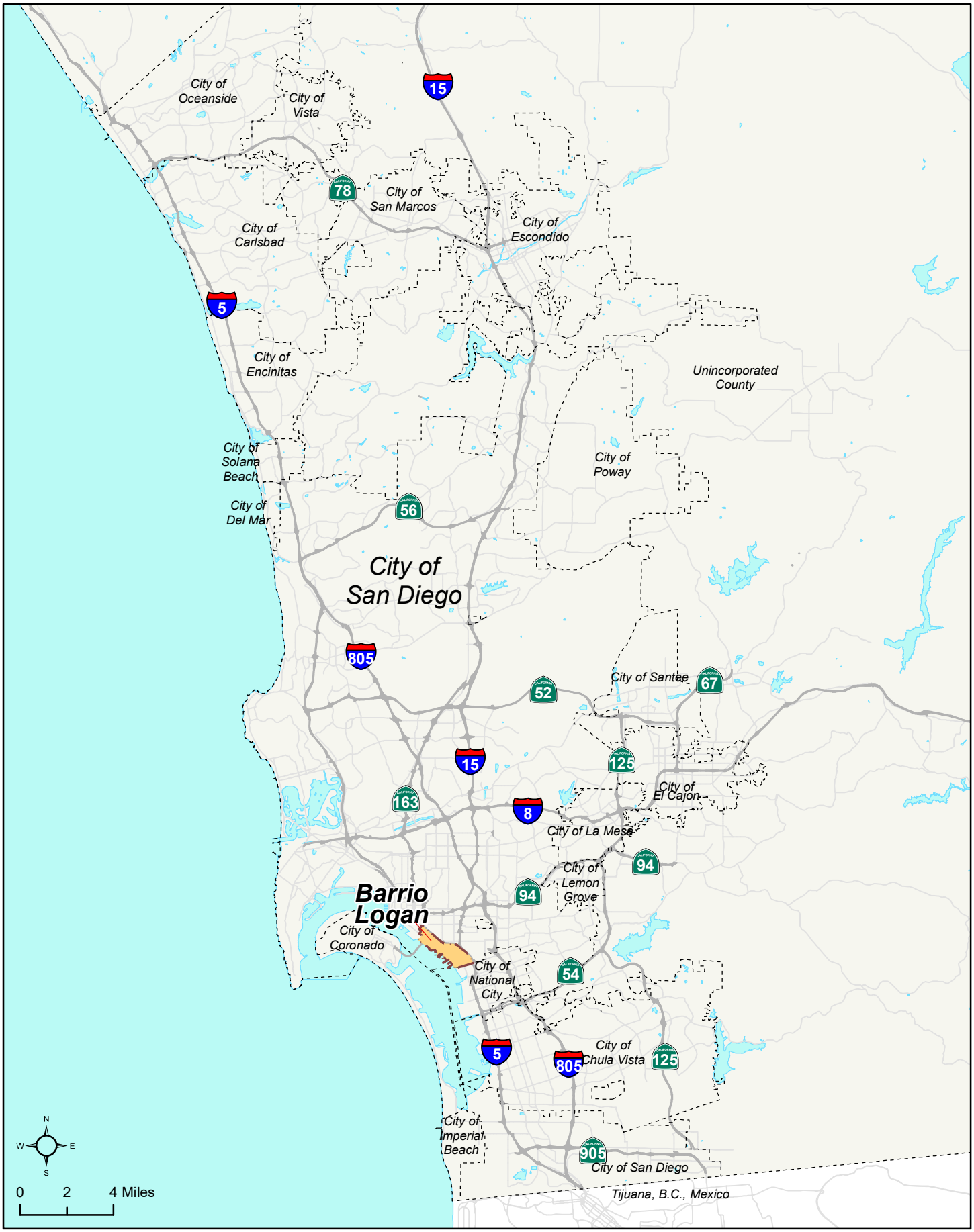

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Figure 1.1
Regional Location Map

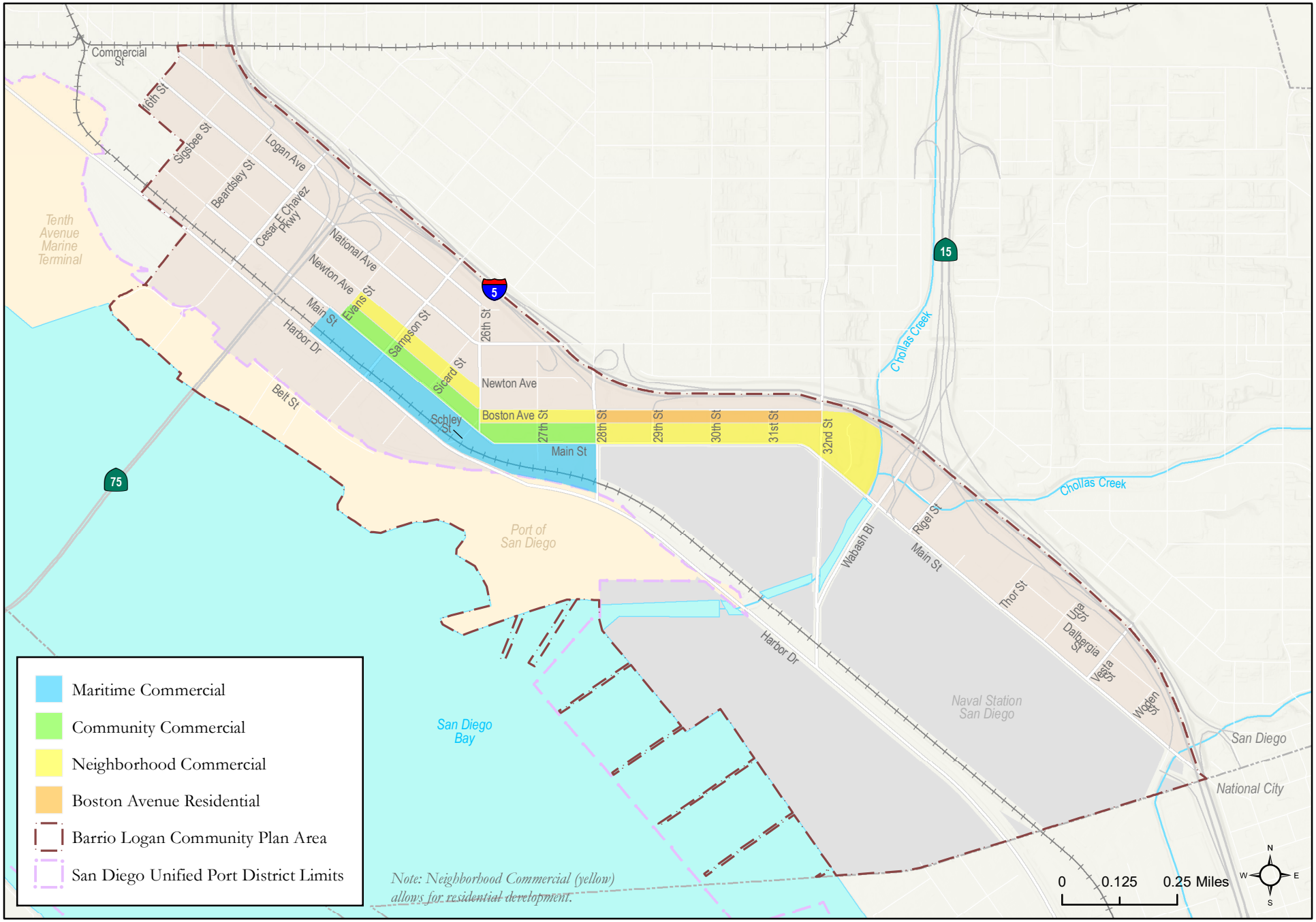

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Figure 1.2

Focus Area of Change

Source: City of San Diego

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Figure 1.3

Proposed Plan's Land Use

2.0 Barrio Logan Proposed Network

This section describes the Proposed Plan's mobility recommendations and changes from the 2013 Draft CPU. In September of 2008, the State of California approved AB 1358 – the Complete Streets Act. Effective January 1, 2011, AB 1358 requires city or county legislative bodies to plan for a balanced, multimodal transportation network that meets the needs of all users of streets, roads, and highways. "All users" is defined to include pedestrians, children, persons with disabilities, seniors, bicyclists, users of public transportation, motorists, and movers of commercial goods. In conformance with AB 1358, the City of San Diego has been assessing mobility needs for all road users on long-range planning efforts, including this Proposed Plan.

2.1 Development of the Proposed Plan

Mobility related issues and needs within the Barrio Logan community were previously identified in the *Barrio Logan Community Plan Update Traffic Impact Analysis (March 2011)*, included as **Appendix A**, along with input received from community members. These identified issues and needs were utilized as a starting point, in conjunction with other planning efforts and the overall community vision, to develop the recommended mobility improvements incorporated into the Proposed Plan. Several other previous and on-going relevant planning efforts referenced as part of understanding the mobility conditions within and around the vicinity of the community include:

- Draft Barrio Logan Community Plan Update (2013)
- Barrio Logan Harbor 101 Community Plan (Last Amended May 1991)
- City of San Diego General Plan – Mobility Element (Last Amended June 2015)
- City of San Diego Complete Communities: Housing Solutions and Mobility Choices (May 2020)
- San Diego Forward, The Regional Plan (October 2015)
- San Diego Forward, The 2021 Regional Plan (Currently On-Going)
- South Bay to Sorrento Comprehensive Multimodal Corridor Plan (Currently On-Going)
- Bayshore Bikeway Plan Improvements (Currently On-Going)
- City of San Diego Bicycle Master Plan (December 2013)
- City of San Diego Capital Improvement Program (2015)
- City of San Diego Pedestrian Master Plan – Phase 4 (December 2013)
- City of San Diego Climate Action Plan (2015)
- Southeastern San Diego Community Plan (October 2015)
- Downtown Community Plan (April 2006)
- Downtown San Diego Mobility Plan (June 2016)
- Port of San Diego Port Master Plan Update (Currently On-Going)
- Harbor Drive Multimodal Corridor Study/Harbor Drive 2.0 Draft (November 2019)
- Vesta Bridge Project Approval Environmental Document (Currently On-Going)
- State Route 15/Vesta Street/Harbor Drive Operational Improvements Project (Currently On-Going)
- Naval Base San Diego 2030 Mobility Vision (Currently On-Going)

Where possible, the Proposed Plan carried forward improvements from previous planning efforts that have been adopted or vetted. New improvement strategies were then developed to accommodate the anticipated future growth within the community and to create a network of complete streets to serve all road users. Additionally, public input received through the outreach efforts played a critical role to shape the recommendations. The following sections outline the proposed mobility network improvements.

2.2 Walkability

The pedestrian environment affects everyone, whether one is walking to transit, a store, school, or simply walking from a parked car to a building or home. Most people prefer walking in places where there are sidewalks shaded with trees, lighting, interesting buildings or scenery to look at, other people outside, neighborhood destinations and a feeling of safety. Pedestrian improvements in areas with land uses that promote pedestrian activities can help to increase walking as a means of transportation and recreation. Land use and street design recommendations that benefit pedestrians also contribute to the overall quality, vitality, and sense of community within a neighborhood. The Proposed Plan includes pedestrian improvements along roadways with mixed-use land uses that generate high pedestrian activities.

2.2.1 Pedestrian Facility Improvements

Pedestrian improvements were identified based upon supporting land uses, proximity to transit, and a roadway's purpose in terms of how it services the greater network. These considerations drove an identification of several pedestrian route types and each garnered the inclusion of supporting improvements that are best suited to their unique characteristics, detailed in the sections that follow.

PEDESTRIAN ROUTE TYPES

Pedestrian route types are used to categorize pedestrian facilities along roadways based on adjacent uses and characteristics of the walking environment. The City of San Diego Pedestrian Master Plan defines route types, each suggesting a level of treatments or features that best supports the specific area's walking environment. Neighborhood, Connector, Corridor, and District route types are particularly suitable within the context of Barrio Logan.

Neighborhood route types are along roadways that are in lower density and single use residential areas and requires basic treatments such as standard sidewalks widths and ADA-complaint curb ramps.

Connector route types run along roadways with lower pedestrian activity levels, thus requiring more basic treatments such as landscaped buffers between the sidewalk and roadway, and mandatory features like standard sidewalk widths, ADA-compliant curb ramps, and marked crosswalks at signalized intersections with advance stop bars. Connectors also offer key circulation connections that feed more prominent Corridor and District roadways.

Corridor route types are present along roadways that support business and shopping districts with moderate pedestrian activity levels and consist of features of those identified under Connector route types with the addition of more enhanced treatments such as above minimum sidewalk widths (>5 feet), visual and audible pedestrian signal heads, lead pedestrian intervals, high visibility crosswalks, pedestrian lighting, and trees to shade walkways.

District route types support high pedestrian activity levels in mixed-use urban areas and major community thoroughfares, consisting of features designed to support higher volumes of pedestrians in an environment where heavier vehicular traffic is also likely. Districts are intended to include improvements that provide premium comfort and priority for pedestrians. District features consist of those identified under Connector and Corridor route types with the addition of wider walkway widths for forming promenades/paseos/linear parks, decorative crosswalks and/or pavement materials,

street furnishings, bulb-outs/curb extensions, and median refuges and/or pedestrian actuated controls at crossings.

Figure 2.1 displays the Proposed Plan pedestrian route types.

INTERSECTIONS

All crossing points at signalized intersections are planned to be upgraded to current City standards, to include the following:

- ADA compliant pedestrian ramps
- High visibility continental crosswalks
- Advanced stop bar placement
- Pedestrian countdown signals

For unsignalized intersections, features such as ADA-compliant curb ramps, advanced stop bar placement, and high visibility continental crosswalks are to be included along the intersection leg with the traffic control (i.e., stop sign).

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The pedestrian treatments shown in **Figure 2.2** should be considered to strengthen the existing pedestrian network and to maximize the benefit of new connections as they are built.

DISTRICTS AND CORRIDORS PEDESTRIAN ENHANCEMENTS

Corridors and Districts include additional operational and physical treatments beyond the basic pedestrian amenities to support the heavier pedestrian activity levels that traverse along such roadways. As previously defined, the more enhanced and premium pedestrian improvements that can be implemented along the Proposed Plan's Corridors and Districts include, but are not limited to, walkways greater than 5 feet, pedestrian actuated traffic control devices and signals, early pedestrian start at crossing signals (i.e., LPIs), bulb-outs, and pedestrian furnishings and lighting, where appropriate. Listed below are the Proposed Plan's identified Corridors and Districts, where enhanced and/or premium pedestrian treatments will be implemented to strengthen the community's pedestrian network.

Corridor route types will be present along the following roadways under the Proposed Plan:

- Logan Avenue; from 16th Street to 26th Street;
- National Avenue; from 16th Street to eastern community boundary;
- Main Street, from Beardsley Street to I-15 Ramps
- Sampson Street, from I-5 to Harbor Drive;
- 26th Street, from Logan Avenue to National Avenue.

Districts route type will be present along Cesar Chavez Parkway, from Logan Avenue to Harbor Drive.

LEAD PEDESTRIAN INTERVALS

Lead Pedestrian Intervals (LPIs), which give pedestrians an advance walk signal before motorists get a green light, are recommended to improve pedestrian safety and efficiency at signalized intersection locations along District and Corridor pedestrian route types. Additionally, locations where LPIs are recommended can also accommodate lead bicycle intervals simultaneously. LPIs are recommended at the following intersections and legs where pedestrian crossings are permitted:

- Logan Avenue & Cesar Chavez Parkway (all legs)

- National Avenue & Sigsbee Street (crossing Sigsbee Street)
- National Avenue & Cesar Chavez Parkway (crossing National Avenue and Cesar Chavez Parkway)
- National Avenue & Sampson Street (crossing National Avenue and Sampson Street)
- Main Street & Cesar Chavez Parkway (crossing Main Street and Cesar Chavez Parkway)
- Main Street & 28th Street (crossing 28th Street)
- Main Street & 32nd Street (crossing 32nd Street)
- Harbor Drive & Cesar Chavez Parkway (crossing Harbor Drive and Cesar Chavez Parkway)
- Harbor Drive & Sampson Street (crossing Harbor Drive and Sampson Street)

SIDEWALK IMPROVEMENTS

The Proposed Plan promotes the construction of sidewalks in areas where they are currently missing or degraded, such as areas along Harbor Drive, Main Street, Schley Street and Sigsbee Street. In addition to closing gaps in the sidewalk network, seeking additional right-of-way for wider, noncontiguous sidewalks and parkway area would occur at the project-level to help upgrade the community's pedestrian network and to support the anticipated increase in pedestrian activity within redevelopment areas in the Community Village and Historic Core. The Proposed Plan specifically identifies future widened sidewalks that are 10 to 15 feet wide along segments of Boston Avenue, 26th Street, 28th Street, National Avenue and Cesar E. Chavez Parkway. Also, maximizing sidewalk landscape, shade-producing street trees, and pedestrian scale street furnishing to the greatest extent feasible would further activate public spaces and improve the pedestrian environment and experience.

TRAFFIC CALMING

The previous 2013 Draft CPU proposed traffic calming measures to slow traffic speeds and improve safety for residents. Improvements included traffic calming measures along Boston Avenue between 26th Street and 28th Street, the reduction in street width along Boston Avenue between 29th and 32nd Street, and curb extension or bulb-outs at key intersections along Boston Avenue, 26th Street, 28th Street, National Avenue and Cesar E. Chavez Parkway. These improvements continue to be included as part of this Proposed Plan to further improve pedestrian safety and comfort through the community. Discussion on additional traffic calming features is provided in Section 2.6.

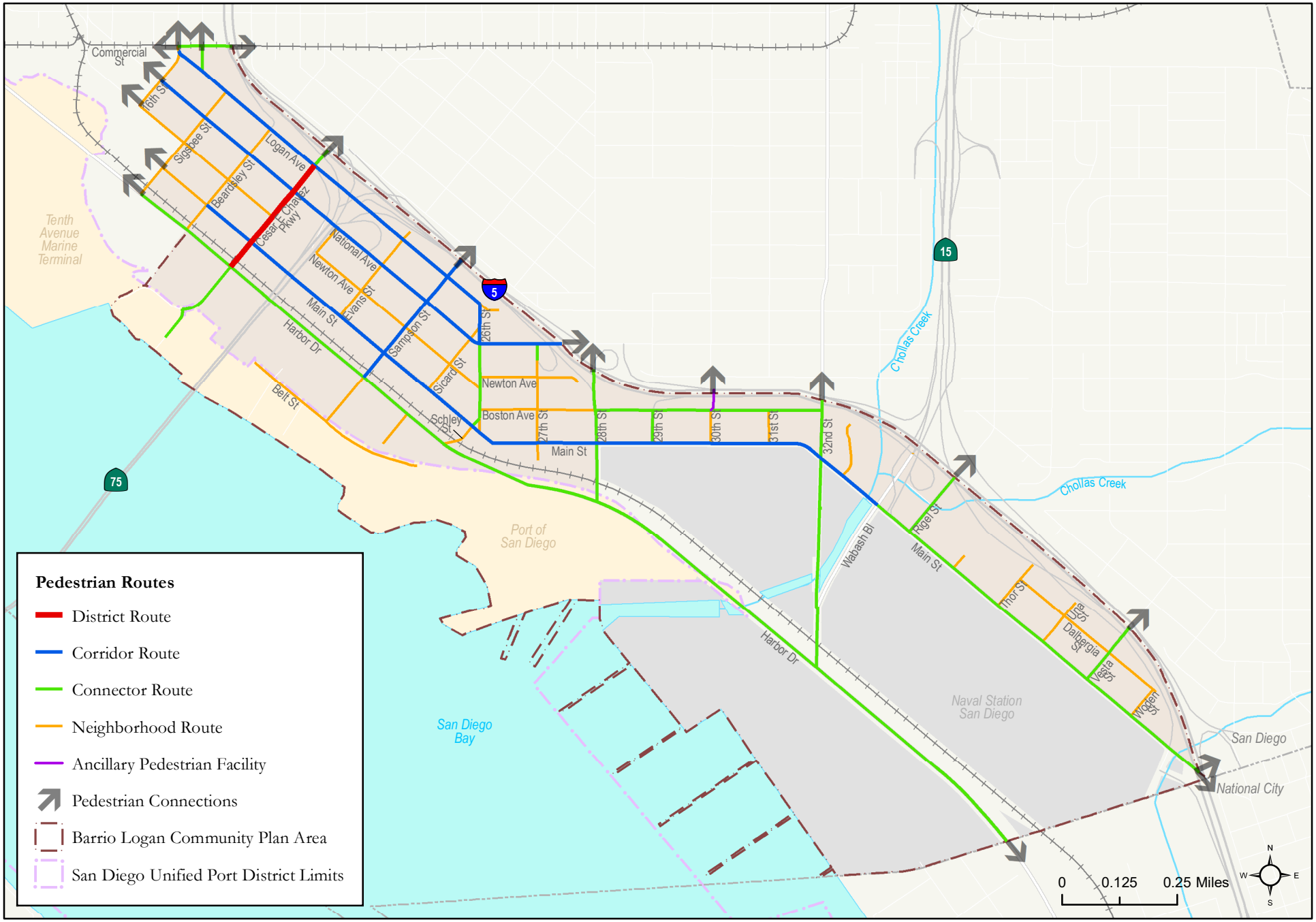

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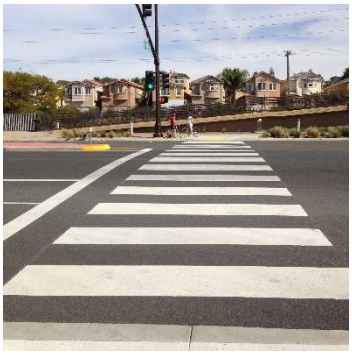
Figure 2.1

Pedestrian Route Types - Proposed Plan

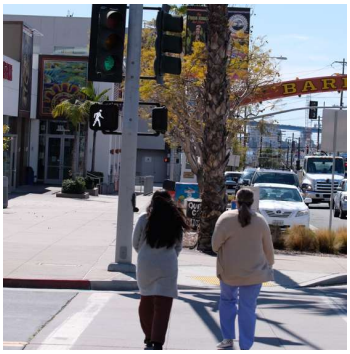
Figure 2.2 - **Pedestrian Treatments**



Continental Crosswalks *improve crosswalk visibility and are known to improve driver yielding compliance.*

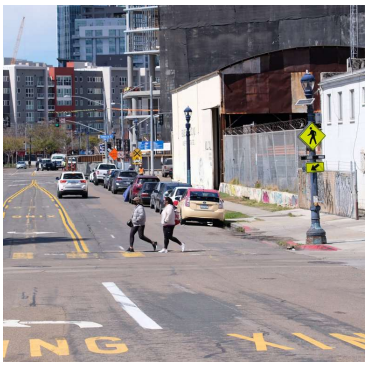
Pedestrian Countdown Signals *provide pedestrians with a clear indication of how many seconds remain to safely cross.*

Curb Bulb-outs or Curb Extensions *shorten pedestrian crossing distances and serve as a traffic calming mechanism.*



Lead Pedestrian Intervals *provide pedestrians a 3-7 second head start when entering an intersection, reinforcing their right-of-way over turning vehicles.*

Advance Stop Bars/Limit Lines *direct drivers where to stop at intersections and mid-block crossing locations, providing separation between the vehicle and crossing pedestrians.*



Pedestrian Hybrid Beacons *are traffic control signals that help pedestrians and bicyclists cross mid-block across high traffic roadways.*

Pedestrian Scale Lighting *increases visibility along walkways, creating a more comfortable and inviting environment for pedestrians.*

Wayfinding *is used to help orient pedestrians and direct them to destinations. Maps and directional signage are two wayfinding examples.*

Landscaped Buffers *along roadways provide separation between pedestrians and vehicles, creating a more comfortable environment.*

2.3 Bicycling

The planned bicycle improvements were developed while referencing the recommendations identified in the City of San Diego Bicycle Master Plan, the SANDAG's Regional Bike Plan, as well as synthesizing recommendations from adjacent community planning efforts such as the Downtown San Diego Mobility Plan and the Southeastern San Diego Community Plan. Additionally, community input gathered from Community Planning Group meetings were incorporated into the Proposed Plan. Efforts included coordination between City departments, improvements furthering implementation of the goals and policies of the City and region, forwarding the City's Climate Action Plan goals, as well as advancing State Complete Streets aims. The Proposed Plan bicycle facilities are listed below and displayed in **Figure 2.3**. Implementation of these facilities should consider additional treatments at intersections to improve cyclist safety and comfort (i.e., bike boxes, exclusive bicycle signal phasing, and conflict zone paint).

