Downtown San Diego Mobility Plan

Technical Report

Final Report | December 2015

CIVIC san diego

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Final Report

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1.0 Introduction

1.1 Study Background and Purpose

The Downtown San Diego Mobility Plan Technical Report (Technical Report) summarizes the physical and operational conditions of the Downtown/Centre City Community Planning Area (subsequently referred to as "Downtown San Diego"), in terms of existing conditions as well as future conditions for the year 2035. The evaluation includes an overview of pedestrian and bicycle facilities, transit systems, and roadways within Downtown San Diego and presents the planned improvements for each mode along with an analysis of the resulting impacts. The report also describes the key terms and methodologies utilized for conducting the analyses presented, and identifies current deficiencies across the transportation system. This report is intended to support the improvements recommended in the Downtown San Diego Mobility Plan.

The Downtown San Diego mobility network is comprised of diverse elements, including roadway and freeway systems, public transit, light rail, and bicycle and pedestrian infrastructure. Each of these elements is discussed in the following chapters.

Several key planning efforts and legislative actions of the past decade have redefined the way community transportation planning is carried out. An important unifying theme is to achieve a more balanced, multimodal transportation system that allows people of varying physical and economic conditions to accomplish daily activities without making a single-occupant vehicle trip.

One of the most noteworthy local planning efforts occurring in the past decade is the adoption of the City of San Diego's updated General Plan in 2008. This document defines a land use-transportation strategy for the City of San Diego predicated on new growth occurring in already urbanized areas of the City – or "villages" – that are served by high-capacity transit and provide high quality pedestrian and bicycle networks. Additionally, the San Diego Association of Governments (SANDAG) adopted a Smart Growth Concept Map (2008) in their *Regional Comprehensive Plan* proposing a land use-transportation strategy whereby new growth is directed to already urbanized areas, in mixed-used high-density nodes served by high capacity transit and including high quality bicycle and pedestrian improvements. SANDAG incentivizes implementation of these types of strategies within local jurisdictions through grant funding programs like the Smart Growth Incentive Program and the Active Transportation Grant Program.

On September 30, 2008, the State of California approved Assembly Bill 1358 – The Complete Streets Act. This act required, commencing January 1, 2011, that the legislative body of a city or county, plan for a balanced, multimodal transportation network that meets the needs of all users of streets, roads, and highways, defined to include motorists, pedestrians, bicyclists, children, persons with disabilities, seniors, movers of commercial goods, and users of public transportation, in a manner that is suitable to the rural, suburban, or urban context of the general plan. In addition, the adoption of the 2008 Senate Bill 375 requires metropolitan planning organizations in the state to formulate a "sustainable community's strategy" as part of their regional transportation plans, specifically identifying how the region will achieve targeted reductions in greenhouse gas emissions from automobiles and light trucks. SANDAG adopted the region's first SCS in October 2011, making it the first agency in California to do so.

Most recently, SB 743 modified the existing California Environmental Quality Act (CEQA) by removing auto delay, level of service (LOS), parking and other vehicular capacity measures as metrics of transportation system impacts to mixed-use, infill, or transit oriented development projects.

Taken together, these developments and associated planning initiatives reflect a growing recognition that our communities should be working to reduce reliance on automobile travel and increase the ease of walking, bicycling and using transit to support daily life.

City of San Diego's General Plan Mobility Element Goal *… "To improve mobility through development of a balanced, multimodal transportation network."*

Downtown Community Plan (8 Guiding Planning Principles)

1st Guiding Principle*… "A distinctive world-class Downtown, reflecting San Diego's unique setting. San Diego has evolved into a desirable place to live, work, shop, learn, and play. The Community Plan builds upon Downtown's magnificent waterfront setting and its location as a* ***transportation hub****, and promotes outdoor and creative lifestyles."*

6th Guiding Principle*… "A celebration of San Diego's climate and waterfront location. The Plan fosters* ***vital public spaces and active street-life****. Building massing has been orchestrated to ensure that sunlight reaches parks and Neighborhood Centers. Open spaces are located to enable residents to live within an* ***easy walk of a park****, and streets are designed for* ***pedestrian comfort, walking, and lingering****."*

7th Guiding Principle*… "A place connected to its context and to San Diego Bay. The Plan seeks to connect Downtown's neighborhoods to the waterfront with* ***new streets and view corridors****, re-establish Balboa Park's relationship to Downtown, and integrate Downtown with the surrounding neighborhoods. It also fosters* ***better linkages within Downtown****."*

1.2 Study Location

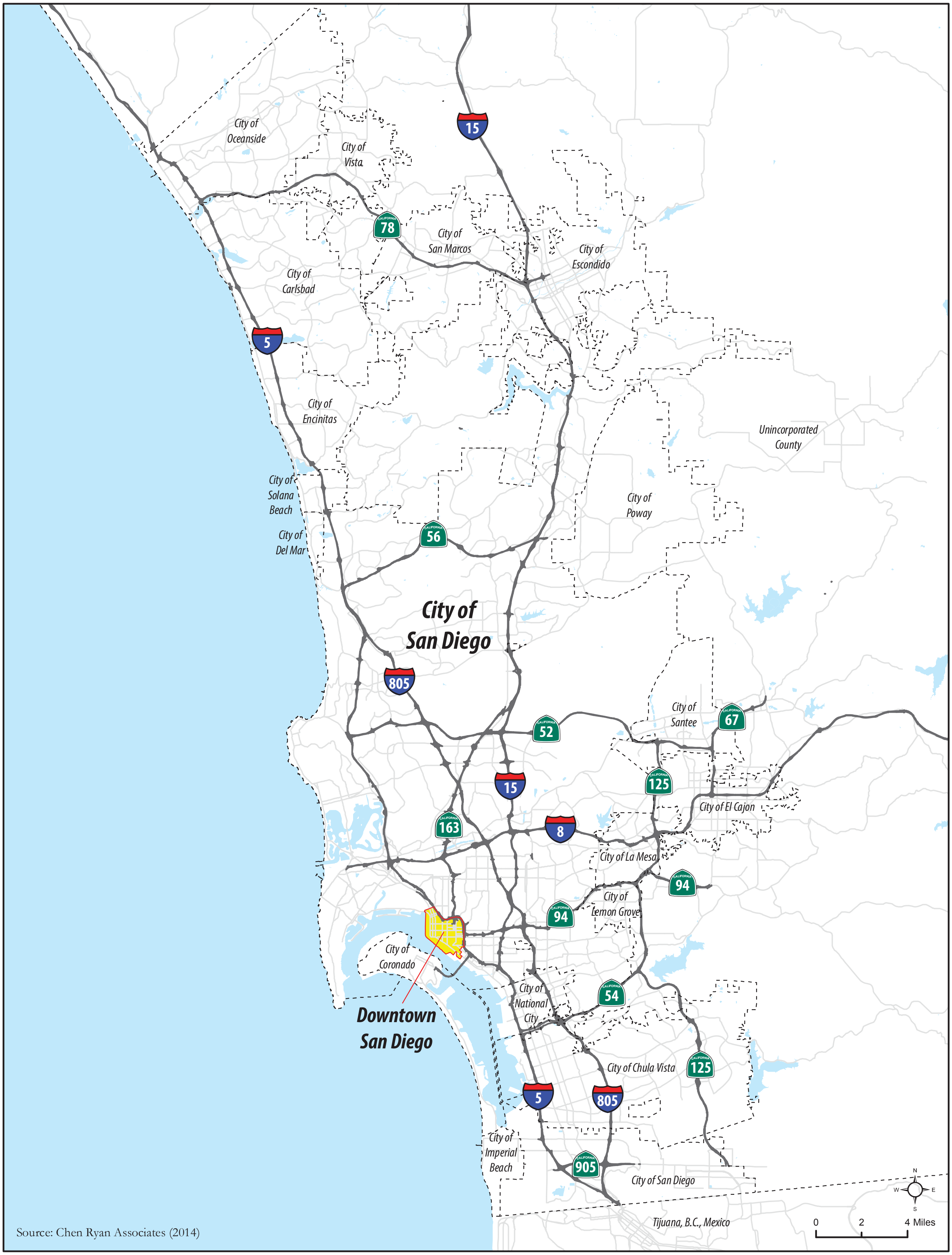
The Downtown San Diego occupies approximately 1,516 acres and is located south and west of Interstate 5 and north and east of the San Diego Bay. The interstates, light rail, commuter rail, and heavy rail provide regional accessibility between Downtown San Diego and other locations across the county. There is a well-connected grid of roadways within the community that provides for a high level of pedestrian and bicycle connectivity. In addition, the community is well-served by public transit, with the Orange, Blue and Green MTS Trolley lines all making stops there, along with a number of MTS busses.

The current Downtown Community Plan was adopted in March 2006 and amended in May 2013. The Community Plan identifies a set of neighborhoods within Downtown San Diego as part of an effort to call out the unique histories and identities of various areas of the community. These unique neighborhoods include: Little Italy, Cortez, Columbia, Civic/Core, Marina, Horton/Gaslamp, Convention Center, Ball Park, and East Village. **Figure 1-1** displays the Downtown San Diego community within the region. **Figure 1-2** illustrates the different neighborhoods within Downtown San Diego.

1.3 Supporting Information

Several previous and on-going studies are relevant to understanding existing mobility conditions in Downtown San Diego. These studies were referenced as part of the preparation of this report, and include the following:

- City of San Diego General Plan: Mobility Element (2008)
- City of San Diego Bicycle Master Plan Update (2013)
- City of San Diego Pedestrian Master Plan (2006)
- Downtown Community Plan (2006)
- Downtown Design Guidelines (2011)
- Downtown Open Space Implementation Plan (2011)
- Comprehensive Parking Plan for Downtown San Diego (2009)
- Centre City Streetscape Manual (2012)
- San Diego Forward: The Reginal Plan (2015)
- SANDAG's 2050 Regional Transportation Plan (2011)
- SANDAG's Riding to 2050: San Diego Regional Bike Plan (2010)
- SANDAG's Trip Generation for Smart Growth (2010)
- SANDAG's Planning and Designing for Pedestrians (2002)
- Uptown Community Plan Update (Draft 2013)
- Southeastern San Diego Community Plan Update (2015)
- Barrio Logan Community Plan Update (2014)
- Midway – Pacific Highway Corridor Community Plan Update (Draft 2013)



Downtown San Diego Mobility Plan

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Figure 1-1
Downtown San Diego within the Region

City of San Diego
Downtown Complete Streets Mobility Plan
CHEN✚RYAN

Figure 1-2
Downtown Neighborhoods

A synopsis of these planning documents and their relevance to the Downtown San Diego Mobility Plan is provided in Chapter 3.

1.4 Organization of the Report

After this introductory chapter, ***Chapter 2*** of this report describes the methodologies employed to assess the mobility systems; ***Chapter 3*** summarizes relevant planning documents; ***Chapter 4*** presents a summary of analysis results for the pedestrian and cycling environments, the transit system, and roadways and freeways. ***Chapter 5*** presents the methodologies employed to analyze future conditions; and ***Chapter 6*** concludes with a description of the planned improvements and future conditions analysis results.

2.0 Analysis Methodology

This chapter describes the various methodologies utilized to analyze Downtown San Diego's mobility network. Since the adoption of the 2008 California Complete Streets Act (AB 1358), the City of San Diego has employed multimodal analysis procedures to assess mobility needs for pedestrians, cyclists and transit users. Analysis of the vehicular systems – roadway arterials, intersections, and freeways – was prepared for this study in accordance with City of San Diego and SANTEC/ITE Guidelines.

2.1 Selection of the Study Area

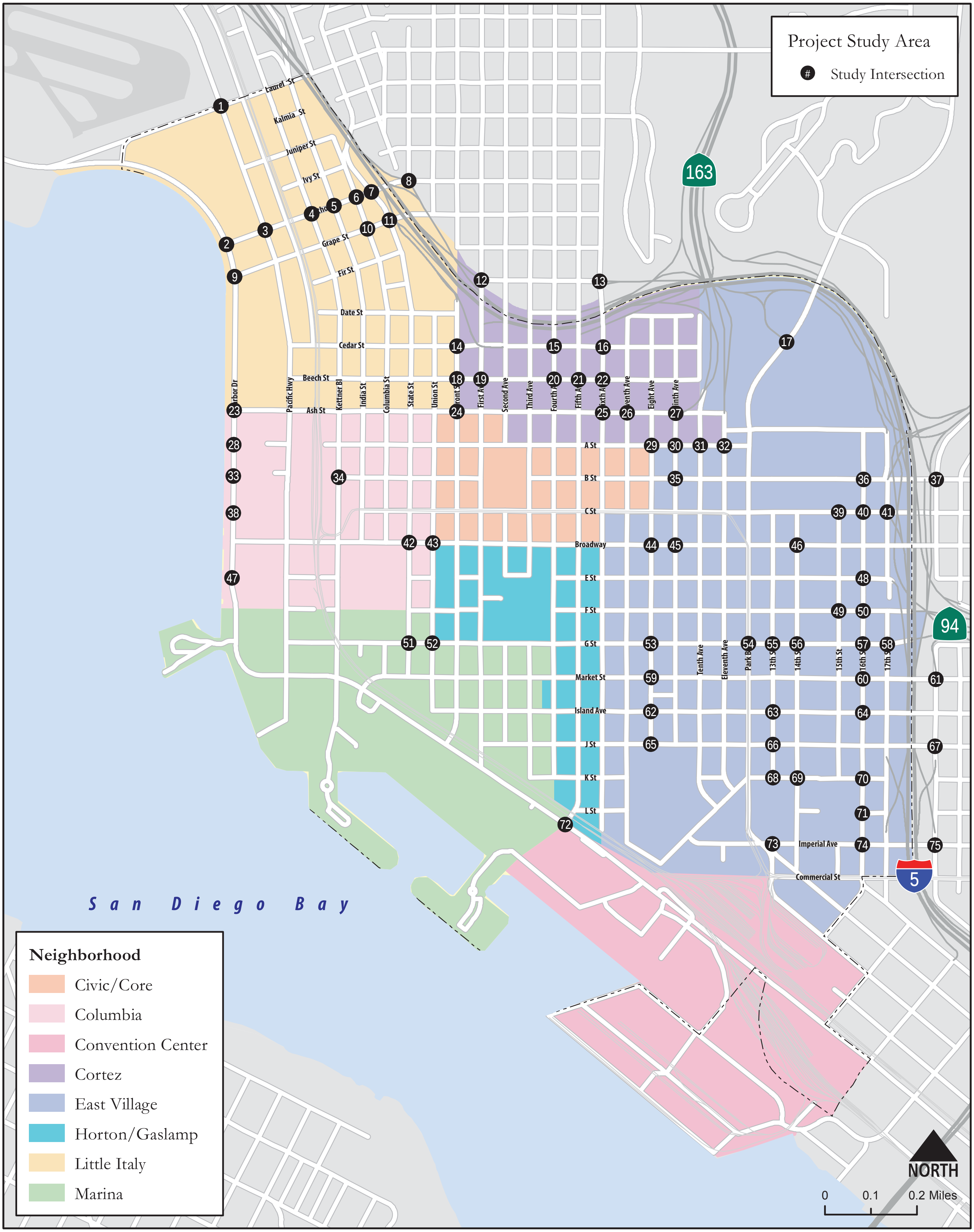
Freeways and other natural barriers were used as general study area boundaries for the purposes of this existing conditions assessment. The primary study area encompasses Downtown San Diego and up to one key intersection (generally ramp intersections) beyond, in order to be consistent with the impact study area designated for California Environmental Quality Act (CEQA) analysis. To be consistent with the 2006 Community Plan as well as all other traffic impact analyses performed in Downtown San Diego, this technical report focuses on peak hour intersection analysis rather than roadway segment level of service analysis based on roadway capacity. Roadway arterial analysis was also included. Study intersections were selected to include all intersections projected to operate at LOS D, E and F under buildout of the 2006 Community Plan as well as critical intersections that control vehicular flow within the Downtown area, such as freeway ramp intersections and other high activity locations for a total of 107 intersections. The study intersections were reviewed and approved by the Technical Advisory Group (TAG), which includes staff from the City of San Diego. **Figure 2-1** displays the study area extent and location of study intersections. Reference **Table 4-2** for a complete list of study intersections.

2.1.1 Pedestrian, Bicycle and Transit Facilities

All pedestrian and bicycle facilities located in Downtown San Diego are evaluated in this study. In addition, all roadways in Downtown San Diego are assumed to serve as bicycle facilities and are included in the various types of analyses such as travel-shed comparisons by mode. All MTS transit routes serving Downtown San Diego are also evaluated in this study. Additionally, eight (8) key locations were selected, based on input from stakeholder interviews and public workshop comments, to serve as starting points for pedestrian, bicycle and transit travel mode comparisons. The key locations are identified in Section 4.4.1.

2.1.2 Auto Facilities

<u>Roadways</u>
Peak hour arterial analyses were conducted on all roadways providing major connections to the regional freeway system and along roadways serving as major bus transit corridors.



Downtown San Diego Near-Term Traffic Assessment

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Figure 2-1

Downtown San Diego Project Study Area and Key Study Intersections

Intersections
The Downtown San Diego Mobility Plan will make recommendations on a future planned transportation network; it will not make recommendations on future planned land uses in Downtown San Diego. Therefore, study intersections for this planning process are focused on those intersections projected to operate near or at unacceptable conditions (including LOS D, LOS E or F) under buildout conditions of the currently adopted Community Plan.

Freeway Mainline and Ramps
All freeway mainline segments, ramp intersections and ramp meters in or adjacent to Downtown San Diego were evaluated for this study.

2.2 Multimodal Analysis Methods

This section outlines methodologies employed to analyze facility quality and travel operations associated with each of the four major modes of travel (pedestrian, bicycle, transit and auto) in Downtown San Diego.

2.2.1 Pedestrian

The following methods were used to evaluate the quality, safety and connectivity of pedestrian travel in Downtown San Diego:

Sidewalk Quality
All sidewalk facilities in Downtown San Diego were evaluated using the following three metrics:

- Presence of a clear pedestrian zone (absence of a pedestrian obstruction)
- Presence of a physical buffer (landscaping, parkway, street trees, etc.)
- Presence of on-street parking serving as a buffer

Sidewalk facilities with one or fewer of these characteristics were defined as poor quality pedestrian facilities. Sidewalk facilities with a clear pedestrian zone, and one of the two buffer types were defined as adequate pedestrian facilities. Sidewalk facilities with each of the three characteristics were defined as quality pedestrian facilities.

Pedestrian Safety
Historic vehicular-pedestrian collision data were obtained from the City of San Diego for the period from 2008 to 2013. This data was geocoded and mapped to display locations in Downtown San Diego where multiple collisions have occurred and may require additional pedestrian safety enhancements.

Pedestrian Travel-Shed
ArcGIS software was used to perform a pedestrian travel-shed analysis using eight key Downtown San Diego locations identified through stakeholder interviews and public workshop comments. The travel-shed analysis determines how far a pedestrian can walk in 30 minutes from the eight key locations based on an average pedestrian travel speed of 3.5 mph and the availability of

existing pedestrian facilities. Pedestrian, bicycle and transit travel-sheds were generated in order to compare the relative efficiency of each mode.

2.2.2 Bicycle

The following methods were used to evaluate the safety and connectivity of bicycle travel in Downtown San Diego.

Facility Quality

All bicycle facilities in Downtown San Diego were evaluated using the following four metrics:

1. Presence of designated bicycle facility/markings (Class II or Class III)
2. Presence of vertical/horizontal traffic calming measures (Bike Boulevard)
3. Presence of designated right-of-way for cyclists (Class II)
4. Presence of a physical buffer from vehicular traffic (Class I or Cycle Track)

In high speed and congested vehicular environments, protected facilities such as Class I multi-use paths or Cycle Track facilities are typically the desired facility type to protect cyclists and create a comfortable environment for cyclists of all levels. On roadways with low vehicular volumes and speeds, shared facilities (bike boulevards) can also be implemented to create a safe and comfortable environment for cyclists.

Bicycle Safety

Historic vehicular-bicycle collision data was obtained from the City of San Diego for the period from 2008 to 2013. This data was geocoded and mapped to display locations in Downtown San Diego where multiple collisions have occurred and may require additional bicycle facility enhancements.

Bicycle Travel-shed

ArcGIS software was used to perform a bicycle travel-shed analysis from each of the three major transit stations located within the Downtown area (Santa Fe Depot, City College and 12th and Imperial). The travel-shed analysis determines how far a cyclist can travel in 30 minutes from the three major transit stations based on an average bicycle travel speed of 10 mph and the availability of marked or unmarked (roadways) cycling facilities.

2.2.3 Transit

The following methods were used to evaluate the quality, safety and connectivity of transit routes and stations serving Downtown San Diego.

Station Quality

Each transit station/stop in Downtown San Diego was reviewed for presence of the following amenities:

- Shelters
- Benches
- Trash Receptacles
- Maps/Wayfinding
- Lighting
- ADA compliancy

Safety around Transit Stations/Stops

Historic vehicular-pedestrian and vehicular-bicycle collision data were obtained from the City of San Diego for the period from 2008 to 2013. This data was geocoded and mapped to display locations within a ½ mile distance of transit stations where collisions have occurred.

Transit Travel-shed

ArcGIS software was used to perform a transit travel-shed analysis from each of the three major transit stations located within the Downtown area (Santa Fe Depot, City College and 12th and Imperial). The transit travel-shed analysis determines how far a transit patron can travel from the three transit stations within 30 minutes using transit. The analysis was performed using the following assumptions:

- Transit travel assumed to occur during the PM peak hour,
- Transit riders access the nearest transit station/stop at both ends of the trip via walking,
- Transit riders arrive at the station/stops midway between transit arrival times, and
- Transit riders can transfer, but would be assigned a wait-time equivalent to half the headway at each transfer point.

2.2.4 Vehicular Analysis

Peak Hour Arterial Analysis

Arterial level of service (LOS) is based on the average peak hour travel speed along a roadway segment. The average travel speed is computed from the running time on the arterial segment(s) and the intersection approach delay. Average speed is strongly influenced by the number of signals per mile and the average intersection delay. On a given facility, factors such as inappropriate signal timing, poor progression, and increasing traffic flow can substantially degrade the arterial LOS. **Table 2-1** shows the LOS thresholds used for the arterial analysis. The computerized analysis of arterial speed analysis was performed utilizing the *Synchro 8.0 (2000 HCM methodology)* traffic analysis software (by Trafficware, 2011).

Table 2-1 Arterial Analysis Level of Service Thresholds

Arterial Class	I	II	III
Range of Free Flow Speed (mph)	45 to 35	35 to 30	30 to 25
Typical Free Flow Speed (mph)	40 mph	33 mph	27 mph
Level of Service Analysis	**Average Travel Speed**		
A	35	30	25
B	28	24	19
C	22	18	13
D	17	14	9
E	13	10	7
F	< 13	< 10	< 7

Source: 2000 Highway Capacity Manual

Peak Hour Intersection Level of Service Standards and Thresholds

This section presents the methodologies used to perform 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*: Obtained from existing pedestrian counts.
- *Heavy Vehicle Factor*: A 2% heavy vehicle factor was assumed for all intersections within the study area.
- *Peak Hour Factor*: Obtained from existing peak hour counts.
- *Signal Timing*: Obtained from existing signal timing plans (as of July 2014).

Signalized Intersection Analysis

The signalized intersection analysis utilized in this study conforms to the operational analysis methodology outlined in *2000 Highway Capacity Manual (HCM), Transportation Research Board Special Report 209*. This method defines LOS in terms of delay, or more specifically, average control delay per vehicle (seconds/vehicle).

The *2000 HCM* 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 2-2**. The computerized analysis of intersection operations was performed utilizing the *Synchro 8.0 (2000 HCM methodology)* traffic analysis software (by Trafficware, 2011).

Unsignalized Intersection Analysis

Unsignalized intersections, including two-way and all-way stop controlled intersections were analyzed using the *2000 HCM* unsignalized intersection analysis methodology. The Synchro 8.0 software supports this methodology and was utilized to produce LOS results. The LOS for a two-way stop controlled (TWSC) intersection is determined by the computed or measured control delay and is defined for each minor movement. The LOS for an all-way stop controlled (AWSC) intersection is determined by the computed or measured average control delay of all movements. **Table 2-3** summarizes the level of service criteria for unsignalized intersections. Consistent with City policy, LOS E was used in this study as the minimum acceptable LOS for peak hour intersection operations in Downtown San Diego.

Table 2-2 Signalized Intersection Level of Service
Highway Capacity Manual 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: 2000 Highway Capacity Manual, Transportation Research Board Special Report 209

Table 2-3 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: 2000 Highway Capacity Manual

2.2.5 Freeway/State Highway Level of Service Standards and Thresholds

Freeway level of service analysis is based upon procedures developed by Caltrans District 11. The procedure for calculating freeway level of service involves estimating a peak hour volume to capacity (V/C) ratio. Peak hour volumes are estimated from the application of design hour (“K”), directional (“D”) and truck (“T”) factors to Average Daily Traffic (ADT) volumes. The base capacities were assumed to be 2,350 passenger-car per hour per main lane (pc/h/ln) and 1,410 pc/h/ln for auxiliary lane (60% of main lane capacity), respectively. A 0.95 peak-hour factor (PHF) is utilized for this analysis.

The resulting V/C ratio is then compared to acceptable ranges of V/C values corresponding to the various levels of service for each facility classification, as shown in **Table 2-4**. The corresponding level of service represents an approximation of existing or anticipated future freeway operating conditions in the peak direction of travel during the peak hour.

LOS D or better is used in this study as the threshold for acceptable freeway operations based upon Caltrans and the SANDAG Regional Growth Management Strategy (RGMS) requirements.

Table 2-4 Caltrans District 11
Freeway Segment Level of Service Thresholds

LOS	V/C	Congestion/Delay	Traffic Description
Used for freeways, expressways and conventional highways			
"A"	<0.41	None	Free flow.
"B"	0.42-0.62	None	Free to stable flow, light to moderate volumes.
"C"	0.63-0.79	None to minimal	Stable flow, moderate volumes, freedom to maneuver noticeably restricted.
"D"	0.80-0.92	Minimal to substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver.
"E"	0.93-1.00	Significant	Extremely unstable flow, maneuverability and psychological comfort extremely poor.
Used for conventional highways			
"F"	>1.00	Considerable	Forced or breakdown flow. Delay measured in average travel speed (MPH). Signalized segments experience delays >60.0 seconds/vehicle.
Used for freeways and expressways			
“F0”	1.01–1.25	Considerable (0-1 hour delay)	Forced flow, heavy congestion, long queues form behind breakdown points, stop and go.
“F1”	1.26-1.35	Severe (1-2 hour delay)	Very heavy congestion, very long queues.
“F2”	1.36-1.45	Very severe (2-3 hour delay)	Extremely heavy congestion, longer queues, more numerous breakdown points, longer stop periods.
“F3”	>1.46	Extremely severe (3+ hours of delay)	Gridlock.

Source: SANTEC/ITE Guidelines for TIS in the San Diego Region

2.2.6 Determination of Significant Traffic Impacts

A project within the Centre City area is considered to have a significant impact on the traffic operations of an intersection when one of the following occurs:

- The addition of project traffic results in a LOS dropping from LOS E or better to LOS F. Under this condition, the project is determined to have a direct impact and mitigation measures would be necessary to restore the intersection LOS to LOS E conditions or better;

- If an intersection is operating at LOS F under base conditions and the project adds more than an additional 2 seconds of average vehicle delay, the project is determined to have a cumulatively significant impact and mitigation measures would be necessary to bring the intersection LOS to pre-development conditions or better.

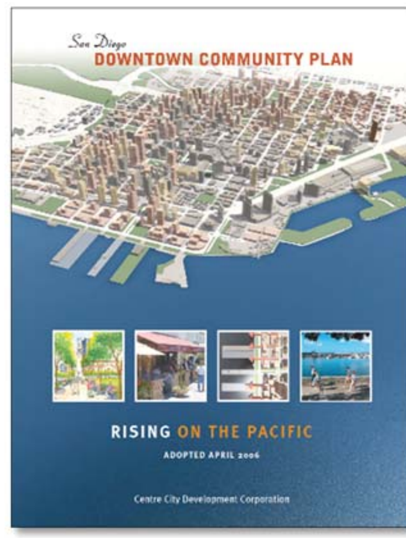
These impact standards were established in the *Downtown San Diego Traffic Impact Assessment (TIA) Methodology for Evaluation of New Projects; June 2007*, and deviate from the traffic impact thresholds outlined in the *City of San Diego Significant Determinations Thresholds (January 2011)*. It should be noted that these impact standards are only applicable within the Centre City area.

3.0 Review of Relevant Local Planning Documents

This chapter describes previous and on-going planning efforts related to Downtown San Diego, as well as in adjacent communities and the region. These planning efforts provide important context for the current Downtown San Diego Mobility Plan effort. The first section of this chapter summarizes plans and studies related directly to Downtown San Diego, the second section addresses relevant citywide and adjacent San Diego community plans and studies, while the last section of this chapter presents relevant regional plans and studies.

3.1 Previous Downtown San Diego Plans and Studies

3.1.1 Downtown Community Plan (2006)



This document proposes planned mobility improvements for Downtown San Diego, as well as for several roadways connecting to surrounding communities. The Plan promotes reconfiguring streets where feasible in residential neighborhoods and in neighborhood centers to accommodate diagonal parking, widen or provide sidewalks, and improve pedestrian and bicycle safety. It also promotes improving Broadway to reflect its status as Downtown's principal boulevard. The plan outlines the following specific street improvements:

- Examine the feasibility of extending B Street and 2^{nd} Avenue to open up the Civic Center, cultivate the public realm, and increase accessibility and connections.
- Re-establish the street grid, extending the streets in the waterfront areas and across bus yards when redevelopment occurs, and extending 8^{th} Avenue across Interstate 5 in conjunction with freeway "lid" construction.
- Promote closures on E Street and Union Street to vehicle traffic while retaining pedestrian access.

Another important goal of the plan is to re-connect Downtown San Diego to the surrounding neighborhoods. The Plan encourages re-dedication of Park Boulevard as a pedestrian corridor and green street to provide the "Park-to-Bay" connection. The Plan also promotes evaluation of removing the Cedar Street off-ramp, and switching Cedar Street from one-way to two-way traffic to improve pedestrian safety and re-establish the historic connection between Balboa Park, Cortez, Little Italy, and the waterfront. Another way the plan promotes connecting Downtown to Balboa Park is through a local shuttle service. There are also regional connections for bicycle mobility such as the San Diego Bayshore Bikeway.

The Plan sets forth several mobility goals that are relevant to the current Downtown San Diego Mobility Plan, such as:

Pedestrian and Bicycle Movement:

- Develop a cohesive and attractive walking and bicycle system within Downtown that provides linkages within the area and to surrounding neighborhoods.
- Facilitate development of mixed-use neighborhoods, with open spaces, services, and retail within convenient walking distance of residents, to maximize opportunities for walking.

Transit System:

- Provide land uses to support a flexible, fast, frequent, and safe transit system that provides connections within Downtown and beyond.
- Increase transit use among Downtown residents, workers, and visitors.

Street System:

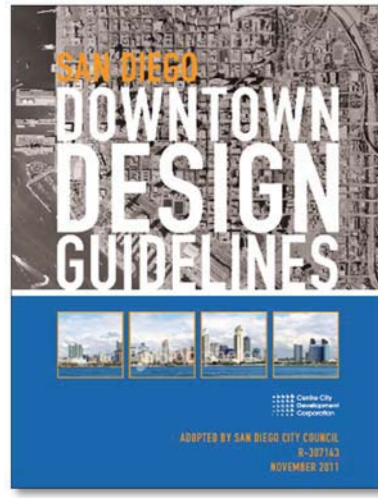
- Develop street typology based on functional and urban design considerations, emphasizing connections and linkages, pedestrian and cyclist comfort, transit movement, and compatibility with adjacent land uses.
- Maintain, re-establish, and enhance the street grid to promote flexibility of movement, preserve and/or open view corridors, and retain the historic scale of the streets.

3.1.2 Downtown Open Space Implementation Plan

This document proposes a vision for open spaces in the community emphasizing Downtown San Diego's value as the center of the City and its street network as a crucial component of the public realm. The Plan encourages using park equivalencies and joint-use spaces to meet acreage deficits and converting traffic and parking space to park space. The Plan includes a network of promenades specifically along Cedar Street, E Street, Island Avenue, Union Street, 8th Avenue, and 14th Street. While there was significant public input and policies developed, the planning effort was suspended and never officially adopted. Key strategies identified during this planning process include the following:

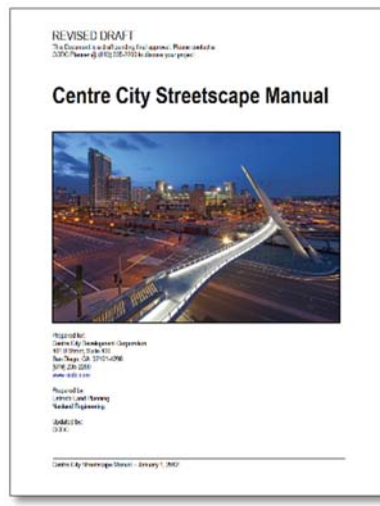
- The re-utilization of existing public rights-of-way for open space opportunities, and
- Creating a series of linear park promenades along the Downtown Community Plan designated green streets connecting all public parks.

3.1.3 Downtown Design Guidelines (2011)



This document helps implement the guidelines and principles of the Downtown Community Plan and provides guidance to further enhance the natural beauty, physical character, and livability of Downtown. Chapter 2, the Urban Design Framework, establishes an image for Downtown emphasizing a legible hierarchy of street corridors and pathways and a clear network of linkages between Downtown districts and neighborhoods. The Urban Design Framework also focuses on the public realm, including streets, sidewalks, parks, and plazas where public life takes place. Figures 2-1 through 2-3 of the document display the overall urban design framework, including the street hierarchy and linkages.

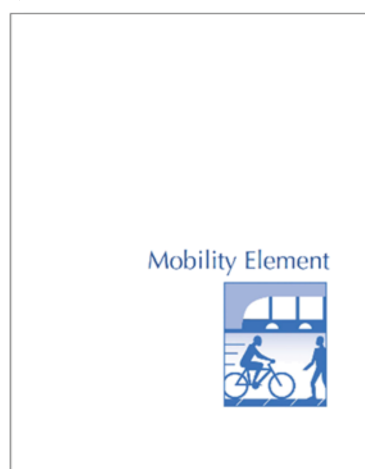
3.1.4 Centre City Streetscape Manual (2012)



This document provides guidance for improving the functionality and aesthetic quality of Downtown San Diego through a streetscape improvement program. The Manual requires construction of improvements that enhance the quality of the pedestrian environment focusing on safety, convenience, and encouraging walking. The neighborhoods should have their own character through the use of street trees, sidewalk paving, and street lighting in the public right-of-way. The Manual also classifies each Downtown street as a Neighborhood Street, Special Street, Gateway Street, or Ceremonial Street based on the associated land uses, architecture, scale, and vehicular traffic along those streets.

3.2 Relevant City of San Diego Plans

3.2.1 City of San Diego General Plan Mobility Element (2008)



This element from the City of San Diego's General Plan proposes transportation planning goals and policies related to pedestrian, transit, street and freeway systems, Intelligent Transportation Systems, Transportation Demand Management, bicycling, parking management, airports, passenger rail, goods movement/freight, and regional coordination and financing. The element discusses several key topics related to pedestrian-oriented planning, traffic calming techniques, bicycle facility network improvements, and transit priorities.

The Mobility Element sets forth several goals that are relevant to the current Downtown San Diego Mobility Plan, such as:

Walkable Communities

- A City where walking is a viable travel choice, particularly for trips of less than one-half mile.
- A safe and comfortable pedestrian environment.
- A complete, functional, and interconnected pedestrian network that is accessible to pedestrians of all abilities.
- Greater walkability achieved through pedestrian-friendly street, site and building design.

Bicycling

- A City where bicycling is a viable travel choice, particularly for trips less than five miles.
- A safe and comprehensive local and regional bikeway network.
- Environmental quality, public health, recreation and mobility benefits through increased bicycling.

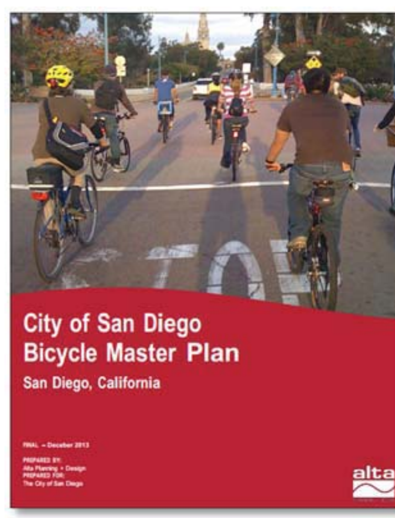
Transit

- An attractive and convenient transit system that is the first choice of travel for many of the trips made in the City.
- Increased transit ridership.

Streets and Freeway Systems

- A street and freeway system that balances the needs of multiple users of the public right away.
- An interconnected street system that provides multiple linkages within and between communities.
- Vehicle congestion relief.
- Safe and efficient street design that minimizes environmental and neighborhood impacts.
- Well maintained streets

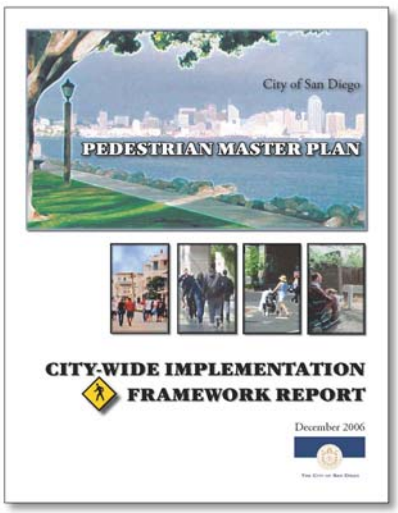
3.2.2 City of San Diego Bicycle Master Plan Update (2013)



The City of San Diego Bicycle Master Plan Update provides a framework for making cycling a more practical and convenient transportation option for a wider variety of San Diegans with varying riding purposes and skill-levels. The plan update evaluates and builds on the 2002 Bicycle Master Plan so that it reflects changes in bicycle user needs and changes to the City's bicycle network and overall infrastructure. The Plan proposes a dense network of Class III bicycle routes in Downtown San Diego, including in the north-south direction, along Kettner Boulevard, India Street, State Street, Columbia Street, 1st Avenue, 4th Avenue, 5th Avenue, 6th Avenue, Park Boulevard, and 14th Street. Class III bicycle route is also proposed, in the east-west direction, along A Street, Broadway, Market Street and Island Avenue. Class II bike lane is proposed, in the north-south direction, along portions of State Street, 3rd Avenue, 8th Avenue, Park Boulevard, and 14th Street; while in the east-west direction, bike lane is proposed along Cedar Street, B Street, and C Street.

As part of this planning process, forty high priority project were identified through a systematic prioritization effort. Conceptual designs and cost estimates were prepared for the forty high priority projects. Eight of the forty high priority project corridors are located within Downtown San Diego, including the following:

#2 – Broadway, between Park Boulevard and 19th Street (Class III)
#3 – Ash Street and A Street couplet (Class III)
#6 – Island Avenue/Market Street connection to Harbor Drive (Class III)
#7 – Park Boulevard (Class II)
#9 – 14th Street (Class II)
#12 – 4th/5th Avenue couplet (Class III)
#18 – State Street (Class III)
#26 – 8th Avenue (Class II)

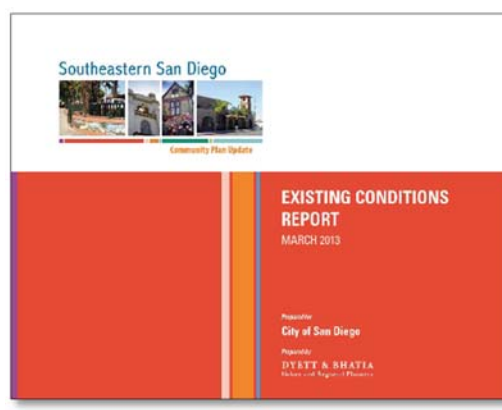


3.2.3 City of San Diego Pedestrian Master Plan (2006)

The Pedestrian Master Plan serves as guidance for the implementation of pedestrian projects. The document also created a prioritization process used to identify high priority pedestrian routes within community planning areas and a methodology to determine potential pedestrian improvement projects along identified high priority routes. The Pedestrian Master Plan concludes with "Phase Two Guidance" which serves to provide direction for community-level Pedestrian Master Plans (CPMP). The guidance aims to achieve a level of consistency among the plans and analysis methodologies utilized.

3.2.4 Southeastern San Diego Community Plan Update (2015)

This document proposes mobility improvements to corridors that connect with the southeastern portion of Downtown San Diego. There are planned Urban Street corridors along Market Street and Imperial Avenue connecting to Downtown. There is a planned One-Way Cycle Track without on-street parking along Market Street and a Class II Bike Lane along Island Avenue that continues into Downtown San Diego. Consistent with the SANDAG 2050 RTP, the Orange Line Trolley shows increased frequencies and the planned Orange Line Express provides service between El Cajon and Downtown San Diego.

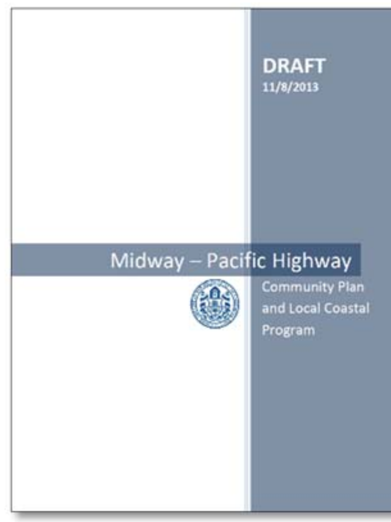


3.2.5 Barrio Logan Community Plan Update (2014)

This document proposes mobility improvements connecting with the southern portion of Downtown San Diego. The MTS Blue Line and its stations at Cesar E Chavez Parkway, 28th Street, and 32nd Street connects with the southeastern boundary of Downtown San Diego. A key proposed mobility improvement is to connect Barrio Logan with Downtown San Diego via the Bayshore Bikeway.

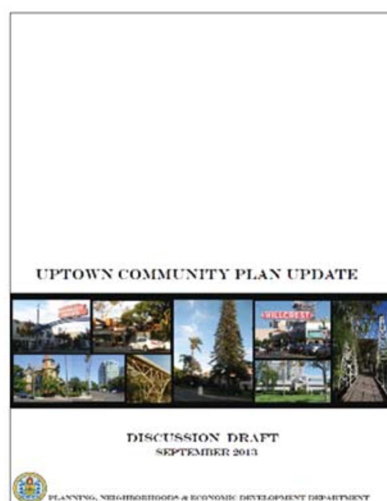
3.2.6 Midway – Pacific Highway Corridor Community Plan Update (Draft)

This document proposes mobility improvements to corridors that connect with the northwestern portion of Downtown San Diego. Pacific Highway has historically served as a regional conduit for vehicular traffic to Downtown and its intersection with Laurel Street serves as a gateway to Downtown. The planned improvements designate Pacific Highway as a Boulevard street type. Retrofits to Pacific Highway include reducing travel lanes, incorporating bicycle lanes, removing frontage roads, reducing curb cuts, replacing bridges and ramps with signalized intersections, widening sidewalks that can include a double row of street trees, and the incorporation of landscaped medians. The planned Pacific Highway pedestrian route type is Corridor sidewalk and the planned bicycle facility type is Class I Bike Path. Another planned Class II or III bike facility along Kettner Boulevard also connects to the northwestern portion of Downtown San Diego.



3.2.7 Uptown Community Plan Update (Draft)

This document proposes mobility improvements to corridors that connect with the northern portion of Downtown San Diego. Recommendations along Park Boulevard include reduction of travel lane widths, removal of travel lanes, incorporation of a landscaped median, and neckdowned (sidewalk bulb-outs) intersections. The Plan proposes that First, Fourth, and Fifth Avenues focus on creating more pedestrian scale streets, enhancing pedestrian and bicycle facilities, and calming traffic with enhancements.



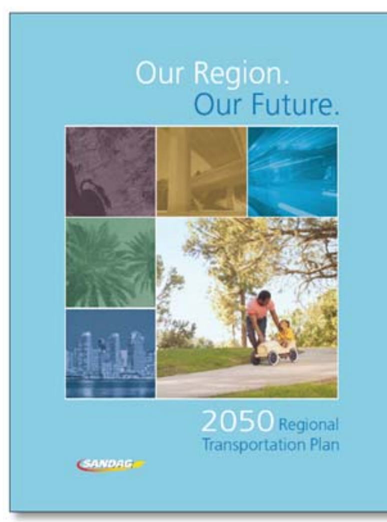
3.3 Relevant Regional Plans and Studies

3.3.1 San Diego Forward: The Regional Plan (2015)

The adopted regional transportation plan (RTP), San Diego Forward: The Regional Plan, serves as the blueprint for a regional transportation system with a Horizon Year of 2050. A general overview of the planned improvements impacting Downtown as reflected in the Revenue Constrained Network includes the following:

- 20-minute peak hour and 60-minute off-peak hour Coaster headways
- 10-minute peak hour Rapid Bus headways to Escondido via the Interstate 15 corridor; San Diego State University via the Park Boulevard/El Cajon Boulevard corridor; Otay Border crossing via the State Route 94/Interstate 805 corridor; North Park via Golden Hill; and Coronado via Barrio Logan
- 15-minute peak hour Rapid Bus headways to Santee and El Cajon Transit Centers; San Ysidro, and Kearney Mesa via Hillcrest and Mission Valley
- Streetcar with 10-minute all day headways from Downtown to Hillcrest; Little Italy to East Village; and 30th Street to Downtown via North Park and Golden Hill
- 10-minute all day headways on most local bus routes
- 7.5-minute Trolley all day headways
- Downtown San Diego Street Car between Little Italy and East Village with 10-minute headways
- Mid-Coast Trolley from Downtown to University City via Old Town and the University of California, San Diego
- Rapid Bus service to North Park and Golden Hill, Kearny Mesa, Coronado, Spring Valley and SDSU

3.3.2 2050 Regional Transportation Plan (2011)



This document proposes a vision for a regional transportation system that further enhances quality of life, promotes sustainability, and offers more mobility options for people and goods. The Plan includes an integrated, multimodal transportation system proposing transit investments in specific areas. These include creating a system of high-frequency services on many of the existing local bus routes in the urban core. The Plan also proposes constructing Bus Rapid Transit (BRT) routes and stations to provide access to Downtown San Diego from Escondido, Otay Mesa, Mid-City (San Diego State University), and Coronado.

There are planned improvements to the Trolley service including an Orange Line Express from El Cajon to Downtown San Diego and the Blue Line Express from UTC to San Ysidro via Downtown San Diego. The planned trolley system includes a tunnel in Downtown San Diego between the 12th Avenue and Imperial Transit Center to the County Center/Little Italy Trolley Station. The Plan also proposes including a streetcar and/or shuttle circulation services to improve mobility within

Downtown. The planned streetcar includes a San Diego Loop in Hillcrest, Balboa Park, and Downtown and also from Little Italy to East Village. Improvements to the passenger rail service include plans extending the COASTER to the Convention Center and Petco Park. Other planned improvements consist of double tracking the LOSSAN coastal rail corridor to enable more frequent and reliable service on the COASTER and Amtrak.

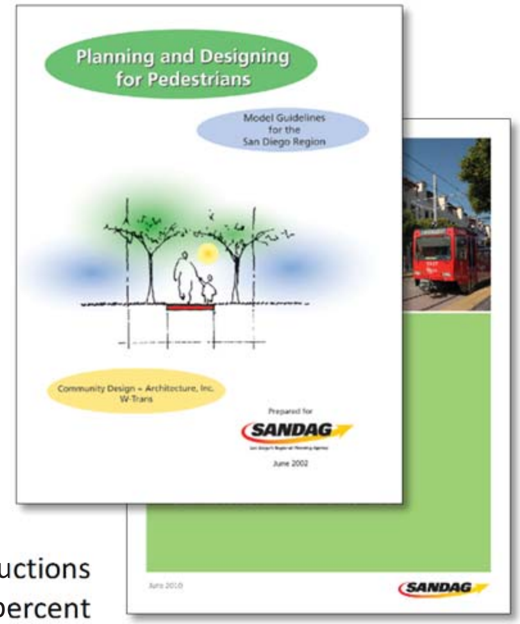
3.3.3 San Diego Regional Bike Plan (2010)

This document proposes a vision for a diverse regional bicycle system of interconnected bicycle corridors, support facilities, and programs to make cycling more practicable and desirable to a broader range of people in the region. The document includes recommendations and goals that seek to increase the number of people who bike and the frequency of bicycle trips for all purposes. It also encourages the development of Complete Streets, to improve safety for bicyclists, and to increase public awareness and support for bicycling in the region.

There are seven "high priority" planned regional corridor alignments reaching into or through Downtown San Diego including:

- *Central Coast Corridor* (runs along Harbor Drive, north of the Coronado Ferry Landing, into Point Loma and northerly via Nimitz Boulevard)
- *Costal Rail Trail* (runs along Pacific Highway into Downtown, ultimately connecting the City of Oceanside to Downtown San Diego)
- *Clairemont – Centre City Corridor* (runs south along Ulric Street into Mission Valley, up Bachman Place and connects into Downtown San Diego along $4^{th}/5^{th}$ Avenues and terminates at C Street)
- *North Park – Centre City Corridor* (connects from the City Heights – Old Town Corridor in North Park, through Balboa Park along Park Boulevard, then connects to C Street and runs westerly to the waterfront)
- *Park Boulevard Connector* (provides a connection between the North Park – Centre City Corridor along C Street to Island Avenue in Downtown San DIego, where the Centre City – La Mesa Corridor runs)
- *Centre City – La Mesa Corridor* (runs east-west from La Mesa into Downtown San Diego via Ocean View Boulevard, then Island Avenue, terminating at the Bayshore Bikeway near Harbor Drive and Market Street)
- *Bayshore Bikeway* (runs along Harbor Drive and the waterfront south of the Coronado Ferry Landing and provides a loop around the San Diego Bay)

A number of these corridors have segments near Downtown San Diego that were identified in SANDAG's Early Action Plan (2011) with an estimated schedule for completion around the year 2021.



3.3.4 Trip Generation for Smart Growth (2010)

This document proposes a more detailed approach to evaluating trips generated in smart growth developments as compared to the former *Not-so-Brief Guide to Trip Generation* published by SANDAG in 2002 which suggests application of generic vehicle trip reductions of 5 percent for locations within one-quarter mile of transit and 10 percent for mixed-use. This trip generation method accounts for the degree to which a development can be considered "smart growth," by measuring specific characteristics such as nearby transit frequency and level of service, walkability, development density, and mix of uses. The findings show the vehicle trip reductions level in the Smart Growth Opportunity Areas averaged 24 percent relative to raw trip calculations and reached as high as 47 percent in Downtown San Diego.

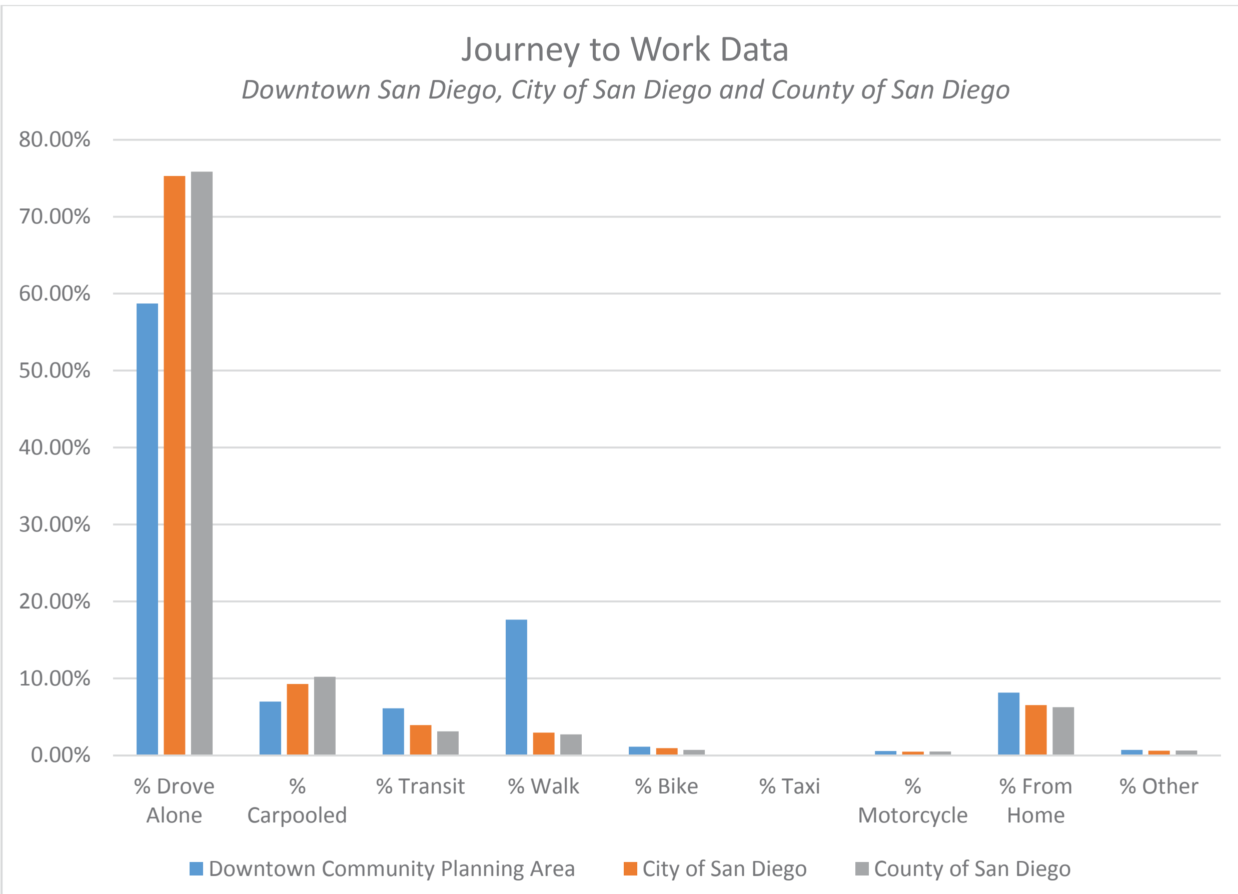
3.3.5 Planning and Designing for Pedestrians

This document proposes guidelines to assist local governments and other interested entities in the creation and redevelopment of pedestrian areas and corridors. The guidelines suggest that a municipality or property owner can start at the site design level to incorporate a pedestrian-oriented community structure. A municipality can also require or provide incentives to property owners so they provide amenities such as plazas, pedestrian pass-throughs, or a public bench on their property. Incorporating these amenities supports the vision of the neighborhood, as seen in the pedestrian-friendly design of Little Italy. In addition, sidewalk bulb-outs can reduce street widths and calm traffic, as seen in Downtown areas with revitalization efforts and streetscape improvements. In an effort to develop a pedestrian district, the municipality can encourage the development of a pedestrian district by making changes to the public right-of-way that support the eventual transformation of land uses in the area such as widening sidewalks, installing traffic calming measures, and planting street trees.

4.0 Existing Conditions

This chapter describes activity patterns and performance for all modes of travel in Downtown San Diego including walking, cycling, riding transit, and driving. The chapter also summarizes services associated with passenger rail, airports, goods movement, intelligent transportation systems (ITS), and travel demand management (TDM).

Travel associated with Downtown San Diego is different than travel citywide. The chart below summarizes overall mode share for the journey to work for Downtown San Diego community members, City of San Diego as a whole, and the County of San Diego.



Source: Census Bureau; 2012 American Community Survey 5-Year Estimates

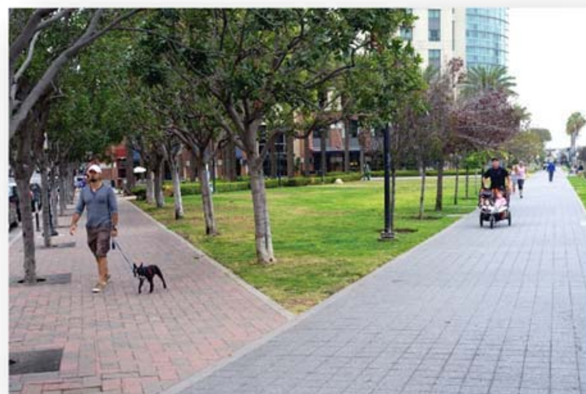
As shown, Downtown San Diego residents reported a relatively low rate of drive alone commuting compared to the City of San Diego (59% vs 75%) and the County of San Diego. In addition, Downtown San Diego residents reported much higher rates of walking commuting compared to the City of San Diego (17% vs 3%) and relatively higher biking levels (1.1% vs 0.9%). The share of transit commuters is also higher in Downtown San Diego when compared to the City (6.1% vs 3.9%).

Notably, these data depict commuters traveling to work and do not reflect children and youth walking, biking or riding transit to school.

The typical right-of-way for a Downtown San Diego roadway spans 80 feet in width, and has 14 foot sidewalks on both sides and a 52 feet of paved roadway between the curb lines. One-way roadways are typically comprised of three 12-foot lanes, while two-way roadways are typically undivided and have two 18-foot lanes (one in each direction). Eight foot wide delineated parallel parking lanes are typically provided on both sides of the roadway.

Appendix A summarizes the existing physical characteristics of roadways within Downtown San Diego, in relation to pedestrian, bicycle, transit and automobile travel. The majority of this information was collected via field reviews and available, current GIS layers.

4.1 Walkable Communities



Walkability refers to the pedestrian network's comfort, safety, convenience and connectivity, and is an important mobility and quality of life consideration for communities. The degree to which people walk for transportation and recreation is influenced by the comfort, safety and convenience of their walking experience. Comfort is influenced by traffic volumes, travel speed, and separation from through traffic, topography, the presence of sidewalks and improved paths, and climate. Safety is influenced by the speed and volume of conflicting vehicle traffic, street widths, traffic control, number of conflict points, and infrastructure design. Convenience is influenced by distance and directness of travel. As connectivity increases, travel distances and route options increase for the pedestrian.

The walkability goals as expressed in the City's 2008 General Plan Mobility Element include the following:

- *A city where walking is a viable travel choice, particularly for trips of less than one-half mile,*
- *A safe and comfortable pedestrian environment,*
- *A complete, functional, and interconnected pedestrian network, that is accessible to pedestrians of all abilities, and*
- *Greater walkability achieved through pedestrian friendly streets, sites and building design.*

The 2006 Downtown Community Plan contains the follow language related to walkability goals.

- *Develop a cohesive and attractive walking and bicycle system within Downtown that provides links within the area and to the surrounding neighborhoods, and*

- *Facilitate development of mixed-use neighborhoods, with open spaces, services, and retail within convenient walking distance of residents, to maximize opportunities for walking.*

The following subsections describe existing pedestrian facilities, activity levels, pedestrian level of service analysis results, and pedestrian safety analyses for Downtown San Diego.

4.1.1 Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, signage, curb ramps, and other amenities such as street trees for shading. The City of San Diego's 1997 ADA Transition Plan seeks to help create better accessibility and connectivity throughout San Diego by making all sidewalks and pedestrian ramps ADA compliant.

Figure 4-1 displays pedestrian facility deficiencies, including roadway segments with missing sidewalks, missing pedestrian ramps and non-ADA compliant pedestrian ramps within the community. Current inventories indicate that, of the 1,359 potential curb ramp locations in Downtown San Diego, 43 are missing curb ramps and 463 of the curb ramps are not ADA Compliant. At the time of this study, 8 curb ramps were under construction.

<u>**Connectivity**</u>

As shown in Figure 4-1, Downtown San Diego is comprised of a dense network of streets, all with sidewalk facilities, providing excellent pedestrian connectivity throughout the community. Crossing distances for pedestrians range from 30 to 70 feet, with a majority of intersection locations provided signalized controlled with pedestrian indications. Although pedestrian connectivity is strong within Downtown San Diego, connections to adjacent communities are weak due to Interstate 5 forming a barrier around the northern and eastern boundaries of the community, restricting pedestrian access to the adjacent neighborhoods of Golden Hill, Southeastern San Diego, Bankers Hill and Balboa Park.

<u>**Quality of Facilities**</u>

Figure 4-2 illustrates the quality of pedestrian facilities in Downtown San Diego. The quality was determined by examining three criteria: Clear Pedestrian Zone (existing sidewalk with no obstructions), Buffer Zone (an area between the sidewalk and the street), and On-Street Parking. Quality of facilities were evaluated using the following metric:

Quality Pedestrian Facility – Facility possesses all three of the characteristics (clear pedestrian zone, buffer, and on-street parking).

Adequate Pedestrian Facility – Facility possesses a clear pedestrian zone and has either a buffer or on-street parking is present.

Poor Pedestrian Facility – Facility only possesses one or fewer of the three characteristics.

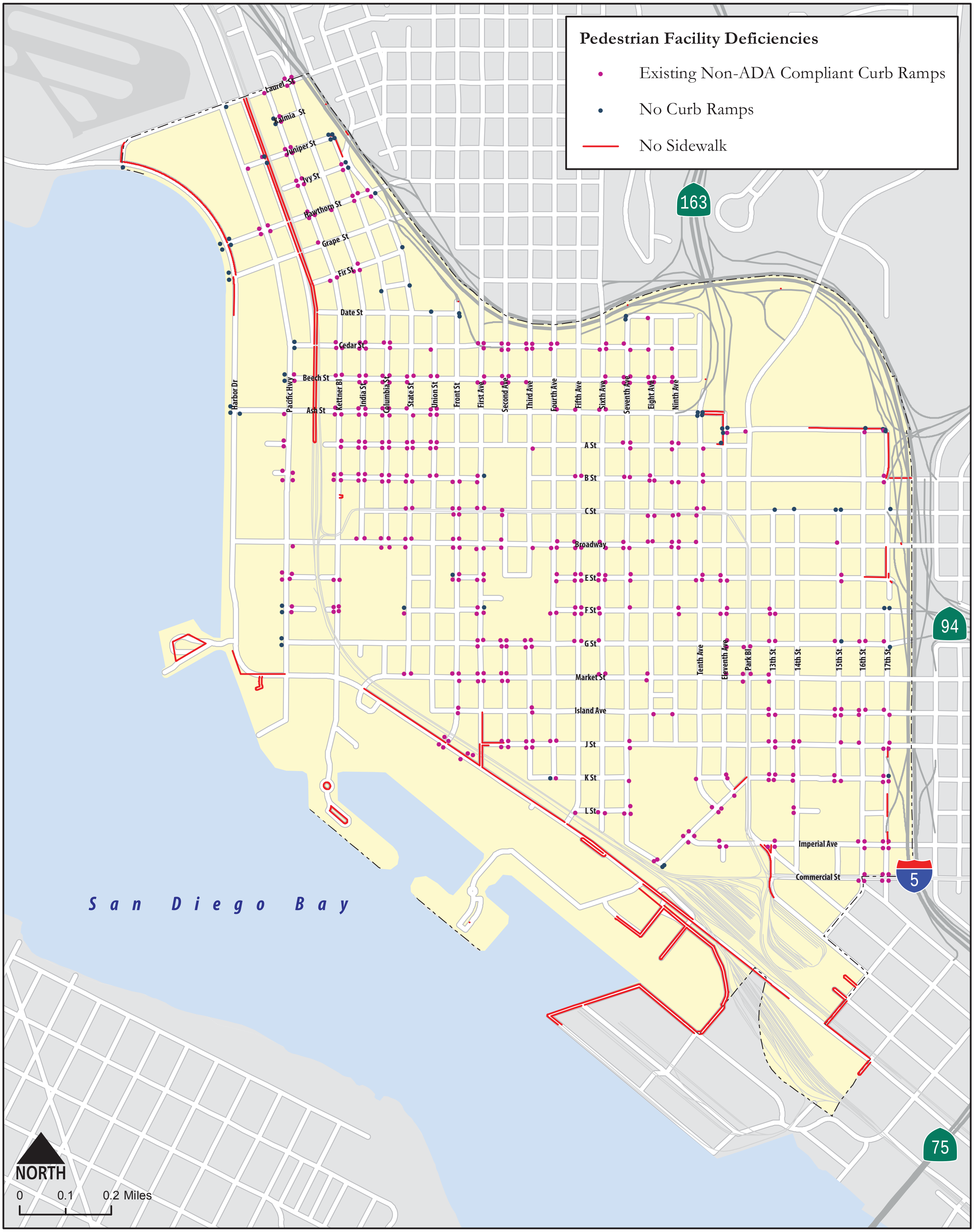


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Figure 4-1
Pedestrian Facilitiy Deficiencies

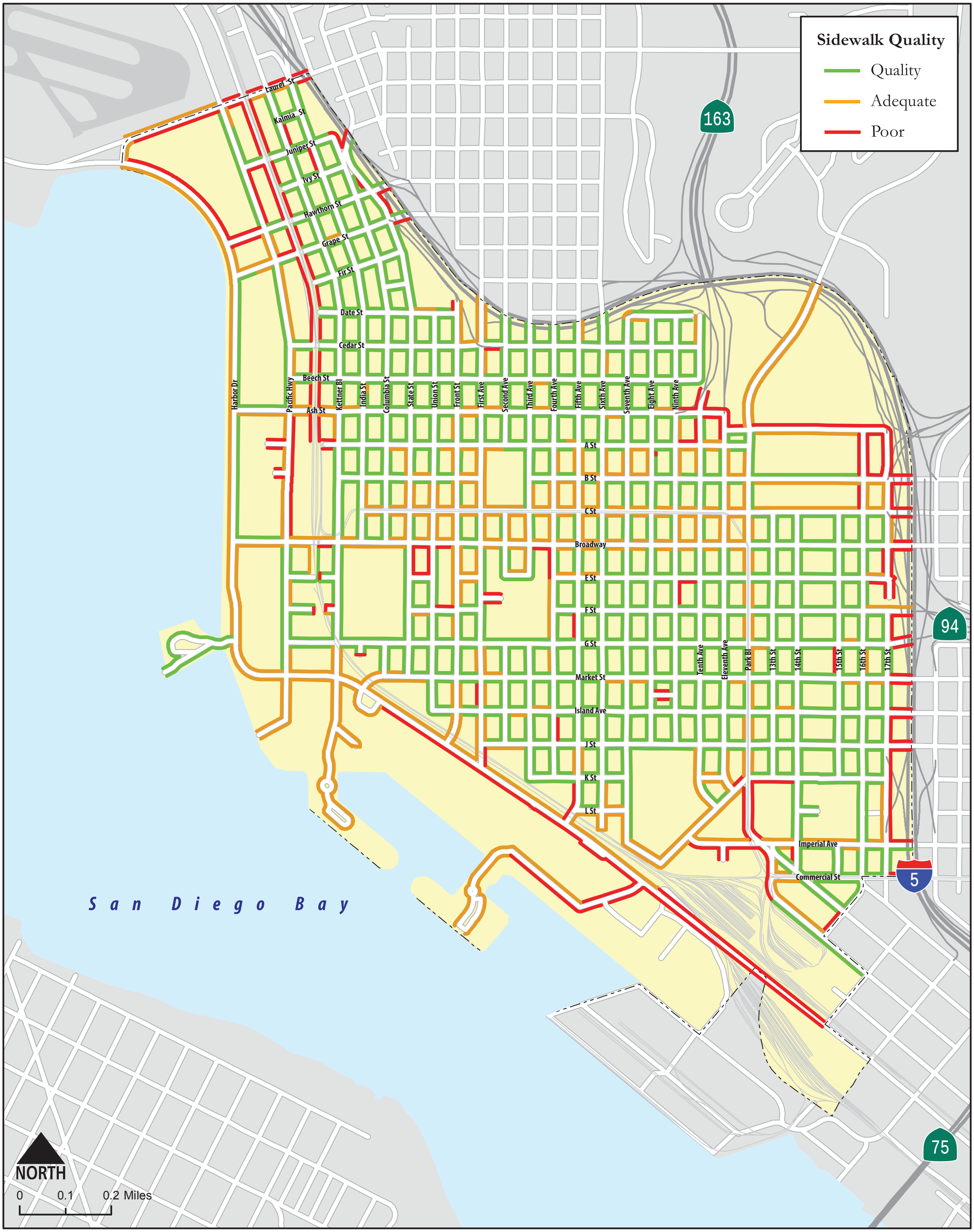

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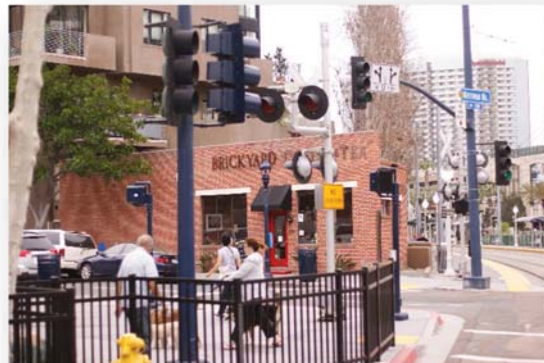
Figure 4-2
Quality of Pedestrian Facilities

As seen in Figure 4-2, about 61% of all pedestrian facility in Downtown San Diego can be defined as Quality Pedestrian Facilities, approximately 27% of facilities are Adequate Pedestrian Facilities, and about 12% sidewalk facilities are Poor Pedestrian Facilities. A significant concentration of "poor" quality facilities is found in the East Village neighborhood of Downtown, adjacent to Interstate 5. "Adequate" facilities are concentrated in the heart of Downtown San Diego, along C Street and Broadway, while "quality" facilities are distributed throughout Downtown San Diego.

4.1.2 Pedestrian Activity Levels



This section presents several sources of pedestrian activity data, including suitability modeling results from the Pedestrian Master Plan (PMP) Phase 2 & 3 pedestrian priority model, survey data from the Census Bureau, and current peak period pedestrian counts.

Figure 4-3 displays the summation of pedestrian attractors, detractors, and generators per the City's pedestrian priority model as updated during Phases 2 & 3 of the City's Pedestrian Master Plan effort. Pedestrian trip attractors include schools, transit stops, neighborhood civic facilities, commercial/retail, and parks and recreational land uses. Trip generators include population and employment density, household income, mix of land uses, and age and disability density. The model inputs and interpretation of outputs is well documented in the PMP-Phase 1 document. In general, higher levels of pedestrian attractors and generators signify higher levels of existing and/or latent demand for walking.

As shown in Figure 4-3, almost the entire Downtown community falls within high pedestrian demand locations. Downtown, when compared to other parts of the City, has very high population and employment densities, and strong mixes of residential and commercial/retail land uses, helping to drive up both trip attraction and generation values leading to the high pedestrian demand model score. The few exceptions include large developments without residential units, such as the Convention Center, the Ballpark parking lot, and City College.

Several sources of actual walking rates and pedestrian counts are publically available or were collected as part of this planning effort.

Table 4-1 presents estimated walk to work rates, as reported by the American Community Survey (ACS) for Downtown San Diego, the City of San Diego, and San Diego County for comparison.

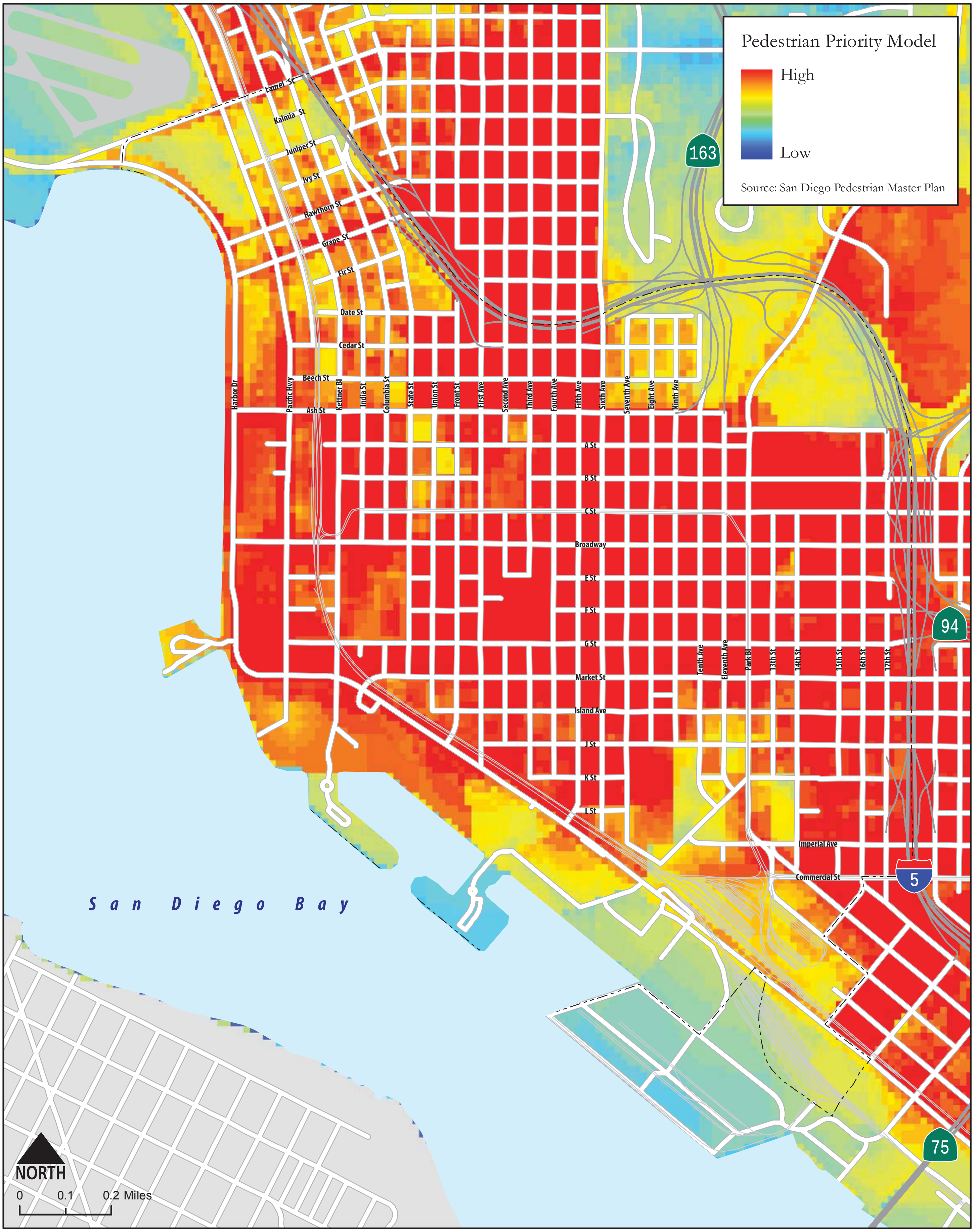


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Figure 4-3
Pedestrian Priority Model

Table 4-1 Percent of Walking Commuters in Downtown San Diego

	Downtown San Diego	City of San Diego	County of San Diego
Number of Workers Walking to Work	927	18,470	38,874
Percent of Total Workers	5.4%	3.9%	2.7%

Source: US Census, American Community Survey, 2012 Estimates; Chen Ryan Associates; September 2014

As shown, approximately 927 residents, or 5.4% of all Downtown residents currently walk to work, compared to 3.9% of all workers citywide and 2.7% of workers countywide. The higher rate of walking to work in Downtown San Diego reflects the strong mix of land uses and relatively high population densities, all of which is supported by a strong grid network.

Figure 4-4 displays the 2012 pedestrian commute mode share by census tract for Downtown San Diego residents. The highest commute walking rates were reported in the central most census tract, comprised of portions of the Columbia, Marina, Civic/Core and Horton/Gaslamp Neighborhoods of the Downtown Community.

Figure 4-5 displays the AM and PM peak hour pedestrian volumes in crosswalks at each intersection. **Figure 4-6A** and **Figure 4-6B** graphically display the existing AM and PM peak hour pedestrian volumes at all key study area intersections, respectively, while **Table 4-2** presents the observed volumes for each location. The ID in Table 4-2 is consistent with the intersection ID in Figure 4-5.

The highest AM peak hour volumes were observed at the intersections of Fifth Avenue and Market Street, and Fourth Avenue and Market Street, with 591 and 544 pedestrians, respectively. Zero pedestrians were observed at the intersection of 16th Street and L Street during the AM peak period, the lowest level of all intersections.

Consistent with AM peak hour observations, the highest PM peak hour volumes were observed at the intersections of Fifth Avenue and Market Street, and Fourth Avenue and Market Street, with 2,093 and 1,234 pedestrians, respectively. Replicating AM peak period observations, zero pedestrians were observed at 16th Street and L Street. Compared to AM volumes, increased PM volumes were observed south of F Street, predominantly near the Gaslamp area within the East Village neighborhood. Relatively high pedestrian volumes were observed along Broadway during both the AM and PM pedestrian counts.

