Reinvent PHX:
Third Street and Van Buren Street Pedestrian and Bicycle Improvements

FINAL Pre-Design Study

August, 2015

Prepared for:

City of Phoenix
Street Transportation Department
200 West Washington Street
Phoenix, AZ 85003

Prepared by:

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In Association with:

Corral Design Group, Inc.

EcoPlan Associates, Inc.

EcoPlan Associates, Inc.
Environmental Science & Resource Economics

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1.0 Introduction

1.1 Purpose of Study

The purpose of the Third Street and Van Buren Street Bicycle and Pedestrian Improvement Pre-Design Report is to develop a preferred alternative for the implementation of bicycle and pedestrian improvements that will add other transportation modes, increase connectivity and preserve vehicle access within the Third Street and Van Buren Street corridors. The improvements will create a bicycle and pedestrian friendly corridor along Third Street and Van Buren Street to move traffic to and from downtown.

The purpose of the pre-design study is to document the existing and future conditions within the Third Street and Van Buren Street corridors as well as describe and evaluate the proposed design alternatives for retrofitting or enhancing bicycle and pedestrian accommodations, reasons for selecting specific improvements, design criteria, cost estimates and implementation schedule.

1.2 Study Goals and Objectives

This report builds upon the efforts made by the City's Reinvent Phoenix transit oriented development planning work for the Midtown, Eastlake-Garfield and Gateway districts, the Third Street Promenade Pedestrian Improvements Study, the Van Buren Corridor Bicycle and Pedestrian Improvements Design Assistance, the City of Phoenix Complete Streets Initiative and the Comprehensive Bicycle Master Plan. The Midtown, Eastlake-Garfield and Gateway transit oriented development studies covered a larger area extending beyond the Third Street and Van Buren Street corridors. The Third Street Promenade Pedestrian Improvements Study examined the current pedestrian conditions and developed a set of guidelines that could be implemented within the public right-of-way. The Van Buren Corridor Bicycle and Pedestrian Improvements Design Assistance report focused on the next level of planning and design within the public right-of-way for Van Buren Street between 24th Street and 40th Street. The City of Phoenix Complete Streets Initiative establishes a policy recommendation to address existing and future transportation corridors by utilizing best practices, guidelines and design standards to design livable streets that accommodate all transportation modes. The Comprehensive Bicycle Master Plan identifies specific improvements and an implementation plan to expand and improve bicycle facilities within Phoenix. The goal of the Third Street and Van Buren Street Bicycle and Pedestrian Improvements project is to identify preferred design options that can be implemented in the Third Street and Van Buren Street corridors to provide bike lanes while maintaining vehicular throughput of the corridor as well as recommend pedestrian improvements. This report and the pre-design plans will be used by City staff for implementation of future improvements on both Third Street and Van Buren Street.

1.3 Study Area

The study area for the Third Street and Van Buren Street Bicycle and Pedestrian Improvement Pre-Design Report encompasses two corridors. The first corridor is along Third Street between Indian School Road and Garfield Street. The second corridor is along Van Buren Street between 7th Street and 24th Street. The Study Area for the Third Street Corridor and the Van Buren Street Corridor is depicted in **Figure 1** and **Figure 2**, respectively.

Figure 1 – Third Street Corridor Study Area

Figure 2 – Van Buren Street Corridor Study Area

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2.0 Existing Corridor Features

This section provides an overview of existing corridor features for the Third Street and Van Buren Street corridors study area. Additional information is available in the ***Final Technical Memorandum #1 – Existing and Future Conditions*** located in the **Appendix** of this report.

2.1 Review of Studies and Reports

Currently, several existing studies and reports address multi-modal transportation issues in the study area. The primary purpose of this chapter is to review these documents to recognize what planned transportation improvements are already identified as well as ascertain what issues have been ongoing concerns of residents and public officials. A secondary purpose of this review is to extract data that may be useful in conducting the technical analysis required to identify near term and long range transportation system improvements. **Table 1** provides a listing of the reports and studies that were obtained and reviewed as part of the Third Street and Van Buren Street Bicycle and Pedestrian Improvements Pre-Design Study.