2.3.1 Bicycle Facility Improvements

Bicycle facilities could be implemented by repurposing existing public right-of-way (ROW) and/or coordinating with abutting property owners. The list of bicycle improvements below identifies the recommended improvement to the bicycle network in Barrio Logan. At the project-level when more information is available, modifications to these recommended classifications may be considered by the City.

CLASS I BICYCLE PATH

- Boston Avenue (north side), from 29th Street to Chollas Creek
- Bayshore Bikeway – Harbor Drive (south side), from Beardsley Street to southern community boundary
- Adjacent to 32nd Street, from Chollas Creek near Wabash Boulevard to Harbor Drive/Bayshore Bikeway[1]
- Chollas Creek, from Boston Street to Wabash Boulevard (parallel to I-5 and Chollas Creek)
- Chollas Creek, from Rigel Street to eastern community boundary
- Commercial Street, from western community boundary to eastern community boundary
- Beardsley Street Pedestrian Bridge across I-5
- 30th Street Pedestrian Bridge across I-5

CLASS II BIKE LANES

- National Avenue, from 16th Street to I-5
- 28th Street, from I-5 to Harbor Drive

CLASS III BIKE ROUTES

- 32nd Street, from I-5 to Harbor Drive[1]
- Newton Avenue, from 16th Street to Sigsbee Street
- Sigsbee Street, from National Avenue to Harbor Drive
- Cesar Chavez Parkway, from I-5 to Harbor Drive
- Main Street, from Cesar Chavez Parkway to 26th Street

[1] The Proposed Plan's policy framework includes supporting further engineering analyses and opportunities to explore either a Class I bicycle path or Class IV cycle track connection from Harbor Drive to Main Street along or adjacent to 32nd Street in consultation with the US Navy redevelopment of the Navy Exchange and the Vesta Street Bridge project.

- Sampson Street, from I-5 to Harbor Drive
- 26th Street, from National Avenue to Main Street
- Boston Avenue, from 26th Street to 32nd Street
- 30th Street, from Boston Avenue to Main Street
- Rigel Street, from the Chollas Creek to Main Street
- Main Street, from Rigel Street to southeastern community boundary

CLASS IV CYCLE TRACK (TWO -WAY)

- Schley Street (east side), from Harbor Drive to Main Street
- Main Street (south side), from 26th Street to Rigel Street

BICYCLE SIGNAL PHASING

Bicycle signal phasing are recommended to improve cyclists' safety and efficiency at signalized intersection locations along Class IV Cycle Track facilities. Bicycle signal phasing modifications were based upon incorporating lead bike signals, which provide a three-second lead for bicyclists to enter the intersection before the start of the vehicular phase. In the case of intersections that also would include LPIs, the lead bike signal would occur at the same time as the pedestrian-only phase. These locations include:

- Main Street & 28th Street (signal with LPI – crossing 28th Street)
- Main Street & 32nd Street (signal with LPI – crossing 32nd Street)

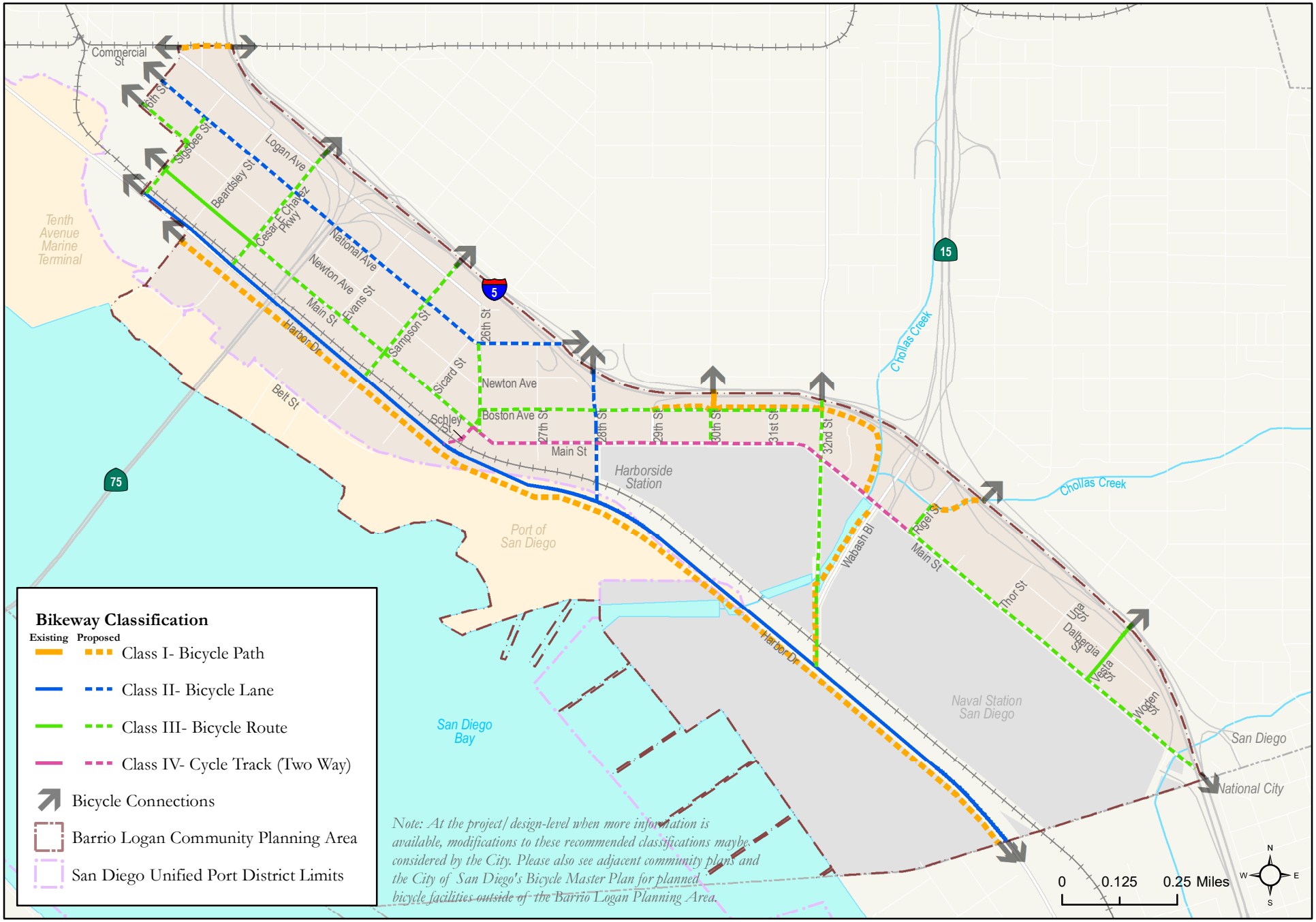


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Figure 2.3
Bicycle Network - Proposed Plan

2.4 Transit Services and Facilities

The Barrio Logan Community Plan Update considers the adopted and draft versions of the San Diego Forward (2015/2019 and 2021, respectively) for planned regional transit routes. The San Diego Forward, Regional Transportation Plan (RTP), provides a long-term blueprint for the San Diego region that stives to meet regulatory requirements, address traffic congestion, and create equal access to community resources. This transformative Plan will bring a bold new vision to our region framing around the 5 Big Moves including Complete Corridors, Transit Leap, Mobility Hubs, Flexible Fleets, and Next OS (Operating System). Access to transit, mobility hubs, and transit-oriented developments were focuses as a part of the planning effort.

San Diego's Metropolitan Transit System (MTS) provided ridership data for all their routes serviced in Barrio Logan for Fall 2020. **Appendix B** includes the boardings and alightings for each transit stop located within the MTS transit network in the community for Fall 2020. While the data was collected during COVID-19 and travel patterns were considered to be atypical, the data was more used as a proxy to identify transit locations with the highest demand.

The three Blue Line trolley stations (Pacific Fleet, Harborside, and Barrio Logan) serve the highest ridership within the community. Of the local bus routes, Route 901 and Route 929 serve the highest ridership at the Cesar Chavez Parkway & National Avenue and Main Street & Cesar Chavez Parkway intersections, respectively.

2.4.1 Transit Facility and Service Improvements

SANDAG's San Diego Forward: The Regional Plan (adopted 2015 and draft 2021) identifies the transit improvements, including those listed below as planned for implementation within Barrio Logan prior to the 2050 horizon year. These improvements are supported in the Proposed Plan.

- *Rapid Bus Route 12* – Increase bus service to 10-minute headways. This route will run from Spring Valley to Downtown. Implementation timelines currently target for approximately 2035.
- *Blue Line* – Improve light rail services with grade separations and double tracking to serve frequencies to every 7.5 minutes all day. All day service would operate up to 22 hours per day. Implementation timelines currently target for approximately 2050.

With the Draft 2021 Regional Plan under review, transit-focused policies in the Proposed Plan includes to coordinate with SANDAG to plan and implement transit infrastructure and service enhancements identified in this Regional Plan, including light rail and/or bus rapid transit to serve areas of future residential and employment uses. The Proposed Plan also includes references to transit leap and commuter rails to provide critical connections throughout the community and region. A map of the alignment of future transit, such as transit leap corridors and commuter rails are included at a high-level, and specific route alignments and stations are not included in the Proposed Plan as future transit corridors from SANDAG are subject to change.

MOBILITY HUBS

A mobility hub is a location where different travel options come together to offer opportunities for multimodal trips. This concept is encouraged at the regional level through SANDAG's 5 Big Moves, with mobility hubs identified as one of the five key strategies envisioned to enhance the movement of people and goods throughout the region. A mobility hub can improve the experience for existing travelers and help entice others to make multimodal trips by providing additional supporting services

and features. Convenient and comfortable access for all modes of travel is critical to realizing the potential of a mobility hub area.

The scale and features of a mobility hub are dependent on the context of location. Features and services that may be considered could include enhanced transit waiting areas, passenger loading zones, real time travel information, walkways, high-visibility crosswalks, bicycle parking, bikeshare, carshare, on-demand rideshare, neighborhood electric vehicles, micro-transit, electric vehicle charging stations, wayfinding, and high-speed internet.

The Draft 2021 Regional Plan includes implementation of mobility hubs all throughout the Barrio Logan community to help provide connections to existing and future transit. Mobility Hubs could be implemented at key existing and planned transit stops/stations, including, but not limited to, Barrio Logan Station, Harborside Station, Pacific Fleet Station – these are locations with the highest transit ridership in the community and the addition of a mobility hub could further encourage transit ridership and provide enhanced first/last mile connections. Smaller mobility hubs could also be implemented at the Cesar Chavez Parkway/Logan Avenue intersection and Chicano Park, which are near the densest parts of the community, where many future residents and/or employees could greatly benefit from the multimodal options provided at these smaller mobility hubs. Additionally, a mobility hub could be implemented at the Cesar Chavez Park near the waterfront. This park is owned by the Port District, so policies are provided in the Proposed Plan to coordinate with the Port to implement some mobility hub features to help connect this park, that is relatively isolated from the community, to the nearby trolley stations or central areas of the Barrio Logan community.

Figure 2.4 displays the anticipated transit coverage under Proposed Plan buildout conditions.

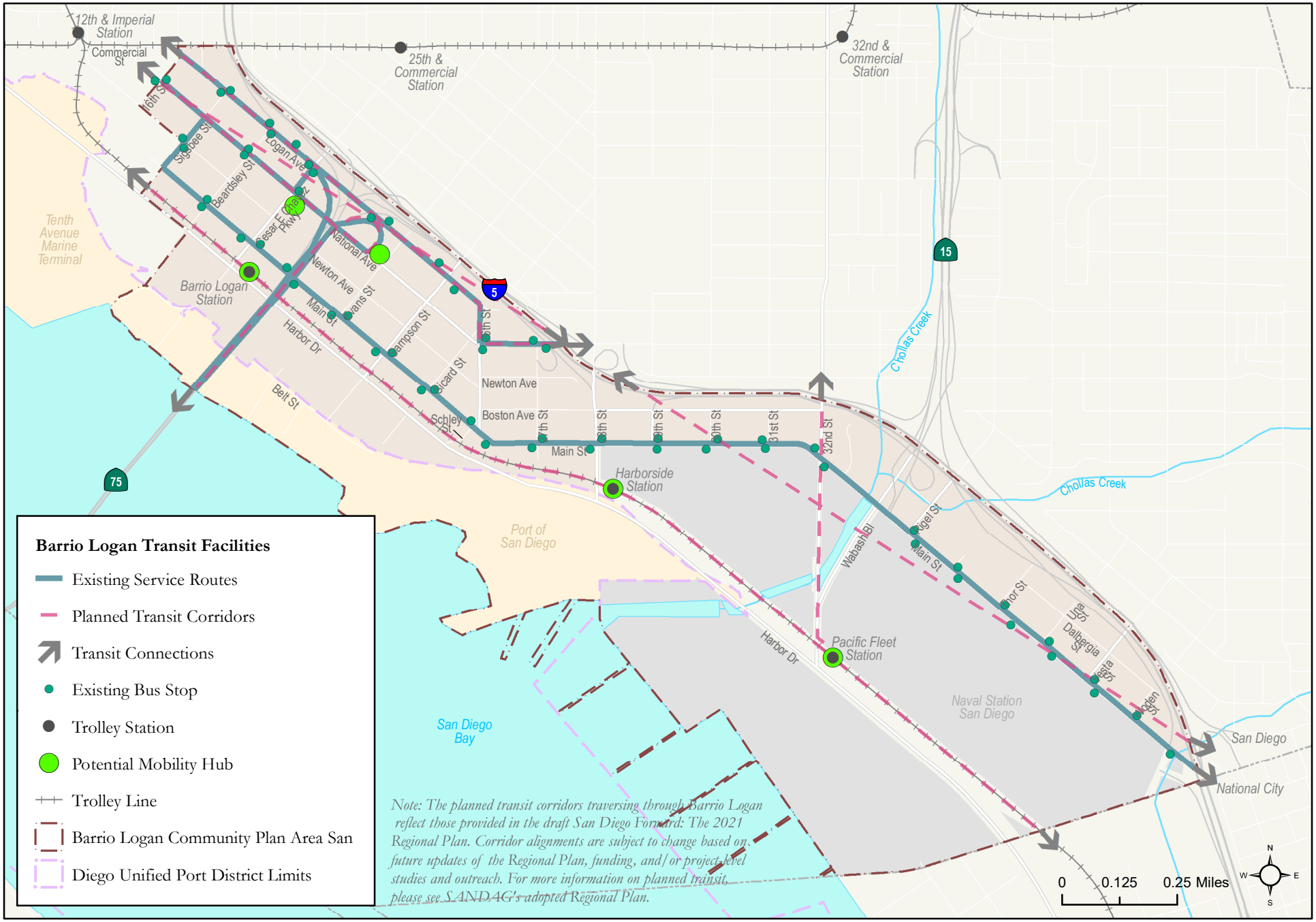

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Figure 2.4

Transit Coverage - Proposed Plan

2.5 Streets and Freeways

Streets and freeways comprise the framework of our transportation system and play a major role in shaping the form and quality of life within the community. When the street system is plagued by congestion, it can have a major impact on the community, thus it is vital to provide a network to adequately serve vehicle demand, while still accommodate other transportation modes. The planned roadway network for the 2021 Barrio Logan Community Plan Update was developed referencing previous identified improvements in the 2013 Barrio Logan Public Facilities Financing Plan (also known as the Impact Fee Study) and transportation improvements from the PEIR, as well as integrating recent on-going efforts from the City of San Diego or other agencies such as SANDAG, Port of San Diego, and the Navy.

This mobility assessment focused on the areas of change within the community (specified in Section 1.3), so the mobility element roadways and key intersections were analyzed, but freeways were not evaluated in this effort. A freeway analysis was conducted for the 2013 Draft CPU in the respective Transportation Impact Study (TIS). This analysis was more conservative as it used a different transportation model that generated higher vehicle volumes. The Proposed Plan includes policies to coordinate with Caltrans on future transportation projects to improve safety, accessibility, and connectivity between their facilities and the Barrio Logan community.

2.5.1 Study Area Definition

All Mobility Element designated roadway segments, also known as circulation roadways, were analyzed. For intersections, a focused analysis was conducted to analyze selected intersections that fit at least one of the following criteria:

- Facilities with proposed mitigations identified in the previous PEIR that have not yet been implemented and/or that aligns with the current goals of the Proposed Plan;
- Intersections within the focused area of change where there are planned increases in density compared to the 2013 Draft CPU, and that were identified in the PEIR to operate at LOS D or worse under the future year conditions; and
- Intersections with major active transportation improvements that could affect intersection signal operations.

Based on the criteria above, the following 12 intersections were analyzed:

1. Beardsley Street/I-5 SB Off-Ramp & Logan Avenue
2. Harbor Drive & Sigsbee Street
3. Harbor Drive & Beardsley Street
4. Sampson St & Logan Ave
5. Harbor Drive & Schley Street
6. 28th Street & Boston Ave
7. 28th Street & Main Street
8. 28th Street & Harbor Drive
9. 29th Street & I-5 Southbound On-Ramp & Boston Avenue
10. 32nd Street & Main Street
11. 32nd Street & I-15 Northbound On-Ramp/Norman Scott Road (Wabash Blvd)
12. 32nd Street & Harbor Drive

Figure 2.5 displays the study area roadway and key intersections.