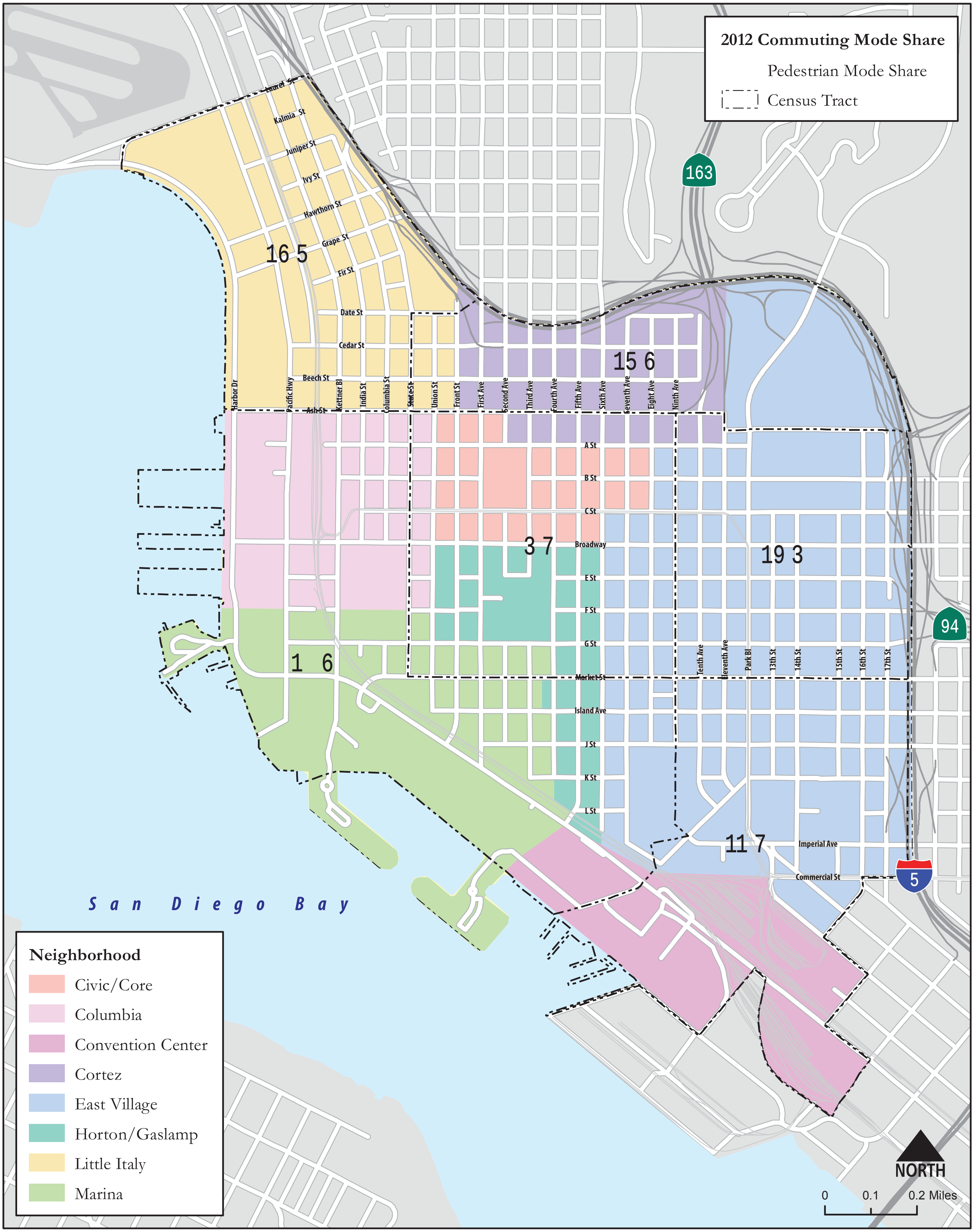

Figure 4-4

2012 Pedestrian Commute Mode Share by Census Tract

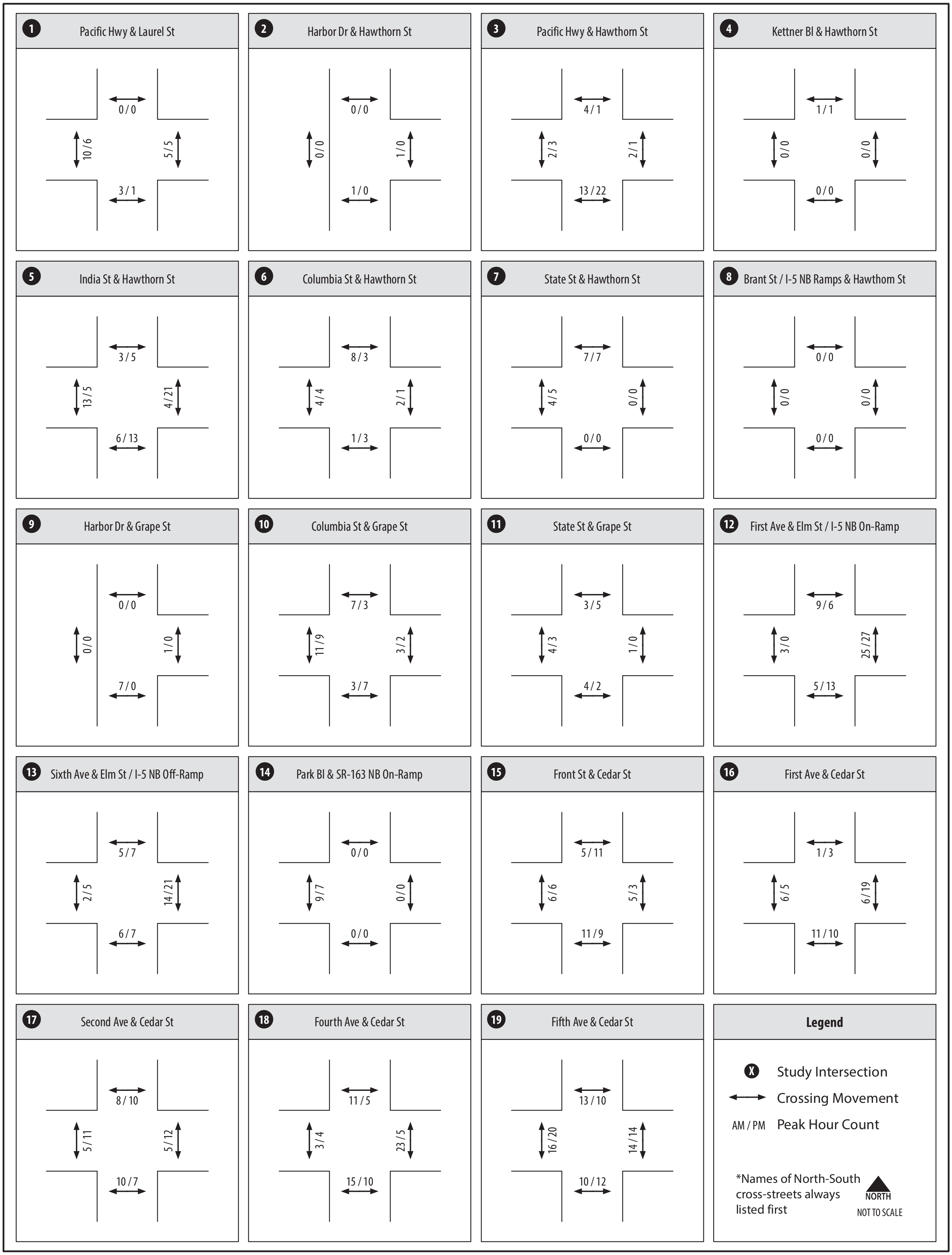

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Figure 4-5

Existing AM/PM Peak Hour Pedestrian Counts (Intersections 1-19)

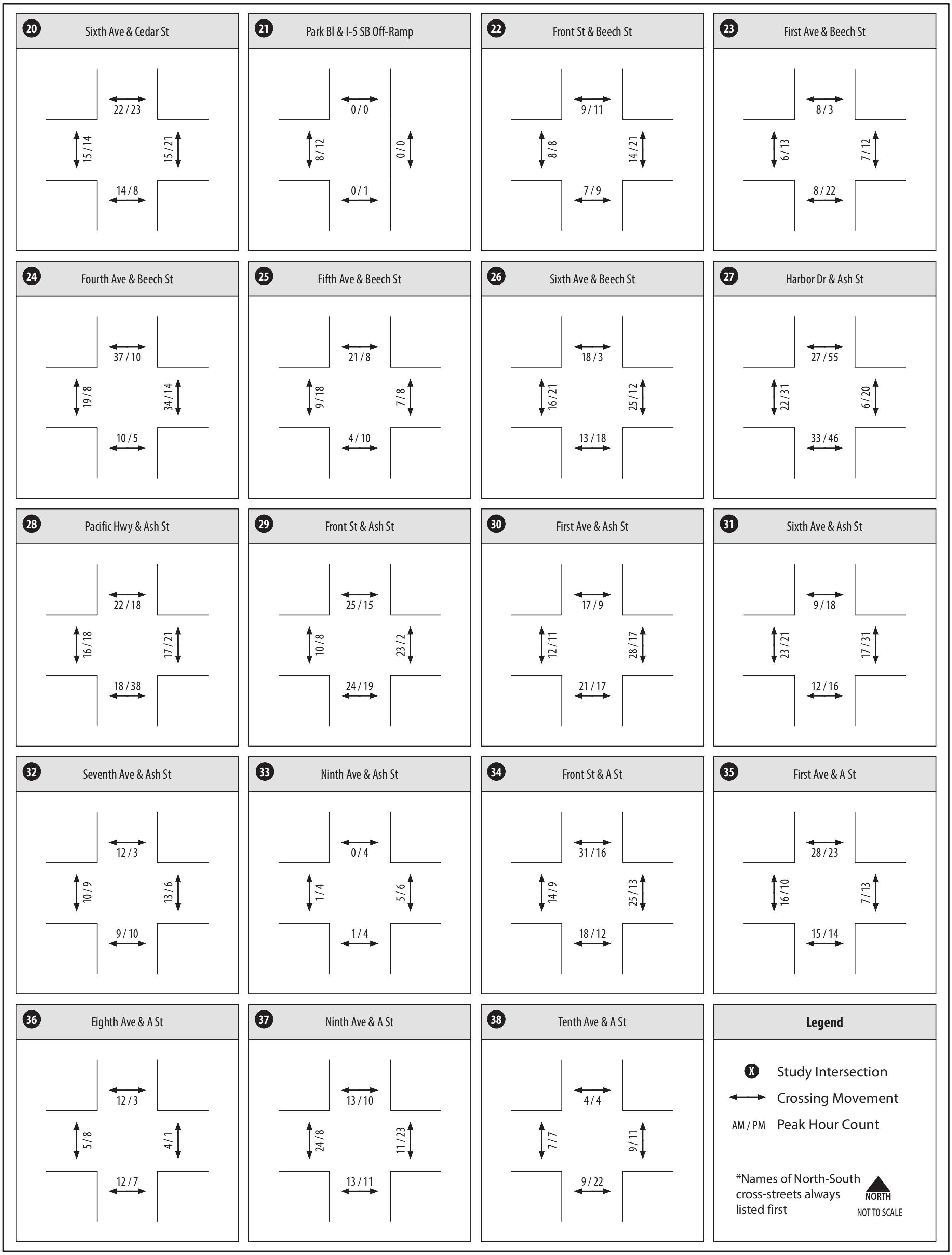

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Figure 4-5

Existing AM/PM Peak Hour Pedestrian Counts (Intersections 20-38)

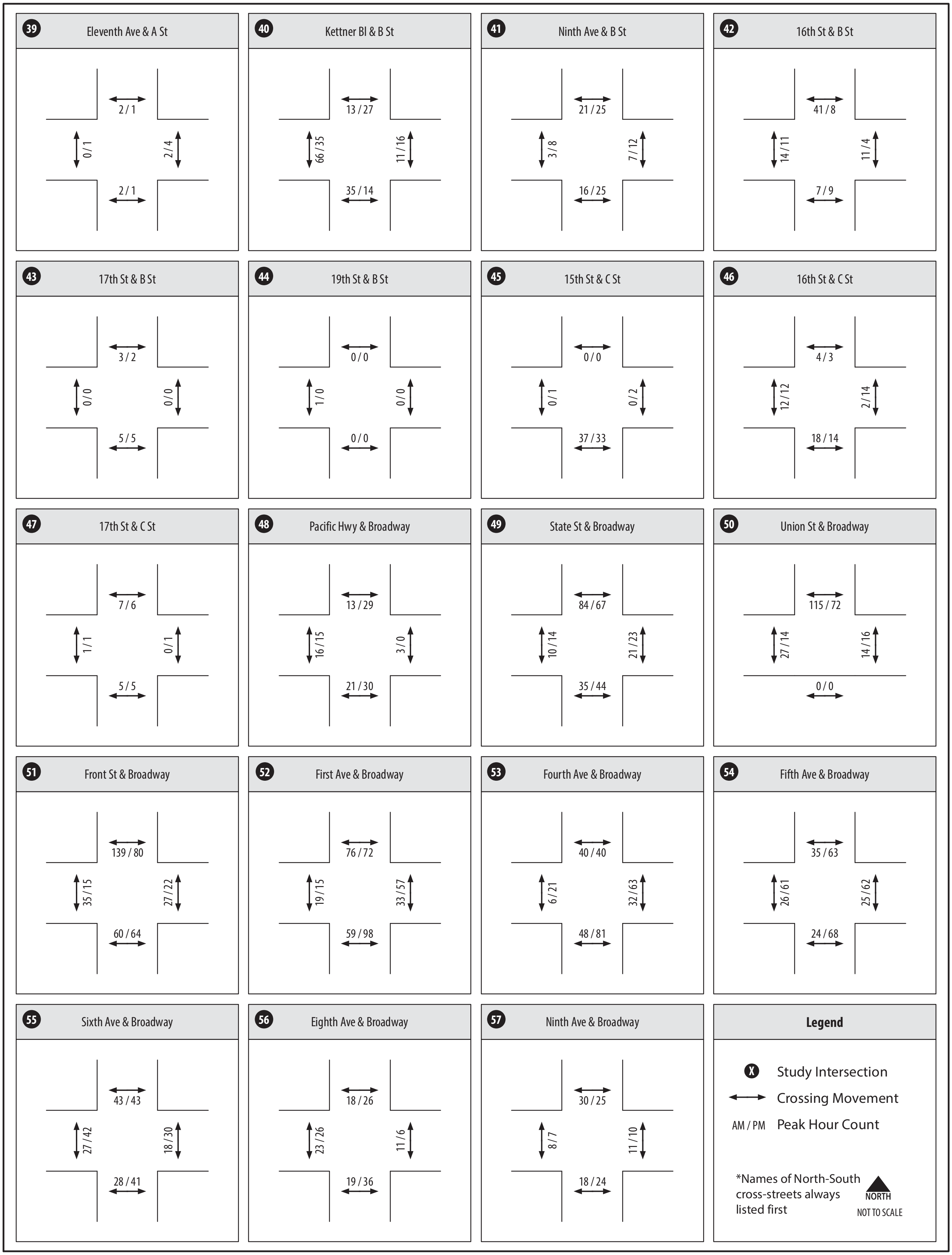

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Figure 4-5

Existing AM/PM Peak Hour Pedestrian Counts (Intersections 39-57)

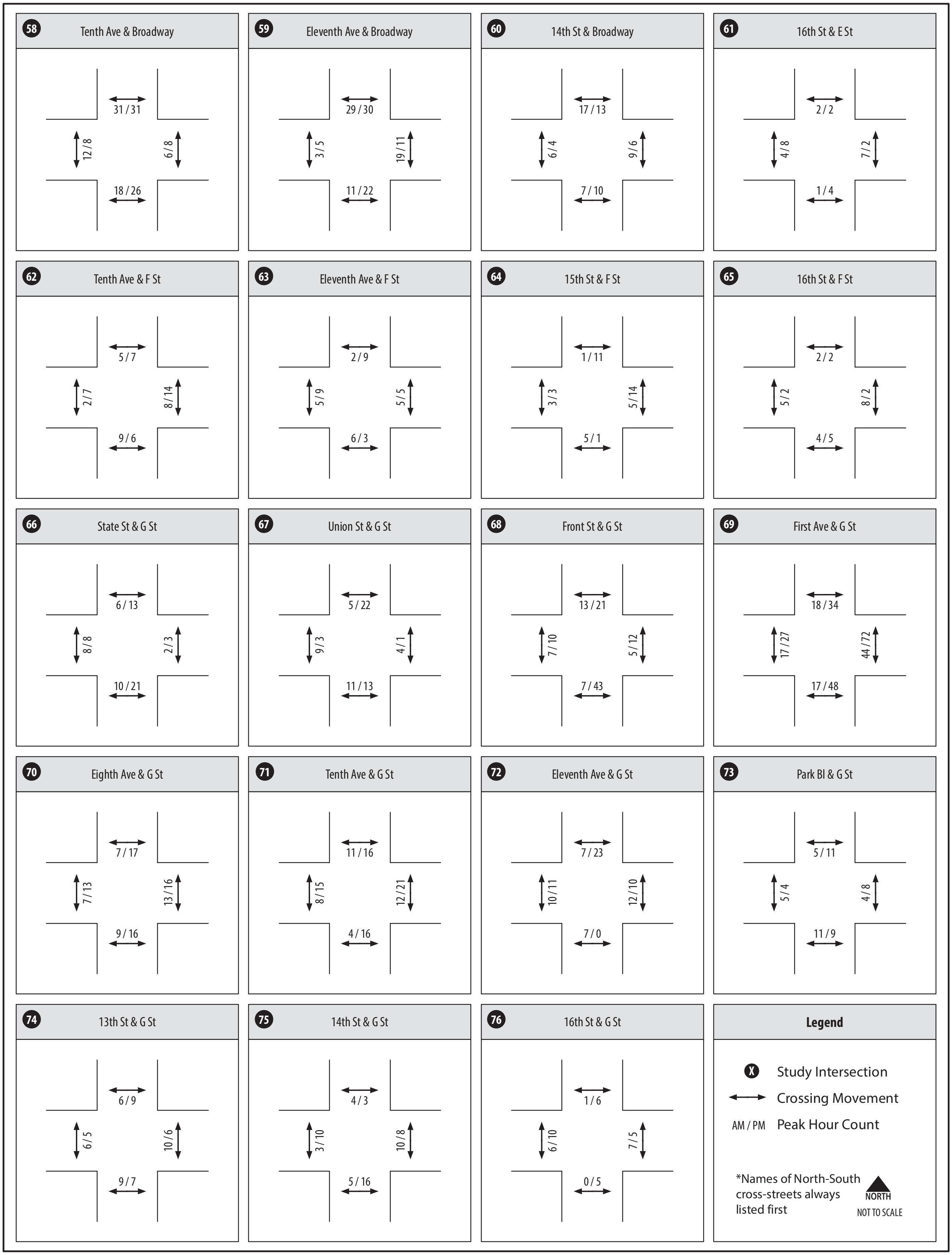

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Figure 4-5

Existing AM/PM Peak Hour Pedestrian Counts (Intersections 58-76)

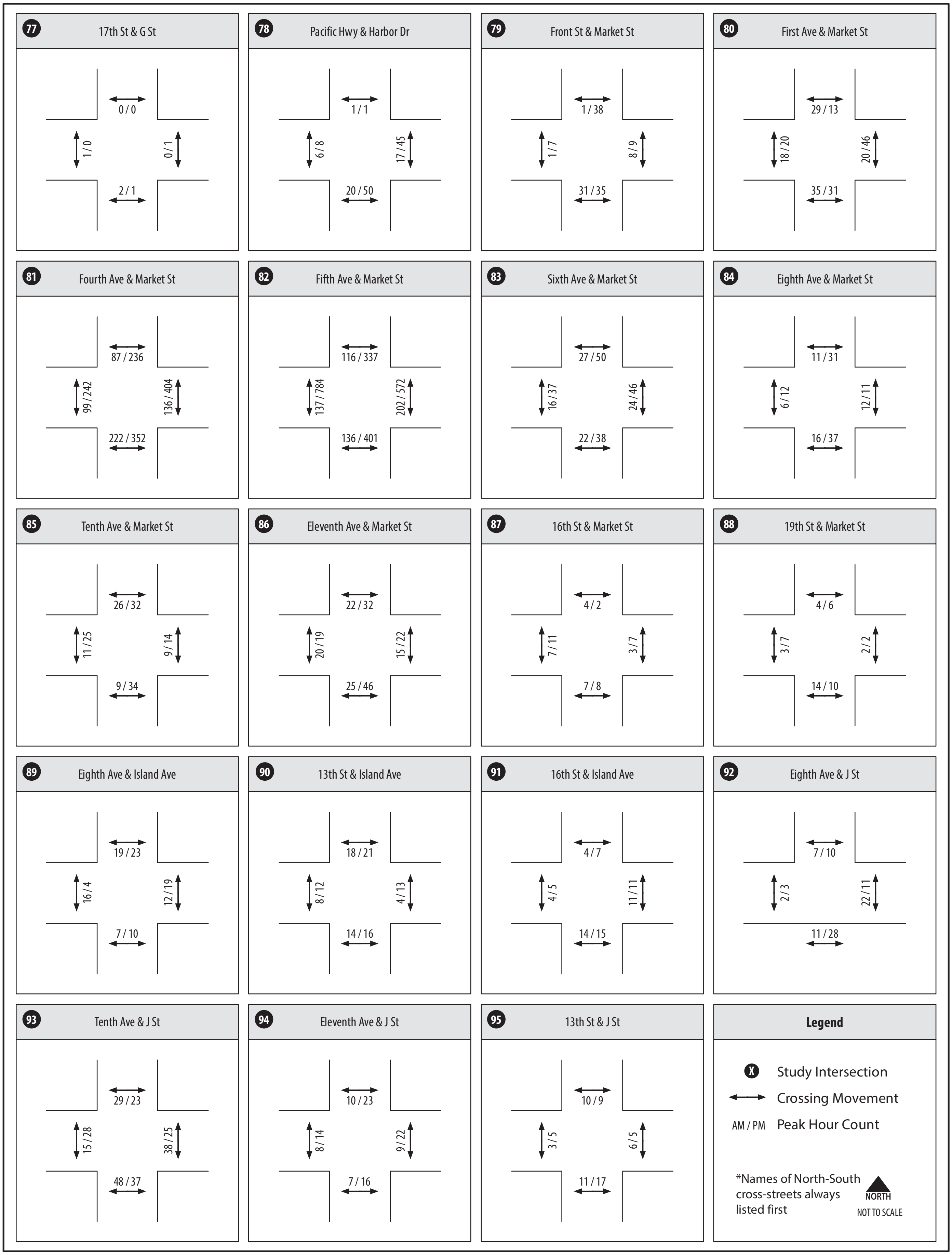

Figure 4-5

Existing AM/PM Peak Hour Pedestrian Counts (Intersections 77-95)

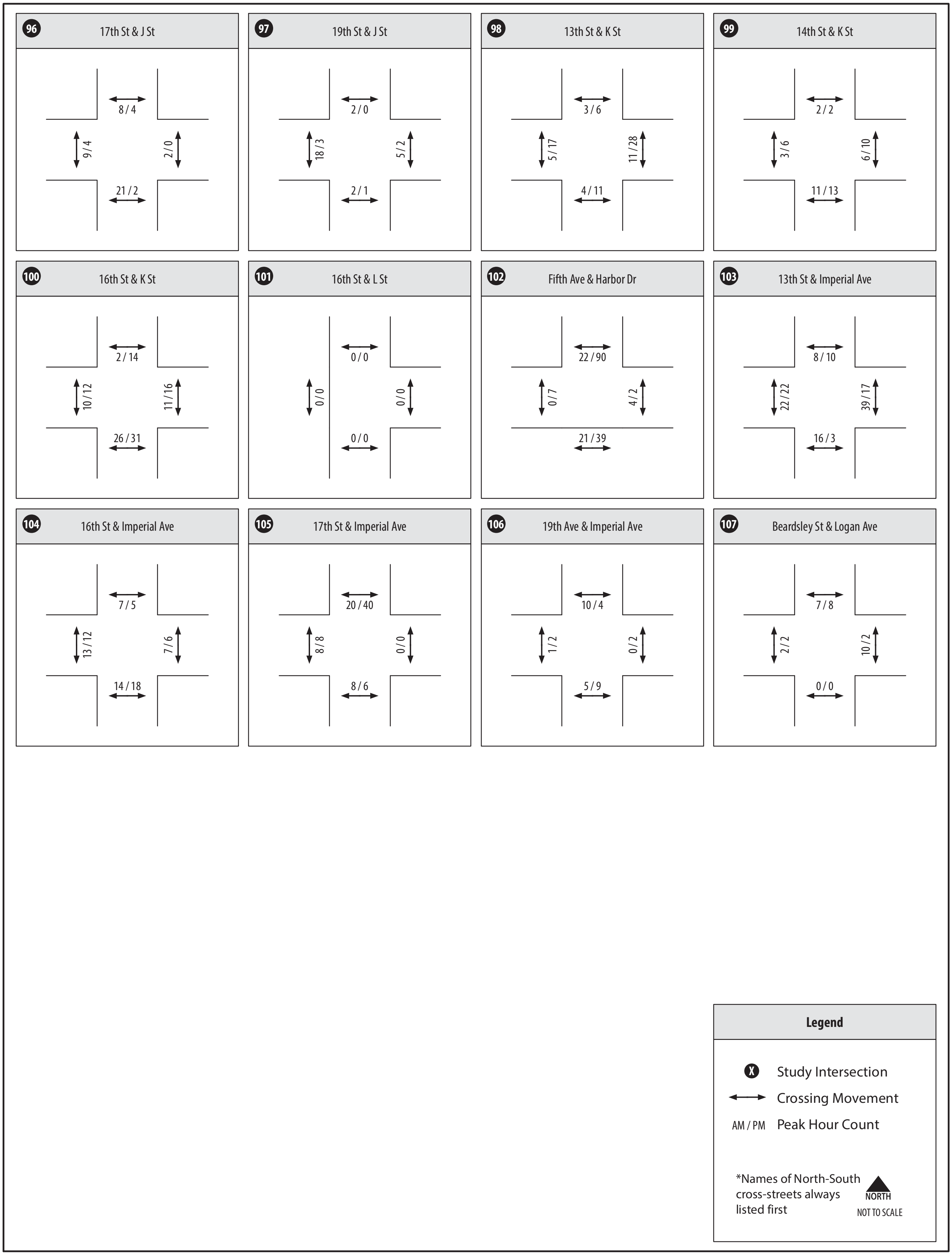

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Figure 4-5

Existing AM/PM Peak Hour Pedestrian Counts (Intersections 96-107)

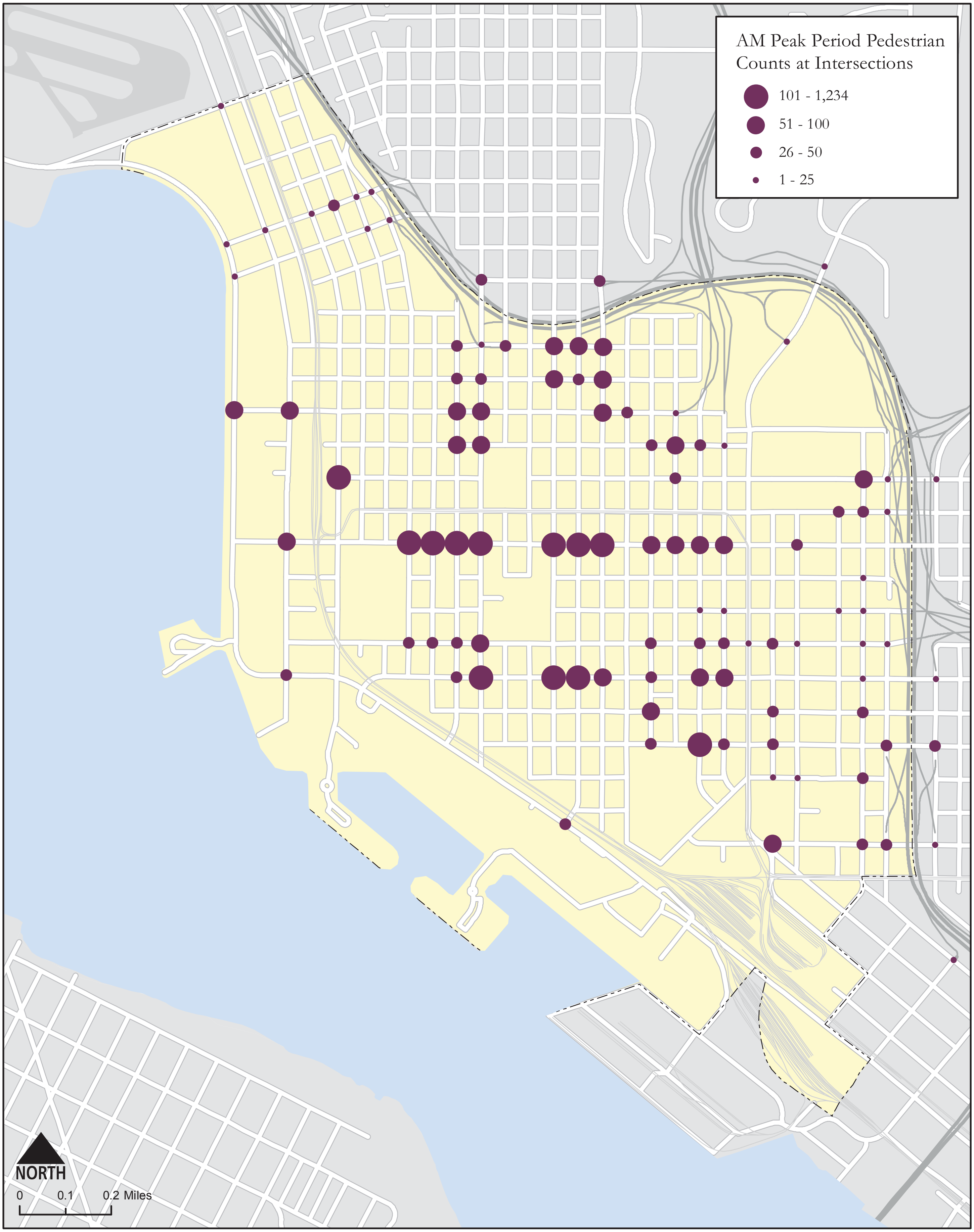

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Figure 4-6A
Pedestrians Crossing at Study Intersections
(AM Peak Hour)

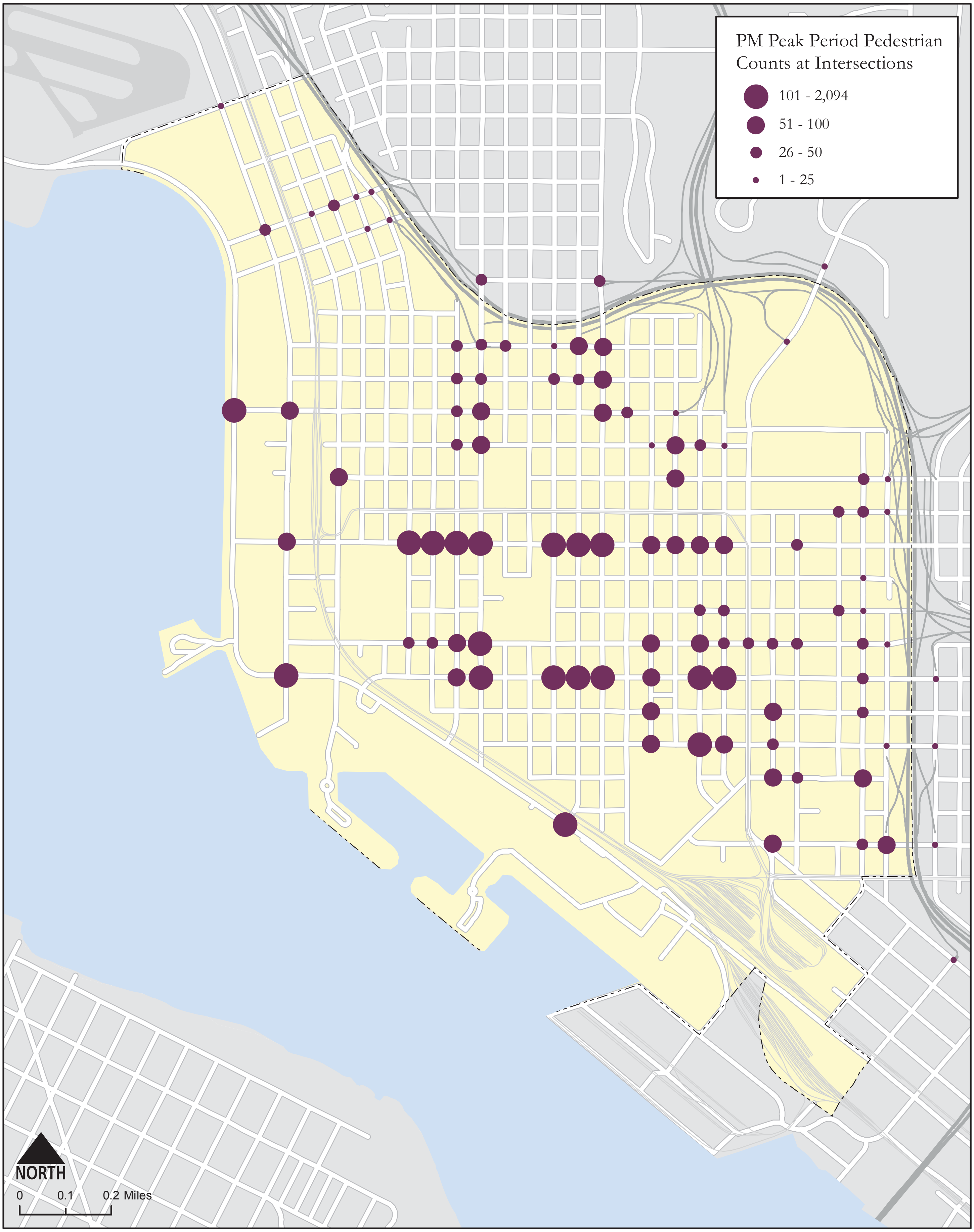

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Figure 4-6B
Pedestrians Crossing at Study Intersections (PM Peak Hour)

The four highest pedestrian counts during both the AM and PM peak hours occurred along Market Street and Broadway, as listed below, signifying the importance of pedestrian mobility along these corridors:

AM Peak Hour

- Fifth Avenue and Market Street (591)
- Fourth Avenue and Market Street (544)
- Front Street and Broadway (261)
- First Avenue and Broadway (187)

PM Peak Hour

- Fifth Avenue and Market Street (2093)
- Fourth Avenue and Market Street (1234)
- Fifth Avenue and Broadway (254)
- First Avenue and Broadway (242)

Table 4-2 AM and PM Peak Hour Pedestrian Counts (Total Intersection)

ID	Location	AM	PM
1	Pacific Highway / Laurel St	18	12
2	Harbor Drive / Hawthorn St	2	0
3	Pacific Highway / Hawthorn St	21	27
4	Kettner Boulevard / Hawthorn St	1	1
5	India Street / Hawthorn St	26	44
6	Columbia Street / Hawthorn St	15	11
7	State Street / Hawthorn St	11	12
8	Brant St/I-5 NB On Ramp/I-5 NB Off Ramp / Hawthorn St	0	0
9	Harbor Drive / Grape St	8	0
10	Columbia Street / Grape St	24	21
11	State Street / Grape St	12	10
12	First Avenue / Elm St/I-5 NB On Ramp	42	46
13	Sixth Avenue / Elm St/I-5 NB Off Ramp	27	40
14	Park Boulevard / 163 NB On Ramp	9	7
15	Front Street / Cedar St	27	29
16	First Avenue / Cedar St	24	37
17	Second Avenue / Cedar St	28	40
18	Fourth Avenue / Cedar St	52	24
19	Fifth Avenue / Cedar St	53	56
20	Sixth Avenue / Cedar St	66	66
21	Park Boulevard / I-5 SB Off Ramps	8	13
22	Front Street / Beech St	38	49
23	First Avenue / Beech St	29	50
24	Fourth Avenue / Beech St	100	37
25	Fifth Avenue / Beech St	41	44
26	Sixth Avenue / Beech St	72	54
27	Harbor Drive / Ash St	88	152
28	Pacific Highway / Ash St	73	95
29	Front Street / Ash St	82	44
30	First Avenue / Ash St	78	54

Table 4-2 AM and PM Peak Hour Pedestrian Counts (Total Intersection)

ID	Location	AM	PM
31	Sixth Avenue / Ash St	61	86
32	Seventh Avenue / Ash St	44	28
33	Ninth Avenue / Ash St	7	18
34	Front Street / A St	88	50
35	First Avenue / A St	66	60
36	Eighth Avenue / A St	33	19
37	Ninth Avenue / A St	61	52
38	Tenth Avenue / A St	29	44
39	Eleventh Avenue / A St	6	7
40	Kettner Boulevard / B St	125	92
41	Ninth Avenue / B St	47	70
42	16th Street / B St	73	32
43	17th Street / B St	8	7
44	19th Street / B St	1	0
45	15th Street / C St	37	36
46	16th Street / C St	36	43
47	17th Street / C St	13	13
48	Pacific Highway / Broadway	53	74
49	State Street / Broadway	150	148
50	Union Street / Broadway	156	102
51	Front Street / Broadway	261	181
52	First Avenue / Broadway	187	242
53	Fourth Avenue / Broadway	126	205
54	Fifth Avenue / Broadway	110	254
55	Sixth Avenue / Broadway	116	156
56	Eighth Avenue / Broadway	71	94
57	Ninth Avenue / Broadway	67	66
58	Tenth Avenue / Broadway	67	73
59	Eleventh Avenue / Broadway	62	68
60	14th Street / Broadway	39	33
61	16th Street / E Street	14	16
62	Tenth Avenue / F Street	24	34
63	Eleventh Avenue / F Street	18	26
64	15th Street / F Street	14	29
65	16th Street / F Street	19	11
66	State Street / G Street	26	45
67	Union Street / G Street	29	39
68	Front Street / G Street	32	86
69	First Avenue / G Street	96	181
70	Eighth Avenue / G Street	36	62

Table 4-2 AM and PM Peak Hour Pedestrian Counts (Total Intersection)

ID	Location	AM	PM
71	Tenth Avenue / G Street	35	68
72	Eleventh Avenue / G Street	36	44
73	Park Boulevard / G Street	25	32
74	13th Street / G Street	31	27
75	14th Street / G Street	22	37
76	16th Street / G Street	14	26
77	17th Street / G Street	3	2
78	Pacific Highway / Market Street	44	104
79	Front Street / Market Street	41	89
80	First Avenue / Market Street	102	110
81	Fourth Avenue / Market Street	544	1234
82	Fifth Avenue / Market Street	591	2093
83	Sixth Avenue / Market Street	89	171
84	Eighth Avenue / Market Street	45	91
85	Tenth Avenue / Market Street	55	105
86	Eleventh Avenue / Market Street	82	119
87	16th Street / Market Street	21	28
88	19th Street / Market Street	23	25
89	Eighth Avenue / Island Avenue	54	56
90	13th Street / Island Avenue	44	62
91	16th Street / Island Avenue	33	38
92	Eighth Avenue / J Street	42	52
93	Tenth Avenue / J Street	130	113
94	Eleventh Avenue / J Street	34	75
95	13th Street / J Street	30	36
96	17th Street / J Street	40	10
97	19th Street / J Street	27	6
98	13th Street / K Street	23	62
99	14th Street / K Street	22	31
100	16th Street / K Street	49	73
101	16th Street / L Street	0	0
102	Fifth Avenue / Harbor Drive	47	138
103	13th Street / Imperial Avenue	85	52
104	16th Street / Imperial Avenue	41	41
105	17th Street / Imperial Avenue	36	54
106	19th Street / Imperial Avenue	16	17
107	Beardsley St / Logan Avenue	19	12

Source: Chen Ryan Associates; September 2014

Appendix B displays the AM and PM peak hour pedestrian count sheets for each Downtown San Diego study intersection.

4.1.3 Pedestrian Safety

Pedestrian collision data was obtained from the City of San Diego for the period from 2008 to 2013. During this timeframe, 327 pedestrian-involved collisions were reported in Downtown San Diego.

Figure 4-7 displays the distribution of the 327 collisions across Downtown. Although pedestrian collisions were recorded in a somewhat even distribution across Downtown San Diego during the 2008 – 2013 period, there is a substantial concentration in the community's center, also along Ash Street, B Street and Imperial Avenue.

Table 4-3A summarizes the reported pedestrian-involved collisions by collision cause. The most common collision cause was "pedestrian right-of-way violations," accounting for 138 (or 42.2%) of all pedestrian-involved collisions, which is more than double the second leading cause, "unknown," with an 18.0% share of collision causes.

Table 4-3A Collision Causes (Pedestrian)

Primary Collision Cause	Collisions	Percent of Total
Pedestrian R/W Violation	138	42.2%
Unknown	59	18.0%
Pedestrian at Fault	27	8.3%
Violated Vehicle's R/W	23	7.0%
Other	20	6.1%
D.U.I. or N/A	16	4.9%
Not Paying Attention	12	3.7%
Ran Traffic Signal	9	2.8%
Visibility Issue	9	2.8%
Violation of Signs	6	1.8%
Ran Stop Sign	4	1.2%
Unsafe Movement – Right Turn	4	1.2%
Total	**327**	**100%**

Source: SWITRS, Chen Ryan Associates; September 2014

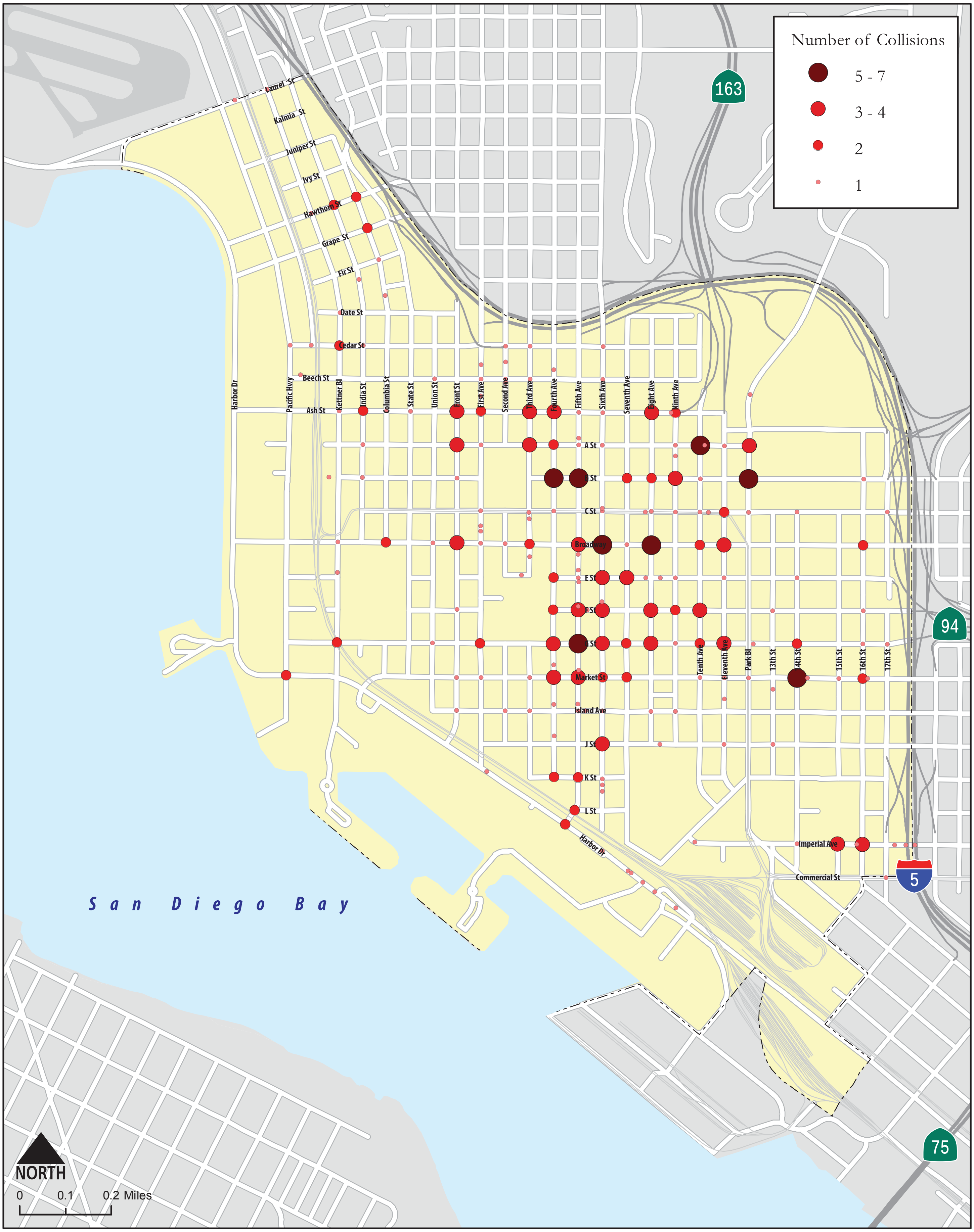

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Figure 4-7
Pedestrian Collisions (2008-2013)

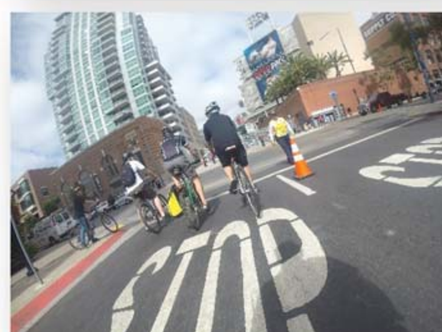
Table 4-3B summarizes the most frequent pedestrian collision locations, reiterating the high concentration of multiple collision locations within the central part of Downtown.

Table 4-3B Most Frequent Collision Locations (Pedestrian)

Most Frequent Locations	Collisions
Fifth Avenue & B Street	7
Fifth Avenue & G Street	5
Sixth Avenue & Broadway	5
Eighth Avenue & Broadway	5
14th Street & Market Street	5
Fourth Avenue & B Street	5
Tenth Avenue & A Street	5
Park Boulevard & B Street	5

Source: SWITRS, Chen Ryan Associates; September 2014

4.2 Bicycling



Bicycle facilities are an integral component of the Downtown San Diego transportation system. Adequate bicycle facilities encourage active transportation, enhance recreational opportunities, and help attract visitors. Bikeways not only provide local opportunities for cyclists, but also offer regional connections and connections to transit. This section discusses existing bicycle facilities, activity levels, and safety analyses for Downtown San Diego.

The cycling goals as expressed in the City's 2008 General Plan Mobility Element include the following:

- *A City where bicycling is a viable travel choice, particularly for trips of less than five miles.*
- *A safe and comprehensive local and regional bikeway network.*
- *Environmental quality, public health, recreation and mobility benefits through increased bicycling.*

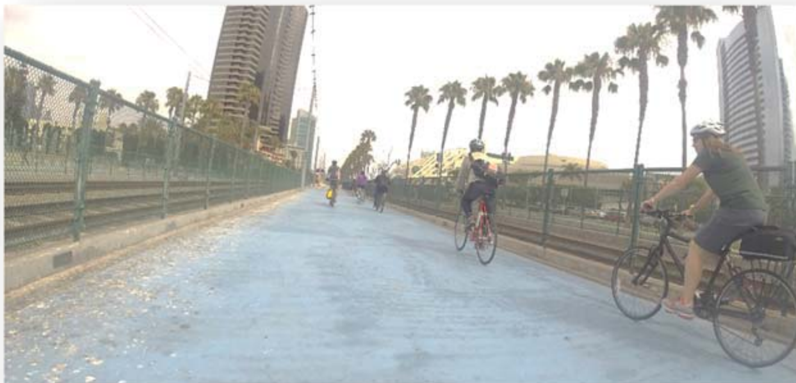
The 2006 Downtown Community Plan only contains the follow language related to cycling goals.

- *Develop a cohesive and attractive walking and bicycle system within Downtown that provides links within the area and to the surrounding neighborhoods.*

4.2.1 Existing Bicycle Facilities

Bicycle facilities are classified based on the standard Caltrans typology as follows:

- Class I Bikeway (Multi-Use Bike Path) provides a completely separate right-of-way and is designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian cross-flow minimized.



Class I Bike Path that runs Parallel between Harbor Drive and the Martin Luther King Promenade

- Class II Bikeway (Bike Lane) is designated for the use of bicycles by a striped lane on a street or highway. Bicycle lanes are generally five feet wide. Vehicle parking and vehicle/pedestrian cross-flow are permitted. Downtown San Diego does not currently have bike lanes.

Class II Bike Lane along Market Street between 32nd and I-15 SB Ramps.

- Class III Bike Route provides for a right-of-way designated by signs or pavement markings for shared use with pedestrians or motor vehicles.

Class III Bike Route (with Sharrows) along Ash Street, part of the Downtown San Diego Bike Loop

Connectivity

Figure 4-8 displays the location of existing bicycle facilities within the Downtown San Diego community, while **Table 4-4** summarizes the mileage of existing bicycle facilities. The network provides facility close to the community boundaries, however, no designated facility (Class I or Class II) currently exists through the heart of Downtown San Diego.

Quality

As shown, there are approximately 15.3 miles of existing bicycle facilities within Downtown San Diego, with 70% comprised of Class III Bike Route, which provides cyclists with the lowest level of separation from vehicular travel. A large portion of the Class III facility is the new San Diego Bike Loop.

About twenty-two percent (22.1%) of Downtown San Diego roadways have bicycle facilities, which is higher than the citywide total of 12.6%. However, as stated above, the overwhelming majority of facility in Downtown San Diego is Class III with “Sharrow” which offer no separation from vehicular traffic.

Table 4-4 Mileage of Existing Bicycle Facility within Downtown San Diego

Facility Type	Mileage	Percent of Total Bicycle Facility	Percent of Total Roadway
Class I Multi-Use Path	3.8 miles	25%	N/A
Class II Bicycle Lane	0.7 miles	5%	1.4%
Class III Bicycle Route	10.8 miles	70%	20.7%
TOTAL	**15.3 miles**	**100%**	**22.1%**

Source: SANDAG; Chen Ryan Associates; September 2014

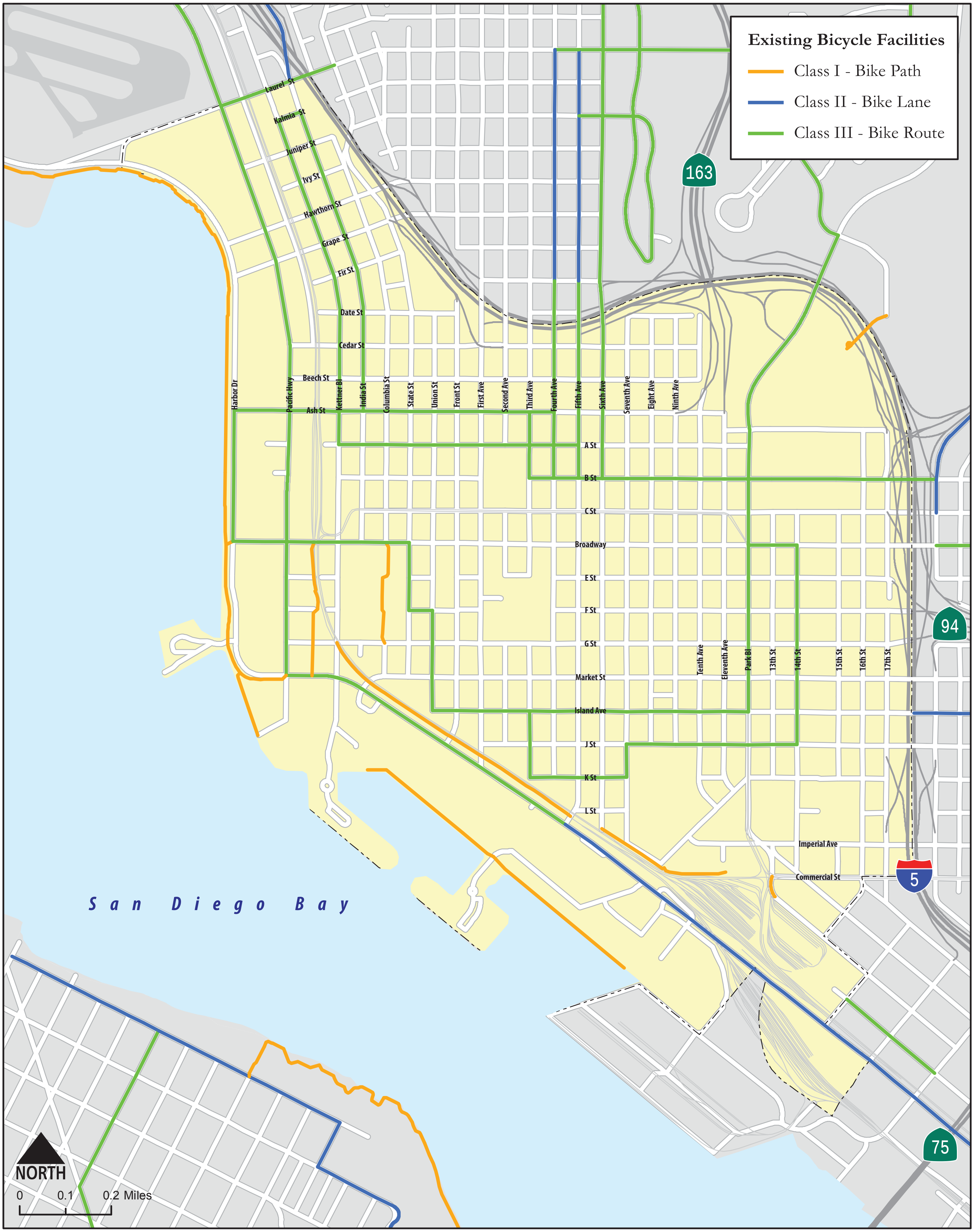


Figure 4-8
Existing Bicycle Facilities

4.2.2 Bicycling Activity Levels

Table 4-5 displays estimated commuter cycling rates as reported by the 2012 American Community Survey (ACS) 5-Year Estimates for Downtown San Diego, the City and the County, as a whole. As shown, approximately 189 residents currently bike to work, representing 1.1% of all workers in Downtown San Diego. Across the City as a whole, approximately 0.9% of all workers bike to work. The rate of cycling to work is significantly higher in Downtown San Diego compared to the City and also compared to the County as a whole.

Table 4-5 Percent of Cycling Commuters in Downtown San Diego

	Downtown San Diego	City of San Diego	County of San Diego
Number of Workers Cycling to Work	189	5841	38874
Percent of Total Workers	1.1%	0.9%	0.7%

Source: US Census, 2012 American Community Survey, 5-Year Estimates; Chen Ryan Associates; September 2014

Figure 4-9 displays bicycle commute mode share by census tracts for Downtown San Diego residents. The northern census tract within the East Village neighborhood and the census tract encompassing large portions of the Marina and Columbia neighborhoods reported the highest rates of bicycle commuting in the Downtown Community at 1.5% and 1.3%, respectively.

Figure 4-10 presents the 2013 City of San Diego Bicycle Master Plan bicycle demand model results for Downtown, displaying locations with relatively high bicycle trip attractors and bicycle trip generators. Trip attractors include schools, parks, retail facilities, transit stops with more than 1,000 passengers per day, tourist attractions, and civic facilities. Examples of bicycle trip generators include increased levels of population density and employment density, and households reported as zero-vehicle households, bicycle commuters, or walk and transit commuters. As shown, a majority of Downtown San Diego reflects high levels of cycling propensity. The lack of bicycle facilities in the community, however, inhibits safe cycling and potentially leads to lower rates of cycling.

Figure 4-11 displays the existing bicycle volumes at study area intersections. **Appendix C** provides the actual AM and PM peak hour bicycle counts for each Downtown San Diego study intersections.

Figures 4-12A and **4-12B** display the distribution of peak hour bicycle volumes for the AM and PM peak hour, respectively, across the community of Downtown San Diego. As shown, the corridors of Market Street, Broadway, and 16th Street have relatively higher intersection bicycle volumes during both the AM and PM peak periods. The increased volumes along 16th Street intersections reaffirms the comparatively higher bicycle commute mode share represented in the community's easternmost census tract (displayed in Figure 4-9). Additionally, the 16th Street volumes may be reflective of inter-community bicycle commuting, potentially representing cyclists riding between Downtown San Diego and the communities of Greater Golden Hill, Southeastern San Diego, and Barrio Logan.

Table 4-6 summarizes the counts by location for both the AM and PM peak hours. As shown, the highest bicycle activity was recorded at the following intersections:

AM Peak Hour

- Fifth Avenue and Market Street (19)
- Fourth Avenue and Market Street (18)
- Fourth Avenue and Broadway (11)
- Sixth Avenue and Broadway (9)
- 14th and Broadway (9)
- 16th Street and F Street (9)
- 16th Street and G Street (9)

PM Peak Hour

- Fifth Avenue and Market Street (50)
- Fourth Avenue and Market Street (42)
- Harbor Drive and Ash Street (15)
- Pacific Highway and Ash Street (15)
- 16th Street and G Street (13)
- 13th Street and Island Avenue (13)
- Pacific Highway and Market Street (13)

Table 4-6 AM and PM Peak Hour Bicycle Counts (Total Intersection)

ID	Location	AM	PM
1	Pacific Highway / Laurel St	4	10
2	Harbor Drive / Hawthorn St	0	0
3	Pacific Highway / Hawthorn St	1	2
4	Kettner Boulevard / Hawthorn St	1	1
5	India Street / Hawthorn St	3	7
6	Columbia Street / Hawthorn St	2	5
7	State Street / Hawthorn St	1	4
8	Brant St/I-5 NB On Ramp/I-5 NB Off Ramp / Hawthorn St	0	0
9	Harbor Drive / Grape St	0	0
10	Columbia Street / Grape St	3	3
11	State Street / Grape St	0	1
12	First Avenue / Elm St/I-5 NB On Ramp	1	3
13	Sixth Avenue / Elm St/I-5 NB Off Ramp	2	7
14	Park Boulevard / 163 NB On Ramp	5	3
15	Front Street / Cedar St	3	3
16	First Avenue / Cedar St	1	3
17	Second Avenue / Cedar St	5	2
18	Fourth Avenue / Cedar St	0	0
19	Fifth Avenue / Cedar St	0	0
20	Sixth Avenue / Cedar St	3	0
21	Park Boulevard / I-5 SB Off Ramps	4	3
22	Front Street / Beech St	2	8
23	First Avenue / Beech St	2	5
24	Fourth Avenue / Beech St	0	0
25	Fifth Avenue / Beech St	0	0
26	Sixth Avenue / Beech St	4	2
27	Harbor Drive / Ash St	6	15
28	Pacific Highway / Ash St	6	15
29	Front Street / Ash St	4	5

Table 4-6 AM and PM Peak Hour Bicycle Counts (Total Intersection)

ID	Location	AM	PM
30	First Avenue / Ash St	3	2
31	Sixth Avenue / Ash St	2	4
32	Seventh Avenue / Ash St	1	0
33	Ninth Avenue / Ash St	0	3
34	Front Street / A St	3	6
35	First Avenue / A St	5	2
36	Eighth Avenue / A St	4	2
37	Ninth Avenue / A St	1	2
38	Tenth Avenue / A St	4	6
39	Eleventh Avenue / A St	1	1
40	Kettner Boulevard / B St	3	10
41	Ninth Avenue / B St	8	6
42	16th Street / B St	5	4
43	17th Street / B St	6	5
44	19th Street / B St	5	0
45	15th Street / C St	1	1
46	16th Street / C St	5	2
47	17th Street / C St	2	6
48	Pacific Highway / Broadway	6	2
49	State Street / Broadway	4	5
50	Union Street / Broadway	6	3
51	Front Street / Broadway	8	9
52	First Avenue / Broadway	5	7
53	Fourth Avenue / Broadway	11	8
54	Fifth Avenue / Broadway	1	8
55	Sixth Avenue / Broadway	9	11
56	Eighth Avenue / Broadway	3	8
57	Ninth Avenue / Broadway	7	11
58	Tenth Avenue / Broadway	5	1
59	Eleventh Avenue / Broadway	2	4
60	14th Street / Broadway	9	6
61	16th Street / E Street	3	2
62	Tenth Avenue / F Street	2	4
63	Eleventh Avenue / F Street	2	1
64	15th Street / F Street	2	0
65	16th Street / F Street	9	4
66	State Street / G Street	3	2
67	Union Street / G Street	3	2
68	Front Street / G Street	2	5
69	First Avenue / G Street	3	5

Table 4-6 AM and PM Peak Hour Bicycle Counts (Total Intersection)

ID	Location	AM	PM
70	Eighth Avenue / G Street	3	4
71	Tenth Avenue / G Street	0	4
72	Eleventh Avenue / G Street	4	3
73	Park Boulevard / G Street	4	3
74	13th Street / G Street	3	4
75	14th Street / G Street	8	6
76	16th Street / G Street	9	13
77	17th Street / G Street	1	1
78	Pacific Highway / Market Street	1	13
79	Front Street / Market Street	1	2
80	First Avenue / Market Street	3	7
81	Fourth Avenue / Market Street	18	42
82	Fifth Avenue / Market Street	19	50
83	Sixth Avenue / Market Street	6	8
84	Eighth Avenue / Market Street	3	5
85	Tenth Avenue / Market Street	5	0
86	Eleventh Avenue / Market Street	3	3
87	16th Street / Market Street	5	7
88	19th Street / Market Street	1	0
89	Eighth Avenue / Island Avenue	5	11
90	13th Street / Island Avenue	7	13
91	16th Street / Island Avenue	7	5
92	Eighth Avenue / J Street	2	5
93	Tenth Avenue / J Street	3	12
94	Eleventh Avenue / J Street	3	3
95	13th Street / J Street	1	9
96	17th Street / J Street	3	0
97	19th Street / J Street	4	2
98	13th Street / K Street	5	4
99	14th Street / K Street	7	4
100	16th Street / K Street	2	4
101	16th Street / L Street	0	0
102	Fifth Avenue / Harbor Drive	5	11
103	13th Street / Imperial Avenue	8	6
104	16th Street / Imperial Avenue	6	7
105	17th Street / Imperial Avenue	3	5
106	19th Street / Imperial Avenue	2	2
107	Beardsley St / Logan Avenue	2	1

Source: Chen Ryan Associates; September 2014

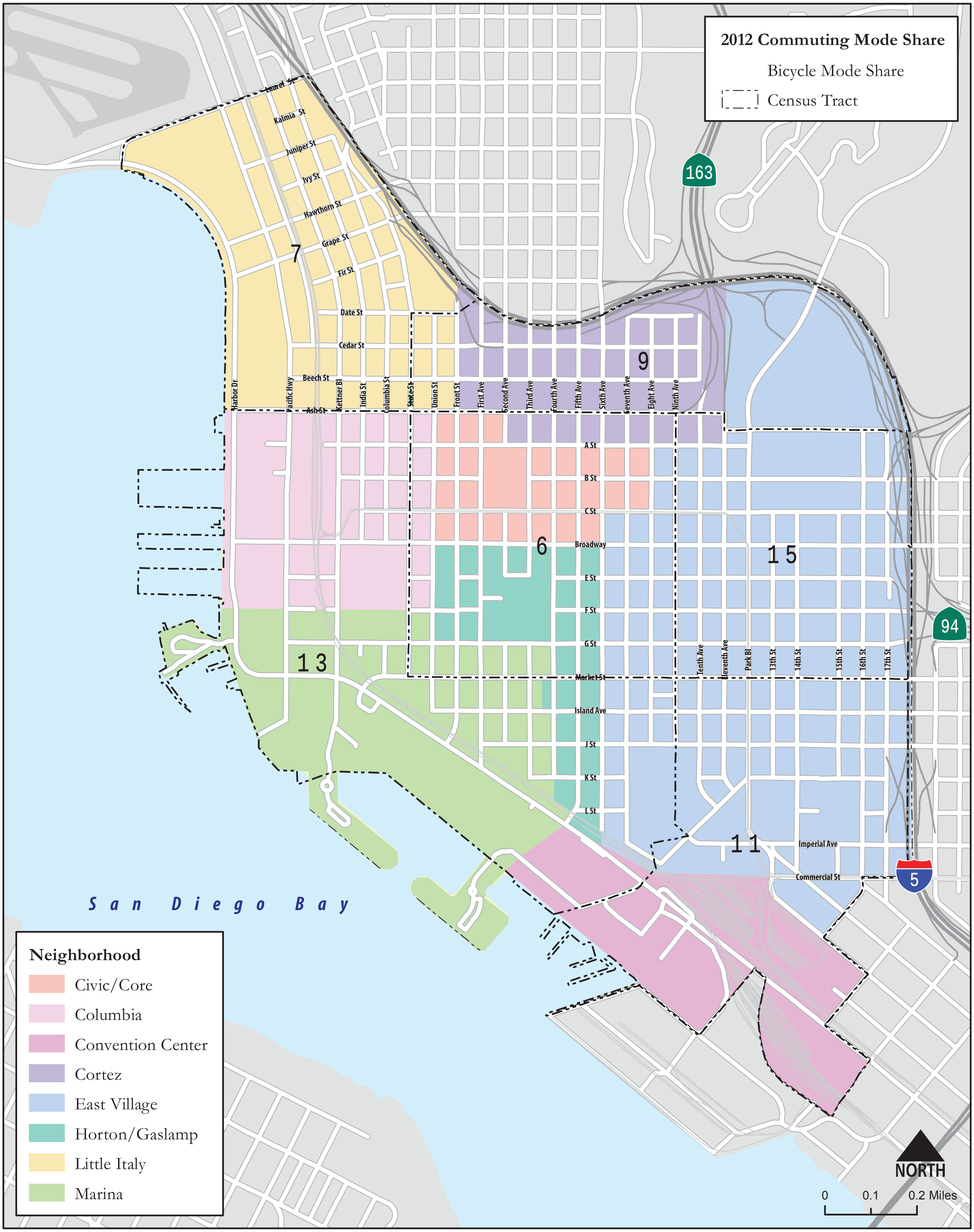


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Figure 4-9
2012 Bicycle Commute Mode Share by Census Tract

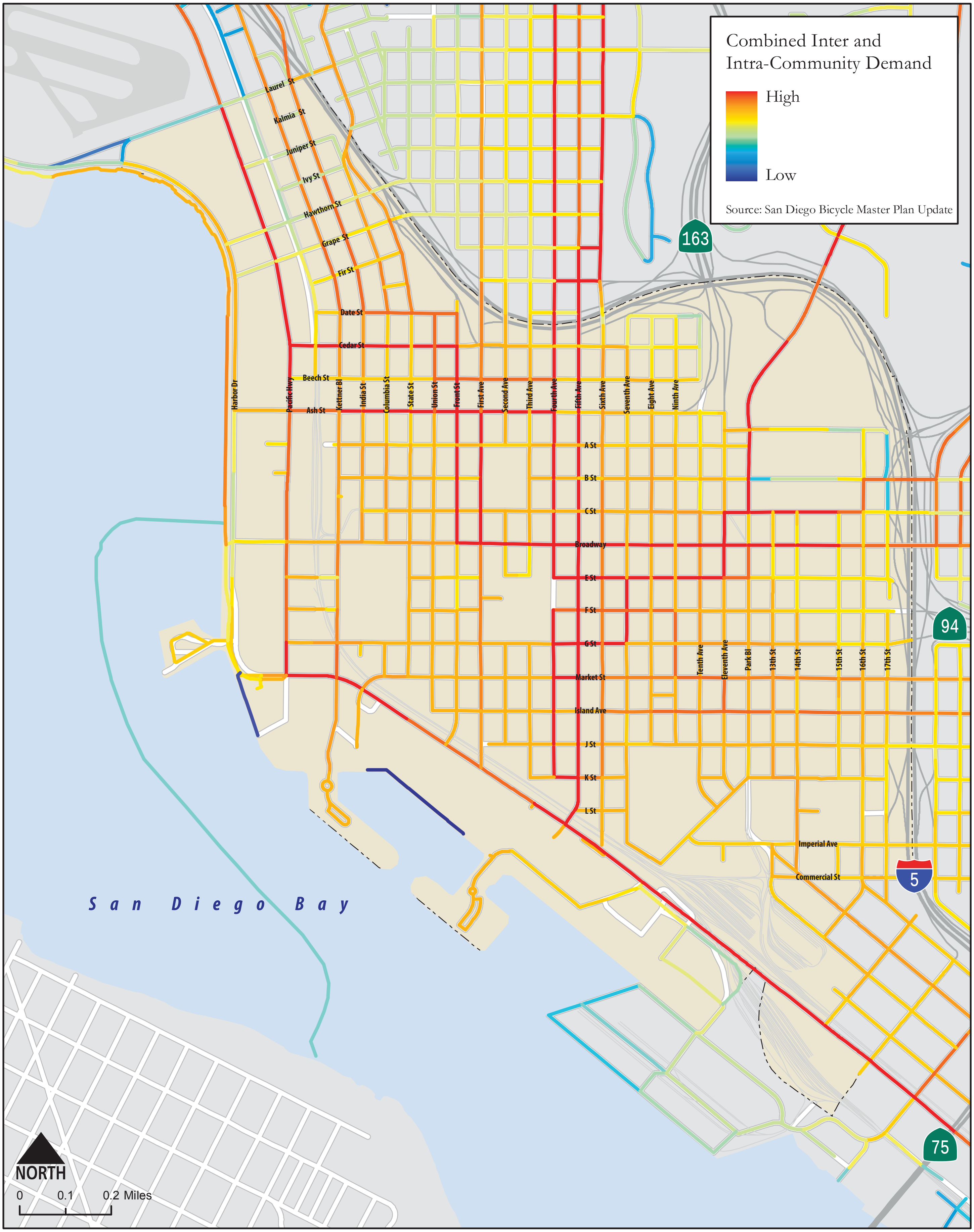

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Figure 4-10

City of San Diego Bicycle Master Plan Propensity Model

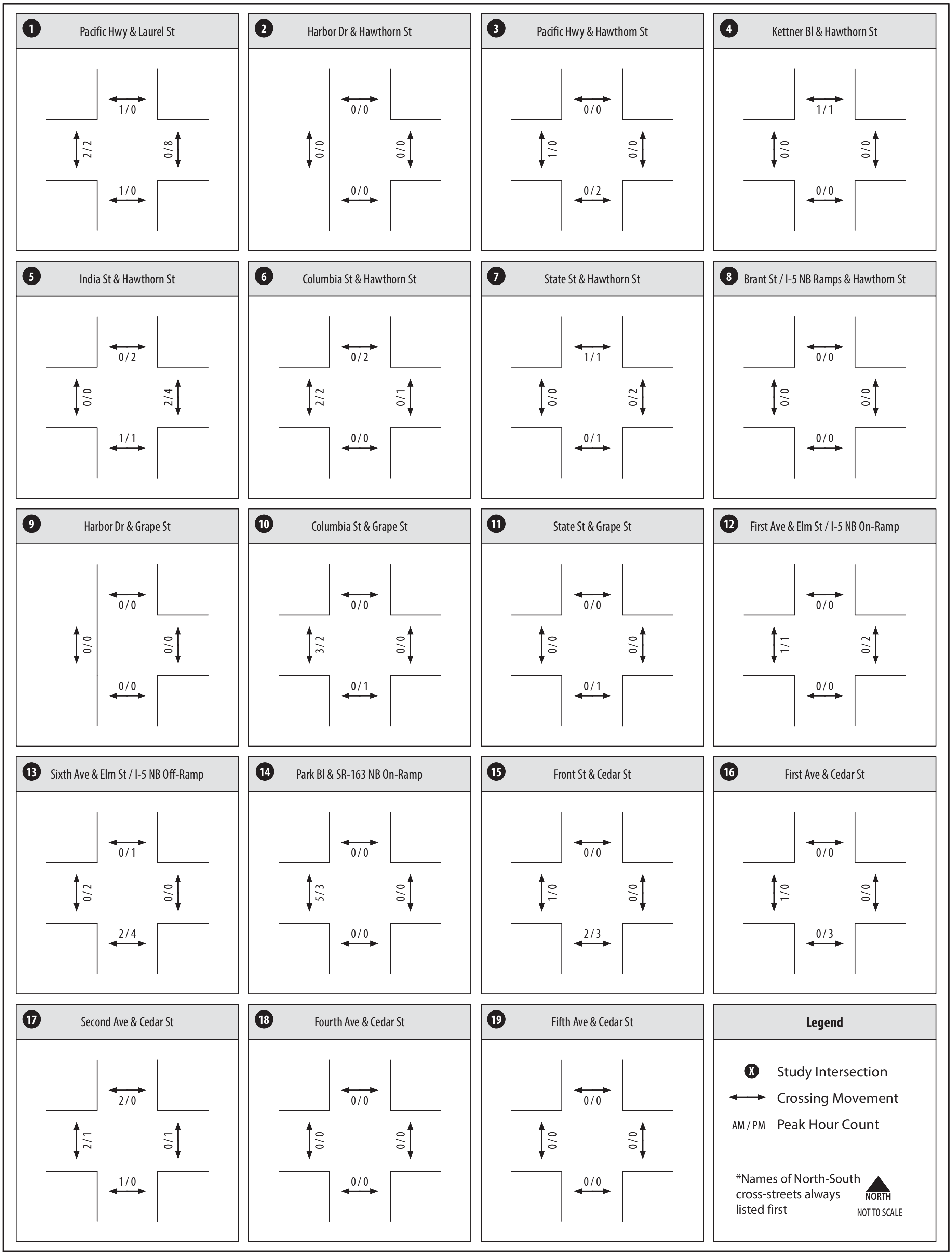

Figure 4-11

Existing AM/PM Peak Hour Bicycle Counts
(Intersections 1-19)

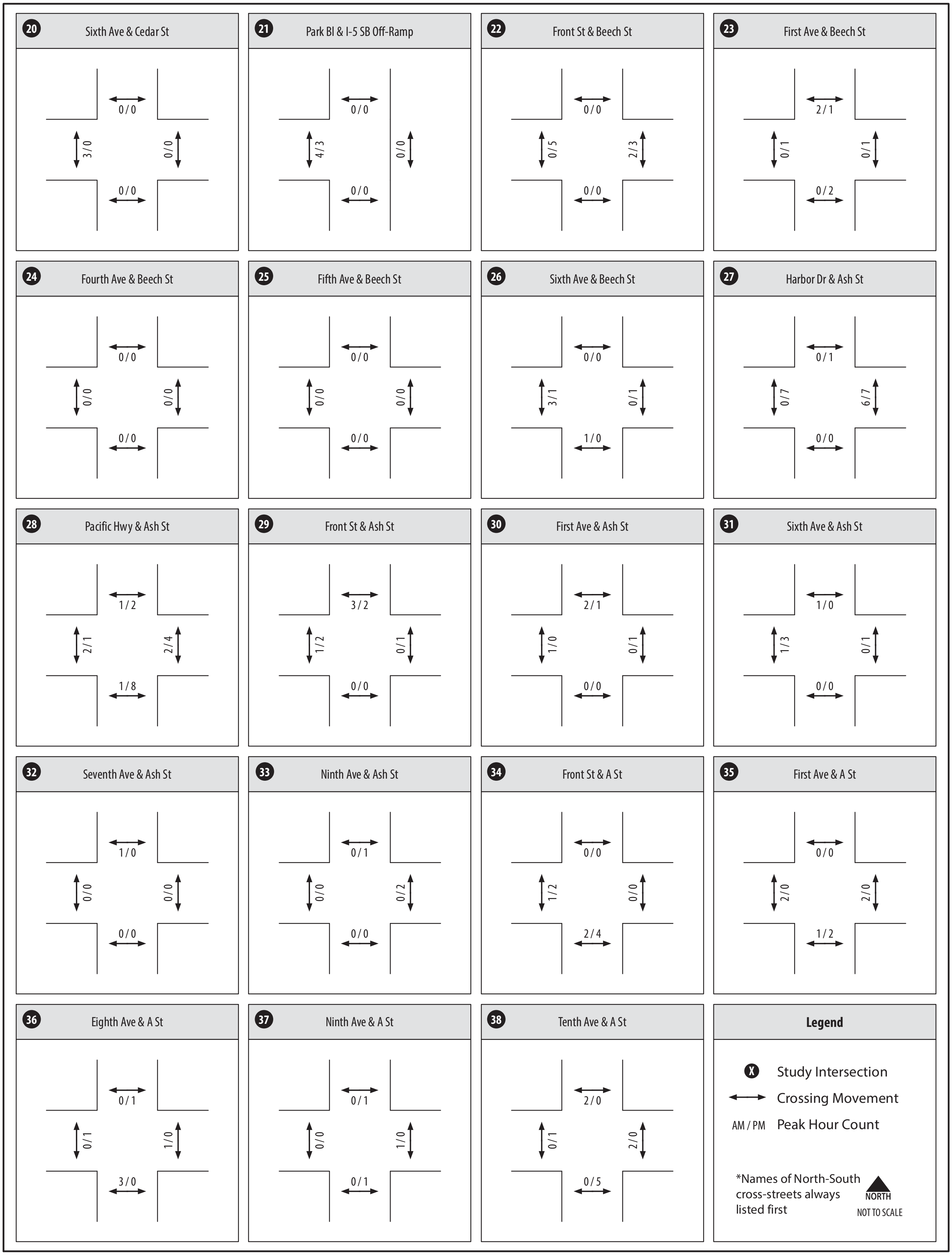

Figure 4-11

Existing AM/PM Peak Hour Bicycle Counts
(Intersections 20-38)

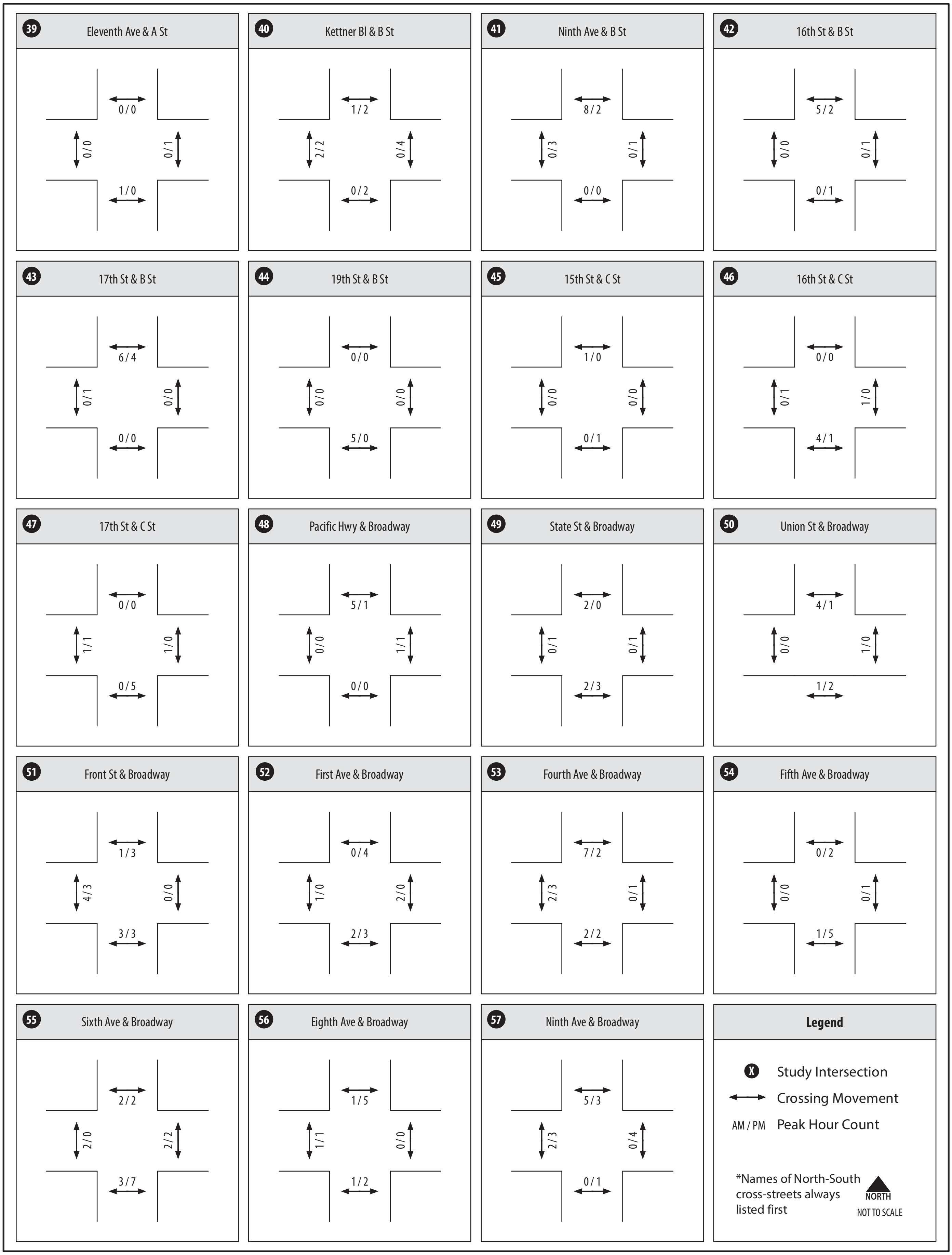

Figure 4-11

Existing AM/PM Peak Hour Bicycle Counts (Intersections 39-57)