Table 1 - Summary of Collected Documentation

Corridor	Report or Study	Date
Third Street	Reinvent PHX – Midtown Transit Oriented Development Policy Plan	February 2015 (DRAFT)
Third Street	Comprehensive Bicycle Master Plan	November 2014
Third Street	Phoenix Comprehensive Downtown Transportation Study	September 2014
Third Street	Third Street Promenade Pedestrian Improvements	May 2010
Van Buren Street	Reinvent PHX – Eastlake-Garfield Transit Oriented Development Policy Plan	February 2015 (DRAFT)
Van Buren Street	Reinvent PHX – Gateway Transit Oriented Development Policy Plan	February 2015 (DRAFT)
Van Buren Street	Van Buren Corridor (24th Street to 40th Street) Bicycle and Pedestrian Improvements Assistance	December 2014

2.2 Third Street Existing Conditions

The Third Street Corridor is a collector street which runs through Midtown Phoenix. It parallels the Valley Metro light rail located ¼ mile to the west along Central Avenue. It also parallels 7th Street located ¼ mile to the east that is a heavily traveled arterial. The Third Street corridor provides neighborhood connections to places such as Steele Indian School Park, St. Mary's High School, La Hacienda, Ashland Place, Alvarado, Los Olivos historic districts, Heard Museum, Phoenix Art Museum, Margaret T. Hance Park, Khalsa Primary School and numerous businesses and residences.

Over the course of the project, multiple site visits were conducted to inventory the street elements. The inventory included the existing number of lanes (**Figure 3**), posted speed limits (**Figure 4**), intersection lane configurations for the arterial and collector roadways (**Figure 5**) within the study area. The existing conditions and context for the street are summarized in **Table 2** and depicted below in the Existing Conditions Maps (**Figure 6** through **Figure 9**). Additional information is available in the ***Technical Memorandum #1: Existing and Future Conditions*** located in the **Appendix** of this report.