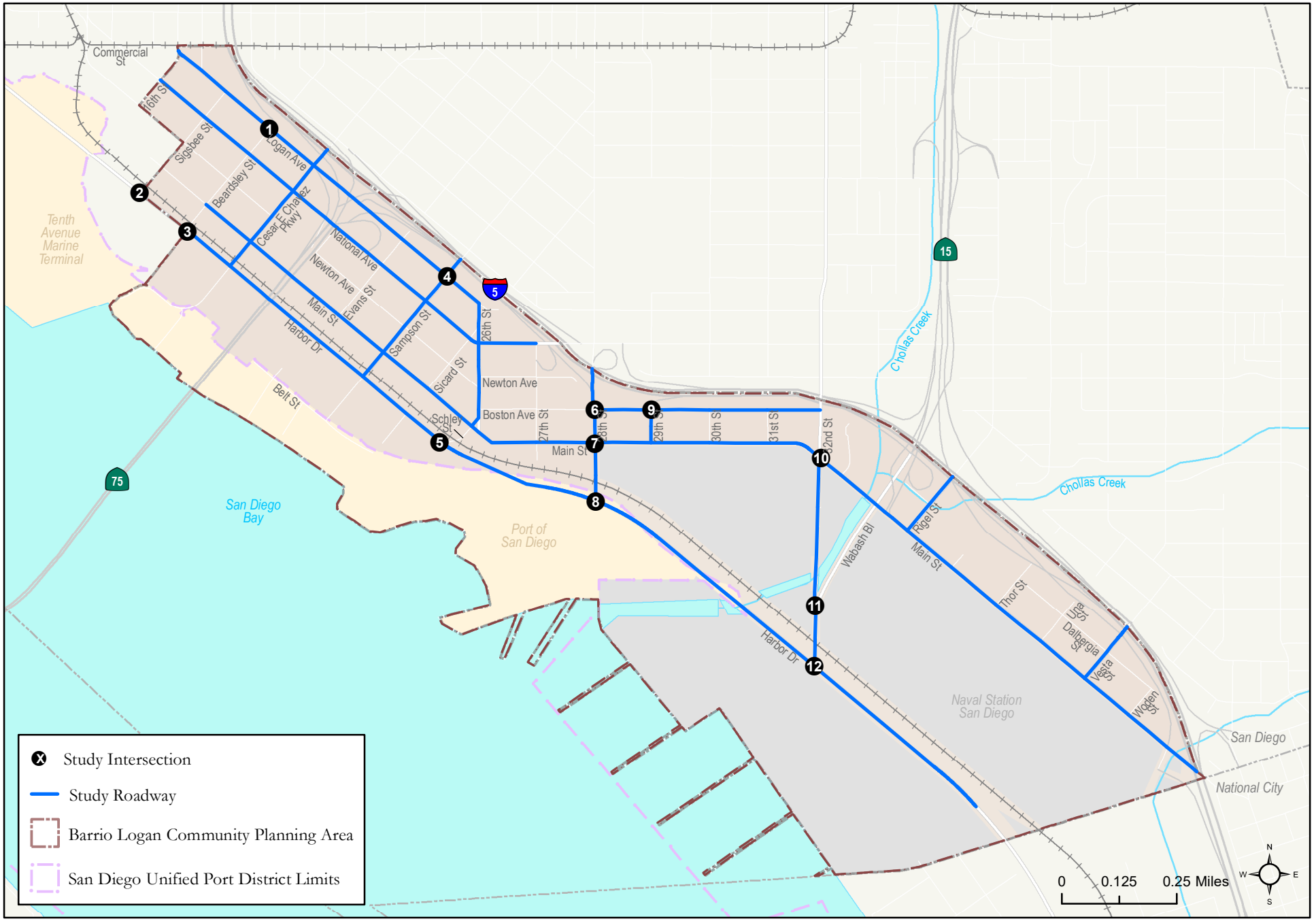

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Figure 2.5

Study Area Roadways and Key Study Intersections

2.5.2 Streets and Roadway Improvements

IMPROVEMENTS RECOMMENDED IN 2013 PEIR AND DRAFT CPU

The PEIR included transportation improvements to mitigate the transportation related CEQA impacts of the project. Each of those mitigation measures were reviewed to determine whether they should be carried forward into the Proposed Plan. **Table 2.1** summarizes the roadway and intersection improvements from the PEIR that were re-evaluated for the appropriateness to be included in the Proposed Plan. The full project list matrix that includes all the transportation improvements in the Barrio Logan community is provided in **Appendix C.**

Table 2.1 – 2013 Recommended Roadway and Intersection Improvements

Location	Improvement	Included in Proposed Plan[1]?
Roadway		
Main Street between Evan Street and 26th Street	• Add a two-way left-turn lane	Yes
28th Street between I-5 and Harbor Drive	• Widen to a 5-lane Major Arterial (3 southbound and 2 northbound lanes)	No[2]
Intersection		
Harbor Drive & Sigsbee Street	• Install a traffic signal	Yes
Logan Avenue & Beardsley Street / I-5 SB Off-Ramp	• Install a traffic signal	No
Harbor Drive & Beardsley Street	• Modify raised median along Harbor Dr to restrict eastbound left-turn and southbound left-turn movements • Install a traffic signal	Partial[3]
Logan Avenue & Sampson Street	• Install a traffic signal Add northbound and southbound left turn lanes	No
Main Street & 26th Street	• Eliminate northbound through and westbound left-turn movements (truck deterring improvement)	Yes
Harbor Drive & Schley Street	• Eliminate southbound left/through movement Add southbound right-turn overlap phase	No
Boston Avenue & 28th Street	• Add a third southbound lane	No
Main Street & 28th Street[2]	• Add a third southbound through lane	No
Harbor Drive & 28th Street	• Add second eastbound left turn lane	No

Notes:
[1] The two Updates (2013 and 2021) utilized two different regional models both in terms of version of the RTP and modeling platform. The PEIR transportation analysis utilized SANDAG's Series 11 Transportation Demand Forecasting Model, which was a four-step, trip-based model reflecting the 2030 San Diego Regional Transportation Plan (2030 RTP) adopted in 2007. Since the completion of the PEIR, SANDAG released the Series 13 Activity Based Model (referred to as ABM1), which is an activity-based model (ABM) that uses a completely different methodology for synthesizing population and forecasting vehicle trips under a 2050 horizon year. The ABM1 model is much more

sensitive to travel behavior patterns and broader planning strategies, as well as better replicates non-auto travel modes. As such, vehicular volumes in the Series 13 model are typically forecasted to be less and trending more closely to observed traffic counts than vehicle volumes forecasted in the Series 11 model. Therefore, certain mitigations in the PEIR may no longer be necessary with the newer Series 13 traffic volumes.

[2] 28th Street widening to a 5-Lane Major Arterial is not recommended as the roadway is anticipated to operate at ideal levels with the current 4-Lane configuration under 2050 conditions.

[3] The partial inclusion is the implementation of reconstructing the median to restrict southbound and eastbound left-turn movements; the signal is not required.

IMPROVEMENTS RECOMMEND IN THE PROPOSED PLAN

A list of Proposed Plan roadway and intersection improvements are presented below. Any planned bicycle facility improvements within the specified roadway extents are also identified; however, the full list of bicycle facility improvements is provided in Section 2.3.1. The roadway improvements are predominantly based on the future year traffic volumes that are projected under buildout of the Proposed Plan (displayed in Figure 2.6) and to accommodate the multimodal improvements. Full analysis of all Proposed Plan roadways is provided in the next section.

ROADWAY MODIFICATIONS

- *National Avenue, from 16th Street to Beardsley Street* – Reclassify this segment from a 2-lane Collector with two-way left-turn lane (TWLTL) to a 2-Lane Collector with striped median, repurposing the additional roadway width as one-way Class II bike lanes.
- *National Avenue, from Cesar Chavez Parkway to 26th Street* – Reclassify this segment from a 2-lane Collector with TWLTL to a 2-Lane Collector with striped median, repurposing the additional roadway width as one-way Class II bike lanes.
- *Main Street, from Evans Street to 26th Street* – Reclassify this segment from a 2-Lane Collector with striped median to a 2-Lane Collector with TWLTL, repurposing the additional roadway lane widths for a TWLTL.
- *Main Street, from 26th Street to 27th Street* – Reclassify this segment from a 3-Lane Collector with a striped or raised median to a 2-Lane Collector, repurposing the additional width as two-way Class IV cycle track.
- *Main Street, from 27th Street to 28th Street* – Reclassify this segment from a 4-Lane Collector with a striped median to a 2-Lane Collector, repurposing the additional width as two-way Class IV cycle track.
- *Main Street, from 28th Street to 29th Street* – Reclassify this segment from a 4-Lane Collector with a striped median to a 3-Lane Collector with two westbound lanes and one eastbound lane or a 2-Lane Collector with a TWLTL, repurposing the additional width as a two-way Class IV cycle track.
- *Main Street, from 29th Street to 31st Street* – Reclassify this segment from a 3-Lane Collector with a striped median to a 2-Lane Collector with TWLTL, repurposing the additional width as a two-way Class IV cycle track.
- *Main Street, from 31st Street to 32nd Street* – Reclassify this segment from a 3-Lane Collector with a striped median to a 2-Lane Collector, repurposing the additional width as a two-way Class IV cycle track.
- *Main Street, from 32nd Street to Rigel Street* - Reclassify this segment from a 4-Lane Collector with a striped median to a 3-Lane Collector with two westbound lanes and one eastbound lane, repurposing the additional width as a two-way Class IV cycle track.

The roadway classifications under the Proposed Plan are presented in **Figure 2.6.** A summary of the roadway modifications is presented in **Table 2.2.**

Table 2.2 – Planned Roadway Modifications

Roadway	Segment	Existing Functional Classification	Proposed Classification Designation
National Avenue	16th Street to Beardsley Street	2-Lane Collector (with TWLT)	2-Lane Collector (No TWLT)
National Avenue	Cesar Chavez Parkway to 26th Street	2-Lane Collector (with TWLT)	2-Lane Collector (No TWLT)
Main Street	Evans Street to 26th Street	2-Lane Collector (No TWLT)	2 Lane Collector (with TWLT)
Main Street	26th Street to 27th Street	3-Lane Collector (No TWLT)	2 Lane Collector (No TWLT)
Main Street	27h Street to 28th Street	4-Lane Collector (No TWLT)	2 Lane Collector (No TWLT)
Main Street	28th Street to 29th Street	4-Lane Collector (No TWLT)	3-Lane Collector (No TWLT) / 2-Lane Collector with TWLTL
Main Street	29th Street to 31st Street	3-Lane Collector (No TWLT)	2 Lane Collector (with TWLT)
Main Street	31st Street to 32nd Street	3-Lane Collector (No TWLT)	2 Lane Collector (No TWLT)
Main Street	32nd Street to Rigel Street	4-Lane Collector (No TWLT)	3 Lane Collector (No TWLT)

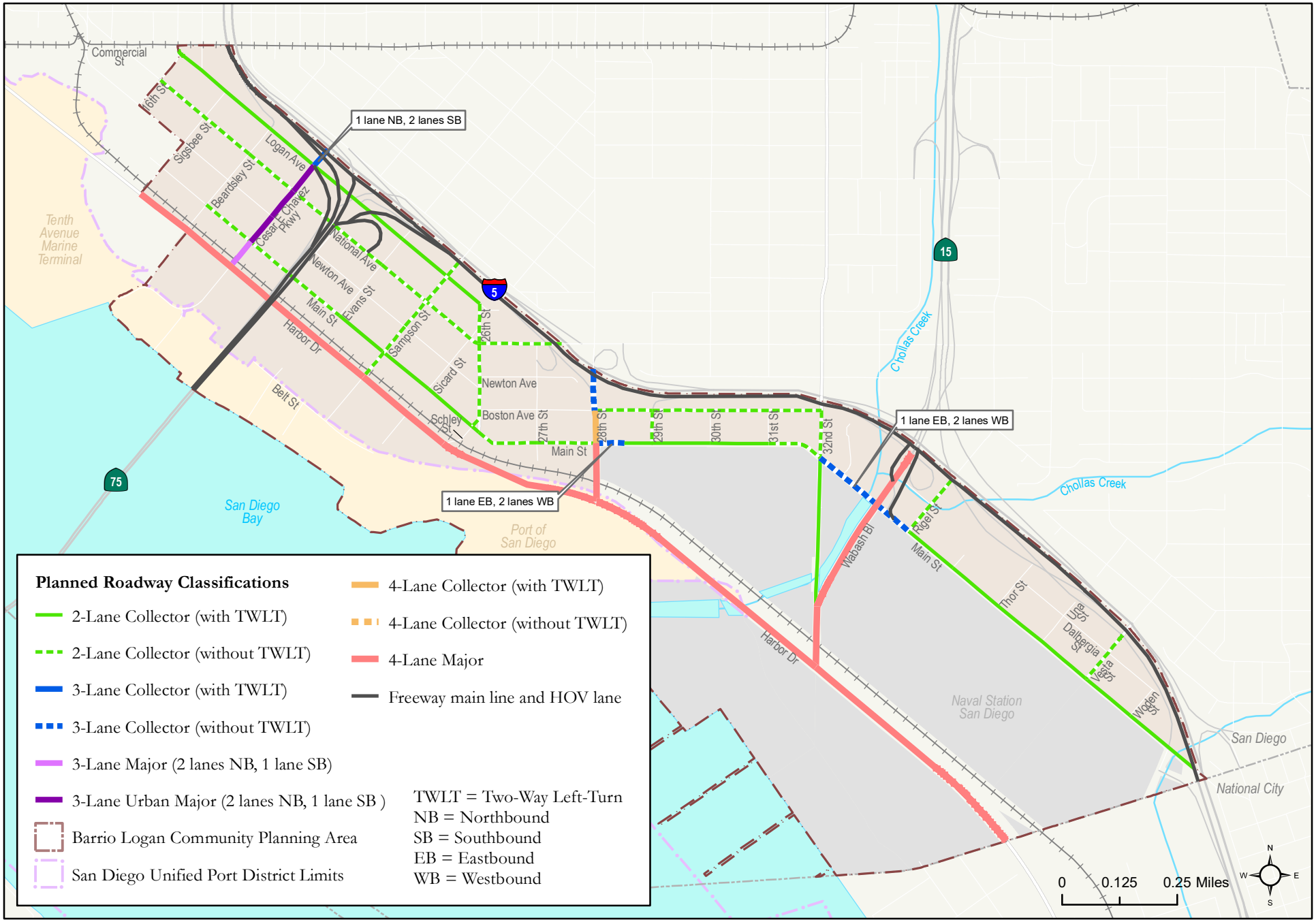

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Figure 2.6

Roadway Classifications - Proposed Plan

INTERSECTION MODIFICATIONS.

Several intersections were modified to accommodate buildout of the roadway segment and bicycle classifications, as well as to support pedestrian treatments associated with the pedestrian route typologies. Buildout intersection geometry is provided in Section 2.5.3. In addition to intersection related improvements described in previous sections, a summary of intersection modifications to accommodate buildout of the roadway segment classifications, such as lane geometry and signal modifications to accommodate proposed Class IV bicycle facilities, and major traffic control modifications is presented in **Table 2.3**.

Table 2.3 – List of Intersections with Planned Modifications Under Proposed Plan

Intersection	Improvement	Geometry Mod[1]	Signal Mod[2]	New Signal
Harbor Drive & Sigsbee Street	• Install a traffic signal			✓
Harbor Drive & Beardsley Street	• Modify raised median along Harbor Dr to restrict eastbound left-turn and southbound left-turn movements	✓		
28th Street & Main Street	• Remove an eastbound through lane to accommodate a two-way Class IV cycle track on the south side of the roadway • Add Lead Pedestrian Intervals (LPI) and Lead Bicycle Intervals and phasing crossing 28th Street • Add "No Right Turn on Red" for the eastbound and northbound right-turn	✓	✓	
29th Street & Main Street	• Remove an eastbound through lane • Convert a westbound through lane to a Two-Way-Left-Turn Lane (TWLTL)	✓		
30th Street & Main Street	• Convert a westbound through lane to a TWLTL	✓		
31st Street & Main Street	• Convert a westbound through lane to a TWLTL	✓		
32nd Street & Main Street	• Remove an eastbound through lane to accommodate a two-way Class IV cycle track on the south side of the roadway • Add lead bicycle interval phasing crossing 32nd Street • Add "No Right Turn on Red" for the eastbound and northbound right-turn	✓	✓	
32nd Street & Harbor Drive	• Remove existing pedestrian bridge and add at-grade pedestrian crossings on the west and north legs • Add "No Right Turn on Red" for the southbound and westbound right-turn • Add right-turn overlap phasing for the southbound and westbound right-turn • Add LPIs crossing 32nd Street and Harbor Drive		✓	

Notes:

[1] Geometry modifications are changes to the intersection configuration and examples include: restriping, lane addition or removal, new intersection legs, new turn pockets, and channelization of turning movements.
[2] Signal modifications are changes to the phasing and key timings and examples include: change in left-turn phasing (i.e., protected phasing, permissive phasing) and addition or removal of a right-turn overlap.

Additionally, this listing of intersections does not include locations with only recommended LPIs as it focuses more on signal modifications related to vehicular movement and associated with accommodating buildout of the Proposed Plan's roadway and bicycle classifications. **Figure 2.7** displays the intersection geometrics of the study intersection for the Proposed Plan.

Furthermore, the Proposed Plan also proposes roadway and intersection improvements along Cesar Chavez Parkway to enhance multimodal connections, as well as increase community spaces. During this effort, the possibility of roundabouts at intersections along the corridor was explored. A high-level evaluation of the existing right-of-way determined that a single-lane roundabout could fit within the intersections along Cesar Chavez Parkway between Boston Avenue and Harbor Drive. However, one of the main operational challenges associated with implementing roundabouts along this corridor is the at-grade railroad crossing on the southern end and the potential for queues forming at certain locations and blocking flow through the rest of the corridor when the gates are down and a train is traversing through. A project-level analysis is required in order to make certain of the roundabout feasibility and constructability, therefore, they are not included in this Mobility Assessment. Policy framework has since been included in the Barrio Logan Mobility Element to support future exploration of additional roadway and public rights-of-ways modifications to further enhance the bicycle facilities, pedestrian realm, and streetscape along Cesar E. Chavez Parkway.

ON-STREET PARKING

Many of the Proposed Plan improvements identified throughout this Chapter are intended to be implemented within the existing curb-to-curb environments. As such, the removal of existing on-street parking may be required to aid implementation, in some instances. It is anticipated that any additional parking demand associated with future developments will be accommodated on-site.

The Proposed Plan recommendations are intended to improve the mobility network for all modes of travel, including substantial investments in pedestrian, bicycle, and transit access improvements. Combined with the planned transit network expansions and service enhancements, these improvements will provide attractive alternatives to personal vehicles, potentially alleviating future on-street parking demands.

On-street parking will be removed at the following locations as network improvements are implemented:

- Main Street (south side) between27th Street to 28th Street
- Main Street (south side) between 30th Street to 31st Street

Additionally, the implementation of the Class II bicycle lanes on National Avenue (described in Section 2.3.1) will result in a loss of parking spaces near intersections where left-turn pockets will be maintained. The diagonal parking on National Avenue between Beardsley Street and Cesar Chavez Parkway will be maintained with the implementation of the Class II bicycle lanes.

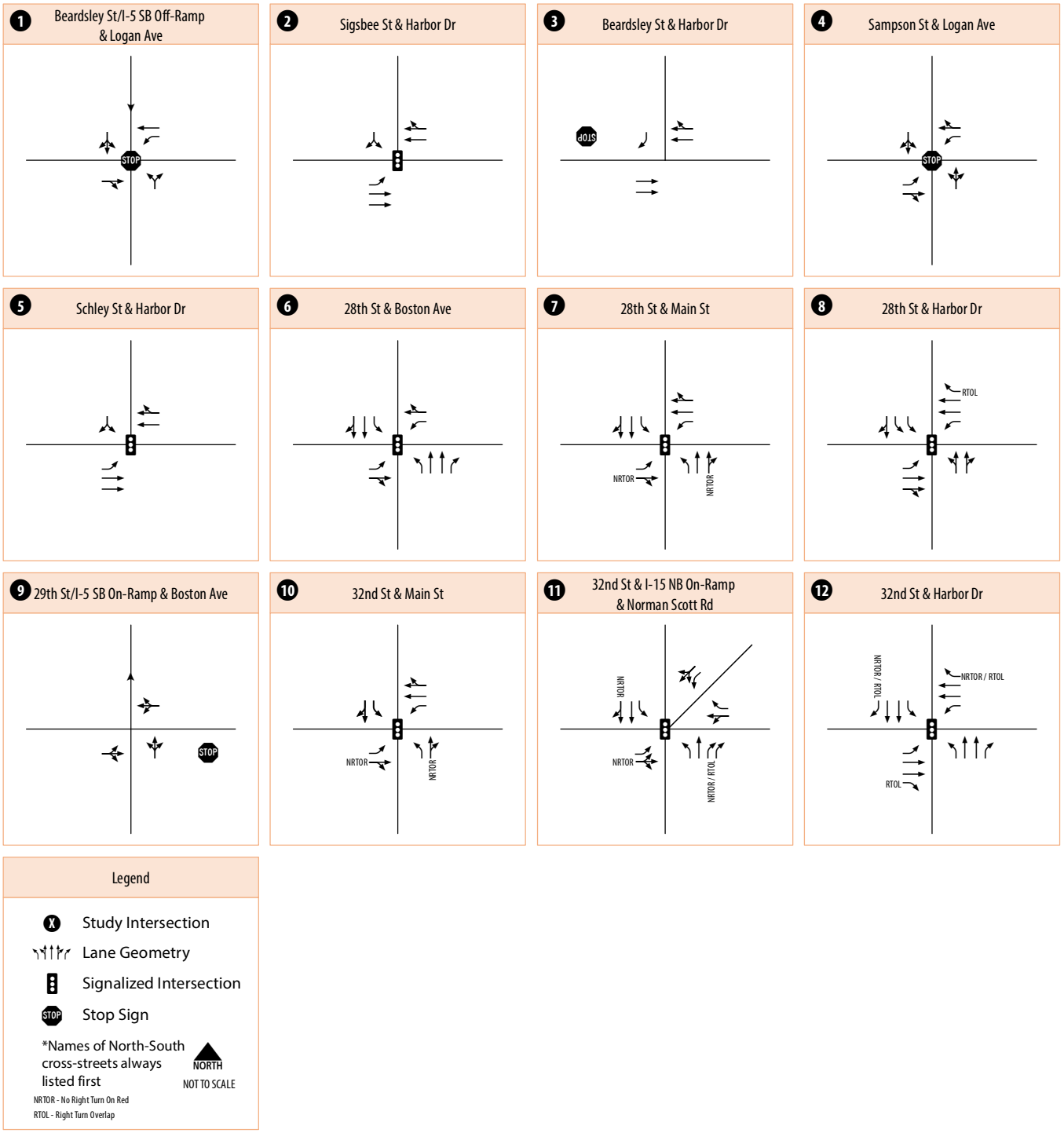

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Figure 2.7
Intersection Geometrics - Proposed Plan

2.5.3 Vehicular Operations Analysis

The local streets system was evaluated under Proposed Plan conditions, which assumes full buildout of the plan's land uses. The operations were first analyzed under existing roadway configuration to determine if the need for implementation of the improvements identified in Table 2.1 in the beginning of this section are warranted.

TRAFFIC VOLUMES FORECAST

Future vehicular demand was derived from the SANDAG Activity Based Model Series 13 travel forecast, which estimates volumes based on buildout of Proposed Plan land uses and planned transportation networks. It should be noted that after completion of this mobility analysis, some of the employment land use inputs were updated for the Proposed Plan. This difference includes a slight shift in employment uses along Main Street. A separate model run was conducted with these land use changes and the model output (i.e., projected volumes) was compared against output from the original model run used in the mobility analysis. Although the original model is not exactly replicative of the Proposed Project's land use distribution, the difference is considered insignificant as the employment difference is negligible. It was also verified that updating the volumes in the mobility analysis based on model output from the separate model run would not change the conclusions of the vehicle operations analysis. Therefore, the original model used in the analysis was still considered to be representative of the projected vehicular volumes for the Proposed Plan.
The Future Year model was developed by inputting the Proposed Plan land uses and roadway network into the recently customized Port Master Plan Update (PMPU) model that includes the PMPU proposed buildout land use and transportation infrastructure improvements, with the following adjustments/assumptions:

- Buildout of the Proposed Plan land uses within the project study area (land use assumptions are provided in **Appendix D**).
- Future roadway network within the study area with one new roadway assumption:
    - Vesta Street Bridge extending its existing terminus at Mc Candless Boulevard to provide direct access to the Naval Base San Diego (NBSD)
- Year 2050 land uses outside of the study area, including the Southeastern San Diego Community Plan (updated in 2015) and the Port Master Plan Update (PMPU).

The model inputs described above were reviewed by the project team and approved by City staff prior to running the model forecasts. Future Year forecast volumes were reviewed and adjusted by the project team and City staff based on a comparison between the Base Year 2012 traffic volume and historic counts.

ANALYSIS METHODOLOGY

Analysis of the vehicular system – roadway segments and intersections– was prepared for this study in accordance with the *City of San Diego Transportation Study Manual* (TSM) (September 2020). The vehicular analysis provides an evaluation of vehicular operations at intersections and along roadway segments. A description of the methodologies employed to evaluate vehicular travel is outlined throughout this section.

Level of Service (LOS) is a quantitative measure representing the quality of service from the driver's perspective. LOS A represents optimal conditions for the driver, while LOS F represents the worst. **Table 2.4** describes generalized definitions of vehicular LOS A through F.