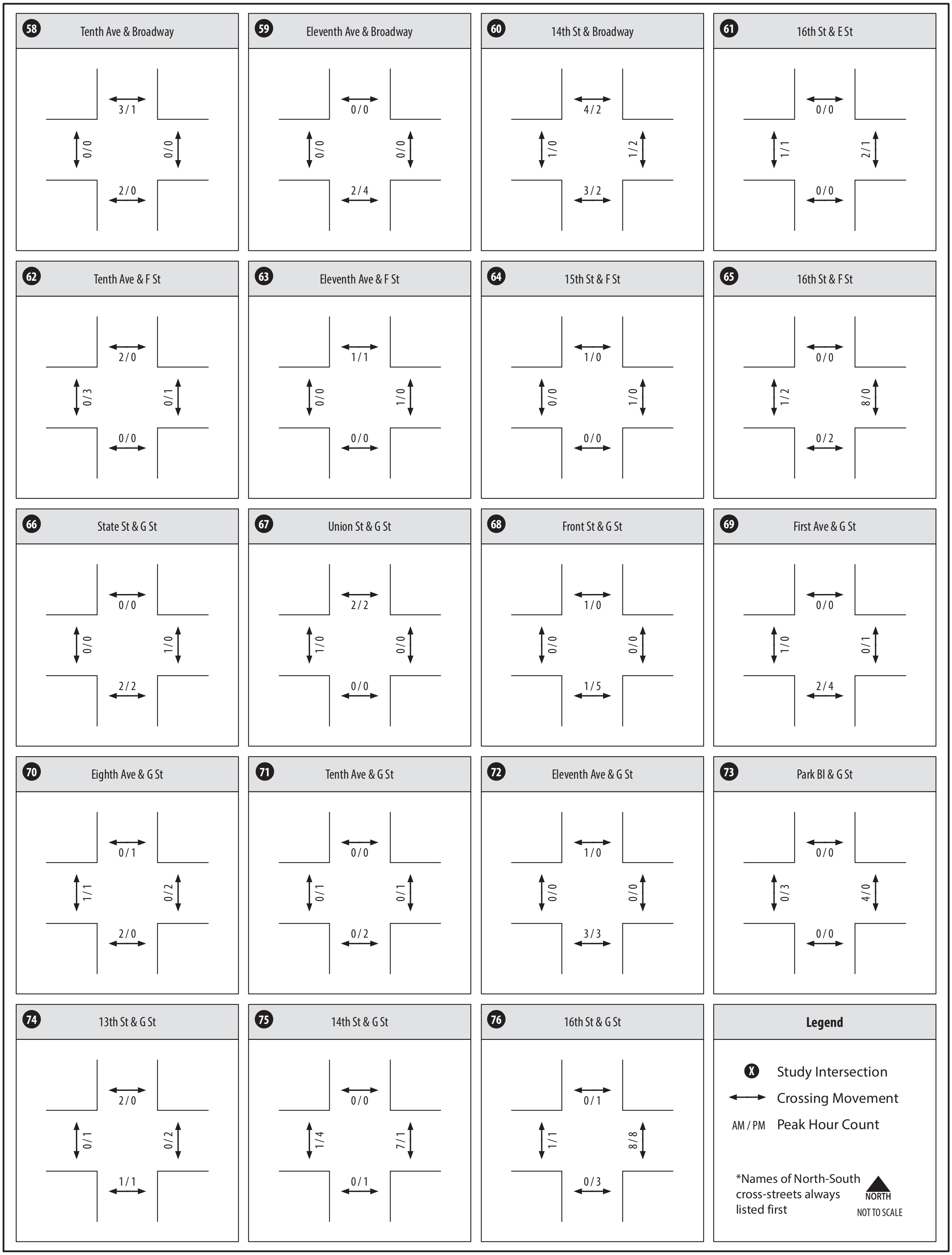

Figure 4-11

Existing AM/PM Peak Hour Bicycle Counts (Intersections 58-76)

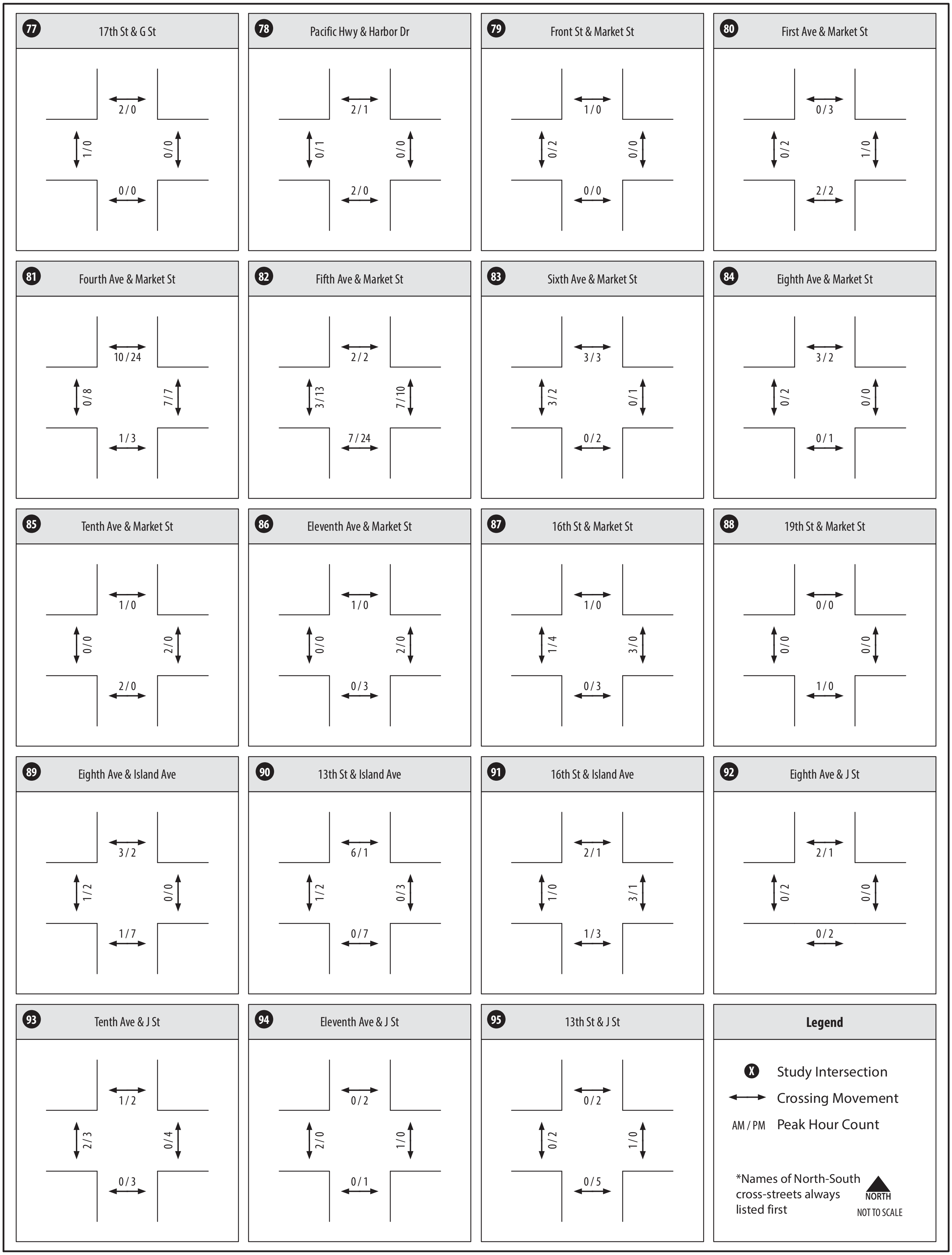

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Figure 4-11

Existing AM/PM Peak Hour Bicycle Counts (Intersections 77-95)

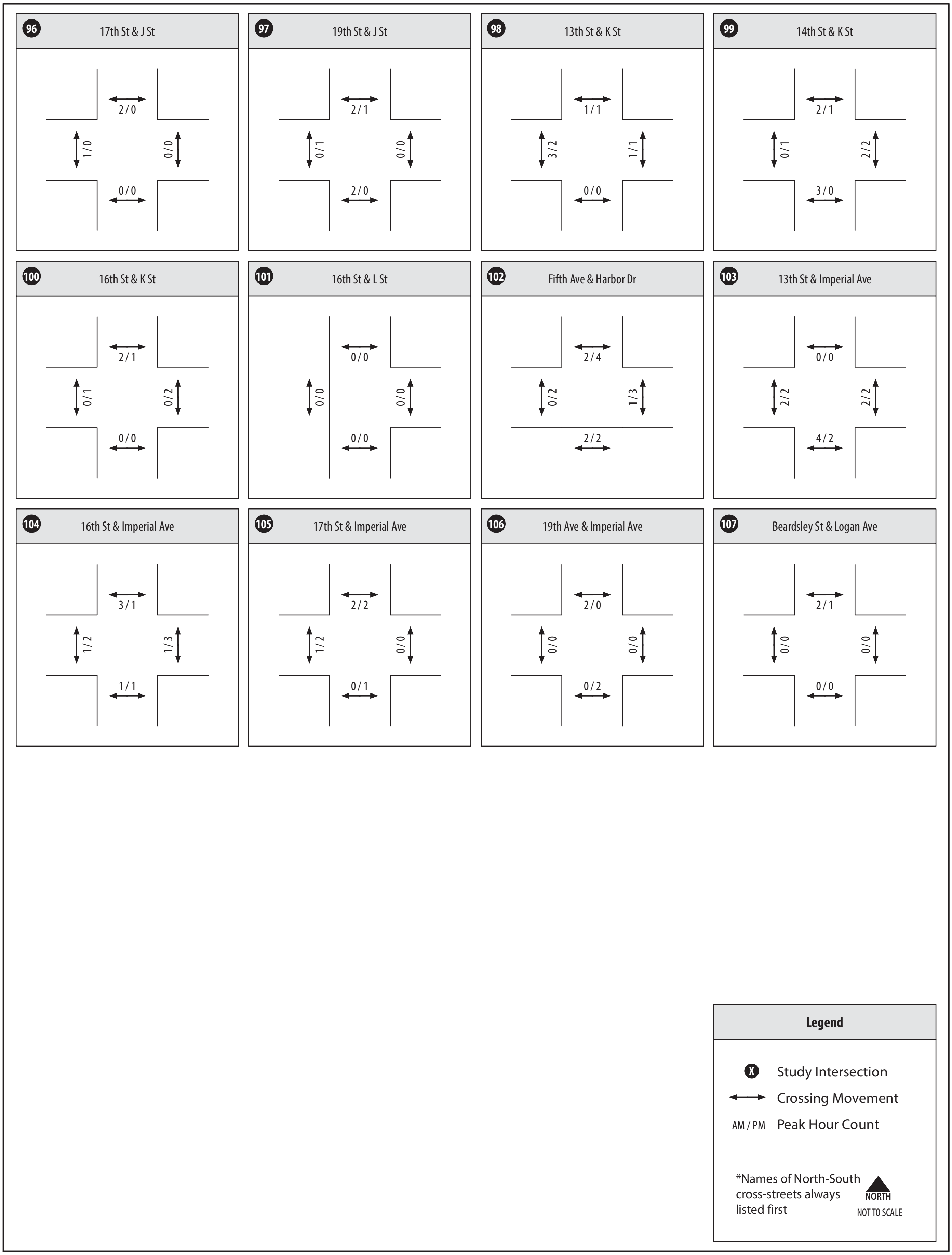

Figure 4-11

Existing AM/PM Peak Hour Bicycle Counts (Intersections 96-107)

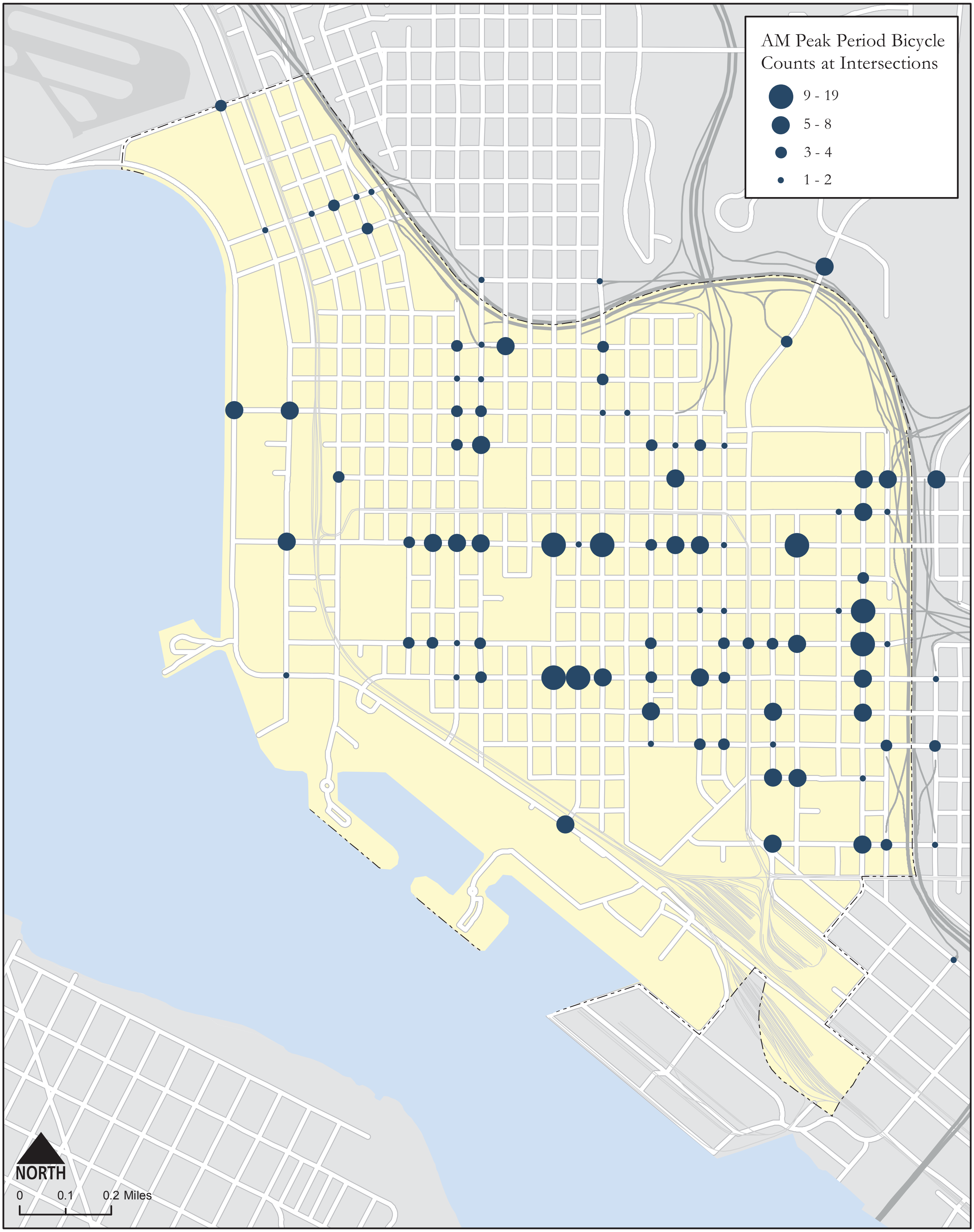

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Figure 4-12A
Bicyclists Counted at Study Intersections (AM Peak Hour)

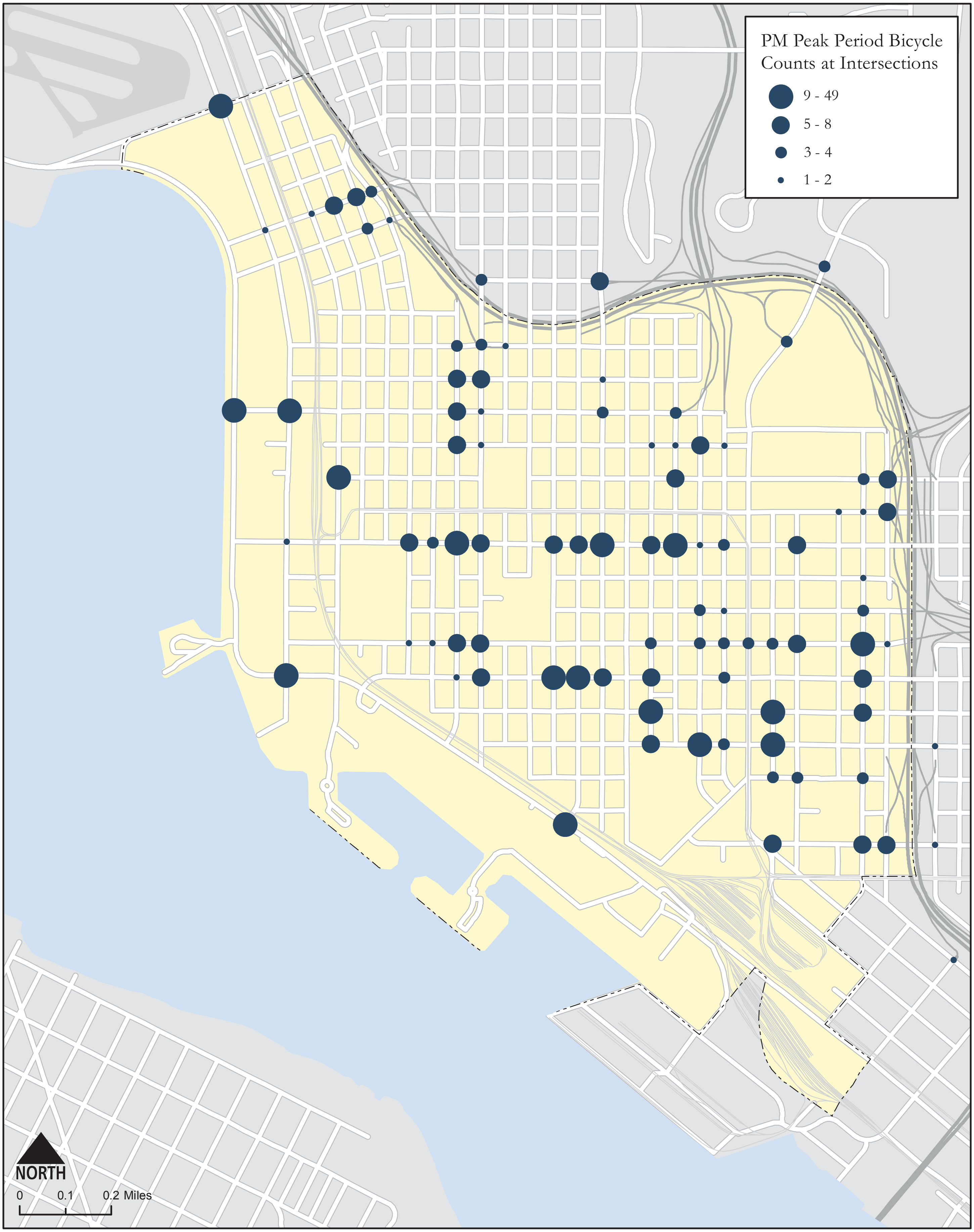

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Figure 4-12B

Bicyclists Counted at Study Intersections (PM Peak Hour)

Currently, the sole bicycle facility connecting Downtown San Diego and communities to the east is a Class III Bike Route along B Street, which connects to a Class II Bike Lane on Pershing Drive, just east of Interstate 5. Similarly, two east-west facilities, a Class III Bike Route along Broadway in Golden Hill and a Class II Bike Lane along Island Avenue in Southeastern San Diego, could potentially connect Downtown San Diego to communities to the east, but they abruptly terminate just east of Downtown. These network gaps signify a need for improved connectivity and present significant opportunity for improvement through this Downtown San Diego Mobility Plan effort.

When comparing Figures 4-12A and 4-12B, a slight increase in PM peak period bicycle activity can be noticed, with relatively higher volumes along Market Street, and at the west end of Ash Street and along Front Street. Additionally, observed PM bicycle volumes in the lower East Village were higher than AM peak activity, this evening increase was also observed for pedestrian activity.

Figure 4-13 presents bicycle counts across both north/south travel screenline, as wells as east/west screenline across Downtown San Diego, as collected in 2011 by San Diego State University's Active Transportation Research Center. Screenline counts were collected on weekdays during the 4PM to 6PM peak period. The figure also demonstrates the number of cyclists riding against traffic flows. The highest total number of cyclists counted was 112, recorded along Harbor Drive, between Ivy Street and Hawthorn Street. Broadway at Seventh Avenue experienced the second highest cycling volumes during this period, with 50 total cyclists during the PM peak period.

As shown in Figure 4-13, the highest rate of cyclists riding against the traffic flow occurs along G Street, between Sixth Avenue and Seventh Avenue, where 13 of the 17 cyclists were traveling against the traffic flow. The second highest rate of wrong way cycling occurred one block north, along F Street, between Sixth Avenue and Seventh Avenue, with 11 of the 18 cyclists riding against the traffic flow.

In addition to conducting the manual bicycle screenline counts, Active Transportation Research also manages a network of continuous automated counters, dispersed across the San Diego regional bicycle network. Data from the automated counters was used to calculate a peak period percentage, as a means to grow or extrapolate peak period manual counts into daily volume estimations. The 22 automated sites in San Diego found the weekday peak period mean volume to be 16.5% of total daily bicycle volumes. This finding is further supported by a recent study performed by Chen Ryan Associates in Maricopa County, Arizona which collected continuous counts over two-week periods at 44 locations. The study found the Maricopa County average weekday peak period percentage of total daily bicycle volumes to be 16.8%, very consistent with the 16.5% in San Diego County.

Using the San Diego weekday peak period percentage and the manual screenline counts from Figure 4-13, average daily north/south bicycle travel flows in Downtown San Diego can be estimated as approximately 1,770 cyclists, while the average daily east/west bicycle volume can be estimated as approximately 1,650 cyclists.

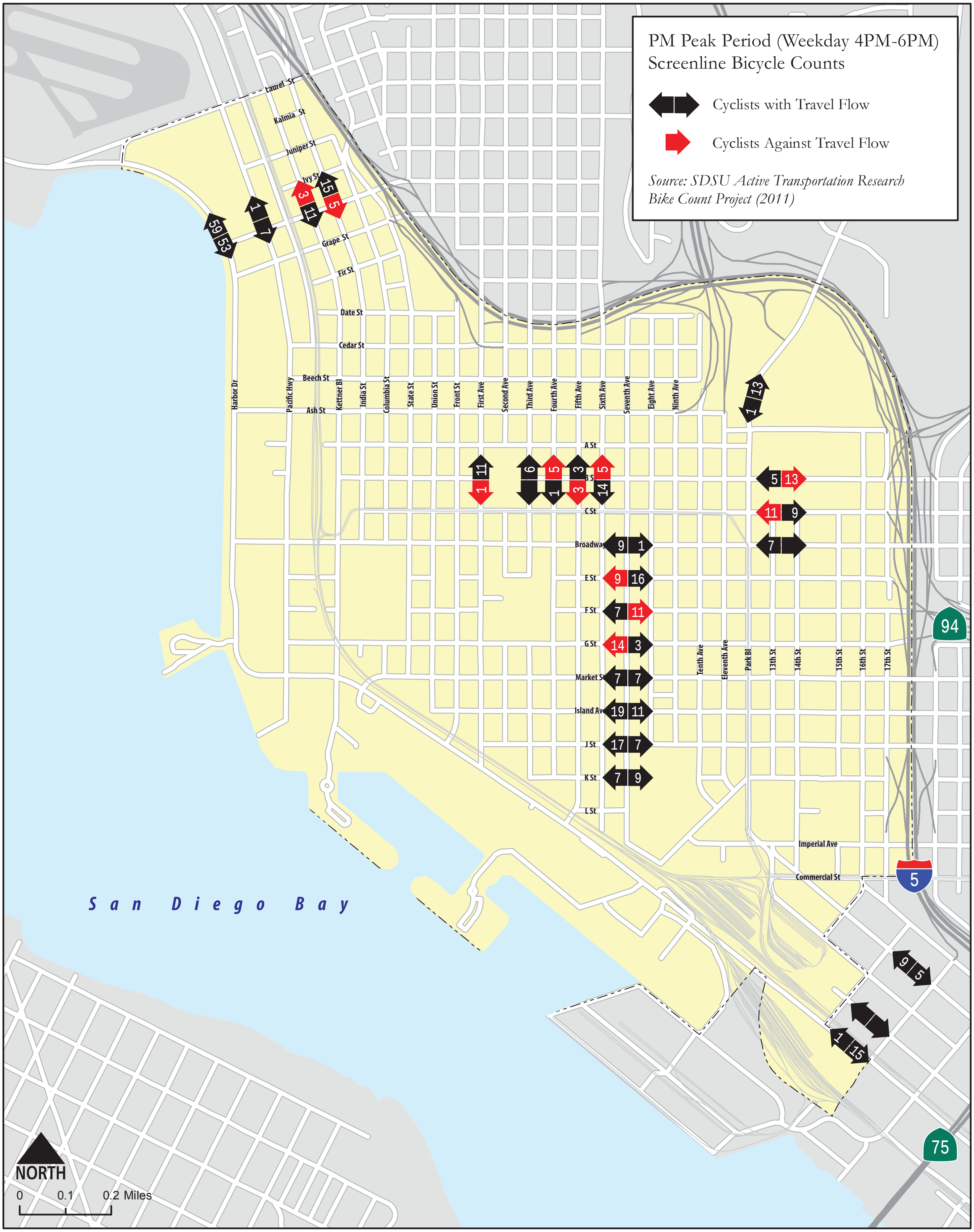

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Figure 4-13
PM Peak Period Screenline Bicycle Counts

Figure 4-14 displays the share of female cyclists along roadways in Downtown San Diego during the PM peak period from 4PM to 6PM. The lowest percentage of female cyclists was 0% on Kettner Boulevard, between Ivy Street and Hawthorn Street, and along Market Street, between Sixth Avenue and Seventh Avenue. The highest share of observed female cyclists was 33% on Fifth Avenue, between B Street and C Street. Overall, these findings show that men are riding bicycles at much higher rates than women, potentially indicating strong differences in how men and women feel about riding along the facilities or roadways currently available for cycling.

Figure 4-15 shows the percentage of cyclists from Figure 4-13 observed riding on the sidewalk. Within Downtown San Diego, sidewalk cycling rates ranged from a low of 0% along C Street, Broadway (east of Park Boulevard) and F Street, to a high of 63% of cyclists on sidewalks along B Street, east of Park Boulevard. Relatively higher sidewalk cycling rates are a strong indicator that cyclists do not feel comfortable using the bicycle facility, if present, or mixing with traffic. These environments may be uninviting due to a number of reasons, such as high vehicle volumes, high vehicle speeds, lack of bicycle facility, or no shoulder.

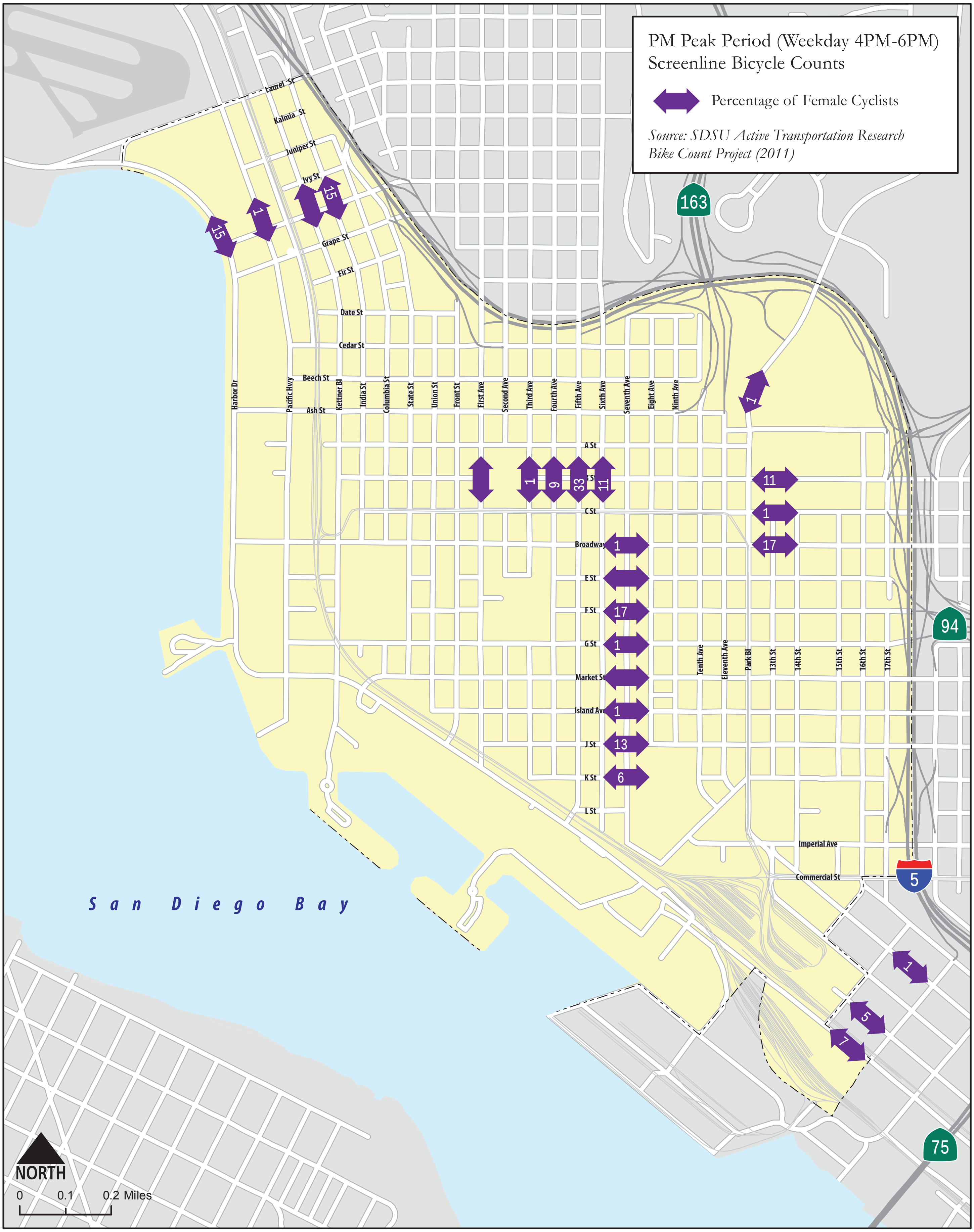
4.2.3 Bicycle Safety

Bicycle collision data was obtained from the City of San Diego for the period from 2008 to 2013. **Figure 4-16** displays the distribution and location of bicycle collisions across Downtown San Diego. Both Broadway and 16th Street, which were found to have relatively high bicycle volumes, experienced several bicycle collisions, including intersections where multiple collisions occurred. Additional corridors with noteworthy numbers of collisions include Fourth Avenue, Fifth Avenue, Market Street, Ash Street, and Park Boulevard.

During the five year collision analysis period, 11 bicycle involved collisions were recorded adjacent to San Diego City College and/or San Diego High School (along Park Avenue, B Street, and C Street). This finding, in an area with known trip attractors, indicates a need for safety enhancement considerations near the schools.

Tables 4-7A and **4-7B** summarize the reported bicycle-involved collisions.

During the five year period there were a reported 164 bicycle-involved collisions within Downtown San Diego. As shown in Table 4-7A, the most common collision cause was due to cyclists violating the vehicle's right-of-way (23.8%). As shown in Table 4-7B, broadside collisions were the most frequent collision type, accounting for just under half (49.4%) of bicycle involved collisions.



Downtown San Diego
Mobility Plan
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Figure 4-14
PM Peak Period Screenline
Bicycle Counts - Percentage of Female Cyclists

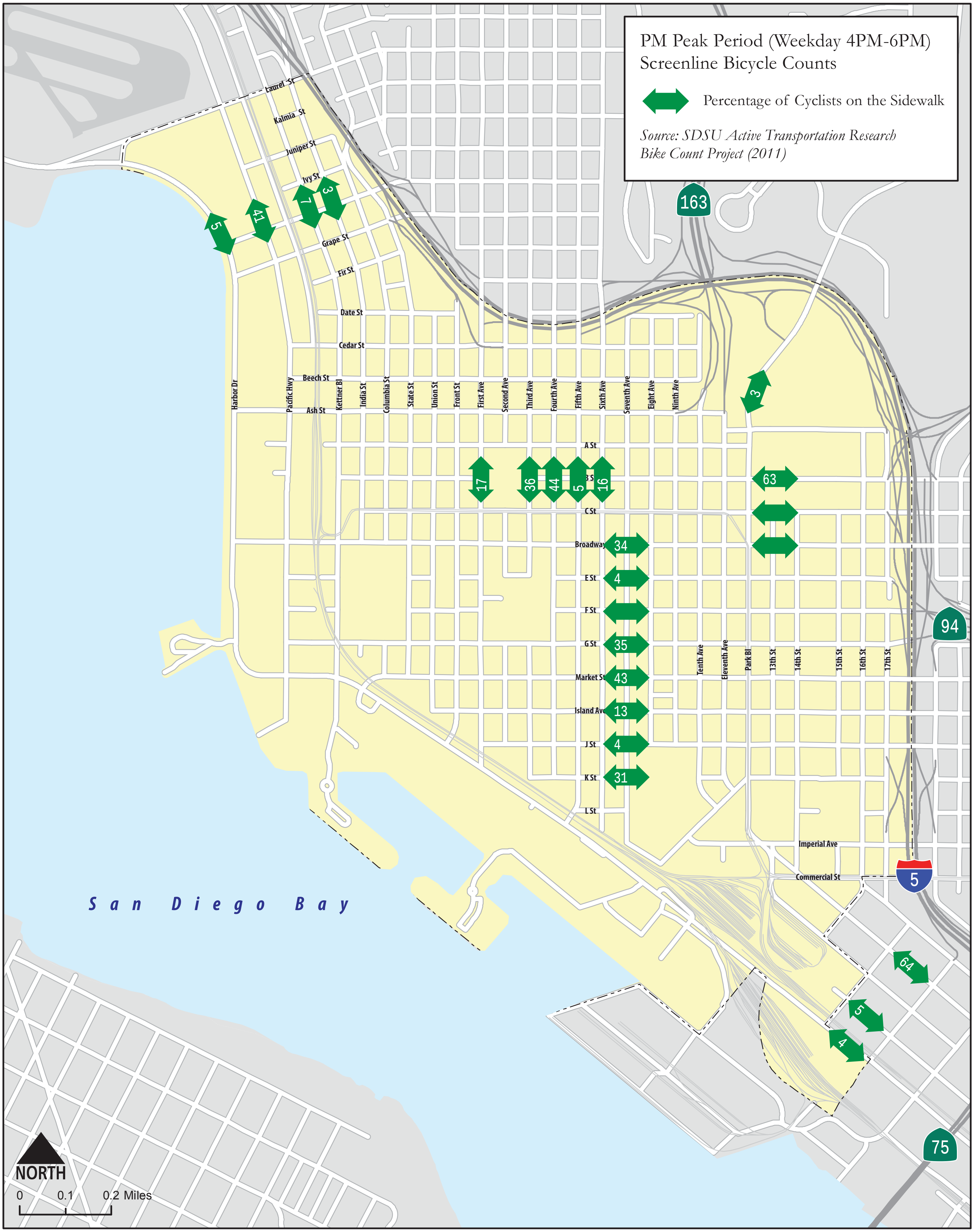

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Figure 4-15
PM Peak Period Screenline
Bicycle Counts - Percentage of Sidewalk Cyclists

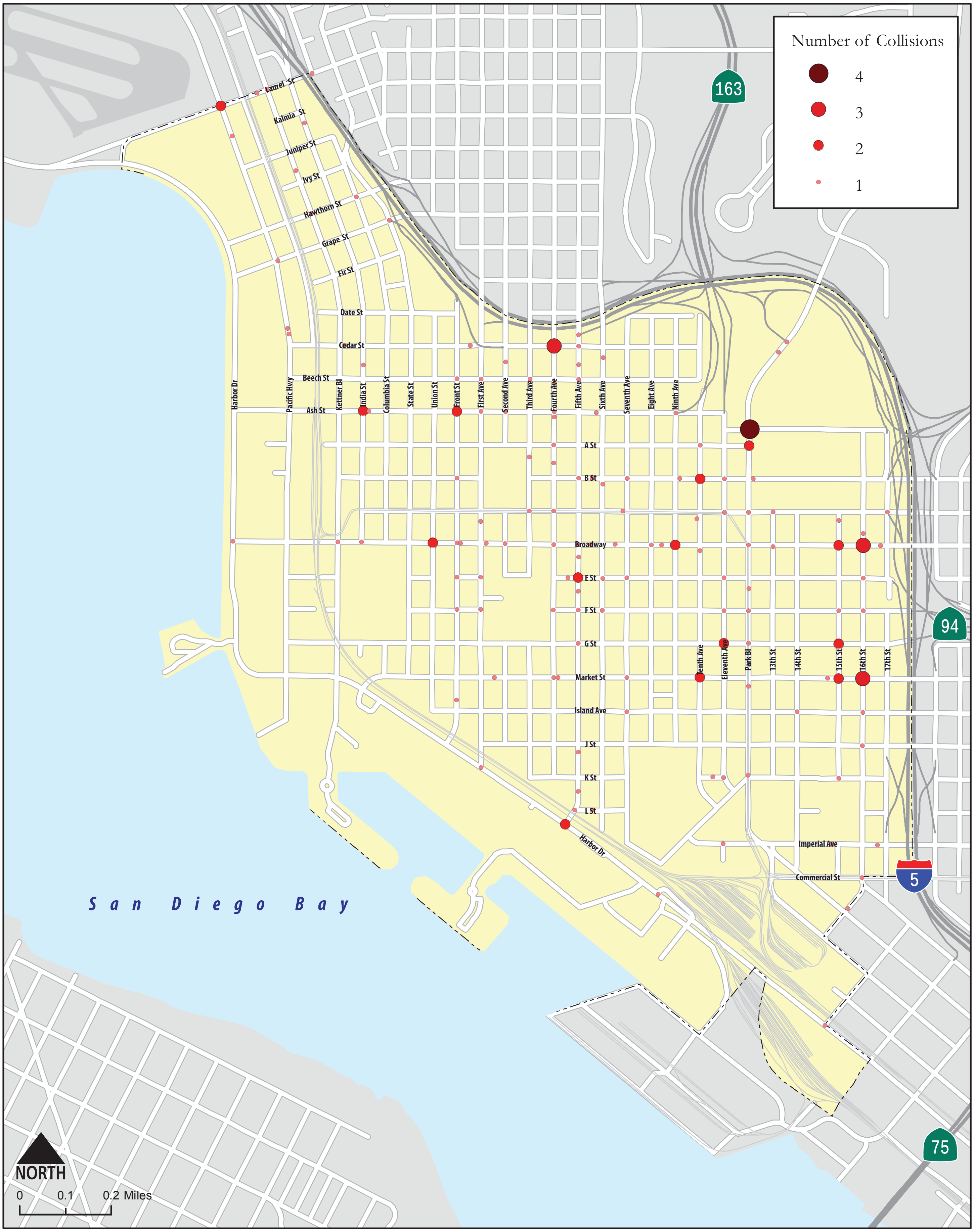

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Figure 4-16
Bicycle Collisions
(2008-2013)

Table 4-7A Collision Cause (Bicycle)

Primary Collision Cause	Collisions	Percent of Total
Violated Vehicle's R/W	39	23.8%
Unknown	34	20.7%
Speed Too Fast for Conditions	21	12.8%
Ran Traffic Signal	15	9.2%
Other	12	7.3%
Ran Stop Sign	10	6.1%
Not Paying Attention	9	5.5%
Fell Out/Off Vehicle	7	4.3%
D.U.I. or N/A	6	3.7%
Open Vehicle Door	5	3.1%
PK/R1 in R/W-Illegal	3	1.8%
Visibility Issue	3	1.8%
Total	**164**	**100%**

Source: SWITRS, Chen Ryan Associates; September 2014

Table 4-7B Collision Type (Bicycle)

Collision Type	Collisions	Percent of Total
Right-Angle (Broadside)	81	49.4%
Sideswipe	29	17.7%
Overturned in Road	13	7.9%
Rear-End	9	5.5%
Non-Collision Accident	8	4.9%
Hit Parked Vehicle	7	4.3%
Hit Object	6	3.7%
Head-On	6	3.7%
Vehicle - Pedestrian	4	2.4%
Not Stated	1	0.5%
Total	**164**	**100%**

Source: SWITRS, Chen Ryan Associates; September 2014

4.2.4 Benefits of Bicycling

Many cities and regional planning agencies are placing increased emphasis on bicycle infrastructure and creating more bicycle friendly environments. Bicycling is one tool that can positively contribute to the many complex issues facing Downtown San Diego and the San Diego region, including, public health, traffic congestion, emissions reductions and economic benefits.

The following benefits can be highlighted from various recent research efforts conducted in the U.S.

Health Benefits

- For substantial health benefits, adults should perform at least 150 minutes a week of moderate-intensity aerobic activity, such as bicycling[1].
- A San Francisco Bay Area study found that increasing biking and walking from 4 to 24 minutes a day on average would reduce cardiovascular disease and diabetes by 14% and decrease greenhouse gas emissions by 14%[2].
- The health benefits of Ciclovia events (temporary road closure that are open to bikes) outweigh the costs by a factor of up to 4:1[3].

Environmental Benefits:

- The air quality improvement and reduced greenhouse gas emissions due to bicycling in Wisconsin is worth more than $90 million every year[4].
- Increasing bicycling trips with a corresponding decrease in automobile trip lengths, by as little as 1 to 3 miles on average, can have a significant effect on emissions and fuel consumption[5].

Economic Benefits:

- After the construction of a protected bike lane on 9th Avenue in New York City, local businesses saw a 49% increase in retail sales, compared to a 3% increase in Manhattan[6].
- Shifting travel from driving to biking can reduce external costs (costs paid by society) by 25 cents per mile in average conditions and 50 cents per mile in heavy urban traffic.
- The Wisconsin bicycle industry brings $556 million and 3,420 jobs to the state[7].

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[1] U.S. Department of Health and Human Services. "2008 Physical Activity Guidelines for Americans," (2008).
[2] Maizlish, N. et al., "Health Cobenefits and Transportation-Related Reduction in Greenhouse Gas Emissions in the San Francisco Bay Area," *American Journal of Public Health* 103(4) (2013): 703-9.
[3] Montes, F., et al., "Do health benefits outweigh the costs of mass recreational programs? An economic analysis of four Ciclovia programs," *Journal of Urban Health* 89 (2012): 153-70.
[4] Grabow, M., et al., "Valuing Bicycling's Economic and Health Impacts in Wisconsin," The Nelson Institute for Environmental Sciences (2010).
[5] Gotschi, T., Mills, K., "Active Transportation for America: The Case for Federal Investment in Bicycling and Walking," Rails-to-Trails Conservancy (2008).
[6] New York City Department of Transportation. "Measuring the Street: New Metrics for 21st Century Streets," (2012).
[7] Bicycle Federation of Wisconsin and the Wisconsin Department of Transportation. "The Economic Impact of Bicycling in Wisconsin," (2006).

4.3 Transit First

Transit opportunities in Downtown San Diego are provided by the Metropolitan Transit System (MTS), offering both bus and Light Rail Trolley services, North County Transit District (NCTD) operating the Coaster commuter rail, and Amtrak which operates passenger train. The currently adopted citywide General Plan Mobility Element identifies the following goals for transit service and travel:

- *An attractive and convenient transit system that is the first choice of travel for many of the trips made in the City.*
- *Increased transit ridership.*

The Downtown Community Plan identifies the following goals for transit services:

- *A land use pattern that supports a flexible, fast, frequent, and safe transit system, providing connections within Downtown and beyond.*
- *Increased transit use among Downtown residents, workers, and visitors.*

The following sections in this chapter describe the various transit facilities, modes, and services within Downtown San Diego.

4.3.1 Existing Transit Service and Facilities

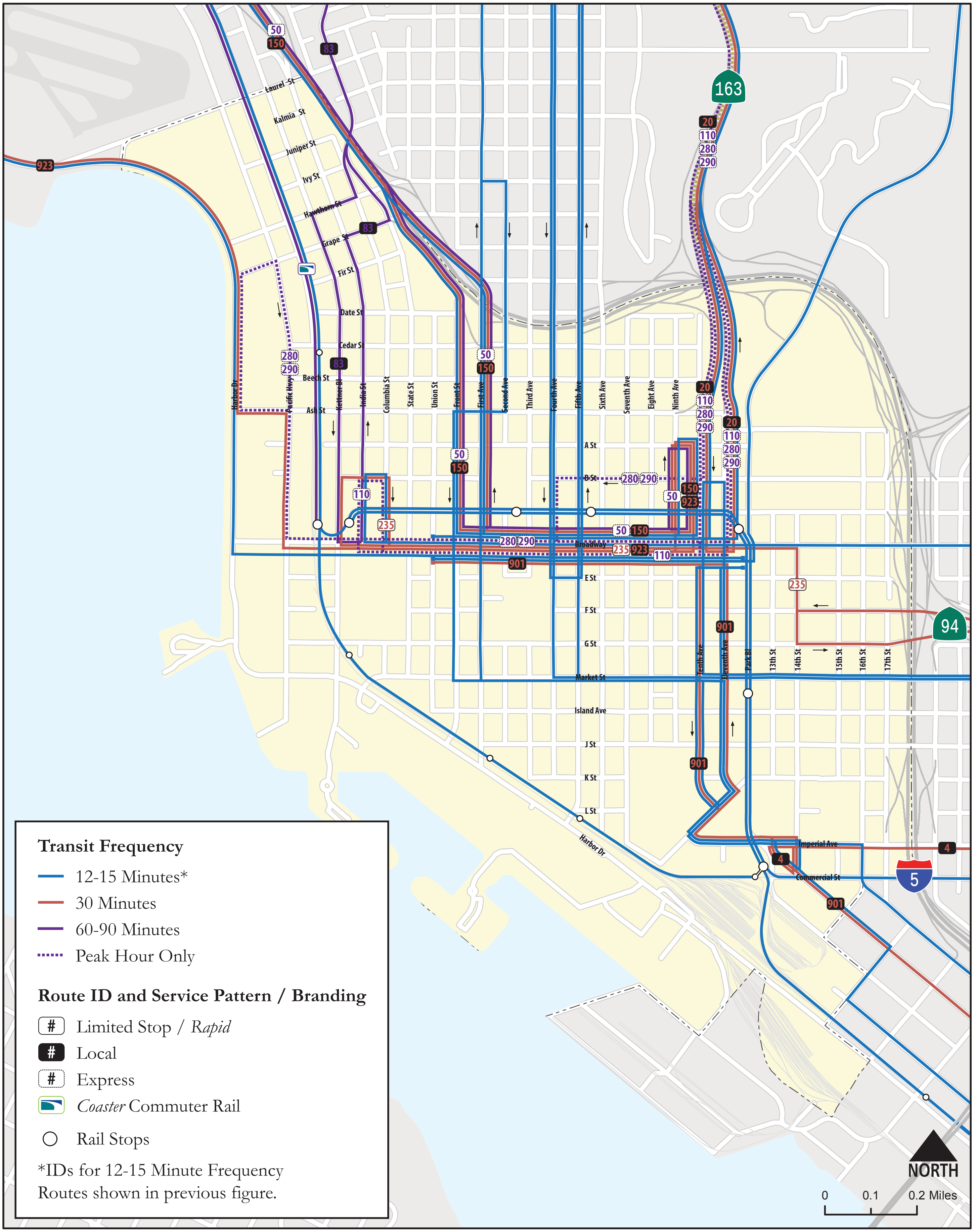
Figure 4-17 displays the existing high frequency transit network, defined as routes with headways of 15 minutes or less during the majority of operating hours, inclusive of Trolley, Rapid Bus, and Local Bus.

Figure 4-18 displays transit frequency for all routes within the Downtown area.

As shown, Downtown San Diego is comprised of a relatively dense transit network. Broadway, Market Street, Front Street, First Avenue, 4th Avenue, 5th Avenue, 10th Avenue and 11th Avenue currently serve as transit corridors, each with multiple bus routes.

In total, there are 25 transit lines that service Downtown San Diego, with 128 transit stops. A description of each of the local bus routes and Trolley Lines follows, while maps of the route extent can be found in **Appendix D**.

Figure 4-17
High Frequency Transit Network



Downtown San Diego Mobility Plan

CHEN RYAN

Figure 4-18
Transit Frequency

Bus Transit

Route 2 – Runs from India Street and C Street in Downtown San Diego to 30th Street and Adams Avenue in North Park via Broadway/C Street/30th Street. Route 2 currently runs between 5:10AM and 1:00AM on weekdays and Saturdays, and 6:30AM and 10:39PM on Sundays and holidays. Route 2 runs at 11-minute headways during its peak and 15, 30 and 60-minute headways during the off-peak periods, including all day on Sundays and holidays.

Route 3 – Runs from the UCSD Medical Center in Hillcrest, southerly along 4th Avenue to Downtown San Diego, then easterly along Market Street to Sherman Heights, Logan Heights, and Mountain View, and then terminates at the Euclid Avenue Trolley Station in the community of Encanto. Route 3 currently runs between 4:49AM and 12:10AM on weekdays; 5:26AM and 12:10AM on Saturdays; and 5:36AM and 8:06PM on Sundays. Route 3 runs at 15-minute headways during its peak period and 30-minute or 1 hour headways during off-peak periods, including all day on Sundays and holidays.

Route 4 – Runs from the 12th and Imperial Transit Center in Downtown San Diego to Paradise Valley Road in the community of Paradise Hills. This route runs along Imperial Avenue easterly from the 12th and Imperial Transit Center, then through Southeastern San Diego and Encanto, serving the 32nd & Commercial Trolley Station, the Euclid Avenue Trolley Station and the Encanto/62nd Trolley Station. Route 4 currently runs between 4:46AM and 11:47PM on weekdays; 5:46AM and 11:15PM on Saturdays; and 5:46AM and 8:50PM on Sundays. Route 4 runs at 30-minute headways during the weekdays and on Saturdays, and at 1-hour headways on Sundays.

Route 5 – Runs from 10th and Broadway in Downtown San Diego to the Euclid Avenue Trolley Station in Encanto. Route 5 runs along 10th Avenue and 11th Avenue in Downtown San Diego, then runs easterly along Market Street through Southeastern San Diego and Encanto to the Euclid Avenue Trolley Station. Route 5 currently runs between 4:49AM and 11:24PM on weekdays; 5:20AM and 9:39PM on Saturdays; and 5:50AM and 8:40PM on Sundays. Route 5 runs at 15-minute headways during its weekday peak period, and 30-minute headways during the remaining hours of service.

Route 7 – Runs from Downtown San Diego to La Mesa, via North Park and City Heights. In Downtown San Diego, Route 7 originates at Front Street and B Street, then runs east along Broadway and northeasterly along Park Boulevard. Route 7 runs from 4:38AM to 2:01AM Monday through Friday with 6- to 7-minute peak directional headways (into Downtown during morning peak, away from Downtown during evening peak) and 12-minute headways in the off-peak direction, during the peak hours. During off-peak hours, headways range from 15- to 30-minutes. On Saturdays, the route runs from 5:32AM to 1:32PM with 12-minute to 30-minute headways. On Sundays, the route runs from 6:27AM to 11:13PM with headways ranging from 12-minute to 30-minute headways.

Route 11 – Runs from San Diego State University (SDSU) in the College Area Community to Downtown San Diego, then to Paradise Valley Road in the community of Paradise Hills. Route 11 enters Downtown from 2nd Avenue and then heads west on Ash Street until southbound along Front Street, followed by eastbound on Market Street and then continuing on 10th avenue until reaching Imperial Avenue which the route follows eastbound until exiting Downtown. Route 11 currently runs between 4:29AM and 11:38PM on weekdays; 4:40AM and 11:38PM on Saturdays; and 5:21AM and 9:42PM on Sundays. Route 11 operates with 7- to 8-minute peak directional headways (into Downtown during morning peak, away from Downtown during evening peak) and 15-minute headways in the off-peak direction, during the peak hours. During non-peak hours, Route 11 runs with 15-minute to 1-hour headways. Route 11 runs at 15-minute headways during its weekday peak period, and 30-minute headways during the remaining hours of service.

Route 20 – Runs from Downtown San Diego to Rancho Bernardo via Kearny Mesa and Fashion Valley as an express route. Route 20 enters and exits downtown via SR-163 and 10th Avenue and 11th Avenue, the route continues along Broadway until going north on India Street, east on B Street and then south on Columbia Street until Broadway where the route returns to the origin. Mondays through Fridays, the route operates from 4:55AM to 8:39PM, with headways of 15 to 30-minutes during the peak periods up to 1-hour in the off peak. On Saturdays, the route runs from 5:40AM to 8:10PM with headways ranging from 30 to 60-minutes. On Sundays and Holidays, the route operates at 1-hour headways from 6:10AM to 8:10PM.

Route 30 – Currently runs from Downtown San Diego to UTC via Old Town, Pacific Beach and La Jolla. Route 30 enters Downtown from Interstate-5 at Front Street, continuing south until reaching Broadway and heading east. At 9th Avenue the route heads north briefly until east on A Street and retuning back to Broadway via 10th Avenue. The route operates between 5:09AM and 6:56PM with 15 to 30-minute headways all day. Saturdays, the route only leaves Downtown from 5:24 to 6:54AM with 30-minute headways. On Sundays, the route only departs out of Downtown from 5:46 to 7:46AM with 30-minute headways.

Route 50 – Runs from Downtown San Diego to University City via Clairemont as an express route. The route enters Downtown from Interstate-5 at Front Street, continuing south until reaching Broadway and heading east. At 9th Avenue the route heads north briefly until east on A Street and returning back to Broadway via 10th Avenue. Mondays through Fridays, the route operates from 4:58AM to 6:00PM, with 30-minute headways during the peak period to 1-hour in the off-peak. This route does not operate on the weekends or holidays.

Route 83 – Runs from Downtown San Diego to Mission Hills/Hillcrest via Reynard Way. The route enters Downtown from Bankers Hill via Hawthorn Street, continuing west until heading south on Kettner Boulevard until reaching its destination in Downtown of Santa Fe Depot, then the bus runs back up India Street in Little Italy returning to Banker Hill via Grape Street. Mondays through Fridays, this route operates from 6:04AM to 6:04PM with 1-hour headways. This route does not operate on weekends or holidays.

Route 110 – Operates as an express route between Downtown San Diego and Mira Mesa via Interstate-15 and SR-163. Upon entering Downtown, the route continues along 10th Avenue until heading westbound along Broadway until India Street where the route terminates. The route runs Monday through Friday with four morning southbound buses leaving Mira Mesa between

6:00AM to 7:06AM at the origin and four northbound afternoon buses leaving Downtown from 3:59PM to 5:19PM. There are three morning and three afternoon stops within Downtown (See the map for Route 20).

Route 120 – Currently Runs from Downtown San Diego to Kearny Mesa via Hillcrest and Fashion Valley. Route 120 enters Downtown while heading south on 4th Avenue and continuing until reaching Broadway and heading east briefly until returning north up 5th Avenue. This route operates from 5:01AM to 11:06PM with 15 to 30-minute headways all day. Saturdays, the route operates from 5:44AM to 9:43PM with 30 to 60 minute headways. On Sundays, the route runs from 6:13AM to 9:12PM with headways ranging from 30-minutes to 1-hour.

Route 150 – Currently runs from Downtown San Diego to University City via Old Town as an express route. The route enters Downtown from Interstate-5 at Front Street, continuing south until reaching Broadway and heading east. At 9th Avenue the route heads north briefly until east on A Street and returning back to Broadway via 10th Avenue. This bus only operates Mondays through Fridays between 5:55AM and 5:53PM, with headways ranging from 13-minutes during the peak periods to 1-hour in the off peak (See the map for Route 50).

Route 215 – Is a rapid bus route running from Downtown San Diego to SDSU via El Cajon Boulevard. From the Downtown origin at American Plaza Trolley Station / Santa Fe Depot Transit Center the route heads east along Broadway until heading northerly on 11th Avenue, A Street, and Park Boulevard. The route continues north on Park Boulevard until heading west on El Cajon Boulevard to the College Area, where the route then heads north on College Avenue to SDSU. Mondays through Fridays the route operates from 4:35AM to 1:26AM ranging from 10-minute headways during peak periods to 30-minute headways during the off-peak. Saturdays and Sundays, the route operates from 4:50AM to 12:56AM with headways ranging from 15 to 30-minutes.

Route 235 – Operates as a rapid bus route between Downtown San Diego and Escondido via Interstate 15 and State Route 163. The route originates in Downtown San Diego at the Santa Fe Depot Transit Center and then heads east along Broadway until reaching 14th Street where the route continues south briefly. At G Street the route heads east and continues on State Route 94 to the 15 freeway where the route continues north until exiting at Clairemont Mesa Boulevard heading west. From Clairemont Mesa Boulevard, Route 235 continues north on SR-163, merging with I-15 and continuing until Escondido. Monday through Friday Route 235 operates from 4:38AM to 11:48PM with 12 to 15-minute headways during peak periods and 30 minute headways during non-peaks. Saturdays and Sundays Route 235 operates from 4:38AM to 11:18PM with 30-minute headways throughout the day.

Route 280 – Is a rapid express route that runs from Downtown San Diego to Escondido via Interstate 15/SR-163. Route 280 enters Downtown from the SR-163/10th Avenue and continues south until heading westerly via B Street, 4th Avenue, and Broadway. The route heads north at Pacific Highway, Ash Street, then along Harbor Drive to Grape Street. The route only arrives in Downtown San Diego from 5:55AM to 9:00AM Monday through Friday at headways of 15 to 30-

minutes. The route only departs from Downtown between 2:57 and 5:57PM Mondays through Friday, with headways ranging from 15 to 30-minutes.

Route 290 – Is a rapid express route that runs from Downtown San Diego to Rancho Bernardo via Saber Springs along the Interstate 15. Route 290 enters Downtown from the SR-163/10th Avenue and continues south until heading westerly via B Street, 4th Avenue, and Broadway. This route only arrives in Downtown between 6:06AM to 9:08AM with headways ranging from 10 to 30-minutes. This route only departs from Downtown between 2:54PM and 5:54PM with headways ranging from 10 to 30-minutes. (See map for Route 280).

Route 901 – This route runs from Downtown San Diego to Iris Trolley Station via Coronado and Imperial Beach. Route 901 enters Downtown westbound on Imperial Avenue, then heading northeasterly on Park Boulevard and 11th Avenue, then westbound along Broadway. The route then continues north on Front Street until B Street. Mondays through Fridays, the route runs from 5:02AM to 1:17AM with headways ranging from 15 to 30-minutes in the peak periods to 1-hour in the off peak periods. Saturdays, the route runs from 5:17AM to 1:17AM with headways ranging from 30-minutes to 1-hour. On Sundays, the route runs from 6:32AM to 11:02PM with headways ranging from 1 to 1 and a half-hours.

Route 923 – Runs from Downtown San Diego to Ocean Beach. Route 923 enters Downtown heading southbound on Harbor Drive, Ash Street, and Pacific Highway. The route turns east on Broadway until completing a loop at 9th Avenue, A Street, and 10th Avenue and then returning. This route operates between 5:41AM and 6:39PM, Mondays through Fridays, with headways ranging of 30-minutes all day. This route does not operate out of Downtown San Diego on the weekends or holidays.

Route 929 – Runs from Downtown San Diego to Otay Nestor via National City and Chula Vista. Route 929 enters Downtown westbound on Imperial Avenue, then heading northeasterly on Park Boulevard and 11th Avenue, before heading back south at Broadway. Monday through Fridays, the route operates from 5:11AM to 1:54AM, with headways of 12 to 15-minutes during the peak periods to 30-minutes to 1-hour during the off peak periods. On Saturdays, the route operates from 5:26AM to 1:55AM with headways of 20 to 30-minutes during the peak hours to 1-hour in the off peak periods. On Sundays, the route runs from 6:26AM to 8:52PM with headways ranging from 20-minutes to 1-hour.

Route 992 – Runs from Downtown San Diego to the San Diego International Airport. Route 992 originates on Broadway and Park Boulevard, heading west across Downtown until reaching Harbor Drive and heading north towards the airport. Mondays through Friday, this route runs from 4:53AM to 11:10PM with headways ranging from 15-minutes during the peak periods and 30 to 45-minutes in the off peak periods. On the weekends and holidays, the route operates from 4:53AM to 10:40PM with headways ranging 30 to 35-minutes.

Light Rail Trolley

All MTS Trolley Lines (Blue, Orange, Green and Silver) travel through parts of Downtown San Diego. A description of each route is provided below.

Blue Line – The Blue Line was the first trolley line built in the San Diego Trolley system, opening in 1981. The Blue Line currently runs from the America Plaza Building in Downtown San Diego to the community of San Ysidro in the south. There are currently 17 stops along the Blue Line Trolley covering about 15.4 miles. The Blue Line operates at 7- to 8-minute headways during the peak commuting periods and 15- to 30-mintue headways during non-peak hours, including all day Saturday, Sunday and on holidays.

Orange Line – The Orange Line was the second trolley line built in the San Diego Trolley system with service beginning in 1986. It initially operated between Downtown San Diego and Euclid Avenue, and underwent two major extensions, to Spring Street in La Mesa, then to the Santee Town Center. The Orange Line covers 20.7 miles with 15-minute service Mondays to Saturdays, and 15- to 30-minute service during the late-evenings, weekend mornings, and Sundays. It serves a total of 23 stations.

Green Line – The Green Line began service in 2005 and currently runs between 12th Avenue and Imperial Street Transit Center to the Santee Town Center. The 23.6 mile light rail line services 27 stations. The Green Line operates at 15-minute headways during the peak hours and 30-minute headways on the weekend and holidays.

Silver Line – The Silver Line is a refurbished Presidents' Conference Committee (PCC) street car. These street cars ran in San Diego during the 1930's and 1940's. Currently the Silver Line runs on a 2.7 mile loop of Downtown San Diego, and services 9 stations. The Silver Line operates at 30 minutes headways, but only operates from 9:50AM to 2PM on Tuesdays and Thursdays and 10:50AM to 3:30PM on the weekends and holidays. There is currently only one car in service, with another car being refurbished and slated to be in operation by the end of 2014.

Transit Stops

Table 4-8 lists the Downtown San Diego transit stops and amenities found at each location. As shown in the table, very few transit stops in Downtown San Diego have shelters, and roughly half of the bus stops have benches and trash cans. Given the high transit ridership in Downtown San Diego, more transit stop amenities would help improve the quality of experience for transit riders. It should be noted that the majority of the ridership data is from Year 2013 there were extreme anomalies in the ridership data for routes 810, 820, 850, 860 and 901; therefore, year 2012 ridership data was used for these routes.

Table 4-8 Transit Station/Stop Locations and Amenities Boardings and Alightings by Stop

Stop ID	Intersection	Direction of Travel	Stop Location	Amenities					Daily Average		
				Shelter	Bench	Trash Cans	Lighting	Schedule Display	Boardings	Alightings	Total
10086	Broadway / State St	EB	Near	Yes	Yes	Yes	Yes	Yes	180	17	197
10090	Broadway / Front St	EB	Near	Yes	Yes	No	Yes	Yes	685	134	819
10094	Broadway / 3rd Av	EB	Near	Yes	Yes	Yes	Yes	Yes	1,426	907	2,333
10097	Broadway / 5th Av	EB	Near	No	No	No	Yes	No	868	574	1,442
10099	Broadway / 6th Av	EB	Near	No	No	No	Yes	No	126	4	130
10102	Broadway / 8th Av	EB	Near	Yes	Yes	Yes	Yes	Yes	427	274	701
10104	Broadway / 10th Av	EB	Near	Yes	Yes	Yes	Yes	Yes	142	57	199
10105	Market St / 10th Av	EB	Near	Yes	No	No	Yes	Yes	51	63	114
10108	Market St / 12th Av	EB	Near	Yes	Yes	Yes	Yes	Yes	525	33	558
10109	Broadway / Park Bl	EB	Near	No	Yes	No	Yes	No	517	77	594
10113	Broadway / 14th St	EB	Near	No	Yes	No	Yes	No	34	11	45
10115	Imperial Av / 16th St	EB	Near	No	No	No	Yes	No	131	143	274
10116	Market St / 16th St	EB	Near	Yes	Yes	Yes	Yes	Yes	46	24	70
10449	Broadway / N Harbor Dr	EB	Far	No	Yes	Yes	Yes	No	1	0	1
10454	Broadway / Kettner Bl	EB	Far	Yes	Yes	No	Yes	Yes	137	189	326
10474	Market St / 6th Av	EB	Far	No	Yes	No	Yes	No	80	40	120
10487	G St / 14th St	EB	Far	No	No	Yes	Yes	No	2	0	2
10488	Market St / 14th St	EB	Far	No	Yes	Yes	Yes	No	52	21	73
10489	Broadway / 15th St	EB	Far	Yes	Yes	Yes	Yes	Yes	50	39	89
10492	G St / 16th St	EB	Far	No	Yes	No	Yes	No	0	0	0
10828	Broadway / Pacific Hwy	WB	Far	No	Yes	Yes	Yes	No	0	0	0
10829	Ash St / N Harbor Dr	WB	Midblock	No	Yes	No	Yes	Yes	0	0	0
10833	Broadway / Kettner Bl	WB	Near	Yes	Yes	No	Yes	Yes	357	99	456
10836	Broadway / Columbia St	WB	Near	Yes	Yes	Yes	Yes	Yes	38	130	168
10839	Broadway / Union St	WB	Near	Yes	Yes	Yes	Yes	Yes	71	536	607
10840	Broadway / 1st Av	WB	Near	Yes	No	Yes	Yes	Yes	638	889	1,527

Table 4-8 Transit Station/Stop Locations and Amenities Boardings and Alightings by Stop

Stop ID	Intersection	Direction of Travel	Stop Location	Amenities					Daily Average		
				Shelter	Bench	Trash Cans	Lighting	Schedule Display	Boardings	Alightings	Total
10841	Broadway / 4th Av	WB	Near	Yes	No	No	Yes	Yes	413	728	1,141
10845	Broadway / 6th Av	WB	Near	No	No	Yes	Yes	No	222	671	893
10846	Market St / 6th Av	WB	Near	No	Yes	No	Yes	No	36	52	88
10848	Market St / 8th Av	WB	Near	No	Yes	Yes	Yes	No	13	19	32
10851	Broadway / 9th Av	WB	Near	Yes	Yes	No	Yes	Yes	457	452	909
10856	Market St / 10th Av	WB	Near	Yes	Yes	No	Yes	Yes	115	67	183
10858	Market St / Park Bl	WB	Far	No	Yes	Yes	Yes	No	42	400	442
10861	Broadway / 13th St	WB	Near	No	Yes	No	Yes	No	5	28	33
10863	Broadway / 15th St	WB	Near	Yes	Yes	Yes	Yes	Yes	37	50	87
10866	Market St / 16th St	WB	Near	Yes	Yes	Yes	Yes	Yes	35	44	79
11256	Market St / 14th St	WB	Far	No	Yes	Yes	Yes	No	12	30	42
11258	Imperial Av / 16th St	WB	Far	No	No	Yes	Yes	No	5	49	54
11259	F St / 16th St	WB	Far	No	No	Yes	Yes	No	0	2	2
11610	N Harbor Dr / Hawthorn St	SB	Midblock	No	No	No	Yes	No	15	11	26
11612	N Harbor Dr / Ash St	SB	Near	No	No	No	Yes	No	2	9	11
11633	Front St / A St	SB	Near	Yes	Yes	No	Yes	Yes	148	273	421
11639	2nd Av / Ash St	SB	Near	Yes	Yes	Yes	Yes	Yes	17	57	74
11640	2nd Av / Beech St	SB	Near	Yes	No	Yes	Yes	Yes	43	71	114
11654	10th Av / C St	SB	Near	No	Yes	Yes	Yes	No	218	1,165	1,383
11656	10th Av / Broadway	SB	Near	No	Yes	No	Yes	Yes	298	126	424
11657	10th Av / Market St	SB	Near	No	No	Yes	Yes	No	78	17	95
11986	Pacific Hwy / Grape St	SB	Far	No	No	No	No	No	67	7	74
11993	Pacific Hwy / Ash St	SB	Far	No	Yes	No	Yes	Yes	1	10	11
11994	Pacific Hwy / Cedar St	SB	Midblock	Yes	Yes	Yes	Yes	Yes	24	1	25
12012	Front St / B St	SB	Far	No	Yes	Yes	Yes	No	227	383	610
12031	4th Av / Broadway	SB	Far	Yes	Yes	No	Yes	No	50	10	60

Table 4-8 Transit Station/Stop Locations and Amenities Boardings and Alightings by Stop

Stop ID	Intersection	Direction of Travel	Stop Location	Amenities					Daily Average		
				Shelter	Bench	Trash Cans	Lighting	Schedule Display	Boardings	Alightings	Total
12036	4th Av / B St	SB	Midblock	No	No	Yes	Yes	No	64	640	705
12048	10th Av / F St	SB	Far	No	Yes	No	Yes	No	87	17	104
12049	10th Av / A St	SB	Far	No	No	No	No	No	1	186	187
12050	10th Av / Island Av	SB	Far	No	Yes	No	Yes	No	13	11	24
12053	Park Bl / B St	SB	Near	Yes	Yes	Yes	Yes	Yes	27	272	299
12395	N Harbor Dr / Hawthorn St	NB	Near	No	No	Yes	Yes	Yes	24	11	35
12397	N Harbor Dr / Ash St	NB	Near	No	No	No	Yes	Yes	7	11	18
12411	1st Av / Ash St	NB	Near	Yes	Yes	No	Yes	Yes	257	117	374
12426	5th Av / Broadway	NB	Near	No	No	Yes	Yes	No	142	8	151
12434	5th Av / C St	NB	Near	No	Yes	Yes	Yes	Yes	358	10	368
12438	9th Av / C St	NB	Near	No	Yes	Yes	Yes	Yes	154	266	420
12441	11th Av / Market St	NB	Near	Yes	No	No	Yes	Yes	16	123	139
12750	1st Av / G St	NB	Far	No	Yes	Yes	Yes	No	129	116	245
12781	11th Av / F St	NB	Far	No	No	No	Yes	No	3	82	85
12782	11th Av / Broadway	NB	Far	No	No	No	Yes	No	864	754	1,618
12783	11th Av / B St	NB	Far	Yes	Yes	Yes	Yes	Yes	134	18	152
12786	Park Bl / B St	NB	Far	Yes	Yes	Yes	Yes	Yes	293	44	337
13137	Park Bl / Russ Bl	SB	Midblock	No	Yes	Yes	Yes	No	11	185	196
13147	Park Bl / San Diego High School	NB	Midblock	Yes	Yes	No	Yes	Yes	131	72	203
13152	N Harbor Dr / Grape St	NB	Midblock	No	No	Yes	Yes	Yes	5	18	23
13165	Ash St / N Harbor Dr	EB	Midblock	No	Yes	No	Yes	Yes	5	21	26
13191	Market St / 4th Av	WB	Far	No	No	Yes	Yes	No	62	74	136
13193	Market St / 3rd Av	EB	Far	No	Yes	No	Yes	No	72	57	129
40244	B St / 5th Av	WB	Near	Yes	Yes	No	Yes	Yes	1	346	347
60061	National Av / 16th St	SB	Near	No	No	Yes	Yes	No	37	23	60

Table 4-8 Transit Station/Stop Locations and Amenities Boardings and Alightings by Stop

Stop ID	Intersection	Direction of Travel	Stop Location	Amenities					Daily Average		
				Shelter	Bench	Trash Cans	Lighting	Schedule Display	Boardings	Alightings	Total
60546	1st Av / C St	NB	Far	No	Yes	No	Yes	No	279	38	317
91107	Park Bl / Broadway	SB	Near	No	No	Yes	Yes	No	39	1,157	1,196
96010	Front St / F St	SB	Near	No	No	No	Yes	No	22	34	56
97004	Ash St / Pacific Hwy	WB	Far	No	Yes	Yes	Yes	No	0	8	8
99005	10th Av / Park Bl (Petco Park)	EB	Near	Yes	Yes	Yes	Yes	Yes	69	39	108
99006	Park Bl / 10th Av (Petco Park)	NB	Midblock	Yes	Yes	Yes	Yes	Yes	27	60	87
99010	11th Av / K St	NB	Near	No	Yes	No	Yes	No	54	34	88
99020	State St / B St	NB	Near	No	No	No	Yes	No	91	78	169
99021	B St / State St	EB	Far	No	No	No	Yes	No	62	56	118
99022	Grape St / Pacific Hwy	EB	Near	No	No	No	Yes	No	1	43	44
99025	Pacific Hwy / Broadway	NB	Far	No	Yes	No	Yes	No	2	33	35
99026	Broadway / Pacific Hwy	EB	Far	No	Yes	Yes	Yes	Yes	78	91	169
99027	N Harbor Dr / Hawthorn St	NB	Midblock	No	No	No	Yes	Yes	14	16	30
99039	Front St / Broadway	SB	Near	No	No	No	Yes	No	107	160	267
99118	1st Av / Broadway	NB	Far	No	Yes	No	Yes	No	188	181	369
99146	Imperial Av / 15th St	WB	Midblock	No	No	No	No	No	61	71	132
99342	Broadway / Park Bl	WB	Far	No	No	No	Yes	No	590	515	1,105
99343	11th Av / C St	NB	Near	No	No	No	Yes	Yes	1,863	141	2,004
99356	Broadway / N Harbor Dr	WB	Near	No	Yes	Yes	Yes	No	0	0	0
99367	11th Av / B St	NB	Near	No	No	Yes	Yes	No	202	3	205
99437	13th ST / Broadway	SB	Near	No	No	No	No	No	0	9	9
99477	9th Av / C St	NB	Far	--	--	--	--	--	29	29	58
99791	India St / C St	NB	Far	No	No	No	Yes	Yes	154	148	302
99827	9th Av / B St	NB	Near	No	No	No	Yes	No	79	51	130
99859	N Harbor Dr / Ash St	NB	Midblock	No	No	No	Yes	Yes	11	23	34

Table 4-8 Transit Station/Stop Locations and Amenities Boardings and Alightings by Stop

Stop ID	Intersection	Direction of Travel	Stop Location	Amenities					Daily Average		
				Shelter	Bench	Trash Cans	Lighting	Schedule Display	Boardings	Alightings	Total
70009	12th & Imperial Transit Center	EB/WB	N/A	Yes	Yes	Yes	Yes	Yes	290	195	485
75080	County Center/Little Italy Station	EB	N/A	Yes	Yes	Yes	Yes	Yes	669	511	1,180
75081	County Center/Little Italy Station	WB	N/A	Yes	Yes	Yes	Yes	Yes	453	740	1,193
75082	Santa Fe Depot	WB	N/A	Yes	Yes	Yes	Yes	Yes	1,383	3,758	5,141
75083	Santa Fe Depot	EB	N/A	Yes	Yes	Yes	Yes	Yes	2,834	450	3,284
75084	America Plaza Station	EB	N/A	Yes	Yes	Yes	Yes	Yes	377	414	791
75085	America Plaza Station	NB/SB	N/A	Yes	Yes	Yes	Yes	Yes	879	836	1,715
75086	Civic Center Station	SB/EB	N/A	Yes	Yes	Yes	Yes	Yes	2,636	540	3,176
75087	Civic Center Station	NB	N/A	Yes	Yes	Yes	Yes	Yes	547	2,398	2,945
75088	Fifth Avenue Station	NB	N/A	Yes	Yes	Yes	Yes	Yes	708	2,994	3,702
75089	Fifth Avenue Station	SB	N/A	Yes	Yes	Yes	Yes	Yes	2,879	858	3,737
75090	City College Station	NB	N/A	Yes	Yes	Yes	Yes	Yes	1,285	5,000	6,285
75091	City College Station	SB/EB	N/A	Yes	Yes	Yes	Yes	Yes	4,210	1,321	5,531
75092	Park & Market Station	NB	N/A	Yes	Yes	Yes	Yes	Yes	1,182	1,630	2,812
75093	Park & Market Station	SB	N/A	Yes	Yes	Yes	Yes	Yes	1,525	1,342	2,867
75094	Seaport Village Station	WB	N/A	Yes	Yes	Yes	Yes	Yes	342	454	796
75095	Seaport Village Station	EB	N/A	Yes	Yes	Yes	Yes	Yes	448	367	815
75096	Convention Center Station	EB	N/A	Yes	Yes	Yes	Yes	Yes	479	262	741
75097	Convention Center Station	WB	N/A	Yes	Yes	Yes	Yes	Yes	245	556	801
75098	Gaslamp Quarter Station	EB	N/A	Yes	Yes	Yes	Yes	Yes	979	319	1,298
75099	Gaslamp Quarter Station	WB	N/A	Yes	Yes	Yes	Yes	Yes	264	1,039	1,303
75100	12th & Imperial Transit Center	EB/WB	N/A	Yes	Yes	Yes	Yes	Yes	2,508	2,038	4,546
75102	12th & Imperial Transit Center	NB	N/A	Yes	Yes	Yes	Yes	Yes	3,359	9,620	12,979

Table 4-8 Transit Station/Stop Locations and Amenities Boardings and Alightings by Stop

Stop ID	Intersection	Direction of Travel	Stop Location	Amenities					Daily Average		
				Shelter	Bench	Trash Cans	Lighting	Schedule Display	Boardings	Alightings	Total
75103	12th & Imperial Transit Center	SB	N/A	Yes	Yes	Yes	Yes	Yes	8,724	3,481	12,205
91101	12th & Imperial Transit Center	EB	N/A	Yes	Yes	Yes	Yes	Yes	1,988	267	2,255
91102	12th & Imperial Transit Center	WB	N/A	Yes	Yes	Yes	Yes	Yes	366	1,654	2,020

Source: Fiscal Year 2012 & 2013 Data from MTS, Chen Ryan Associates; September 2014
*Fiscal Year Data for 2012 was used for routes 810, 820, 850, 860 and 901

4.3.2 Transit Ridership

Table 4-8 also displays the average daily boardings and alightings for the FY 2013 at each of the 128 transit stops in Downtown San Diego. There are approximately 41,000 boardings and 42,500 alightings on an average weekday, for approximately 83,500 transit trips within the community on an average weekday.

Figure 4-19 shows the average daily boardings and alightings across Downtown San Diego.

The following lists the top 5 trolley and bus stops in Downtown San Diego for all boardings and alightings:

Trolley

- 12th and Imperial (29,444)
- City College (11,816)
- Santa Fe Depot (8,425)
- 5th Avenue Station (7,439)
- Civic Center (6,121)

Bus

- Third Avenue and Broadway (2,333)
- Eleventh Avenue and C Street (2,004)
- Broadway and Park Boulevard (1,699)
- Eleventh Avenue and Broadway (1,618)
- First Avenue and Broadway (1,527)

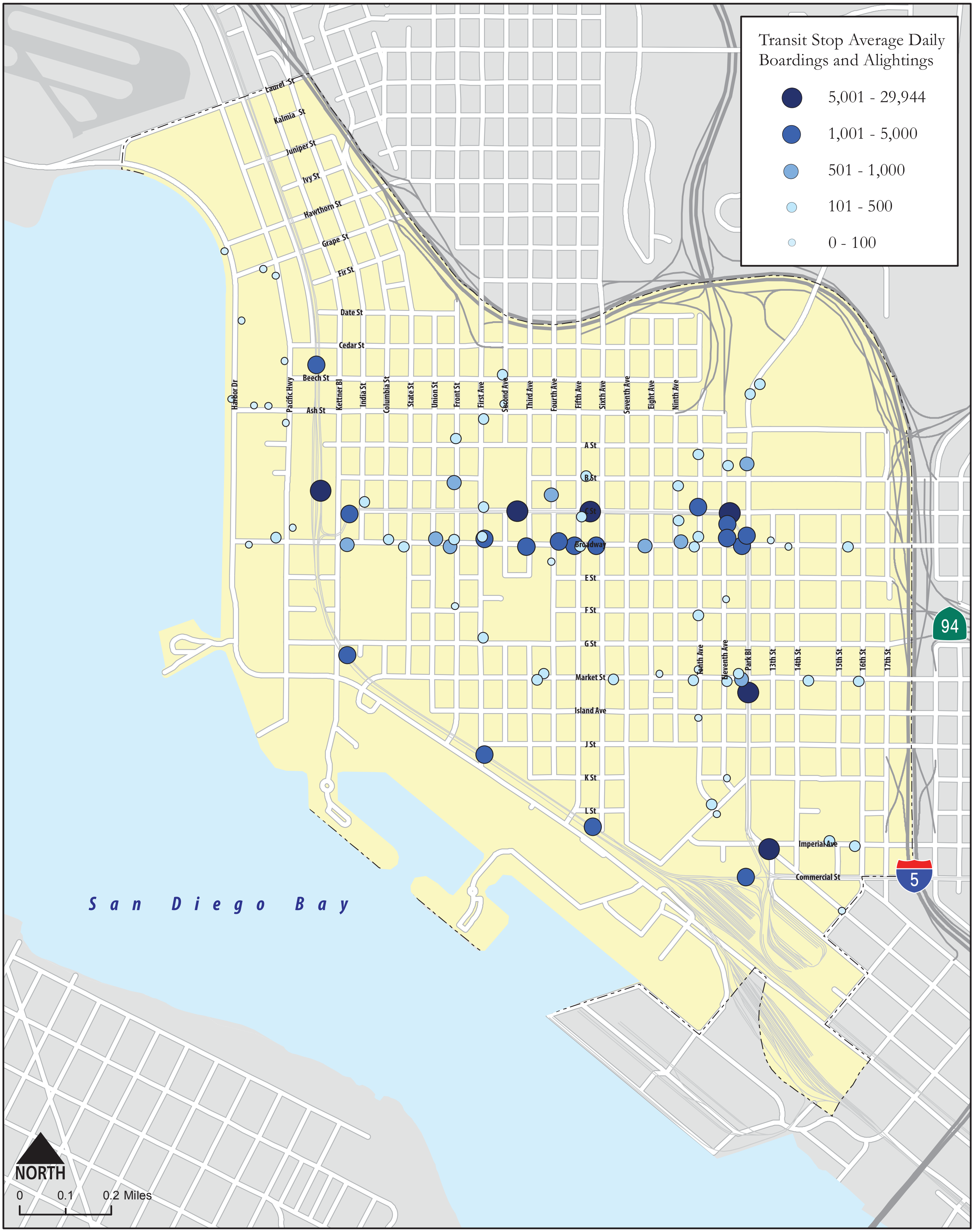


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Figure 4-19
2013 Average Dailiy Transit
Boardings and Alightings (2013)

Table 4-9 summarizes the average daily boardings and alightings occurring within Downtown by route (Fiscal Year 2013) for all transit services within Downtown. **Appendix E** includes average daily boardings and alightings by route and stop ID for each Downtown San Diego transit stop.