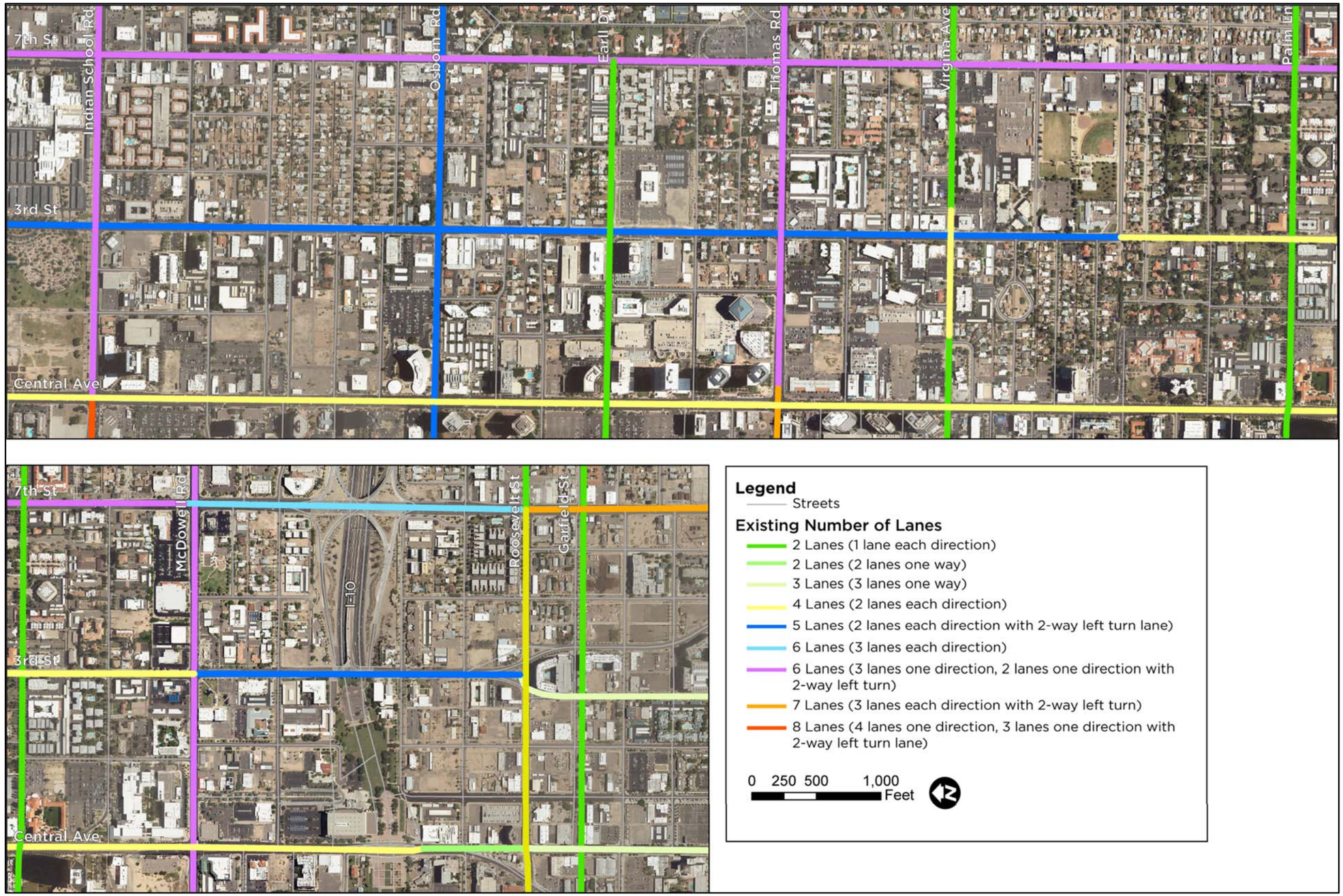
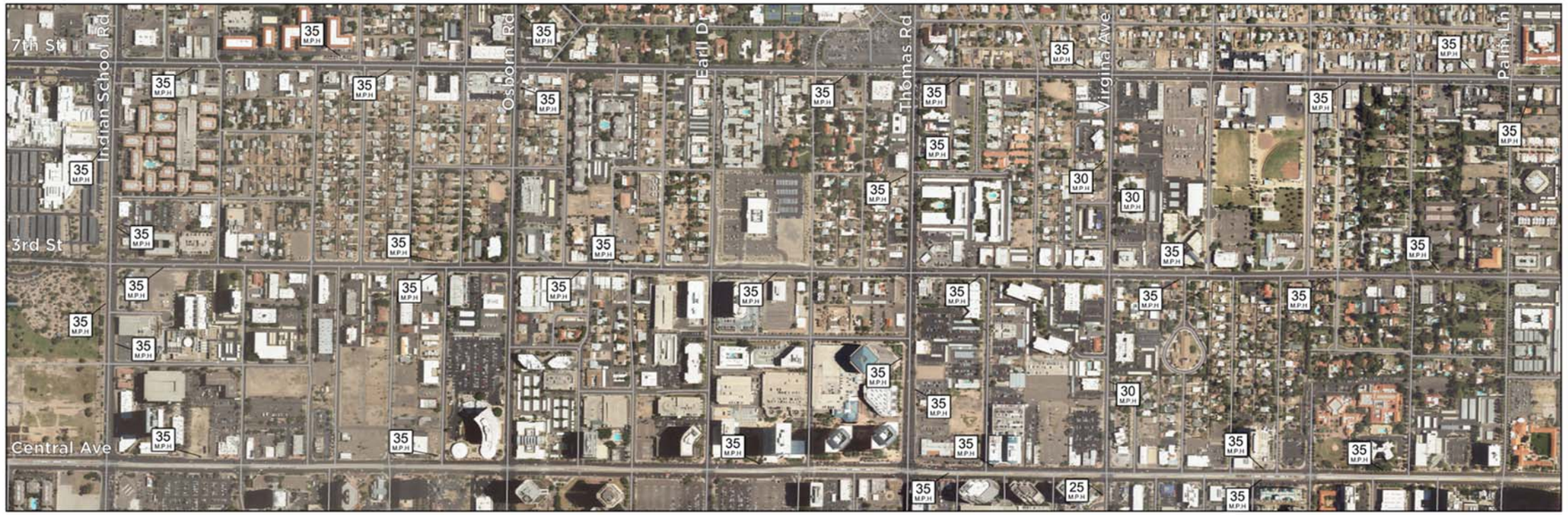