Table 2.4 – Vehicular Level of Service Definitions

LOS	Characteristics
A	Primarily free-flow operation. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Controlled delay at the boundary intersections is minimal. The travel speed exceeds 85% of the base free-flow speed.
B	Reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted and control delay at the boundary intersections is not significant. The travel speed is between 67% and 85% of the base free-flow speed.
C	Stable operation. The ability to maneuver and change lanes at mid-segment locations may be more restricted than at LOS B. Longer queues at the boundary intersections may contribute to lower travel speeds. The travel speed is between 50% and 67% of the base free-flow speed.
D	Less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volume, or inappropriate signal timing at the boundary intersections. The travel speed is between 40% and 50% of the base free-flow speed.
E	Unstable operation and significant delay. Such operations may be due to some combination of adverse signal progression, high volume, and inappropriate signal timing at the boundary intersections. The travel speed is between 30% and 40% of the base free-flow speed.
F	Flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30% or less of the base free-flow speed. Also, LOS F is assigned to the subject direction of travel if the through movement at one or more boundary intersections have a volume-to-capacity ratio greater than 1.0.

Source: Highway Capacity Manual, Transportation Research Board (2010)

Roadway Segment Analysis

Roadway segment level of service standards and thresholds provided the basis for analysis of arterial roadway segment performance. The analysis of roadway segment level of service is based on the functional classification of the roadway, the maximum capacity, roadway geometrics, and existing or forecast Average Daily Traffic (ADT) volumes. **Table 2.5** presents the roadway segment capacity and LOS standards utilized to analyze roadways evaluated in this report.

These standards are generally used as long-range planning guidelines to determine the functional classification of roadways. The actual capacity of a roadway facility varies according to its physical and operational attributes. LOS D is considered acceptable for Mobility Element roadway segments in the City of San Diego. Often, a roadway segment that is analyzed to be LOS E or F based on theoretical capacity is found to operate acceptably in practice. In such cases, HCM arterial analysis may be conducted and utilized (or intersection analysis, if arterial analysis is not applicable) to provide a more accurate indication of LOS.

Peak Hour Intersection Level of Service Standards and Thresholds

This section presents the methodologies used to perform weekday peak hour intersection capacity analysis, for both signalized and unsignalized intersections. The following assumptions were utilized in conducting all intersection level of service analyses:

- *Pedestrian Calls per Hour*: An assumption of 10 pedestrian calls per hours.

- *Heavy Vehicle Factor*: An assumption of 10% heavy vehicle factor was applied for the major corridors, such as Harbor Drive, 28th Street, and 32nd Street.
- *Peak Hour Factor*: 0.92 was assumed for most movements unless more recent data was available.
- *Signal Timings*: Obtained from existing signal timing plans (as of July 2021) and cycle length and phase splits were optimized for Horizon Year 2050.

Signalized Intersection Analysis

The signalized intersection analysis utilized in this study conforms to the operational analysis methodology outlined in *Highway Capacity Manual (HCM) 6th Edition*. This method defines LOS in terms of delay, or more specifically, average control delay per vehicle (seconds/vehicle).

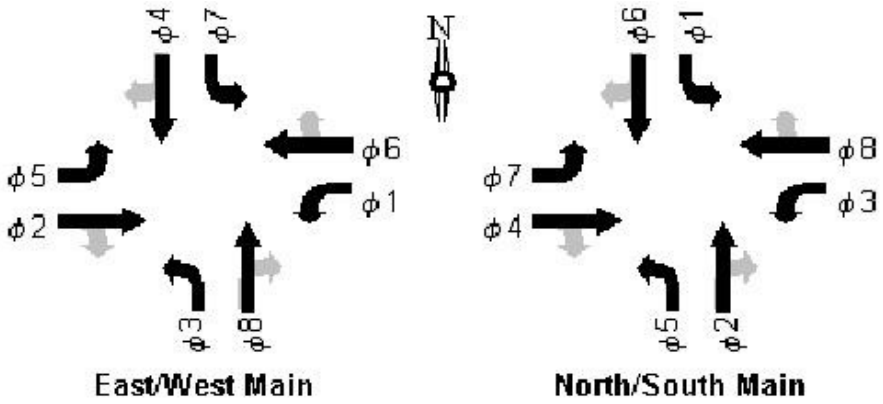
The *HCM 6th Edition* methodology sets 1,900 passenger-cars per hour per lane (pcphpl) as the ideal saturation flow rate at signalized intersections based upon the minimum headway that can be sustained between departing vehicles at a signalized intersection. The service saturation flow rate, which reflects the saturation flow rate specific to the study facility, is determined by adjusting the ideal saturation flow rate for lane width, on-street parking, bus stops, pedestrian volume, traffic composition (or percentage of heavy vehicles), and shared lane movements (e.g., through and right-turn movements sharing the same lane). The LOS criteria used for this technique are described in **Table 2.6**. The computerized analysis of intersection operations was performed utilizing the *Synchro 10.0 (HCM 6th Edition methodology)* traffic analysis software (by Trafficware, 2021).

Table 2.5 – City of San Diego Roadway Segment Daily Capacity and Level of Service Standards

Roadway Functional Classification	Lanes	Level of Service				
		A	B	C	D	E
Freeway	8	60,000	84,000	120,000	140,000	150,000
Freeway	6	45,000	63,000	90,000	110,000	120,000
Freeway	4	30,000	42,000	60,000	70,000	80,000
Expressway	6	30,000	42,000	60,000	70,000	80,000
Prime Arterial	8	35,000	50,000	70,000	75,000	80,000
Prime Arterial	6	25,000	35,000	50,000	55,000	60,000
Prime Arterial	4	17,500	24,500	35,000	40,000	45,000
Major Arterial	7	22,500	31,500	45,000	50,000	55,000
Major Arterial	6	20,000	28,000	40,000	45,000	50,000
Major Arterial	5	17,500	24,500	35,000	40,000	45,000
Major Arterial	4	15,000	21,000	30,000	35,000	40,000
Major Arterial	3	11,250	15,750	22,500	26,250	30,000
Major Arterial	2	7,500	10,500	15,000	17,500	20,000
Major Arterial (one-way)	3	12,500	16,500	22,500	25,000	27,500
Major Arterial (one-way)	2	10,000	13,000	17,500	20,000	22,500
Collector (w/ two-way left-turn lane)	4	10,000	14,000	20,000	25,000	30,000
Collector (w/ two-way left-turn lane)	3	7,500	10,500	15,000	18,750	22,500
Collector (w/ two-way left-turn lane)	2	5,000	7,000	10,000	13,000	15,000
Collector (w/o two-way left-turn lane)	4	5,000	7,000	10,000	13,000	15,000
Collector (w/o two-way left-turn lane)	3	4,000	5,000	7,500	10,000	11,000
Collector (w/o two-way left-turn lane)	2	2,500	3,500	5,000	6,500	8,000
Collector (w/o two-way left-turn lane) – no fronting property	2	4,000	5,500	7,500	9,000	10,000
Collector (one-way)	3	11,000	14,000	19,000	22,500	26,000
Collector (one-way)	2	7,500	9,500	12,500	15,500	17,500
Collector (one-way)	1	2,500	3,500	5,000	6,500	7,500
Sub-Collector (single-family)	2	-	-	2,200	-	-

Source: City of San Diego Traffic Impact Study Manual (1998)
Updated with input from City of San Diego Planning Department Mobility Staff (2019)

The *HCM 6th Edition* analysis methodology requires strict adherence to standard dual ring NEMA phasing. Conflicting phase overlaps, clustered intersections, or other non-compliant phasing sequences cannot be analyzed using this method.



Based upon geometry and phasing assignation per their respective signal timing sheets, the 32nd Street & Norman Scott Road/I-15 Northbound On-Ramp intersections does not adhere to standard NEMA phasing (as seen in the figure on the bottom of the previous page), so the HCM 2000 methodology was applied for that five-legged intersection.

Table 2.6 – Signalized Intersection Level of Service HCM Operational Analysis Method

Average Control Delay Per Vehicle (seconds)	Level of Service (LOS) Characteristics
≤10.0	*LOS A* occurs when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.
10.1 – 20.0	*LOS B* occurs when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.
20.1 – 35.0	*LOS C* occurs when progression is favorable or the cycle length is moderate. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.
35.1 – 55.0	*LOS D* occurs when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.
55.1 – 80.0	*LOS E* occurs when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.
>80.0	*LOS F* occurs when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Source: Highway Capacity Manual, Transportation Research Board (2010)

Unsignalized Intersection Analysis

Unsignalized intersections, including two-way and all-way stop controlled intersections were analyzed using the *HCM 6th Edition* unsignalized intersection analysis methodology. The Synchro 10.0 software supports this methodology and was utilized to produce LOS results. The LOS for a two-way

stop controlled (TWSC) or a side-street stop controlled (SSSC) intersection is determined by the computed or measured control delay and is defined for each minor movement, and the worst movement is reported. The LOS for an all-way stop controlled (AWSC) intersection is determined by the computed or measured average control delay of all movements, and intersection-level LOS is reported. **Table 2.7** summarizes the level of service criteria for unsignalized intersections. Consistent with City policy, LOS D was used in this study as the minimum acceptable LOS for peak hour intersection operations.

Table 2.7 – Level of Service Criteria for Stop Controlled Unsignalized Intersections

Average Control Delay (sec/veh)	Level of Service (LOS)
≤10.0	A
10.1 – 15.0	B
15.1 – 25.0	C
25.1 – 35.0	D
35.1 – 50.0	E
>50.0	F

Source: Highway Capacity Manual, Transportation Research Board (2010)

ROADWAY SEGMENT ANALYSIS

The roadway segment analysis was conducted for the Proposed Plan roadway classifications, displayed in Figure 2.6. **Figure 2.8** and **Table 2.8** display the projected ADT volumes and associated roadway LOS under Proposed Plan conditions.

As shown, of 42 segments analyzed under Proposed Plan conditions,34 Mobility Element roadway segments are projected to operate at an acceptable LOS D or better under Proposed Plan conditions, and eight (8) segments are projected to operate at LOS E or F (19.0% of the segments):

- Cesar Chavez Parkway north of Logan Avenue (LOS E)
- Cesar Chavez Parkway between National Avenue and Newton Avenue (LOS E)
- National Avenue between Beardsley Street and Cesar Chavez Parkway (LOS F)
- National Avenue between Sicard Street and 27th Street (LOS F)
- Main Street between 26th Street and 28th Street (LOS E)
- Main Street between 28th Street and 29th Street (LOS F)
- Main Street between 32nd Street and Rigel Street (LOS F)
- Main Street between Rigel Street and Una Street (LOS F)

The inclusion of the two-way Class IV cycle track on Main Street would reduce vehicle capacity on the roadway by removing either an eastbound travel lane or the two-way-left-turn lane, which would result in LOS F operations on Main Street from 28th Street to Una Street. While vehicle operations on those Main Street segments are anticipated to potentially degrade with the implementation of the two-way Class IV, the improvement to add the separated bicycle facility would provide a vital east-west protected bicycle connection through the community and aligns with the current goals of the community and City to provide a safer and more comprehensive multimodal transportation network.

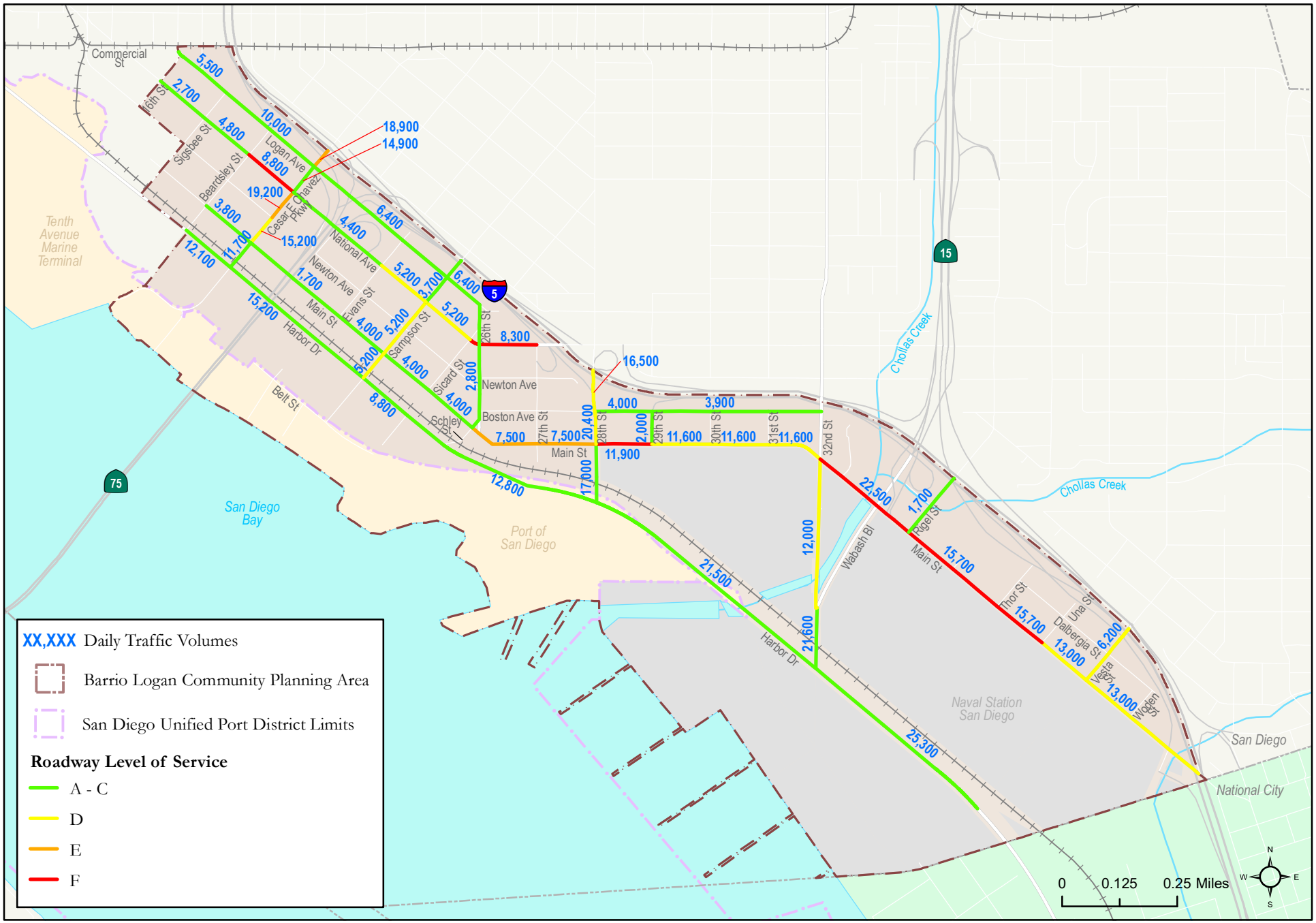


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Figure 2.8

Daily Roadway Segment Traffic Volumes and LOS - Proposed Plan

Table 2.8 – Roadway Level of Service – Proposed Plan

Roadway	Segment	Proposed Classification	ADT	LOS Threshold (LOS E)	V/C	LOS
Cesar Chavez Parkway	North of Logan Avenue	3-Lane Collector (with TWLT)	18,900	22,500	0.840	**E**
Cesar Chavez Parkway	Logan Avenue to National Avenue	4-Lane Collector (with TWLT)	14,900	30,000	0.497	C
Cesar Chavez Parkway	National Avenue to Newton Avenue	3-Lane Collector (with TWLT)	19,200	22,500	0.853	**E**
Cesar Chavez Parkway	Newton Avenue to Main Street	3-Lane Collector (with TWLT)	15,200	22,500	0.676	D
Cesar Chavez Parkway	Main Street to Harbor Drive	4-Lane Collector (with TWLT)	11,700	30,000	0.390	B
Sampson Street	I-5 to National Avenue	2-Lane Collector (No TWLT)	3,700	8,000	0.463	C
Sampson Street	National Avenue to Harbor Drive	2-Lane Collector (No TWLT)	5,200	8,000	0.650	D
26th Street	National Avenue to Main Street	2-Lane Collector (No TWLT)	2,800	8,000	0.350	B
28th Street[1]	I-5 to Boston Avenue	3-Lane Collector (with TWLT)	16,500	22,500	0.733	D
28th Street	Boston Avenue to Main Street	4-Lane Collector (with TWLT)	20,400	30,000	0.680	D
28th Street	Main Street to Harbor Drive	4-Lane Major Arterial	17,000	40,000	0.425	B
29th Street	Boston Avenue to Main Street	2-Lane Collector (No TWLT)	2,000	8,000	0.250	A
32nd Street	Main Street to Wabash Boulevard	2-Lane Collector (with TWLT)	12,000	15,000	0.800	D
32nd Street	Wabash Boulevard to Harbor Drive	4-Lane Major Arterial	21,600	40,000	0.540	C
Rigel Street	Main Street to I-5	2-Lane Collector (No TWLT)	1,700	8,000	0.213	A
Vesta Street	Main Street to I-5	2-Lane Collector (No TWLT)	6,200	8,000	0.775	D
Logan Avenue	17th Street to Sigsbee Street	2-Lane Collector (with TWLT)	5,500	15,000	0.367	B
Logan Avenue	Sigsbee Street to Cesar Chavez Parkway	2-Lane Collector (with TWLT)	10,000	15,000	0.667	C
Logan Avenue	Cesar Chavez Parkway to 26th Street	2-Lane Collector (with TWLT)	6,400	15,000	0.427	B
National Avenue	16th Street to Sigsbee Street	2-Lane Collector (No TWLT)	2,700	8,000	0.338	B
National Avenue	Sigsbee Street to Beardsley Street	2-Lane Collector (No TWLT)	4,800	8,000	0.600	C
National Avenue	Beardsley Street to Cesar Chavez Parkway	2-Lane Collector (No TWLT)	8,800	8,000	1.100	**F**
National Avenue	Cesar Chavez Parkway to Evans Street	2-Lane Collector (No TWLT)	4,400	8,000	0.550	C

Table 2.8 – Roadway Level of Service – Proposed Plan

Roadway	Segment	Proposed Classification	ADT	LOS Threshold (LOS E)	V/C	LOS
National Avenue	Evans Street to Sicard Street	2-Lane Collector (No TWLT)	5,200	8,000	0.650	D
National Avenue	Sicard Street to 27th Street	2-Lane Collector (No TWLT)	8,300	8,000	1.038	**F**
Boston Avenue	28th Street to 29th Street	2-Lane Collector (No TWLT)	4,000	8,000	0.500	C
Boston Avenue	29th Street to 32nd Street	2-Lane Collector (No TWLT)	3,900	8,000	0.488	C
Main Street	Beardsley Street to Cesar Chavez Parkway	2-Lane Collector (No TWLT)	3,800	8,000	0.475	C
Main Street	Cesar Chavez Parkway to Evans Street	2 Lane Collector (No TWLT)	1,700	8,000	0.213	A
Main Street	Evans Street to 26th Street	2-Lane Collector (with TWLT)	4,000	15,000	0.267	A
Main Street	26th Street to 28th Street	2-Lane Collector (No TWLT)	7,500	8,000	0.938	**E**
Main Street	28th Street to 29th Street	3-Lane Collector (No TWLT)	11,900	11,000	1.082	**F**
Main Street	29th Street to 32nd Street	2-Lane Collector (with TWLT)	11,600	15,000	0.773	D
Main Street	32nd Street to Rigel Street	3-Lane Collector (No TWLT)	22,500	11,000	2.045	**F**
Main Street	Rigel Street to Una Street	2-Lane Collector (with TWLT)	15,700	15,000	1.047	**F**
Main Street	Una Street to I-5	2-Lane Collector (with TWLT)	13,000	15,000	0.867	D
Harbor Drive	Beardsley Street to Cesar Chavez Parkway	4-Lane Major Arterial	12,100	40,000	0.303	A
Harbor Drive	Cesar Chavez Parkway to Sampson Street	4-Lane Major Arterial	15,200	40,000	0.380	B
Harbor Drive	Sampson Street to Schley Street	4-Lane Major Arterial	8,800	40,000	0.220	A
Harbor Drive	Schley Street to 28th Street	4-Lane Major Arterial	12,800	40,000	0.320	A
Harbor Drive	28th Street to 32nd Street	4-Lane Major Arterial	21,500	40,000	0.538	C
Harbor Drive	32nd Street to Vesta Street	4-Lane Major Arterial	25,300	40,000	0.633	C

Notes:
V/C = Volume/Capacity.
Bold letter indicates substandard LOS E or F.
TWLT = Two-Way-Left-Turn.
[1] 28th Street between I-5 to Boston Avenue is a 3-Lane Collector without a TWLTL; however, a portion of this segment includes the I-5 Southbound off-ramp that functions as an auxiliary lane that adds additional capacity on the roadway. Therefore, the segment was analyzed as a 3-Lane Collector with a TWLTL to account for the auxiliary lane.