Table 4-9 Average Daily Boardings and Alightings in Downtown by Route (FY 2013*)

Route	Destination	Boardings	Alightings	Total
Route 2	Downtown – North Park	1,709	1,635	3,343
Route 3	UCSD Medical Center / Hillcrest – Euclid Trolley	25	25	50
Route 4	Lomita Village – 12th & Imperial Transit Center	344	268	612
Route 5	Euclid Trolley – Downtown / 10th & Broadway	912	1,025	1,937
Route 7	La Mesa – Downtown	3,319	3,3096	6,414
Route 11	Skyline Hills – SDSU	2,606	2,454	5,060
Route 20	Rancho Bernardo Transit Station – Downtown	552	454	1,005
Route 30	UTC / VA Medical Center – Downtown	1,047	1,035	2,082
Route 50	UTC Express – Downtown Express	381	389	770
Route 83	Downtown – Mission Hills / Hillcrest	47	54	101
Route 110	Downtown – Mira Mesa	N/A		
Route 120	Kearny Mesa Transit Center – Downtown	606	657	1,263
Route 150	UTC / VA Medical Center – Downtown	565	590	1,155
Route 215	Downtown – SDSU	N/A		
Route 235	Downtown – Escondido Transit Center	N/A		
Route 280	Downtown – Escondido Transit Center	237	888	325
Route 290	Downtown – Rancho Bernardo Transit Station	341	318	659
Route 810	Downtown – Escondido	321	374	695
Route 820	Downtown - Poway	103	110	213
Route 850	Downtown – Rancho Penasquitos	86	85	171
Route 860	Downtown – Carmel Mountain Ranch	68	84	152
Route 901	Downtown – Iris Trolley	1,062	1,017	2,079
Route 923	Ocean Beach – Downtown	383	577	960
Route 929	Downtown – Iris Trolley	1,175	879	2,054
Route 992	Downtown – Airport	866	485	1,351
Blue Line	America Plaza – Downtown	15,472	16,932	32,404
Green Line	Downtown / 12th & Imperial Transit Center – Santee	9,698	9,919	19,617
Orange Line	Santa Fe Depot – El Cajon	13,745	14,077	27,822

Source: Fiscal Year 2012 and 2013 Data from MTS, Chen Ryan Associates; September 2014
*Fiscal Year Data for 2012 was used for routes 810, 820, 850, 860 and 901

Note:
N/A = Transit routes started in 2014 therefore no ridership data is available at this time.

Table 4-10 summarizes levels of transit commuting for Downtown San Diego residents, compared to the City of San Diego and the County. As shown, the rate of transit usage for the work trip among Downtown San Diego workers is significantly greater than the citywide rate (6.1% versus 3.9%).

Table 4-10 Percent of Transit Commuters in Downtown San Diego

	Downtown San Diego	City of San Diego	County of San Diego
Number of Workers Taking Transit to Work	1,043	24,690	44,448
Percent of Total Workers	6.1%	3.9%	3.1%

Source: US Census, American Community Survey, 2012 Estimates; Chen Ryan Associates; September 2014

Table 4-11 displays the percent of time each transit route serving Downtown San Diego reaches its station/stop on-time, as identified by the MTS time tables.

Table 4-11 On-Time Percentage

Route	NB/EB	SB/WB	Route	NB/EB	SB/WB
2	59.8%	49.5%	120	58.5%	63.6%
3	86.6%	88.5%	150	62.3%	67.2%
4	55.5%	57.3%	235[1]	--	--
5	53.3%	60.2%	280[1]	--	--
7	52.2%	53.7%	290[1]	--	--
11	51.7%	55.6%	901	67.1%	90.3%
20	63.7%	64.8%	929	73.0%	83.4%
30	56.5%	57.2%	992[2]	77.4%	--
50	59.2%	56.5%	Blue Line (510)	78%	77.8%
83	88.5%	89.7%	Green Line (520)	93.4%	89.8%
110[1]	--	--	Orange Line (530)	94.1%	85.2%

Source: 2010 RIDECHECK PLUS SANDAG; Chen Ryan Associates; September 2014

Notes:
1. On-time percentage data was unavailable for Route 110, 23, 280, and 290.
2. Route 992 only operates in one direction.

Figure 4-20 shows the 2012 transit commute mode share by census tract. The highest rate of transit commuting was reported for the southeastern portion of the community in Lower East Village and Convention Center Neighborhoods, accounting for 10.8% of commuters within that census tract.

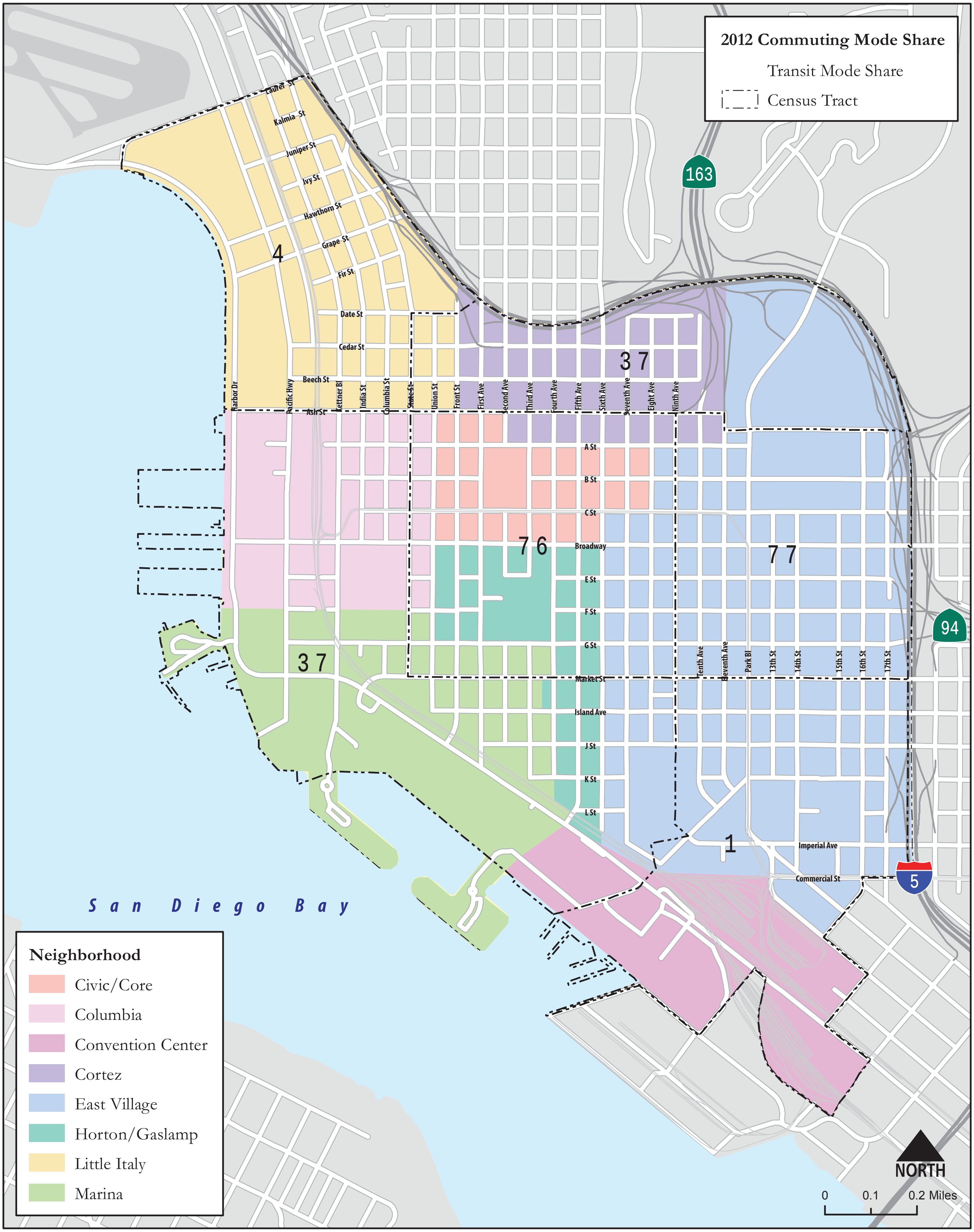

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Figure 4-20
2012 Transit Commute Mode Share by Census Tract

4.3.3 Bicycle and Pedestrian Collisions Near Transit

The City of Villages growth strategy in the citywide 2008 General Plan relies upon a land-use transportation strategy whereby land use densification and transit system improvements occur in a manner that will enable residents to carry out daily activities without owning a vehicle. The need to own a vehicle is greatly diminished if residents can walk or bicycle to nearby high quality transit. This section documents the density of pedestrian and cyclist involved collisions near transit, as safety in these locations will be particularly important for bringing about mode shifts and travel changes that support the City of Villages concept.

Figure 4-21 displays pedestrian and bicycle-involved collisions within 500 feet of transit stops.

Transit stop locations with relatively higher numbers of pedestrian and bicycle collisions within 500 feet include the following:

- Broadway / Sixth Avenue (westbound) – 21 Collisions
- Broadway / Sixth Avenue (eastbound) – 16 Collisions
- Broadway / Eight Avenue (eastbound) – 15 Collisions
- Broadway / Fourth Avenue (eastbound) – 15 Collisions
- Fifth Avenue / G Street – 15 Collisions
- B Street / Fifth Avenue – 15 Collisions

These locations should be investigated further for "safe routes to transit" improvement recommendations in the Downtown San Diego Mobility Plan.

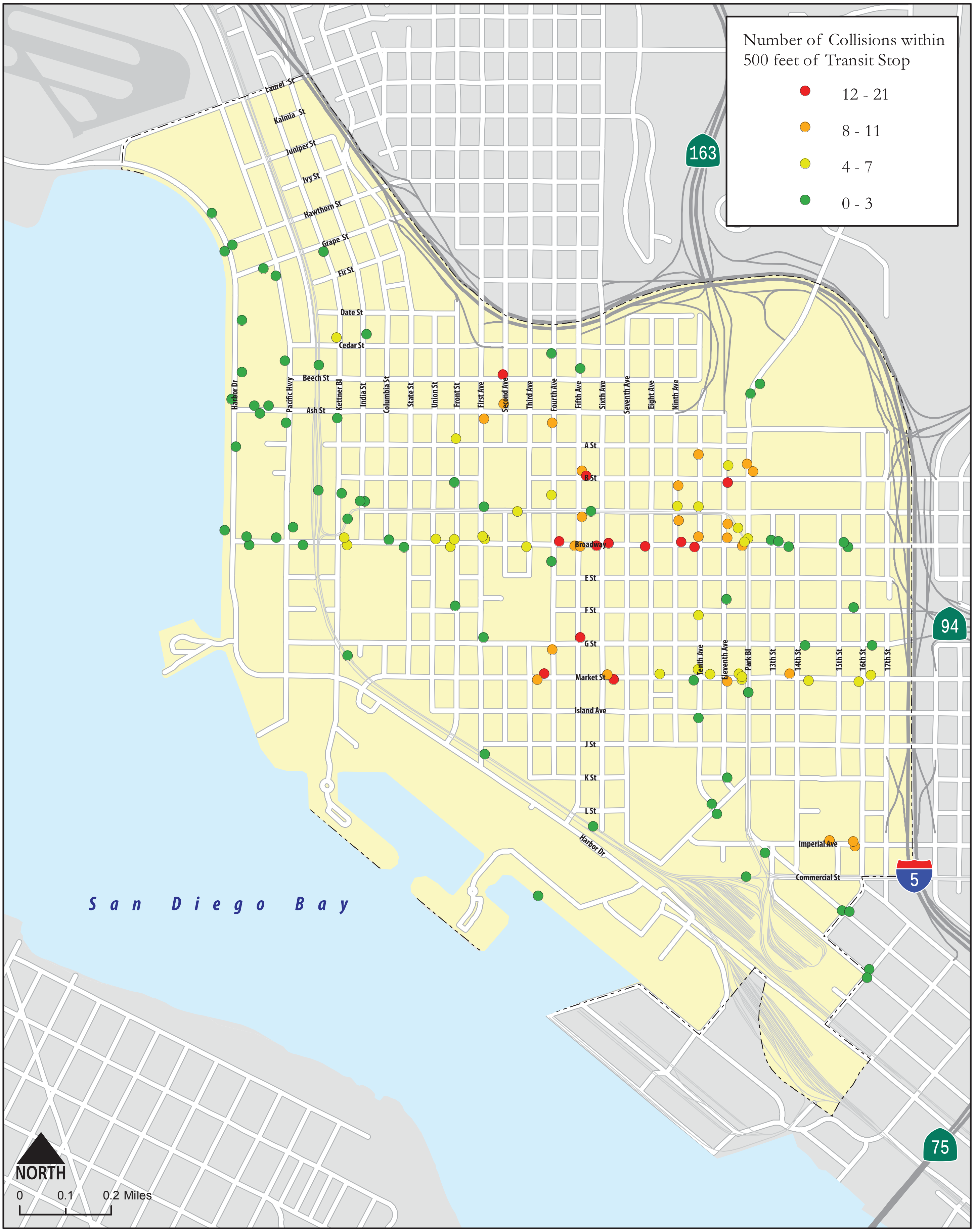

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Figure 4-21
Bicycle and Pedestrian Collisions Near Public Transit

4.4 Comparing Walking, Cycling and Transit in the Downtown Context

This section presents a series of travel efficiency comparisons for walking, cycling and transit in the Downtown San Diego context. Two types of travel-shed analyses were performed. First, an assessment of which mode of travel (walking, cycling or transit) is most efficient in terms of the connectivity of the network from eight key major attractions in Downtown San Diego. This analysis attempts to answer the question, "What's the best way to get around Downtown?" Second, an analysis of which mode (walking, cycling or transit) provides for more efficient travel in/out of Downtown San Diego was conducted, using the three major Downtown Transit Centers as points of departure, including the 12th & Imperial Transit Center, the City College Transit Center and Santa Fe Depot.

4.4.1 Comparing Active Travel and Transit for Getting Around Downtown

The following eight (8) key locations were selected to serve as starting points for travel mode comparisons, based on input from the stakeholder interviews and public workshop comments:

- The County of San Diego Administration Building (Pacific Highway Entrance)
- Little Italy Gateway Sign (India Street between Date Street and Fir Street)
- Horton Plaza (at the Lyceum Theater)
- Petco Park (J Street and Eighth Avenue)
- Gaslamp District (Market Street and Fifth Avenue)
- City College South Entrance (C Street between 14th Street and 15th Street)
- Santa Fe Depot (Kettner Boulevard Entrance)
- Civic Center Plaza (Third Avenue and B Street)

The analysis was conducted using transit headway times and transit stop/station locations from MTS, and an assumed walk speed of 3.5 miles per hour. Cycling was assumed to occur at a speed of 10 miles per hour.

Figures 4-22A and **4-22B** present a comparison of walking and transit travel for getting around Downtown San Diego. This set of maps shows where walking is faster than transit (in red) from each point of departure, and likewise, where transit is faster than walking (in green). As shown in this set of maps, walking is faster than transit across a majority of Downtown San Diego.

Figures 4-23A and **4-23B** present a comparison of cycling and transit for getting around Downtown San Diego. The set of maps shows where cycling is faster than transit (in magenta). As shown in the maps, cycling in Downtown is faster than using transit to get to all points in Downtown San Diego.

These combined comparisons highlight the relevance of walking and cycling as effective travel modes in the Downtown San Diego context. Moreover, investments in walking and cycling promise to bring high returns in terms of travel efficiencies.

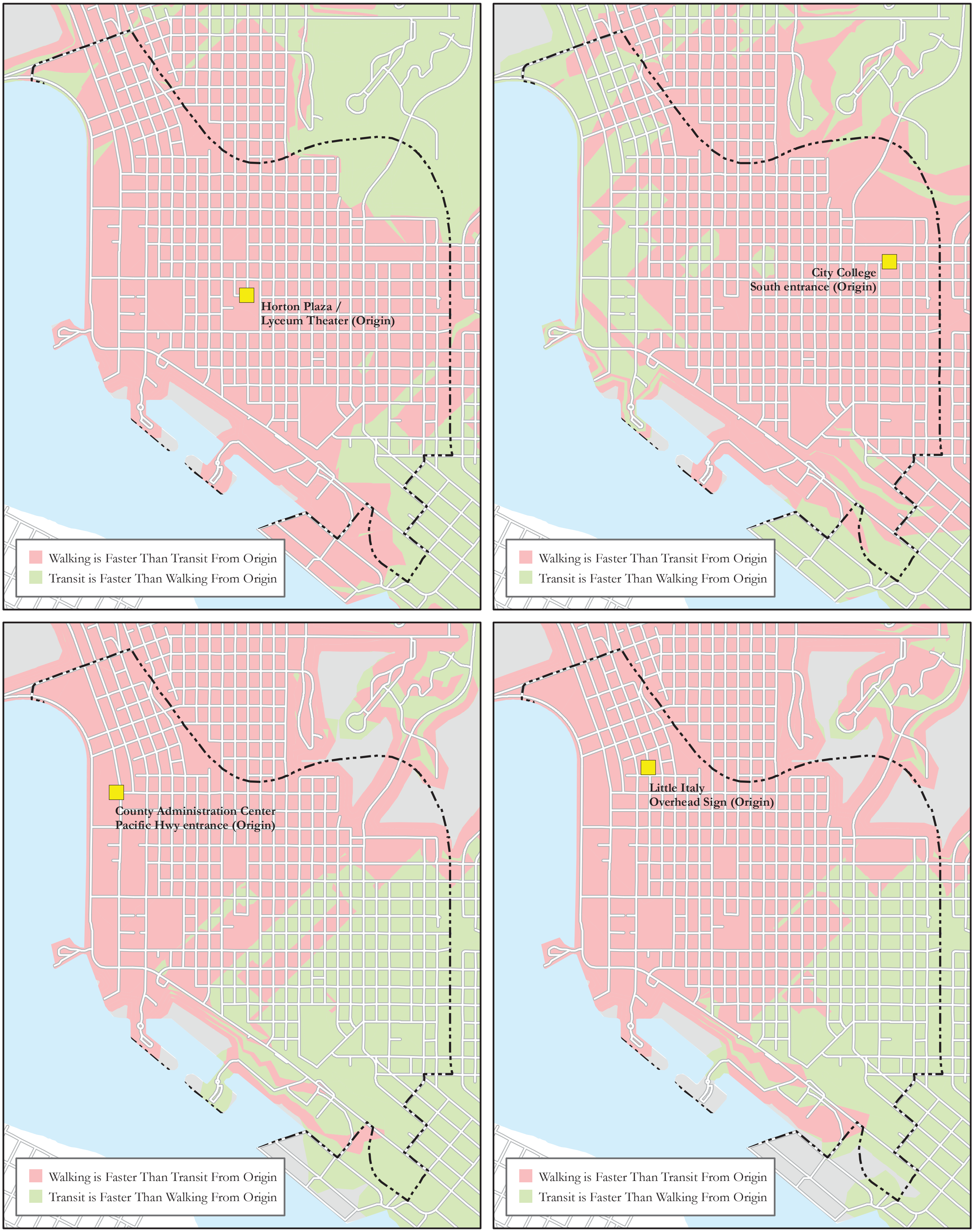

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Figure 4-22A
Comparing Walking and Transit from Key Downtown Locations

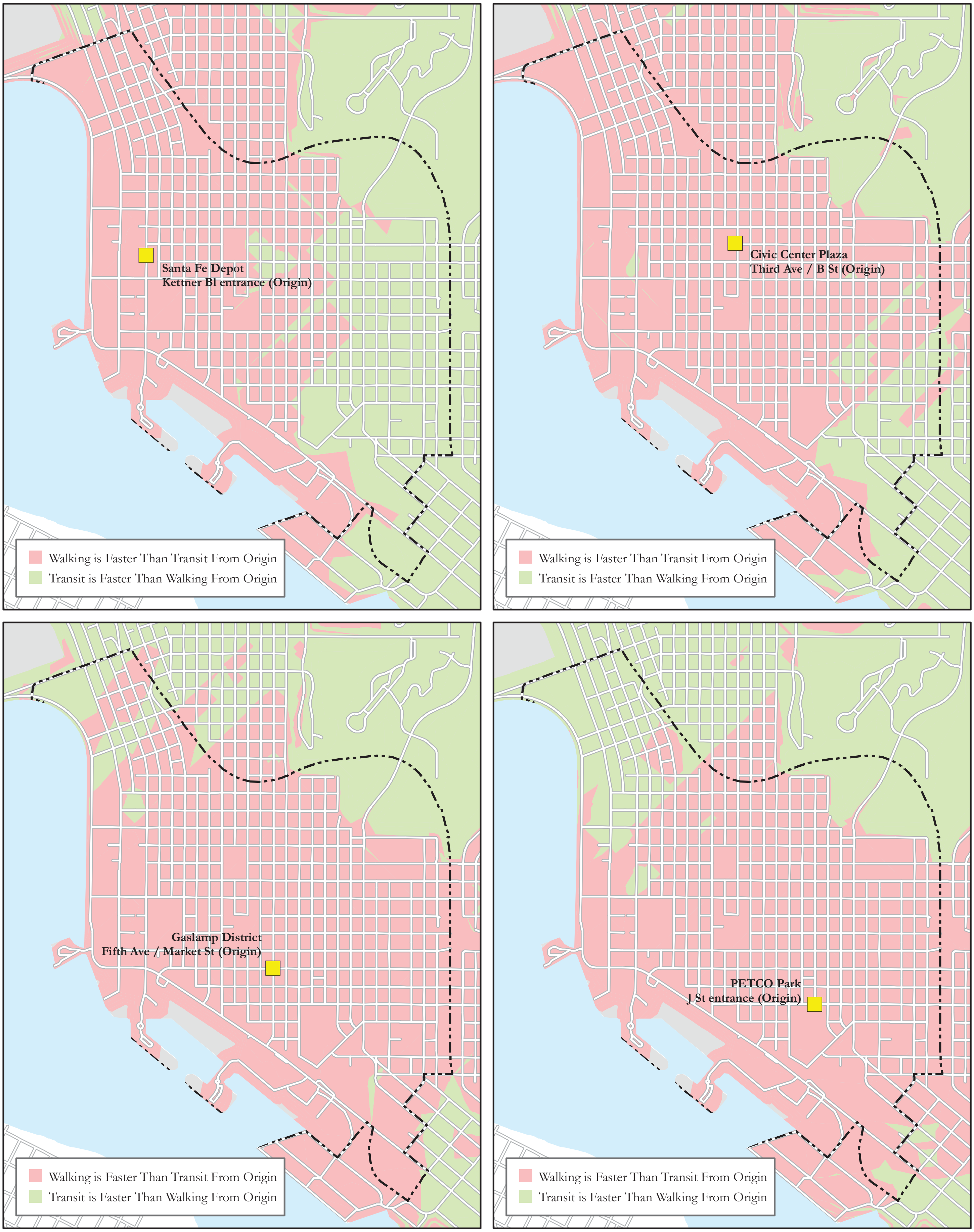

Figure 4-22B
Comparing Walking and Transit from Key Downtown Locations

Figure 4-23A
Comparing Cycling and Transit from Key Downtown Locations

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Figure 4-23B
Comparing Cycling and Transit from Key Downtown Locations

4.4.2 Comparing Walking, Cycling and Transit for Getting In/Out of Downtown

This analysis compares 30-minute travel-sheds for walking, cycling and transit from the three key Downtown Transit Centers.

Figure 4-24 shows 30-minute walk, bike and transit travel-sheds from the 12th & Imperial Transit Center, while **Figure 4-25** shows 30-minute travel-sheds from the Santa Fe Depot Transit Center, and **Figure 4-26** shows 30-minute travel-sheds from the City College Transit Center.

Each of the figures shows similar patterns, which is that cycling provides the broadest reach or travel distance in/out of Downtown San Diego given a 30-minute travel time, followed by transit, followed by walking. Again, as with the analysis presented Section 4.4.1, there are significant benefits to be gained from active travel in the Downtown context. While transit and auto are relevant for covering long distances in a suburban environment, walking and cycling make the most sense and should be the focus of public investments in the dense, Downtown environment.

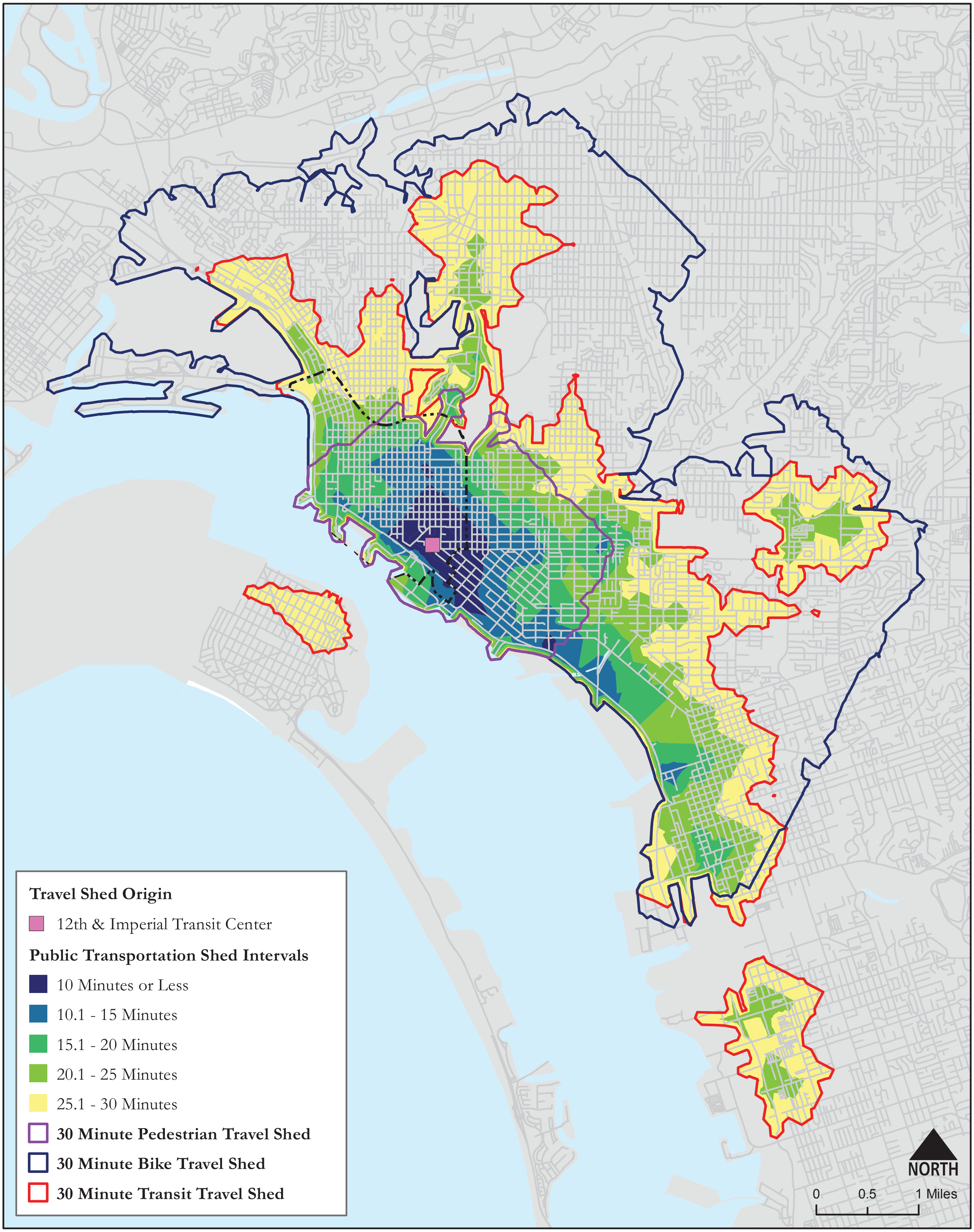

Figure 4-24
30-Minute Walk, Bike and Transit Travel Sheds from
12th & Imperial Transit Center

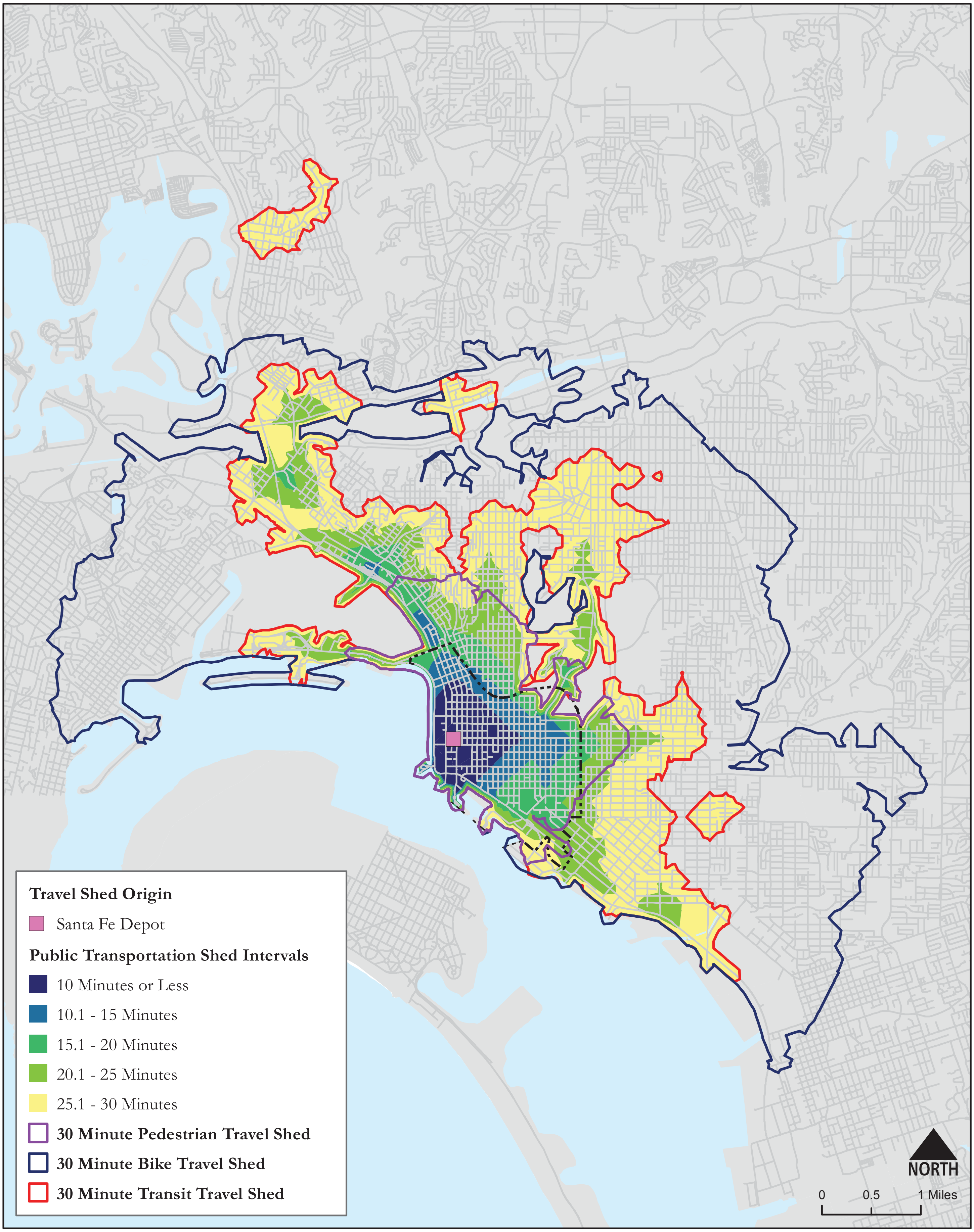

Figure 4-25
30-Minute Walk, Bike and Transit Travel Shed from
Santa Fe Depot Transit Center

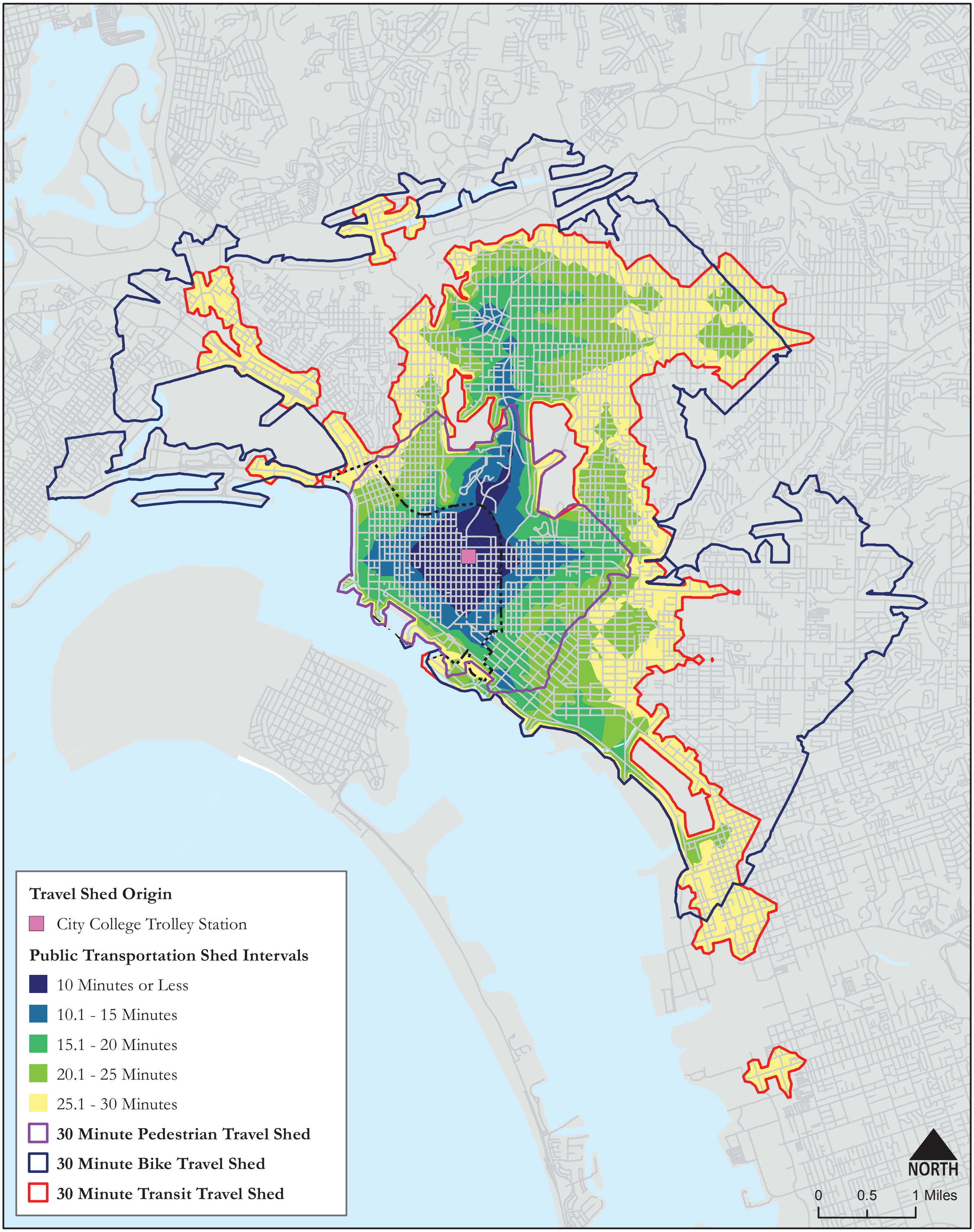

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Figure 4-26
30-Minute Walk, Bike and Transit Travel Sheds from the City College Trolley Station

4.5 Street System

This section identifies key study roadways, intersections, and freeways in Downtown San Diego, and presents existing level of service conditions associated with these facilities. The currently adopted citywide General Plan Mobility Element identifies the following goals for street and freeway system:

- *A street and freeway system that balances the needs of multiple users of the public right-of-way.*
- *An interconnected street system that provides multiple linkages within and between communities.*
- *Vehicle congestion relief.*
- *Safe and efficient street design that minimizes environmental and neighborhood impacts.*
- *Well maintained streets.*

The currently adopted Downtown Community Plan identifies the following goals for street and freeway system:

- *A street typology based on functional and urban design considerations, emphasizing connections and linkages, pedestrian and cyclist comfort, transit movement, and compatibility with adjacent land uses.*
- *An enhanced street grid that promotes flexibility of movement, preserves and/or opens view corridors, and retains the historic scale of the streets.*

Figure 4-27 displays the existing functional classifications for study area roadways. For detailed physical roadway characteristics, please refer to Appendix A.

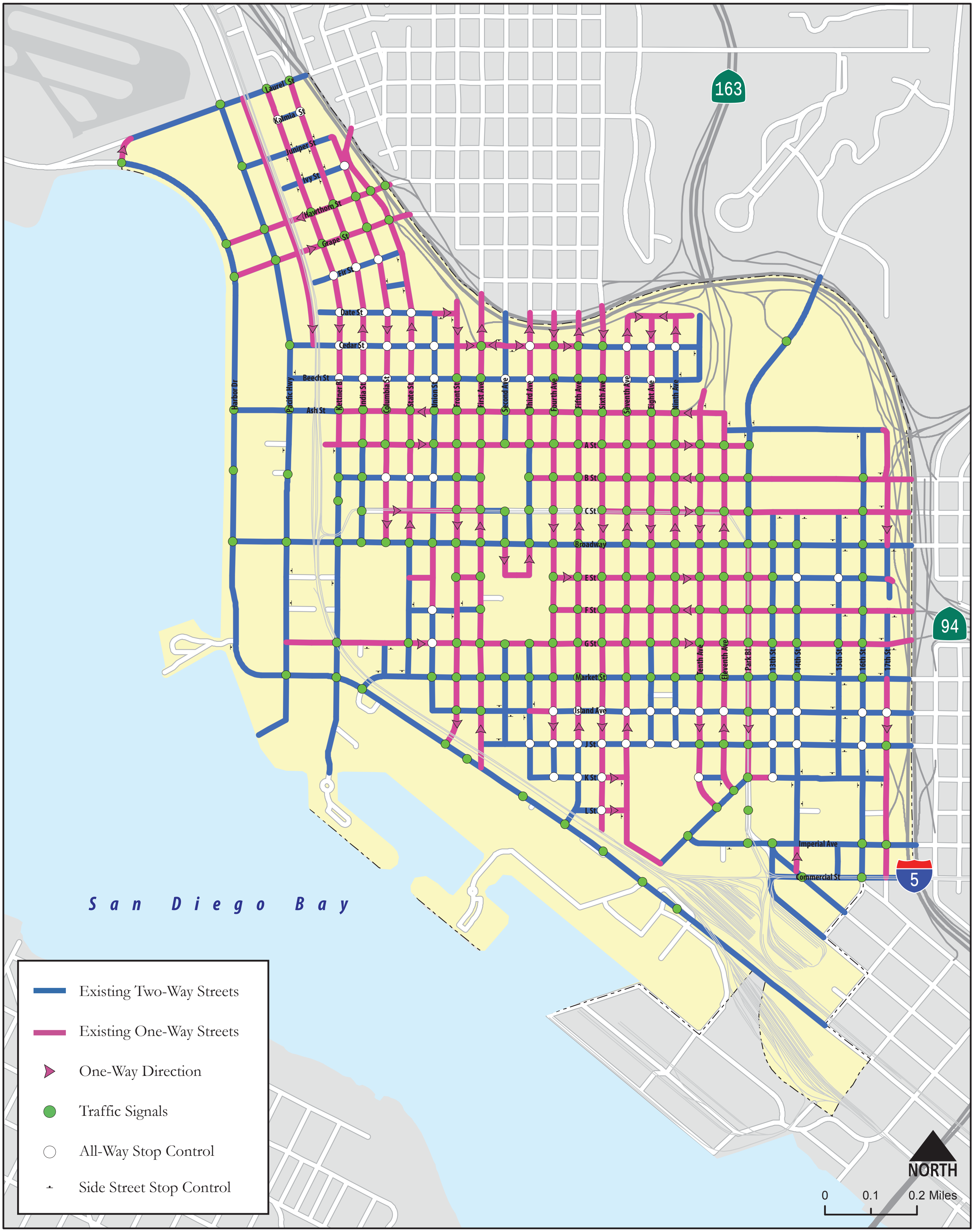

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Figure 4-27
Existing Roadway Network

4.5.1 Roadway Arterial Analysis

Table 4-12 shows existing roadway arterial level of service (LOS) and average speed for Downtown San Diego, while **Figures 4-28A** and **4-28B** graphically display AM and PM peak hour LOS. An acceptable LOS within the City of San Diego is LOS E or better. Broadway in the eastbound direction during the PM peak hour is the only roadway that currently operates at unacceptable LOS F. **Appendix F** contains the arterial analysis worksheets which provide a segment by segment breakdown of the arterial speed, travel time and delay.

Table 4-12 Roadway Segment Arterial Analysis

Roadway	From	To	Speed Limit (mph)	AM Peak Hour		PM Peak Hour	
				Speed (mph)	LOS	Speed (mph)	LOS
Hawthorn Street	Harbor Drive	Brant Street	25	8.0	E	9.6	D
Grape Street	Harbor Drive	State Street	25	10.6	D	9.3	D
Ash Street (Eastbound)	Harbor Drive	Kettner Boulevard	25	10.0	D	12.6	D
Ash Street (Westbound)	Harbor Drive	9th Avenue	25	11.7	D	12.6	D
A Street	Front Street	11th Avenue	25	11.5	D	11.1	D
Broadway (Eastbound)	Pacific Highway	14th Street	25	12.8	D	6.6	**F**
Broadway (Westbound)	Pacific Highway	15th Street	25	7.2	E	8.5	E
F Street	10th Avenue	16th Street	25	8.1	E	7.4	E
G Street	State Street	16th Street	25	10.2	D	9.6	D
Market Street (Eastbound)	Front Street	19th Street	25	13.0	C	13.2	C
Market Street (Westbound)	Front Street	20th Street	25	12.4	D	12.5	D
J Street (Eastbound)	10th Avenue	17th Street	25	10.0	D	9.9	D
J Street (Westbound)	10th Avenue	18th Street	25	10.6	D	10.7	D
Imperial Avenue (Eastbound)	13th Street	19th Street	25	13.1	C	12.0	D
Imperial Avenue (Westbound)	13th Street	19th Street	25	12.5	D	12.2	D
Pacific Highway (Northbound)	Laurel Street	Harbor Drive	35	18.4	C	15.6	D
Pacific Highway (Southbound)	Laurel Street	Harbor Drive	35	17.5	D	15.9	D
Kettner Boulevard (Northbound)	B Street	Broadway	25	9.2	D	9.0	D
Kettner Boulevard (Southbound)	Hawthorn Street	Broadway	25	11.8	D	13.7	C
Front Street	Cedar Street	Market Street	25	11.4	D	11.9	D
First Avenue	Elm Street	Market Street	25	11.9	D	11.2	D
Tenth Avenue	A Street	J Street	25	8.2	E	11.3	D
Eleventh Avenue	A Street	J Street	25	10.0	D	8.7	E
Park Boulevard (Northbound)	163 On-Ramp	I-5 SB Ramp	25	20.7	B	20.9	B
Park Boulevard (Southbound)	I-5 Ramps	G Street	25	12.1	D	11.1	D

Source: Chen Ryan Associates; September 2014

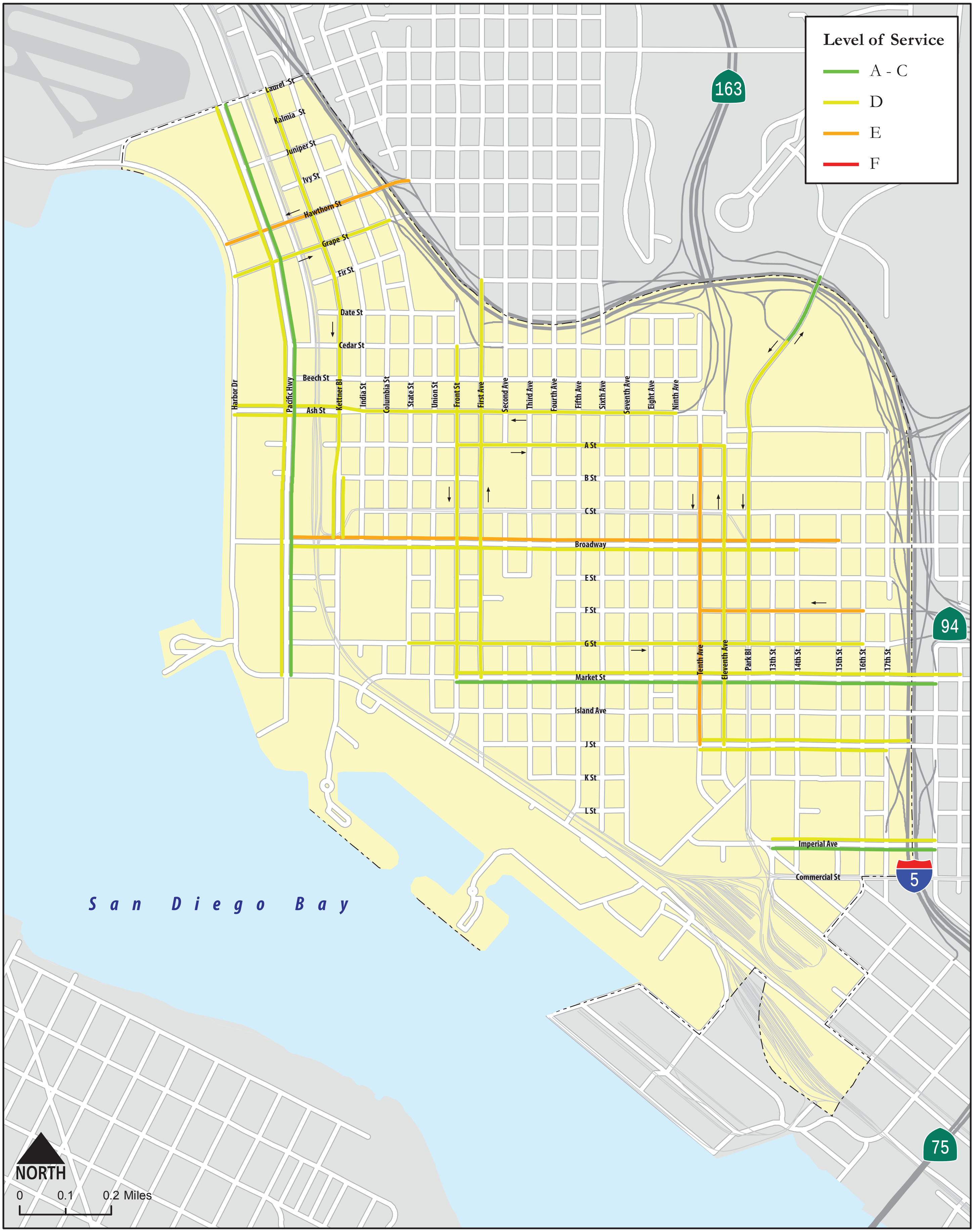

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Figure 4-28A
Existing AM Peak Hour
Arterial Auto Level of Service

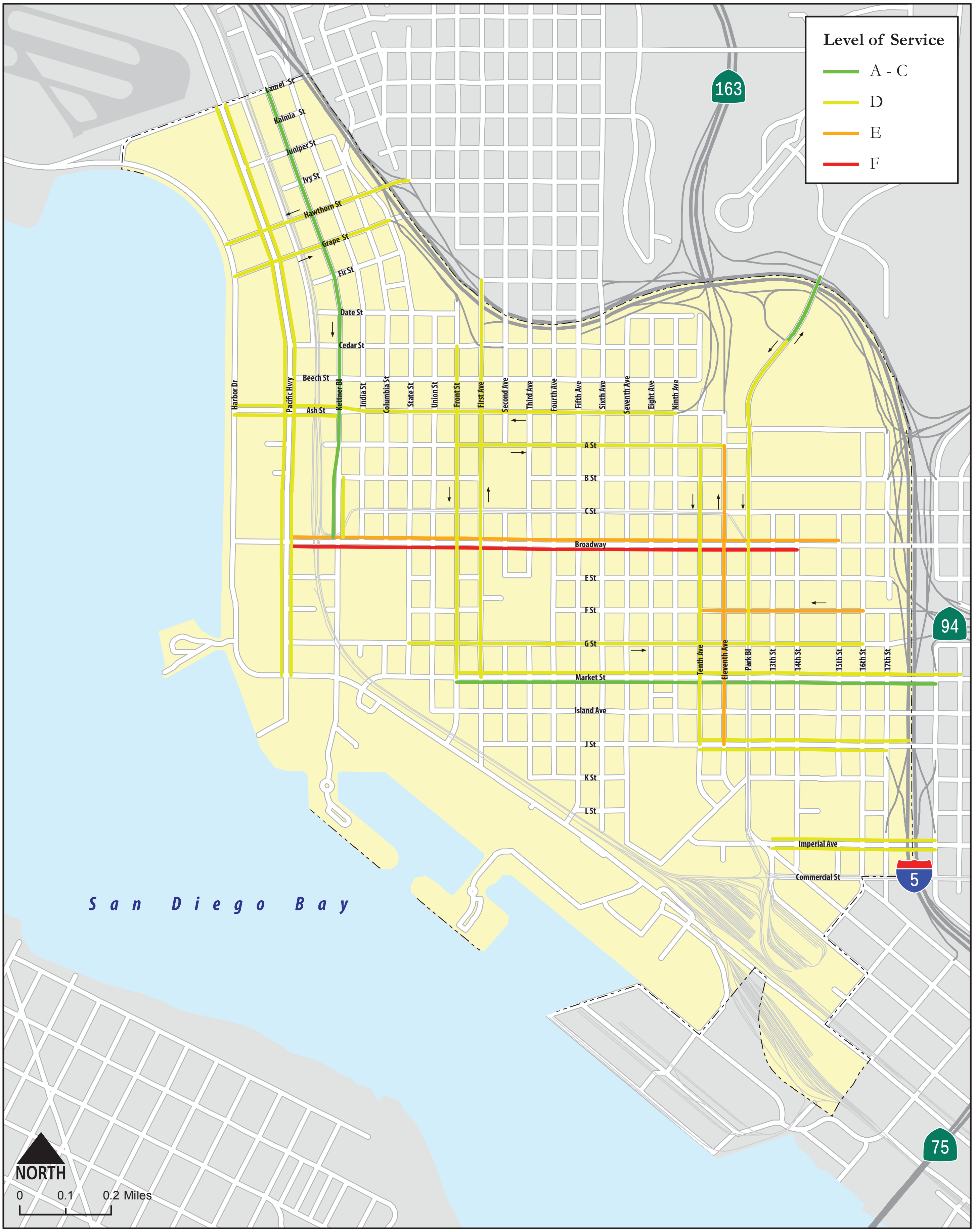

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Figure 4-28B
Existing PM Peak Hour
Arterial Auto Level of Service

4.5.2 Intersection Geometry and Level of Service Analysis

As described in Chapter 2, a total of fifty-eight (58) study intersections were analyzed as part of this existing conditions assessment. Nineteen (19) of these intersections are located outside Downtown San Diego in adjacent communities.

Figure 4-29 displays current intersection geometry, while **Figure 4-30** shows existing peak period turning movements for both the AM and PM peak periods. The peak period intersection traffic counts are provided in **Appendix G.**

Table 4-13 displays the level of service analysis results for the key study area intersections located within Downtown San Diego under existing conditions. LOS analyses were conducted using the methodologies described in Chapter 2.0.

Intersection LOS calculation worksheets for existing conditions are provided in **Appendix H**.

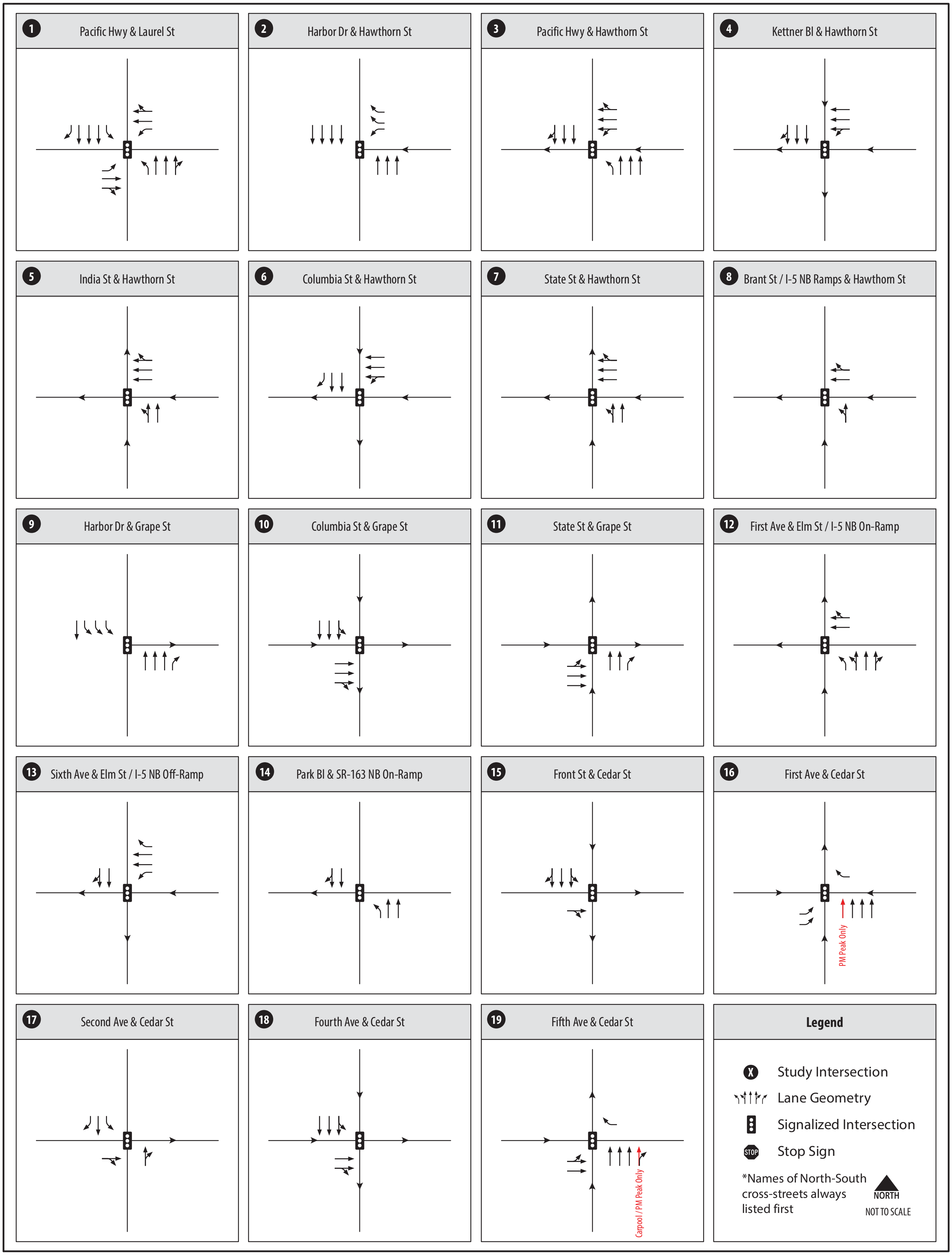

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Figure 4-29

Existing Intersection Geometrics (Intersections 1-19)

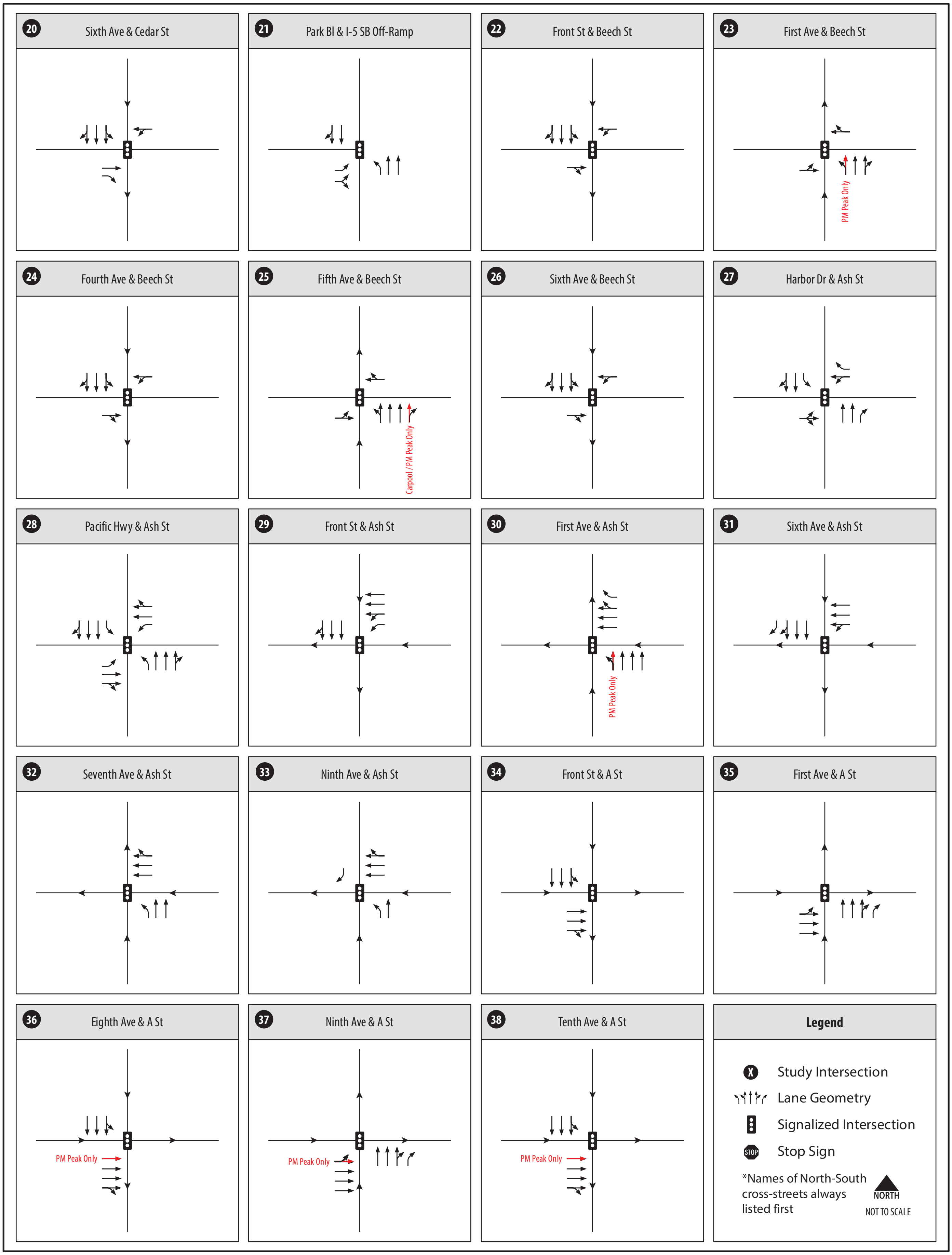

Figure 4-29

Existing Intersection Geometrics
(Intersections 20-38)

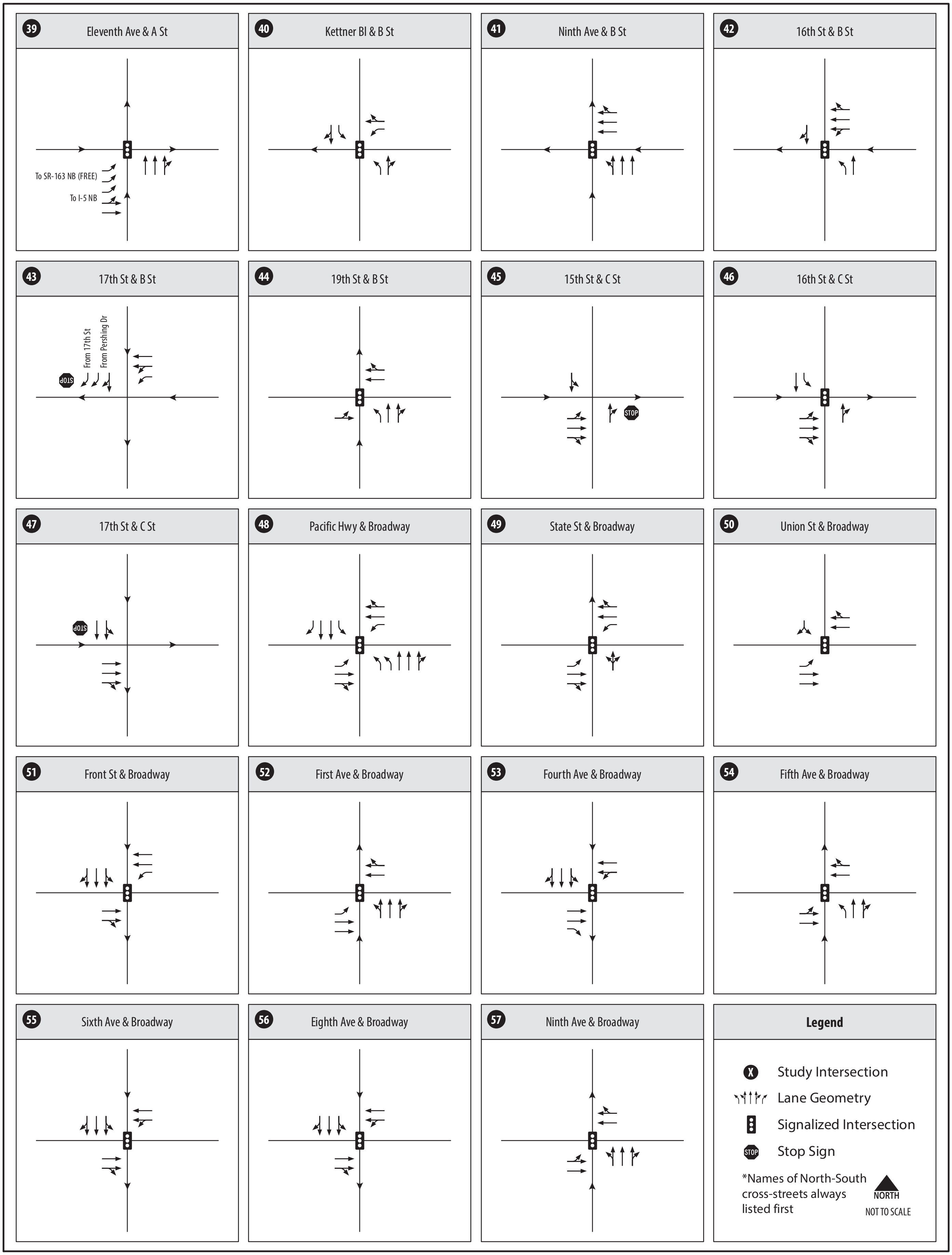

Figure 4-29

Existing Intersection Geometrics
(Intersections 39-57)

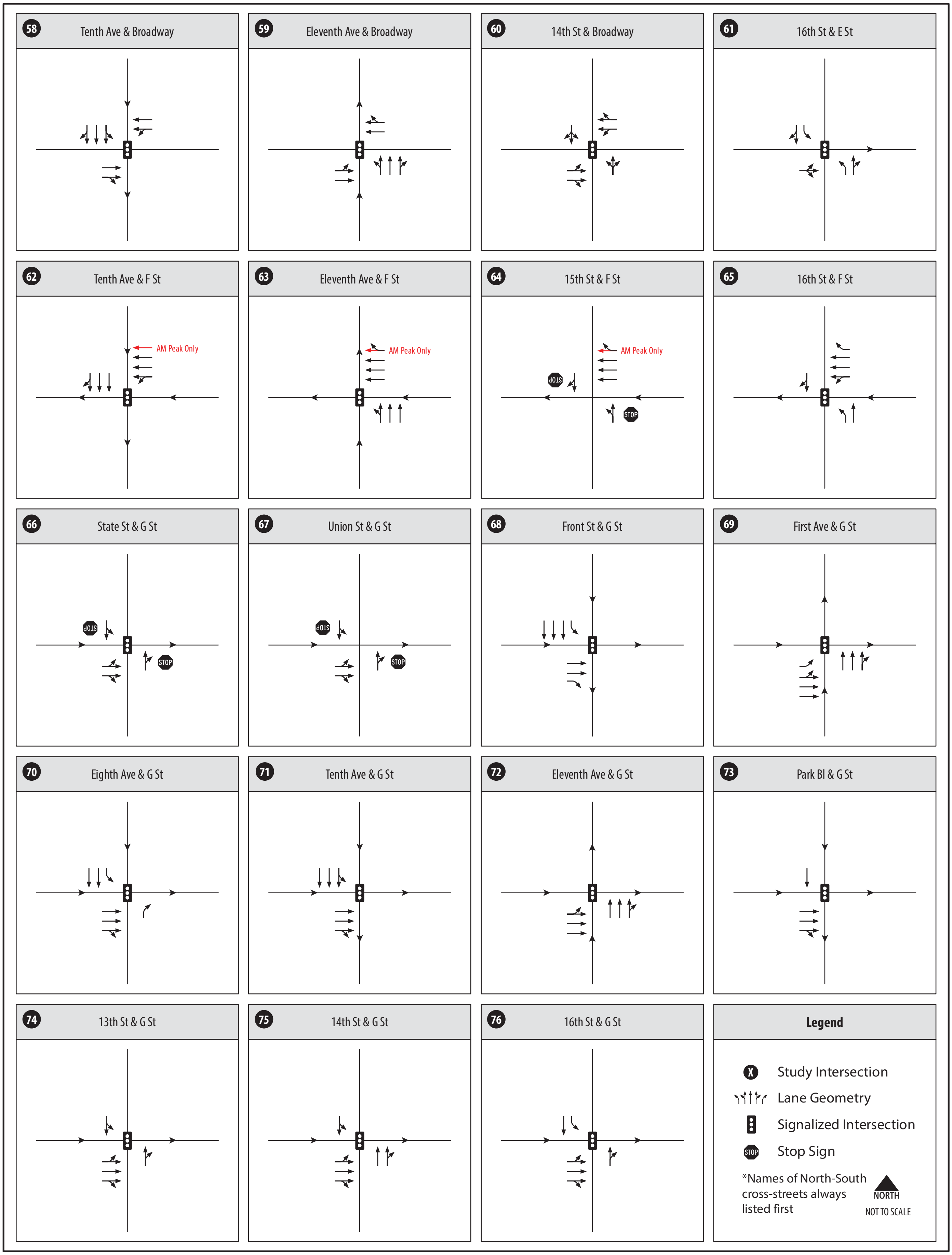

Figure 4-29

Existing Intersection Geometrics (Intersections 58-76)

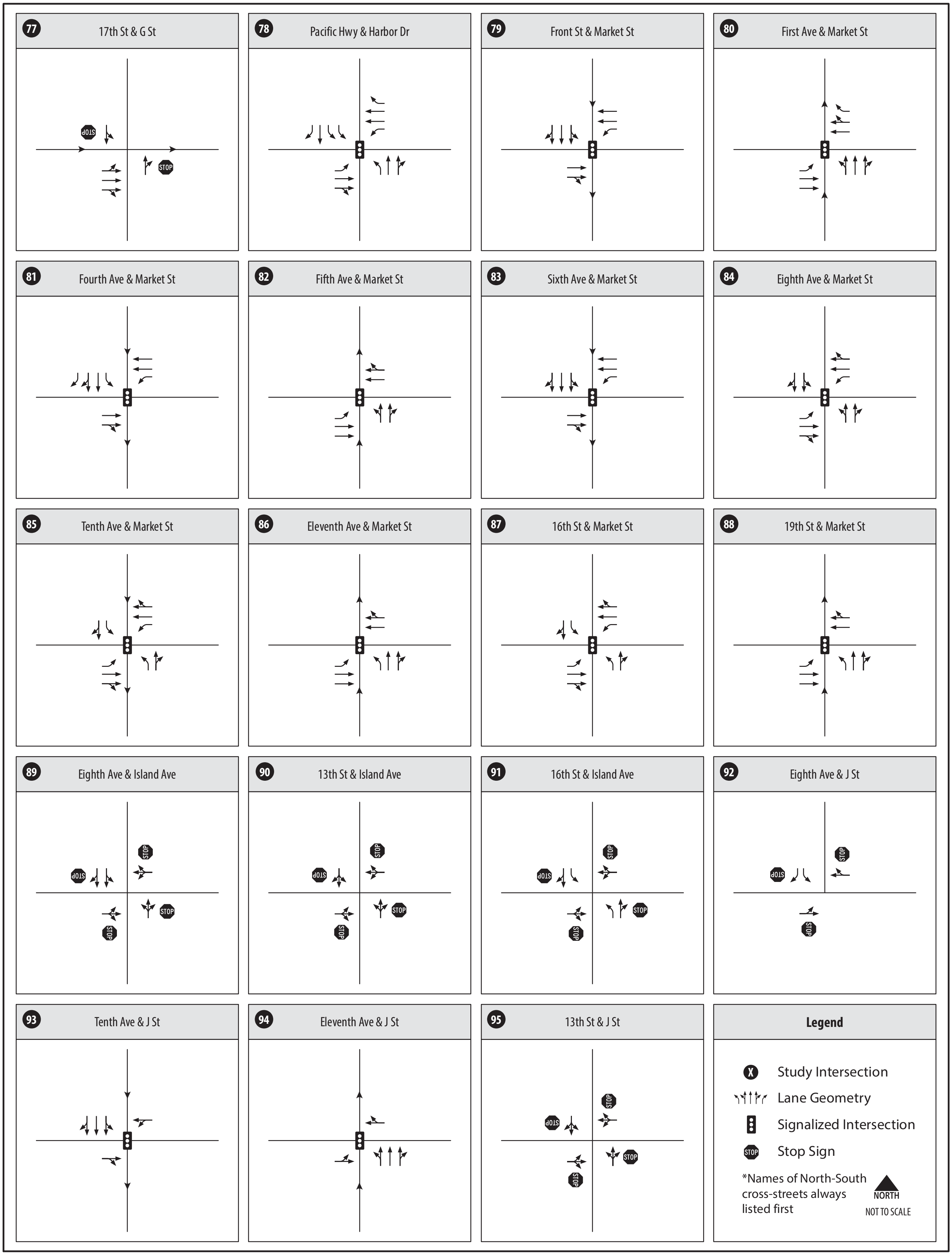

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Figure 4-29

Existing Intersection Geometrics (Intersections 77-95)

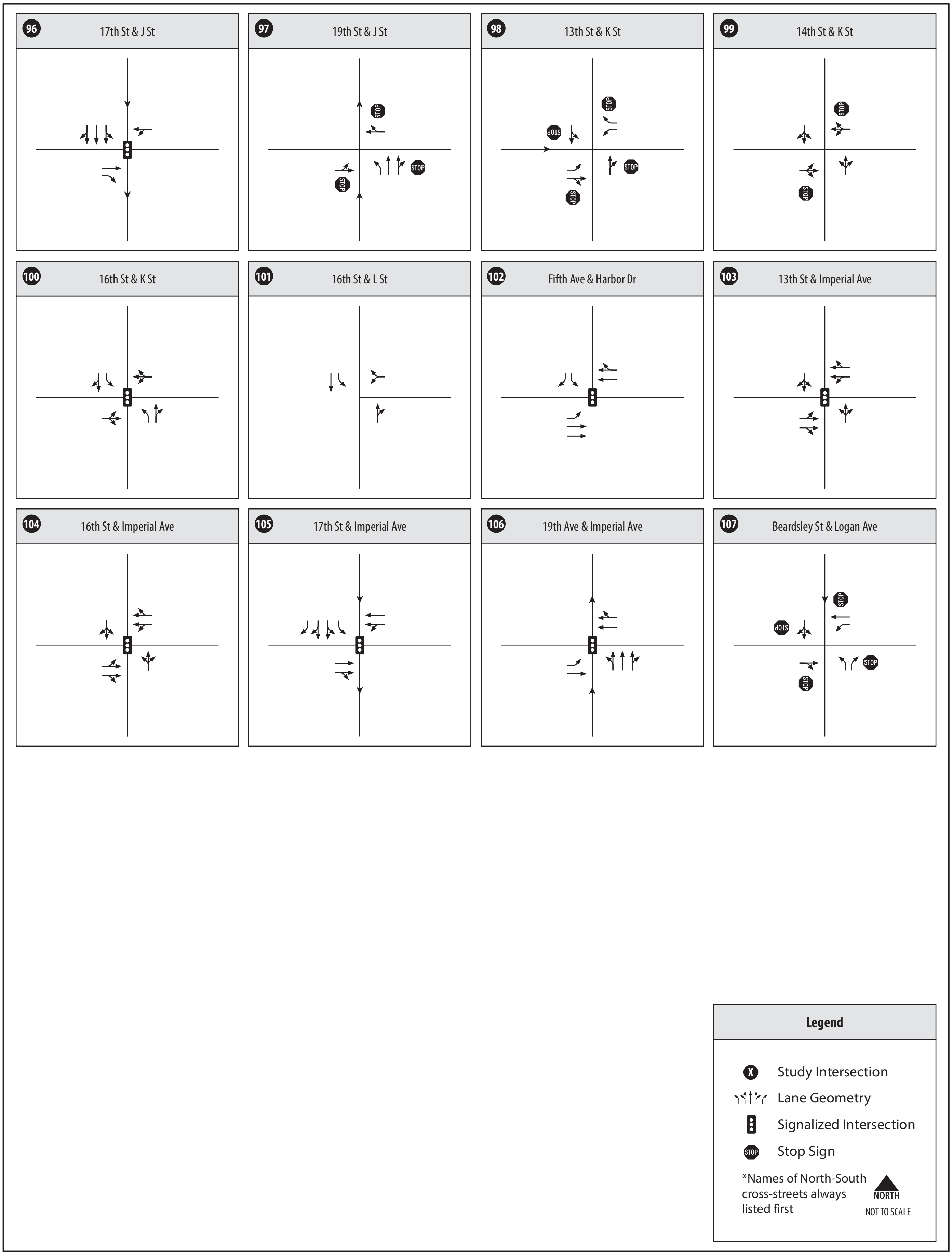

Figure 4-29

Existing Intersection Geometrics
(Intersections 96-107)

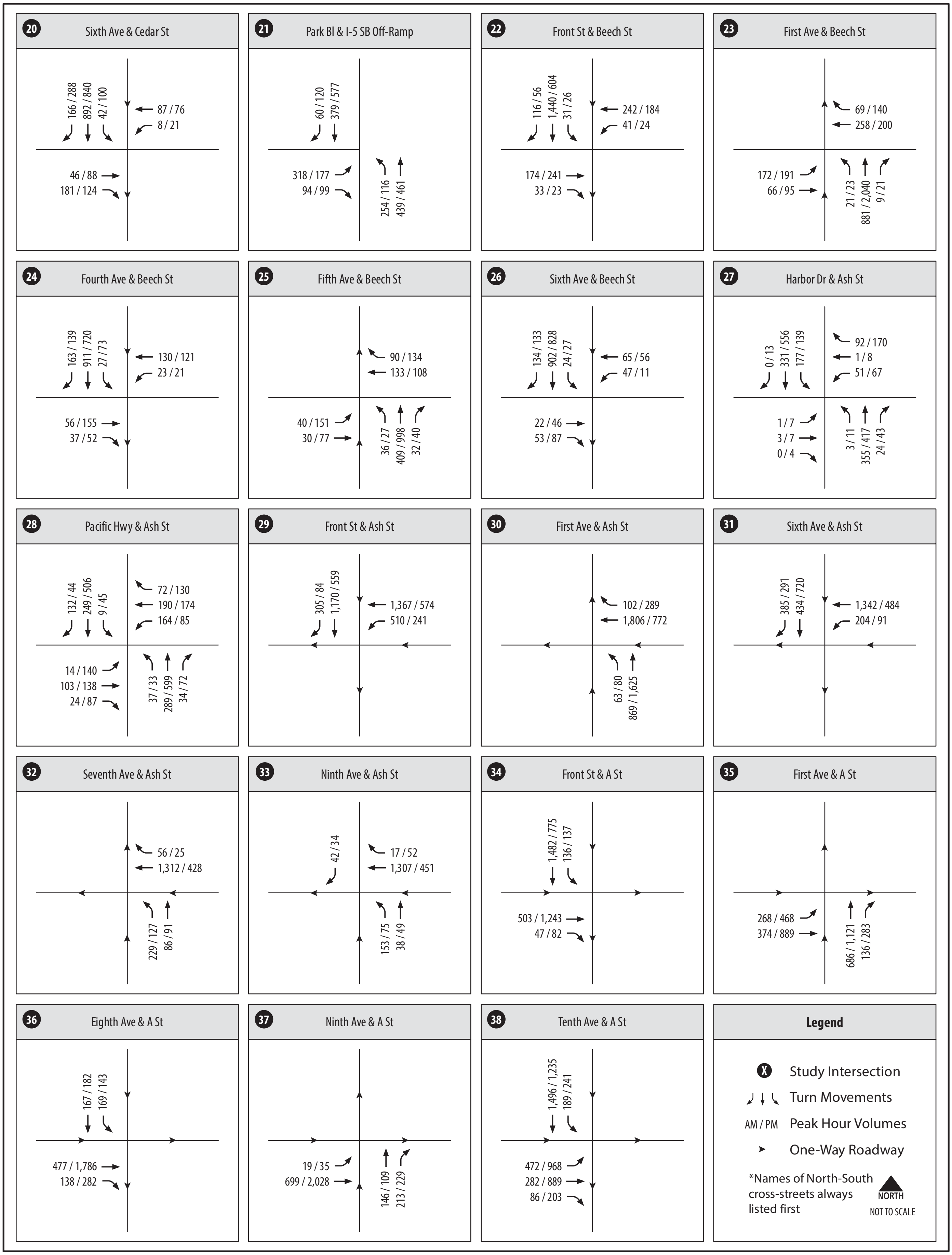

Figure 4-30

Existing AM/PM Peak Hour Intersection Turning Movements (Intersections 20-38)