Figure 3 - Third Street Corridor Existing Number of Lanes



Legend

0 250 500 1,000 Feet

Streets

35 M.P.H Posted Speed Limit

Figure 4 - Third Street Corridor Speed Limits

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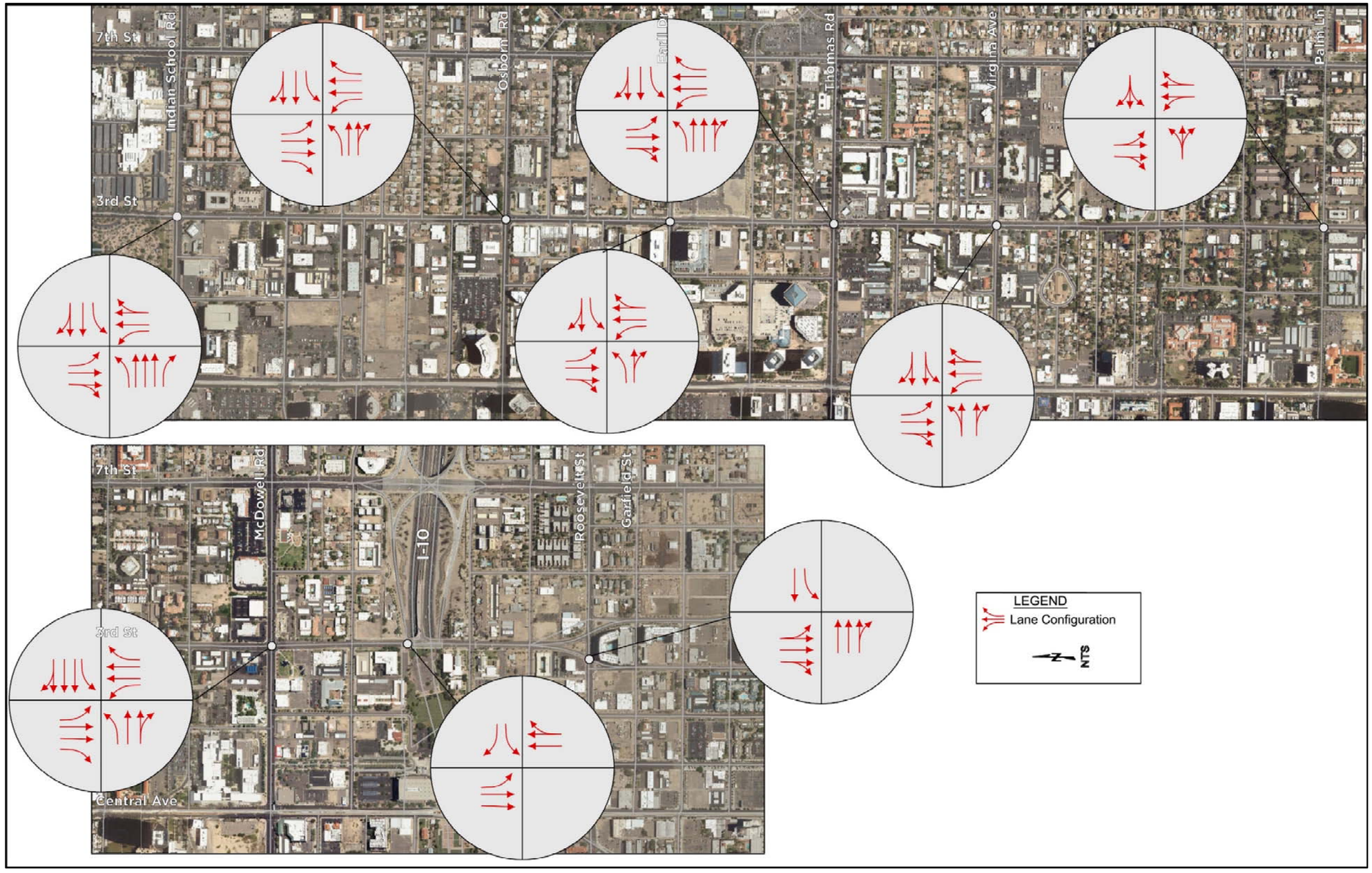
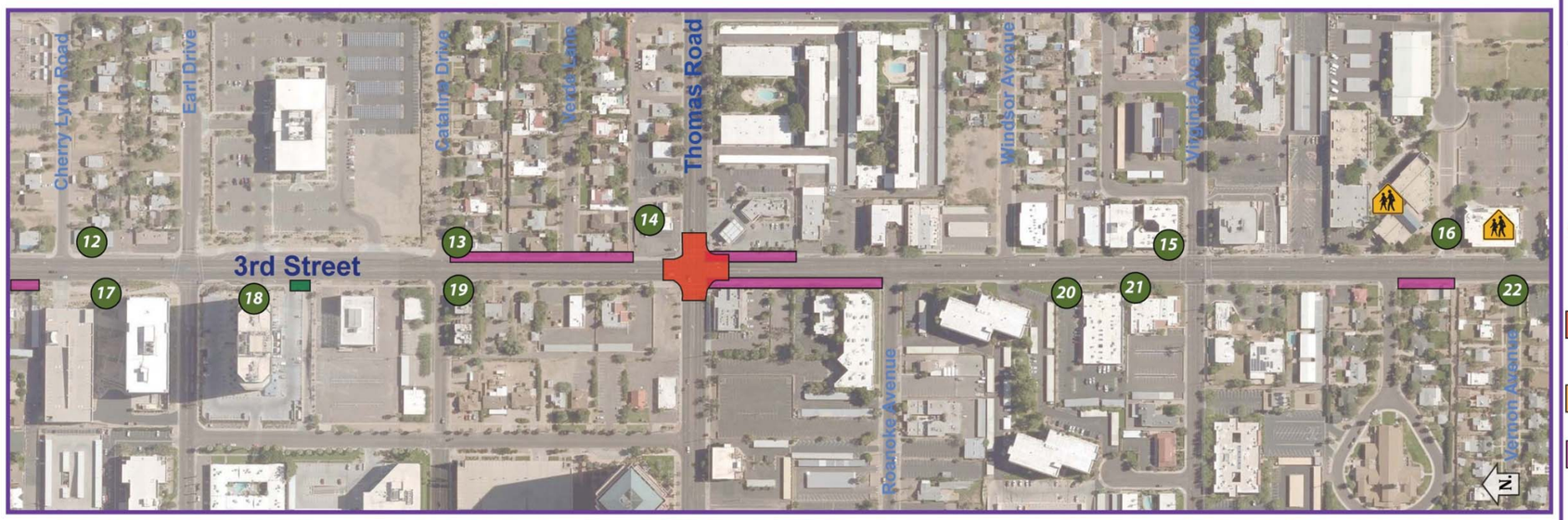