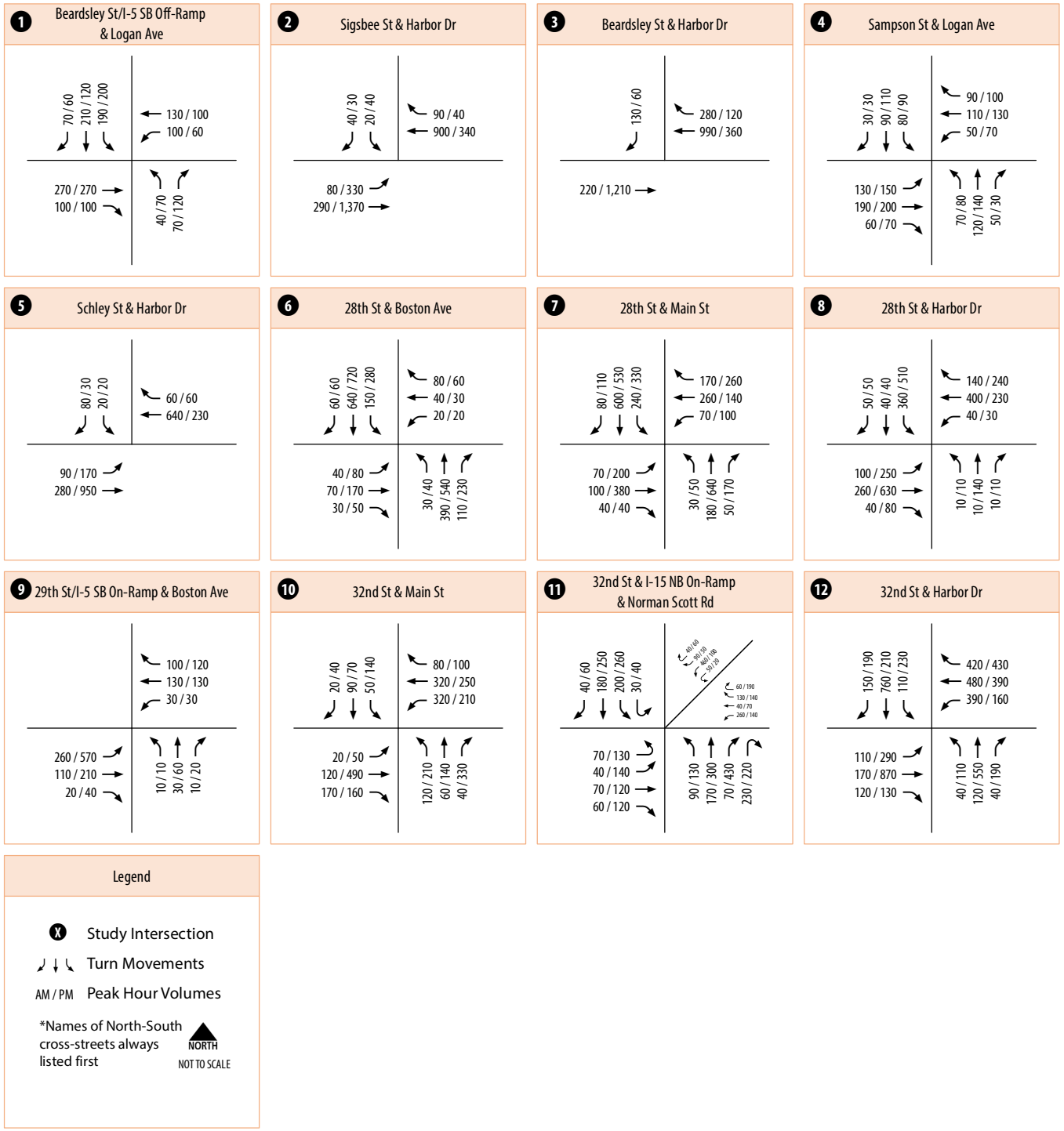
INTERSECTION ANALYSIS

Forecasted AM and PM peak hour turning movements are displayed in **Figure 2.9.** Proposed Plan AM and PM peak hour turning movements are displayed. AM and PM peak hour LOS analysis results are also provided in **Table 2.9**. Signal timing was assumed to be optimized under Proposed Plan conditions. Additionally, AM and PM peak hour LOS analysis results are also provided in **Figure 2.10.** Intersection LOS calculation worksheets are provided in **Appendix E.**

Table 2.9 – Peak Hour Intersection LOS Results – Proposed Plan

#	Intersection	Control Type	AM Peak Hour		PM Peak Hour	
			Ave. Delay (Sec.)	LOS	Ave. Delay (Sec.)	LOS
1	Beardsley Street/I-5 SB Off-Ramp & Logan Avenue	AWSC	29.6	D	20.3	C
2	Harbor Drive & Sigsbee Street	Signal	26.3	C	31.9	C
3	Harbor Drive & Beardsley Street	SSSC	19.7	C	10.4	B
4	Sampson Street & Logan Avenue	AWSC	14.1	B	16.6	C
5	Harbor Drive & Schley Street	Signal	11.1	B	6.8	A
6	28th Street & Boston Avenue	Signal	11.0	B	14.2	B
7	28th Street & Main Street	Signal	21.6	C	74.9	**E**
8	28th Street & Harbor Drive	Signal	22.3	C	47.0	D
9	29th Street/I-5 SB On-Ramp & Boston Avenue	SSSC	17.4	C	141.6	**F**
10	32nd Street & Main Street	Signal	28.5	C	107.5	**F**
11	32nd Street/I-15 NB On-Ramp & Norman Scott Road	Signal	90.3	**F**	121.0	**F**
12	32nd Street & Harbor Drive	Signal	48.4	D	79.4	**E**

Notes:
AWSC = All Way Stop Control.
SSSC = Side Street Stop Control. For SSSC intersections, the delay shown is the worst delay experienced by any of the movements.
Bold letter indicates substandard LOS E or F.



Barrio Logan Community Plan Update
Mobility Assessment

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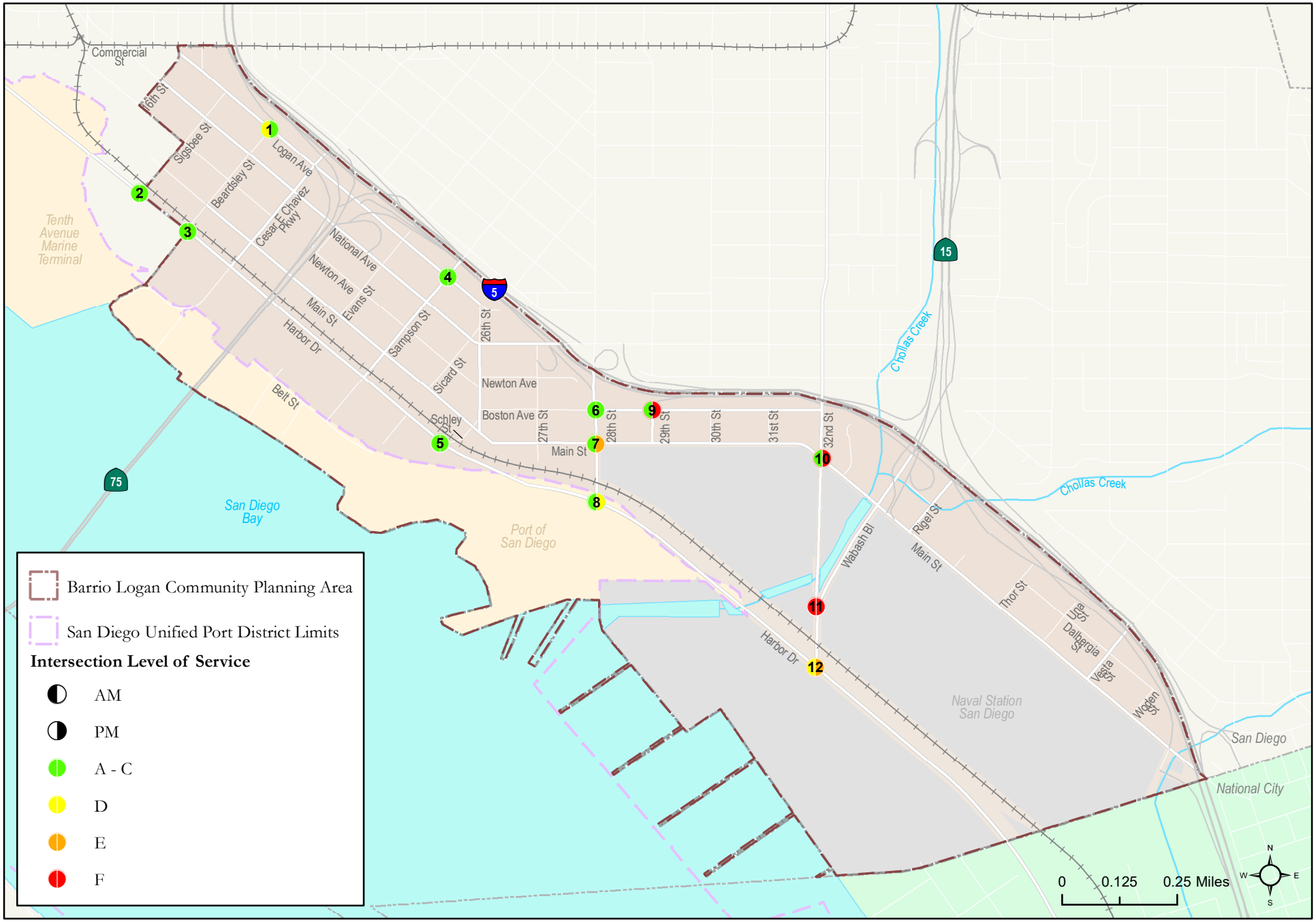
Figure 2.9
AM/PM Intersection Volumes - Proposed Plan



Barrio Logan Community Plan Update

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Figure 2.10

AM/PM Peak Hour Intersection LOS - Proposed Plan

Of the 12 intersections analyzed, the following five (5) intersections were found to operate at a substandard LOS E or F during the AM or PM peak hour under Proposed Plan conditions:

- 7: 28th Street & Main Street – PM (LOS E)
- 9: 29th Street/I-5 Southbound On-Ramp & Boston Avenue – PM (LOS F)
- 10: 32nd Street & Main Street – PM (LOS F)
- 11: 32nd Street/I-5 Northbound On-Ramp & Norman Scott Road – AM (LOS F); PM (LOS F)
- 12: 32nd Street & Harbor Drive – PM (LOS E)

Similar to the roadway segments on Main Street, the intersections along Main Street at 28th Street and 32nd Street are anticipated to result in LOS E or F operations as a result of the two-way Class IV cycle track that would require reduction in travel lanes and implementation of leading bicycle signal phases. Additionally, the proposed pedestrian improvements (i.e., removal of existing pedestrian bridges and implementation of at-grade crossing) at the 32nd Street and Harbor Drive intersection is also anticipated to degrade operations to LOS E in the PM peak hour. While these bicycle and pedestrian improvements are projected to result in delay increases at several intersections in the community, the improvements are still vital to the Proposed Plan as they provide bicycle and pedestrian facilities at key locations and helps provide a multimodal network.

2.6 Goods Movements and Freight Circulation

The movement of goods to, through, and within Barrio Logan is critical to the local businesses, Port of San Diego, and the military. However, trucks generate noise and air pollutants as well as contribute to traffic congestion along roadways. Therefore, it is vital that trucks travel on designated truck routes to minimize impacts on local residential streets and the quality of life for community members in Barrio Logan.

Designated truck routes through the Barrio Logan community along with truck restrictions are illustrated on **Figure 2.11**. Truck routes are established to designate specific roadways where trucks are allowed to travel on. These routes direct trucks away from streets that are inappropriate or inadequate for substantial truck traffic. Trucks are allowed to access locations on other mobility element roads and local streets for site deliveries (e.g., goods delivery or moving vans); however, they must take the most direct route to and from the designated truck routes.

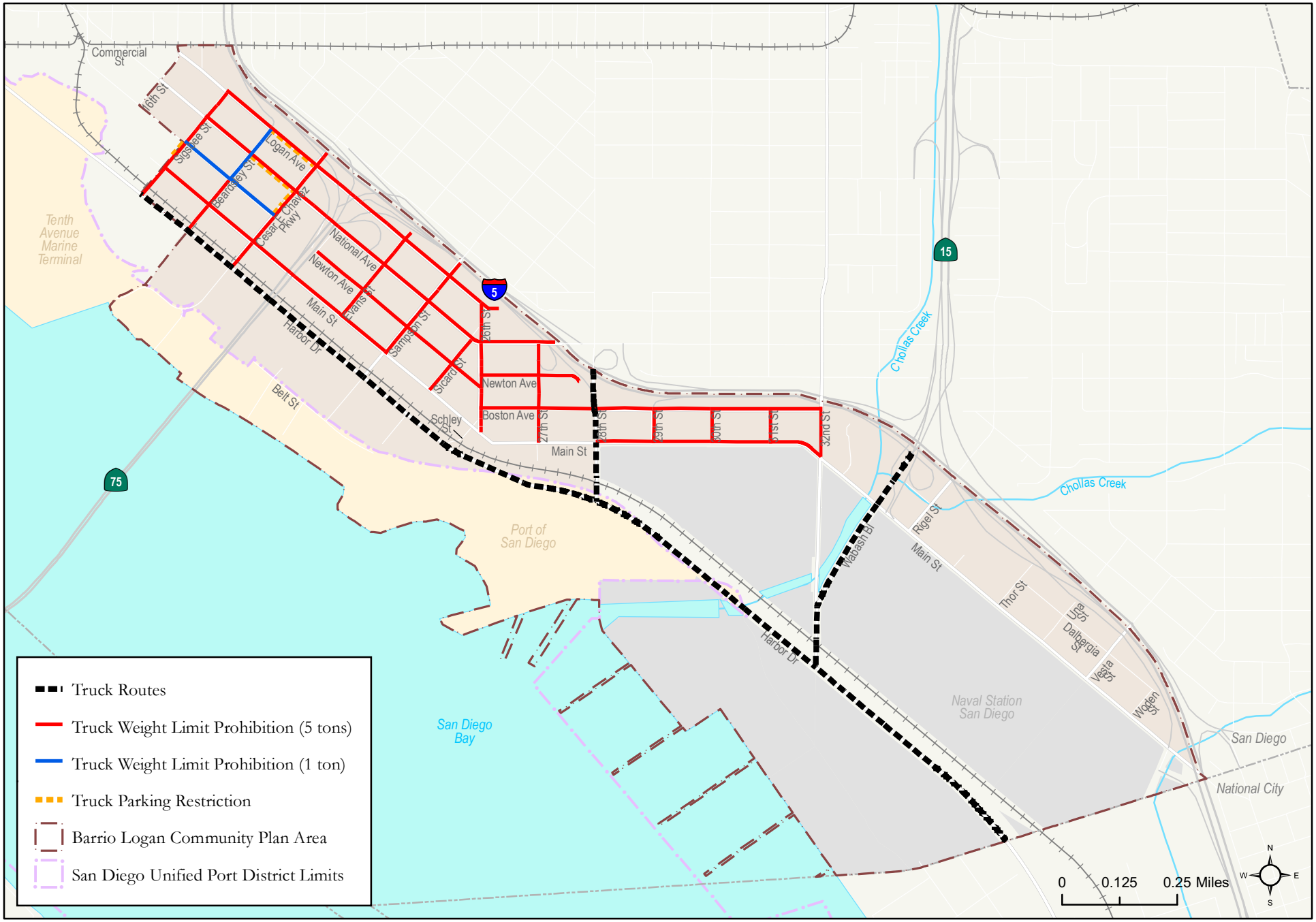
Additionally, to help further preserve residential streets for local traffic and improve safety along those corridors by slowing down travel speeds, traffic calming measures could be implemented. Traffic calming measures at specific roadway segments or intersections throughout the community to deter truck travel could include, but not limited to, the following:

- *Speed cushions/humps/tables* along roadway segments
- *Curb extensions* at intersection corners
- *Signage* at key gateway intersections
- *Turn restrictions or traffic diverters* to restrict vehicles from turning onto specific roadways
- *Traffic circles* at midblock roadway segments

Corridors of particular interest for traffic calming treatments include, but not limited to, Sigsbee Street, Beardsley Street, Sampson Street, Boston Avenue, National Avenue, Cesar E. Chavez Parkway. Furthermore, the community identified several key intersections where treatments could be implemented to alleviate truck traffic traveling on residential streets, including:

- Logan Avenue & Sigsbee Street
- Harbor Drive & Sigsbee Street
- Logan Avenue & Beardsley Street
- Harbor Drive & Beardsley Street
- Harbor Drive & Sampson Street
- Main Street & Schley Street

High-level conceptual drawings are provided in **Appendix F** of potential traffic calming measures that could be implemented at those specific locations. Further engineering analysis is required to determine the feasibility and appropriateness of implementing these traffic calming measures.



Barrio Logan Community Plan Update

Mobility Assessment

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Figure 2.11

Truck Routes - Proposed Plan

Appendix A - 2013 Draft Plan – Barrio Logan Community Plan Update Traffic Impact Analysis (March 2011)

Barrio Logan Community Plan Update Traffic Impact Analysis (March 2011)

https://www.sandiego.gov/planning/community/cpu/barriologan/eir

Appendix B - Existing Transit Demand

Average Daily Boardings and Alightings by Route (FY2020)

Route and Location	Stop ID	Direction	Boardings	Alightings	Total
Route 12 – Skyline Hills to City College					
Logan Ave/Cesar E Chavez Pkwy	10122	EB	35	21	56
Logan Ave/Sampson St	10519	EB	14	19	33
Logan Ave/Cesar E Chavez Pkwy (Chicano Park)	10510	EB	10	8	19
Logan Ave/Beardsley St	10501	EB	10	16	26
National Ave/27th St	10529	EB	8	6	14
26th St/Sicard St	60220	EB	3	6	10
Route 901 – Downtown San Diego to Iris Transit Center					
Cesar E Chavez Pkwy/National Ave	60327	SB	42	5	47
National Ave/Beardsley St	60465	SB	4	11	15
National Ave/16th St	60061	SB	2	1	3
Route 929 – Iris Transit Center to 12th & Imperial Transit Center					
Main St/Cesar E Chavez Pkwy	11667	South	38	9	47
Main St/28th St	99414	South	29	8	37
Main St/Vesta St	12496	North	23	15	37
Main St/32nd St	10551	South	20	12	32
Main St/Vesta St	12119	South	16	21	37
Main St/Sampson St	11681	South	14	3	17
Main St/32nd St	11308	North	11	25	36
Main St/Cesar E Chavez Pkwy	12451	North	10	22	32
Main St/26th St	11279	North	10	7	16
Main St/Rigel St	12110	South	7	7	14
Main St/Thor St	12493	North	7	4	11
Main St/26th St	12077	South	7	11	17
Main St/28th St	10913	North	6	22	28
Main St/Rigel St	12488	North	6	6	13
National Av/16th St	60061	South	5	1	6
Main St/30th St	10165	South	5	14	19
Main St/Sampson St	12463	North	4	8	12
Main St/Thor St	12115	South	3	8	11

Average Daily Boardings and Alightings by Route (FY2020)

Route and Location	Stop ID	Direction	Boardings	Alightings	Total
Main St/Woden St	12497	North	3	3	6
Main St/Yama St	60226	South	3	2	5
Main St/Beardsley St	12794	North	3	3	5
Main St/Beardsley St	11664	South	2	2	5
Main St/27th St	10143	South	2	1	3
Main St/27th St	10902	North	2	4	6
Sigsbee St/Newton Ave	11663	South	2	1	4
Main St/30th St	10927	North	2	6	8
Main St/Evans St	12462	North	1	2	3
Main St/Evans St	11679	South	1	1	2
National Av/16th St	60119	North	1	13	14
Sigsbee St/Newton Ave	12447	North	0	1	2
Blue Line – America Plaza to San Ysidro Transit Center					
Pacific Fleet Station	75106	North	375	203	578
Harborside Station	75104	North	265	708	973
Barrio Logan Station	75018	North	364	712	1,075
Barrio Logan Station	75019	South	751	367	1,118
Harborside Station	75105	South	772	246	1,018
Pacific Fleet Station	75107	South	177	454	631

Source: Metropolitan Transit System

Appendix C - Barrio Logan Transportation Project List

IFS & EIR Projects

IFS Project ID	EIR Mitigation ID	Title	Location	Description	Cost (2008?)	Inclusion in the 2021 CPU?
T1	TRF-19	Cesar E. Chavez Parkway - Harbor Drive to Logan Avenue	Cesar E. Chavez Parkway, between Harbor Drive and Logan Avenue	Construct a raised median	$ 850,000	No - needs to reevaluate with other options such as RAs
T2	TRF-15 & 21	28th Street - Harbor Drive to Main Street	28th Street, between Harbor Drive and Main Street	- Reconfigure roadway to increase capacity and improve access to the Navy commissary. - Installation of quad gate for the railroad/trolley tracks - Modify the intersection of Harbor Drive and 28th Street to provide dual eastbound left turn lanes	$ 1,850,000	Yes - also focus on opertaions and safety
T3	TRF-21	28th Street - National Avenue to Main Street	28th Street, between National Avenue and Main Street	- Reconfigure the roadway to accommodate two northbound lanes and three southbound lanes with a 5' raised median	$ 1,675,000	No - 3rd SBT not needed from a operations standpoint
T4		National Avenue - 16th Street to 26th Street	National Avenue, between 16th Street and 26th Street	- Evaluation of the feasibility of traffic calming measures on National Avenue, between 16th Street and 26th Street - Based on the results of the evaluation, installation of any feasible traffic calming measures such as the installation of pop-outs at four locations, one new traffic signal, and two signal modifications.	$ 1,650,000	No - safety focused, traffic claming. Check SESD CPU. Bike facility…
T5		Boston Avenue - 26th Street to 28th Street	Boston Avenue - 26th Street and 28th Street	- Provide traffic calming improvements which impact vehicular traffic, improve pedestrian safety, and provides parking and "sharrow" bicycle lanes.	$ 1,650,000	Yes
T6	TRF-11	26th Street - Main Street to Boston Avenue	26th Street, between Main Street and Boston Avenue	- Construct an island on 26th Street to restrict the northbound traffic from Schley Street to 26th Street	$ 250,000	Yes
T7	TRF 1-4	Traffic Signal Installation - Various Locations	National Avenue & 16th Street Harbor Drive & Sigsbee Street Logan Avenue & Beardsley Street National Avenue & Beardsley Street	*Additional locations may be added in the future based on need	$ 1,700,000	Partial Yes - Only Harbor Dr & Sigsbee St signal needed from an operations standpoint
T8	TRF-5	Harbor Drive and Beardsley Street	Harbor Drive & Beardsley Street	Modify raised median along Harbor Drive to restrict the eastbound left-turn movements and southbound left-turn movements	$ 325,000	Yes
T9	TRF-6	Cesar E. Chavez Parkway and Logan Avenue	Cesar E. Chavez Parkway & Logan Avenue	- Close the northbound right turn lane at Cesar E. Chavez Parkway and SR-75 On-Ramp. - Reconstruct sidewalks and improve pedestrian crossing, add an exclusive northbound right turn overlap.	$ 500,000	Ground conditions may supersede CPU recommendation.
T10	TRF-7	Cesar E. Chavez Parkway and National Avenue	Cesar E. Chavez Parkway & National Avenue	Modify intersection to accommodate exclusive westbound and eastbound right turn lanes. This would include signal modifications.	$ 50,000	No - needs to reevaluate with other options such as RAs
T11	TRF-8	Cesar E. Chavez Parkway and Main Street	Cesar E. Chavez Parkway & Main Street	Modify intersection to accommodate exclusive westbound right turn lane on Cesar E. Chavez Parkway. This project would include signal modifications.	$ 50,000	No - needs to reevaluate with other options such as RAs
T12	TRF-9A (Scenario 1)	Cesar E. Chavez Parkway and Harbor Drive	Cesar E. Chavez Parkway & Harbor Drive	- Add dual eastbound left turn lanes, southbound right turn overlap phase, exclusive westbound right turn lane, and exclusive northbound right turn lane. - It is anticipated that Caltrans will complete the extension of the westbound left turn lane.	$ 475,000	No - needs to reevaluate with other options such as RAs
T13	TRF-10	Logan Avenue and Sampson Street	Logan Avenue & Sampson Street	Install a traffic signal and restripe the intersection to accommodate an exclusive southbound and northbound left turn lanes	$ 375,000	No - signal no longer needed from an operations standpoint
T14	TRF-12	Harbor Drive and Schley Street	Harbor Drive & Schley Street	Add a southbound right turn overlap phase and restripe the intersection to eliminate the southbound through/left turn movements	$ 250,000	No - needs to reevaluate with other options such as RAs
T15		Boston Avenue Class I Bicycle Facility	Boston Avenue, between 29th Street and 32nd Street	Construct a Class I bicycle facility	$ 150,000	Yes
T16		Bayshore Bikeway	Harbor Drive, between Harbor Bridge and 32nd Street	Construct a Class I bicycle facility	$ 2,634,000	Yes
T22		Traffic Signal Modification	Community-wide	Install, upgrade, and/or improve traffic signals throughout the community	$ 200,000	Yes
T24		Bicycle Lanes Throughout the Community	Community-wide	This project would install bicycle lanes throughout the community	$ 1,000,000	re-planning
-	TRF-13	National Avenue and 28th Street	National Avenue and 28th Street	Add exclusive southbound right turn lane	??	No
-	TRF-14	Boston Ave and 25th St	Boston Ave and 25th St	Add southbound through lane and remove exclusive northbound right turn lane	??	No
-	TRF-16	Boston Ave and I-5 SB On-Ramp signal	Boston Ave and I-5 SB On-Ramp	Install a traffic signal	??	No
	TRF-17	32nd St and Wabash St Direct Connector	32nd St and Wabash St	Construct a direct connector from Harbor Drive to Wabash Street (under study by Caltrans)	??	No
-	TRF-18	Harbor Dr and 32nd St Direct Connector	Harbor Dr and 32nd St	Construct a direct connector from Harbor Drive to Wabash Street (under study by Caltrans)	??	No
	TRF-19	I-5 SB Off-Ramp and 28th St Signal	I-5 SB Off-Ramp and 28th St	Install a traffic signal	??	No
-	TRF-22	National Ave TWLTL	National Avenue, between Cesar E. Chavez Parkway and Evans Street	Reclassify as a two-lane collector with a two-way left-turn lane.	??	No - already constructed
-	TRF-23	National Ave TWLTL	National Avenue, between Sicard and 27th Street	Reclassify as a two-lane collector with a two-way left-turn lane.	??	No
-	TRF-24	Main St TWLTL	Main Street, between Evans Street and 26th Street	Reclassify as a two-lane collector with a two-way left-turn lane.	??	No
New 2021 CPU Projects						
-	-	National Ave Bike Lanes	National Avenue, between Commercial Street to 28th Street	Reclassify as a two-lane collector with no two-way left-turn lane. Install protected Class II bike lanes.	??	Yes
-	-	Main St Two-Way Class IV	Main Street, between 26th Street to Rigel St	Remove a travel lane to install a two-way Class IV cycle track on the south side of the road	??	Yes

Appendix D - Proposed Plan Land Uses

Definitions

MGRA: Master Geographic Reference Area used in SANDAG Series 13 Activity Based Model.