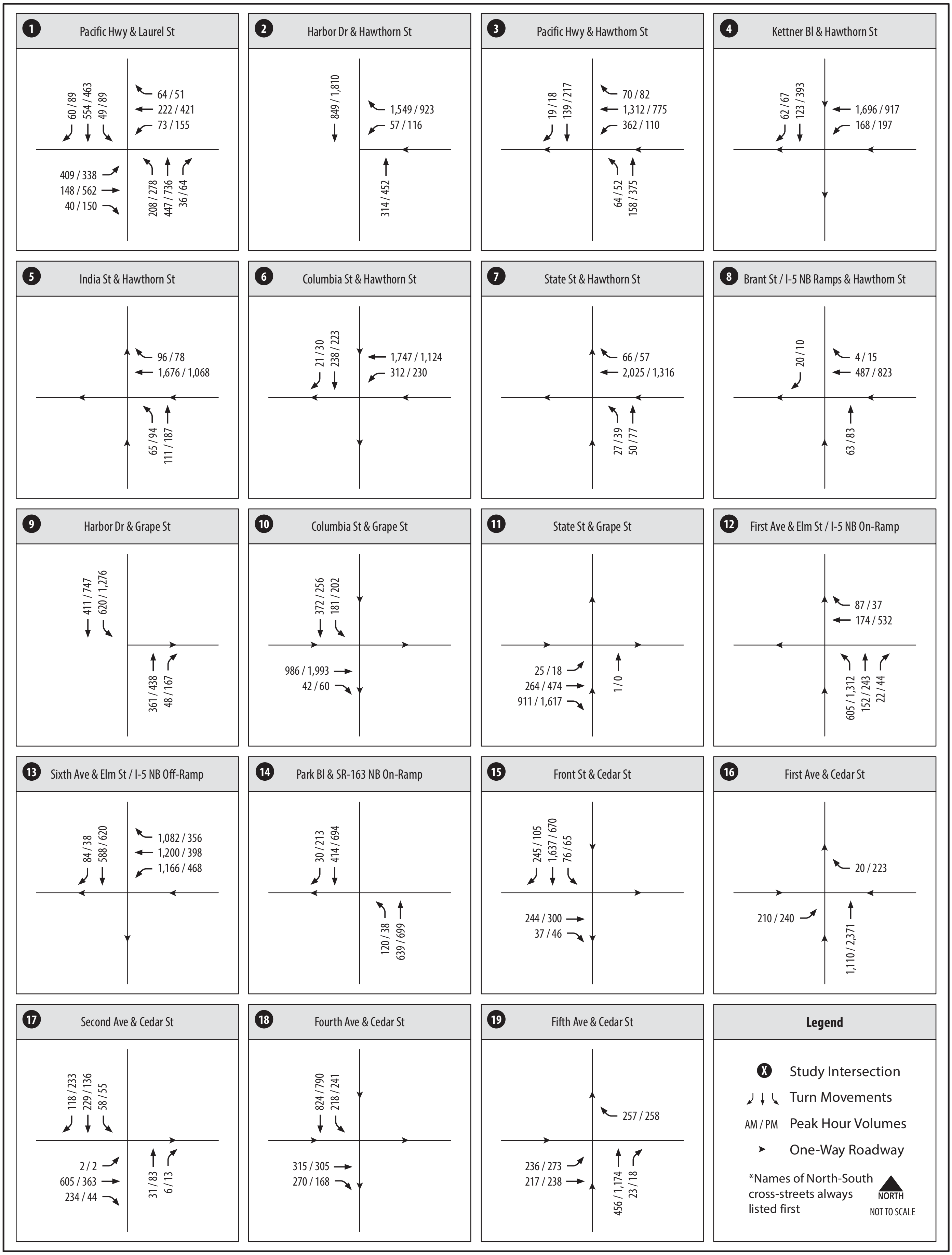

Figure 4-30

Existing AM/PM Peak Hour Intersection Turning Movements
(Intersections 1-19)

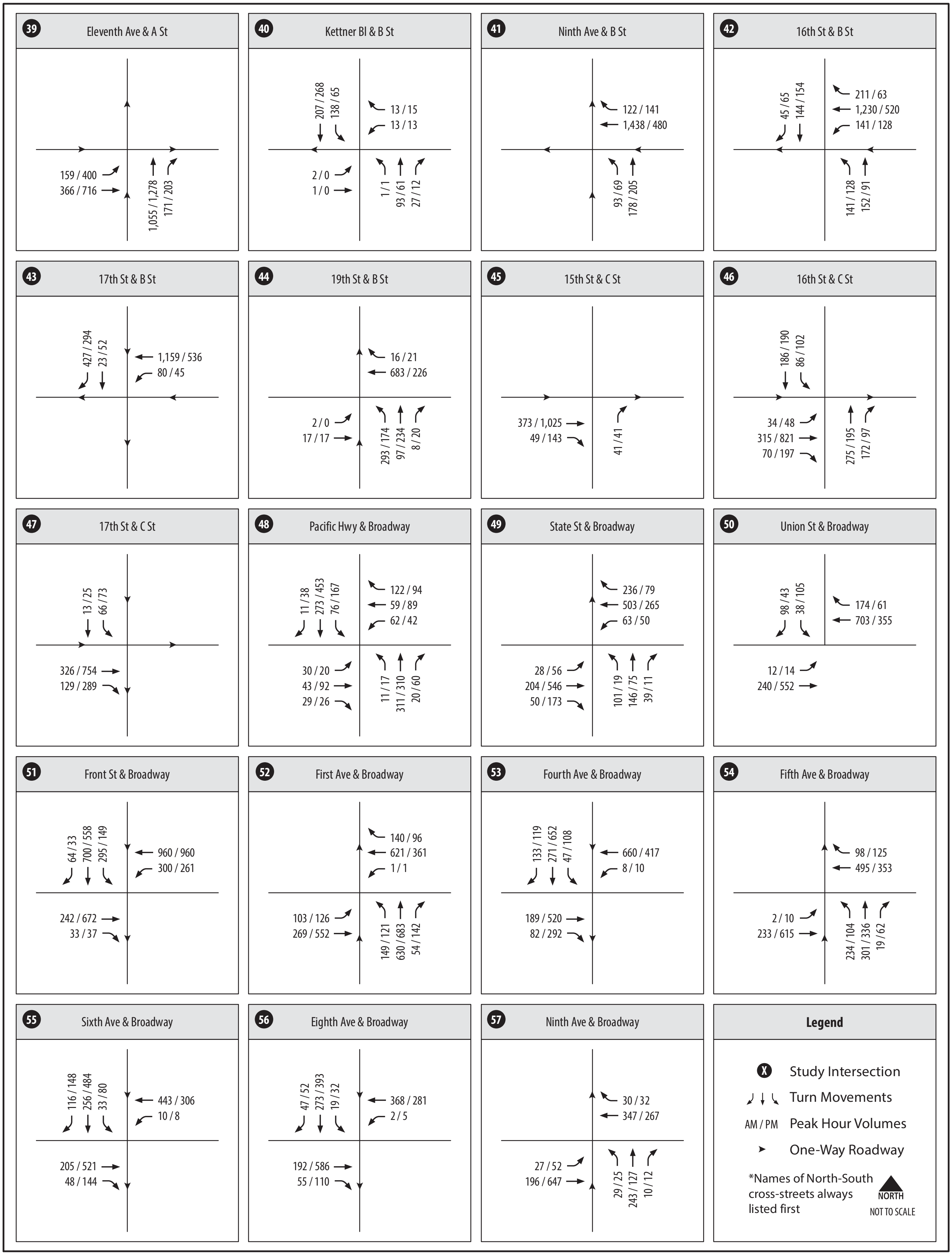

Figure 4-30

Existing AM/PM Peak Hour Intersection Turning Movements (Intersections 39-57)

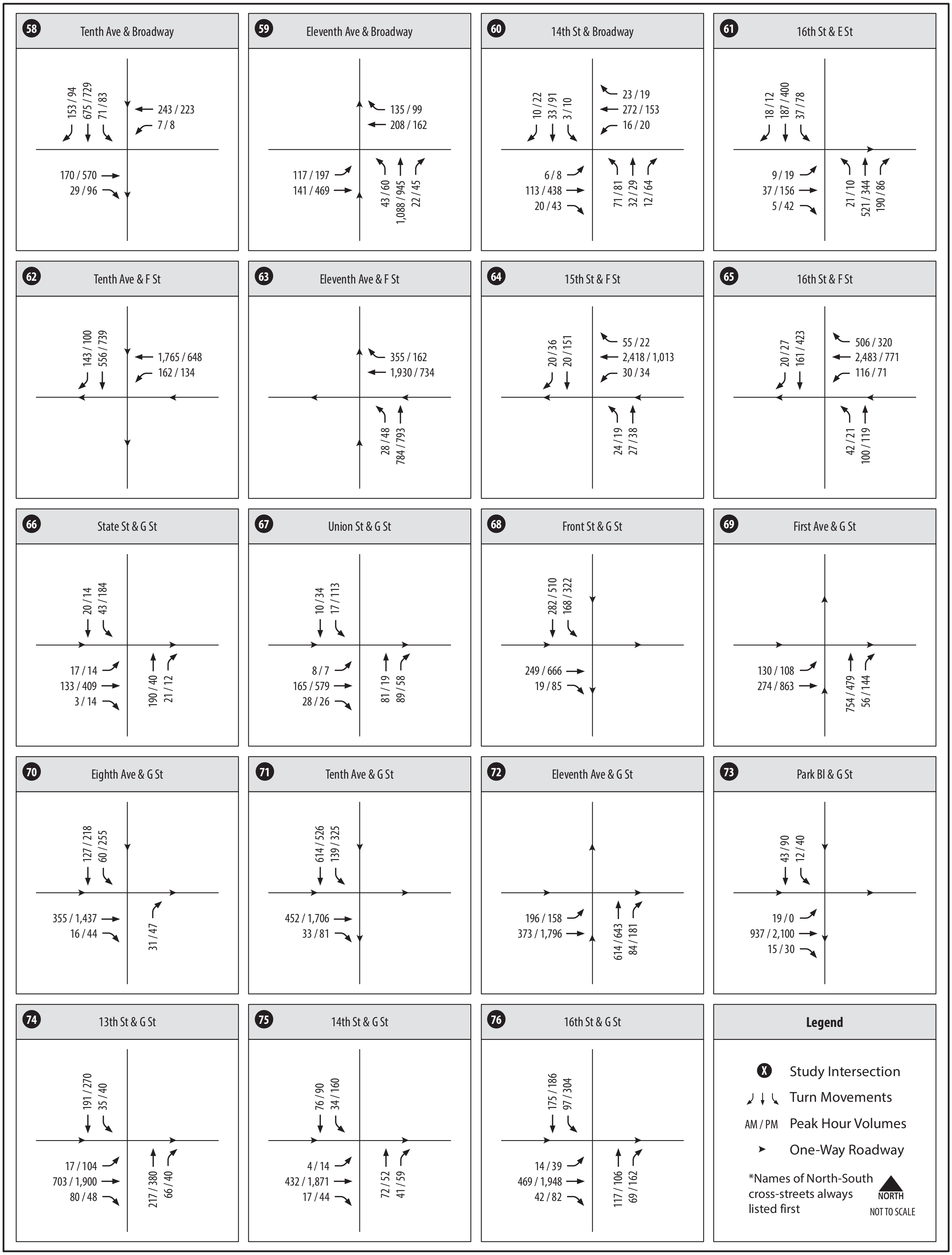

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Figure 4-30

Existing AM/PM Peak Hour Intersection Turning Movements (Intersections 58-76)

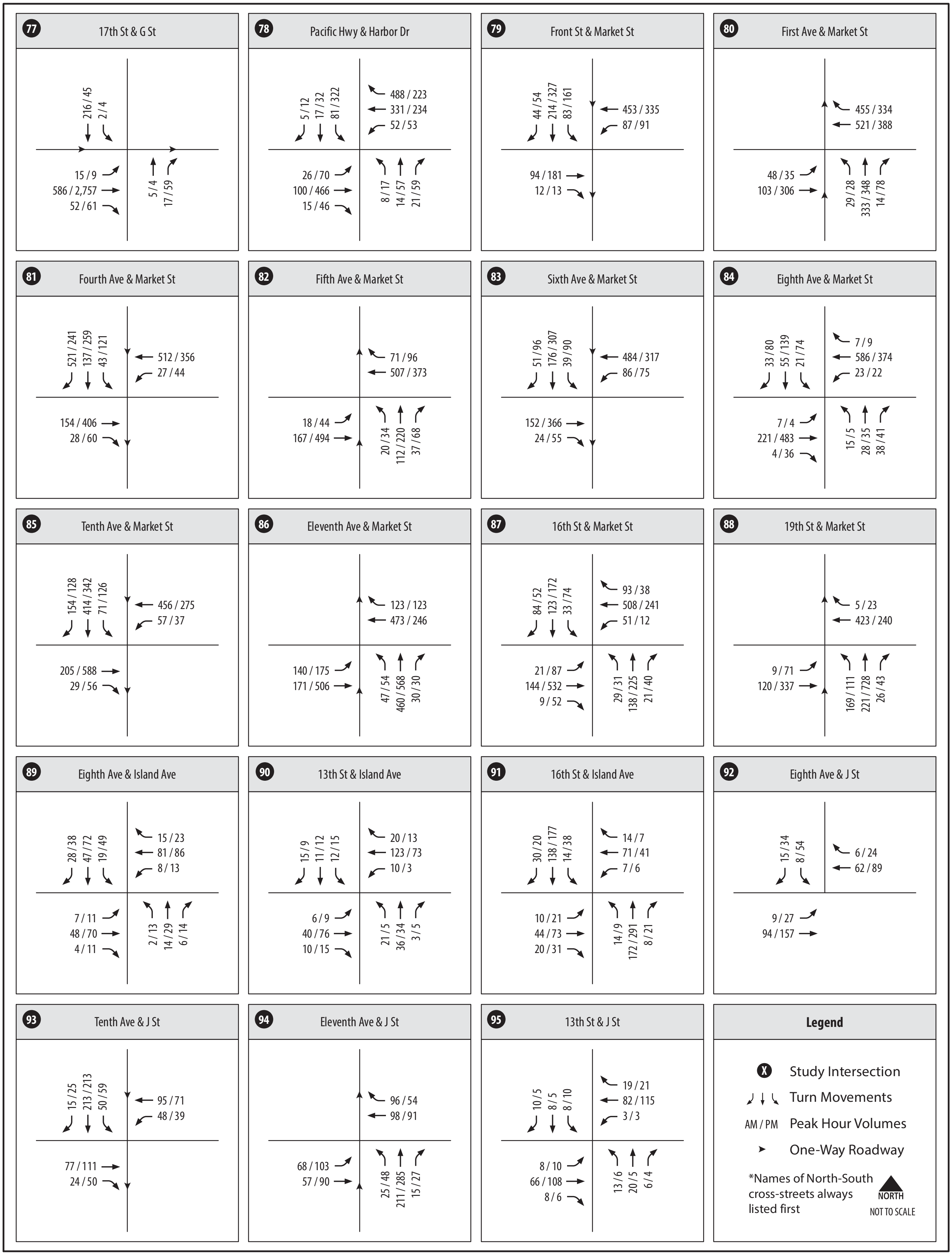

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Figure 4-30

Existing AM/PM Peak Hour Intersection Turning Movements (Intersections 77-95)

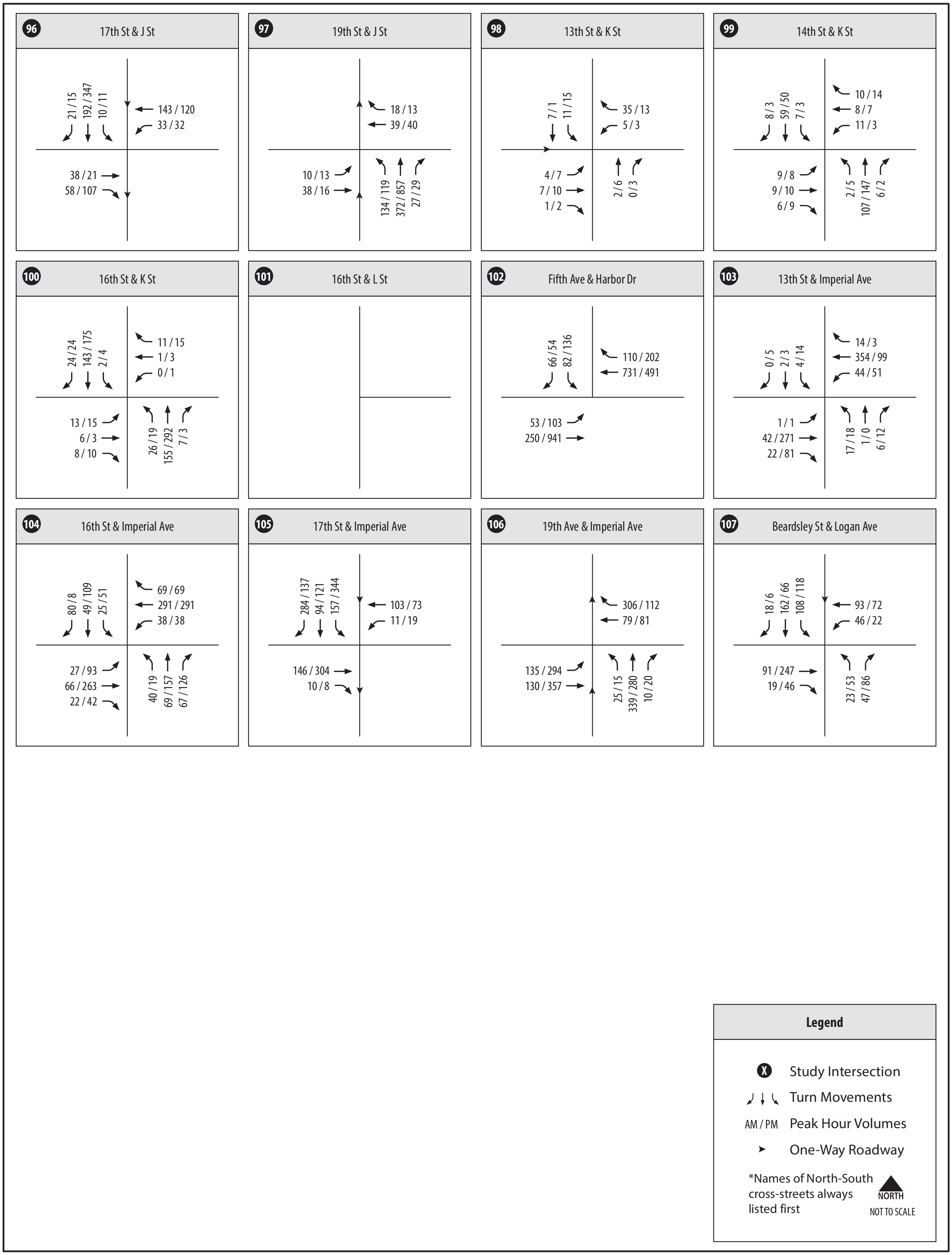

Figure 4-30

Existing AM/PM Peak Hour Intersection Turning Movements (Intersections 96-107)

Table 4-13 Existing Peak Hour Intersection Level of Service Results

Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Avg. Delay (Sec.)	LOS	Avg. Delay (Sec.)	LOS
1: Pacific Highway & Laurel Street	Signal	47.6	D	54.7	D
2: Harbor Drive & Hawthorn Street	Signal	17.6	B	9.4	A
3: Pacific Highway & Hawthorn Street	Signal	16.3	B	19.9	B
4: Kettner Boulevard & Hawthorn Street	Signal	18.0	B	11.3	B
5: India Street & Hawthorn Street	Signal	25.9	C	9.2	A
6: Columbia Street & Hawthorn Street	Signal	9.6	A	8.9	A
7: Hawthorn Street & State Street	Signal	9.5	A	8.9	A
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street	SSSC	14.6	B	25.4	D
9: Harbor Drive & Grape St	Signal	18.9	B	12.3	B
10: Columbia Street & Grape Street	Signal	17.8	B	27.5	C
11: State St & Grape Street/Grape St/I-5 SB On Ramp	Signal	10.6	B	55.2	E
12: First Avenue & I-5 NB On-Ramp/Elm Street	Signal	17.5	B	27.1	C
13: Sixth Avenue & Elm Street/I-5 NB Off-Ramp	Signal	13.0	B	10.3	B
14: Park Boulevard & 163 NB On Ramp	SSSC	No Conflicting Movements			
15: Front Street & Cedar Street	Signal	18.5	B	14.2	B
16: First Avenue & Cedar Street	Signal	22.5	C	17.7	B
17: Second Avenue & Cedar Street	SSSC	58.9	**F**	14.7	B
18: Fourth Avenue & Cedar Street	Signal	13.7	B	13.7	B
19: Fifth Avenue & Cedar Street	Signal	15.3	B	20.8	C
20: Sixth Avenue & Cedar Street	Signal	13.8	B	16.0	B
21: Park Boulevard & I-5 SB Off Ramps	Signal	19.5	B	18.7	B
22: Front Street & Beech Street	Signal	6.9	A	13.4	B
23: First Avenue & Beech Street	Signal	28.3	C	16.8	B
24: Fourth Avenue & Beech Street	Signal	13.3	B	16.1	B
25: Fifth Avenue & Beech Street	Signal	11.8	B	16.7	B
26: Sixth Avenue & Beech Street	Signal	23.4	C	7.8	A
27: Harbor Drive & Ash Street	Signal	32.7	C	13.4	B
28: Pacific Highway & Ash Street	Signal	59.1	E	26.2	C
29: Front Street & Ash Street	Signal	13.1	B	5.3	A
30: First Avenue & Ash Street	Signal	14.8	B	12.6	B
31: Sixth Avenue & Ash Street	Signal	8.8	A	6.5	A
32: Seventh Avenue & Ash Street	Signal	8.0	A	10.5	B
33: Ninth Street & Ash Street	Signal	11.9	B	14.4	B
34: Front Street & A Street	Signal	11.0	B	16.1	B
35: First Avenue & A Street	Signal	11.8	B	12.9	B
36: Eighth Street & A Street	Signal	11.5	B	12.0	B
37: Ninth Street & A Street	Signal	17.2	B	5.1	A
38: Tenth Avenue & A Street	Signal	19.6	B	16.1	B

Table 4-13 Existing Peak Hour Intersection Level of Service Results

Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Avg. Delay (Sec.)	LOS	Avg. Delay (Sec.)	LOS
39: Eleventh Avenue & A Street	Signal	14.8	B	12.9	B
40: Kettner Boulevard & B Street	Signal	9.1	A	9.3	A
41: Ninth Street & B Street	Signal	16.3	B	13.6	B
42: 16th Street & B Street	Signal	17.8	B	15.4	B
43: 17th Street & B Street	SSSC	93.5	**F**	14.5	B
44: 19th Street/Pershing Drive / I-5 NB On-Ramp & B Street	Signal	11.1	B	10.1	B
45: 15th Street & C Street	SSSC	10.1	B	13.1	B
46: 16th Street & C Street	Signal	16.3	B	17.5	B
47: 17th Street & C Street	SSSC	10.9	B	15.6	C
48: Pacific Highway & Broadway	Signal	23.9	C	25.6	C
49: State Street & Broadway	Signal	9.8	A	7.0	A
50: Broadway & Union Street	Signal	4.1	A	5.9	A
51: Front Street & Broadway	Signal	13.4	B	105.8	**F**
52: First Avenue & Broadway	Signal	22.5	C	20.1	C
53: Fourth Avenue & Broadway	Signal	9.6	A	12.0	B
54: Fifth Avenue & Broadway	Signal	14.8	B	14.8	B
55: Sixth Avenue & Broadway	Signal	7.3	A	9.1	A
56: Eighth Street & Broadway	Signal	11.8	B	8.4	A
57: Ninth Street & Broadway	Signal	11.1	B	11.6	B
58: Tenth Avenue & Broadway	Signal	16.2	B	15.3	B
59: Eleventh Avenue & Broadway	Signal	9.4	A	22.0	C
60: 14th Street & Broadway	Signal	12.0	B	12.9	B
61: 16th Street & E Street	Signal	116.8	**F**	17.5	B
62: Tenth Avenue & F Street	Signal	11.0	B	12.3	B
63: Eleventh Avenue & F Street	Signal	12.8	B	9.8	A
64: 15th Street & F Street	SSSC	13.3	B	58.0	**F**
65: 16th Street & F Street	Signal	19.8	B	12.2	B
66: State Street & G Street	Signal	17.4	B	18.5	B
67: Union Street/Union St & G Street	AWSC	8.0	A	11.5	B
68: Front Street & G Street	Signal	17.5	B	22.1	C
69: First Avenue & G Street	Signal	11.4	B	16.7	B
70: Eighth Street & G Street	Signal	11.6	B	16.3	B
71: Tenth Avenue & G Street	Signal	18.0	B	14.6	B
72: Eleventh Avenue & G Street	Signal	8.7	A	8.4	A
73: Park Boulevard & G Street	Signal	10.4	B	12.0	B
74: 13th Street & G Street	Signal	6.5	A	20.3	C
75: 14th Street & G Street	Signal	7.6	A	6.5	A
76: 16th Street & G Street	Signal	8.6	A	20.5	C

Table 4-13 Existing Peak Hour Intersection Level of Service Results

Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Avg. Delay (Sec.)	LOS	Avg. Delay (Sec.)	LOS
77: 17th Street & G Street	SSSC	22.1	C	OVRFL	**F**
78: Pacific Highway & Market Street	Signal	31.5	C	23.6	C
79: Front Street & Market Street	Signal	6.1	A	8.7	A
80: First Avenue & Market Street	Signal	10.9	B	8.5	A
81: Fourth Avenue & Market Street	Signal	13.6	B	24.5	C
82: Fifth Avenue & Market Street	Signal	29.8	C	29.0	C
83: Sixth Avenue & Market Street	Signal	6.3	A	12.8	B
84: Eighth Street & Market Street	Signal	8.7	A	8.4	A
85: Tenth Avenue & Market Street	Signal	26.1	C	6.4	A
86: Eleventh Avenue & Market Street	Signal	14.4	B	11.7	B
87: 16th Street & Market Street	Signal	11.5	B	15.2	B
88: 19th Street & Market Street	Signal	15.9	B	17.7	B
89: Eighth Street & Island Avenue	AWSC	7.8	A	8.3	A
90: 13th Street & Island Avenue	AWSC	8.0	A	7.7	A
91: 16th Street & Island Avenue	AWSC	8.9	A	11.4	B
92: J Street & Eighth Street	AWSC	7.5	A	8.3	A
93: Tenth Avenue & J Street	Signal	10.0	B	10.1	B
94: Eleventh Avenue & J Street	Signal	8.2	A	9.0	A
95: 13th Street & J Street	AWSC	7.6	A	7.9	A
96: 17th Street & J Street	Signal	9.8	A	8.5	A
97: 19th Street & J Street	AWSC	11.1	B	119.6	**F**
98: 13th Street & K Street	AWSC	6.4	A	6.7	A
99: 14th Street & K Street	SSSC	10.3	B	10.1	B
100: 16th Street & K Street	SSSC	9.9	A	12.2	B
101: 16th Street & L Street	Does Not Exist				
102: Harbor Drive & Fifth Avenue	Signal	15.0	B	25.7	C
103: 13th Street & Imperial Avenue	Signal	3.4	A	3.9	A
104: Imperial Avenue & 16th Street	Signal	12.8	B	13.9	B
105: Imperial Avenue & 17th Street	Signal	11.7	B	10.8	B
106: Imperial Avenue & 19th Street	Signal	14.7	B	16.4	B
107: Logan Avenue & I-5 SB Off-Ramp	AWSC	11.4	B	14.2	B

Source: NDS, City of San Diego, Chen Ryan Associates; September 2014

Notes:
Bold letter indicates unacceptable LOS F.
OWSC = One-way stop controlled.
SSSC = Side Street stop controlled.
AWSC = All-way stop controlled.
For one or two-way stop controlled intersections, the delay shown is the worst delay experienced by any of the approaches.
OVRFL – intersection delay is longer than calculation capacity of the traffic analysis software

As shown in Table 4-13, the following seven (7) study area intersections are currently operating at LOS F during the AM and/or PM peak hour:

- 2nd Avenue and Cedar Street (AM - LOS F)
- 17th Street and B Street (AM - LOS F)
- Front Street and Broadway (PM - LOS F)
- 16th Street and E Street (AM - LOS F)
- 15th Street and F Street (PM - LOS F)
- 17th Street and G Street (PM - LOS F)
- 19th Street and J Street (PM - LOS F)

Figure 4-31 graphically displays peak period intersection LOS during the AM and PM peak periods for the Downtown San Diego study area. As shown, six of the seven failing intersections are located near freeway on- or off-ramps, with the exception being the intersection of Front Street and Broadway.

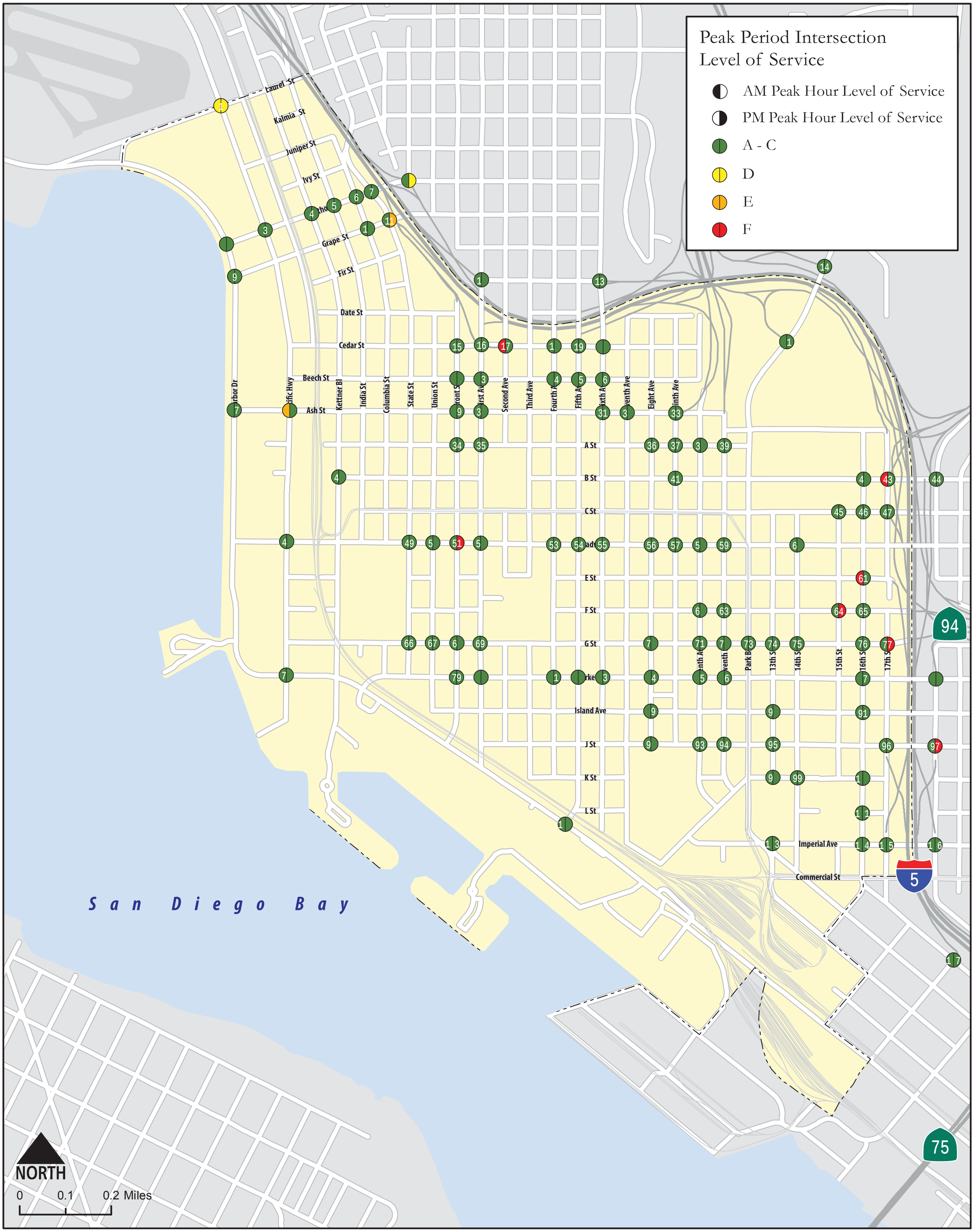

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Figure 4-31

Existing AM/PM Peak Hour Intersection Levels of Service

4.5.3 Freeway Segments and Level of Service

Interstate 5

Interstate 5 (I-5) is a major north-south regional facility providing access between the U.S.-Mexico International Border to the south, and cities north of San Diego, as well as Orange and Los Angeles Counties to the north. I-5 has eight mixed-flow/general purpose lanes (four in each direction), and one or two auxiliary lanes. Within Downtown San Diego, I-5 access is provided via southbound interchanges at Cedar/Front Street, 10th Avenue/Ash Street, B Street, and 17th Street/Imperial Avenue. Local access is also provided via northbound interchanges at J Street, B Street, 6th Street, and Hawthorn Street.

The California Department of Transportation (Caltrans) maintains and operates I-5. In 2011, I-5 accommodated 155,000 to 208,000 average daily trips (ADT) along the segments adjacent to Downtown San Diego. Trucks comprise approximately 4-5% of the total traffic on I-5.

Table 4-14 displays the level of service for the freeway segments adjacent to Downtown San Diego, derived using the methodologies described in Chapter 2. As shown in the table, all of the freeway segments along I-5 surrounding Downtown are currently operating at acceptable LOS D or better with the exception of the following:

- Northbound Interstate 5, between First Avenue and Sixth Avenue - operates at LOS E during the peak hour of traffic flow conditions.
- Northbound Interstate 5, between Sixth Avenue and SR-163 - operates at LOS F during the peak hour of traffic flow conditions.
- Northbound Interstate 5, between SR-163 and Pershing - operates at LOS E during the peak hour of traffic flow conditions.
- Northbound Interstate 5, between Pershing Drive and SR-94 - operates at LOS E during the peak hour of traffic flow conditions.
- Southbound Interstate 5, between Pershing Drive and SR-94 - operates at LOS F during the peak hour of traffic flow conditions.

Table 4-14 Existing Freeway Segment Level of Service Results

Freeway	Segment	ADT[1]	Direction	# of Lanes	Capacity[2]	D[3]	K[4]	HVF[5]	Peak Hour Volume	V/C	LOS
I-5	India Street and Hawthorn Street	192,000	NB	4M+1A	10,810	7.9%	59.3%	4.1%	9,500	0.88	D
			SB	4M+1A	10,810	8.2%	52.9%	3.7%	8,800	0.81	D
I-5	Hawthorn Street and First Avenue	161,000	NB	4M+1A	10,810	7.9%	59.3%	4.1%	7,900	0.73	C
			SB	4M+1A	10,810	8.2%	52.9%	3.7%	7,400	0.68	C
I-5	1st Street and 6th Street	204,000	NB	4M+1A	10,810	7.9%	59.3%	4.1%	10,100	0.93	**E**
			SB	4M+2A	12,220	8.2%	52.9%	3.7%	9,300	0.76	C
I-5	6th Street and SR-163	204,000	NB	4M+1A	10,810	8.5%	61.5%	4.1%	11,300	1.05	**F**
			SB	4M+1A	10,810	7.9%	56.4%	3.7%	9,600	0.89	D
I-5	SR-163 and Pershing Drive	212,000	NB	4M+2A	12,220	8.5%	61.5%	4.0%	11,700	0.96	**E**
			SB	4M+2A	12,220	7.9%	56.4%	3.8%	10,000	0.82	D
I-5	Pershing Drive and SR-94	212,000	NB	4M+2A	12,220	8.5%	61.5%	4.0%	11,700	0.96	**E**
			SB	4M	9,400	7.9%	56.4%	4.1%	10,000	1.06	**F**
I-5	SR-94 and Imperial Avenue	165,000	NB	4M+1A	10,810	8.5%	61.5%	4.0%	9,100	0.84	D
			SB	4M+1A	10,810	7.9%	56.4%	4.1%	7,800	0.72	C

Source: CALTRANS, Chen Ryan Associates; September 2014

Notes:
Bold letter indicates unacceptable LOS E or F.
M = Mainline. Aux = Auxiliary Lane.
[1] Traffic volumes provided by Caltrans (2013).
[2] The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.
[3] D = Directional split, Source: Caltrans (2013)
[4] K = Peak hour %, Source: Caltrans (2013)
[5] HV = Heavy vehicle %, Source: Caltrans (2013)

4.5.4 Vehicular Collision Analysis

Automobile collision data was obtained from the City of San Diego for the period from 2008 to 2013. The data indicated a total of 1,745 vehicular collisions occurred over this period within Downtown San Diego.

Table 4-15 shows the number of collisions by collision cause over the period from 2008 to 2013. As shown, about 26% of all vehicle-vehicle collisions are reported as having an "unknown" collision cause, while about 15% are caused by vehicles running red lights.

Table 4-15 Collision Causes
(Motor Vehicle with Other Motor Vehicle)

Primary Collision Cause	Collisions	Percent of Total
Unknown	462	26.5%
Ran Traffic Signal	266	15.2%
Speed Too Fast for Conditions	216	12.4%
Violated Vehicle's R/W	200	11.5%
D.U.I or N/A	139	8.0%
Not Paying Attention	115	6.6%
Other	109	6.2%
Ran Stop Sign	61	3.5%
Following Too Close	48	2.8%
Unsafe Movement – Right Turn	34	2.0%
Lost Control of Vehicle	24	1.4%
Unsafe Movement – Left Turn	19	1.1%
Improper Start	16	0.9%
Visibility Issue	12	0.7%
Unsafe Backing	9	0.5%
No Fault	8	0.5%
Distraction in Vehicle	7	0.4%
Total	**1,745**	**100%**

Source: SWITRS, Chen Ryan Associates; September 2014

Table 4-16 shows the number of collisions by collision type over the period from 2008 to 2013. As shown, about 33% of all vehicle-vehicle collisions can be described as a broadside collision, while about 20% are caused by vehicles running red lights.

Table 4-16 Collision Type
(Motor Vehicle with Other Motor Vehicle)

Collision Type	Collisions	Percent of Total
Right Angle (Broadside)	569	32.6%
Rear End	345	19.8%
Hit Parked Vehicle	277	15.9%
Side Swipe (Same)	277	15.9%
Hit Object / Hit "Fixed" Object	133	7.6%
Rear End / Backing	76	4.4%
Other	38	2.1%
Head-On	16	0.9%
Overturned in Road	14	0.8%

Source: SWITRS, Chen Ryan Associates; September 2014

Table 4-17 shows the locations in Downtown San Diego with the highest frequency of vehicle-vehicle collisions over the period from 2008 to 2013. As shown, the intersection of 10th Avenue and A Street had 25 collisions during this period, followed by 4th Avenue and Ash Street with 18 collisions, and then 11th Avenue and A Street with 17 collisions.

Table 4-17 Most Frequent Vehicle-Vehicle Collision Locations

Most Frequent Locations	Collisions
Tenth Avenue & A Street	25
Fourth Avenue & Ash Street	18
Eleventh Avenue & A Street	17
16th Street & G Street	15
16th Street & F Street	15
Fifth Avenue & A Street	14
Fifth Avenue & Ash Street	14
Fifth Avenue & Market Street	12
17th Street & Market Street	12
Eleventh Avenue & Broadway	12
Fourth Avenue & G Street	11
Tenth Avenue & Market Street	11
Tenth Avenue & G Street	11
17th Street & G Street	11
First Avenue & A Street	11
Tenth Avenue & Broadway	11
Eleventh Avenue & B Street	11
Park Boulevard & B Street	11

Source: SWITRS, Chen Ryan Associates; September 2014

Figure 4-32 shows the distribution of vehicle-vehicle collisions across Downtown San Diego. Intersections near the SR-94 and the SR-163 on- and off-ramps show relatively high levels of collisions. Additionally, high collision frequencies were also recorded at the northern extent of Fifth Avenue within the Downtown area, where access to Interstate 5 is provided. These findings reveal a need for further safety and operational assessments of intersections and roadways leading to and from freeway access points.

Corridors with notably high collision occurrences include:

- Broadway
- Grape Street
- Market Street
- A Street
- Ash Street
- Fifth Avenue
- 16th Street

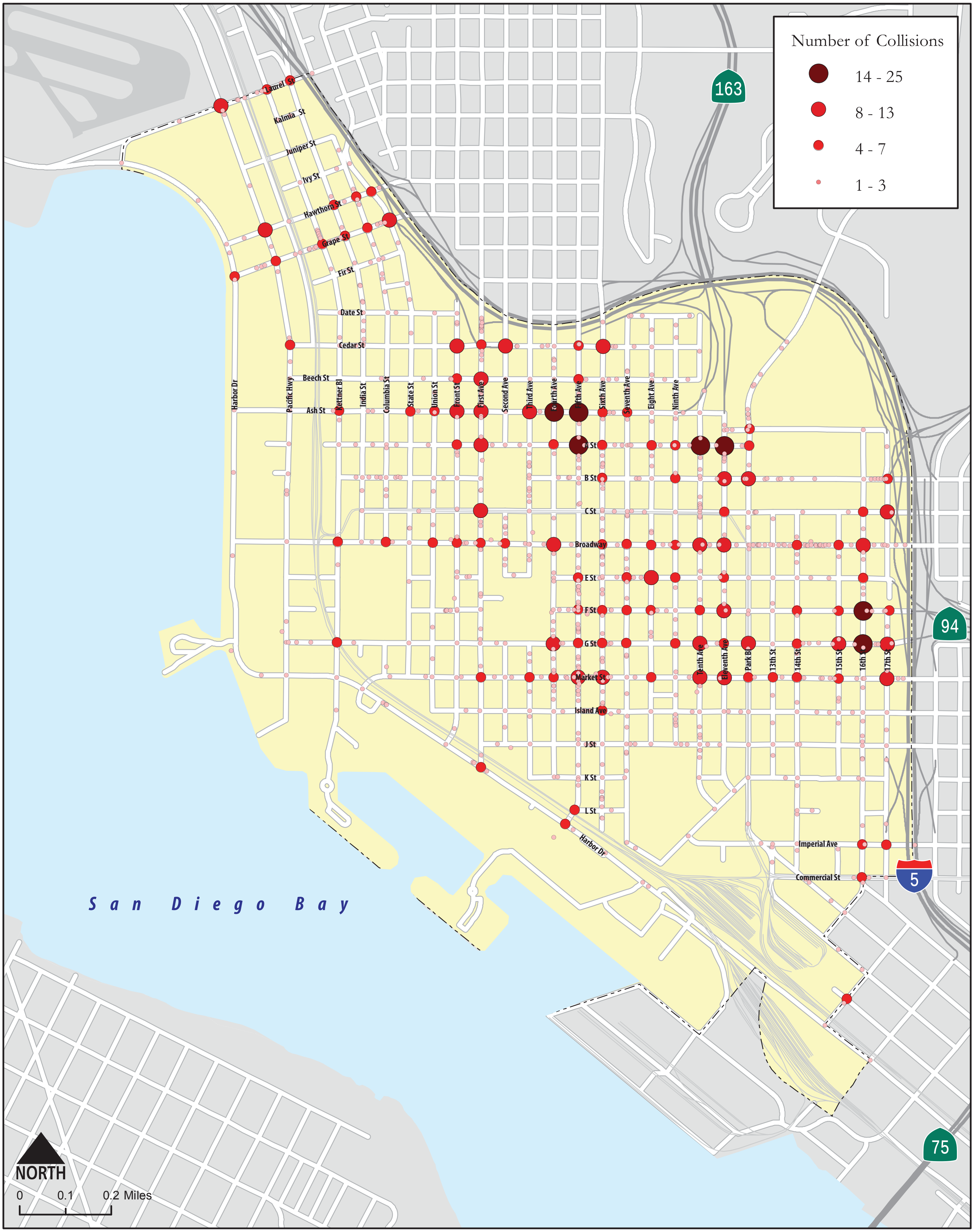

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Figure 4-32
Vehicle Collisions
(2008-2013)

4.6 Intelligent Transportation Systems (ITS)

The currently adopted citywide Mobility Element identifies the following goals for an intelligent transportation system:

- *A transportation system which operates efficiently saves energy and reduces negative environmental impacts.*
- *A safe transportation system.*
- *A transportation system that effectively uses appropriate technologies.*

Implementation of Intelligent Transportation Systems (ITS) can provide many benefits to the local roadway network, including improving roadway traffic operations, improving transit operations and relaying valuable traffic-related information and providing guidance to drivers (e.g. locations of available parking, traffic congestion points, and the location of accidents). Coordinated traffic signals and transit signal priority treatments are examples of ITS programs that can help improve both transit and roadway operations.

4.6.1 Signal Coordination

Signal coordination can improve the operations of a roadway corridor by allowing motorists to travel through the corridor with reduced delays and fewer stops at red lights. This is accomplished by linking the signals, usually via underground copper or fiber optic wire, and coordinating signal timing to account for the time it takes for a motorist, traveling at the speed limit, to drive from one signal to the next. These benefits should be balanced with the need for pedestrian and bicycle safety.

The majority of signals within Downtown San Diego are coordinated using pre-timed 70 second cycle lengths. Additionally, the offsets between signals are designed to allow motorists to progress through the corridor at the posted speed limit without stopping at a red light. This system is particularly effective for the movement of vehicular traffic on one-way grid system with consistent block spacing, such as the Downtown street network.

4.6.2 Transit Priority

Transit Priority treatments are designed to improve transit operations and overall schedule adherence. Such treatments can be found at Intersections along First Avenue and Broadway which are equipped with transit priority treatments such as transit priority signals and transit only lanes at congested intersections. The transit priority signal allows an advanced transit phase allowing busses to enter the intersection before vehicular traffic, while the transit only lanes allow busses to bypass congestion and queued vehicles at the intersection, limiting delay.

4.6.3 Potential ITS Improvements

Additional ITS improvement concepts for future consideration include the following:

- Enhance signal coordination;
- Consider the use of traffic responsive or adaptive traffic control in areas with variable traffic patterns;
- Implement transit signal priority treatments at signalized intersections serving BRT and/or rapid bus routes; and
- Use of variable message signs to direct motorists to available parking and to alert them of street closures.

4.7 Transportation Demand Management (TDM)

The goal of the City's Transportation Demand Management (TDM) program is to improve mobility, reduce congestion and air pollution, and provide options for employees and residents to commute to and from work.

Typical TDM strategies include promoting the following:

- Teleworking
- Alternative Work Schedules
- Walking
- Bicycling and Bike Sharing (DecoBike to launch October of 2014)
- Carpooling
- Vanpooling
- Transit
- Car-sharing (Car2Go and ZipCar)
- Mixed-Use Development
- Other Transportation Options

TDM measures improve the efficiency of transportation system by helping to reduce vehicle trips during peak periods of demand.

According to the American Community Survey (ACS 2012), 6.98% of Downtown San Diego residents carpool to work, which is well below the citywide average of 9.27%. The San Diego Association of Governments (SANDAG) has an established program (iCommute) providing regional coordination of TDM programs. iCommute provides the following services:

- *RideMatcher* – resources for finding carpool partners or available vanpool seats;
- *SchoolPool* – a program that enrolls schools to encourage parents to carpool;
- *Transit Information* - provides a linkage to transit service provider web pages;
- *Bicycle Information* – provides a link to SANDAG's Regional Bikeway Master Plan, which has been updated to show bicycle paths, lanes and routes in the region; and
- *Guaranteed Ride Home* – a program that allows vanpool riders affordable rides home to deal with emergency meetings or illness.

In addition to the iCommute program, Caltrans owns and/or maintains several park-and-ride lots in the region that are used to promote carpool activity. However, there are no park-and-ride facilities within Downtown San Diego.

The City of San Diego's Municipal Code requires new development to provide sufficient bicycle parking stalls, carpool parking and motorcycle facilities to encourage the use of alternative modes of transportation. The City is early in the process of developing recommendations to amend the land development requirements for pedestrian, bicycle, carpool, and commuter information facilities. The City is also coordinating with SANDAG on the implementation of a car-sharing demonstration program. Pricing strategies are also used to reduce demand on the transportation system. Managed lanes, such as the managed or express lanes on Interstate 15, are included in the 2050 RTP.

4.8 Airports, Passenger Rail, and Goods Movement

This section presents a discussion of the transportation facilities and infrastructure supporting the San Diego International Airport (located just northwest of Downtown), Coaster and Amtrak rail services, and freight services.

4.8.1 Airports

The closest airport serving Downtown San Diego is the San Diego International Airport (Lindbergh Field). This section outlines several recent plans related to the airport.

The Destination Lindbergh Plan proposes an expanded configuration of the San Diego International Airport that attempts to minimize airport-related traffic impacts to adjacent communities, and improve intermodal access to the airport. The plan recommends improvements to the local and regional roadway network providing access to the airport, as well as a new transit route to serve the airport. The Intermodal Transit Center (ITC) is proposed as an intermodal hub to facilitate air passengers accessing the airport without driving a single-occupant vehicle.

The ITC is planned to be located at the north end of the airport, just south of I-5 between Washington Street and Sassafras Street. Plans indicate that existing trolley lines, the COASTER, Amtrak, new express bus routes, several local bus routes and the planned California High Speed Rail system, will all be served by the ITC. In addition, the ITC will provide the following connections and amenities:

- 360 new parking spaces;
- 126,000 SF of new retail uses;
- Direct access to I-5 / via the Pacific Highway on/off-ramps;
- Grade separation of the Washington Street and Sassafras at-grade rail crossings;
- New grade separated crossing at Vine Street;
- Raised bicycle lanes and cycle tracks on the street surrounding the ITC;
- Wider sidewalks around both the ITC and new retail uses; and
- Curb extensions and planting/parking strips as well as provide new opportunities to employ green street strategies on impacted/new roadways.

San Diego International Airport Consolidated Rental Car Facility (CONRAC) – The CONRAC project proposes consolidating rental car facilities currently serve the airport into a single location, located west of Pacific Highway and north of Sassafras Street. The project proposes extending Sassafras Street west of Pacific Highway and along the east end of the airport to serve as a point of access for rental vehicles.

High-Speed Rail Station – A station for the California High-Speed Rail System is proposed at the ITC. The High-Speed Rail station is also proposed to include a parking garage with 6,000 parking spaces.

San Diego International Airport (SDIA) Master Plan – The SDIA Master Plan outlines several local roadway improvement measures near the airport to expand vehicular capacity and enhance access.

4.8.2 Passenger Rail

Heavy rail commuter train service, provided by the North County Transit District (called the Coaster) and Amtrak connect Downtown San Diego to locations outside the county. Although there is no heavy passenger rail service directly within Downtown San Diego, the Coaster and Amtrak services are accessible to Downtown San Diego residents via the Orange Line Trolley.

More than 20 Coaster trains run on weekdays, with additional service on the weekends. The Coaster provides connections to numerous other transit routes, including bus routes, the Sprinter, San Diego Trolley, Amtrak and Metro Transit (to Orange and LA Counties via the Oceanside Transit Center).

The main Amtrak route serving San Diego is the Pacific Surfliner which provides service between the major coastal cities in California. The Pacific Surfliner stops at Union Station in Los Angeles, which functions as a transfer point to rail services across the country. The main Amtrak station within the City of San Diego is Santa Fe Depot (located Downtown); however, on weekends and holidays the Pacific Surfliner service also stops at the Old Town Transit Center.

4.8.3 Goods Movement

The efficient movement of goods is essential for meeting basic consumer demands and requires interaction among various modes of travel. The San Diego region is supported by intermodal goods movement infrastructure consisting of roadways, railways, maritime facilities, and airport facilities. Downtown San Diego is located in close proximity to several regionally significant goods movement facilities, including Lindbergh Field, maritime facilities, coastal and inland freight railways, and several regional freeways.

The *City's 2008 General Plan Mobility Element* stated goods movement goal is expressed as follows:

> *"Safe and efficient movement of goods with minimum negative impacts."*

A description of the various goods movement modes is provided, including trucking, air freight, rail, and maritime.

Trucking

Most goods in the San Diego region are transported via trucks along highways and roadways. While the City of San Diego does not have a system of designated truck routes, truck access to Downtown San Diego is provided by major freeways, including specifically I-5, SR-163 and SR-94. Within Downtown San Diego, industrial and commercial destinations are generally concentrated along Commercial Street.

Local streets provide access to delivery destinations as well as the transition of freight to rail and ocean transport.

Air Freight

In addition to the transport of freight on roadways, cargo may also move through Downtown San Diego via air freight transport companies such as FedEx, DHL Express and UPS. San Diego International Airport serves as the primary regional airport for freight transported via air. Major cargo airlines serving Lindbergh field include FedEx, DHL Express, and UPS. These and other movers of freight may receive and distribute cargo via maritime operations, rail, or trucks.

Rail

Two companies operate freight rail service within San Diego County. The Burlington Northern Santa Fe Railway Company (BNSF) operates freight rail service along the same right-of-way as Amtrak and the Coaster passenger services. BNSF transports freight to points north and east of San Diego County, such as Los Angeles and Arizona. According to the *LOSSAN Corridor Strategic Assessment, January 2010* freight rail frequencies within this corridor are expected to double (from 4 trains a day to 8) over the next 20 years.

The San Diego and Imperial Valley Railroad (SDIY) also operates short-haul freight service in San Diego County along the Orange Line trolley corridor through Downtown San Diego during the early morning hours. This service provides an important connection between the Class I BNSF and freight rail service in Mexico. The railroad's main commodities are petroleum products, agricultural products, and wood pulp. The SDIY hauled around 6,500 carloads in 2008. It also suggests potential for conflict between freight trains and community members who live on or near Commercial Street. The SDIY carried almost 6,000 cars in 2010.

Maritime

There are currently no port cargo facilities located within Downtown San Diego, although cargo is transported near the study community, via the modes summarized above, to and from the port cargo facilities located at the nearby 10th Avenue Marine Terminal and at the National City Marine Terminal.

5.0 Transportation Model Forecast Methodology

This Chapter documents the process employed for estimating and forecasting travel by mode under existing and future conditions for the Downtown San Diego area. A particular focus of this process involved developing accurate forecast automobile trips since vehicular volumes were required to be analyzed in more detail (i.e. peak hour intersection level of service analysis) than volumes for other modes.

5.1 Background

One of the main goals of the Downtown San Diego Mobility Plan is to create a balanced multimodal network within Downtown San Diego that will functionally serve all modes of travel. A layered, modally-prioritized network was proposed due to the difficulty accommodating all modes within the typical Downtown 52-foot curb-to-curb width on most streets, along with the desire to plan within the existing curbs. For example, there are a number of auto-centric couplets (Front Street/First Avenue, Tenth Avenue/Eleventh Avenue, Ash Street/A Street, and F Street/G Street) currently providing freeway access and moving vehicular traffic in and out of Downtown, hence auto travel is identified as the prioritized mode along these roadways.

5.2 Transportation System Modeling Options

Accurately projecting future auto travel demand is critical to sizing Downtown streets, since over estimation of travel by car could lead to an unbalanced circulation system potentially underserving other modes of travel. Both SANDAG transportation forecast models (the Four-Step Model Series 12 and the Activity Based Model Series 13) were reviewed prior to the development of an alternative hybrid approach. Both models, as well as the rationale for not using these models directly, are outlined below.

5.2.1 Four-Step Model – Series 12

The traditional four-step model was utilized in the analysis of the 2006 Downtown Community Plan. Several issues became apparent during the calibration and validation efforts associated with that planning process. In particular, the lack of model accuracy resulted in significant manual adjustments. Based on previous experience and the project team's understanding of the four-step model, as well as discussions with SANDAG modeling staff, the following potential issues were identified with an analysis approach based upon SANDAG's current four-step model for forecasting travel demand in support of the Downtown San Diego Mobility Plan:

1. *Sensitivity to Active Modes* – Discussions with SANDAG modeling staff clarified the fact that the Mode Choice Model used in the SANDAG Series 12 Transportation Forecast is not sensitive to changes in bicycle and pedestrian facilities. In other words, the model does not accurately adjust travel behavior in response to implementation of multimodal facilities such as bicycle lanes or separated multimodal paths. Since the main goal of this plan is to develop a balanced circulation network that supports all modes of travel, it is critical that potential changes in travel mode choice are accurately quantified and reflect

travelers' responses to recommended multimodal improvements. The lack of sensitivity to non-motorized modes in the Series 12 model, therefore, presents a major hurdle to the development of a robust multimodal mobility plan.

2. *Trip Loadings and Assignments* – A typical four-step model uses a traffic analysis zone (TAZ) system to aggregate and depict land uses across a study area. Vehicular trips generated by study area land uses are loaded onto the transportation network at the origin TAZ and then distributed to other study area TAZs based on the attractiveness of their respective land uses. This approach works well in non-Downtown settings where most of the land uses provide parking on-site. However, a significant portion of Downtown land uses do not provide adequate parking on-site to serve their parking demands. Instead, Downtown land uses rely heavily on centralized public parking facilities and on-street parking to accommodate parking needs. In other words, Downtown trip generation is largely dependent on parking locations and supply. This is problematic when using a four-step model since it relies on the location of actual land uses, not parking facilities, to load and distribute vehicular trips across the network. Since most public parking facilities are dispersed throughout the Downtown area, and not sited directly at or adjacent to the trip-generating/attracting land uses, travel flows forecasted by the model will likely be inaccurate.

3. *Trip Generation Imbalance* – Downtown San Diego is anticipated to continue serving as the region's urban core. In support of this goal, the Community Plan Land Use Element shows very high buildout densities within the Downtown area, especially relative to other areas of the region. The City of San Diego requires that transportation analyses carried out as part of a Community Plan Update Environmental Impact Report (CPU EIR) assume full buildout of a community's land uses. It is also typical to assume year 2035 land uses outside of the community for the purposes of preparing a CPU EIR. These assumptions (buildout land uses in the Downtown community and year 2035 land uses for the rest of the region) result in a severe imbalance in trip productions and attractions with end result of underestimating trips entering/leaving the Downtown community. Rectifying this problem requires extensive manual adjustments, such as those carried out for the 2006 Downtown Community Plan.

Based upon the concerns outlined above, it was determined that the Series 12 four-step model would not be an appropriate tool for this project.

5.2.2 Activity Based Model (ABM) – Series 13

SANDAG is currently in the process of developing an Activity Based Model (ABM) which will more accurately account for shifts in transportation modes based on the implementation of pedestrian and bicycle facilities. However, this model is still under development and will not be ready for public release until a later date.

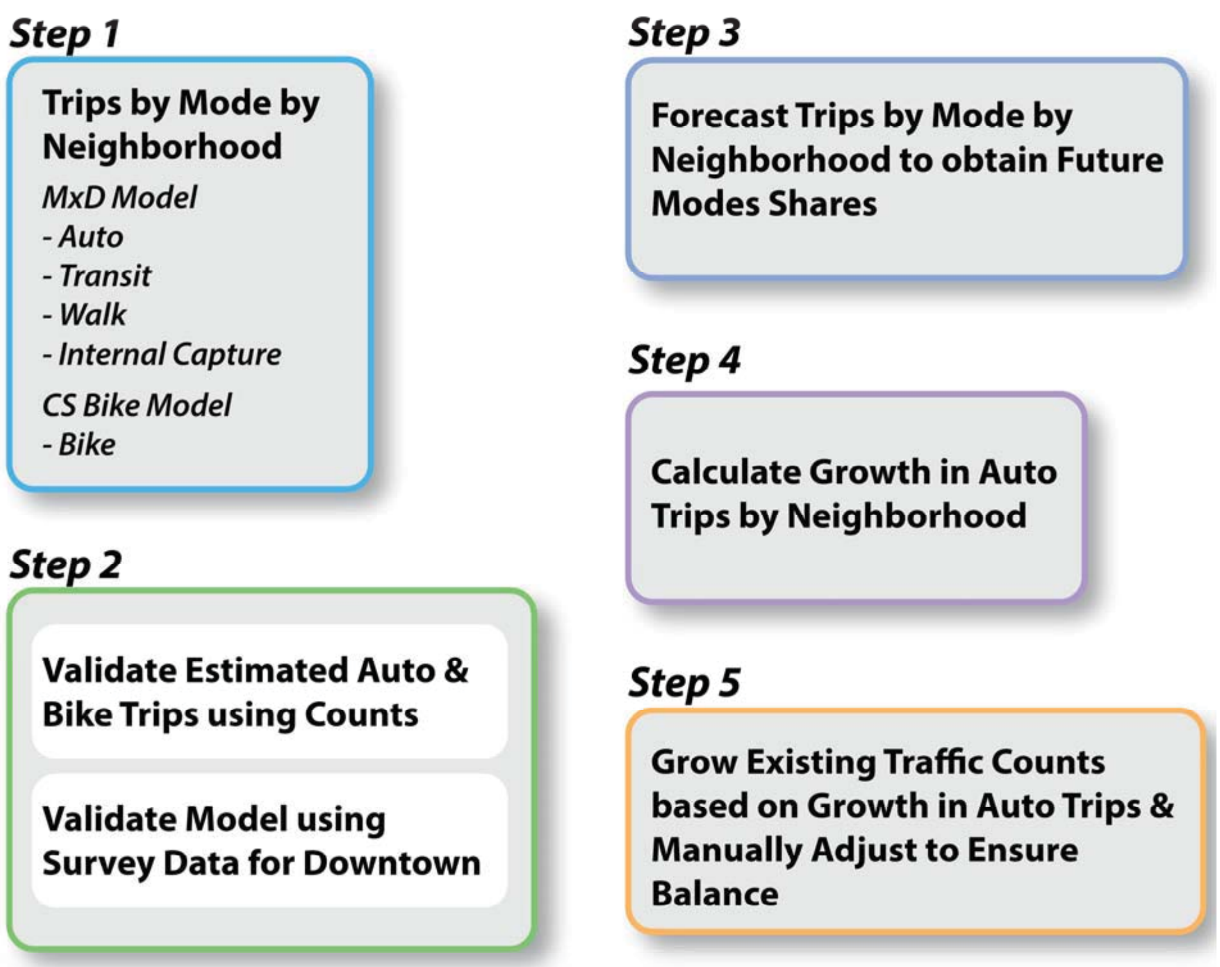
5.3 Modeling Approach

As noted in the previous sections, current tools for developing future year vehicular volumes lack the sensitivity and refinement necessary for achieving accuracy in high density urban areas such as the Downtown environment. A hybrid approach, drawing on several state-of-the-art techniques, was employed to achieve a stronger level of vehicular travel forecast accuracy.

The hybrid modeling approach relied upon five key steps, including estimating trips by mode; validating auto and bike trips using counts as well as validating mode shares using survey data; forecasting trips by mode; calculating growth in auto trips; and finally, growing existing auto counts using the growth factors from Step 4.

Figure 5-1 summarizes the five steps employed in the hybrid modeling process. Sections 5.3.1 through 5.3.5 provide a description of each of these five steps.

Figure 5-1 Hybrid Modeling Approach



5.3.1 Step 1 – Estimating Trips by Mode by Neighborhood

Quantifying the effects of proposed network alternatives on mode choice in the Downtown area is a critical component of the study and is one of the major weaknesses in the current four-step modeling process. Two key tools – SANDAG's MXD tool and Cambridge Systematic's (CS) Bike Model – were employed to support a more robust mode choice modeling effort sensitive enough to reflect travel behavior change associated with the various network alternatives (see Step 2). Application of these two tools provide for the most accurate vehicular trip forecast, given the dense nature of Downtown San Diego.

The following is an overview of these tools:

- **Trip Generation for Smart Growth Tool (MXD)** – SANDAG published the *Trip Generation for Smart Growth: Planning Tools for the San Diego Region* in 2009 to identify trip generation rates associated with smart growth urban developments. This tool provides a more accurate accounting of vehicle trip generation associated with mixed-use and transit-oriented development (TOD) in smart growth and urban environments, especially relative to current local and national methods for calculating trip generation by mode.

  The MXD tool is a spreadsheet-based tool that quantifies shifts in travel modes (auto, pedestrian and transit) for a specific study area based on land use combinations and densities, network connectivity, available transit service, population and employment, and household travel data. This tool calculates the number of person trips generated for each travel mode. The tool, however, does not quantify the bicycle trip generation.

- **CS Bike Model** – The CS Bike Model was used to estimate existing bicycle trips given existing bicycle facility in Downtown San Diego, as well as to forecast future bicycle trips given proposed improvements to bicycle facilities in year 2035. The CS Bicycle Model is a first-of-a-kind sketch planning tool that estimates bicycle trips associated with varying facility types. Rather than guessing at the change in cycling levels resulting from new bikeway facilities, not incorporating these changes at all, or applying coarse research factors from other parts of the country, the Bicycle Model offers a peer-reviewed, econometric analysis of the expected change in cycling levels based on actual revealed preferences collected in Southern California. Its output can be used to quantify likely reductions in vehicle trips resulting from increased cycling in the form of new bicycle trips and bicycle miles traveled, as well as a number of associated benefit measures including:
  - New bicycle trips by purpose (work, non-work utilitarian, recreational)
  - New bicycle miles traveled (BMT) by purpose (work, non-work utilitarian, recreational)
  - Congestion reduction (vehicle hours of delay reduced)
  - Greenhouse gas emissions reduction (carbon emissions reduced)
  - Household energy consumption reduction (gallons of motor vehicle fuel saved)
  - Air pollution damage savings (air pollution cost savings)
  - Household operating cost savings

Additional information regarding the Bike Model and associated methodology is provided in **Appendix I**. A technical memorandum on *Metro Bicycle Investment Scenario Analysis Model Methodology* is also included as **Appendix J** for reference.

Table 5-1 presents key results of the MXD and CS Bike Model hybrid analysis approach. Mode share percentages are shown by neighborhood for the Downtown area under base year conditions.

Table 5-1 Base Year Downtown Mode Shares by Neighborhood - Hybrid Model

Neighborhood	Auto	Transit	Active
Columbia	67.3%	6.2%	26.5%
Core	60.8%	9.7%	29.5%
Cortez Hill	56.7%	6.7%	36.5%
East Village	59.6%	4.8%	35.6%
Gaslamp/Horton	63.0%	8.7%	28.2%
Little Italy	68.0%	5.1%	26.8%
Marina	69.5%	4.3%	26.2%
Convention Center	61.0%	11.7%	27.3%
Total	**63.3%**	**7.2%**	**29.4%**

Source: Chen Ryan Associates; December 2015

Note:
Active refers to both Bicycle and Pedestrian Trips.

5.3.2 Step 2 – Validating Estimated Auto and Bike Trips & Mode Shares (Auto, Transit, Bike and Walk)

Auto and bike trips estimated by the hybrid analysis approach were validated using counts and travel surveys. Auto trips were validated to gain an adequate level of certainty with these numbers since they would ultimately be used to forecast intersection turning movements and carry out peak hour intersection level of service analysis as required under CEQA. Bike trips were validated to determine if the CS bike model was properly calibrated to the study area.

<u>**Auto Trip Validation**</u>

Table 5-2 displays the MXD-estimated number of auto trips that would flow in/out of Downtown between each neighborhood and communities outside of Downtown (in other words, 'internal-external' trips) under base year conditions.

Table 5-2 Auto Trips by Neighborhood Estimated by the Hybrid Model (Base Year)

Neighborhood	Internal-External Estimated Auto Trips
Columbia	53,136
Core	54,628
Cortez Hill	15,191
East Village	65,601
Gaslamp/Horton	78,248
Little Italy	27,868
Marina	52,001
Convention Center	24,264
Total	**370,937**

Source: Chen Ryan Associates; December 2015

In order to validate the auto trip estimates, the total number of internal-external auto trips (or 370,937 daily auto trips) was compared to observed screenline counts collected from around the perimeter of the Downtown study area.

Table 5-3 displays the results of 19 screenline counts collected around the perimeter of Downtown San Diego. As shown in the table, the sum of the screenline auto counts is about 319,555 trips, which is within 10% of the MXD-estimated auto trips.

Table 5-3 Traffic Counts Used to Validate MXD Auto Trip Estimates

#	Facility	Area	Screenline Count[1]
1	I-5	Little Italy	27,650
2	I-5	First Ave / Front St	35,500
3	I-5	4th St / 5th St / 6th St	11,900
4	SR-163	10th St / 11th St	36,300
5	I-5	10th St / 11th St	32,300
6	I-5	East Village	14,200
7	SR-94	F St / G St	43,000
8	I-5	Imperial Avenue	12,000
9	PH	Laurel Street	19,160
10	Park	A Street	9,945
11	Harbor	Laurel Street	16,970
12	Harbor	Cesar Chavez	12,855
13	Market	19th St	9,640
14	Broadway	19th St	7,530
15	Imperial	19th St	7,300
16	Island	19th St	1,900
17	Kettner	Laurel Street	0
18	5th	Elm St	10,315
19	4th	Elm St	11,090
		Screenline Count Total	**319,555**
		MXD-Estimated Auto Trips	**370,937**
		Difference	**51,382**
		%	**9.5%**

Source: Chen Ryan Associates; December 2015

Note:
[1]Based on historic count data. Count data was adjusted to account for traffic from adjacent communities.

Bike Trip Validation

Validation of the CS Bike Model was carried out by comparing model estimated daily bike trip flows to actual screenline ground counts taken in the Downtown study area. As presented in Chapter 4, SDSU's Active Transportation Research performed manual PM peak period screenline counts in 2011, and found that there were 597 bicycle trips within Downtown area during the PM peak period (4PM to 6PM). Based on SDSU's Active Transportation Research Center continuous, automated bicycle data collection program, a typical PM peak period equates to approximately 16% of total daily bicycle volumes. Therefore, 597 PM period bicycle trips equates to about 3,731 daily trips. Under existing conditions, the bike model estimated that approximately 4,355 bicycle trips would be generated within the Downtown area, which is approximately 16% higher than the existing ground counts. Since the existing bicycle screenline counts did not collect data along every Downtown roadway, there is a likely under-measurement of actual cyclists, making the 16% difference between observed and estimated cyclists reasonable.

Mode Share Validation

A final validation was performed on the overall mode shares estimated by the hybrid model using the following two travel surveys:

> *SANDAG Household Travel Survey* – SANDAG conducted a regional travel survey in 2013 for the development and validation of their upcoming Series 13 model. This survey tracked approximately 2,800 trips by mode, destination and purpose within the Downtown area. This data was refined by destination (internal or external to the Downtown area) and by mode type (pedestrian, bicycle, transit, or auto) to determine the base year mode split within the Downtown area.

> *Census Bureau 2012 Journey to Work Data* – The American Community Survey is an on-going national survey that samples a small percentage of the population every year on a variety of inputs including where and how you get to work. Travel data specific to Downtown San Diego was obtained from this survey to determine the overall mode split for the Downtown area.

Table 5-4 displays the base year mode share results within the Downtown area from both surveys and compares them to the results estimated by the hybrid model.

Table 5-4 Downtown Mode Shares – Comparing Survey Data and Hybrid Model Estimates

Survey	Measure	Auto	Transit	Active
SANDAG Travel Survey	Survey Mode Share	56.9%	13.2%	29.9%
	Hybrid Model Estimate	63.3%	7.2%	29.4%
	Difference from Hybrid Model Estimate	-6.4%	6.0%	0.5%
Journey to Work Survey	Survey Mode Share	66.4%	6.1%	27.5%
	Hybrid Model Estimate	63.3%	7.2%	29.4%
	Difference from Hybrid Model Estimate	3.1%	-1.1%	-1.9%

Source: Chen Ryan Associates; December 2015

Note:
Active refers to both Bicycle and Pedestrian Trips.

As shown, the hybrid model projects very similar mode shares as compared with both the SANDAG Travel Survey and the Census Bureau 2012 Journey to Work data. Based on the results displayed in Table 5-4, as well as the validation results for both the number of auto trips and bicycle trips estimated for Downtown San Diego, the proposed hybrid modeling process appears to accurately estimate the number of trips by travel mode in the Downtown area. Given the ability of the hybrid modeling process to estimate current travel behaviors, the model was used to forecast future travel demands under buildout of the Downtown San Diego Mobility Plan and the adopted Downtown Community Plan land uses.

5.3.3 Step 3 – Forecast Trips by Mode by Neighborhood

Buildout land uses, transportation networks (assuming the year 2035 transit network and the preferred mobility plan network), and future employment and population were entered into the hybrid model to project mode shares for the Downtown area under buildout of the Downtown San Diego Mobility Plan and the adopted Downtown Community Plan land uses. The number of vehicles owned per household was assumed to be lower under future conditions, and was reduced from 1.2 to 0.7. The lower vehicle ownership rate is comparable to other high density centers (such as Seattle, Portland, Denver) with similar residential densities and multimodal facilities as those projected for Downtown San Diego under buildout of the Downtown San Diego Mobility Plan.

Table 5-5 outlines the projected mode shares by neighborhood under buildout of the Preferred Mobility Plan conditions. Both the base year and buildout land use assumptions are provided in **Appendix K**.

Table 5-5 Future Year 2035 Mode Shares Forecast Using the Hybrid Model
Downtown Preferred Mobility Plan

Neighborhood	Auto		Transit		Active	
	Base Year	Future Year	Base Year	Future Year	Base Year	Future Year
Columbia	67.3%	50.2%	6.2%	11.6%	26.5%	38.1%
Core	60.8%	42.6%	9.7%	16.8%	29.5%	40.5%
Cortez Hill	56.7%	35.2%	6.7%	12.7%	36.5%	52.2%
East Village	59.6%	41.5%	4.8%	9.6%	35.6%	48.9%
Gaslamp/Horton	63.0%	45.2%	8.7%	14.6%	28.2%	40.1%
Little Italy	68.0%	45.6%	5.1%	9.5%	26.8%	44.9%
Marina	69.5%	55.3%	4.3%	7.5%	26.2%	37.2%
Convention Center	61.0%	60.6%	11.7%	11.6%	27.3%	27.9%
Total	**63.3%**	**45.8%**	**7.2%**	**11.4%**	**29.4%**	**42.7%**

Source: Chen Ryan Associates; December 2015

Note:
Active refers to both Bicycle and Pedestrian Trips.

As shown in Table 5-5, there is a significant shift from auto travel (63.3% to 45.8%) to both active transportation and transit trips (7.2% to 11.4% and 29.4% to 42.7%, respectively), resulting most likely from the increased residential densities and new transit services in the Downtown area under future buildout conditions.

5.3.4 Step 4 – Calculate Growth in Auto Trips by Neighborhood

Existing and future auto trips, as estimated/forecasted using the MXD model, were used to calculate growth in auto trips by neighborhood over the planning horizon. **Table 5-6A** through **Table 5-6C** display the anticipated growth in vehicular trips by neighborhood under buildout of the Preferred Mobility Plan for daily, AM peak hour and PM peak hour conditions, respectively.

Table 5-6A Vehicular Traffic Growth by Neighborhood (Daily)

Neighborhood	Base Year Estimated Auto Trips	Future Year Preferred Plan Forecast Auto Trips	Growth (Trips)	Growth (%)
Columbia	53,375	96,382	43,007	81%
Core	54,865	52,498	-2,367	-4%
Cortez Hill	15,239	23,656	8,417	55%
East Village	65,777	144,862	79,085	120%
Gaslamp/Horton	78,621	58,921	-19,700	-25%
Little Italy	27,888	42,134	14,246	51%
Marina	52,184	60,828	8,644	17%
Convention Center	24,099	31,689	9,855	45%
Total	**372,048**	**510,970**	**141,187**	**37%**

Source: Chen Ryan Associates; December 2015

Table 5-6B Vehicular Traffic Growth by Neighborhood (AM Peak Hour)

Neighborhood	Base Year Estimated Auto Trips	Future Year Preferred Plan Forecast Auto Trips	Growth (Trips)	Growth (%)
Columbia	6,495	10,150	3,656	56%
Core	6,923	6,171	-752	-11%
Cortez Hill	1,315	1,868	553	42%
East Village	5,031	11,677	6,646	132%
Gaslamp/Horton	4,618	3,122	-1,496	-32%
Little Italy	2,274	3,236	962	42%
Marina	3,620	3,383	-237	-7%
Convention Center	1,897	3,029	1,310	60%
Total	**32,173**	**42,636**	**10,642**	**33%**

Source: Chen Ryan Associates; December 2015

Table 5-6C Vehicular Traffic Growth by Neighborhood (PM Peak Hour)

Neighborhood	Base Year Estimated Auto Trips	Future Year Preferred Plan Forecast Auto Trips	Growth (Trips)	Growth (%)
Columbia	5,402	8,885	3,483	64%
Core	5,497	5,125	-371	-7%
Cortez Hill	1,542	2,258	716	46%
East Village	5,869	12,287	6,418	109%
Gaslamp/Horton	5,570	4,073	-1,497	-27%
Little Italy	2,781	4,293	1,512	54%
Marina	4,531	4,702	171	4%
Convention Center	2,382	3,691	1,309	55%
Total	**33,573**	**45,314**	**11,741**	**35%**

Source: Chen Ryan Associates; December 2015

As shown, the East Village neighborhood is anticipated to experience the most significant growth in vehicular traffic under buildout of the Downtown land uses. The East Village neighborhood is the largest and least built out of the 8 Downtown neighborhoods; therefore, this amount of growth in vehicular traffic (120% daily) was anticipated. Conversely the Core and Gaslamp/Horton neighborhoods are anticipated to see a reduction in vehicular traffic under buildout of the Downtown land uses. This reduction in vehicular traffic is caused by the limited growth in both neighborhoods as well as the added diversity of land uses. Both neighborhoods are currently dominated by office and commercial land uses whose density is anticipated to stay mostly stagnant. However, the buildout of Downtown land uses will add additional residential land uses to both neighborhoods which will provide a better diversity and mix of land uses allowing for the opportunity of more internal pedestrian trips.

5.3.5 Step 5 – Grow Existing Auto Traffic Counts (using Step 4 output) & Manually Adjust

Future year traffic volumes within the Downtown area were developed based on the mode share and vehicular growth projected by the hybrid model. Existing peak hour turning movement volumes were grown using the factors derived in Tables 5-6b & 5-6c, based on the anticipated peak hour growth and neighborhood location.

Growth factors were used to accumulate traffic volumes along the following individual roadway corridors serving freeway access points or other major connections in and out of the Downtown area:

North/South Streets

- Harbor Drive
- Pacific Highway
- Front Street / First Avenue
- Fourth Avenue / Fifth Avenue
- Tenth Avenue / Eleventh Avenue
- Park Boulevard

East/West Streets

- Hawthorne Street / Grape Street
- Ash Street / A Street
- B Street / C Street
- F Street / G Street
- Broadway
- Market Street
- J Street / Imperial Avenue

Future traffic generated by the Downtown neighborhoods was distributed along these roadways to regional connection points and freeway ramps based on a SANDAG Series 12 Select Zone assignment developed for each Downtown neighborhood individually.

The projected future year traffic on the roadways was then compared to the existing traffic volumes to develop an overall growth factor for the corridor. Roadways within the Downtown area that do not serve a major connection (ie any roadway not included in the listed above) were assigned a growth factor based on the anticipated neighborhood growth, as included in Tables 5-6B & 5-6C.

Detailed analysis worksheets on showing how the growth factors were derived and applied to the Downtown roadway network are included in **Appendix L**.

Future year peak hour intersection turning movement volumes were developed by applying the respective segment-level growth factor to the intersection approach and departure volumes within a corridor, and then distributing the individual approach turning movements based on the growth of the departure leg. Manual adjustments were also made to ensure that traffic volumes among adjacent intersections are reasonably balanced.