Lu_type_id: Identification number of unit type (i.e. 1 = Dwelling Units; 3 = Employees, 7 = Hotel Rooms, 8 = Students)

LU Code: Land Use Code used by SANDAG and/or City of San Diego. Non-residential uses are typically 4-digits. Residential land use codes fall into 3 categories: 101 = Single Family; 102 = Multifamily; 103 = Mobile Homes.

Amount: Number of units by unit type (lu_type_id)

Example:

Series 13 MGRA	lu_type_id	LU Code	Amount
6198	1	102	300
6198	3	4118	0
6198	3	5007	46
6198	3	5010	19
6198	3	5025	7
6198	3	6071	540

In the above example, MGRA 6198 contains 300 multifamily dwelling units with 623 employees split into various retail and office land uses.

Proposed Plan Buildout Land Use Override Inputs

Series 13 MGRA	lu_type_id	LU Code	Amount
2024	3	2001	228
2024	3	4112	0
2024	3	7603	0
2025	3	2001	642
2026	3	2001	731
2027	3	2001	234
2028	3	2001	376
2029	3	2001	315
2029	3	4112	0
2029	3	4118	0
2030	3	2001	379
2031	3	2001	373
2032	3	2001	205
2138	1	102	78
2138	3	5007	121
2138	3	7601	0
2139	1	102	101
2139	3	5007	72
2140	1	102	72
2140	3	5007	71
2140	3	7603	0
2141	1	102	87
2141	3	5007	83
2142	1	102	249
2142	3	5007	176
2142	3	7603	0
2142	3	4118	0
2428	1	101	1
2428	1	102	239
2428	3	1501	7
2428	3	4118	0
2428	3	5004	4
2428	3	5007	43
2428	3	6011	33
2428	3	6021	97
2428	3	6105	15
2428	3	7601	0
2428	7	1501	42
2429	1	102	152
2429	3	5007	12
2429	3	6509	251
2430	1	102	211
2430	3	5007	8
2431	1	102	23
2431	3	4118	0
2431	3	5004	35

Proposed Plan Buildout Land Use Override Inputs

Series 13 MGRA	lu_type_id	LU Code	Amount
2431	3	7601	0
2432	1	102	121
2432	3	4118	0
2432	3	5004	105
2432	3	7601	0
2433	3	6031	42
2433	3	6041	222
2434	1	102	133
2434	3	5004	113
2435	1	102	211
2435	3	5007	75
2436	1	101	9
2436	1	102	105
2436	3	4118	0
2437	3	6021	24
2437	3	6031	45
2437	3	6041	80
2437	3	6803	70
2437	8	6803	4290
2438	1	102	144
2439	3	2001	503
2439	3	4111	0
2439	3	4117	0
2439	3	5001	84
2440	1	101	2
2440	1	102	164
2440	3	5007	48
2440	3	6509	30
2441	1	101	10
2441	1	102	85
2441	3	4114	0
2441	3	6109	2
2442	3	4117	0
2442	3	5007	179
2442	3	6011	19
2442	3	6031	92
2442	3	6041	184
2443	1	102	50
2443	3	5007	69
2444	3	2001	411
2444	3	4113	0
2444	3	4117	0
2445	1	102	243
2445	3	5007	117
2446	1	102	131
2446	3	5007	21

Proposed Plan Buildout Land Use Override Inputs

Series 13 MGRA	lu_type_id	LU Code	Amount
2447	3	2001	191
2447	3	4120	0
2448	1	101	2
2448	1	102	52
2448	3	5007	9
2449	1	102	31
2449	3	2103	15
2449	3	5007	54
2450	3	2001	1720
2451	1	101	4
2451	1	102	235
2451	3	5007	18
2453	3	2103	30
2453	3	5007	35
2454	3	5007	110
2455	1	102	51
2455	3	5007	118
2456	1	102	51
2456	3	5007	68
2457	3	5007	60
2458	3	4113	81
2458	3	5007	55
2458	3	5010	20
2459	3	4113	42
2459	3	5007	12
2460	3	2001	3680
2460	3	4111	5
2475	1	102	123
2475	3	5007	7
2475	3	6011	48
2475	3	6021	46
2475	3	6031	153
2475	3	6041	88
2476	1	102	341
2476	3	5007	58
2477	1	102	202
2477	3	5007	10
2478	1	102	200
2478	3	5007	13
2479	3	6806	48
2479	8	6806	450
2480	3	4117	0
2480	3	6031	182
2480	3	6041	83
2481	3	4117	0
2481	3	4119	40

Proposed Plan Buildout Land Use Override Inputs

Series 13 MGRA	lu_type_id	LU Code	Amount
2482	3	7601	1
2483	3	7601	1

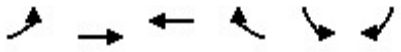
Appendix E - Peak Hour Intersection Calculation Worksheets

Intersection	
Intersection Delay, s/veh	29.6
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	270	100	100	130	0	40	0	70	190	210	70
Future Vol, veh/h	0	270	100	100	130	0	40	0	70	190	210	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	293	109	109	141	0	43	0	76	207	228	76
Number of Lanes	0	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	26.4	13.7	12.6	43.9
HCM LOS	D	B	B	E

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	36%	0%	100%	0%	40%
Vol Thru, %	0%	73%	0%	100%	45%
Vol Right, %	64%	27%	0%	0%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	110	370	100	130	470
LT Vol	40	0	100	0	190
Through Vol	0	270	0	130	210
RT Vol	70	100	0	0	70
Lane Flow Rate	120	402	109	141	511
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.242	0.74	0.248	0.302	0.906
Departure Headway (Hd)	7.283	6.627	8.212	7.697	6.384
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	495	543	440	469	562
Service Time	5.296	4.719	5.912	5.397	4.467
HCM Lane V/C Ratio	0.242	0.74	0.248	0.301	0.909
HCM Control Delay	12.6	26.4	13.6	13.7	43.9
HCM Lane LOS	B	D	B	B	E
HCM 95th-tile Q	0.9	6.3	1	1.3	10.9



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	80	290	900	90	20	40
Future Volume (veh/h)	80	290	900	90	20	40
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1870	1870
Adj Flow Rate, veh/h	103	372	978	98	25	50
Peak Hour Factor	0.78	0.78	0.92	0.92	0.80	0.80
Percent Heavy Veh, %	6	6	6	6	2	2
Cap, veh/h	129	1910	1374	138	192	385
Arrive On Green	0.07	0.56	0.44	0.44	0.35	0.35
Sat Flow, veh/h	1725	3532	3249	316	542	1084
Grp Volume(v), veh/h	103	372	533	543	76	0
Grp Sat Flow(s),veh/h/ln	1725	1721	1721	1754	1648	0
Q Serve(g_s), s	5.9	5.4	25.3	25.3	3.1	0.0
Cycle Q Clear(g_c), s	5.9	5.4	25.3	25.3	3.1	0.0
Prop In Lane	1.00			0.18	0.33	0.66
Lane Grp Cap(c), veh/h	129	1910	749	763	585	0
V/C Ratio(X)	0.80	0.19	0.71	0.71	0.13	0.00
Avail Cap(c_a), veh/h	198	1910	749	763	585	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.5	11.1	23.1	23.1	21.8	0.0
Incr Delay (d2), s/veh	11.9	0.2	5.7	5.6	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.0	10.5	10.7	1.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	57.5	11.3	28.8	28.7	22.3	0.0
LnGrp LOS	E	B	C	C	C	A
Approach Vol, veh/h		475	1076		76	
Approach Delay, s/veh		21.3	28.7		22.3	
Approach LOS		C	C		C	

Timer - Assigned Phs		4		6	7	8
Phs Duration (G+Y+Rc), s		60.0		40.0	12.0	48.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		55.5		35.5	11.5	39.5
Max Q Clear Time (g_c+I1), s		7.4		5.1	7.9	27.3
Green Ext Time (p_c), s		2.8		0.2	0.1	5.1

Intersection Summary	
HCM 6th Ctrl Delay	26.3
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	220	990	280	0	130
Future Vol, veh/h	0	220	990	280	0	130
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	76	76	92	92	90	90
Heavy Vehicles, %	6	6	6	6	2	2
Mvmt Flow	0	289	1076	304	0	144

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1374	691
Stage 1	-	-	-	-	1229	-
Stage 2	-	-	-	-	145	-
Critical Hdwy	-	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	0	-	-	-	137	387
Stage 1	0	-	-	-	239	-
Stage 2	0	-	-	-	867	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	137	387
Mov Cap-2 Maneuver	-	-	-	-	137	-
Stage 1	-	-	-	-	239	-
Stage 2	-	-	-	-	866	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	19.7
HCM LOS			C

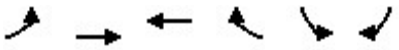
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	387
HCM Lane V/C Ratio	-	-	-	0.373
HCM Control Delay (s)	-	-	-	19.7
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	1.7

Intersection	
Intersection Delay, s/veh	14.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	130	190	60	50	110	90	70	120	50	80	90	30
Future Vol, veh/h	130	190	60	50	110	90	70	120	50	80	90	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	141	207	65	54	120	98	76	130	54	87	98	33
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	14.4	13.1	14.8	13.8
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	29%	100%	0%	100%	0%	40%
Vol Thru, %	50%	0%	76%	0%	55%	45%
Vol Right, %	21%	0%	24%	0%	45%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	240	130	250	50	200	200
LT Vol	70	130	0	50	0	80
Through Vol	120	0	190	0	110	90
RT Vol	50	0	60	0	90	30
Lane Flow Rate	261	141	272	54	217	217
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.462	0.281	0.489	0.112	0.397	0.395
Departure Headway (Hd)	6.382	7.159	6.476	7.405	6.57	6.546
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	563	502	557	484	548	550
Service Time	4.423	4.9	4.216	5.148	4.313	4.59
HCM Lane V/C Ratio	0.464	0.281	0.488	0.112	0.396	0.395
HCM Control Delay	14.8	12.7	15.3	11.1	13.6	13.8
HCM Lane LOS	B	B	C	B	B	B
HCM 95th-tile Q	2.4	1.1	2.7	0.4	1.9	1.9



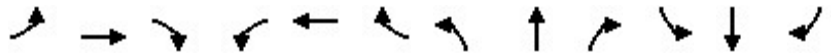
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	90	280	640	60	20	80
Future Volume (veh/h)	90	280	640	60	20	80
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	98	304	696	65	22	87
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	285	2331	1295	121	28	112
Arrive On Green	0.16	0.66	0.39	0.39	0.09	0.09
Sat Flow, veh/h	1781	3647	3379	307	325	1284
Grp Volume(v), veh/h	98	304	376	385	110	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1815	1623	0
Q Serve(g_s), s	2.1	1.4	7.0	7.0	2.9	0.0
Cycle Q Clear(g_c), s	2.1	1.4	7.0	7.0	2.9	0.0
Prop In Lane	1.00			0.17	0.20	0.79
Lane Grp Cap(c), veh/h	285	2331	700	715	142	0
V/C Ratio(X)	0.34	0.13	0.54	0.54	0.78	0.00
Avail Cap(c_a), veh/h	412	4011	1373	1402	980	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.1	2.8	10.1	10.1	19.3	0.0
Incr Delay (d2), s/veh	0.7	0.0	1.2	1.2	8.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.1	2.0	2.0	1.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.9	2.8	11.3	11.2	28.1	0.0
LnGrp LOS	B	A	B	B	C	A
Approach Vol, veh/h		402	761		110	
Approach Delay, s/veh		6.3	11.3		28.1	
Approach LOS		A	B		C	

Timer - Assigned Phs	2		4	5	6
Phs Duration (G+Y+Rc), s	34.6		8.7	11.3	23.2
Change Period (Y+Rc), s	* 6.2		4.9	4.4	6.2
Max Green Setting (Gmax), s	* 49		26.1	10.0	33.4
Max Q Clear Time (g_c+I1), s	3.4		4.9	4.1	9.0
Green Ext Time (p_c), s	3.5		0.3	0.1	8.0

Intersection Summary	
HCM 6th Ctrl Delay	11.1
HCM 6th LOS	B

Notes

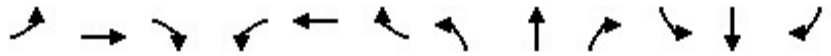
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	70	30	20	40	80	30	390	110	150	640	60
Future Volume (veh/h)	40	70	30	20	40	80	30	390	110	150	640	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1752	1870	1870	1752	1870
Adj Flow Rate, veh/h	43	76	33	22	43	87	33	424	120	163	696	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	10	2	2	10	2
Cap, veh/h	318	201	87	340	90	181	56	1065	507	212	1255	117
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.03	0.32	0.32	0.12	0.41	0.41
Sat Flow, veh/h	1260	1237	537	1284	552	1117	1781	3328	1585	1781	3077	287
Grp Volume(v), veh/h	43	0	109	22	0	130	33	424	120	163	376	385
Grp Sat Flow(s),veh/h/ln	1260	0	1774	1284	0	1669	1781	1664	1585	1781	1664	1700
Q Serve(g_s), s	1.1	0.0	2.0	0.6	0.0	2.5	0.7	3.5	2.0	3.2	6.2	6.2
Cycle Q Clear(g_c), s	3.7	0.0	2.0	2.5	0.0	2.5	0.7	3.5	2.0	3.2	6.2	6.2
Prop In Lane	1.00		0.30	1.00		0.67	1.00		1.00	1.00		0.17
Lane Grp Cap(c), veh/h	318	0	288	340	0	271	56	1065	507	212	678	693
V/C Ratio(X)	0.14	0.00	0.38	0.06	0.00	0.48	0.59	0.40	0.24	0.77	0.55	0.56
Avail Cap(c_a), veh/h	1001	0	1250	1036	0	1176	285	2065	983	680	1401	1432
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.2	0.0	13.3	14.4	0.0	13.6	17.0	9.4	8.9	15.2	8.1	8.1
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.0	0.0	0.5	3.7	0.3	0.3	2.2	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.7	0.1	0.0	0.8	0.3	1.0	0.5	1.2	1.6	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.3	0.0	13.6	14.5	0.0	14.0	20.7	9.8	9.2	17.4	9.0	9.0
LnGrp LOS	B	A	B	B	A	B	C	A	A	B	A	A
Approach Vol, veh/h		152			152			577			924	
Approach Delay, s/veh		14.1			14.1			10.3			10.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.6	16.3		10.7	5.5	19.4		10.7
Change Period (Y+Rc), s	4.4	4.9		4.9	4.4	4.9		4.9
Max Green Setting (Gmax), s	13.6	22.1		25.1	5.7	30.0		25.1
Max Q Clear Time (g_c+I1), s	5.2	5.5		5.7	2.7	8.2		4.5
Green Ext Time (p_c), s	0.1	3.7		0.4	0.0	6.4		0.5

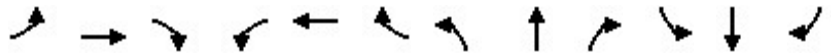
Intersection Summary		
HCM 6th Ctrl Delay	11.0	
HCM 6th LOS	B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	100	40	70	260	170	30	180	50	240	600	80
Future Volume (veh/h)	70	100	40	70	260	170	30	180	50	240	600	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1752	1870	1870	1346	1870
Adj Flow Rate, veh/h	76	109	43	76	283	185	33	196	54	261	652	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	10	2	2	10	2
Cap, veh/h	110	147	58	110	535	339	51	526	141	317	872	44
Arrive On Green	0.06	0.11	0.11	0.06	0.26	0.26	0.03	0.20	0.20	0.18	0.35	0.35
Sat Flow, veh/h	1781	1276	503	1781	2086	1323	1781	2594	697	1781	2477	125
Grp Volume(v), veh/h	76	0	152	76	240	228	33	124	126	261	336	349
Grp Sat Flow(s),veh/h/ln	1781	0	1780	1781	1777	1632	1781	1664	1626	1781	1279	1324
Q Serve(g_s), s	2.4	0.0	4.7	2.4	6.6	6.8	1.0	3.6	3.8	8.0	13.1	13.1
Cycle Q Clear(g_c), s	2.4	0.0	4.7	2.4	6.6	6.8	1.0	3.6	3.8	8.0	13.1	13.1
Prop In Lane	1.00		0.28	1.00		0.81	1.00		0.43	1.00		0.09
Lane Grp Cap(c), veh/h	110	0	204	110	456	419	51	337	330	317	450	466
V/C Ratio(X)	0.69	0.00	0.74	0.69	0.53	0.54	0.65	0.37	0.38	0.82	0.75	0.75
Avail Cap(c_a), veh/h	473	0	883	221	881	809	189	648	634	568	770	797
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.0	0.0	24.2	26.0	18.0	18.1	27.1	19.4	19.5	22.4	16.1	16.1
Incr Delay (d2), s/veh	7.5	0.0	2.0	7.5	0.4	0.4	5.0	0.8	0.8	2.1	2.9	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.9	1.2	2.4	2.3	0.5	1.4	1.4	3.2	3.7	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	0.0	26.2	33.5	18.4	18.6	32.2	20.2	20.3	24.4	19.0	18.9
LnGrp LOS	C	A	C	C	B	B	C	C	C	C	B	B
Approach Vol, veh/h		228			544			283			946	
Approach Delay, s/veh		28.6			20.6			21.6			20.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	16.5	15.5	10.5	5.6	24.9	7.5	18.5
Change Period (Y+Rc), s	4.0	5.0	12.0	4.0	4.0	5.0	4.0	4.0
Max Green Setting (Gmax), s	10.0	22.0	7.0	28.0	6.0	34.0	15.0	28.0
Max Q Clear Time (g_c+I1), s	10.6	5.8	4.4	6.7	3.0	15.1	4.4	8.8
Green Ext Time (p_c), s	0.3	1.4	0.0	0.5	0.0	4.8	0.1	1.7

Intersection Summary	
HCM 6th Ctrl Delay	21.6
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	260	40	40	400	140	0	10	10	360	40	50
Future Volume (veh/h)	100	260	40	40	400	140	0	10	10	360	40	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1346	1752	1752	1752	1752	1346	1437	1346	1437	1346	1437	1437
Adj Flow Rate, veh/h	109	283	43	43	435	152	0	11	11	391	43	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	10	10	10	2	10	2	10	2	2
Cap, veh/h	127	1040	156	56	975	594	0	84	72	567	132	166
Arrive On Green	0.10	0.36	0.36	0.03	0.29	0.29	0.00	0.06	0.06	0.23	0.23	0.23
Sat Flow, veh/h	1282	2902	436	1668	3328	1141	0	1370	1120	2487	579	727
Grp Volume(v), veh/h	109	161	165	43	435	152	0	11	11	391	0	97
Grp Sat Flow(s),veh/h/ln	1282	1664	1673	1668	1664	1141	0	1279	1144	1244	0	1306
Q Serve(g_s), s	5.2	4.2	4.3	1.6	6.6	4.6	0.0	0.5	0.6	8.9	0.0	3.8
Cycle Q Clear(g_c), s	5.2	4.2	4.3	1.6	6.6	4.6	0.0	0.5	0.6	8.9	0.0	3.8
Prop In Lane	1.00		0.26	1.00		1.00	0.00		0.98	1.00		0.56
Lane Grp Cap(c), veh/h	127	596	600	56	975	594	0	83	74	567	0	298
V/C Ratio(X)	0.86	0.27	0.28	0.76	0.45	0.26	0.00	0.13	0.15	0.69	0.00	0.33
Avail Cap(c_a), veh/h	220	1106	1112	170	1986	941	0	83	74	567	0	298
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.4	14.1	14.1	29.6	17.8	8.2	0.0	27.3	27.3	21.9	0.0	19.9
Incr Delay (d2), s/veh	15.0	1.1	1.1	7.7	1.5	1.0	0.0	3.2	4.3	6.7	0.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	1.5	1.6	0.7	2.3	1.7	0.0	0.2	0.2	2.9	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.4	15.2	15.3	37.3	19.3	9.2	0.0	30.5	31.6	28.6	0.0	22.8
LnGrp LOS	D	B	B	D	B	A	A	C	C	C	A	C
Approach Vol, veh/h		435			630			22			488	
Approach Delay, s/veh		22.0			18.1			31.1			27.5	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.5	27.5		19.0	10.5	23.4		8.9
Change Period (Y+Rc), s	4.4	5.3		4.9	4.4	* 5.3		4.9
Max Green Setting (Gmax), s	6.3	41.1		14.1	10.6	* 37		4.0
Max Q Clear Time (g_c+I1), s	3.6	6.3		10.9	7.2	8.6		2.6
Green Ext Time (p_c), s	0.0	5.8		0.7	0.1	9.5		0.0