Background Traffic

As noted in Table 5-3, the MXD model estimates for vehicular trips were approximately 9.5% higher than the observed screenline ground counts. This difference can be attributed to the fact that existing land uses are not fully occupied under current conditions. To calculate the additional vehicular traffic associated with the full buildout land uses (both existing and future) under future year conditions, existing traffic volumes were grown by an additional 9.5% (in addition to the future growth rates outlined above) to account for the low existing land use occupancy rates.

External Cumulative Projects

In addition to the buildout of the Downtown land uses, the North Embarcadero Visionary Plan (NEVP) and Airport Master Plan are both anticipated to contribute additional traffic to the Downtown area under future year conditions. The projected traffic associated with these plans was derived from their final project EIRs and SANDAGs Series 12 traffic forecast, and was then added to the future year roadway network. Relevant excerpts from each respective project EIR and the SANDAG Series 12 Transportation Forecast are included in **Appendix M**.

Future Year Turning Movement Volumes

Based on the methodologies outlined in the previous sections, future year turning movement volumes were developed assuming both the preferred plan transportation network and buildout of the planned Downtown land uses. **Figure 5-2** displays the future year AM and PM peak hour turning movement volumes at all key study intersections within the Downtown area under the Preferred Mobility Plan.

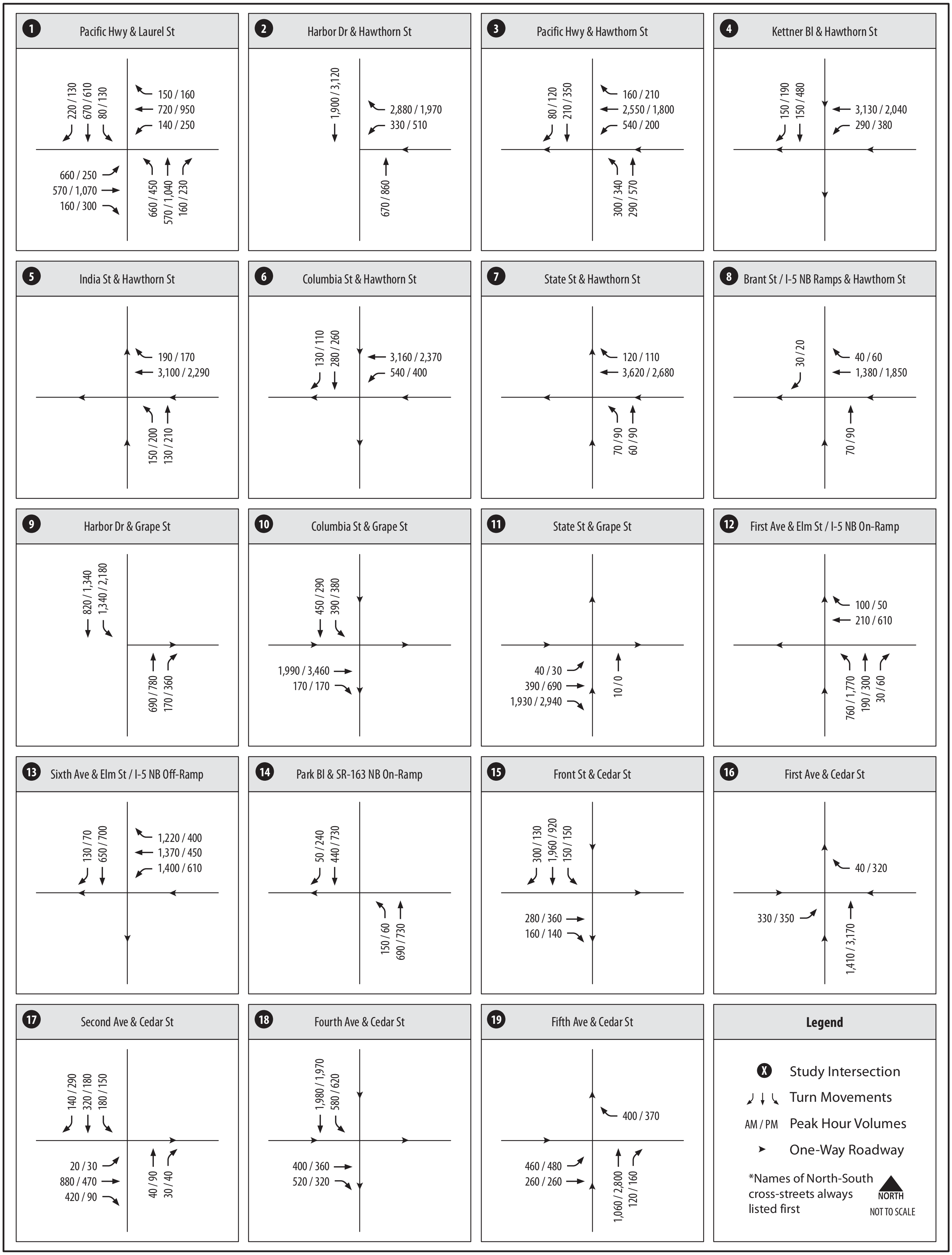


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Figure 5-2

Future Year 2035 (Buildout) AM/PM Peak Hour Intersection Turning Movements (Intersections 1-19)

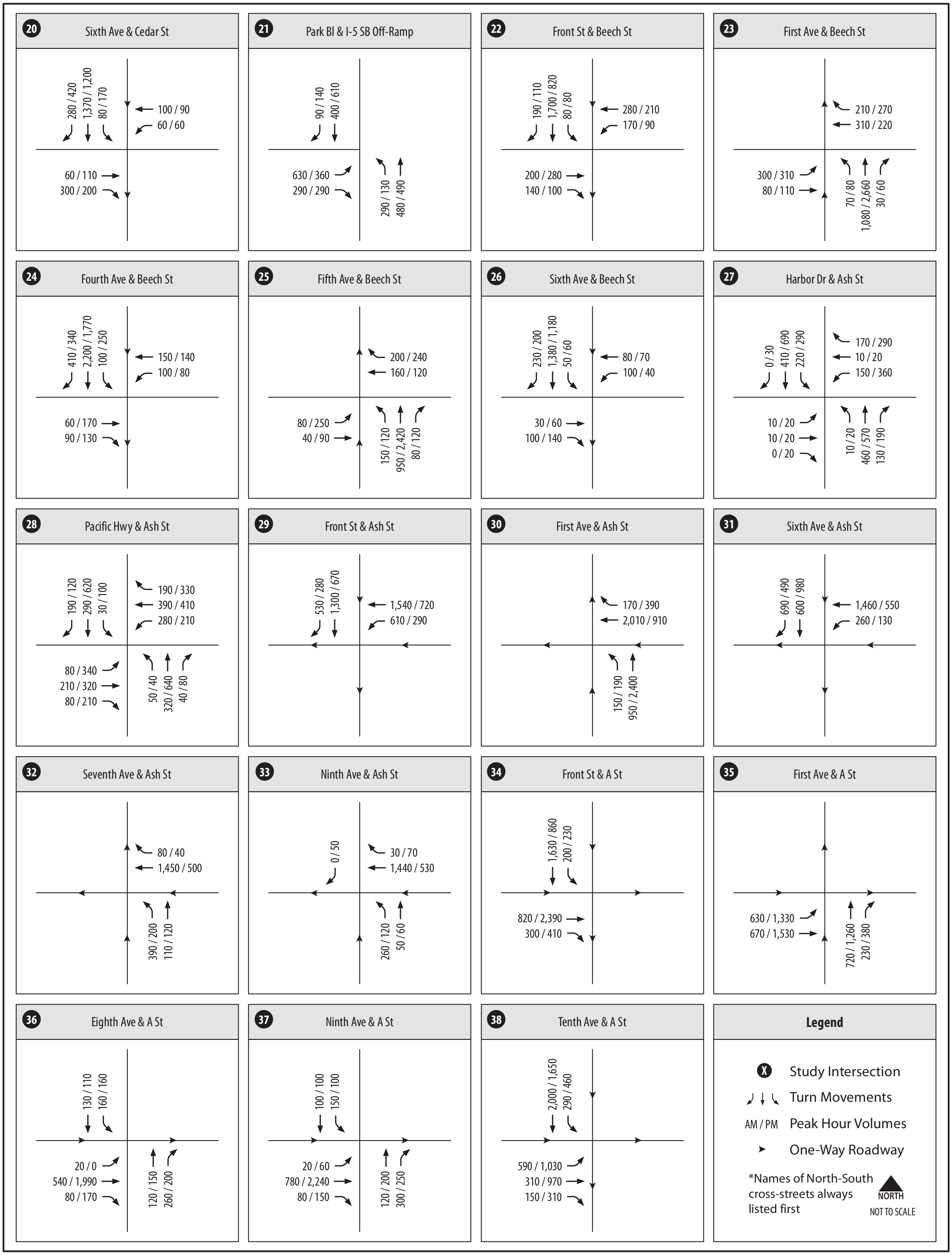

Figure 5-2

Future Year 2035 (Buildout) AM/PM Peak Hour Intersection Turning Movements
(Intersections 20-38)

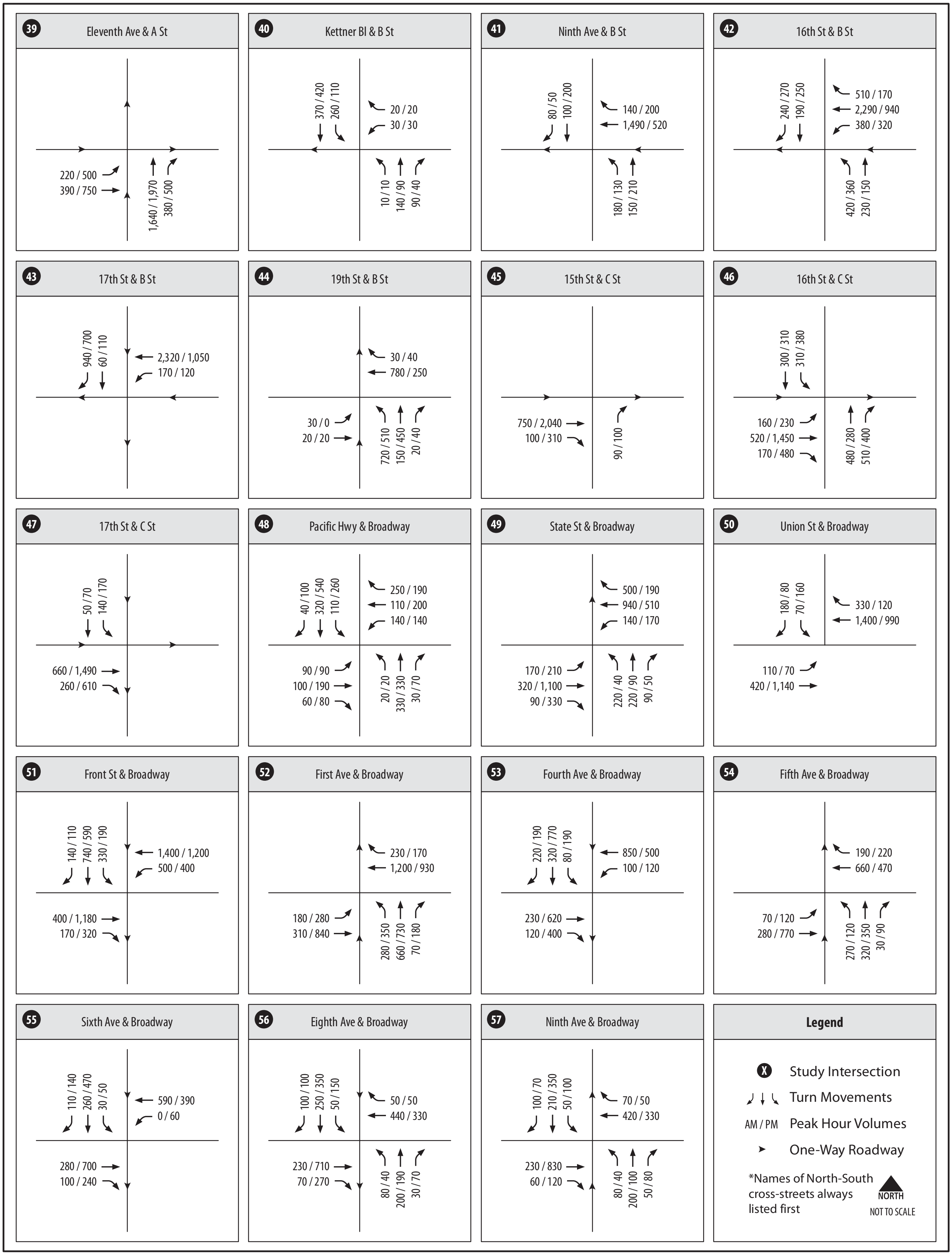

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Figure 5-2

Future Year 2035 (Buildout) AM/PM Peak Hour Intersection Turning Movements (Intersections 39-57)

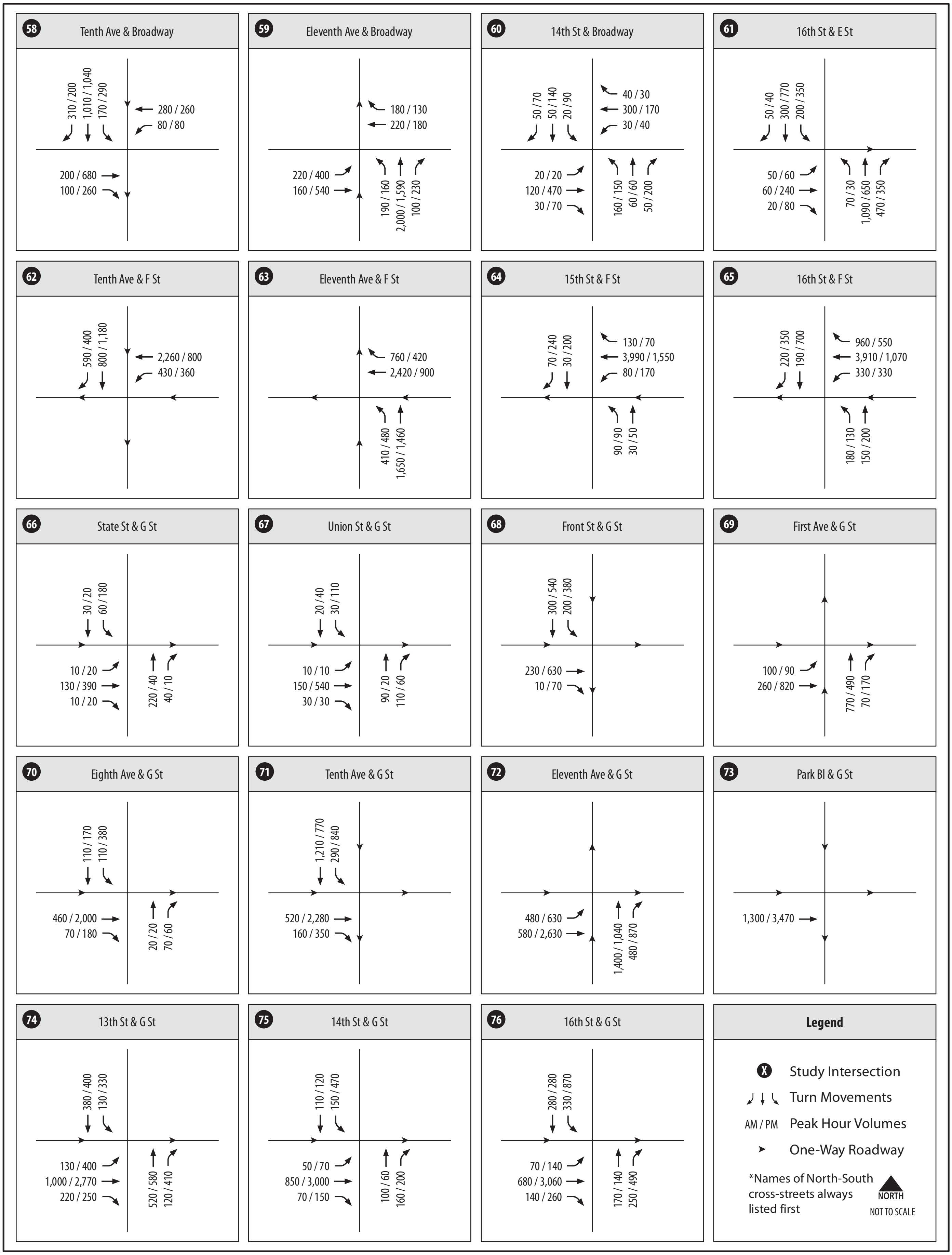

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Figure 5-2

Future Year 2035 (Buildout) AM/PM Peak Hour Intersection Turning Movements (Intersections 58-76)

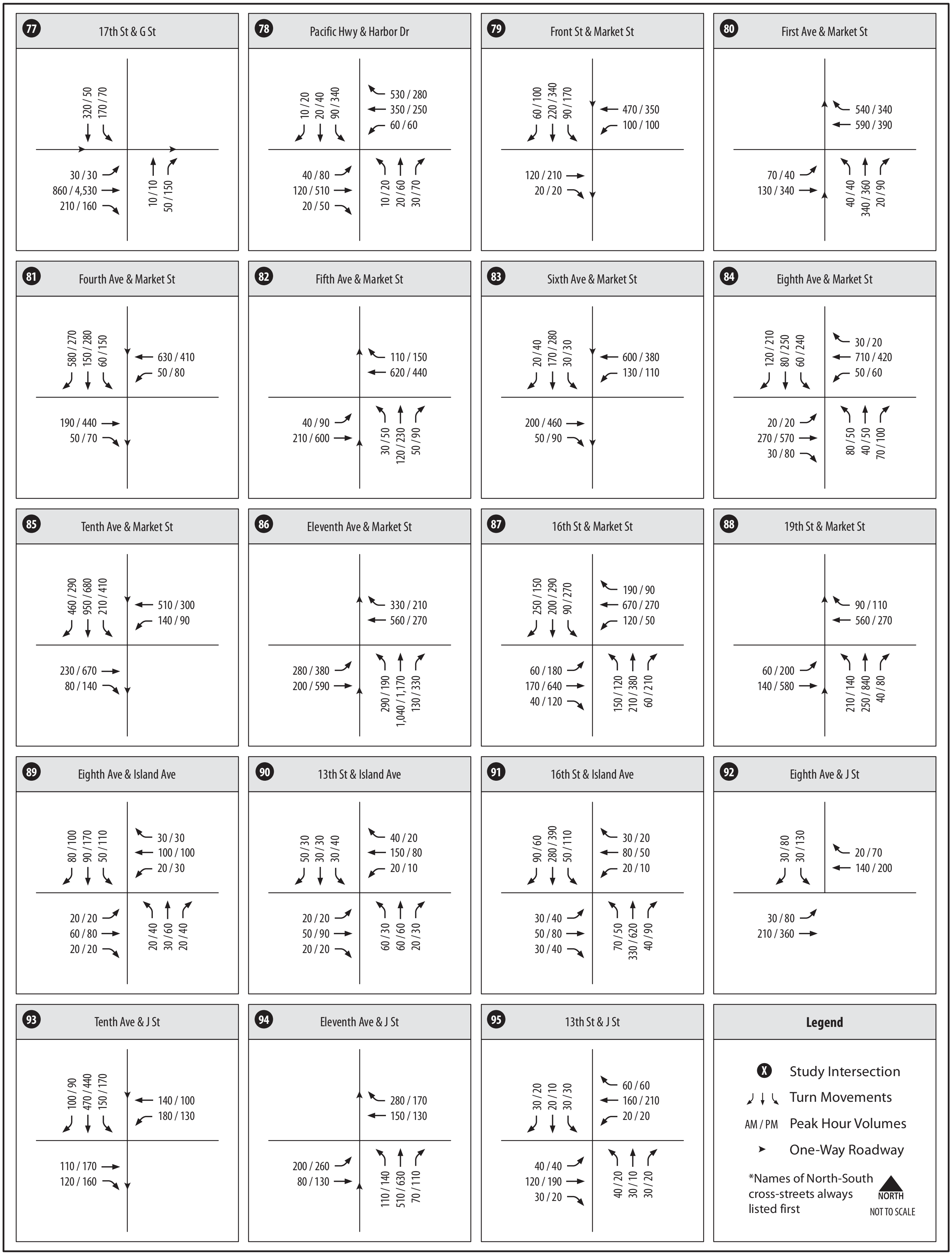

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Figure 5-2

Future Year 2035 (Buildout) AM/PM Peak Hour Intersection Turning Movements (Intersections 77-95)

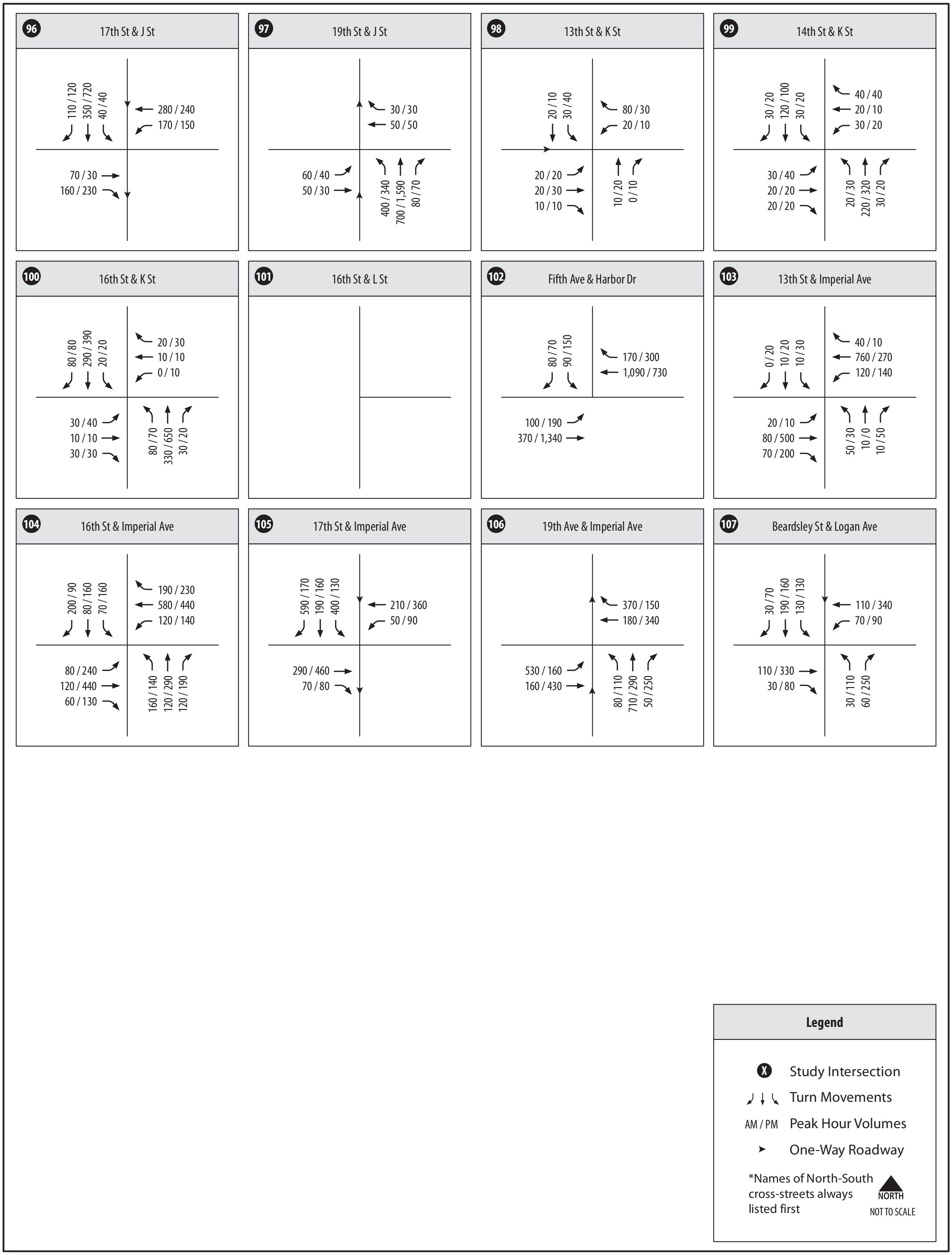

Figure 5-2

Future Year 2035 (Buildout) AM/PM Peak Hour Intersection Turning Movements (Intersections 96-107)

6.0 Future Conditions Analysis

The Downtown San Diego community is comprised of a well-connected grid system with a typical right-of-way spanning 80 feet in width, including 14-foot sidewalks on both sides and a 52-foot paved roadway between the curb lines. One-way roadways are typically comprised of three 12-foot lanes, while two-way roadways are typically undivided and have two 18-foot lanes (one in each direction). Acknowledging the constraints posed by a built out community as well as the opportunities presented by a grid system, this Mobility Plan proposes a layered approach to the mobility network, prioritizing different corridors for different transportation modes based on greater network connections. The layered network approach also accommodates existing and planned bicycle and pedestrian facilities, transit stops and routes, and freeway access points both within Downtown San Diego and adjacent community connections.

Figure 6-1 presents the Downtown Mobility Network, identifying the four street typologies presented in this Chapter, including Greenways, Cycleways, Transitways, and Autoways. Cross-sections for each of the street typologies are provided in **Appendix N**. The planned network is intended to provide a prioritized roadway connection for each mode about every three to four blocks, evenly distributing access for each mode across the community. The networks were largely developed parallel and in close proximity to one another, generally offering an emphasized roadway for each mode within each Downtown neighborhood. This approach is intended to provide multimodal choices throughout the community. Additionally, the network allows for extensive multimodal travel through intersecting networks, for example, a pedestrian in Cortez Hill can walk southerly along the Eighth Avenue Greenway to arrive at the C Street Transitway to access the Blue Line or Orange Line.

One overarching approach to ensuring the design of a feasible transportation system is to reconfigure the current roadway pavement and allocate excess auto capacity to other travel modes and to on-street parking. A system wide traffic operational analysis was conducted to determine which Downtown streets have excess capacity and where an auto travel lane may be removed to accommodate a greenway, a separated bicycle facility, or angled (from parallel) on-street parking to off-set the potential parking losses associated with the implementation of cycle tracks and greenways. **Figure 6-2** illustrates planned travel lane reductions (road diets) throughout Downtown to accommodate complete streets implementation.

This Chapter presents the analysis of future mode shares, activity levels, planned improvements and the proposed prioritized networks for all modes, including active transportation, transit, and vehicular. Additional considerations and recommendations related to parking management, intelligent transportation systems (ITS), transportation demand management (TDM) strategies, and goods movement are also provided.

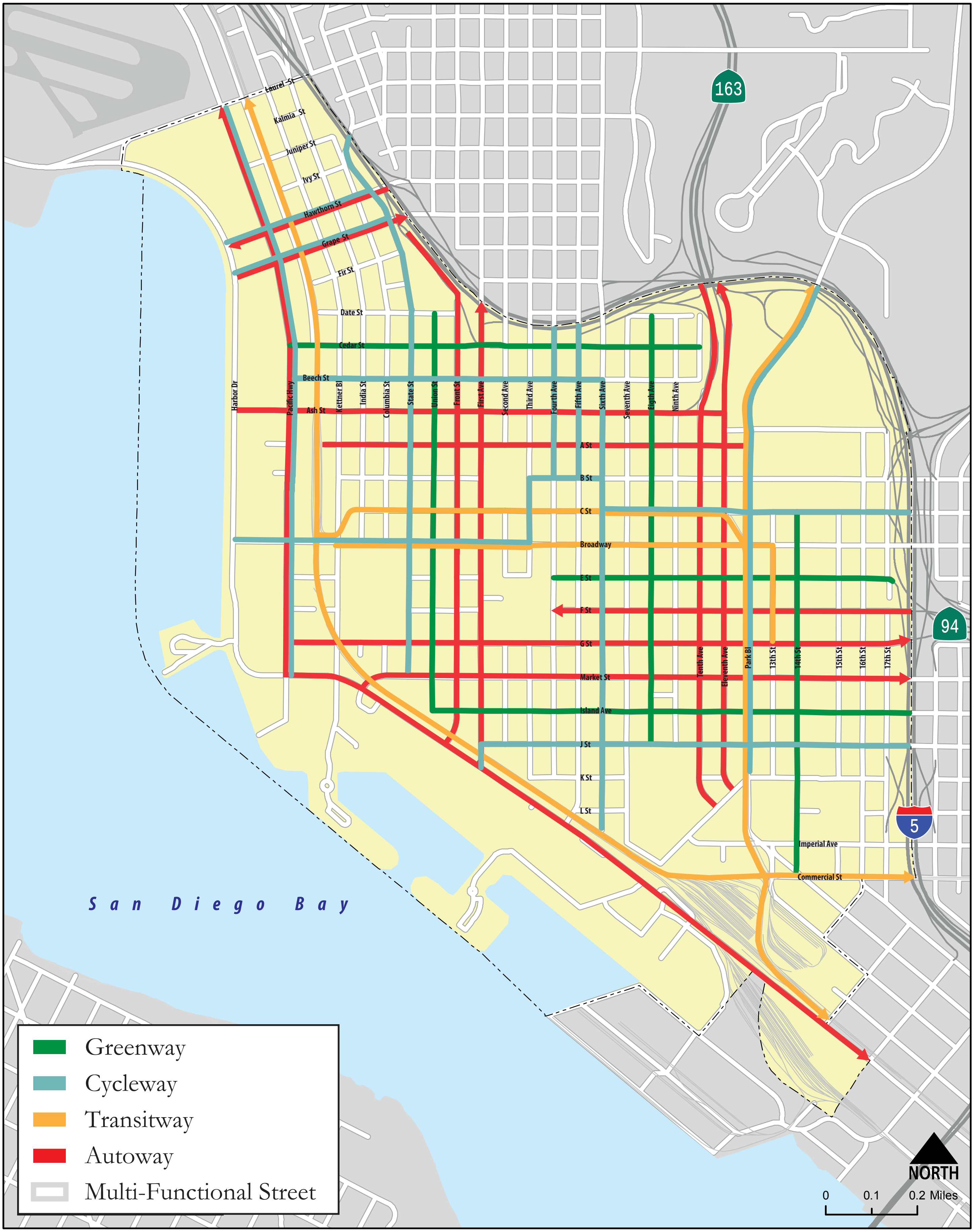

Figure 6-1
Planned Downtown Mobility Network

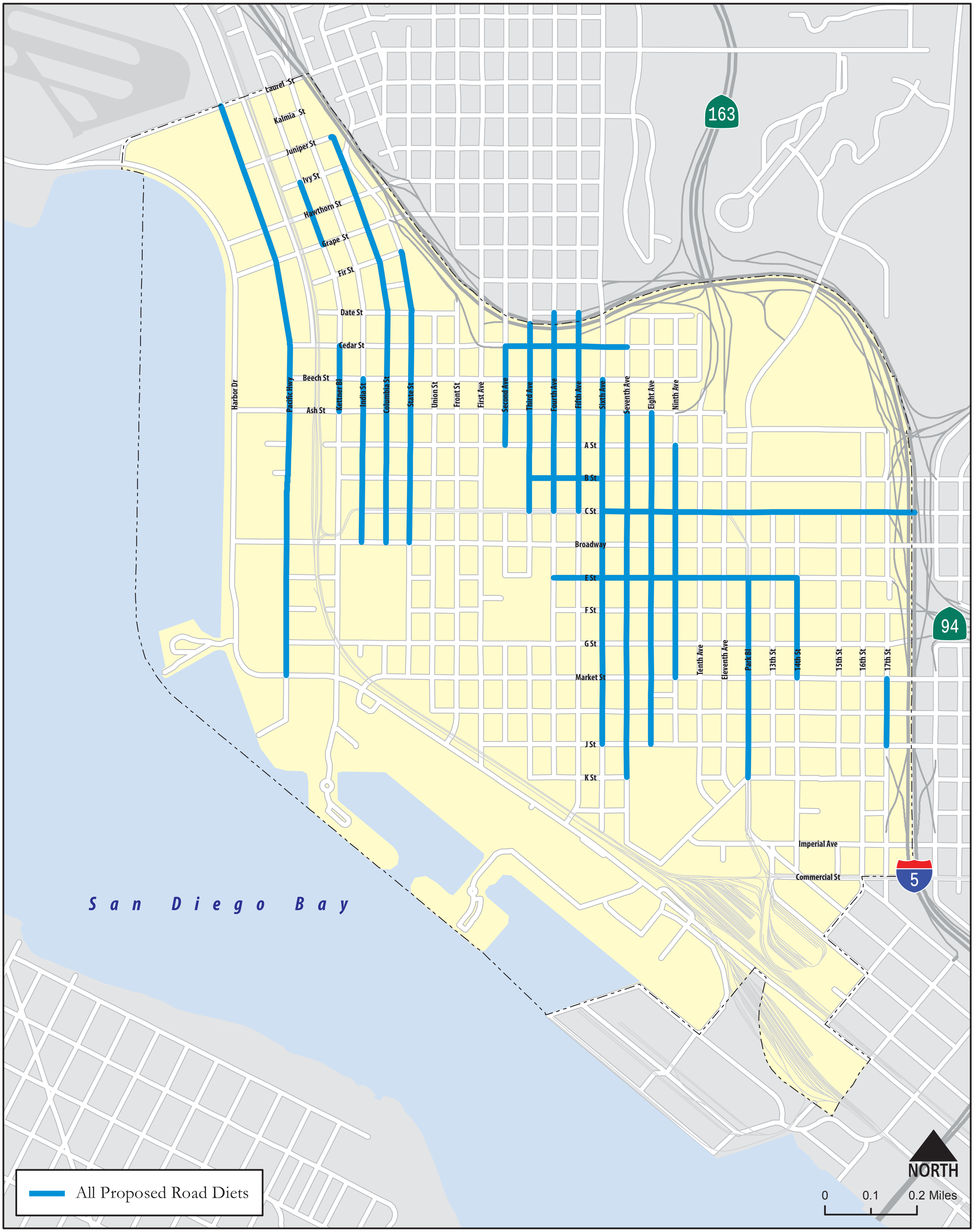

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Figure 6-2
Road Diets Accommodating Complete Streets

6.1 Active Transportation

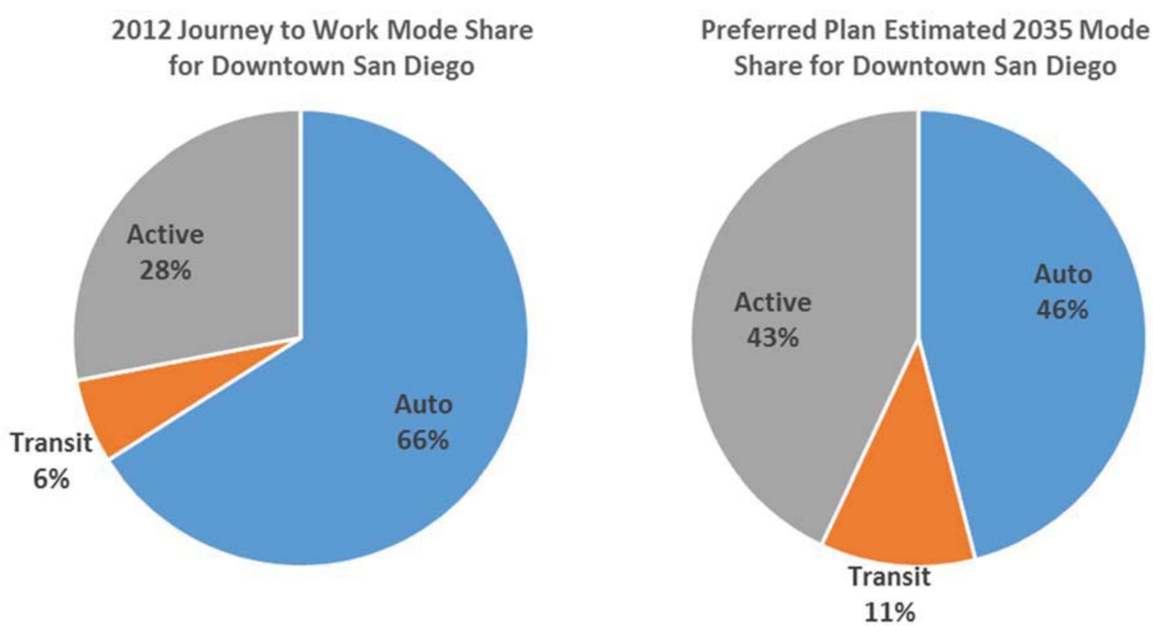
Active transportation refers to human powered travel, primarily walking and bicycling. The pedestrian and cycling environments in Downtown San Diego greatly benefit from the strong grid network which maximizes connections, and the diverse mix of land uses which places potential trip generating and trip attracting land uses in close proximity to one another. The pedestrian and bicycle demand model results presented in Chapter 4 reflect this, displaying nearly all of Downtown as high propensity for pedestrian activity, as well as high levels of combined inter- and intra-community bicycle demands.

The travel-shed analysis provided in Chapter 4 revealed that walking or cycling within Downtown San Diego can cover greater distances in shorter periods of time than transit. Additionally, the City of San Diego implemented a bike share program in the fall of 2014, with a large share of stations and bikes sited in the Downtown area for public use. The program makes bikes available to all Downtown community members and visitors, potentially leading to an increase in Downtown bicycle volumes.

6.1.1 Active Transportation Mode Share

Comparing existing and projected mode shares is one measure for evaluating how successful a transportation system will be. **Figure 6-3** displays the existing mode shares according to US Census data and the estimated future year mode share resulting from the planned improvements, as calculated using the hybrid model presented in Chapter 5.0.

Figure 6-3 2012 and 2035 Estimated Mode Shares for Downtown San Diego



Source: American Community Survey 5-Year Estimates (2012); Chen Ryan Associates (2015)

As shown, the existing active transportation mode share is estimated at 29.4%. The hybrid model estimates this mode share to grow to 42.7% as a result of buildout of the Preferred Plan, Preferred Plan buildout land uses, transportation network (assuming Year 2035 transit network), and employment and population projections. The pie chart indicates that a much more balanced mode share could be achieved in Downtown San Diego with significant increases in active transportation facilities and moderate transit service increases.

Overall, the active transportation mode share is estimated to grow by approximately 13.3% in the Downtown San Diego community. **Table 6-1** displays the base year and future year active travel mode share by neighborhood.

As shown, the mode shares increase from 0.6% in the Convention Center neighborhood to 15.7% in Cortez Hill.

Table 6-1 Comparing Base Year to Preferred Mobility Plan Active Travel Mode Shares by Neighborhood

Neighborhood	Base Year	Future Year	Change
Columbia	26.5%	38.1%	+11.6%
Core	29.5%	40.5%	+11.0%
Cortez Hill	36.5%	52.2%	+15.7%
East Village	35.6%	48.9%	+13.3%
Gaslamp/Horton	28.2%	40.1%	+11.9%
Little Italy	26.8%	44.9%	+8.1%
Marina	26.2%	37.2%	+11.0%
Convention Center	27.3%	27.9%	+0.6%
Total	**29.4%**	**42.7%**	**+13.3%**

Source: MXD, Chen Ryan Associates; December 2015

Safety improvements will be fundamental to encouraging increased mode shifts to walking and cycling. Additionally, walking and cycling are often means to reach transit services, underscoring the importance of strengthening the active transportation environment near major transit stops and corridors.

6.1.2 Active Transportation Recommendations

Pedestrian Mobility

Every street is intended to provide for comfortable and safe pedestrian travel. To further improve the pedestrian environment this Mobility Plan proposes a system of Greenways along select corridors, linking to existing and planned parks and improving connections to adjacent communities, as well as the waterfront. Greenways provide sidewalks serving as linear parks, providing needed park space. Greenways will be designed individually within the available space, but all will help create a street that is more pedestrian oriented with prominent landscaping and expanded sidewalk widths. A uniform set of street furnishing (benches, trach cans, street lighting, tree grates, and signage) should be present along these pedestrian corridors to differentiate them from other streets. Curb bulb-outs should be present at intersections to help calm traffic and shorten crossing distances. Additional features may include tot lots, dog parks, jogging trails, picnic areas, and public plazas. **Figure 6-4** displays the proposed Greenways along with existing and planned park space.

As shown, the Greenways will provide a network of linear parks and pedestrian promenades traversing the community from north to south and east to west, connecting to resources such as Amici Park, Children's Park, Children's Museum Park, Civic Square, Cortez Hill Park, County Administration Waterfront Park, and Petco Park. In addition to connecting to these community resources, the Greenways are sited to be accessible every three to four blocks, providing improved pedestrian thoroughfares throughout the community. All of these streets were identified in the currently adopted 2006 Downtown San Diego Community Plan as "green streets". The seven Greenways, and a summary of the individual opportunities and challenges for implementing, include the following:

Union Street – Several blocks along Union Street have established trees. The 75' public right-of-way is relatively narrow by Downtown standards which may limit opportunities for increasing sidewalk width. Parking lane removal on one side will be required to implement the desired Greenway. The existing roadway is limited to two-lanes, resulting in relatively short east-west crossing distances (48'). Union Street will be able to accommodate anticipated vehicular volumes within the current lane configuration.

Eighth Avenue – Bulb-outs are present at many intersections along Eighth Avenue, particularly in the northern and southern extents of the roadway. The existing roadway configuration provides one-way vehicular travel north of G Street and two-way travel to the south. Existing and future vehicular volumes permit the removal of one travel lane and converting the entire roadway to allow two-way travel. The road diet will provide some of the required right-of-way to implement the proposed Greenway, however, parking removal on one side of the street will be required.

14^{th} Street – The vehicular volumes along 14^{th} Street are low enough to remove one travel lane to provide some of the required right-of-way to accommodate the proposed Greenway, however, parking removal on one side of the street will be required. The intersection of 14^{th} Street and Island Avenue has existing curb bulb-outs on all four corners.

Cedar Street – The roadway configuration along Cedar Street varies from one-way eastbound to two-way travel. The existing wide lanes provide opportunities for reduced lane widths that will help provide space to implement Greenway features, however, parking removal on one side of the street will also be required.

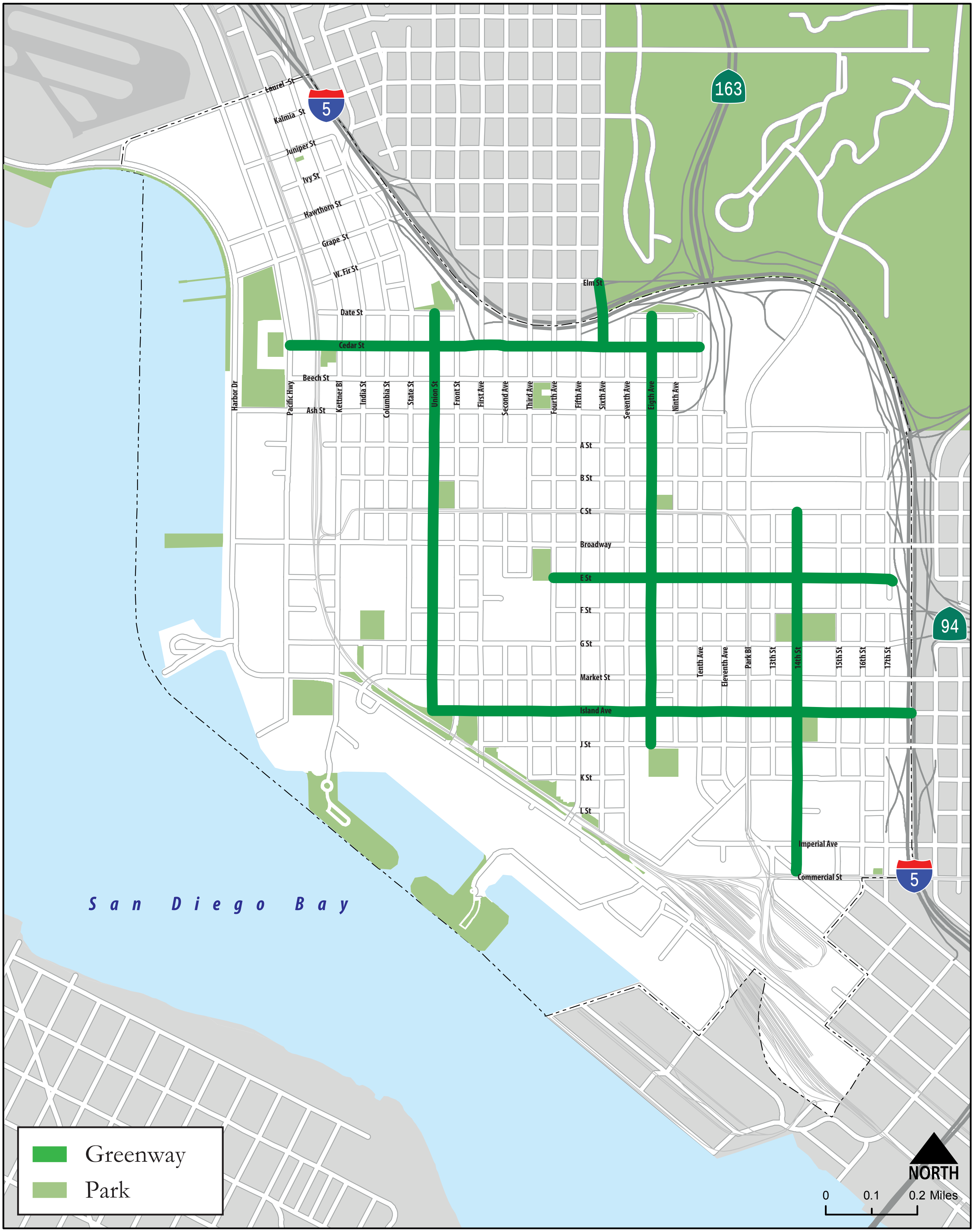


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Figure 6-4
Proposed Greenways

E Street – The roadway configuration along E Street changes from one-way eastbound to two-way travel at 13th Street. There is an opportunity to convert the entire roadway to two-way, and to drop one travel lane. Additionally, the existing wide lanes provide opportunities for reduced lane widths that will help provide space to implement Greenway features, however, parking removal on one side of the street will also be required.

Island Avenue – Island Avenue benefits from many intersection curb bulb-outs. One constraint along this roadway is from Third Avenue to Fourth Avenue, where the roadway becomes a single lane heading west. The limited public right-of-way here reduces potential space to acquire for Greenway accommodation.

Sixth Avenue – A Greenway is proposed along Sixth Avenue between Cedar and Elm streets to connect Downtown to Balboa Park. This can be accomplished by eliminating the free left-turn movement from the I-5 off-ramp onto southbound Sixth Avenue (requires further study and reconfiguration of the Sixth Avenue/Elm Street intersection) and converting a travel lane and the parking on the east side of the bridge into an enhanced, landscaped pedestrian walkway.

The perception of the pedestrian environment is influenced not only by the presence and quality of the facility, such as a sidewalk or street crossing, but also by pedestrian amenities, lighting, traffic calming features, traffic speeds and volumes, and adjacent buildings. Where feasible and appropriate, widened sidewalks and landscape features can serve as a buffer between pedestrians and vehicular traffic. Adequate pedestrian lighting should be provided throughout the community to increase pedestrian safety and comfort.

In areas of relatively higher pedestrian demand, increasing pedestrian crossing phases and exploring the potential of "all walk" signalization (pedestrian scrambles), such as found at the intersection of Fifth Avenue and Market Street, will further enhance the comfort and safety of pedestrians.

Bicycle Mobility

Cycling in Downtown San Diego is more accessible than ever. In the fall of 2014 the City of San Diego launched the bicycle sharing program to make 180 stations and 1,800 bikes available to the public. Over 40 of these stations are located within Downtown San Diego, making bicycles available to all residents, workers, and visitors. Downtown's growing residential and employment populations will create additional inter-neighborhood travel, potentially leading to more pedestrians and bicyclists. Well-directed expansion of the bicycle network and bicycle parking will help encourage use and provide a safe and convenient bicycling environment for cyclists of all ages and skill levels.

The proposed bicycle network addresses the current lack of connectivity through the center of Downtown, as well as the lack of safe facilities traversing the community. **Figure 6-5** presents the proposed bicycle network. As shown, the network is comprised of all four bicycle facility classifications recognized by Caltrans: bike path, bike lane, bike route, and cycle track. **Table 6-2** provides a description and example image for each classification.

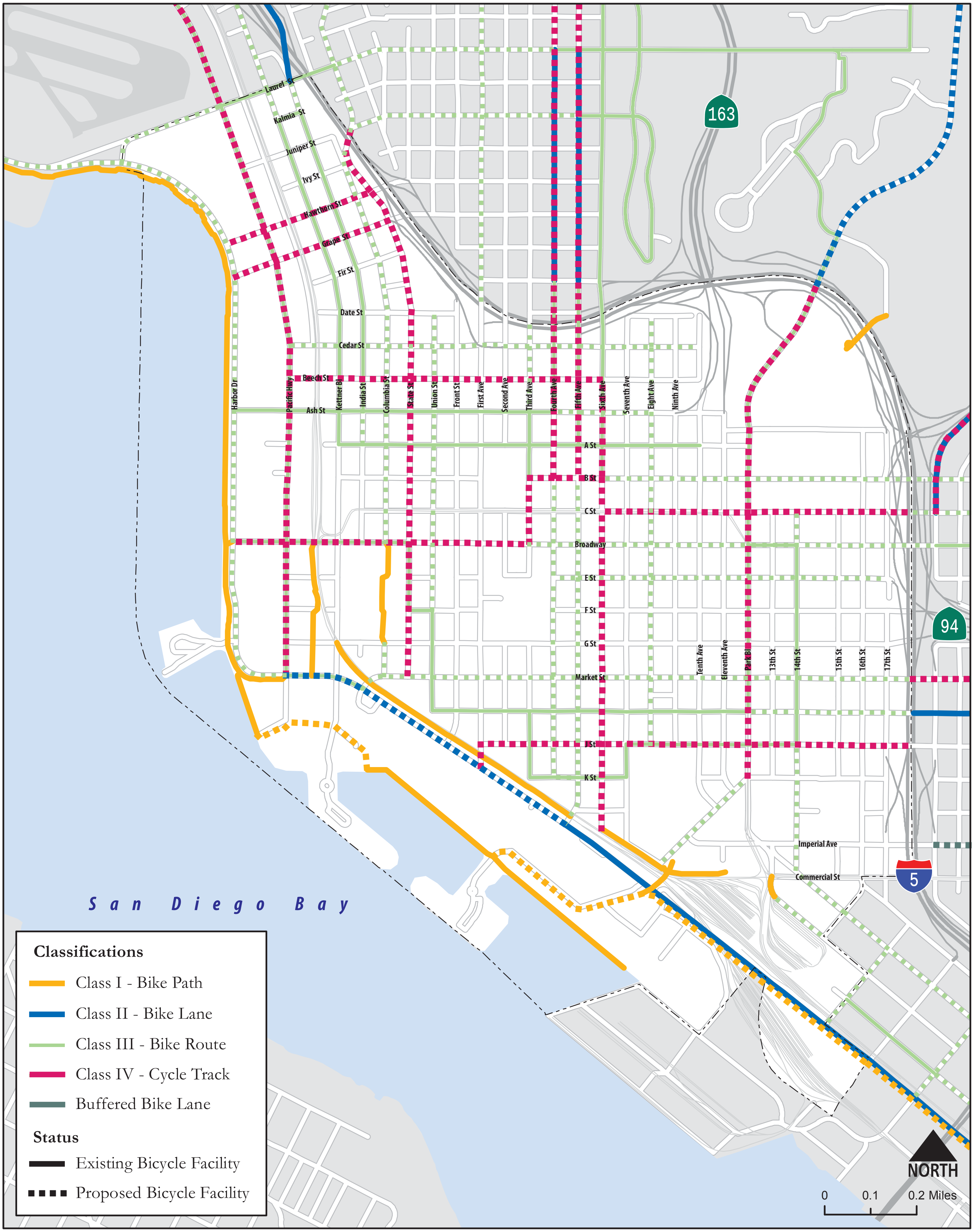

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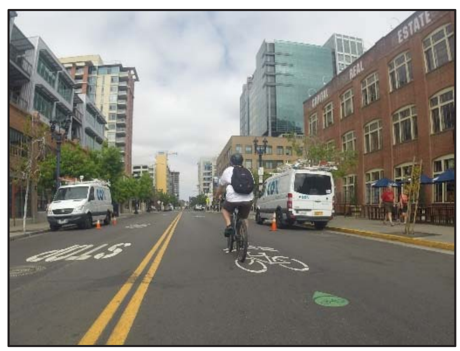
Figure 6-5
Proposed Bicycle Network

Table 6-2 California Bicycle Facility Classifications

Class Description	Example
Class I Bikeway (Bike Path) – Also referred to as shared-use paths or multi-use paths, Class I facilities provide a completely separated right-of-way designated for the exclusive use of bicycles and pedestrians with crossflows by motorists minimized. Bike paths can provide connections where roadways are non-existent or unable to support bicycle travel. The minimum paved width for a two-way bike path is 8 feet and 5 feet for a one-way bike path, with a minimum 2 foot wide graded area adjacent to the pavement.	
Class II Bikeway (Bike Lane) – Provides a striped lane designated for the exclusive or semi-exclusive use of bicycles with through travel by motor vehicles or pedestrians prohibited, but with pedestrian and motorist crossflows permitted. The minimum bike lane width where parking stalls are marked is 5 feet. The minimum width for a shared bike lane and parking lane is 11 feet.	
Class III Bikeway (Bike Route) – Provides shared use of traffic lanes with cyclists and motor vehicles, identified by signage and street markings such as “sharrows”. Bike routes are best suited for low-speed, low-volume roadways with an outside lane width of 14 feet.	
Class IV Bikeway (Cycle Track) – Also referred to as separated or protected bikeways, cycle tracks provide a right-of-way designated exclusively for bicycle travel within the roadway and physically protected from vehicular traffic. Types of separation include, but are not limited to, grade separation, flexible posts, or on-street parking.	

Recognizing the relatively high volume of vehicles that circulate in Downtown, the proposed bicycle network relies heavily on cycle tracks and multi-use paths which provide physical separation between vehicular traffic and cyclists. **Figure 6-6** displays the proposed cycle tracks, differentiating between one- and two-way cycle tracks and identifying directionality for streets that will include facilities in a single direction.

6.2 Transit

Transit opportunities within Downtown San Diego are provided by the Metropolitan Transit System (MTS) with both bus and Light Rail Trolley services, the North County Transit District (NCTD) with commuter rail, and Amtrak providing passenger train service. This section describes the projected transit mode share and activity levels, currently planned transit improvements, and transit recommendations made through this Mobility Plan.

6.2.1 Transit Mode Share

The transit mode share is estimated to increase from 6% to 11% for Downtown San Diego. **Table 6-3** displays the base year and future year transit mode share by neighborhood. As shown, increases in transit mode share are anticipated within each neighborhood with the exception of the Convention Center, where a 0.1% decrease is estimated. The remaining increases range from 3.2% in the Marina Neighborhood to a 7.1% increase in the Core neighborhood.

Table 6-3 Comparing Base Year to Preferred Plan
Transit Mode Share by Neighborhood

Neighborhood	Base Year	Future Year	Change
Columbia	6.2%	11.6%	+5.4%
Core	9.7%	16.8%	+7.1%
Cortez Hill	6.7%	12.7%	+6.0%
East Village	4.8%	9.6%	+4.8%
Gaslamp/Horton	8.7%	14.6%	+5.9%
Little Italy	5.1%	9.5%	+4.4%
Marina	4.3%	7.5%	+3.2%
Convention Center	11.7%	11.6%	-0.1%
Total	**7.2%**	**11.4%**	**+4.2%**

Source: Chen Ryan Associates; December 2015

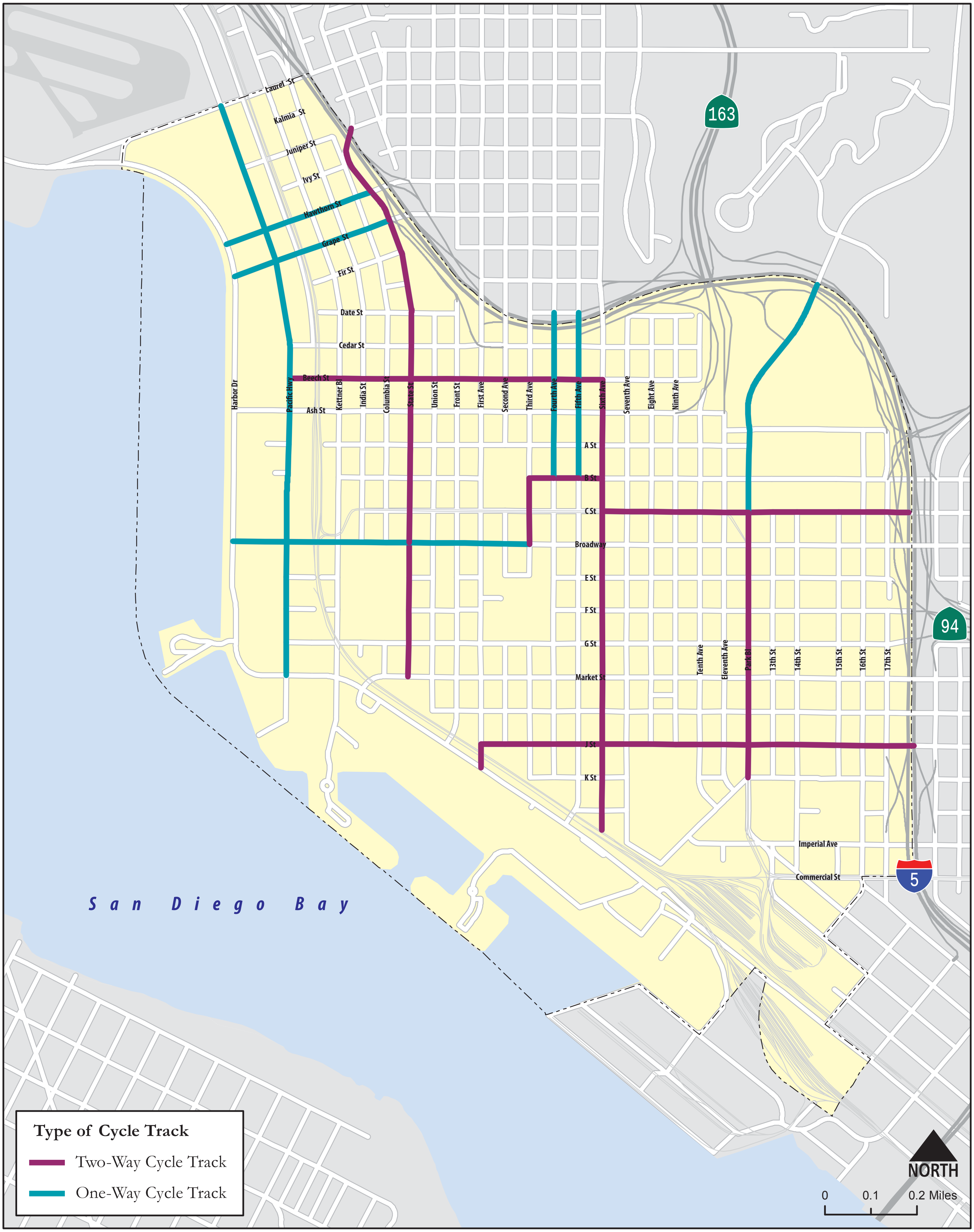


Figure 6-6
Proposed Cycle Track Network

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6.2.2 Planned Transit Service Improvements

The San Diego Association of Government's *2050 Regional Transportation Plan* Revenue Constrained scenario identifies several public transit service improvements within Downtown San Diego. Each of the service improvements are summarized below, including frequency changes, new routes, and anticipated implementation years.

- Coaster, Route 398 – Additional double tracking and increased frequency between Oceanside and Downtown and an extension to the Convention Center/Petco Park. Coaster headways will operate with 20-minute headways during peak periods and 60-minute headways during off-peak periods. The 2050 RTP indicates this will be implemented by 2018.
- Trolley, Route 510 – The Mid-Coast Corridor Transit Project will extend Trolley service from the Santa Fe Depot in Downtown San Diego to the University City community; with peak frequencies of 7.5-minutes to Downtown and 15-minutes to UTC, and off-peak headways of 15-minutes. The 2050 RTP estimates completion by 2018.
- Trolley, Route 530 – The Green Line will operate with 15-minute headways during peak and off-peak periods. The 2050 RTP indicates this service will be operate by the year 2018. Additionally, service will increase to 7.5-minute headways during peak and off-peak periods by the year 2040.
- BRT, Route 607 – Rancho Bernardo to Downtown San Diego via 1-15 and SR-163; this route will only operate during peak hours, with 10-minute headways. The 2050 RTP indicates this service will begin by 2018.
- BRT, Route 608 – Escondido to Downtown San Diego via I-15; this route will only operate during peak hours, with 10-minute headways. The 2050 RTP indicates this service will be begin by 2018.
- BRT, Route 610 – Temecula (peak only)/Escondido to Downtown San Diego. This route will only run to and from Temecula during peak hours with 10-minute headways. During off-peak hours, the route will only run between Escondido and Downtown San Diego with 10-minute headways. According to the 2050 RTP, the route will be implemented by 2018.
- BRT, Route 628 – South Bay BRT (Otay Mesa – Downtown) via Otay Ranch/Millenia. This route will run between the community of Otay Mesa and Downtown San Diego, operating only during the peak period, with 15-minute headways. The 2050 RTP indicates this service will begin by 2018.
- Streetcar, Route 554 – The San Diego Loop will circulate between Downtown San Diego, Hillcrest, and Balboa Park. The route will operate at 10-minute headways during peak and off-peak hours. According to the 2050 RTP, this route will be implemented by 2020.
- BRT, Route 90 – Santee and El Cajon Transit Centers to Downtown San Diego via SR-94. This route will only run during peak periods, with 15-minute headways. According to the 2050 RTP, this route will be implemented by the year 2020.
- BRT, Route 640 – San Ysidro to Downtown San Diego and Kearny Mesa via I-5 shoulder lanes and HOV lanes; via Hillcrest, and Mission Valley. This route will run at 15-minute headways during peak and off-peak hours. According to the 2050 RTP the route will be implemented by 2020.

- Local Buses – According to the 2050 RTP, local buses in key corridors will operate with 15-minute headways during peak and off-peak periods. The 2050 RTP indicates the increased service will begin by 2020.
- Coaster, Route 398 – Double tracking/increased frequency between Oceanside and Downtown San Diego, with an extension to the Convention Center. Peak period service will operate with 20-minute headways and off-peak headways will remain the same as current conditions. The 2050 RTP indicates this route will be implemented by 2030.
- Trolley, Route 520 Orange Line – The 2050 RTP indicates the Orange Line will increase service frequencies to 7.5-minutes during peak periods and 15-minutes = off-peak by the year 2030 of, and a further increase by 2040 to 7.5-minute off-peak. An extended linkage to the Airport Intermodal Transit Center is also planned by the year 2035.
- Street Car, Route 553 – The Downtown San Diego Street Car will run between Little Italy and the East Village with headways of 10-minutes during both the peak and off-peak periods. According to the 2050 RTP, this route will be implemented by 2030.
- Rapid Bus, Route 2 –North Park to Downtown San Diego, via North Park and Golden Hill. This route will run at 10-minute headways during both the peak and off-peak periods. According to the 2050 RTP, this project will be implemented by 2030.
- Rapid Bus, Route 120 –Kearny Mesa to Downtown San Diego, via Mission Valley. This route will operate at 10-minute headways during both the peak and off-peak periods. According to the 2050 RTP, the route will be implemented by 2030.
- Rapid Bus, Route 910 –Coronado to Downtown San Diego, via the San Diego-Coronado Bay Bridge. This route will operate with 10-minute headways during peak and off-peak periods. This route will be implemented by 2030, according to the 2050 RTP.
- Street Car, Route 555 – This circulator will run from 30th Street to Downtown San Diego via North Park and Golden Hill. The route will operate with 10-minute headways during peak and off-peak periods. According to the 2050 RTP, the route will begin by 2035.
- Trolley, Route 560 –Mid-City to Downtown San Diego (Phase 1), via El Cajon Boulevard and Park Boulevard. This route will operate at 7.5-minute headways during peak and off-peak periods. According to the 2050 RTP this route will be implemented by 2035.
- Rapid Bus, Route 11 –Spring Valley to SDSU via Southeastern San Diego, Downtown San Diego, Hillcrest, and Mid-City. This route will operate with 10-minute headways during peak and off-peak periods. The 2050 RTP indicates this route will be implemented by the year 2035.
- Local Buses – According to the 2050 RTP, local bus routes in key corridors will operate with 10-minute headways during peak and off-peak periods, by the year 2035.
- Trolley, Route 522 – The Orange Line Express will run between El Cajon and Downtown San Diego with 10-minute headways during peak and off-peak periods. The 2050 RTP indicates this route will be implemented by the year 2040.
- Trolley, Route 540 – The Blue Line Express will run from UTC to San Ysidro via Downtown San Diego with 10-minute headways during peak and off-peak periods. According to the 2050 RTP, this route will be implemented by 2040.

- Trolley, Route 560 (Phase 2) – This route will run from SDSU to Downtown San Diego via Mid-City, El Cajon Boulevard and Park Boulevard. The route will operate with 7.5-minute headways during peak and off-peak periods. According to the 2050 RTP, this route will be implemented by 2050.

6.2.3 Prioritized Transit Network

Providing an efficient, high quality transit system, especially in high intensity communities such as Downtown San Diego, is vital to maintaining acceptable levels of mobility for all travelers. It is important to consider that transit riders are also typically pedestrians at the beginning and end of their trips. For a truly complete and holistic mobility network, providing connections between modes, especially walk-to-transit and bike-to-transit, is of critical concern.

Increasing transit ridership to, from, and within Downtown San Diego is an important component of future mobility. In addition to providing an efficient, well connected transit network, transit amenities and transit stop environments contribute to transit ridership. The planned public transit network identified in the 2050 RTP is comprised of local bus, rapid bus, light rail (Trolley), commuter rail (Coaster), and rail (Amtrak).

Figure 6-7 displays the proposed Transitways, identifying corridors where transit and transit users are prioritized. These corridors were selected based upon their existing and planned transit services and high transit demand. Transit is a priority along these corridors. Special consideration should be paid to transit stops along the identified Transitways. High quality transit shelters, bike racks, bike share stations, information kiosks, and other amenities that serve to promote transit, and improve the environment and experience for transit users should be considered.

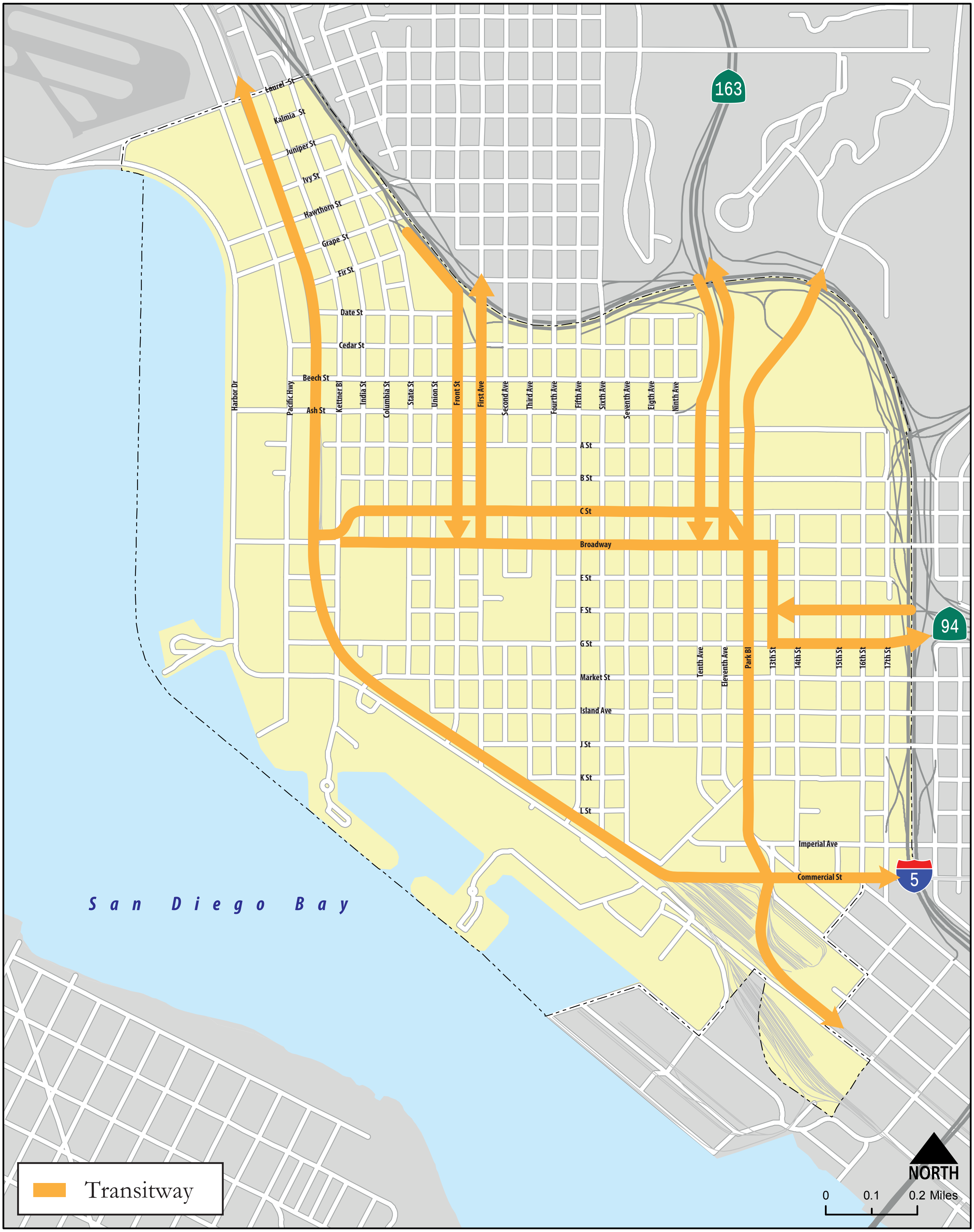

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Figure 6-7
Proposed Transitways

6.3 Vehicular

The street network in Downtown San Diego provides a high degree of connectivity, allowing for shorter travel distances between origins-destinations and greater dispersion of traffic. In addition, numerous regional opportunities are available via three (3) major freeway facilities including I-5, SR-163, and SR-94. The Downtown roadway network is a combination of one- and two-way streets, with some roadways incorporating a mix of the two, such as Cedar Avenue. In general, a couplet system is used to help filter traffic from freeway on- and off-ramps to and from Downtown San Diego. This section presents an analysis of future conditions related to roadways, intersections, and freeway facilities within and adjacent to Downtown San Diego.

6.3.1 Vehicular Mode Share

The vehicular mode share is estimated to decrease from 63.3% to 45.8% for Downtown San Diego. As reported earlier in this Chapter, active transportation modes are projected to pick up the majority of this shift, with a slight additional increase in the transit mode share. **Table 6-4** displays the base year and future year vehicular mode share by neighborhood. As shown, decreases in the vehicular mode share are anticipated in every Downtown San Diego neighborhood, with decreases ranging from -0.4% in the Convention Center neighborhood to -20.5% in Cortez Hill.

Table 6-4 Comparing Base Year to Preferred Plan
Vehicular Mode Share by Neighborhood

Neighborhood	Base Year	Future Year	Change
Columbia	67.3%	50.2%	-17.1%
Core	60.8%	42.6%	-18.2%
Cortez Hill	56.7%	35.2%	-20.5%
East Village	59.6%	41.5%	-18.1%
Gaslamp/Horton	63.0%	45.2%	-17.8%
Little Italy	68.0%	45.6%	-12.4%
Marina	69.5%	55.3%	-14.2%
Convention Center	61.0%	60.6%	-0.4%
Total	**63.3%**	**45.8%**	**-17.5%**

Source: Chen Ryan Associates; December 2015

6.3.2 Preferred Alternative Vehicular Improvements

A guiding strategy for vehicular improvements is to limit recommendations to modifications within the current roadway curb-to-curb widths. This approach was intended to limit project expenses by avoiding costly measures such as property acquisition and major construction involving moving curbs and utilities.

The proposed roadway modifications fall under one of four general themes, 1) one-way street segments proposed for conversion to two-way streets, 2) lane diet or road diet to accommodate cycle-tracks, 3) lane diet or road diet to provide for additional parking, and 4) lane diet or road diet to accommodate Greenways.

One-Way Couplet Conversions

The Downtown street system currently consists of both one- and two-way streets, with some streets alternating the permitted directions of travel. **Figure 6-8** identifies one-way street segments proposed for conversion to two-way streets to provide for increased vehicular mobility. As shown, the following segments are proposed for conversion from one-way to two-way travel:

- Third Avenue, from Date Street to A Street
- Eighth Avenue, from Ash Street to G Street
- Ninth Avenue, from Ash Street to Market Street
- E Street, from Fourth Avenue to 13th Street

Cycle-Track Accommodation

As discussed in Section 6.1, and graphically displayed in Figure 6-8, a cycle track network is proposed throughout Downtown to improve bicycle mobility and safety. **Figure 6-9** displays roadway segments where a lane diet or road diet is proposed to accommodate a cycle track. As shown, the lane diets or road diets are proposed to accommodate cycle tracks along the following segments:

Lane Diet

- State Street, from Broadway to Market Street
- Third Avenue, from C Street to Broadway
- Park Boulevard, from I-5 NB On-Ramp to C Street
- Beech Street, from Pacific Highway to Sixth Avenue
- Broadway, from Harbor Drive to Third Avenue
- J Street, from First Avenue to Interstate 5

Road Diet

- Pacific Highway, from Laurel Street to Harbor Drive
- State Street, from W. Fir Street to Broadway
- Third Avenue, from B Street to C Street
- Fourth Avenue, from Date Street to B Street
- Fifth Avenue, from Date Street to B Street
- Sixth Avenue, from Beech Street to J Street
- B Street, from Third Avenue to Sixth Avenue
- C Street, from Tenth Avenue to Interstate 5

Closure to Vehicular Traffic

- Park Boulevard, from E Street to K Street
- C Street, from Sixth Avenue to Tenth Avenue

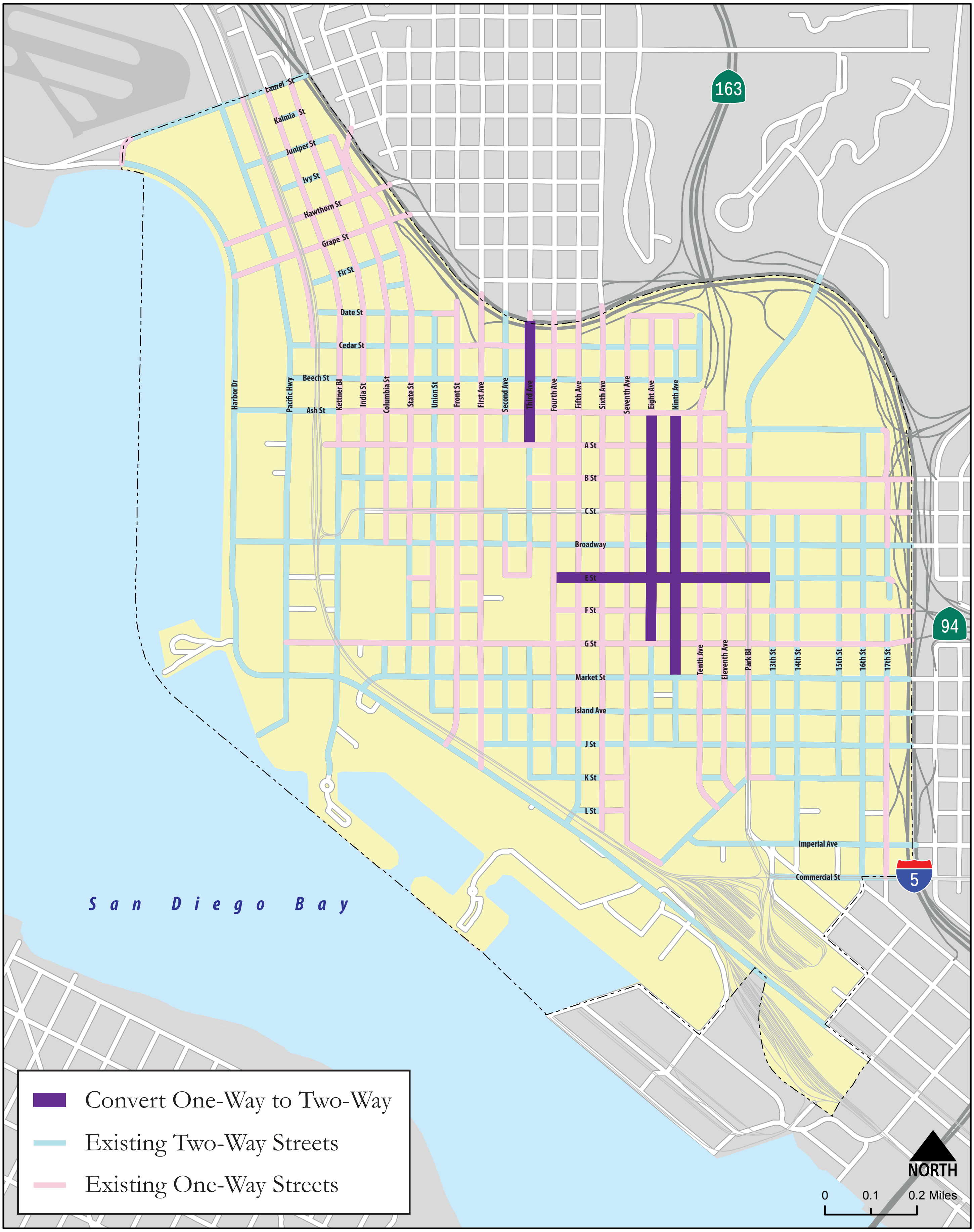

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Figure 6-8

Proposed One-Way to Two-Way Street Conversions

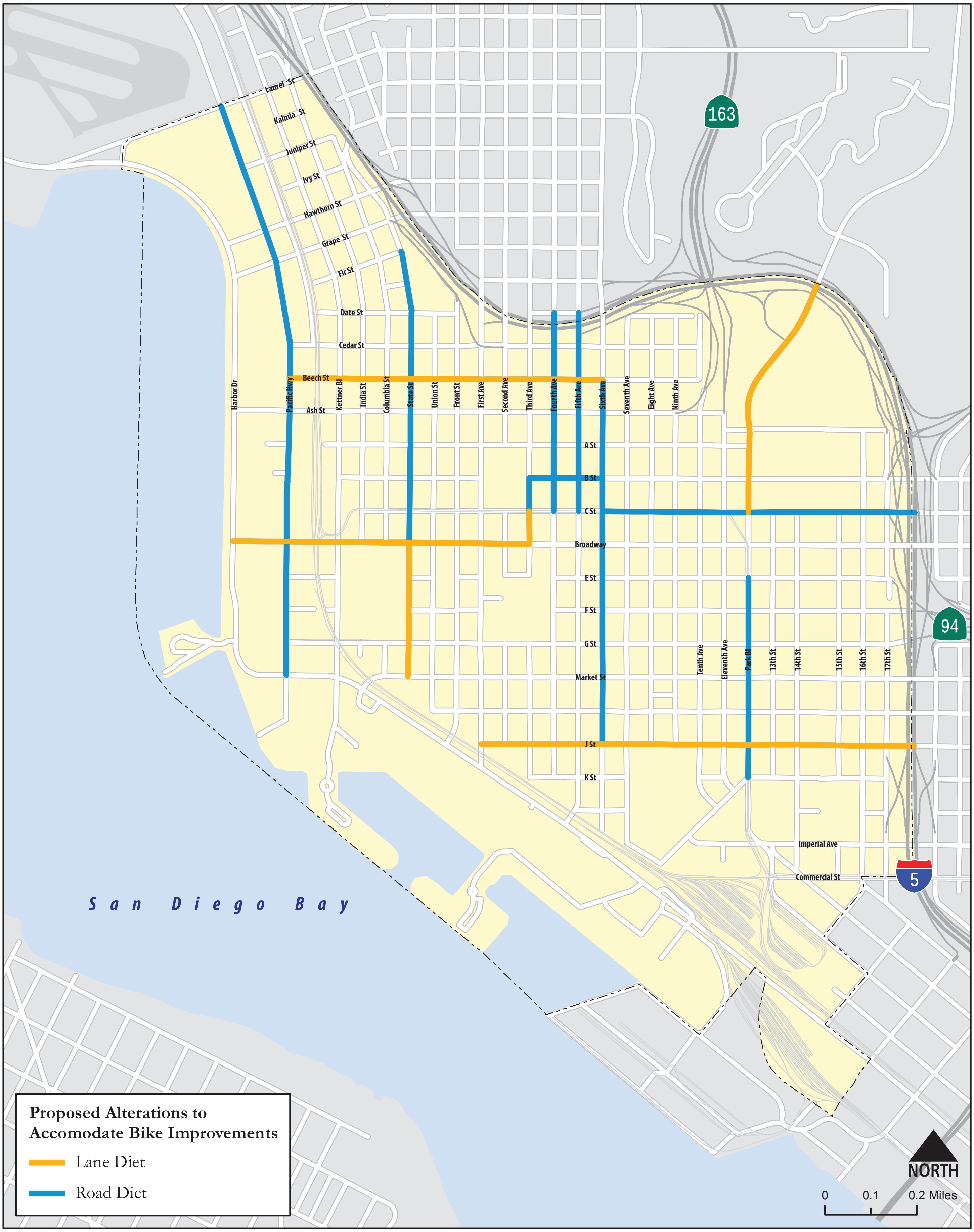

Figure 6-9
Lane and Road Diets to Accommodate Bike Improvements

Parking Accommodation

A concerted effort was made to maximize on-street parking throughout the project area. The primary method explored to achieve this was through the conversion of parallel parking to angled parking spaces, due to the ability to fit more angled parking spaces per foot of curb space than parallel parking. For example, one parallel parking space takes 20 feet of curb length, while an 8 foot wide parking space configured at a 45 degree angle takes 11.3 feet.