Intersection Summary	
HCM 6th Ctrl Delay	22.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

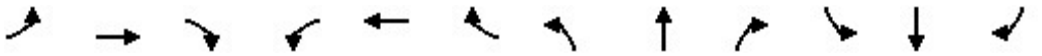
Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				
Traffic Vol, veh/h	260	110	20	30	130	100	10	30	10	0	0	0
Future Vol, veh/h	260	110	20	30	130	100	10	30	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	283	120	22	33	141	109	11	33	11	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	250	0	0	142	0	0	959	1013	131
Stage 1	-	-	-	-	-	-	697	697	-
Stage 2	-	-	-	-	-	-	262	316	-
Critical Hdwy	4.12	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1316	-	-	1441	-	-	285	239	919
Stage 1	-	-	-	-	-	-	494	443	-
Stage 2	-	-	-	-	-	-	782	655	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1316	-	-	1441	-	-	212	0	919
Mov Cap-2 Maneuver	-	-	-	-	-	-	212	0	-
Stage 1	-	-	-	-	-	-	378	0	-
Stage 2	-	-	-	-	-	-	761	0	-

Approach	EB	WB	NB
HCM Control Delay, s	5.7	0.9	17.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	345	1316	-	-	1441	-	-
HCM Lane V/C Ratio	0.158	0.215	-	-	0.023	-	-
HCM Control Delay (s)	17.4	8.5	0	-	7.6	0	-
HCM Lane LOS	C	A	A	-	A	A	-
HCM 95th %tile Q(veh)	0.6	0.8	-	-	0.1	-	-



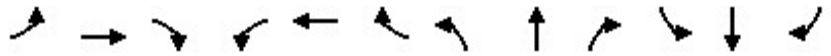
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	120	170	320	320	80	120	60	40	50	90	20
Future Volume (veh/h)	20	120	170	320	320	80	120	60	40	50	90	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	130	185	348	348	87	130	65	43	54	98	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	35	158	225	391	1509	372	165	150	99	68	131	29
Arrive On Green	0.02	0.23	0.23	0.22	0.53	0.53	0.09	0.14	0.14	0.04	0.09	0.09
Sat Flow, veh/h	1781	698	993	1781	2825	697	1781	1050	695	1781	1479	332
Grp Volume(v), veh/h	22	0	315	348	217	218	130	0	108	54	0	120
Grp Sat Flow(s),veh/h/ln	1781	0	1692	1781	1777	1745	1781	0	1745	1781	0	1811
Q Serve(g_s), s	0.9	0.0	12.4	13.3	4.6	4.7	5.0	0.0	4.0	2.1	0.0	4.5
Cycle Q Clear(g_c), s	0.9	0.0	12.4	13.3	4.6	4.7	5.0	0.0	4.0	2.1	0.0	4.5
Prop In Lane	1.00		0.59	1.00		0.40	1.00		0.40	1.00		0.18
Lane Grp Cap(c), veh/h	35	0	383	391	949	932	165	0	250	68	0	161
V/C Ratio(X)	0.62	0.00	0.82	0.89	0.23	0.23	0.79	0.00	0.43	0.79	0.00	0.75
Avail Cap(c_a), veh/h	142	0	751	431	1269	1246	243	0	770	117	0	670
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.2	0.0	25.8	26.6	8.7	8.7	31.2	0.0	27.5	33.5	0.0	31.3
Incr Delay (d2), s/veh	6.5	0.0	3.8	17.8	0.1	0.1	5.5	0.0	0.7	7.6	0.0	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	5.0	7.2	1.5	1.5	2.3	0.0	1.6	1.0	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.6	0.0	29.6	44.4	8.8	8.8	36.8	0.0	28.2	41.1	0.0	33.9
LnGrp LOS	D	A	C	D	A	A	D	A	C	D	A	C
Approach Vol, veh/h		337			783			238			174	
Approach Delay, s/veh		30.4			24.6			32.9			36.1	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.4	20.8	10.9	11.1	5.8	42.5	7.1	15.0
Change Period (Y+Rc), s	12.0	4.9	4.4	4.9	4.4	4.9	4.4	4.9
Max Green Setting (Gmax), s	17.0	31.2	9.6	26.0	5.6	50.2	4.6	31.0
Max Q Clear Time (g_c+I1), s	15.3	14.4	7.0	6.5	2.9	6.7	4.1	6.0
Green Ext Time (p_c), s	0.1	1.5	0.0	0.4	0.0	2.0	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	28.5
HCM 6th LOS	C

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	70	40	70	60	260	40	130	60	90	170	70	230
Future Volume (vph)	70	40	70	60	260	40	130	60	90	170	70	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.9	5.9			5.9	5.9		5.4	5.9	7.8	
Lane Util. Factor		0.95	0.95			1.00	1.00		1.00	1.00	0.88	
Frt		1.00	0.93			1.00	0.85		1.00	1.00	0.85	
Flt Protected		0.95	1.00			0.96	1.00		0.95	1.00	1.00	
Satd. Flow (prot)		1665	1632			1768	1568		1752	1845	2760	
Flt Permitted		0.95	1.00			0.96	1.00		0.95	1.00	1.00	
Satd. Flow (perm)		1665	1632			1768	1568		1752	1845	2760	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.93	0.84	0.84	0.84	0.84
Adj. Flow (vph)	78	44	78	67	280	43	140	65	107	202	83	274
RTOR Reduction (vph)	0	0	13	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	118	136	0	0	323	205	0	107	202	357	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Split	Split	NA		Split	NA	Perm		Prot	NA	pm+ov	
Protected Phases	7	7	7		8	8			5	2	3	
Permitted Phases							8				2	
Actuated Green, G (s)		23.5	23.5			42.0	42.0		17.0	27.3	78.1	
Effective Green, g (s)		23.5	23.5			42.0	42.0		17.0	27.3	78.1	
Actuated g/C Ratio		0.11	0.11			0.20	0.20		0.08	0.13	0.37	
Clearance Time (s)		5.9	5.9			5.9	5.9		5.4	5.9	7.8	
Vehicle Extension (s)		2.0	2.0			2.0	2.0		2.0	3.3	4.5	
Lane Grp Cap (vph)		187	183			355	314		142	240	1030	
v/s Ratio Prot		0.07	c0.08			c0.18			0.06	c0.11	0.08	
v/s Ratio Perm							0.13				0.05	
v/c Ratio		0.63	0.74			0.91	0.65		0.75	0.84	0.35	
Uniform Delay, d1		88.7	89.9			81.7	76.8		94.0	88.8	47.1	
Progression Factor		1.00	1.00			1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2		5.0	13.2			25.7	3.7		18.0	22.8	0.4	
Delay (s)		93.7	103.0			107.4	80.5		112.0	111.6	47.5	
Level of Service		F	F			F	F		F	F	D	
Approach Delay (s)			98.9			97.0				77.3		
Approach LOS			F			F				E		

Intersection Summary			
HCM 2000 Control Delay	90.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	209.1	Sum of lost time (s)	30.9
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	170	120	390	480	420	40	120	40	110	760	150
Future Volume (veh/h)	110	170	120	390	480	420	40	120	40	110	760	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1346	1752	1752	1752	1752	1346	1426	1346	1426	1752	1752	1752
Adj Flow Rate, veh/h	116	179	126	411	505	442	42	126	0	116	800	158
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	10	10	10	10	10	10	3	10	3	10	10	10
Cap, veh/h	116	705	367	436	1273	533	49	595		142	937	552
Arrive On Green	0.09	0.21	0.21	0.26	0.38	0.38	0.04	0.23	0.00	0.08	0.28	0.28
Sat Flow, veh/h	1282	3328	1485	1668	3328	1141	1358	2558	1208	1668	3328	1485
Grp Volume(v), veh/h	116	179	126	411	505	442	42	126	0	116	800	158
Grp Sat Flow(s),veh/h/ln	1282	1664	1485	1668	1664	1141	1358	1279	1208	1668	1664	1485
Q Serve(g_s), s	11.0	5.5	8.5	29.4	13.4	41.0	3.7	4.8	0.0	8.3	27.7	9.1
Cycle Q Clear(g_c), s	11.0	5.5	8.5	29.4	13.4	41.0	3.7	4.8	0.0	8.3	27.7	9.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	116	705	367	436	1273	533	49	595		142	937	552
V/C Ratio(X)	1.00	0.25	0.34	0.94	0.40	0.83	0.86	0.21		0.82	0.85	0.29
Avail Cap(c_a), veh/h	116	705	367	521	1351	560	71	595		233	1031	594
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	40.0	37.6	44.0	27.3	28.2	58.4	37.7	0.0	54.8	41.3	26.8
Incr Delay (d2), s/veh	83.8	0.3	0.9	22.3	0.3	10.4	35.9	0.2	0.0	14.9	7.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	2.2	3.1	14.4	5.2	12.0	1.8	1.5	0.0	4.1	12.2	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	139.2	40.3	38.5	66.3	27.7	38.6	94.2	37.9	0.0	69.7	48.3	27.2
LnGrp LOS	F	D	D	E	C	D	F	D		E	D	C
Approach Vol, veh/h		421			1358			168	A		1074	
Approach Delay, s/veh		67.0			42.9			52.0			47.5	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.3	33.2	38.8	32.4	11.4	39.2	18.0	53.2
Change Period (Y+Rc), s	7.0	4.9	7.0	* 6.6	7.0	4.9	7.0	6.6
Max Green Setting (Gmax), s	10.3	27.1	38.0	* 23	6.4	37.7	11.0	49.4
Max Q Clear Time (g_c+I1), s	10.3	6.8	31.4	10.5	5.7	29.7	13.0	43.0
Green Ext Time (p_c), s	0.2	0.7	0.4	1.7	0.0	4.6	0.0	3.6

Intersection Summary	
HCM 6th Ctrl Delay	48.4
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

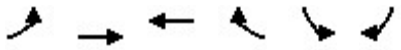
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	20.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	270	100	60	100	0	70	0	120	200	120	60
Future Vol, veh/h	0	270	100	60	100	0	70	0	120	200	120	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	293	109	65	109	0	76	0	130	217	130	65
Number of Lanes	0	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	23.2	12.2	13.5	24.4
HCM LOS	C	B	B	C

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	37%	0%	100%	0%	53%
Vol Thru, %	0%	73%	0%	100%	32%
Vol Right, %	63%	27%	0%	0%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	190	370	60	100	380
LT Vol	70	0	60	0	200
Through Vol	0	270	0	100	120
RT Vol	120	100	0	0	60
Lane Flow Rate	207	402	65	109	413
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.374	0.706	0.144	0.224	0.725
Departure Headway (Hd)	6.517	6.317	7.931	7.417	6.32
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	549	571	451	482	570
Service Time	4.594	4.379	5.71	5.196	4.381
HCM Lane V/C Ratio	0.377	0.704	0.144	0.226	0.725
HCM Control Delay	13.5	23.2	12.1	12.3	24.4
HCM Lane LOS	B	C	B	B	C
HCM 95th-tile Q	1.7	5.7	0.5	0.9	6



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	330	1370	340	40	40	30
Future Volume (veh/h)	330	1370	340	40	40	30
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1870	1870
Adj Flow Rate, veh/h	423	1756	370	43	50	38
Peak Hour Factor	0.78	0.78	0.92	0.92	0.80	0.80
Percent Heavy Veh, %	6	6	6	6	2	2
Cap, veh/h	457	1961	808	93	323	246
Arrive On Green	0.26	0.57	0.26	0.26	0.34	0.34
Sat Flow, veh/h	1725	3532	3199	359	951	723
Grp Volume(v), veh/h	423	1756	204	209	89	0
Grp Sat Flow(s),veh/h/ln	1725	1721	1721	1746	1693	0
Q Serve(g_s), s	23.9	44.8	9.9	10.1	3.7	0.0
Cycle Q Clear(g_c), s	23.9	44.8	9.9	10.1	3.7	0.0
Prop In Lane	1.00			0.21	0.56	0.43
Lane Grp Cap(c), veh/h	457	1961	447	454	576	0
V/C Ratio(X)	0.93	0.90	0.46	0.46	0.15	0.00
Avail Cap(c_a), veh/h	523	1961	447	454	576	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.8	18.9	31.1	31.1	23.0	0.0
Incr Delay (d2), s/veh	21.1	6.8	3.3	3.3	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.5	18.1	4.3	4.5	1.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	56.9	25.7	34.4	34.4	23.6	0.0
LnGrp LOS	E	C	C	C	C	A
Approach Vol, veh/h		2179	413		89	
Approach Delay, s/veh		31.8	34.4		23.6	
Approach LOS		C	C		C	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	61.5	38.5	31.0	30.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	57.0	34.0	30.3	22.2
Max Q Clear Time (g_c+I1), s	46.8	5.7	25.9	12.1
Green Ext Time (p_c), s	8.0	0.2	0.6	1.5

Intersection Summary	
HCM 6th Ctrl Delay	31.9
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1210	360	120	0	60
Future Vol, veh/h	0	1210	360	120	0	60
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	76	76	92	92	90	90
Heavy Vehicles, %	6	6	6	6	2	2
Mvmt Flow	0	1592	391	130	0	67

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1253	262
Stage 1	-	-	-	-	457	-
Stage 2	-	-	-	-	796	-
Critical Hdwy	-	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	0	-	-	-	164	737
Stage 1	0	-	-	-	604	-
Stage 2	0	-	-	-	405	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	164	736
Mov Cap-2 Maneuver	-	-	-	-	164	-
Stage 1	-	-	-	-	603	-
Stage 2	-	-	-	-	405	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.4
HCM LOS			B

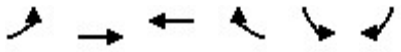
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	736
HCM Lane V/C Ratio	-	-	-	0.091
HCM Control Delay (s)	-	-	-	10.4
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.3

Intersection	
Intersection Delay, s/veh	16.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	150	200	70	70	130	100	80	140	30	90	110	30
Future Vol, veh/h	150	200	70	70	130	100	80	140	30	90	110	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	163	217	76	76	141	109	87	152	33	98	120	33
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	16.9	15.3	17.5	16.7
HCM LOS	C	C	C	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	32%	100%	0%	100%	0%	39%
Vol Thru, %	56%	0%	74%	0%	57%	48%
Vol Right, %	12%	0%	26%	0%	43%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	250	150	270	70	230	230
LT Vol	80	150	0	70	0	90
Through Vol	140	0	200	0	130	110
RT Vol	30	0	70	0	100	30
Lane Flow Rate	272	163	293	76	250	250
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.524	0.344	0.563	0.166	0.486	0.488
Departure Headway (Hd)	6.947	7.602	6.902	7.833	7.005	7.022
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	516	471	519	457	512	512
Service Time	5.017	5.37	4.67	5.605	4.776	5.091
HCM Lane V/C Ratio	0.527	0.346	0.565	0.166	0.488	0.488
HCM Control Delay	17.5	14.3	18.3	12.2	16.3	16.7
HCM Lane LOS	C	B	C	B	C	C
HCM 95th-tile Q	3	1.5	3.4	0.6	2.6	2.6



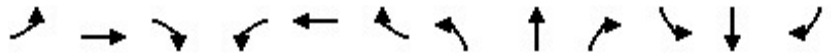
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	170	950	230	60	20	30
Future Volume (veh/h)	170	950	230	60	20	30
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	185	1033	250	65	22	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	420	2276	788	201	31	47
Arrive On Green	0.24	0.64	0.28	0.28	0.05	0.05
Sat Flow, veh/h	1781	3647	2898	715	653	979
Grp Volume(v), veh/h	185	1033	157	158	56	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1742	1661	0
Q Serve(g_s), s	3.2	5.2	2.5	2.6	1.2	0.0
Cycle Q Clear(g_c), s	3.2	5.2	2.5	2.6	1.2	0.0
Prop In Lane	1.00			0.41	0.39	0.59
Lane Grp Cap(c), veh/h	420	2276	499	489	79	0
V/C Ratio(X)	0.44	0.45	0.31	0.32	0.71	0.00
Avail Cap(c_a), veh/h	500	4872	1667	1634	1218	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.6	3.2	10.1	10.1	16.7	0.0
Incr Delay (d2), s/veh	0.7	0.3	0.7	0.7	10.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.1	0.7	0.7	0.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.3	3.5	10.8	10.8	27.5	0.0
LnGrp LOS	B	A	B	B	C	A
Approach Vol, veh/h		1218	315		56	
Approach Delay, s/veh		4.8	10.8		27.5	
Approach LOS		A	B		C	

Timer - Assigned Phs	2		4	5	6
Phs Duration (G+Y+Rc), s	29.0		6.6	12.8	16.2
Change Period (Y+Rc), s	* 6.2		4.9	4.4	6.2
Max Green Setting (Gmax), s	* 49		26.1	10.0	33.4
Max Q Clear Time (g_c+I1), s	7.2		3.2	5.2	4.6
Green Ext Time (p_c), s	15.5		0.1	0.2	3.1

Intersection Summary	
HCM 6th Ctrl Delay	6.8
HCM 6th LOS	A

Notes

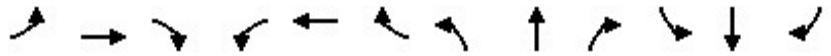
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	170	50	20	30	60	40	540	230	280	720	60
Future Volume (veh/h)	80	170	50	20	30	60	40	540	230	280	720	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	87	185	54	22	33	65	43	587	250	304	783	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	339	267	78	233	108	213	65	1036	462	374	1544	128
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.04	0.29	0.29	0.21	0.46	0.46
Sat Flow, veh/h	1297	1391	406	1141	563	1108	1781	3554	1585	1781	3322	276
Grp Volume(v), veh/h	87	0	239	22	0	98	43	587	250	304	419	429
Grp Sat Flow(s),veh/h/ln	1297	0	1797	1141	0	1671	1781	1777	1585	1781	1777	1821
Q Serve(g_s), s	2.9	0.0	5.7	0.8	0.0	2.3	1.1	6.5	6.1	7.5	7.6	7.7
Cycle Q Clear(g_c), s	5.2	0.0	5.7	6.6	0.0	2.3	1.1	6.5	6.1	7.5	7.6	7.7
Prop In Lane	1.00		0.23	1.00		0.66	1.00		1.00	1.00		0.15
Lane Grp Cap(c), veh/h	339	0	345	233	0	321	65	1036	462	374	826	846
V/C Ratio(X)	0.26	0.00	0.69	0.09	0.00	0.31	0.66	0.57	0.54	0.81	0.51	0.51
Avail Cap(c_a), veh/h	793	0	974	632	0	905	242	1657	739	927	1511	1549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	17.4	20.5	0.0	16.1	22.0	13.9	13.8	17.4	8.7	8.7
Incr Delay (d2), s/veh	0.1	0.0	0.9	0.1	0.0	0.2	4.1	0.6	1.3	1.6	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	2.2	0.2	0.0	0.8	0.5	2.3	2.0	2.8	2.3	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.4	0.0	18.4	20.6	0.0	16.3	26.2	14.6	15.1	19.1	9.3	9.3
LnGrp LOS	B	A	B	C	A	B	C	B	B	B	A	A
Approach Vol, veh/h		326			120			880			1152	
Approach Delay, s/veh		18.4			17.0			15.3			11.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.1	18.4		13.8	6.1	26.4		13.8
Change Period (Y+Rc), s	4.4	4.9		4.9	4.4	4.9		4.9
Max Green Setting (Gmax), s	24.1	21.6		25.1	6.3	39.4		25.1
Max Q Clear Time (g_c+I1), s	9.5	8.5		7.7	3.1	9.7		8.6
Green Ext Time (p_c), s	0.4	5.0		1.0	0.0	8.0		0.3

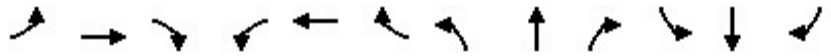
Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	380	40	100	140	260	50	640	170	330	530	110
Future Volume (veh/h)	200	380	40	100	140	260	50	640	170	330	530	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1752	1870	1870	1346	1870
Adj Flow Rate, veh/h	217	413	43	109	152	66	54	696	185	359	576	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	10	2	2	10	2
Cap, veh/h	248	444	46	123	649	270	70	628	167	369	948	108
Arrive On Green	0.14	0.27	0.27	0.07	0.27	0.27	0.04	0.24	0.24	0.21	0.41	0.41
Sat Flow, veh/h	1781	1666	173	1781	2447	1017	1781	2601	691	1781	2313	264
Grp Volume(v), veh/h	217	0	456	109	109	109	54	445	436	359	318	324
Grp Sat Flow(s),veh/h/ln	1781	0	1839	1781	1777	1687	1781	1664	1627	1781	1279	1299
Q Serve(g_s), s	13.8	0.0	28.0	7.0	5.5	5.9	3.5	28.0	28.0	23.2	22.6	22.8
Cycle Q Clear(g_c), s	13.8	0.0	28.0	7.0	5.5	5.9	3.5	28.0	28.0	23.2	22.6	22.8
Prop In Lane	1.00		0.09	1.00		0.60	1.00		0.42	1.00		0.20
Lane Grp Cap(c), veh/h	248	0	490	123	471	447	70	402	393	369	524	532
V/C Ratio(X)	0.87	0.00	0.93	0.89	0.23	0.24	0.78	1.11	1.11	0.97	0.61	0.61
Avail Cap(c_a), veh/h	354	0	556	123	471	447	138	402	393	369	524	532
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.9	0.0	41.5	53.5	33.3	33.5	55.2	43.9	43.9	45.6	26.9	26.9
Incr Delay (d2), s/veh	15.5	0.0	20.1	48.3	0.1	0.1	6.7	77.2	77.9	39.4	2.2	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	0.0	15.2	4.8	2.4	2.4	1.7	20.0	19.7	14.2	7.1	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	61.5	101.7	33.4	33.6	61.9	121.1	121.8	85.0	29.0	29.1
LnGrp LOS	E	A	E	F	C	C	E	F	F	F	C	C
Approach Vol, veh/h		673			327			935			1001	
Approach Delay, s/veh		62.5			56.2			118.0			49.1	
Approach LOS		E			E			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	33.0	20.0	34.9	8.5	52.5	20.2	34.7
Change Period (Y+Rc), s	4.0	5.0	12.0	4.0	4.0	5.0	4.0	4.0
Max Green Setting (Gmax), s	4.0	28.0	8.0	35.0	9.0	43.0	23.0	28.0
Max Q Clear Time (g_c+I1), s	25.2	30.0	9.0	30.0	5.5	24.8	15.8	7.9
Green Ext Time (p_c), s	0.0	0.0	0.0	0.9	0.0	4.4	0.3	0.7