Taking into consideration commercial driveway widths, sight clearance for crosswalks and driveways, and left turn pockets it was estimated that the average block includes 6 parallel parking spaces. Considering the same variables, the average block can potentially fit 7 angled parking spaces. **Figure 6-10** displays roadway segments where a lane diet or road diet is proposed to accommodate angled parking. As shown, lane diets or road diets are proposed along the following segments:

Lane Diet

- Ninth Avenue, from Market Street to J Street
- 13th Street, from C Street to E Street
- 15th Street, from C Street to Broadway
- 17th Street, from F Street to Market Street
- 17th Street, from J Street to Imperial Avenue
- Kalmia Street, from Kettner Boulevard to India Street
- Juniper Street, from India Street to Columbia Street
- B Street, from Kettner Boulevard to State Street
- K Street, from Third Avenue to Seventh Avenue
- K Street, from Park Boulevard to 17th Street

Road Diet

- Kettner Boulevard, from Ivy Street to Grape Street
- Kettner Boulevard, from Cedar Street to Ash Street
- India Street, from Beech Street to Broadway
- Columbia Street, from Juniper Street to Broadway
- Second Avenue, from Cedar Street to A Street
- Third Avenue, from Date Street to B Street
- Sixth Avenue, from Beech Street to B Street
- Seventh Avenue, from Ash Street to K Street
- Ninth Avenue, from A Street to Market Street
- 17th Street, from Market Street to J Street

Appendix O includes a memo detailing the on-street parking considerations and findings. Additionally, Section 6.4 includes a discussion regarding parking management.

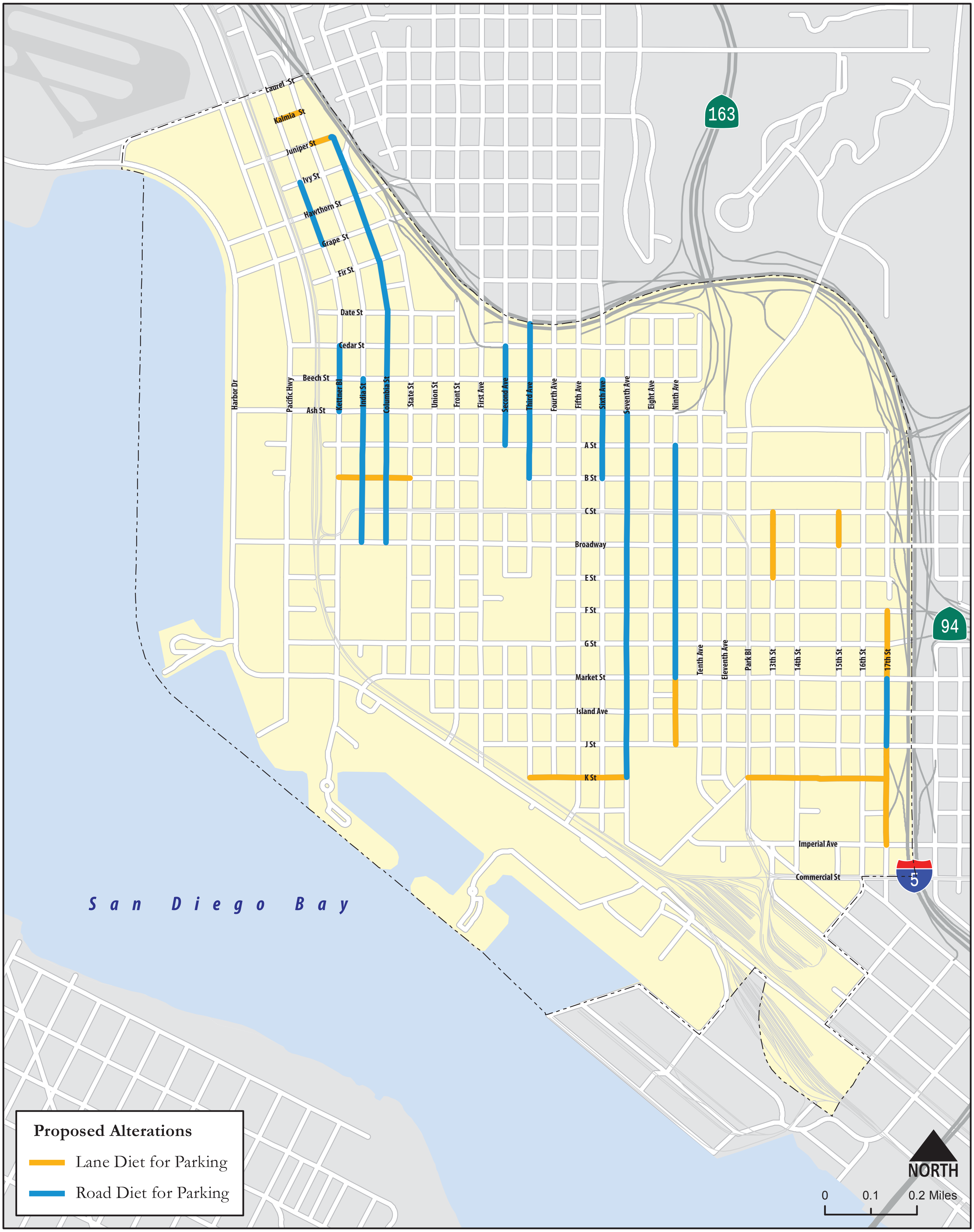

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Figure 6-10
Lane and Road Diets to Accommodate Increased On-Street Parking

Greenway Accommodation

As discussed in Section 6.1 and graphically displayed in Figure 6-4, a network of Greenways is proposed throughout Downtown to improve the pedestrian environment and provide additional park space in the community. **Figure 6-11** displays roadway segments where a lane diet or road diet is proposed to accommodate a Greenway. As shown, a lane diet or road diet is proposed along the following segments:

Lane Diet

- Union Street, from Date Street to Broadway
- Union Street, from F Street to Island Avenue
- Eighth Avenue, from Date Street to Ash Street
- 14th Street, from C Street to E Street
- 14th Street, from Market Street to Commercial Street
- Cedar Street, from Pacific Highway to First Avenue
- Cedar Street, from Seventh Avenue to Tenth Avenue
- E Street, from 14th Street to 17th Street
- Island Avenue, from Union Street to Interstate 5

Road Diet

- Eighth Avenue, from Ash Street to J Street
- 14^{th} Street, from E Street to Market Street
- Cedar Street, from Second Avenue to Seventh Avenue
- E Street, from Fourth Avenue to 14th Street

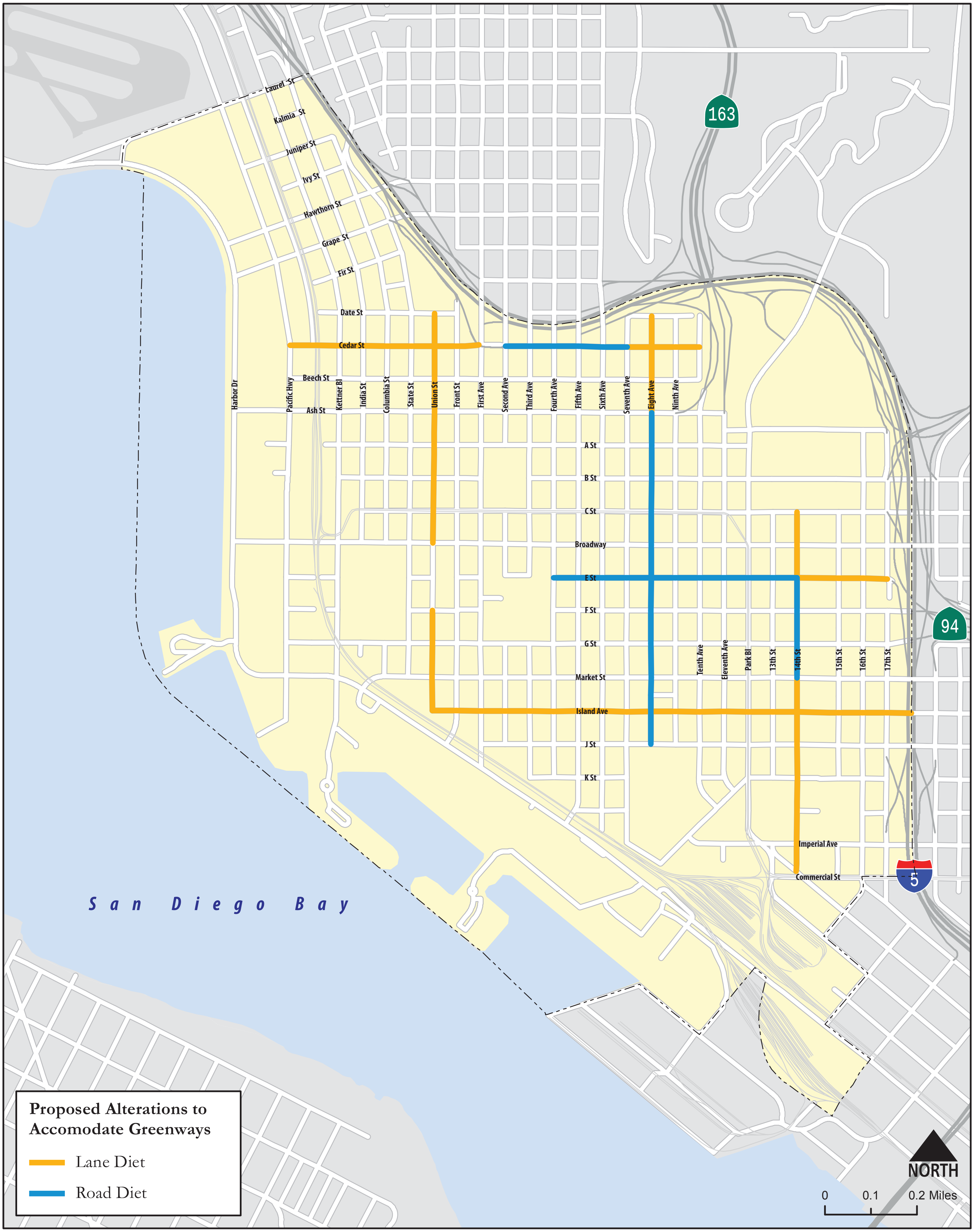

Figure 6-11
Lane and Road Diets to Accommodate Greenways

6.3.3 Other Planned Vehicular Improvements

In addition to the improvements proposed as a part of the Preferred Alternative and identified in the previous section, there are several other roadway and intersections improvements that were identified through previous planning and engineering efforts. This section summarizes the planned street improvements for Downtown San Diego and the freeway improvements for the segments of Interstate 5 that run adjacent to the community. The information for this section was obtained from SANDAG's 2050 RTP and the City of San Diego's Capital Improvement Projects (CIP) list, which is available online at the following location: (http://www.sandiego.gov/cip/projectinfo/index.shtml).

SANDAG 2050 RTP:

In the 2050 RTP, the I-5 is slated to be improved from an 8F classification to an 8F+Operational by 2050, at the cost of $2,689 Million.

City of San Diego Capital Improvement Project (CIP):

The following is a list of all CIP projects in Downtown San Diego that have to do with transportation or the augmentation of the street surface.

- B13056, Park Boulevard and B Street APS Bond DS – The project will provide ADA pedestrian push buttons, Polara APS countdown timers, additional push button poles by each crosswalk and sections of concrete sidewalk as needed.
- B10198, Ash Street at Second, Third, Seventh and Ninth Avenues Traffic Signal Modifications – This project will modify four traffic signals along Ash Street.
- B13137, 4th Avenue and Date Street Traffic Signal – This project will install a new traffic signal including signal poles, vehicle and pedestrian indicators, ADA curb ramps, curb, pedestrian countdown timers, ADA push buttons and Emergency Vehicle Pre-Emption (EVPE).
- B00923, Accessible Pedestrian Signals Phase II – This project will install audible pedestrian signals and associated accessibility upgrades at the following locations: Kettner Boulevard and Harbor Drive, Second Avenue and C Street, Third Avenue and B Street, Tenth Avenue and C Street, Park Boulevard and Ash Street.
- B11108, Traffic Signal Modifications (Fiscal Year 2011) – This project will make major traffic signal modifications to the signal at Eighth Avenue and E Street.

In addition, to be consistent with the 2006 Community Plan, traffic signal is assumed to be installed at the following intersections:

- India St / Fir St
- Kettner Blvd / Cedar St
- India St / Cedar St
- Second Ave / Cedar St
- Third Ave / Cedar St
- Pacific Coast Hwy / Beech St
- Kettner Blvd / Beech St
- State St / Market St
- 15th St / Market St
- 17th St / Market St
- Fifth Ave / Island St
- Seventh Ave / Island St
- Tenth Ave / Island St
- 11th Ave / Island St

- India St / Beech St
- Columbia St / B St
- State St / B St
- Union St / B St
- 17th St / B St
- 13th St / C St
- 15th St / Broadway
- 14th St / E St
- 15th St / E St
- Front St / F St
- 15th St / F St
- 17th St / F St
- 17th St / G St
- Pacific Coast Highway / G St
- 14th St / Island St
- 16th St / Island St
- Fifth Ave / J St
- Seventh Ave / J St
- 14th St / J St
- 16th St / J St
- Fifth Ave / K St
- Tenth Ave / K St
- 11th Ave / K St
- 16th St / L St
- 17th St / L St
- 14th St / Imperial Ave
- 13th St / Commercial St

6.3.4 Prioritized Vehicular Network

Autoways identify Downtown streets where driving is prioritized. These roadways typically provide for high volume flows through Downtown. Autoways are intended to support high volumes of vehicular and transit traffic by providing maximum efficiency while also considering safety.

Figure 6-12 presents the proposed Autoways. These roadways provide access to the regional freeway network, including roadways accessing I-5, SR-163, and SR-94 on- and off-ramps.

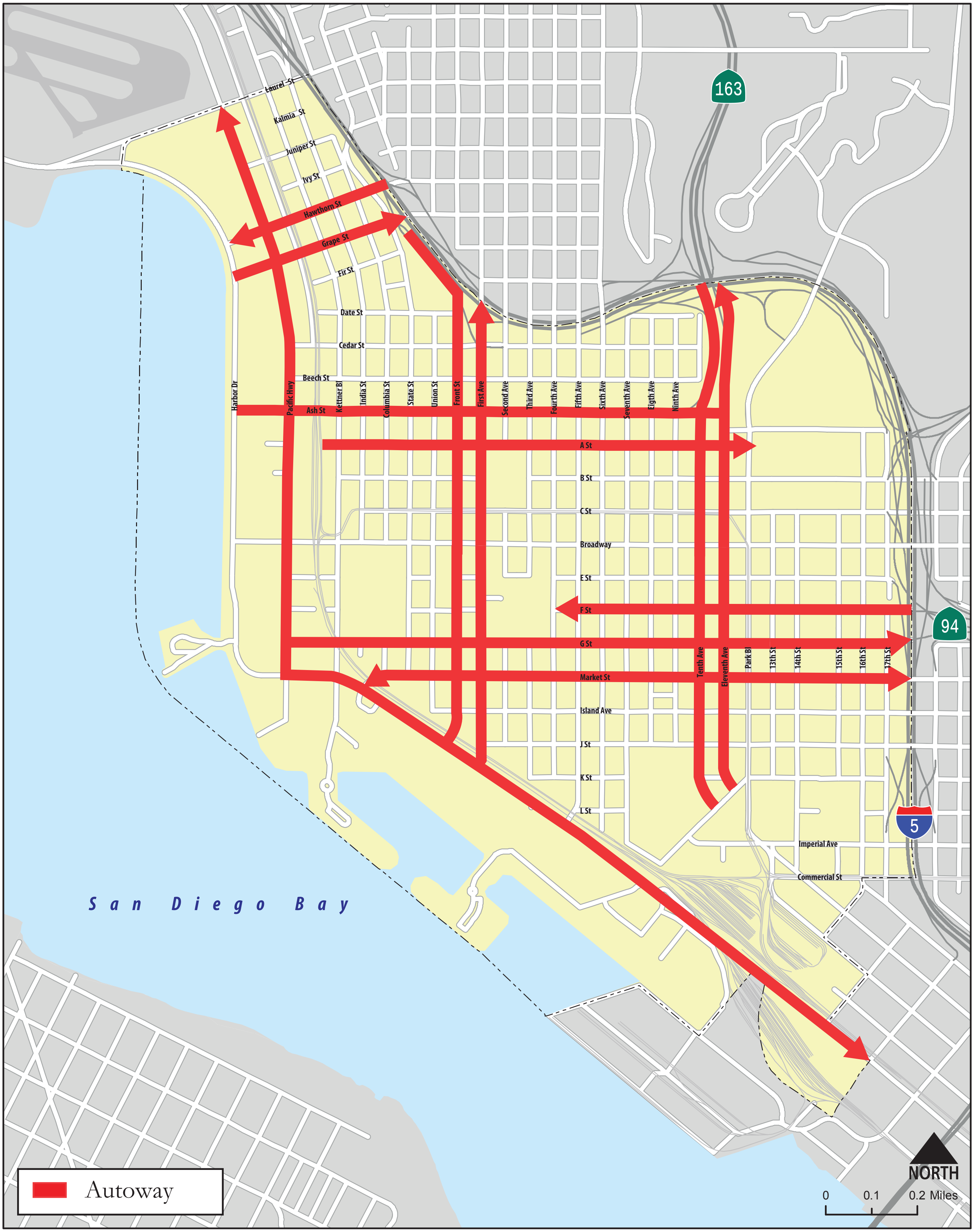

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Figure 6-12

Proposed Autoways

6.3.5 Intersection Geometry and Vehicular Level of Service Analysis

AM and PM peak hour intersection LOS analyses were performed for four alternatives, the Preferred Alternative, Alternative 2, Alternative 3, and Alternative 4. The major difference between the three alternatives relates to the configuration of Broadway and Market Street. The alternatives analyzed the impacts of modifying Market Street from a 4-lane roadway to a 2-lane roadway; closing Broadway to vehicular traffic between 3rd Avenue and Park Boulevard and maintaining Market Street as a 4-lane roadway; and closing Broadway to vehicular traffic between 3rd Avenue and Park Boulevard and modifying Market Street from a 4-lane roadway to a 2-lane roadway.

Due to resistance from the local business community as well as considerations for emergency vehicle access, the existing configurations for both Broadway and Market Street were maintained in the Preferred Alternative. The resulting analyses for the additional alternatives are presented in this report to support implementations of the alternatives should community members decide to support these options in the future.

Preferred Alternative

The preferred alternative maintains Broadway as a 4-lane roadway and Market Street as a 4-lane roadway, providing for maximum vehicular mobility along these key corridors. **Figure 6-13** displays the forecast AM and PM peak hour turning movement volumes under buildout of the Preferred Alternative.

LOS analyses were conducted using the methodologies described in Chapter 2. Intersection LOS calculation worksheets are provided in **Appendix P**. **Table 6-5** displays the LOS results for key study intersections located within the project area. **Figure 6-14** displays the Preferred Alternative intersection LOS analysis results. As shown, the following twenty-five (25) study area intersections are projected to operate at LOS F during the AM and/or PM peak hour:

1: Pacific Highway & Laurel Street
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street
17: Second Avenue & Cedar Street
22: Front Street & Beech Street
23: First Avenue & Beech Street
24: Fourth Avenue & Beech Street
35: First Avenue & A Street
43: 17th Street & B Street
46: 16th Street & C Street
51: Front Street & Broadway
52: First Avenue & Broadway
59: Eleventh Avenue & Broadway
61: 16th Street & E Street
64: 15th Street & F Street
65: 16th Street & F Street
72: Eleventh Avenue & G Street
73: Park Boulevard & G Street
74: 13th Street & G Street
75: 14th Street & G Street
76: 16th Street & G Street
77: 17th Street & G Street
86: Eleventh Avenue & Market Street
91: 16th Street & Island Avenue
97: 19th Street & J Street
107: Logan Avenue & I-5 SB Off-Ramp

Based upon the impact significance criteria presented in Section 2.2.6, the Preferred Plan would have a significant traffic impacts at all twenty-five (25) study area intersections listed above.

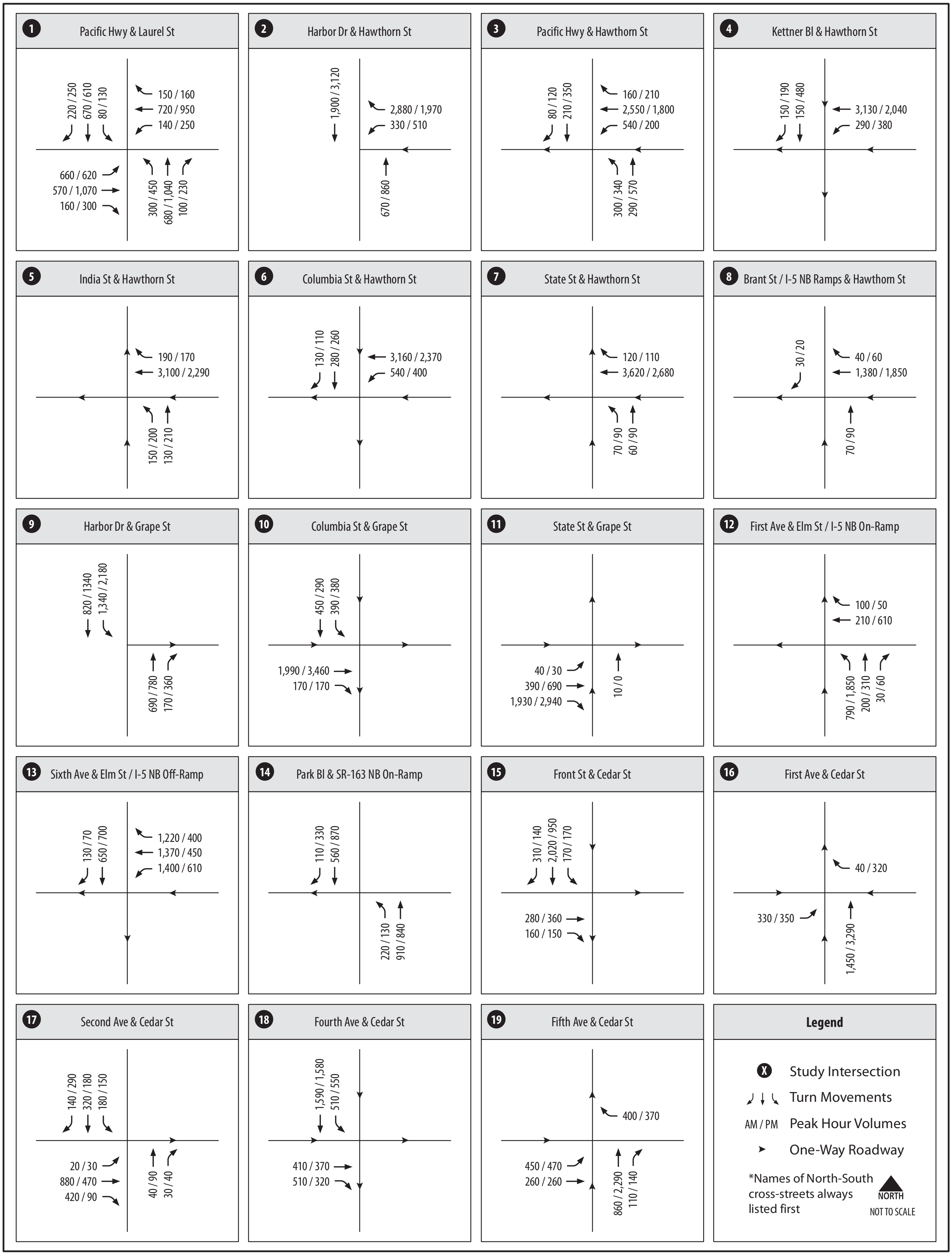

Figure 6-13
Future AM/PM Peak Hour Intersection Turning Movements with Broadway Open (Intersections 1-19)

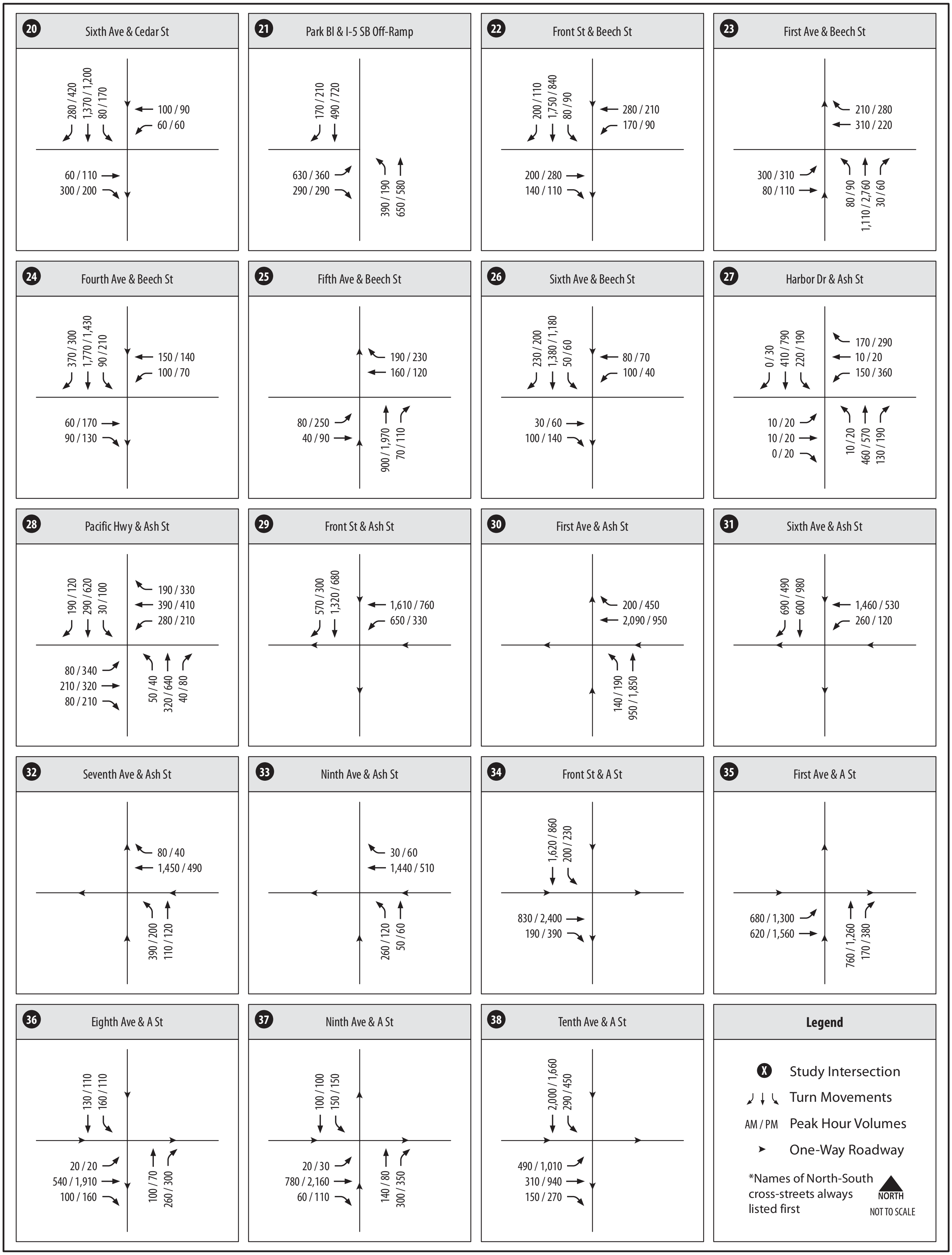

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Figure 6-13
Future AM/PM Peak Hour Intersection Turning Movements with Broadway Open (Intersections 20-38)

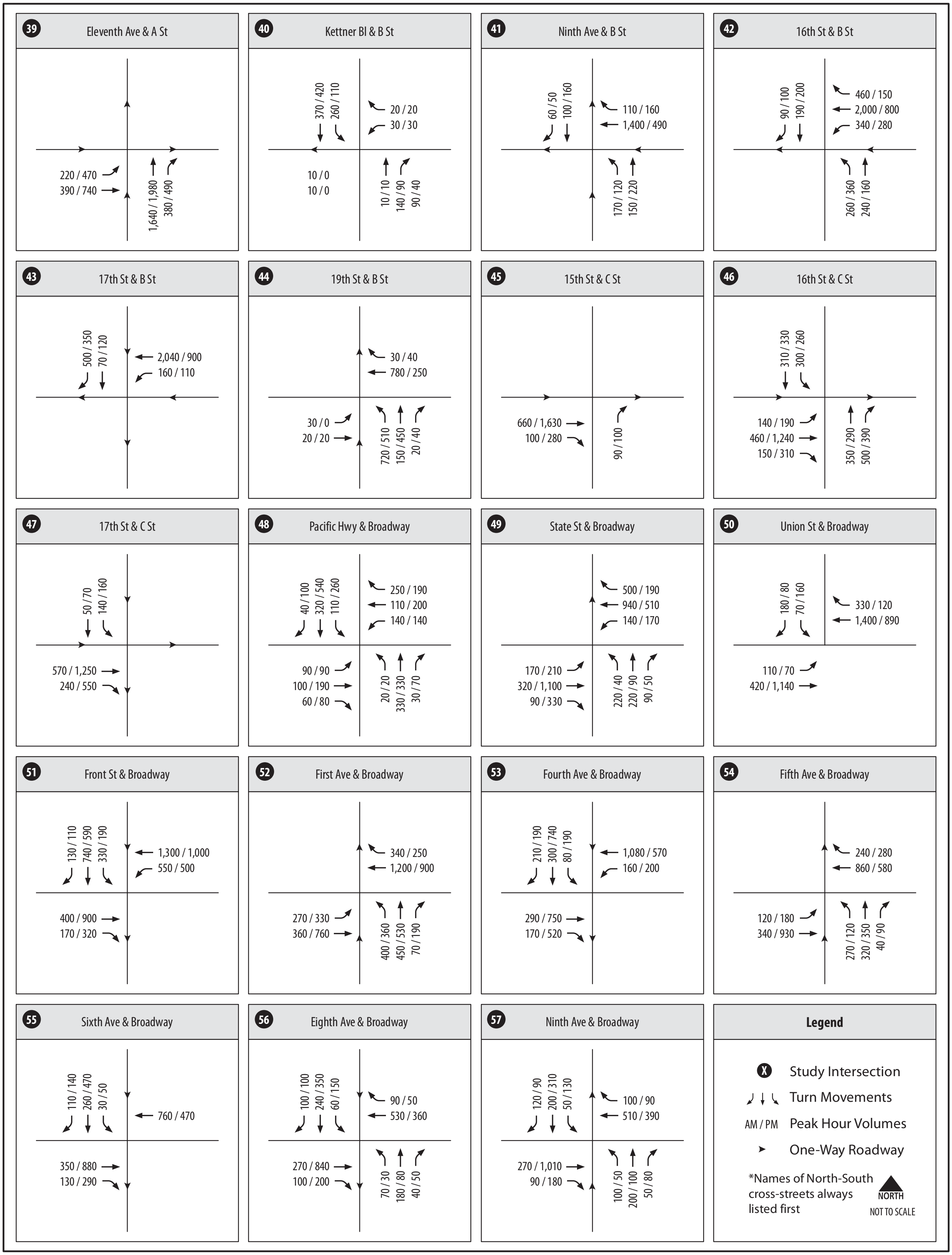

Figure 6-13
Future AM/PM Peak Hour Intersection Turning Movements with Broadway Open (Intersections 39-57)

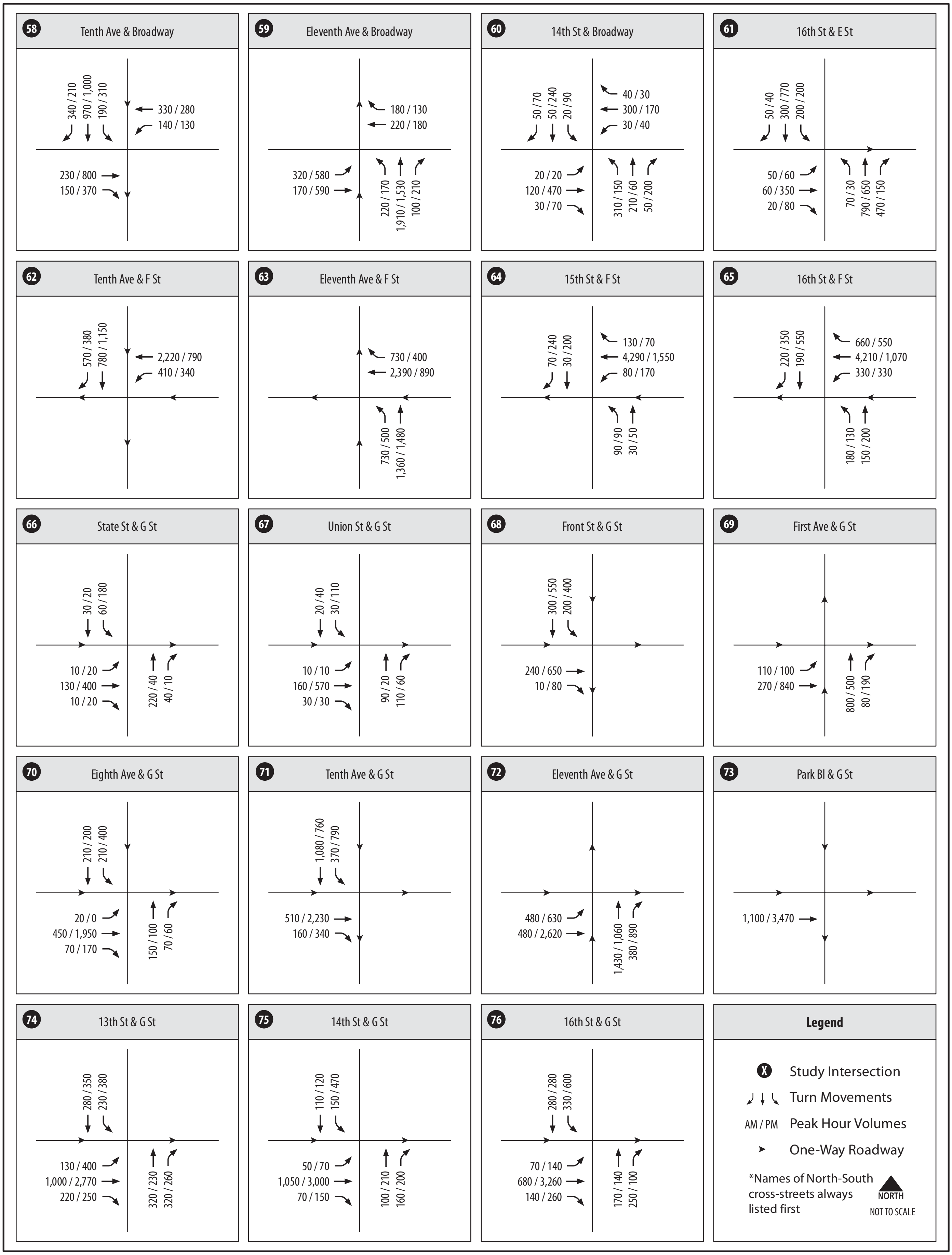

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Figure 6-13
Future AM/PM Peak Hour Intersection Turning Movements with Broadway Open (Intersections 58-76)

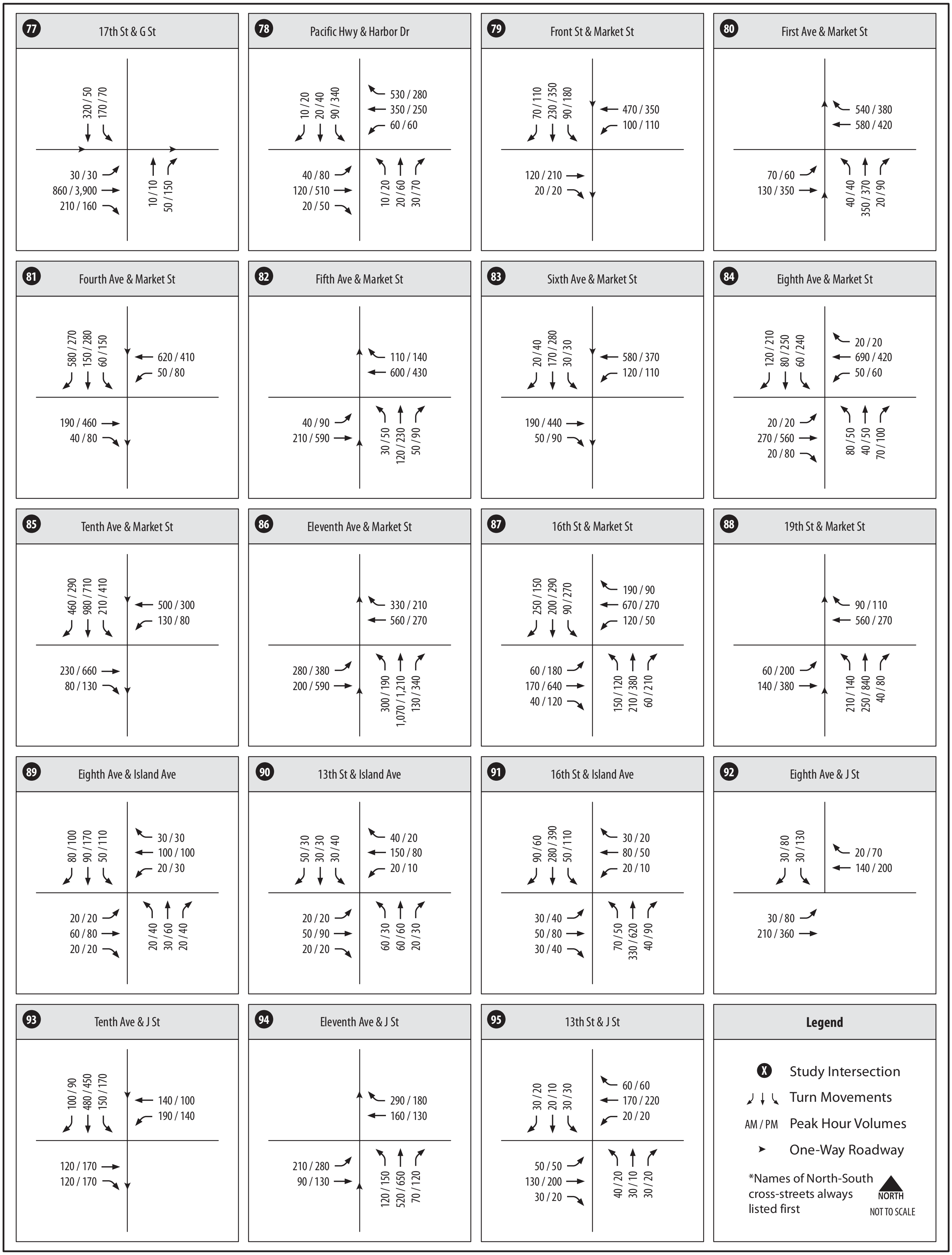

Figure 6-13
Future AM/PM Peak Hour Intersection Turning Movements with Broadway Open (Intersections 77-95)

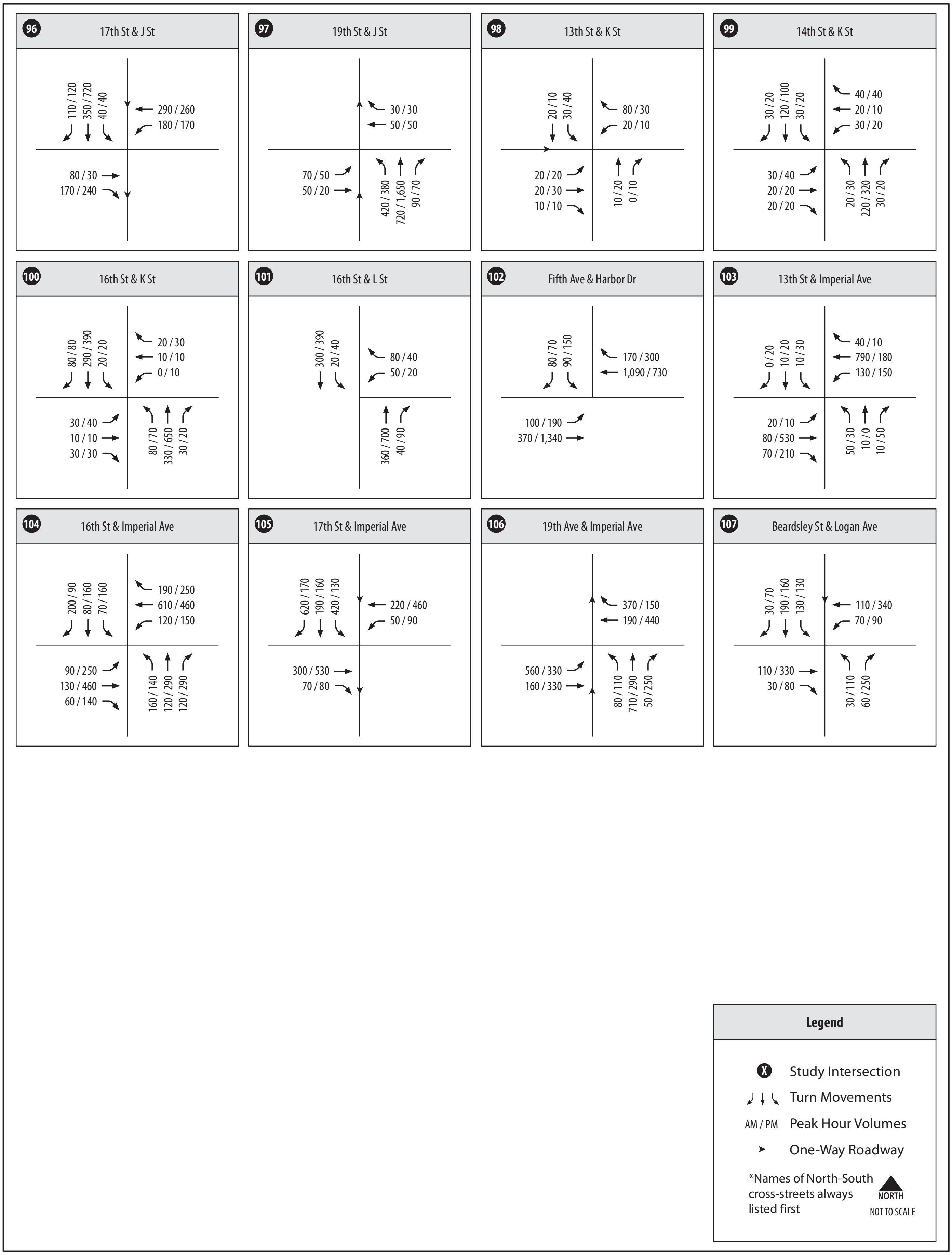

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Figure 6-13
Future AM/PM Peak Hour Intersection Turning Movements with Broadway Open (Intersections 96-107)

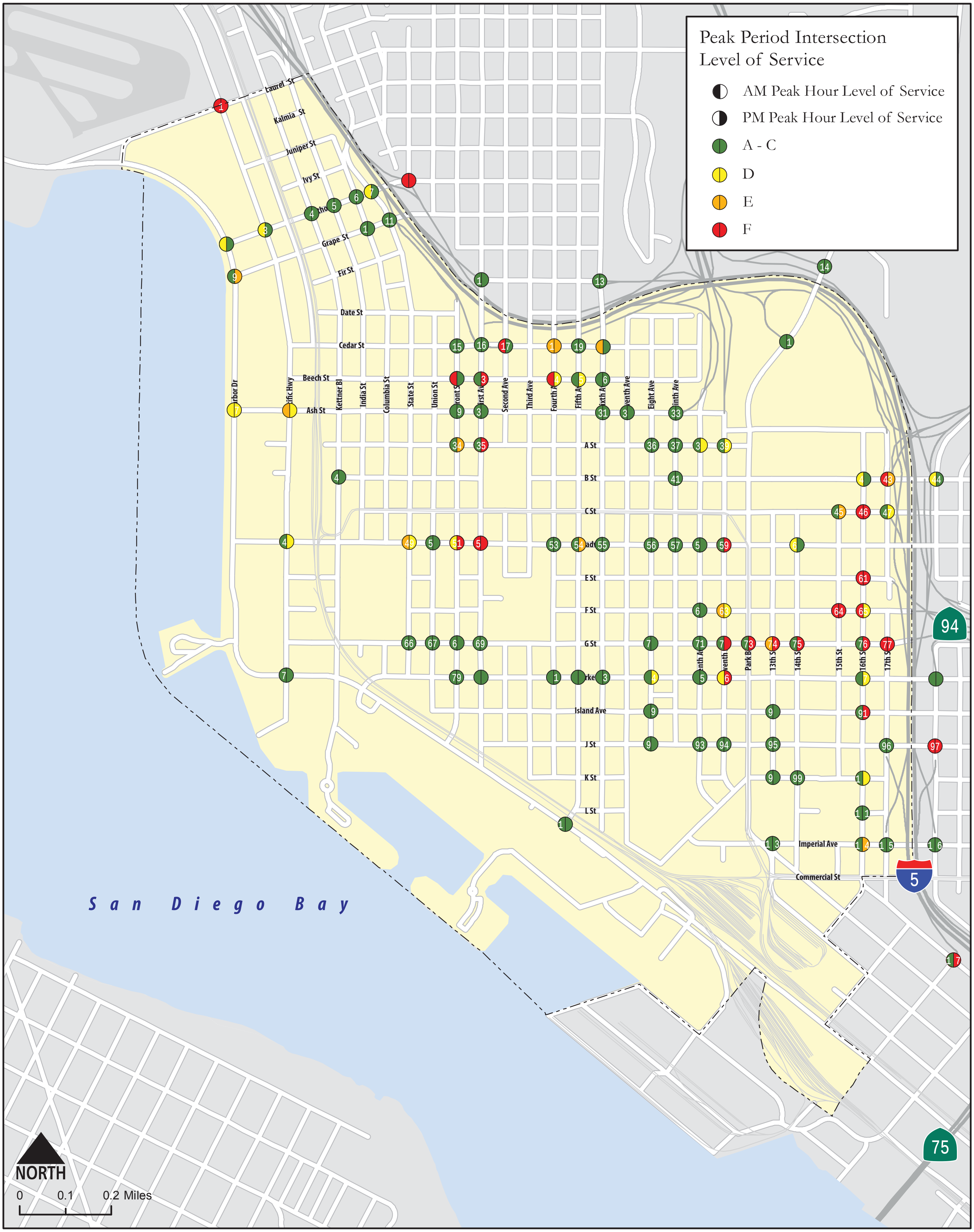

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Figure 6-14
Preferred Alternative Intersection Level of Service

Table 6-5 Preferred Alternative Intersection Peak Hour Level of Service

Intersection	Existing					Preferred Alternative					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
1: Pacific Highway & Laurel Street	Signal	47.6	D	54.7	D	Signal	101.9	**F**	143.5	**F**	54.3 / 88.8	**Yes**
2: Harbor Drive & Hawthorn Street	Signal	17.6	B	9.4	A	Signal	54.5	D	29.5	C	36.9 / 20.1	No
3: Pacific Highway & Hawthorn Street	Signal	16.3	B	19.9	B	Signal	34.8	C	24.8	C	18.5 / 4.9	No
4: Kettner Boulevard & Hawthorn Street	Signal	18.0	B	11.3	B	Signal	26.0	C	11.7	B	8.0 / 0.4	No
5: India Street & Hawthorn Street	Signal	25.9	C	9.2	A	Signal	24.8	C	8.5	A	-1.1 / -0.7	No
6: Columbia Street & Hawthorn Street	Signal	9.6	A	8.9	A	Signal	13.6	B	7.1	A	4.0 / -1.8	No
7: Hawthorn Street & State Street	Signal	9.5	A	8.9	A	Signal	51.1	D	13.9	B	41.6 / 5.0	No
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street	SSSC	14.6	B	25.4	D	SSSC	71.9	**F**	462.1	**F**	57.3 / 436.7	**Yes**
9: Harbor Drive & Grape St	Signal	18.9	B	12.3	B	Signal	20.0	B	72.3	E	1.1 / 60.0	No
10: Columbia Street & Grape Street	Signal	17.8	B	27.5	C	Signal	31.3	C	21.1	C	13.5 / -6.4	No
11: State St & Grape Street/Grape St/I-5 SB On Ramp	Signal	10.6	B	55.2	E	Signal	14.6	B	26.6	C	4.0 / -28.6	No
12: First Avenue & I-5 NB On-Ramp/Elm Street	Signal	17.5	B	27.1	C	Signal	6.2	A	6.7	A	-11.3 / -20.4	No
13: Sixth Avenue & Elm Street/I-5 NB Off-Ramp	Signal	13.0	B	10.3	B	Signal	15.6	B	8.5	A	2.6 / -1.8	No
14: Park Boulevard & 163 NB On Ramp	SSSC	No Conflicting Movements				SSSC	No Conflicting Movements				N/A	No
15: Front Street & Cedar Street	Signal	18.5	B	14.2	B	Signal	28.4	C	17.8	B	9.9 / 3.6	No
16: First Avenue & Cedar Street	Signal	22.5	C	17.7	B	Signal	5.8	A	7.6	A	-16.7 / -10.1	No
17: Second Avenue & Cedar Street	SSSC	58.9	**F**	14.7	B	SSSC	530.3	**F**	21.6	C	471.4 / 6.9	**Yes**
18: Fourth Avenue & Cedar Street	Signal	13.7	B	13.7	B	Signal	68.3	E	58.7	E	54.6 / 45.0	No
19: Fifth Avenue & Cedar Street	Signal	15.3	B	20.8	C	Signal	20.7	C	18.9	B	5.4 / -1.9	No
20: Sixth Avenue & Cedar Street	Signal	13.8	B	16.0	B	Signal	63.3	E	19.5	B	49.5 / 3.5	No
21: Park Boulevard & I-5 SB Off Ramps	Signal	19.5	B	18.7	B	Signal	27.1	C	24.4	C	7.6 / 5.7	No
22: Front Street & Beech Street	Signal	6.9	A	13.4	B	Signal	162.6	**F**	18.1	B	155.7 / 4.7	**Yes**

Table 6-5 Preferred Alternative Intersection Peak Hour Level of Service

Intersection	Existing					Preferred Alternative					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
23: First Avenue & Beech Street	Signal	28.3	C	16.8	B	Signal	28.5	C	123.4	**F**	0.2 / 106.6	**Yes**
24: Fourth Avenue & Beech Street	Signal	13.3	B	16.1	B	Signal	139.5	**F**	44.2	D	126.2 / 28.1	**Yes**
25: Fifth Avenue & Beech Street	Signal	11.8	B	16.7	B	Signal	17.1	B	40.7	D	5.3 / 24.0	No
26: Sixth Avenue & Beech Street	Signal	23.4	C	7.8	A	Signal	27.2	C	12.8	B	3.8 / 5.0	No
27: Harbor Drive & Ash Street	Signal	32.7	C	13.4	B	Signal	45.9	D	52.9	D	13.2 / 39.5	No
28: Pacific Highway & Ash Street	Signal	59.1	E	26.2	C	Signal	66.7	E	50.2	D	7.6 / 24.0	No
29: Front Street & Ash Street	Signal	13.1	B	5.3	A	Signal	32.0	C	3.3	A	18.9 / -2.0	No
30: First Avenue & Ash Street	Signal	14.8	B	12.6	B	Signal	14.1	B	14.1	B	-0.7 / 1.5	No
31: Sixth Avenue & Ash Street	Signal	8.8	A	6.5	A	Signal	17.1	B	18.7	B	8.3 / 12.2	No
32: Seventh Avenue & Ash Street	Signal	8.0	A	10.5	B	Signal	13.5	B	13.0	B	5.5 / 2.5	No
33: Ninth Street & Ash Street	Signal	11.9	B	14.4	B	Signal	14.3	B	12.9	B	2.4 / -1.5	No
34: Front Street & A Street	Signal	11.0	B	16.1	B	Signal	13.6	B	58.7	E	2.6 / 42.6	No
35: First Avenue & A Street	Signal	11.8	B	12.9	B	Signal	9.6	A	92.3	**F**	-2.2 / 79.4	**Yes**
36: Eighth Street & A Street	Signal	11.5	B	12.0	B	Signal	15.4	B	17.3	B	3.9 / 5.3	No
37: Ninth Street & A Street	Signal	17.2	B	5.1	A	Signal	14.0	B	11.2	B	-3.2 / 6.1	No
38: Tenth Avenue & A Street	Signal	19.6	B	16.1	B	Signal	24.1	C	38.4	D	4.5 / 22.3	No
39: Eleventh Avenue & A Street	Signal	14.8	B	12.9	B	Signal	19.4	B	43.5	D	4.6 / 30.6	No
40: Kettner Boulevard & B Street	Signal	9.1	A	9.3	A	Signal	10.9	B	10.4	B	1.8 / 1.1	No
41: Ninth Street & B Street	Signal	16.3	B	13.6	B	Signal	19.8	B	14.3	B	3.5 / 0.7	No
42: 16th Street & B Street	Signal	17.8	B	15.4	B	Signal	53.9	D	20.1	C	36.1 / 4.7	No
43: 17th Street & B Street	SSSC	93.5	**F**	14.5	B	SSSC	252.6	**F**	36.2	E	159.1 / 21.7	**Yes**
44: 19th Street/Pershing Drive / I-5 NB On-Ramp & B Street	Signal	11.1	B	10.1	B	Signal	35.4	D	13.7	B	24.3 / 3.6	No
45: 15th Street & C Street	SSSC	10.1	B	13.1	B	SSSC	12.9	B	35.7	E	2.8 / 22.6	No
46: 16th Street & C Street	Signal	16.3	B	17.5	B	Signal	106.0	**F**	124.7	**F**	89.7 / 107.2	**Yes**
47: 17th Street & C Street	SSSC	10.9	B	15.6	C	SSSC	15.2	C	33.0	D	4.3 / 17.4	No
48: Pacific Highway & Broadway	Signal	23.9	C	25.6	C	Signal	31.9	C	38.8	D	8.0 / 13.2	No

Table 6-5 Preferred Alternative Intersection Peak Hour Level of Service

Intersection	Existing					Preferred Alternative						
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour		Change in Delay (Sec.) (AM/PM)	SI?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
49: State Street & Broadway	Signal	9.8	A	7.0	A	Signal	56.7	E	36.9	D	46.9 / 29.9	No
50: Broadway & Union Street	Signal	4.1	A	5.9	A	Signal	16.4	B	14.3	B	12.3 / 8.4	No
51: Front Street & Broadway	Signal	13.4	B	105.8	**F**	Signal	51.3	D	139.8	**F**	37.9 / 34.0	**Yes**
52: First Avenue & Broadway	Signal	22.5	C	20.1	C	Signal	144.8	**F**	84.5	**F**	122.3 / 64.4	**Yes**
53: Fourth Avenue & Broadway	Signal	9.6	A	12.0	B	Signal	17.1	B	21.1	C	7.5 / 9.1	No
54: Fifth Avenue & Broadway	Signal	14.8	B	14.8	B	Signal	19.9	B	56.2	E	5.1 / 41.4	No
55: Sixth Avenue & Broadway	Signal	7.3	A	9.1	A	Signal	10.1	B	14.8	B	2.8 / 5.7	No
56: Eighth Street & Broadway	Signal	11.8	B	8.4	A	Signal	13.2	B	16.2	B	1.4 / 7.8	No
57: Ninth Street & Broadway	Signal	11.1	B	11.6	B	Signal	17.2	B	22.5	C	6.1 / 10.9	No
58: Tenth Avenue & Broadway	Signal	16.2	B	15.3	B	Signal	18.1	B	22.8	C	1.9 / 7.5	No
59: Eleventh Avenue & Broadway	Signal	9.4	A	22.0	C	Signal	30.3	C	94.2	**F**	20.9 / 72.2	**Yes**
60: 14th Street & Broadway	Signal	12.0	B	12.9	B	Signal	44.2	D	23.3	C	32.2 / 10.4	No
61: 16th Street & E Street	Signal	116.8	**F**	17.5	B	Signal	259.7	**F**	82.7	**F**	142.9 / 65.2	**Yes**
62: Tenth Avenue & F Street	Signal	11.0	B	12.3	B	Signal	17.7	B	19.1	B	6.7 / 6.8	No
63: Eleventh Avenue & F Street	Signal	12.8	B	9.8	A	Signal	79.3	E	40.7	D	66.5 / 30.9	No
64: 15th Street & F Street	SSSC	13.3	B	58.0	**F**	SSSC	OVRFL	**F**	551.5	**F**	OVRFL / 493.5	**Yes**
65: 16th Street & F Street	Signal	19.8	B	12.2	B	Signal	153.5	**F**	48.6	D	133.7 / 36.4	**Yes**
66: State Street & G Street	Signal	17.4	B	18.5	B	Signal	17.5	B	18.2	B	0.1 / -0.3	No
67: Union Street/Union St & G Street	AWSC	8.0	A	11.5	B	AWSC	8.1	A	10.9	B	0.1 / -0.6	No
68: Front Street & G Street	Signal	17.5	B	22.1	C	Signal	12.6	B	13.8	B	-4.9 / -8.3	No
69: First Avenue & G Street	Signal	11.4	B	16.7	B	Signal	13.9	B	11.4	B	2.5 / -5.3	No
70: Eighth Street & G Street	Signal	11.6	B	16.3	B	Signal	12.7	B	26.3	C	1.1 / 10.0	No
71: Tenth Avenue & G Street	Signal	18.0	B	14.6	B	Signal	12.1	B	29.2	C	-5.9 / 14.6	No
72: Eleventh Avenue & G Street	Signal	8.7	A	8.4	A	Signal	10.9	B	148.7	**F**	2.2 / 140.3	**Yes**
73: Park Boulevard & G Street	Signal	10.4	B	12.0	B	Signal	9.2	A	123.0	**F**	-1.2 / 111.0	**Yes**
74: 13th Street & G Street	Signal	6.5	A	20.3	C	Signal	58.8	E	367.2	**F**	52.3 / 346.9	**Yes**
75: 14th Street & G Street	Signal	7.6	A	6.5	A	Signal	10.8	B	297.6	**F**	3.2 / 291.1	**Yes**

Table 6-5 Preferred Alternative Intersection Peak Hour Level of Service

Intersection	Existing					Preferred Alternative					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
76: 16th Street & G Street	Signal	8.6	A	20.5	C	Signal	13.4	B	287.2	**F**	4.8 / 266.7	**Yes**
77: 17th Street & G Street	SSSC	22.1	C	OVRFL	**F**	SSSC	262.1	**F**	OVRFL	**F**	294.4 / OVRFL	**Yes**
78: Pacific Highway & Market Street	Signal	31.5	C	23.6	C	Signal	22.8	C	25.9	C	-8.7 / 2.3	No
79: Front Street & Market Street	Signal	6.1	A	8.7	A	Signal	8.5	A	7.4	A	2.4 / -1.3	No
80: First Avenue & Market Street	Signal	10.9	B	8.5	A	Signal	16.6	B	13.2	B	5.7 / 4.7	No
81: Fourth Avenue & Market Street	Signal	13.6	B	24.5	C	Signal	12.4	B	17.3	B	-1.2 / -7.2	No
82: Fifth Avenue & Market Street	Signal	29.8	C	29.0	C	Signal	31.5	C	29.7	C	1.7 / 0.7	No
83: Sixth Avenue & Market Street	Signal	6.3	A	12.8	B	Signal	9.0	A	14.0	B	2.7 / 1.2	No
84: Eighth Street & Market Street	Signal	8.7	A	8.4	A	Signal	15.9	B	36.5	D	7.2 / 28.1	No
85: Tenth Avenue & Market Street	Signal	26.1	C	6.4	A	Signal	23.4	C	12.5	B	-2.7 / 6.1	No
86: Eleventh Avenue & Market Street	Signal	14.4	B	11.7	B	Signal	48.6	D	87.8	**F**	34.2 / 76.1	**Yes**
87: 16th Street & Market Street	Signal	11.5	B	15.2	B	Signal	16.7	B	35.1	D	5.2 / 19.9	No
88: 19th Street & Market Street	Signal	15.9	B	17.7	B	Signal	16.4	B	40.3	D	0.5 / 22.6	No
89: Eighth Street & Island Avenue	AWSC	7.8	A	8.3	A	AWSC	8.9	A	11.7	B	1.1 / 3.4	No
90: 13th Street & Island Avenue	AWSC	8.0	A	7.7	A	AWSC	9.0	A	8.4	A	1.0 / 0.7	No
91: 16th Street & Island Avenue	AWSC	8.9	A	11.4	B	AWSC	15.2	C	89.1	**F**	6.3 / 77.7	**Yes**
92: J Street & Eighth Street	AWSC	7.5	A	8.3	A	AWSC	8.7	A	14.1	B	1.2 / 5.8	No
93: Tenth Avenue & J Street	Signal	10.0	B	10.1	B	Signal	17.7	B	17.1	B	7.7 / 7.0	No
94: Eleventh Avenue & J Street	Signal	8.2	A	9.0	A	Signal	13.7	B	20.0	C	5.5 / 11.0	No
95: 13th Street & J Street	AWSC	7.6	A	7.9	A	AWSC	9.5	A	10.0	B	1.9 / 2.1	No
96: 17th Street & J Street	Signal	9.8	A	8.5	A	Signal	13.0	B	16.5	B	3.2 / 8.0	No
97: 19th Street & J Street	AWSC	11.1	B	119.6	**F**	AWSC	16.3	C	140.5	**F**	5.2 / 20.9	**Yes**
98: 13th Street & K Street	AWSC	6.4	A	6.7	A	AWSC	6.9	A	7.0	A	0.5 / 0.3	No
99: 14th Street & K Street	SSSC	10.3	B	10.1	B	SSSC	13.8	B	15.3	C	3.5 / 5.2	No
100: 16th Street & K Street	SSSC	9.9	A	12.2	B	SSSC	21.4	C	46.7	E	11.5 / 34.5	No
101: 16th Street & L Street	N/A	Does Not Exist				SSSC	14.8	B	21.8	C	14.8 / 21.8	No
102: Harbor Drive & Fifth Avenue	Signal	15.0	B	25.7	C	Signal	21.3	C	24.6	C	6.3 / -1.1	No

Table 6-5 Preferred Alternative Intersection Peak Hour Level of Service

Intersection	Existing					Preferred Alternative					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
103: 13th Street & Imperial Avenue	Signal	3.4	A	3.9	A	Signal	4.3	A	6.1	A	0.9 / 2.2	No
104: Imperial Avenue & 16th Street	Signal	12.8	B	13.9	B	Signal	22.1	C	79.7	E	9.3 / 65.8	No
105: Imperial Avenue & 17th Street	Signal	11.7	B	10.8	B	Signal	14.0	B	10.6	B	2.3 / -0.2	No
106: Imperial Avenue & 19th Street	Signal	14.7	B	16.4	B	Signal	23.3	C	22.0	C	8.6 / 5.6	No
107: Logan Avenue & I-5 SB Off-Ramp	AWSC	11.4	B	14.2	B	AWSC	12.9	B	62.2	**F**	1.5 / 48.0	**Yes**

Source: Chen Ryan Associates; December 2015

Notes:
Bold letter indicates unacceptable LOS F.
OWSC = One-way stop controlled.
SSSC = Side Street stop controlled.
AWSC = All-way stop controlled.
For one or two-way stop controlled intersections, the delay shown is the worst delay experienced by any of the approaches.
N/A = Not applicable.
SI? = Significant Impact?
OVRFL = Actual intersection delay exceeds the calculation thresholds allowed in the traffic analysis software.

Significant Impacts and Mitigation Measures

This section identifies recommended mitigation measures for intersection that would be significantly impacted by the Preferred Alternative.

Feasible mitigation
Mitigation measures displayed below would fully mitigate traffic impact associated with the Preferred Alternative at the following eleven (11) intersections.

- *Int 8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix P.
- *Int 17: Second Avenue & Cedar Street* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix P.
- *Int 24: Fourth Avenue & Beech Street* – Convert on-street parking to a travel lane on Fourth Avenue between Cedar Street and Ash Street during the AM peak hour.
- *Int 35: First Avenue & A Street* – Restrict on-street parking and add an eastbound left-turn lane.
- *Int 43: 17th Street & B Street* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix P.
- *Int 61: 16th Street & E Street* – Restrict on-street parking and add a northbound right-turn lane.
- *Int 72: Eleventh Avenue & G Street* - Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.
- *Int 73: Park Boulevard & G Street* - Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.
- *Int 91: 16th Street & Island Avenue* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix P.
- *Int 97: 19th Street & J Street* – Restripe the northbound left-turn lane into a northbound left-turn and through shared lane.

- *Int 107: Logan Avenue & I-5 SB Off-Ramp* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix P.

<u>*Partial Mitigation*</u>

The following intersections are currently built to the limits of the existing right-of-way. Full mitigation of the potential traffic impacts associated with the Preferred Alternative would require Intersection widening to provide additional lanes. Sidewalks or bicycle facilities would need to be removed or reduced in width, which would result in impacts to non-vehicular modes of travel (pedestrians and bicyclists). Planning and environmental laws recognize the importance of planning for all modes of transportation, which provide for the needs of all users including pedestrians, bicyclists, transit riders, and motorists. (See AB 1358 [2008] and SB 375 [2008].) As such, full mitigation measures identified below are considered infeasible due to policy considerations. Another option for intersection widening would involve the expansion of current right-of-way through additional property acquisition. Property acquisitions, however, are considered environmentally, financially, and socially infeasible. In many cases, property acquisitions would require demolition of existing buildings which would generate additional environmental impacts associated with air quality, noise, GHGs, solid waste, and traffic as well as continuing to promote vehicular usage. Full mitigation measures identified below are considered infeasible at these six (6) study area intersection and are provided only for informational purposes only. Feasible partial mitigation are also provided at these locations, however, impact associated with the Preferred Alternative would remain significant and unavoidable.

- *Int 22: Front Street & Beech Street*

  <u>Full mitigation</u>: Convert on-street parking to a travel lane on Front Street between Cedar Street and Ash Street during the PM peak hour, as well as construct an additional westbound right-turn lane at the Beech Street approach which would require street widening.

  <u>Partial mitigation</u>: Convert on-street parking to a travel lane on Front Street between Cedar Street and Ash Street during the PM peak hour.

- *Int 64: 15th Street & F Street*

  <u>Full mitigation</u>: Signalization as well as construct an additional westbound through lane at the F Street approach which would require street widening. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix P.

  <u>Partial mitigation</u>: Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this

intersection would meet the “Peak Hour” warrant. The signal warrant worksheet for this intersection is provided in Appendix P.

- *Int 74: 13th Street & G Street*

  Full mitigation: Convert the current eastbound left-turn and through shared lane to a dedicated left-turn lane and construct one additional eastbound through lanes at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

  Partial mitigation: Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

- *Int 75: 14th Street & G Street*

  Full mitigation: Construct an additional eastbound through lane at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

  Partial mitigation: Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

- *Int 76: 16th Street & G Street*

  Full mitigation: Construct an additional eastbound through lane at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

  Partial mitigation: Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

- *Int 77: 17th Street & G Street*

  Full mitigation: Signalization and construct an additional eastbound through lane at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the “Peak Hour” warrant. The signal warrant worksheet for this intersection is provided in Appendix P.

  Partial mitigation: Signalization and convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the “Peak Hour” warrant. The signal warrant worksheet for this intersection is provided in Appendix P.

Infeasible mitigation

The following intersections are also currently built to the limits of the existing right-of-way. Intersection widening to provide additional lanes would be required to mitigate the Preferred Alternative impact to these intersections. Sidewalks or bicycle facilities would need to be removed or reduced in width, which would result in impacts to non-vehicular modes of travel (pedestrians and bicyclists). Planning and environmental laws recognize the importance of planning for all modes of transportation, which provide for the needs of all users including pedestrians, bicyclists, transit riders, and motorists. (See AB 1358 [2008] and SB 375 [2008].) As such, the mitigation measures identified below are considered infeasible due to policy considerations. Another option for intersection widening would involve the expansion of current right-of-way through additional property acquisition. Property acquisitions, however, are considered environmentally, financially, and socially infeasible. In many cases, property acquisitions would require demolition of existing buildings which would generate additional environmental impacts associated with air quality, noise, GHGs, solid waste, and traffic as well as continuing to promote vehicular usage. For these reasons, mitigation measures identified below are considered infeasible and are provided only for informational purposes. Potential traffic impacts associated with the Preferred Alternative impact to these eight (8) study area intersections would remain significant and unavoidable.

- *Int 1: Pacific Highway & Laurel Street* – Construct an additional eastbound left-turn lane and an additional westbound left-turn lane at the Laurel Street approach, and construct an additional northbound left-turn lane at the Pacific Highway approach, both of which would require street widening.
- *Int 23: First Avenue & Beech Street* – Convert on-street parking to a travel lane on First Avenue between Cedar Street and Ash Street during the PM peak hour which would require on-street parking removal. Construct an additional eastbound left-turn lane at the Beech Street approach, which would require street widening.
- *Int 46: 16th Street & C Street* – Construct an additional eastbound through lane at the C Street approach, and construct an additional southbound left-turn lane at the 16th Street approach, both of which would require street widening.
- *Int 51: Front Street & Broadway* – Construct an additional eastbound right-through lane, an eastbound right-turn lane, and an additional westbound left-turn lane at the Broadway approach which would require street widening.
- *Int 52: First Avenue & Broadway* – Construct an additional westbound right-turn lane, and an additional eastbound through-right lane at the Broadway approach which would require street widening.
- *Int 59: Eleventh Avenue & Broadway* – Construct an additional northbound through lane at the Eleventh Avenue approach which would require street widening.
- *Int 65: 16th Street & F Street* – Construct an exclusive northbound right-turn lane at the 16^{th} Street approach which would require street widening.

- *Int 86: Eleventh Avenue & Market Street* – Construct an exclusive northbound right-turn lane at the Eleventh Avenue approach which would require street widening.

Table 6-6 displays Level of Service analysis results for the mitigated intersections under the Preferred Alternative. Calculation worksheets for the intersection analysis are provided in Appendix P. As shown, the recommended mitigation measures would fully mitigate the Preferred Alternative impacts on eleven (11) intersections, partially mitigated the Preferred Alternative impacts on six (6) intersections, and the remaining eight (8) intersections would remain significantly impacted and unmitigated.

Table 6-6 Preferred Alternative Intersection Peak Hour Level of Service with Mitigation

Intersection	Preferred Alternative (Pre Mitigation)				Preferred Alternative (Post Mitigation)				Change in Delay (sec.) (AM/PM)	Mitigated?
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street	71.9	**F**	462.1	**F**	6.6	A	42.9	D	-65.3 / -419.2	Yes
17: Second Avenue & Cedar Street	530.3	**F**	21.6	C	68.7	E	16.6	B	-461.6 / -5.0	Yes
22: Front Street & Beech Street	162.6	**F**	18.1	B	93.9	**F**	18.1	B	-68.7 / 0.0	**Partial**
24: Fourth Avenue & Beech Street	139.5	**F**	44.2	D	30.1	C	44.2	D	-109.4 / 0.0	Yes
35: First Avenue & A Street	9.6	A	92.3	**F**	12.5	B	69.2	E	2.9 / -23.1	Yes
43: 17th Street & B Street	252.6	**F**	36.2	E	33.0	C	15.8	B	-219.6 / -20.4	Yes
61: 16th Street & E Street	259.7	**F**	82.7	**F**	65.3	E	52.2	D	-194.4 / -30.5	Yes
64: 15th Street & F Street	OVRFL	**F**	551.5	**F**	151.1	**F**	10.9	B	OVRFL / -540.6	**Partial**
72: Eleventh Avenue & G Street	10.9	B	148.7	**F**	10.9	B	74.1	E	0.0 / -74.6	Yes
73: Park Boulevard & G Street	9.2	A	123.0	**F**	9.2	A	11.9	B	0.0 / -111.1	Yes
74: 13th Street & G Street	58.8	E	367.2	**F**	21.1	C	159.0	**F**	-37.7 / -208.2	**Partial**
75: 14th Street & G Street	10.8	B	297.6	**F**	11.0	B	152.0	**F**	0.2 / -145.6	**Partial**
76: 16th Street & G Street	13.4	B	287.2	**F**	11.7	B	164.3	**F**	-1.7 / -122.9	**Partial**
77: 17th Street & G Street	262.1	**F**	OVRFL	**F**	14.6	B	99.5	**F**	- 247.5 / OVRFL	**Partial**
91: 16th Street & Island Avenue	15.2	C	89.1	**F**	12.9	B	21.5	C	-2.3 / -67.6	Yes
97: 19th Street & J Street	16.3	C	140.5	**F**	32.7	D	45.5	E	16.4 / -95.0	Yes
107: Logan Avenue & I-5 SB Off-Ramp	12.9	B	62.2	**F**	20.8	C	36.8	D	7.9 / -25.4	Yes

Source: Chen Ryan Associates; December 2015

Notes:
Bold letter indicates unacceptable LOS F.
OVRFL = Actual intersection delay exceeds the calculation thresholds allowed in the traffic analysis software.

Alternative 2

Alternative 2 maintains Broadway as a 4-lane roadway, however, Market Street becomes a 2-lane roadway and the raised median is removed, in order to accommodate a one-way cycle track on each side of the roadway.

Table 6-7 displays Alternative 2 LOS results for key study intersections located within the project area. LOS analyses were conducted using the methodologies described in Chapter 2. Intersection LOS calculation worksheets are provided in **Appendix Q**. As shown, the following twenty-six (26) study area intersections are projected to operate at LOS F during the AM and/or PM peak hour:

1: Pacific Highway & Laurel Street
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street
17: Second Avenue & Cedar Street
22: Front Street & Beech Street
23: First Avenue & Beech Street
24: Fourth Avenue & Beech Street
35: First Avenue & A Street
43: 17th Street & B Street
46: 16th Street & C Street
51: Front Street & Broadway
52: First Avenue & Broadway
59: Eleventh Avenue & Broadway
61: 16th Street & E Street
64: 15th Street & F Street
65: 16th Street & F Street
72: Eleventh Avenue & G Street
73: Park Boulevard & G Street
74: 13th Street & G Street
75: 14th Street & G Street
76: 16th Street & G Street
77: 17th Street & G Street
82: Fifth Avenue & Market Street
86: Eleventh Avenue & Market Street
91: 16th Street & Island Avenue
97: 19th Street & J Street
107: Logan Avenue & I-5 SB Off-Ramp

Based upon the impact significance criteria presented in Section 2.2, Alternative 2 would have a significant cumulative traffic impacts at all of the twenty-six (26) study area intersections listed above.

Table 6-7 Alternative 2 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 2					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
1: Pacific Highway & Laurel Street	Signal	47.6	D	54.7	D	Signal	101.9	**F**	143.5	**F**	54.3 / 88.8	**Yes**
2: Harbor Drive & Hawthorn Street	Signal	17.6	B	9.4	A	Signal	54.5	D	29.5	C	36.9 / 20.1	No
3: Pacific Highway & Hawthorn Street	Signal	16.3	B	19.9	B	Signal	34.8	C	24.8	C	18.5 / 4.9	No
4: Kettner Boulevard & Hawthorn Street	Signal	18.0	B	11.3	B	Signal	26.0	C	11.7	B	8.0 / 0.4	No
5: India Street & Hawthorn Street	Signal	25.9	C	9.2	A	Signal	24.8	C	8.5	A	-1.1 / -0.7	No
6: Columbia Street & Hawthorn Street	Signal	9.6	A	8.9	A	Signal	13.6	B	7.1	A	4.0 / -1.8	No
7: Hawthorn Street & State Street	Signal	9.5	A	8.9	A	Signal	51.1	D	13.9	B	41.6 / 5.0	No
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street	SSSC	14.6	B	25.4	D	SSSC	71.9	**F**	462.1	**F**	57.3 / 436.7	**Yes**
9: Harbor Drive & Grape St	Signal	18.9	B	12.3	B	Signal	20.0	B	72.3	E	1.1 / 60.0	No
10: Columbia Street & Grape Street	Signal	17.8	B	27.5	C	Signal	31.3	C	21.1	C	13.5 / -6.4	No
11: State St & Grape Street/Grape St/I-5 SB On Ramp	Signal	10.6	B	55.2	E	Signal	14.6	B	26.6	C	4.0 / -28.6	No
12: First Avenue & I-5 NB On-Ramp/Elm Street	Signal	17.5	B	27.1	C	Signal	6.2	A	6.7	A	-11.3 / -20.4	No
13: Sixth Avenue & Elm Street/I-5 NB Off-Ramp	Signal	13.0	B	10.3	B	Signal	15.6	B	8.5	A	2.6 / -1.8	No
14: Park Boulevard & 163 NB On Ramp	SSSC	No Conflicting Movements				SSSC	No Conflicting Movements				N/A	No
15: Front Street & Cedar Street	Signal	18.5	B	14.2	B	Signal	28.4	C	17.8	B	9.9 / 3.6	No
16: First Avenue & Cedar Street	Signal	22.5	C	17.7	B	Signal	5.8	A	7.6	A	-16.7 / -10.1	No
17: Second Avenue & Cedar Street	SSSC	58.9	**F**	14.7	B	SSSC	530.3	**F**	21.6	C	471.4 / 6.9	**Yes**
18: Fourth Avenue & Cedar Street	Signal	13.7	B	13.7	B	Signal	68.3	E	58.7	E	54.6 / 45.0	No
19: Fifth Avenue & Cedar Street	Signal	15.3	B	20.8	C	Signal	20.7	C	18.9	B	5.4 / -1.9	No
20: Sixth Avenue & Cedar Street	Signal	13.8	B	16.0	B	Signal	63.3	E	19.5	B	49.5 / 3.5	No
21: Park Boulevard & I-5 SB Off Ramps	Signal	19.5	B	18.7	B	Signal	27.1	C	24.4	C	7.6 / 5.7	No
22: Front Street & Beech Street	Signal	6.9	A	13.4	B	Signal	162.6	**F**	18.1	B	155.7 / 4.7	**Yes**

Table 6-7 Alternative 2 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 2					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
23: First Avenue & Beech Street	Signal	28.3	C	16.8	B	Signal	28.5	C	123.4	**F**	0.2 / 106.6	**Yes**
24: Fourth Avenue & Beech Street	Signal	13.3	B	16.1	B	Signal	139.5	**F**	44.2	D	126.2 / 28.1	**Yes**
25: Fifth Avenue & Beech Street	Signal	11.8	B	16.7	B	Signal	17.1	B	40.7	D	5.3 / 24.0	No
26: Sixth Avenue & Beech Street	Signal	23.4	C	7.8	A	Signal	27.2	C	12.8	B	3.8 / 5.0	No
27: Harbor Drive & Ash Street	Signal	32.7	C	13.4	B	Signal	45.9	D	52.9	D	13.2 / 39.5	No
28: Pacific Highway & Ash Street	Signal	59.1	E	26.2	C	Signal	80.1	**F**	50.2	D	21.0 / 24.0	No
29: Front Street & Ash Street	Signal	13.1	B	5.3	A	Signal	32.0	C	3.3	A	18.9 / -2.0	No
30: First Avenue & Ash Street	Signal	14.8	B	12.6	B	Signal	14.1	B	14.1	B	-0.7 / 1.5	No
31: Sixth Avenue & Ash Street	Signal	8.8	A	6.5	A	Signal	17.1	B	18.7	B	8.3 / 12.2	No
32: Seventh Avenue & Ash Street	Signal	8.0	A	10.5	B	Signal	13.5	B	13.0	B	5.5 / 2.5	No
33: Ninth Street & Ash Street	Signal	11.9	B	14.4	B	Signal	14.3	B	12.9	B	2.4 / -1.5	No
34: Front Street & A Street	Signal	11.0	B	16.1	B	Signal	13.6	B	58.7	E	2.6 / 42.6	No
35: First Avenue & A Street	Signal	11.8	B	12.9	B	Signal	9.7	A	92.3	**F**	-2.1 / 79.4	**Yes**
36: Eighth Street & A Street	Signal	11.5	B	12.0	B	Signal	15.4	B	17.3	B	3.9 / 5.3	No
37: Ninth Street & A Street	Signal	17.2	B	5.1	A	Signal	14.0	B	11.2	B	-3.2 / 6.1	No
38: Tenth Avenue & A Street	Signal	19.6	B	16.1	B	Signal	24.1	C	38.4	D	4.5 / 22.3	No
39: Eleventh Avenue & A Street	Signal	14.8	B	12.9	B	Signal	19.4	B	43.5	D	4.6 / 30.6	No
40: Kettner Boulevard & B Street	Signal	9.1	A	9.3	A	Signal	10.9	B	10.4	B	1.8 / 1.1	No
41: Ninth Street & B Street	Signal	16.3	B	13.6	B	Signal	19.8	B	14.3	B	3.5 / 0.7	No
42: 16th Street & B Street	Signal	17.8	B	15.4	B	Signal	53.9	D	20.1	C	36.1 / 4.7	No
43: 17th Street & B Street	SSSC	93.5	**F**	14.5	B	SSSC	252.6	**F**	36.2	E	159.1 / 21.7	**Yes**
44: 19th Street/Pershing Drive / I-5 NB On-Ramp & B Street	Signal	11.1	B	10.1	B	Signal	35.4	D	13.7	B	24.3 / 3.6	No
45: 15th Street & C Street	SSSC	10.1	B	13.1	B	SSSC	12.9	B	35.7	E	2.8 / 22.6	No
46: 16th Street & C Street	Signal	16.3	B	17.5	B	Signal	106.0	**F**	124.7	**F**	89.7 / 107.2	**Yes**
47: 17th Street & C Street	SSSC	10.9	B	15.6	C	SSSC	15.2	C	33.0	D	4.3 / 17.4	No
48: Pacific Highway & Broadway	Signal	23.9	C	25.6	C	Signal	31.9	C	38.8	D	8.0 / 13.2	No

Table 6-7 Alternative 2 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 2					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
49: State Street & Broadway	Signal	9.8	A	7.0	A	Signal	56.7	E	36.9	D	46.9 / 29.9	No
50: Broadway & Union Street	Signal	4.1	A	5.9	A	Signal	16.4	B	14.3	B	12.3 / 8.4	No
51: Front Street & Broadway	Signal	13.4	B	105.8	**F**	Signal	51.3	D	139.8	**F**	37.9 / 34.0	**Yes**
52: First Avenue & Broadway	Signal	22.5	C	20.1	C	Signal	144.7	**F**	84.5	**F**	122.2 / 64.4	**Yes**
53: Fourth Avenue & Broadway	Signal	9.6	A	12.0	B	Signal	17.1	B	21.1	C	7.5 / 9.1	No
54: Fifth Avenue & Broadway	Signal	14.8	B	14.8	B	Signal	19.9	B	56.2	E	5.1 / 41.4	No
55: Sixth Avenue & Broadway	Signal	7.3	A	9.1	A	Signal	10.1	B	14.8	B	2.8 / 5.7	No
56: Eighth Street & Broadway	Signal	11.8	B	8.4	A	Signal	13.2	B	16.2	B	1.4 / 7.8	No
57: Ninth Street & Broadway	Signal	11.1	B	11.6	B	Signal	17.2	B	22.5	C	6.1 / 10.9	No
58: Tenth Avenue & Broadway	Signal	16.2	B	15.3	B	Signal	18.1	B	22.8	C	1.9 / 7.5	No
59: Eleventh Avenue & Broadway	Signal	9.4	A	22.0	C	Signal	30.3	C	94.2	**F**	20.9 / 72.2	**Yes**
60: 14th Street & Broadway	Signal	12.0	B	12.9	B	Signal	44.2	D	23.3	C	32.2 / 10.4	No
61: 16th Street & E Street	Signal	116.8	**F**	17.5	B	Signal	259.8	**F**	82.7	**F**	143.0 / 65.2	**Yes**
62: Tenth Avenue & F Street	Signal	11.0	B	12.3	B	Signal	17.7	B	19.1	B	6.7 / 6.8	No
63: Eleventh Avenue & F Street	Signal	12.8	B	9.8	A	Signal	79.2	E	40.7	D	66.4 / 30.9	No
64: 15th Street & F Street	SSSC	13.3	B	58.0	**F**	SSSC	OVRFL	**F**	551.5	**F**	OVRFL / 493.5	**Yes**
65: 16th Street & F Street	Signal	19.8	B	12.2	B	Signal	153.6	**F**	48.6	D	133.8 / 36.4	**Yes**
66: State Street & G Street	Signal	17.4	B	18.5	B	Signal	17.5	B	18.2	B	0.1 / -0.3	No
67: Union Street/Union St & G Street	AWSC	8.0	A	11.5	B	AWSC	8.1	A	10.9	B	0.1 / -0.6	No
68: Front Street & G Street	Signal	17.5	B	22.1	C	Signal	12.6	B	13.8	B	-4.9 / -8.3	No
69: First Avenue & G Street	Signal	11.4	B	16.7	B	Signal	12.8	B	11.3	B	1.4 / -5.4	No
70: Eighth Street & G Street	Signal	11.6	B	16.3	B	Signal	12.5	B	26.3	C	0.9 / 10.0	No
71: Tenth Avenue & G Street	Signal	18.0	B	14.6	B	Signal	12.1	B	29.2	C	-5.9 / 14.6	No
72: Eleventh Avenue & G Street	Signal	8.7	A	8.4	A	Signal	9.3	A	148.1	**F**	0.6 / 139.7	**Yes**
73: Park Boulevard & G Street	Signal	10.4	B	12.0	B	Signal	9.2	A	123.0	**F**	-1.2 / 111.0	**Yes**
74: 13th Street & G Street	Signal	6.5	A	20.3	C	Signal	58.8	E	367.2	**F**	52.3 / 346.9	**Yes**
75: 14th Street & G Street	Signal	7.6	A	6.5	A	Signal	10.8	B	297.6	**F**	3.2 / 291.1	**Yes**

Table 6-7 Alternative 2 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 2					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
76: 16th Street & G Street	Signal	8.6	A	20.5	C	Signal	13.8	B	287.2	**F**	5.2 / 266.7	**Yes**
77: 17th Street & G Street	SSSC	22.1	C	OVRFL	**F**	SSSC	262.1	**F**	OVRFL	**F**	240.0 / OVRFL	**Yes**
78: Pacific Highway & Market Street	Signal	31.5	C	23.6	C	Signal	28.0	C	34.5	C	-3.5 / 10.9	No
79: Front Street & Market Street	Signal	6.1	A	8.7	A	Signal	8.4	A	8.3	A	2.3 / -0.4	No
80: First Avenue & Market Street	Signal	10.9	B	8.5	A	Signal	19.1	B	14.7	B	8.2 / 6.2	No
81: Fourth Avenue & Market Street	Signal	13.6	B	24.5	C	Signal	19.9	B	19.8	B	6.3 / -4.7	No
82: Fifth Avenue & Market Street	Signal	29.8	C	29.0	C	Signal	112.2	**F**	84.5	**F**	82.4 / 55.5	No
83: Sixth Avenue & Market Street	Signal	6.3	A	12.8	B	Signal	15.5	B	16.6	B	9.2 / 3.8	No
84: Eighth Street & Market Street	Signal	8.7	A	8.4	A	Signal	24.4	C	43.9	D	15.7 / 35.5	No
85: Tenth Avenue & Market Street	Signal	26.1	C	6.4	A	Signal	23.4	C	16.1	B	-2.7 / 9.7	No
86: Eleventh Avenue & Market Street	Signal	14.4	B	11.7	B	Signal	127.5	**F**	90.7	**F**	113.1 / 79.0	**Yes**
87: 16th Street & Market Street	Signal	11.5	B	15.2	B	Signal	45.3	D	57.3	E	33.8 / 42.1	No
88: 19th Street & Market Street	Signal	15.9	B	17.7	B	Signal	16.3	B	18.2	B	0.4 / 0.5	No
89: Eighth Street & Island Avenue	AWSC	7.8	A	8.3	A	AWSC	8.9	A	11.7	B	1.1 / 3.4	No
90: 13th Street & Island Avenue	AWSC	8.0	A	7.7	A	AWSC	9.0	A	8.4	A	1.0 / 0.7	No
91: 16th Street & Island Avenue	AWSC	8.9	A	11.4	B	AWSC	15.2	C	89.1	**F**	6.3 / 77.7	**Yes**
92: J Street & Eighth Street	AWSC	7.5	A	8.3	A	AWSC	8.7	A	14.1	B	1.2 / 5.8	No
93: Tenth Avenue & J Street	Signal	10.0	B	10.1	B	Signal	17.7	B	17.1	B	7.7 / 7.0	No
94: Eleventh Avenue & J Street	Signal	8.2	A	9.0	A	Signal	13.7	B	20.0	C	5.5 / 11.0	No
95: 13th Street & J Street	AWSC	7.6	A	7.9	A	AWSC	9.5	A	10.0	B	1.9 / 2.1	No
96: 17th Street & J Street	Signal	9.8	A	8.5	A	Signal	13.0	B	16.5	B	3.2 / 8.0	No
97: 19th Street & J Street	AWSC	11.1	B	119.6	**F**	AWSC	16.3	C	140.5	**F**	5.2 / 20.9	**Yes**
98: 13th Street & K Street	AWSC	6.4	A	6.7	A	AWSC	6.9	A	7.0	A	0.5 / 0.3	No
99: 14th Street & K Street	SSSC	10.3	B	10.1	B	SSSC	13.8	B	15.3	C	3.5 / 5.2	No
100: 16th Street & K Street	SSSC	9.9	A	12.2	B	SSSC	21.4	C	46.7	E	11.5 / 34.5	No
101: 16th Street & L Street	N/A	Does Not Exist				SSSC	14.8	B	21.8	C	14.8 / 21.8	No
102: Harbor Drive & Fifth Avenue	Signal	15.0	B	25.7	C	Signal	21.3	C	24.6	C	6.3 / -1.1	No

Table 6-7 Alternative 2 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 2					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
103: 13th Street & Imperial Avenue	Signal	3.4	A	3.9	A	Signal	4.3	A	6.1	A	0.9 / 2.2	No
104: Imperial Avenue & 16th Street	Signal	12.8	B	13.9	B	Signal	22.1	C	79.7	E	9.3 / 65.8	No
105: Imperial Avenue & 17th Street	Signal	11.7	B	10.8	B	Signal	14.0	B	10.6	B	2.3 / -0.2	No
106: Imperial Avenue & 19th Street	Signal	14.7	B	16.4	B	Signal	23.3	C	22.0	C	8.6 / 5.6	No
107: Logan Avenue & I-5 SB Off-Ramp	AWSC	11.4	B	14.2	B	AWSC	12.9	B	62.2	**F**	1.5 / 48.0	**Yes**

Source: Chen Ryan Associates; December 2015

Notes:
Bold letter indicates unacceptable LOS F.
OWSC = One-way stop controlled.
SSSC = Side Street stop controlled.
AWSC = All-way stop controlled.
For one or two-way stop controlled intersections, the delay shown is the worst delay experienced by any of the approaches.
N/A = Not applicable.
SI? = Significant Impact?
OVRFL = Actual intersection delay exceeds the calculation thresholds allowed in the traffic analysis software.

Significant Impacts and Mitigation Measures

This section identifies recommended mitigation measures for intersection that would be significantly impacted by the Alternative 2.

Feasible mitigation

- *Int 8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix Q.
- *Int 17: Second Avenue & Cedar Street* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix Q.
- *Int 24: Fourth Avenue & Beech Street* – Convert on-street parking to a travel lane on Fourth Avenue between Cedar Street and Ash Street during the AM peak hour.
- *Int 35: First Avenue & A Street* – Restrict on-street parking and add an eastbound left-turn lane.
- *Int 43: 17th Street & B Street* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix Q.
- *Int 61: 16th Street & E Street* – Restrict on-street parking and add a northbound right-turn lane.
- *Int 72: Eleventh Avenue & G Street* - Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.
- *Int 73: Park Boulevard & G Street* - Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.
- *Int 91: 16th Street & Island Avenue* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix Q.
- *Int 97: 19th Street & J Street* – Restripe the northbound left-turn lane into a northbound left-turn and through shared lane.

- *Int 107: Logan Avenue & I-5 SB Off-Ramp* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix Q.

Partial Mitigation

The following intersections are currently built to the limits of the existing right-of-way. Full mitigation of the potential traffic impacts associated with Alternative 2 would require Intersection widening to provide additional lanes. Sidewalks or bicycle facilities would need to be removed or reduced in width, which would result in impacts to non-vehicular modes of travel (pedestrians and bicyclists). Planning and environmental laws recognize the importance of planning for all modes of transportation, which provide for the needs of all users including pedestrians, bicyclists, transit riders, and motorists. (See AB 1358 [2008] and SB 375 [2008].) As such, full mitigation measures identified below are considered infeasible due to policy considerations. Another option for intersection widening would involve the expansion of current right-of-way through additional property acquisition. Property acquisitions, however, are considered environmentally, financially, and socially infeasible. In many cases, property acquisitions would require demolition of existing buildings which would generate additional environmental impacts associated with air quality, noise, GHGs, solid waste, and traffic as well as continuing to promote vehicular usage. Full mitigation measures identified below are considered infeasible at these six (6) study area intersection and are provided only for informational purposes only. Feasible partial mitigation are also provided at these locations, however, impact associated with the Preferred Alternative would remain significant and unavoidable.

- *Int 22: Front Street & Beech Street*

  Full mitigation: Convert on-street parking to a travel lane on Front Street between Cedar Street and Ash Street during the PM peak hour, as well as construct an additional westbound right-turn lane at the Beech Street approach which would require street widening.

  Partial mitigation: Convert on-street parking to a travel lane on Front Street between Cedar Street and Ash Street during the PM peak hour.

- *Int 64: 15th Street & F Street*

  Full mitigation: Signalization as well as construct an additional westbound through lane at the F Street approach which would require street widening. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix Q.

  Partial mitigation: Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix Q.

- *Int 74: 13th Street & G Street*

  Full mitigation: Convert the current eastbound left-turn and through shared lane to a dedicated left-turn lane and construct one additional eastbound through lanes at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

  Partial mitigation: Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

- *Int 75: 14th Street & G Street*

  Full mitigation: Construct an additional eastbound through lane at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

  Partial mitigation: Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

- *Int 76: 16th Street & G Street*

  Full mitigation: Construct an additional eastbound through lane at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

  Partial mitigation: Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

- *Int 77: 17th Street & G Street*

  Full mitigation: Signalization and construct an additional eastbound through lane at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix Q.

  Partial mitigation: Signalization and convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix Q.

Infeasible mitigation

The following intersections are also currently built to the limits of the existing right-of-way. Intersection widening to provide additional lanes would be required to mitigate Alternative 2 impact to these intersections. Sidewalks or bicycle facilities would need to be removed or reduced in width, which would result in impacts to non-vehicular modes of travel (pedestrians and bicyclists). Planning and environmental laws recognize the importance of planning for all modes of transportation, which provide for the needs of all users including pedestrians, bicyclists, transit riders, and motorists. (See AB 1358 [2008] and SB 375 [2008].) As such, the mitigation measures identified below are considered infeasible due to policy considerations. Another option for intersection widening would involve the expansion of current right-of-way through additional property acquisition. Property acquisitions, however, are considered environmentally, financially, and socially infeasible. In many cases, property acquisitions would require demolition of existing buildings which would generate additional environmental impacts associated with air quality, noise, GHGs, solid waste, and traffic as well as continuing to promote vehicular usage. For these reasons, mitigation measures identified below are considered infeasible and are provided only for informational purposes. Potential traffic impacts associated with Alternative 2 impact to these nine (9) study area intersections would remain significant and unavoidable.

- *Int 1: Pacific Highway & Laurel Street* – Construct an additional eastbound left-turn lane and an additional westbound left-turn lane at the Laurel Street approach, and construct an additional northbound left-turn lane at the Pacific Highway approach, both of which would require street widening.
- *Int 23: First Avenue & Beech Street* – Convert on-street parking to a travel lane on First Avenue between Cedar Street and Ash Street during the PM peak hour which would require on-street parking removal. Construct an additional eastbound left-turn lane at the Beech Street approach, which would require street widening.
- *Int 46: 16th Street & C Street* – Construct an additional eastbound through lane at the C Street approach, and construct an additional southbound left-turn lane at the 16th Street approach, both of which would require street widening.
- *Int 51: Front Street & Broadway* – Construct an additional eastbound right-through lane, an eastbound right-turn lane, and an additional westbound left-turn lane at the Broadway approach which would require street widening.
- *Int 52: First Avenue & Broadway* – Construct an additional westbound right-turn lane, and an additional eastbound through-right lane at the Broadway approach which would require street widening.
- *Int 59: Eleventh Avenue & Broadway* – Construct an additional northbound through lane at the Eleventh Avenue approach which would require street widening.
- *Int 65: 16th Street & F Street* – Construct an exclusive northbound right-turn lane at the 16^{th} Street approach which would require street widening.

- *Int 82: Fifth Avenue & Market Street* – Construction an additional eastbound through lane and westbound through lane at the Market Street approach which would require street widening.

- *Int 86: Eleventh Avenue & Market Street* – Construct an exclusive northbound right-turn lane at the Eleventh Avenue approach which would require street widening.

Table 6-8 displays Level of Service analysis results for the mitigated intersections under Alternative 2. Calculation worksheets for the intersection analysis are provided in Appendix Q. As shown, the recommended mitigation measures would fully mitigate Alternative 2 impacts on eleven (11), partially mitigated the Alternative 2 impacts on six (6) intersections, and the remaining nine (9) intersections would remain significantly impacted and unmitigated.

Table 6-8 Alternative 2 Intersection Peak Hour Level of Service with Mitigation

Intersection	Alternative 2 (Pre-Mitigation)				Alternative 2 (Post-Mitigation)				Change in Delay (sec.) (AM/PM)	Mitigated?
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street	71.9	**F**	462.1	**F**	6.6	A	42.9	D	-65.3 / -419.2	Yes
17: Second Avenue & Cedar Street	530.3	**F**	21.6	C	68.7	E	16.6	B	-461.6 / -5.0	Yes
22: Front Street & Beech Street	162.6	**F**	18.1	B	93.9	**F**	18.1	B	-68.7 / 0.0	**Partial**
24: Fourth Avenue & Beech Street	139.5	**F**	44.2	D	30.1	C	44.2	D	-109.4 / 0.0	Yes
35: First Avenue & A Street	9.7	A	92.3	**F**	12.5	B	69.2	E	2.8 / -23.1	Yes
43: 17th Street & B Street	252.6	**F**	36.2	E	33.0	C	15.8	B	-219.6 / -20.4	Yes
61: 16th Street & E Street	259.8	**F**	82.7	**F**	65.3	E	52.2	D	-194.5 / -30.5	Yes
64: 15th Street & F Street	OVRFL	**F**	551.5	**F**	151.1	**F**	10.9	B	OVRFL / -540.6	**Partial**
72: Eleventh Avenue & G Street	9.3	A	148.1	**F**	9.3	A	73.5	E	0.0 / -74.6	Yes
73: Park Boulevard & G Street	9.2	A	123.0	**F**	9.2	A	11.8	B	0.0 / -111.2	Yes
74: 13th Street & G Street	58.8	E	367.2	**F**	21.1	C	159.0	**F**	-37.7 / -208.2	**Partial**
75: 14th Street & G Street	10.8	B	297.6	**F**	11.0	B	152.0	**F**	0.2 / -145.6	**Partial**
76: 16th Street & G Street	13.8	B	287.2	**F**	12.2	B	164.2	**F**	-1.6 / -123.0	**Partial**
77: 17th Street & G Street	262.1	**F**	OVRFL	**F**	14.6	B	99.5	**F**	-247.5 / OVRFL	**Partial**
91: 16th Street & Island Avenue	15.2	C	89.1	**F**	12.9	B	21.9	C	-2.3 / -67.2	Yes
97: 19th Street & J Street	16.3	C	140.5	**F**	32.7	D	45.5	E	16.4 / -95.0	Yes
107: Logan Avenue & I-5 SB Off-Ramp	12.9	B	62.2	**F**	20.8	C	36.8	D	7.9 / -25.4	Yes

Source: Chen Ryan Associates; December 2015

Notes:
Bold letter indicates unacceptable LOS F.
OVRFL = Actual intersection delay exceeds the calculation thresholds allowed in the traffic analysis software.

Alternative 3

Alternative 3 closes Broadway to vehicular traffic, allowing for a dedicated transit-only lane and a one-way cycle track in each direction. Market Street is maintained as a 4-lane roadway to accommodate the vehicular traffic routed away from Broadway.

Table 6-9 displays Alternative 3 LOS results for key study intersections located within the project area. LOS analyses were conducted using the methodologies described in Chapter 2. Intersection LOS calculation worksheets are provided in **Appendix R**. As shown, the following twenty-seven (27) study area intersections are projected to operate at LOS F during the AM and/or PM peak hour:

1: Pacific Highway & Laurel Street
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street
17: Second Avenue & Cedar Street
22: Front Street & Beech Street
23: First Avenue & Beech Street
24: Fourth Avenue & Beech Street
35: First Avenue & A Street
43: 17th Street & B Street
46: 16th Street & C Street
51: Front Street & Broadway
52: First Avenue & Broadway
59: Eleventh Avenue & Broadway
61: 16th Street & E Street
63: Eleventh Avenue &F Street
64: 15th Street & F Street
65: 16th Street & F Street
72: Eleventh Avenue & G Street
73: Park Boulevard & G Street
74: 13th Street & G Street
75: 14th Street & G Street
76: 16th Street & G Street
77: 17th Street & G Street
86: Eleventh Avenue & Market Street
91: 16th Street & Island Avenue
97: 19th Street & J Street
104: Imperial Avenue & 16th Street
107: Logan Avenue & I-5 SB Off-Ramp

Based upon the impact significance criteria presented in Section 2.2, Alternative 3 would have a significant cumulative traffic impacts at all of the twenty-seven (27) study area intersections listed above.

Table 6-9 Alternative 3 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 3					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
1: Pacific Highway & Laurel Street	Signal	47.6	D	54.7	D	Signal	101.9	**F**	143.5	**F**	54.3 / 88.8	**Yes**
2: Harbor Drive & Hawthorn Street	Signal	17.6	B	9.4	A	Signal	54.5	D	29.5	C	36.9 / 20.1	No
3: Pacific Highway & Hawthorn Street	Signal	16.3	B	19.9	B	Signal	34.8	C	24.8	C	18.5 / 4.9	No
4: Kettner Boulevard & Hawthorn Street	Signal	18.0	B	11.3	B	Signal	26.0	C	11.7	B	8.0 / 0.4	No
5: India Street & Hawthorn Street	Signal	25.9	C	9.2	A	Signal	24.8	C	8.5	A	-1.1 / -0.7	No
6: Columbia Street & Hawthorn Street	Signal	9.6	A	8.9	A	Signal	13.6	B	7.1	A	4.0 / -1.8	No
7: Hawthorn Street & State Street	Signal	9.5	A	8.9	A	Signal	51.1	D	13.9	B	41.6 / 5.0	No
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street	SSSC	14.6	B	25.4	D	SSSC	71.9	**F**	462.1	**F**	57.3 / 436.7	**Yes**
9: Harbor Drive & Grape St	Signal	18.9	B	12.3	B	Signal	20.0	B	72.3	E	1.1 / 60.0	No
10: Columbia Street & Grape Street	Signal	17.8	B	27.5	C	Signal	31.3	C	21.1	C	13.5 / -6.4	No
11: State St & Grape Street/Grape St/I-5 SB On Ramp	Signal	10.6	B	55.2	E	Signal	14.6	B	26.6	C	4.0 / -28.6	No
12: First Avenue & I-5 NB On-Ramp/Elm Street	Signal	17.5	B	27.1	C	Signal	6.2	A	6.9	A	-11.3 / -20.2	No
13: Sixth Avenue & Elm Street/I-5 NB Off-Ramp	Signal	13.0	B	10.3	B	Signal	15.6	B	8.5	A	2.6 / -1.8	No
14: Park Boulevard & 163 NB On Ramp	SSSC	No Conflicting Movements				SSSC	No Conflicting Movements				N/A	No
15: Front Street & Cedar Street	Signal	18.5	B	14.2	B	Signal	28.4	C	17.8	B	9.9 / 3.6	No
16: First Avenue & Cedar Street	Signal	22.5	C	17.7	B	Signal	5.7	A	9.0	A	-16.8 / -8.7	No
17: Second Avenue & Cedar Street	SSSC	58.9	**F**	14.7	B	SSSC	530.3	**F**	21.6	C	471.4 / 6.9	**Yes**
18: Fourth Avenue & Cedar Street	Signal	13.7	B	13.7	B	Signal	68.3	E	58.7	E	54.6 / 45.0	No
19: Fifth Avenue & Cedar Street	Signal	15.3	B	20.8	C	Signal	20.5	C	19.2	B	5.2 / -1.6	No
20: Sixth Avenue & Cedar Street	Signal	13.8	B	16.0	B	Signal	63.3	E	19.5	B	49.5 / 3.5	No
21: Park Boulevard & I-5 SB Off Ramps	Signal	19.5	B	18.7	B	Signal	27.1	C	24.4	C	7.6 / 5.7	No
22: Front Street & Beech Street	Signal	6.9	A	13.4	B	Signal	162.6	**F**	18.2	B	155.7 / 4.8	**Yes**

Table 6-9 Alternative 3 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 3					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
23: First Avenue & Beech Street	Signal	28.3	C	16.8	B	Signal	29.2	C	149.5	**F**	0.9 / 132.7	**Yes**
24: Fourth Avenue & Beech Street	Signal	13.3	B	16.1	B	Signal	204.1	**F**	44.2	D	190.8 / 28.1	**Yes**
25: Fifth Avenue & Beech Street	Signal	11.8	B	16.7	B	Signal	17.1	B	40.1	D	5.3 / 23.4	No
26: Sixth Avenue & Beech Street	Signal	23.4	C	7.8	A	Signal	27.2	C	12.8	B	3.8 / 5.0	No
27: Harbor Drive & Ash Street	Signal	32.7	C	13.4	B	Signal	45.9	D	52.9	D	13.2 / 39.5	No
28: Pacific Highway & Ash Street	Signal	59.1	E	26.2	C	Signal	80.1	**F**	50.2	D	21.0 / 24.0	No
29: Front Street & Ash Street	Signal	13.1	B	5.3	A	Signal	32.0	C	3.3	A	18.9 / -2.0	No
30: First Avenue & Ash Street	Signal	14.8	B	12.6	B	Signal	14.7	B	14.1	B	-0.1 / 1.5	No
31: Sixth Avenue & Ash Street	Signal	8.8	A	6.5	A	Signal	17.1	B	18.7	B	8.3 / 12.2	No
32: Seventh Avenue & Ash Street	Signal	8.0	A	10.5	B	Signal	13.5	B	13.0	B	5.5 / 2.5	No
33: Ninth Street & Ash Street	Signal	11.9	B	14.4	B	Signal	14.4	B	13.0	B	2.5 / -1.4	No
34: Front Street & A Street	Signal	11.0	B	16.1	B	Signal	13.6	B	58.7	E	2.6 / 42.6	No
35: First Avenue & A Street	Signal	11.8	B	12.9	B	Signal	8.9	A	93.0	**F**	-2.9 / 80.1	**Yes**
36: Eighth Street & A Street	Signal	11.5	B	12.0	B	Signal	14.8	B	20.1	C	3.3 / 8.1	No
37: Ninth Street & A Street	Signal	17.2	B	5.1	A	Signal	15.1	B	10.8	B	-2.1 / 5.7	No
38: Tenth Avenue & A Street	Signal	19.6	B	16.1	B	Signal	24.6	C	44.5	D	5.0 / 28.4	No
39: Eleventh Avenue & A Street	Signal	14.8	B	12.9	B	Signal	20.1	C	71.1	E	5.3 / 58.2	No
40: Kettner Boulevard & B Street	Signal	9.1	A	9.3	A	Signal	10.9	B	10.4	B	1.8 / 1.1	No
41: Ninth Street & B Street	Signal	16.3	B	13.6	B	Signal	44.3	D	15.2	B	28.0 / 1.6	No
42: 16th Street & B Street	Signal	17.8	B	15.4	B	Signal	53.9	D	20.1	C	36.1 / 4.7	No
43: 17th Street & B Street	SSSC	93.5	**F**	14.5	B	SSSC	252.6	**F**	36.2	E	159.1 / 21.7	**Yes**
44: 19th Street/Pershing Drive / I-5 NB On-Ramp & B Street	Signal	11.1	B	10.1	B	Signal	35.4	D	13.7	B	24.3 / 3.6	No
45: 15th Street & C Street	SSSC	10.1	B	13.1	B	SSSC	12.9	B	35.7	E	2.8 / 22.6	No
46: 16th Street & C Street	Signal	16.3	B	17.5	B	Signal	106.0	**F**	124.7	**F**	89.7 / 107.2	**Yes**
47: 17th Street & C Street	SSSC	10.9	B	15.6	C	SSSC	15.2	C	33.0	D	4.3 / 17.4	No
48: Pacific Highway & Broadway	Signal	23.9	C	25.6	C	Signal	31.9	C	38.8	D	8.0 / 13.2	No

Table 6-9 Alternative 3 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 3					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
49: State Street & Broadway	Signal	9.8	A	7.0	A	Signal	56.8	E	36.9	D	47.0 / 29.9	No
50: Broadway & Union Street	Signal	4.1	A	5.9	A	Signal	16.5	B	14.4	B	12.4 / 8.5	No
51: Front Street & Broadway	Signal	13.4	B	105.8	**F**	Signal	59.6	E	153.4	**F**	46.2 / 47.6	**Yes**
52: First Avenue & Broadway	Signal	22.5	C	20.1	C	Signal	77.2	E	98.9	**F**	54.7 / 78.8	**Yes**
53: Fourth Avenue & Broadway	Signal	9.6	A	12.0	B	Signal	19.0	B	21.9	C	9.4 / 9.9	No
54: Fifth Avenue & Broadway	Signal	14.8	B	14.8	B	Signal	15.9	B	15.2	B	1.1 / 0.4	No
55: Sixth Avenue & Broadway	Signal	7.3	A	9.1	A	Signal	13.8	B	18.0	B	6.5 / 8.9	No
56: Eighth Street & Broadway	Signal	11.8	B	8.4	A	Signal	10.5	B	14.9	B	-1.3 / 6.5	No
57: Ninth Street & Broadway	Signal	11.1	B	11.6	B	Signal	18.2	B	18.5	B	7.1 / 6.9	No
58: Tenth Avenue & Broadway	Signal	16.2	B	15.3	B	Signal	18.4	B	12.7	B	2.2 / -2.6	No
59: Eleventh Avenue & Broadway	Signal	9.4	A	22.0	C	Signal	72.2	E	217.0	**F**	62.8 / 195.0	**Yes**
60: 14th Street & Broadway	Signal	12.0	B	12.9	B	Signal	44.2	D	24.5	C	32.2 / 11.6	No
61: 16th Street & E Street	Signal	116.8	**F**	17.5	B	Signal	259.7	**F**	82.7	**F**	142.9 / 65.2	**Yes**
62: Tenth Avenue & F Street	Signal	11.0	B	12.3	B	Signal	16.9	B	23.7	C	5.9 / 11.4	No
63: Eleventh Avenue & F Street	Signal	12.8	B	9.8	A	Signal	103.0	**F**	40.7	D	90.2 / 30.9	No
64: 15th Street & F Street	SSSC	13.3	B	58.0	**F**	SSSC	OVRFL	**F**	551.5	**F**	OVRFL / 493.5	**Yes**
65: 16th Street & F Street	Signal	19.8	B	12.2	B	Signal	153.5	**F**	48.6	D	133.7 / 36.4	**Yes**
66: State Street & G Street	Signal	17.4	B	18.5	B	Signal	17.5	B	18.2	B	0.1 / -0.3	No
67: Union Street/Union St & G Street	AWSC	8.0	A	11.5	B	AWSC	8.1	A	10.9	B	0.1 / -0.6	No
68: Front Street & G Street	Signal	17.5	B	22.1	C	Signal	10.0	B	16.9	B	-7.5 / -5.2	No
69: First Avenue & G Street	Signal	11.4	B	16.7	B	Signal	12.0	B	14.0	B	0.6 / -2.7	No
70: Eighth Street & G Street	Signal	11.6	B	16.3	B	Signal	13.7	B	28.8	C	2.1 / 12.5	No
71: Tenth Avenue & G Street	Signal	18.0	B	14.6	B	Signal	13.3	B	18.7	B	-4.7 / 4.1	No
72: Eleventh Avenue & G Street	Signal	8.7	A	8.4	A	Signal	11.1	B	148.7	**F**	2.4 / 140.3	**Yes**
73: Park Boulevard & G Street	Signal	10.4	B	12.0	B	Signal	9.1	A	123.0	**F**	-1.3 / 111.0	**Yes**
74: 13th Street & G Street	Signal	6.5	A	20.3	C	Signal	67.9	E	357.6	**F**	61.4 / 337.3	**Yes**
75: 14th Street & G Street	Signal	7.6	A	6.5	A	Signal	11.2	B	297.6	**F**	3.6 / 291.1	**Yes**

Table 6-9 Alternative 3 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 3					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
76: 16th Street & G Street	Signal	8.6	A	20.5	C	Signal	11.9	B	287.2	**F**	3.3 / 266.7	**Yes**
77: 17th Street & G Street	SSSC	22.1	C	OVRFL	**F**	SSSC	262.1	**F**	OVRFL	**F**	240.0 / OVRFL	**Yes**
78: Pacific Highway & Market Street	Signal	31.5	C	23.6	C	Signal	22.8	C	25.9	C	-8.7 / 2.3	No
79: Front Street & Market Street	Signal	6.1	A	8.7	A	Signal	8.9	A	6.1	A	2.8 / -2.6	No
80: First Avenue & Market Street	Signal	10.9	B	8.5	A	Signal	20.1	C	19.4	B	9.2 / 10.9	No
81: Fourth Avenue & Market Street	Signal	13.6	B	24.5	C	Signal	14.4	B	23.1	C	0.8 / -1.4	No
82: Fifth Avenue & Market Street	Signal	29.8	C	29.0	C	Signal	41.1	D	73.2	E	11.3 / 44.2	No
83: Sixth Avenue & Market Street	Signal	6.3	A	12.8	B	Signal	10.9	B	27.2	C	4.6 / 14.4	No
84: Eighth Street & Market Street	Signal	8.7	A	8.4	A	Signal	16.1	B	34.1	C	7.4 / 25.7	No
85: Tenth Avenue & Market Street	Signal	26.1	C	6.4	A	Signal	25.3	C	12.6	B	-0.8 / 6.2	No
86: Eleventh Avenue & Market Street	Signal	14.4	B	11.7	B	Signal	48.6	D	80.8	**F**	34.2 / 69.1	**Yes**
87: 16th Street & Market Street	Signal	11.5	B	15.2	B	Signal	16.7	B	35.2	D	5.2 / 20.0	No
88: 19th Street & Market Street	Signal	15.9	B	17.7	B	Signal	16.4	B	22.2	C	0.5 / 4.5	No
89: Eighth Street & Island Avenue	AWSC	7.8	A	8.3	A	AWSC	8.9	A	11.7	B	1.1 / 3.4	No
90: 13th Street & Island Avenue	AWSC	8.0	A	7.7	A	AWSC	9.0	A	8.4	A	1.0 / 0.7	No
91: 16th Street & Island Avenue	AWSC	8.9	A	11.4	B	AWSC	15.2	C	89.1	**F**	6.3 / 77.7	**Yes**
92: J Street & Eighth Street	AWSC	7.5	A	8.3	A	AWSC	8.7	A	14.1	B	1.2 / 5.8	No
93: Tenth Avenue & J Street	Signal	10.0	B	10.1	B	Signal	17.7	B	17.1	B	7.7 / 7.0	No
94: Eleventh Avenue & J Street	Signal	8.2	A	9.0	A	Signal	13.7	B	20.0	C	5.5 / 11.0	No
95: 13th Street & J Street	AWSC	7.6	A	7.9	A	AWSC	9.5	A	10.0	B	1.9 / 2.1	No
96: 17th Street & J Street	Signal	9.8	A	8.5	A	Signal	13.0	B	16.5	B	3.2 / 8.0	No
97: 19th Street & J Street	AWSC	11.1	B	119.6	F	AWSC	16.3	C	140.5	**F**	5.2 / 20.9	**Yes**
98: 13th Street & K Street	AWSC	6.4	A	6.7	A	AWSC	6.9	A	7.0	A	0.5 / 0.3	No
99: 14th Street & K Street	SSSC	10.3	B	10.1	B	SSSC	13.8	B	15.3	C	3.5 / 5.2	No
100: 16th Street & K Street	SSSC	9.9	A	12.2	B	SSSC	21.4	C	46.7	E	11.5 / 34.5	No
101: 16th Street & L Street	N/A	Does Not Exist				SSSC	14.8	B	21.8	C	14.8 / 21.8	No
102: Harbor Drive & Fifth Avenue	Signal	15.0	B	25.7	C	Signal	21.3	C	24.6	C	6.3 / -1.1	No

Table 6-9 Alternative 3 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 3					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
103: 13th Street & Imperial Avenue	Signal	3.4	A	3.9	A	Signal	4.3	A	6.1	A	0.9 / 2.2	No
104: Imperial Avenue & 16th Street	Signal	12.8	B	13.9	B	Signal	22.1	C	79.7	E	9.3 / 65.8	No
105: Imperial Avenue & 17th Street	Signal	11.7	B	10.8	B	Signal	14.0	B	10.6	B	2.3 / -0.2	No
106: Imperial Avenue & 19th Street	Signal	14.7	B	16.4	B	Signal	23.3	C	22.0	C	8.6 / 5.6	No
107: Logan Avenue & I-5 SB Off-Ramp	AWSC	11.4	B	14.2	B	AWSC	12.9	B	62.2	**F**	1.5 / 48.0	**Yes**

Source: Chen Ryan Associates; December 2015

Notes:
Bold letter indicates unacceptable LOS F.
OWSC = One-way stop controlled.
SSSC = Side Street stop controlled.
AWSC = All-way stop controlled.
For one or two-way stop controlled intersections, the delay shown is the worst delay experienced by any of the approaches.
N/A = Not applicable.
SI? = Significant Impact?
OVRFL = Actual intersection delay exceeds the calculation thresholds allowed in the traffic analysis software.

Significant Impacts and Mitigation Measures

This section identifies recommended mitigation measures for intersection that would be significantly impacted by the Alternative 3.

Feasible mitigation

- *Int 8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix R.
- *Int 17: Second Avenue & Cedar Street* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix R.
- *Int 24: Fourth Avenue & Beech Street* – Convert on-street parking to a travel lane on Fourth Avenue between Cedar Street and Ash Street during the AM peak hour.
- *Int 35: First Avenue & A Street* – Restrict on-street parking and add an eastbound left-turn lane.
- *Int 43: 17th Street & B Street* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix R.
- *Int 61: 16th Street & E Street* – Restrict on-street parking and add a northbound right-turn lane.
- *Int 72: Eleventh Avenue & G Street* - Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.
- *Int 73: Park Boulevard & G Street* - Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.
- *Int 91: 16th Street & Island Avenue* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix R.
- *Int 97: 19th Street & J Street* – Restripe the northbound left-turn lane into a northbound left-turn and through shared lane.

- *Int 104: Imperial Avenue & 16th Street* – Restripe the northbound and southbound approach along 16th Street to add a northbound left-turn lane and a southbound left-turn lane.

- *Int 107: Logan Avenue & I-5 SB Off-Ramp* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix R.

Partial Mitigation

The following intersections are currently built to the limits of the existing right-of-way. Full mitigation of the potential traffic impacts associated with Alternative 3 would require Intersection widening to provide additional lanes. Sidewalks or bicycle facilities would need to be removed or reduced in width, which would result in impacts to non-vehicular modes of travel (pedestrians and bicyclists). Planning and environmental laws recognize the importance of planning for all modes of transportation, which provide for the needs of all users including pedestrians, bicyclists, transit riders, and motorists. (See AB 1358 [2008] and SB 375 [2008].) As such, full mitigation measures identified below are considered infeasible due to policy considerations. Another option for intersection widening would involve the expansion of current right-of-way through additional property acquisition. Property acquisitions, however, are considered environmentally, financially, and socially infeasible. In many cases, property acquisitions would require demolition of existing buildings which would generate additional environmental impacts associated with air quality, noise, GHGs, solid waste, and traffic as well as continuing to promote vehicular usage. Full mitigation measures identified below are considered infeasible at these six (6) study area intersection and are provided only for informational purposes only. Feasible partial mitigation are also provided at these locations, however, impact associated with the Preferred Alternative would remain significant and unavoidable.

- *Int 22: Front Street & Beech Street*

  Full mitigation: Convert on-street parking to a travel lane on Front Street between Cedar Street and Ash Street during the PM peak hour, as well as construct an additional westbound right-turn lane at the Beech Street approach which would require street widening.

  Partial mitigation: Convert on-street parking to a travel lane on Front Street between Cedar Street and Ash Street during the PM peak hour.

- *Int 64: 15th Street & F Street*

  Full mitigation: Signalization as well as construct an additional westbound through lane at the F Street approach which would require street widening. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD)*

2012 Edition Figure 4C-103 (CA), this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix R.

Partial mitigation: Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix R.

- *Int 74: 13th Street & G Street*

  Full mitigation: Convert the current eastbound left-turn and through shared lane to a dedicated left-turn lane and construct one additional eastbound through lanes at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

  Partial mitigation: Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

- *Int 75: 14th Street & G Street*

  Full mitigation: Construct an additional eastbound through lane at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

  Partial mitigation: Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

- *Int 76: 16th Street & G Street*

  Full mitigation: Construct an additional eastbound through lane at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

  Partial mitigation: Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

- *Int 77: 17th Street & G Street*

  Full mitigation: Signalization and construct an additional eastbound through lane at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix R.

  Partial mitigation: Signalization and convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices*

(MUTCD) 2012 Edition Figure 4C-103 (CA), this intersection would meet the “Peak Hour” warrant. The signal warrant worksheet for this intersection is provided in Appendix R.

<u>*Infeasible mitigation*</u>

The following intersections are also currently built to the limits of the existing right-of-way. Intersection widening to provide additional lanes would be required to mitigate Alternative 3 impact to these intersections. Sidewalks or bicycle facilities would need to be removed or reduced in width, which would result in impacts to non-vehicular modes of travel (pedestrians and bicyclists). Planning and environmental laws recognize the importance of planning for all modes of transportation, which provide for the needs of all users including pedestrians, bicyclists, transit riders, and motorists. (See AB 1358 [2008] and SB 375 [2008].) As such, the mitigation measures identified below are considered infeasible due to policy considerations. Another option for intersection widening would involve the expansion of current right-of-way through additional property acquisition. Property acquisitions, however, are considered environmentally, financially, and socially infeasible. In many cases, property acquisitions would require demolition of existing buildings which would generate additional environmental impacts associated with air quality, noise, GHGs, solid waste, and traffic as well as continuing to promote vehicular usage. For these reasons, mitigation measures identified below are considered infeasible and are provided only for informational purposes. Potential traffic impacts associated with Alternative 3 impact to these eight (8) study area intersections would remain significant and unavoidable.

- *Int 1: Pacific Highway & Laurel Street* – Construct an additional eastbound left-turn lane and an additional westbound left-turn lane at the Laurel Street approach, and construct an additional northbound left-turn lane at the Pacific Highway approach, both of which would require street widening.
- *Int 23: First Avenue & Beech Street* – Convert on-street parking to a travel lane on First Avenue between Cedar Street and Ash Street during the PM peak hour which would require on-street parking removal. Construct an additional eastbound left-turn lane at the Beech Street approach, which would require street widening.
- *Int 46: 16th Street & C Street* – Construct an additional eastbound through lane at the C Street approach, and construct an additional southbound left-turn lane at the 16th Street approach, both of which would require street widening.
- *Int 51: Front Street & Broadway* – Construct an additional eastbound right-through lane, an eastbound right-turn lane, and an additional westbound left-turn lane at the Broadway approach which would require street widening.
- *Int 52: First Avenue & Broadway* – Construct an additional westbound right-turn lane, and an additional eastbound through-right lane at the Broadway approach which would require street widening.
- *Int 59: Eleventh Avenue & Broadway* – Construct an additional northbound through lane at the Eleventh Avenue approach which would require street widening.

- *Int 65: 16th Street & F Street* – Construct an exclusive northbound right-turn lane at the 16th Street approach which would require street widening.
- *Int 86: Eleventh Avenue & Market Street* – Construct an exclusive northbound right-turn lane at the Eleventh Avenue approach which would require street widening.

Table 6-10 displays Level of Service analysis results for the mitigated intersections under Alternative 3. Calculation worksheets for the intersection analysis are provided in Appendix R. As shown, the recommended mitigation measures would fully mitigate Alternative 3 impacts on twelve (12) intersections, partially mitigated the Alternative 3 impacts on six (6) intersections, and the remaining nine (9) intersections would remain significantly impacted and unmitigated.

Table 6-10 Alternative 3 Intersection Peak Hour Level of Service with Mitigation

Intersection	Alternative 3 (Pre-Mitigation)				Alternative 3 (Post-Mitigation)				Change in Delay (sec.) (AM/PM)	Mitigated?
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street	71.9	**F**	462.1	**F**	6.6	A	42.9	D	-65.3 / -419.2	Yes
17: Second Avenue & Cedar Street	530.3	**F**	21.6	C	68.7	E	16.6	B	-461.6 / -5.0	Yes
22: Front Street & Beech Street	162.6	**F**	18.2	B	93.3	**F**	18.2	B	-69.3 / 0.0	**Partial**
24: Fourth Avenue & Beech Street	204.1	**F**	44.2	D	34.1	C	44.2	D	-170.0 / 0.0	Yes
35: First Avenue & A Street	8.9	A	93.0	**F**	13.6	B	69.3	E	4.7 / -23.7	Yes
43: 17th Street & B Street	252.6	**F**	36.2	E	33.0	C	15.8	B	-219.6 / -20.4	Yes
61: 16th Street & E Street	259.7	**F**	82.7	**F**	65.3	E	52.2	D	-194.4 / -30.5	Yes
64: 15th Street & F Street	OVRFL	**F**	551.5	**F**	151.1	**F**	10.9	B	OVRFL / -540.6	**Partial**
72: Eleventh Avenue & G Street	11.1	B	148.7	**F**	11.1	B	76.5	E	0.0 / -72.2	Yes
73: Park Boulevard & G Street	9.1	A	123.0	**F**	9.1	A	12.0	B	0.0 / -111.0	Yes
74: 13th Street & G Street	67.9	E	357.6	**F**	21.7	C	159.1	**F**	-46.2 / -198.5	**Partial**
75: 14th Street & G Street	11.2	B	297.6	**F**	11.0	B	152.0	**F**	-0.2 / -145.6	**Partial**
76: 16th Street & G Street	11.8	B	287.2	**F**	11.7	B	164.2	**F**	-0.1 / -123.0	**Partial**
77: 17th Street & G Street	262.1	**F**	OVRFL	**F**	14.6	B	99.5	**F**	-247.5 / OVRFL	**Partial**
91: 16th Street & Island Avenue	15.2	C	89.1	**F**	12.9	B	18.5	B	-2.3 / -70.6	Yes
97: 19th Street & J Street	16.3	C	140.5	**F**	32.7	D	45.5	E	16.4 / -95.0	Yes
104: Imperial Avenue & 16th Street	22.1	C	79.7	E	16.5	B	44.8	D	-5.6 / -34.9	Yes
107: Logan Avenue & I-5 SB Off-Ramp	12.9	B	62.2	**F**	20.8	C	36.8	D	7.9 / -25.4	Yes

Source: Chen Ryan Associates; December 2015

Notes:
Bold letter indicates unacceptable LOS F.
OVRFL = Actual intersection delay exceeds the calculation thresholds allowed in the traffic analysis software.

Alternative 4

Alternative 4 closes Broadway to vehicular traffic, allowing for a dedicated transit-only lane and a one-way cycle track in each direction. Additionally, Market Street becomes a 2-lane roadway and the raised median is removed, in order to accommodate a one-way cycle track on each side of the roadway.

Table 6-11 displays Alternative 4 LOS results for key study intersections located within the project area. LOS analyses were conducted using the methodologies described in Chapter 2. Intersection LOS calculation worksheets are provided in **Appendix S**. As shown, the following thirty-two (32) study area intersections are projected to operate at LOS F during the AM and/or PM peak hour:

1: Pacific Highway & Laurel Street
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street
17: Second Avenue & Cedar Street
22: Front Street & Beech Street
23: First Avenue & Beech Street
24: Fourth Avenue & Beech Street
35: First Avenue & A Street
43: 17th Street & B Street
46: 16th Street & C Street
51: Front Street & Broadway
52: First Avenue & Broadway
59: Eleventh Avenue & Broadway
61: 16th Street & E Street
63: Eleventh Avenue &F Street
64: 15th Street & F Street
65: 16th Street & F Street
72: Eleventh Avenue & G Street
73: Park Boulevard & G Street
74: 13th Street & G Street
75: 14th Street & G Street
76: 16th Street & G Street
77: 17th Street & G Street
81: Fourth Avenue & Market Street
82: Fifth Avenue & Market Street
84: Eighth Avenue & Market Street
85: Tenth Avenue & Market Street
86: Eleventh Avenue & Market Street
87: 16th Street & Market Street
91: 16th Street & Island Avenue
97: 19th Street & J Street
104: Imperial Avenue & 16th Street
107: Logan Avenue & I-5 SB Off-Ramp

Based upon the impact significance criteria presented in Section 2.2, Alternative 4 would have a significant cumulative traffic impacts at all of the thirsty-two (32) study area intersections listed above.

Table 6-11 Alternative 4 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 4					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
1: Pacific Highway & Laurel Street	Signal	47.6	D	54.7	D	Signal	101.9	**F**	143.5	**F**	54.3 / 88.8	**Yes**
2: Harbor Drive & Hawthorn Street	Signal	17.6	B	9.4	A	Signal	54.5	D	29.5	C	36.9 / 20.1	No
3: Pacific Highway & Hawthorn Street	Signal	16.3	B	19.9	B	Signal	34.8	C	24.8	C	18.5 / 4.9	No
4: Kettner Boulevard & Hawthorn Street	Signal	18.0	B	11.3	B	Signal	26.0	C	11.7	B	8.0 / 0.4	No
5: India Street & Hawthorn Street	Signal	25.9	C	9.2	A	Signal	24.8	C	8.5	A	-1.1 / -0.7	No
6: Columbia Street & Hawthorn Street	Signal	9.6	A	8.9	A	Signal	13.6	B	7.1	A	4.0 / -1.8	No
7: Hawthorn Street & State Street	Signal	9.5	A	8.9	A	Signal	51.1	D	13.9	B	41.6 / 5.0	No
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street	SSSC	14.6	B	25.4	D	SSSC	71.9	**F**	462.1	**F**	57.3 / 436.7	**Yes**
9: Harbor Drive & Grape St	Signal	18.9	B	12.3	B	Signal	20.0	B	72.3	E	1.1 / 60.0	No
10: Columbia Street & Grape Street	Signal	17.8	B	27.5	C	Signal	31.3	C	21.1	C	13.5 / -6.4	No
11: State St & Grape Street/Grape St/I-5 SB On Ramp	Signal	10.6	B	55.2	E	Signal	14.6	B	26.6	C	4.0 / -28.6	No
12: First Avenue & I-5 NB On-Ramp/Elm Street	Signal	17.5	B	27.1	C	Signal	6.2	A	6.9	A	-11.3 / -20.2	No
13: Sixth Avenue & Elm Street/I-5 NB Off-Ramp	Signal	13.0	B	10.3	B	Signal	15.6	B	8.5	A	2.6 / -1.8	No
14: Park Boulevard & 163 NB On Ramp	SSSC	No Conflicting Movements				SSSC	No Conflicting Movements				N/A	No
15: Front Street & Cedar Street	Signal	18.5	B	14.2	B	Signal	28.4	C	17.8	B	9.9 / 3.6	No
16: First Avenue & Cedar Street	Signal	22.5	C	17.7	B	Signal	5.7	A	9.0	A	-16.8 / -8.7	No
17: Second Avenue & Cedar Street	SSSC	58.9	**F**	14.7	B	SSSC	530.3	**F**	21.6	C	471.4 / 6.9	**Yes**
18: Fourth Avenue & Cedar Street	Signal	13.7	B	13.7	B	Signal	68.3	E	58.7	E	54.6 / 45.0	No
19: Fifth Avenue & Cedar Street	Signal	15.3	B	20.8	C	Signal	20.5	C	19.2	B	5.2 / -1.6	No
20: Sixth Avenue & Cedar Street	Signal	13.8	B	16.0	B	Signal	63.3	E	19.5	B	49.5 / 3.5	No
21: Park Boulevard & I-5 SB Off Ramps	Signal	19.5	B	18.7	B	Signal	27.1	C	24.4	C	7.6 / 5.7	No
22: Front Street & Beech Street	Signal	6.9	A	13.4	B	Signal	162.6	**F**	18.2	B	155.7 / 4.8	**Yes**

Table 6-11 Alternative 4 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 4					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
23: First Avenue & Beech Street	Signal	28.3	C	16.8	B	Signal	29.2	C	149.5	**F**	0.9 / 132.7	**Yes**
24: Fourth Avenue & Beech Street	Signal	13.3	B	16.1	B	Signal	204.1	**F**	44.2	D	190.8 / 28.1	**Yes**
25: Fifth Avenue & Beech Street	Signal	11.8	B	16.7	B	Signal	17.1	B	40.1	D	5.3 / 23.4	No
26: Sixth Avenue & Beech Street	Signal	23.4	C	7.8	A	Signal	27.2	C	12.8	B	3.8 / 5.0	No
27: Harbor Drive & Ash Street	Signal	32.7	C	13.4	B	Signal	45.9	D	52.9	D	13.2 / 39.5	No
28: Pacific Highway & Ash Street	Signal	59.1	E	26.2	C	Signal	80.1	**F**	50.2	D	21.0 / 24.0	No
29: Front Street & Ash Street	Signal	13.1	B	5.3	A	Signal	32.0	C	3.3	A	18.9 / -2.0	No
30: First Avenue & Ash Street	Signal	14.8	B	12.6	B	Signal	14.6	B	14.1	B	-0.2 / 1.5	No
31: Sixth Avenue & Ash Street	Signal	8.8	A	6.5	A	Signal	17.1	B	18.7	B	8.3 / 12.2	No
32: Seventh Avenue & Ash Street	Signal	8.0	A	10.5	B	Signal	13.5	B	13.0	B	5.5 / 2.5	No
33: Ninth Street & Ash Street	Signal	11.9	B	14.4	B	Signal	14.4	B	13.0	B	2.5 / -1.4	No
34: Front Street & A Street	Signal	11.0	B	16.1	B	Signal	13.6	B	58.7	E	2.6 / 42.6	No
35: First Avenue & A Street	Signal	11.8	B	12.9	B	Signal	9.1	A	93.0	**F**	-2.7 / 80.1	**Yes**
36: Eighth Street & A Street	Signal	11.5	B	12.0	B	Signal	14.8	B	20.1	C	3.3 / 8.1	No
37: Ninth Street & A Street	Signal	17.2	B	5.1	A	Signal	15.1	B	10.8	B	-2.1 / 5.7	No
38: Tenth Avenue & A Street	Signal	19.6	B	16.1	B	Signal	24.6	C	44.5	D	5.0 / 28.4	No
39: Eleventh Avenue & A Street	Signal	14.8	B	12.9	B	Signal	20.1	C	71.1	E	5.3 / 58.2	No
40: Kettner Boulevard & B Street	Signal	9.1	A	9.3	A	Signal	10.9	B	10.4	B	1.8 / 1.1	No
41: Ninth Street & B Street	Signal	16.3	B	13.6	B	Signal	44.3	D	15.2	B	28.0 / 1.6	No
42: 16th Street & B Street	Signal	17.8	B	15.4	B	Signal	53.9	D	20.1	C	36.1 / 4.7	No
43: 17th Street & B Street	SSSC	93.5	**F**	14.5	B	SSSC	252.6	**F**	36.2	E	159.1 / 21.7	**Yes**
44: 19th Street/Pershing Drive / I-5 NB On-Ramp & B Street	Signal	11.1	B	10.1	B	Signal	35.4	D	13.7	B	24.3 / 3.6	No
45: 15th Street & C Street	SSSC	10.1	B	13.1	B	SSSC	12.9	B	35.7	E	2.8 / 22.6	No
46: 16th Street & C Street	Signal	16.3	B	17.5	B	Signal	106.0	**F**	124.7	**F**	89.7 / 107.2	**Yes**
47: 17th Street & C Street	SSSC	10.9	B	15.6	C	SSSC	15.2	C	33.0	D	4.3 / 17.4	No
48: Pacific Highway & Broadway	Signal	23.9	C	25.6	C	Signal	31.9	C	38.8	D	8.0 / 13.2	No

Table 6-11 Alternative 4 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 4					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
49: State Street & Broadway	Signal	9.8	A	7.0	A	Signal	56.8	E	36.9	D	47.0 / 29.9	No
50: Broadway & Union Street	Signal	4.1	A	5.9	A	Signal	16.5	B	14.4	B	12.4 / 8.5	No
51: Front Street & Broadway	Signal	13.4	B	105.8	**F**	Signal	59.5	E	153.4	**F**	46.1 / 47.6	**Yes**
52: First Avenue & Broadway	Signal	22.5	C	20.1	C	Signal	77.4	E	98.9	**F**	54.9 / 78.8	**Yes**
53: Fourth Avenue & Broadway	Signal	9.6	A	12.0	B	Signal	19.0	B	21.9	C	9.4 / 9.9	No
54: Fifth Avenue & Broadway	Signal	14.8	B	14.8	B	Signal	15.9	B	15.2	B	1.1 / 0.4	No
55: Sixth Avenue & Broadway	Signal	7.3	A	9.1	A	Signal	13.8	B	18.0	B	6.5 / 8.9	No
56: Eighth Street & Broadway	Signal	11.8	B	8.4	A	Signal	10.5	B	14.9	B	-1.3 / 6.5	No
57: Ninth Street & Broadway	Signal	11.1	B	11.6	B	Signal	18.2	B	18.5	B	7.1 / 6.9	No
58: Tenth Avenue & Broadway	Signal	16.2	B	15.3	B	Signal	18.4	B	12.7	B	2.2 / -2.6	No
59: Eleventh Avenue & Broadway	Signal	9.4	A	22.0	C	Signal	72.2	E	217.0	**F**	62.8 / 195.0	**Yes**
60: 14th Street & Broadway	Signal	12.0	B	12.9	B	Signal	44.2	D	24.5	C	32.2 / 11.6	No
61: 16th Street & E Street	Signal	116.8	**F**	17.5	B	Signal	259.8	**F**	82.7	**F**	143.0 / 65.2	**Yes**
62: Tenth Avenue & F Street	Signal	11.0	B	12.3	B	Signal	16.9	B	23.7	C	5.9 / 11.4	No
63: Eleventh Avenue & F Street	Signal	12.8	B	9.8	A	Signal	103.0	**F**	40.7	D	90.2 / 30.9	No
64: 15th Street & F Street	SSSC	13.3	B	58.0	**F**	SSSC	OVRFL	**F**	551.5	**F**	-13.1 / 493.5	**Yes**
65: 16th Street & F Street	Signal	19.8	B	12.2	B	Signal	153.6	**F**	48.6	D	133.8 / 36.4	**Yes**
66: State Street & G Street	Signal	17.4	B	18.5	B	Signal	17.5	B	18.2	B	0.1 / -0.3	No
67: Union Street/Union St & G Street	AWSC	8.0	A	11.5	B	AWSC	8.1	A	10.9	B	0.1 / -0.6	No
68: Front Street & G Street	Signal	17.5	B	22.1	C	Signal	10.0	B	16.9	B	-7.5 / -5.2	No
69: First Avenue & G Street	Signal	11.4	B	16.7	B	Signal	11.1	B	14.0	B	-0.3 / -2.7	No
70: Eighth Street & G Street	Signal	11.6	B	16.3	B	Signal	13.5	B	28.9	C	1.9 / 12.6	No
71: Tenth Avenue & G Street	Signal	18.0	B	14.6	B	Signal	13.3	B	18.7	B	-4.7 / 4.1	No
72: Eleventh Avenue & G Street	Signal	8.7	A	8.4	A	Signal	9.5	A	148.4	**F**	0.8 / 140.0	**Yes**
73: Park Boulevard & G Street	Signal	10.4	B	12.0	B	Signal	9.1	A	123.0	**F**	-1.3 / 111.0	**Yes**
74: 13th Street & G Street	Signal	6.5	A	20.3	C	Signal	67.9	E	357.6	**F**	61.4 / 337.3	**Yes**
75: 14th Street & G Street	Signal	7.6	A	6.5	A	Signal	11.2	B	297.6	**F**	3.6 / 291.1	**Yes**

Table 6-11 Alternative 4 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 4					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
76: 16th Street & G Street	Signal	8.6	A	20.5	C	Signal	12.3	B	287.2	**F**	3.7 / 266.7	**Yes**
77: 17th Street & G Street	SSSC	22.1	C	OVRFL	**F**	SSSC	262.1	**F**	OVRFL	**F**	262.1 / OVRFL	**Yes**
78: Pacific Highway & Market Street	Signal	31.5	C	23.6	C	Signal	28.0	C	34.5	C	-3.5 / 10.9	No
79: Front Street & Market Street	Signal	6.1	A	8.7	A	Signal	9.3	A	6.8	A	3.2 / -1.9	No
80: First Avenue & Market Street	Signal	10.9	B	8.5	A	Signal	21.7	C	60.4	E	10.8 / 51.9	No
81: Fourth Avenue & Market Street	Signal	13.6	B	24.5	C	Signal	80.8	**F**	116.1	**F**	67.2 / 91.6	No
82: Fifth Avenue & Market Street	Signal	29.8	C	29.0	C	Signal	263.7	**F**	346.2	**F**	233.9 / 317.2	No
83: Sixth Avenue & Market Street	Signal	6.3	A	12.8	B	Signal	16.2	B	69.8	E	9.9 / 57.0	No
84: Eighth Street & Market Street	Signal	8.7	A	8.4	A	Signal	24.6	C	150.2	**F**	15.9 / 141.8	No
85: Tenth Avenue & Market Street	Signal	26.1	C	6.4	A	Signal	25.3	C	137.0	**F**	-0.8 / 130.6	No
86: Eleventh Avenue & Market Street	Signal	14.4	B	11.7	B	Signal	127.5	**F**	82.5	**F**	113.1 / 70.8	**Yes**
87: 16th Street & Market Street	Signal	11.5	B	15.2	B	Signal	45.3	D	181.7	**F**	33.8 / 166.5	No
88: 19th Street & Market Street	Signal	15.9	B	17.7	B	Signal	16.3	B	21.6	C	0.4 / 3.9	No
89: Eighth Street & Island Avenue	AWSC	7.8	A	8.3	A	AWSC	8.9	A	11.7	B	1.1 / 3.4	No
90: 13th Street & Island Avenue	AWSC	8.0	A	7.7	A	AWSC	9.0	A	8.4	A	1.0 / 0.7	No
91: 16th Street & Island Avenue	AWSC	8.9	A	11.4	B	AWSC	15.2	C	89.1	**F**	6.3 / 77.7	**Yes**
92: J Street & Eighth Street	AWSC	7.5	A	8.3	A	AWSC	8.7	A	14.1	B	1.2 / 5.8	No
93: Tenth Avenue & J Street	Signal	10.0	B	10.1	B	Signal	17.7	B	17.1	B	7.7 / 7.0	No
94: Eleventh Avenue & J Street	Signal	8.2	A	9.0	A	Signal	13.7	B	20.0	C	5.5 / 11.0	No
95: 13th Street & J Street	AWSC	7.6	A	7.9	A	AWSC	9.5	A	10.0	B	1.9 / 2.1	No
96: 17th Street & J Street	Signal	9.8	A	8.5	A	Signal	13.0	B	16.5	B	3.2 / 8.0	No
97: 19th Street & J Street	AWSC	11.1	B	119.6	F	AWSC	16.3	C	140.5	**F**	5.2 / 20.9	**Yes**
98: 13th Street & K Street	AWSC	6.4	A	6.7	A	AWSC	6.9	A	7.0	A	0.5 / 0.3	No
99: 14th Street & K Street	SSSC	10.3	B	10.1	B	SSSC	13.8	B	15.3	C	3.5 / 5.2	No
100: 16th Street & K Street	SSSC	9.9	A	12.2	B	SSSC	21.4	C	46.7	E	11.5 / 34.5	No
101: 16th Street & L Street	N/A	Does Not Exist				SSSC	14.8	B	21.8	C	14.8 / 21.8	No
102: Harbor Drive & Fifth Avenue	Signal	15.0	B	25.7	C	Signal	21.3	C	24.6	C	6.3 / -1.1	No

Table 6-11 Alternative 4 Intersection Peak Hour Level of Service

Intersection	Existing					Alternative 4					Change in Delay (Sec.) (AM/PM)	SI?
	Traffic Control	AM Peak Hour		PM Peak Hour		Traffic Control	AM Peak Hour		PM Peak Hour			
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
103: 13th Street & Imperial Avenue	Signal	3.4	A	3.9	A	Signal	4.3	A	6.1	A	0.9 / 2.2	No
104: Imperial Avenue & 16th Street	Signal	12.8	B	13.9	B	Signal	22.1	C	79.7	E	9.3 / 65.8	No
105: Imperial Avenue & 17th Street	Signal	11.7	B	10.8	B	Signal	14.0	B	10.6	B	2.3 / -0.2	No
106: Imperial Avenue & 19th Street	Signal	14.7	B	16.4	B	Signal	23.3	C	22.0	C	8.6 / 5.6	No
107: Logan Avenue & I-5 SB Off-Ramp	AWSC	11.4	B	14.2	B	AWSC	12.9	B	62.2	**F**	1.5 / 48.0	**Yes**

Source: Chen Ryan Associates; December 2015

Notes:
Bold letter indicates unacceptable LOS F.
OWSC = One-way stop controlled.
SSSC = Side Street stop controlled.
AWSC = All-way stop controlled.
For one or two-way stop controlled intersections, the delay shown is the worst delay experienced by any of the approaches.
N/A = Not applicable.
SI? = Significant Impact?
OVRFL = Actual intersection delay exceeds the calculation thresholds allowed in the traffic analysis software.

Significant Impacts and Mitigation Measures

This section identifies recommended mitigation measures for intersection that would be significantly impacted by the Alternative 4.

<u>*Feasible mitigation*</u>

- *Int 8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix S.
- *Int 17: Second Avenue & Cedar Street* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix S.
- *Int 24: Fourth Avenue & Beech Street* – Convert on-street parking to a travel lane on Fourth Avenue between Cedar Street and Ash Street during the AM peak hour.
- *Int 35: First Avenue & A Street* – Restrict on-street parking and add an eastbound left-turn lane.
- *Int 43: 17th Street & B Street* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix S.
- *Int 61: 16th Street & E Street* – Restrict on-street parking and add a northbound right-turn lane.
- *Int 72: Eleventh Avenue & G Street* - Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.
- *Int 73: Park Boulevard & G Street* - Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.
- *Int 91: 16th Street & Island Avenue* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix S.
- *Int 97: 19th Street & J Street* – Restripe the northbound left-turn lane into a northbound left-turn and through shared lane.

- *Int 104: Imperial Avenue & 16th Street* – Restripe the northbound and southbound approach along 16th Street to add a northbound left-turn lane and a southbound left-turn lane.

- *Int 107: Logan Avenue & I-5 SB Off-Ramp* – Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix S.

<u>*Partial Mitigation*</u>
The following intersections are currently built to the limits of the existing right-of-way. Full mitigation of the potential traffic impacts associated with the Alternative 4 would require Intersection widening to provide additional lanes. Sidewalks or bicycle facilities would need to be removed or reduced in width, which would result in impacts to non-vehicular modes of travel (pedestrians and bicyclists). Planning and environmental laws recognize the importance of planning for all modes of transportation, which provide for the needs of all users including pedestrians, bicyclists, transit riders, and motorists. (See AB 1358 [2008] and SB 375 [2008].) As such, full mitigation measures identified below are considered infeasible due to policy considerations. Another option for intersection widening would involve the expansion of current right-of-way through additional property acquisition. Property acquisitions, however, are considered environmentally, financially, and socially infeasible. In many cases, property acquisitions would require demolition of existing buildings which would generate additional environmental impacts associated with air quality, noise, GHGs, solid waste, and traffic as well as continuing to promote vehicular usage. Full mitigation measures identified below are considered infeasible at these six (6) study area intersection and are provided only for informational purposes only. Feasible partial mitigation are also provided at these locations, however, impact associated with the Preferred Alternative would remain significant and unavoidable.

- *Int 22: Front Street & Beech Street*

  <u>Full mitigation</u>: Convert on-street parking to a travel lane on Front Street between Cedar Street and Ash Street during the PM peak hour, as well as construct an additional westbound right-turn lane at the Beech Street approach which would require street widening.

  <u>Partial mitigation</u>: Convert on-street parking to a travel lane on Front Street between Cedar Street and Ash Street during the PM peak hour.

- *Int 64: 15th Street & F Street*

  <u>Full mitigation</u>: Signalization as well as construct an additional westbound through lane at the F Street approach which would require street widening. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix S.

Partial mitigation: Signalization would be required at this intersection to mitigate direct project impacts. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix S.

- *Int 74: 13th Street & G Street*

  Full mitigation: Convert the current eastbound left-turn and through shared lane to a dedicated left-turn lane and construct one additional eastbound through lanes at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

  Partial mitigation: Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

- *Int 75: 14th Street & G Street*

  Full mitigation: Construct an additional eastbound through lane at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

  Partial mitigation: Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

- *Int 76: 16th Street & G Street*

  Full mitigation: Construct an additional eastbound through lane at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

  Partial mitigation: Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour.

- *Int 77: 17th Street & G Street*

  Full mitigation: Signalization and construct an additional eastbound through lane at the G Street approach which would require street widening. Convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix S.

  Partial mitigation: Signalization and convert on-street parking to a travel lane on G Street between 11th Avenue and 17th Street during the PM peak hour. A traffic signal warrant was conducted. Based upon *California Manual of Uniformed Traffic Control Devices (MUTCD) 2012 Edition Figure 4C-103 (CA),* this intersection would meet the "Peak Hour" warrant. The signal warrant worksheet for this intersection is provided in Appendix S.

<u>Infeasible mitigation</u>

The following intersections are also currently built to the limits of the existing right-of-way. Intersection widening to provide additional lanes would be required to mitigate Alternative 4 impact to these intersections. Sidewalks or bicycle facilities would need to be removed or reduced in width, which would result in impacts to non-vehicular modes of travel (pedestrians and bicyclists). Planning and environmental laws recognize the importance of planning for all modes of transportation, which provide for the needs of all users including pedestrians, bicyclists, transit riders, and motorists. (See AB 1358 [2008] and SB 375 [2008].) As such, the mitigation measures identified below are considered infeasible due to policy considerations. Another option for intersection widening would involve the expansion of current right-of-way through additional property acquisition. Property acquisitions, however, are considered environmentally, financially, and socially infeasible. In many cases, property acquisitions would require demolition of existing buildings which would generate additional environmental impacts associated with air quality, noise, GHGs, solid waste, and traffic as well as continuing to promote vehicular usage. For these reasons, mitigation measures identified below are considered infeasible and are provided only for informational purposes. Potential traffic impacts associated with Alternative 4 impact to these fourteen (14) study area intersections would remain significant and unavoidable.

- *Int 1: Pacific Highway & Laurel Street* – Construct an additional eastbound left-turn lane and an additional westbound left-turn lane at the Laurel Street approach, and construct an additional northbound left-turn lane at the Pacific Highway approach, both of which would require street widening.
- *Int 23: First Avenue & Beech Street* – Convert on-street parking to a travel lane on First Avenue between Cedar Street and Ash Street during the PM peak hour which would require on-street parking removal. Construct an additional eastbound left-turn lane at the Beech Street approach, which would require street widening.
- *Int 46: 16th Street & C Street* – Construct an additional eastbound through lane at the C Street approach, and construct an additional southbound left-turn lane at the 16th Street approach, both of which would require street widening.
- *Int 51: Front Street & Broadway* – Construct an additional eastbound right-through lane, an eastbound right-turn lane, and an additional westbound left-turn lane at the Broadway approach which would require street widening.
- *Int 52: First Avenue & Broadway* – Construct an additional westbound right-turn lane, and an additional eastbound through-right lane at the Broadway approach which would require street widening.
- *Int 59: Eleventh Avenue & Broadway* – Construct an additional northbound through lane at the Eleventh Avenue approach which would require street widening.
- *Int 63: Eleventh Avenue & F Street* – construct an exclusive northbound left-turn lane at the Eleventh Avenue approach which would require street widening.

- *Int 65: 16th Street & F Street* – Construct an exclusive northbound right-turn lane at the 16th Street approach which would require street widening.

- *Int* 81: *Fourth Avenue & Market Street* – Construct an additional eastbound and westbound through lane at the Market Street approach which would require street widening.

- *Int 82: Fifth Avenue & Market Street* – Construct an additional eastbound and westbound through lane at the Market Street approach which would require street widening.

- *Int 84: Eighth Avenue & Market Street* - Construct an additional eastbound and westbound through lane at the Market Street approach which would require street widening.

- *Int 85: Tenth Avenue & Market Street* - Construct an additional eastbound and westbound through lane at the Market Street approach which would require street widening.

- *Int 86: Eleventh Avenue & Market Street* – Construct an exclusive northbound right-turn lane at the Eleventh Avenue approach which would require street widening.

- *Int 87: 16th Street & Market Street* - Construct an additional eastbound and westbound through lane at the Market Street approach which would require street widening.

Table 6-12 displays Level of Service analysis results for the mitigated intersections under Alternative 4. Calculation worksheets for the intersection analysis are provided in Appendix S. As shown, the recommended mitigation measures would fully mitigate Alternative 4 impacts on twelve (12) intersections, partially mitigated the Alternative 4 impacts on six (6) intersections, and the remaining fourteen (14) intersections would remain significantly impacted and unmitigated.

Table 6-12 Alternative 4 Intersection Peak Hour Level of Service with Mitigation

Intersection	Alternative 4 (Pre-Mitigation)				Alternative 4 (Post-Mitigation)				Change in Delay (sec.) (AM/PM)	Mitigated?
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS		
8: I-5 NB Off-Ramp/Brant Street & Hawthorn Street	71.9	**F**	462.1	**F**	6.6	A	42.9	D	-65.3 / -419.2	Yes
17: Second Avenue & Cedar Street	530.3	**F**	21.6	C	68.7	E	16.6	B	-461.6 / -5.0	Yes
22: Front Street & Beech Street	162.6	**F**	18.2	B	93.3	**F**	17.7	B	-69.3 / -0.5	**Partial**
24: Fourth Avenue & Beech Street	204.1	**F**	44.2	D	34.1	C	39.3	D	-170.0 / -4.9	Yes
35: First Avenue & A Street	9.1	A	93.0	**F**	13.6	B	69.3	E	4.5 / -23.7	Yes
43: 17th Street & B Street	252.6	**F**	36.2	E	33.0	C	15.8	B	-219.6 / -20.4	Yes
61: 16th Street & E Street	259.8	**F**	82.7	**F**	65.3	E	52.2	D	-194.5 / -30.5	Yes
64: 15th Street & F Street	OVRFL	**F**	551.5	**F**	151.1	**F**	10.9	B	OVRFL / -540.6	**Partial**
72: Eleventh Avenue & G Street	9.5	A	148.4	**F**	9.5	A	75.9	E	0.0 / -72.5	Yes
73: Park Boulevard & G Street	9.1	A	123.0	**F**	9.1	A	12.0	B	0.0 / -111.0	Yes
74: 13th Street & G Street	67.9	E	357.6	**F**	21.7	C	159.1	**F**	-46.2 / -198.5	**Partial**
75: 14th Street & G Street	11.2	B	297.6	**F**	11.0	B	152.0	**F**	-0.2 / -145.6	**Partial**
76: 16th Street & G Street	12.3	B	287.2	**F**	12.2	B	164.2	**F**	-0.1 / -123.0	**Partial**
77: 17th Street & G Street	262.1	**F**	OVRFL	**F**	14.6	B	99.5	**F**	-247.5 / OVRFL	**Partial**
91: 16th Street & Island Avenue	15.2	C	89.1	**F**	12.9	B	18.2	B	-2.3 / -70.9	Yes
97: 19th Street & J Street	16.3	C	140.5	**F**	32.7	D	45.5	E	16.4 / -95.0	Yes
104: Imperial Avenue & 16th Street	22.1	C	79.7	E	16.5	B	44.8	D	-5.6 / -34.9	Yes
107: Logan Avenue & I-5 SB Off-Ramp	12.9	B	62.2	**F**	20.8	C	36.8	D	7.9 / -25.4	Yes

Source: Chen Ryan Associates; December 2015

Notes:
Bold letter indicates unacceptable LOS F.
OVRFL = Actual intersection delay exceeds the calculation thresholds allowed in the traffic analysis software.