Intersection Summary	
HCM 6th Ctrl Delay	74.9
HCM 6th LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	630	80	30	230	240	10	140	0	510	40	50
Future Volume (veh/h)	250	630	80	30	230	240	10	140	0	510	40	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1346	1752	1752	1752	1752	1346	1437	1346	1437	1346	1437	1437
Adj Flow Rate, veh/h	272	685	87	33	250	261	11	152	0	554	43	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	10	10	10	2	10	2	10	2	2
Cap, veh/h	283	1357	172	43	872	543	12	177	0	533	124	156
Arrive On Green	0.22	0.46	0.46	0.03	0.26	0.26	0.07	0.07	0.00	0.21	0.21	0.21
Sat Flow, veh/h	1282	2971	377	1668	3328	1141	168	2515	0	2487	579	727
Grp Volume(v), veh/h	272	383	389	33	250	261	87	76	0	554	0	97
Grp Sat Flow(s),veh/h/ln	1282	1664	1684	1668	1664	1141	1338	1279	0	1244	0	1306
Q Serve(g_s), s	17.7	13.7	13.8	1.7	5.1	13.1	5.5	4.9	0.0	18.1	0.0	5.3
Cycle Q Clear(g_c), s	17.7	13.7	13.8	1.7	5.1	13.1	5.5	4.9	0.0	18.1	0.0	5.3
Prop In Lane	1.00		0.22	1.00		1.00	0.13		0.00	1.00		0.56
Lane Grp Cap(c), veh/h	283	760	769	43	872	543	97	92	0	533	0	280
V/C Ratio(X)	0.96	0.50	0.51	0.77	0.29	0.48	0.90	0.82	0.00	1.04	0.00	0.35
Avail Cap(c_a), veh/h	283	990	1002	121	1491	756	97	92	0	533	0	280
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.6	16.2	16.2	40.9	24.9	15.0	38.9	38.6	0.0	33.1	0.0	28.1
Incr Delay (d2), s/veh	43.3	2.4	2.4	10.6	0.8	3.0	67.9	53.2	0.0	49.4	0.0	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	5.1	5.1	0.8	2.0	5.1	3.6	2.9	0.0	8.9	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.8	18.6	18.6	51.4	25.7	18.0	106.8	91.8	0.0	82.5	0.0	31.5
LnGrp LOS	E	B	B	D	C	B	F	F	A	F	A	C
Approach Vol, veh/h		1044			544			163			651	
Approach Delay, s/veh		33.5			23.6			99.8			74.9	
Approach LOS		C			C			F			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.6	43.8		23.0	23.0	27.4		11.0
Change Period (Y+Rc), s	4.4	5.3		4.9	4.4	* 5.3		4.9
Max Green Setting (Gmax), s	6.1	50.2		18.1	18.6	* 38		6.1
Max Q Clear Time (g_c+I1), s	3.7	15.8		20.1	19.7	15.1		7.5
Green Ext Time (p_c), s	0.0	15.5		0.0	0.0	7.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	47.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

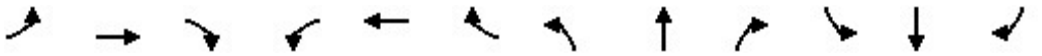
Intersection	
Int Delay, s/veh	15.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				
Traffic Vol, veh/h	570	210	40	30	130	120	10	60	20	0	0	0
Future Vol, veh/h	570	210	40	30	130	120	10	60	20	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	620	228	43	33	141	130	11	65	22	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	271	0	0	271	0	0	1762	1827	250
Stage 1	-	-	-	-	-	-	1490	1490	-
Stage 2	-	-	-	-	-	-	272	337	-
Critical Hdwy	4.12	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1292	-	-	1292	-	-	93	77	789
Stage 1	-	-	-	-	-	-	206	187	-
Stage 2	-	-	-	-	-	-	774	641	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1292	-	-	1292	-	-	39	0	789
Mov Cap-2 Maneuver	-	-	-	-	-	-	39	0	-
Stage 1	-	-	-	-	-	-	89	0	-
Stage 2	-	-	-	-	-	-	750	0	-

Approach	EB	WB	NB
HCM Control Delay, s	7.2	0.8	141.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	106	1292	-	-	1292	-	-
HCM Lane V/C Ratio	0.923	0.48	-	-	0.025	-	-
HCM Control Delay (s)	141.6	10.3	0	-	7.9	0	-
HCM Lane LOS	F	B	A	-	A	A	-
HCM 95th %tile Q(veh)	5.6	2.7	-	-	0.1	-	-



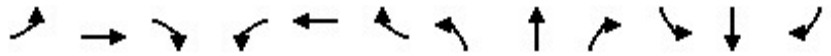
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	490	160	210	250	100	210	140	330	140	70	40
Future Volume (veh/h)	50	490	160	210	250	100	210	140	330	140	70	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	533	174	228	272	109	228	152	359	152	76	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	69	483	158	191	1199	469	251	134	317	135	232	131
Arrive On Green	0.04	0.36	0.36	0.11	0.48	0.48	0.14	0.27	0.27	0.08	0.21	0.21
Sat Flow, veh/h	1781	1350	441	1781	2496	976	1781	494	1166	1781	1122	635
Grp Volume(v), veh/h	54	0	707	228	192	189	228	0	511	152	0	119
Grp Sat Flow(s),veh/h/ln	1781	0	1791	1781	1777	1695	1781	0	1660	1781	0	1756
Q Serve(g_s), s	4.2	0.0	50.1	15.0	8.8	9.2	17.7	0.0	38.1	10.6	0.0	8.1
Cycle Q Clear(g_c), s	4.2	0.0	50.1	15.0	8.8	9.2	17.7	0.0	38.1	10.6	0.0	8.1
Prop In Lane	1.00		0.25	1.00		0.58	1.00		0.70	1.00		0.36
Lane Grp Cap(c), veh/h	69	0	641	191	853	814	251	0	452	135	0	363
V/C Ratio(X)	0.78	0.00	1.10	1.19	0.22	0.23	0.91	0.00	1.13	1.13	0.00	0.33
Avail Cap(c_a), veh/h	126	0	641	191	853	814	289	0	452	135	0	363
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	66.7	0.0	45.0	62.5	21.2	21.3	59.2	0.0	51.0	64.7	0.0	47.2
Incr Delay (d2), s/veh	6.8	0.0	67.1	127.4	0.1	0.1	26.3	0.0	83.2	115.7	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	33.8	13.5	3.7	3.7	9.8	0.0	26.2	9.2	0.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.5	0.0	112.1	189.9	21.3	21.4	85.5	0.0	134.2	180.4	0.0	47.4
LnGrp LOS	E	A	F	F	C	C	F	A	F	F	A	D
Approach Vol, veh/h		761			609			739			271	
Approach Delay, s/veh		109.4			84.4			119.2			122.0	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.0	55.0	24.2	33.8	9.9	72.1	15.0	43.0
Change Period (Y+Rc), s	12.0	4.9	4.4	4.9	4.4	4.9	4.4	4.9
Max Green Setting (Gmax), s	15.0	50.1	22.7	26.0	9.9	62.8	10.6	38.1
Max Q Clear Time (g_c+I1), s	17.0	52.1	19.7	10.1	6.2	11.2	12.6	40.1
Green Ext Time (p_c), s	0.0	0.0	0.1	0.3	0.0	1.7	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	107.5
HCM 6th LOS	F

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	130	140	120	120	140	70	140	190	130	300	430	220
Future Volume (vph)	130	140	120	120	140	70	140	190	130	300	430	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.9	5.9			5.9	5.9		5.4	5.9	7.8	
Lane Util. Factor		0.95	0.95			1.00	1.00		1.00	1.00	0.88	
Frt		1.00	0.93			1.00	0.85		1.00	1.00	0.85	
Flt Protected		0.95	1.00			0.97	1.00		0.95	1.00	1.00	
Satd. Flow (prot)		1665	1624			1785	1568		1752	1845	2760	
Flt Permitted		0.95	1.00			0.97	1.00		0.95	1.00	1.00	
Satd. Flow (perm)		1665	1624			1785	1568		1752	1845	2760	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.93	0.93	0.93	0.93	0.84	0.84	0.84	0.84
Adj. Flow (vph)	144	156	133	133	151	75	151	204	155	357	512	262
RTOR Reduction (vph)	0	0	14	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	284	268	0	0	226	355	0	155	357	774	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Split	Split	NA		Split	NA	Perm		Prot	NA	pm+ov	
Protected Phases	7	7	7		8	8			5	2	3	
Permitted Phases							8				2	
Actuated Green, G (s)		38.2	38.2			50.3	50.3		24.3	44.9	65.8	
Effective Green, g (s)		38.2	38.2			50.3	50.3		24.3	44.9	65.8	
Actuated g/C Ratio		0.17	0.17			0.22	0.22		0.11	0.20	0.29	
Clearance Time (s)		5.9	5.9			5.9	5.9		5.4	5.9	7.8	
Vehicle Extension (s)		2.0	2.0			2.0	2.0		2.0	3.3	4.5	
Lane Grp Cap (vph)		277	270			392	344		185	361	793	
v/s Ratio Prot		c0.17	0.16			0.13			0.09	c0.19	c0.09	
v/s Ratio Perm							c0.23				0.19	
v/c Ratio		1.03	0.99			0.58	1.03		0.84	0.99	0.98	
Uniform Delay, d1		95.4	95.2			79.8	89.3		100.4	91.8	80.8	
Progression Factor		1.00	1.00			1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2		60.7	52.3			1.3	57.0		25.8	44.0	26.1	
Delay (s)		156.1	147.5			81.1	146.4		126.2	135.8	106.9	
Level of Service		F	F			F	F		F	F	F	
Approach Delay (s)			151.8			121.0				117.2		
Approach LOS			F			F				F		

Intersection Summary			
HCM 2000 Control Delay	121.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	229.0	Sum of lost time (s)	30.9
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	290	870	130	160	390	430	110	550	190	230	210	190
Future Volume (veh/h)	290	870	130	160	390	430	110	550	190	230	210	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1346	1752	1752	1752	1752	1346	1426	1346	1426	1752	1752	1752
Adj Flow Rate, veh/h	305	916	137	168	411	453	116	579	0	242	221	200
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	10	10	10	10	10	10	3	10	3	10	10	10
Cap, veh/h	248	1121	617	190	857	441	107	609		215	960	715
Arrive On Green	0.19	0.34	0.34	0.11	0.26	0.26	0.08	0.24	0.00	0.13	0.29	0.29
Sat Flow, veh/h	1282	3328	1485	1668	3328	1141	1358	2558	1208	1668	3328	1485
Grp Volume(v), veh/h	305	916	137	168	411	453	116	579	0	242	221	200
Grp Sat Flow(s),veh/h/ln	1282	1664	1485	1668	1664	1141	1358	1279	1208	1668	1664	1485
Q Serve(g_s), s	27.0	35.2	8.3	13.9	14.6	36.0	11.0	31.2	0.0	18.0	7.1	11.3
Cycle Q Clear(g_c), s	27.0	35.2	8.3	13.9	14.6	36.0	11.0	31.2	0.0	18.0	7.1	11.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	248	1121	617	190	857	441	107	609		215	960	715
V/C Ratio(X)	1.23	0.82	0.22	0.89	0.48	1.03	1.09	0.95		1.13	0.23	0.28
Avail Cap(c_a), veh/h	248	1121	617	215	857	441	107	613		215	964	717
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.4	42.4	26.3	61.1	44.0	42.9	64.4	52.4	0.0	60.9	37.9	21.7
Incr Delay (d2), s/veh	134.3	5.1	0.3	28.4	0.7	50.2	112.0	24.6	0.0	99.6	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	14.8	2.9	7.3	6.0	20.7	7.1	12.1	0.0	13.6	3.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	190.7	47.5	26.6	89.4	44.6	93.1	176.4	77.0	0.0	160.5	38.1	22.0
LnGrp LOS	F	D	C	F	D	F	F	E		F	D	C
Approach Vol, veh/h		1358			1032			695	A		663	
Approach Delay, s/veh		77.6			73.2			93.6			77.9	
Approach LOS		E			E			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.0	38.2	22.9	53.7	18.0	45.2	34.0	42.6
Change Period (Y+Rc), s	7.0	4.9	7.0	* 6.6	7.0	4.9	7.0	6.6
Max Green Setting (Gmax), s	18.0	33.5	18.0	* 45	11.0	40.5	27.0	36.0
Max Q Clear Time (g_c+I1), s	20.0	33.2	15.9	37.2	13.0	13.3	29.0	38.0
Green Ext Time (p_c), s	0.0	0.1	0.0	5.1	0.0	3.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	79.4
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Appendix F - Intersection Traffic Calming Measures – High Level Conceptual Plans

TRUCK ROUTES AND RESTRICTIONS

- Additional Truck Prohibition **(5 tons)**
- Truck Routes
- Truck Weight Limit Prohibition (5 tons)
- Truck Weight Limit Prohibition (1 ton)
- Truck Parking Restriction
- San Diego Unified Port District Limits

★ EHC's Comment Letter – recommended treatment locations

LOGAN AVE / SIGSBEE ST

EHC: Impede trucks from entering the neighborhood from Logan Ave

SOLUTION:

- Install curb extensions
- Install traffic calming measures along Sigsbee St b/w Logan Ave and Harbor Dr

EHC COMMENT: ADDRESSED

Special Note: Conceptual plan illustrations are provided to demonstrate general feasibility/opportunity of the potential measures only. Actual improvements will require additional engineering studies, operational evaluation, and design work and shall be to the satisfaction of the City Engineer.

HARBOR DR / SIGSBEE ST

EHC: Impede trucks from entering from Harbor Dr

SOLUTION:

- Install curb extensions
- Install traffic calming measures along Sigsbee St b/w Logan Ave and Harbor Dr

EHC COMMENT: ADDRESSED

Special Note: Conceptual plan illustrations are provided to demonstrate general feasibility/opportunity of the potential measures only. Actual improvements will require additional engineering studies, operational evaluation, and design work and shall be to the satisfaction of the City Engineer.

LOGAN AVE / BEARDSLEY ST

EHC: Impede trucks from proceeding straight when exiting I-5 South

SOLUTION:

- Install curb extensions
- Install traffic calming measures along Beardsley St b/w Logan Ave and Harbor Dr
- Coordinate w/ Caltrans on truck exit routes

EHC COMMENT: <u>PARTIALLY ADDRESSSED (won't deter EB trucks from I-5 off-ramp)</u>

Special Note: Conceptual plan illustrations are provided to demonstrate general feasibility/opportunity of the potential measures only. Actual improvements will require additional engineering studies, operational evaluation, and design work and shall be to the satisfaction of the City Engineer.

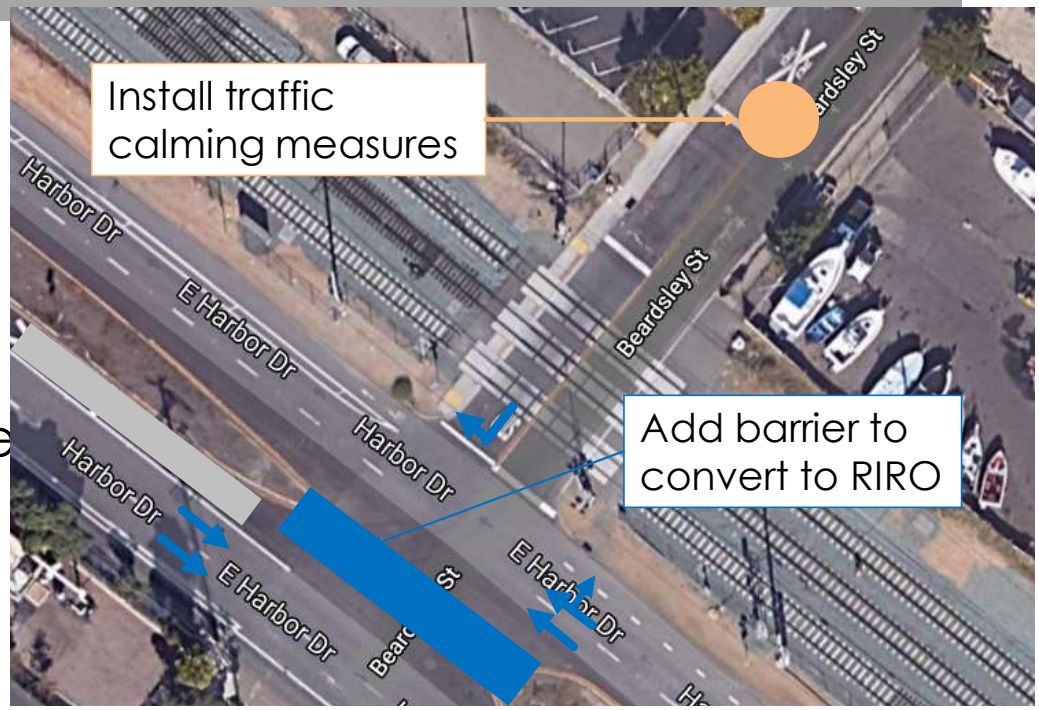
HARBOR DR / BEARDSLEY ST

EHC: Impede trucks from entering from Harbor Dr

SOLUTION:

- Convert to RIRO intersection
- Install traffic calming measures along Beardsley St b/w Logan Ave and Harbor Dr

EHC COMMENT: ADDRESSED



Special Note: Conceptual plan illustrations are provided to demonstrate general feasibility/opportunity of the potential measures only. Actual improvements will require additional engineering studies, operational evaluation, and design work and shall be to the satisfaction of the City Engineer.

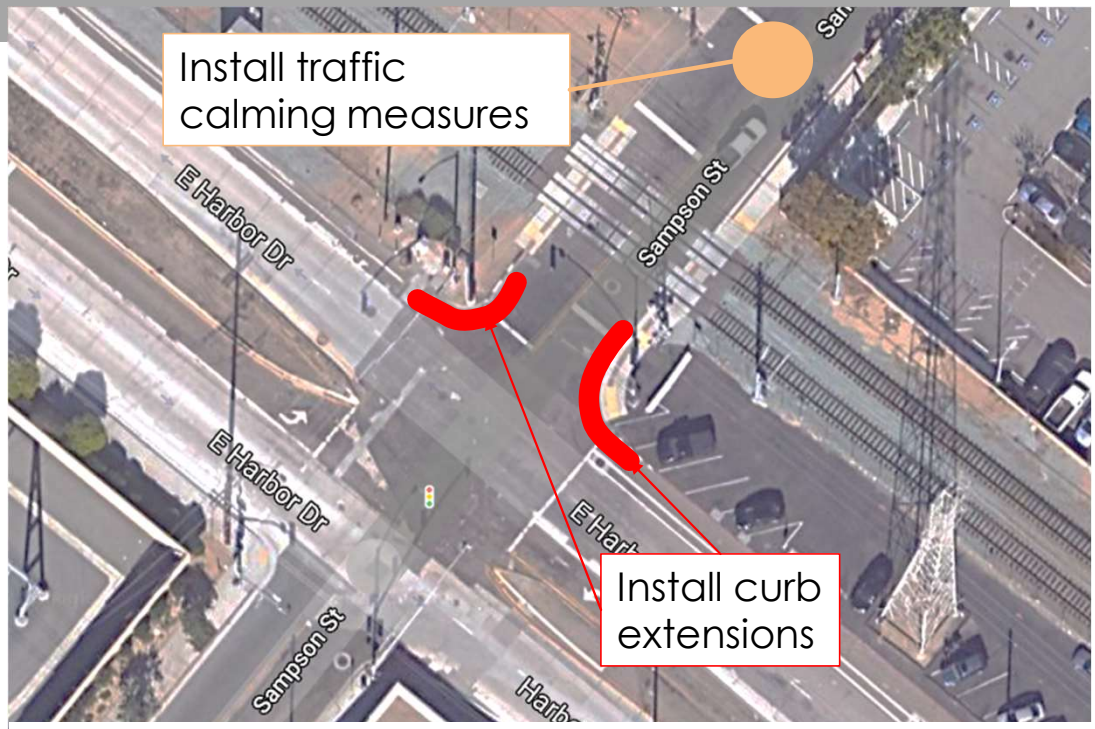
HARBOR DR / SAMPSON ST

EHC: Impede trucks from entering from Harbor Dr

SOLUTION:

- Install curb extensions
- Install traffic calming measures along Sampson St b/w Logan Ave and Harbor Dr
- Add "No Trucks on Sampson St" signage on Harbor Dr

EHC COMMENT: <u>PARTIALLY ADDRESSSED (won't deter EB trucks from Sampson St)</u>



Special Note: Conceptual plan illustrations are provided to demonstrate general feasibility/opportunity of the potential measures only. Actual improvements will require additional engineering studies, operational evaluation, and design work and shall be to the satisfaction of the City Engineer.

MAIN ST / SCHLEY ST

EHC: Divert trucks from entering onto 28th or Main St from Harbor Dr

SOLUTION:

- Partial intersection closure – restrict NBT and EBL onto 26th St

EHC COMMENT: PARTIALLY ADDRESSSED (won't deter NBR trucks from Schley St to Main St)

Special Note: Conceptual plan illustrations are provided to demonstrate general feasibility/opportunity of the potential measures only. Actual improvements will require additional engineering studies, operational evaluation, and design work and shall be to the satisfaction of the City Engineer.