Figure 5 - Third Street Corridor Signalized Intersection Lane Configuration

Table 2 - Summary of Existing Conditions for Third Street

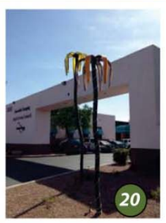
	Indian School Rd to Osborn Rd	Osborn Rd to Thomas Rd	Thomas Rd to Oak St	Oak St to McDowell Rd	McDowell Rd to Roosevelt
Sidewalk Width	Sidewalk is 5' or greater along all segment except between Clarendon Ave and Mitchell Dr on the west side	Sidewalk is 5' or greater along all segment except between Lexington Ave and Monterey Way on the west side	Sidewalk is 5' or greater along all segment except between Vernon Ave and Oak St on the west side	Sidewalk is 5' or greater along all segment except between Oak St and Palm Ln on the west side and between Palm Ln and Coronado Rd on the east side	Sidewalk is 5' or greater along all segment
Sidewalk Condition	Good Condition	Good Condition	Good Condition	Good Condition	Good Condition
Shade	Minimal shade on east side No shade on west side	Minimal shade on east side between Flower St and Cherry Lynn Rd and on the west side between Catalina Dr and Thomas Rd	No shade on either side of the road in the segment	Minimal shade on both sides of the Third St between Monte Vista Rd and Palm Ln	No shade on either side of the road in the segment
Buffer	No buffer between Indian School Rd and Clarendon Ave and between Mitchell Dr and Osborn Rd on both sides of Third St	No buffer present between Osborn Rd and Mulberry Dr and between Earll Dr and Thomas on the east side	No buffer present between Thomas Rd and Roadnoke Rd, at Windsor Ave, between Ashland Ave and Vernon Ave, and between Hoover Ave and Oak St on the west side, as well as between Vernon Ave and Oak St on the east side	No buffer present on west side of Third Street and between Palm Ln and McDowell Rd on east side of Third St	No buffer present between: - McDowell Rd and Willetta St on the west side; - I-10 and Moreland St on the east side; - Portland St and Roosevelt St on both sides
Continuous Sidewalk	Yes on both side of Third Street	Yes on both side of Third Street	Missing sidewalk along the NW corner of Virginia Ave	Missing sidewalk on the SW corner of Alvarado Rd and NW corner of Palm Ln	Yes on both sides of Third Street
Pedestrian Ramp Slope	Meets slope requirements except on: - NE and SE corners at Clarendon Ave; - NE corner at Whitton Ave; - NW and NE corners at Osborn Rd	All pedestrian ramps meet minimum slope requirements	Meets slope requirements except on: - SE corner at Windsor Ave; - SW corner at Virginia Ave; - NW and SW corners at Ashland Ave	All pedestrian ramps meet minimum slope requirements	Meets slope requirements except on: - NW and SW corners at Moreland St; - NW corner at Portland St
Concrete Domes at Ramps	Located on: - NW and SW corners at Indianola Ave; - NW corner at Clarendon Ave; - NW and SW corners at Weldon Ave; - NW corner at Osborn Rd	Located on: - SE corner at Verde Ln; - SE corner at Thomas Rd	Loacated on the NW corner of Roanoke Ave only	Located on: - NW corner of Alvarado Rd; - All four corners at Monte Vista Rd; - All four corners at McDowell Rd	Loacted on all four corners at Roosevelt St
Lighting	Present along west side of Third Street	Present along both sides of the road between Osborn Rd and Earll Dr and along the east side of the road between Earll Dr and Thomas Rd	Present along east side of Third Street	Present along west side between Oak St and Coronado Rd and along both sides of Third St between Coronado Rd and McDowell Rd	Present along both sides of Third Street
On Street Parking	None in segment	Between Flower St and Earll Dr on the east side and between Osborn Rd and Cherry Lynn Rd on the west side	None in segment	None in segment	None in segment

Figure 6 - Third Street Field Inventory from Indian School Road to Monterey Street



3rd Street
Opportunities & Constraints
Summary

- Bus Stop/Shelter. Opportunity to upgrade/enhance amenities that correspond to the artistic elements of the Roosevelt Street Corridor.
- Local School. Opportunity to enhance pedestrian areas near schools with aesthetic treatment.
- Pedestrian Crosswalk, marked for street crossing. Opportunity to enhance with aesthetic marking and treatment.
- Major Intersections, pose a potential site constraint for bicycle movement due to high vehicular traffic volume.
- Vacant Land/Properties, opportunity for redevelopment.
- No Buffer area exists between the sidewalk and street. Areas pose a site constraint for future addition of site buffer areas for comfortable pedestrian movement due to existing R.O.W. limits.
- # - Photo Number Key Location



3RD STREET Site Photo Inventory-Monterey Way to Vernon Avenue

Figure 7 - Third Street Field Inventory from Monterey Street to Vernon Avenue

3rd Street
Opportunities & Constraints
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- Bus Stop/Shelter. Opportunity to upgrade/enhance amenities that correspond to the artistic elements of the Roosevelt Street Corridor.
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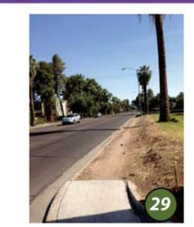
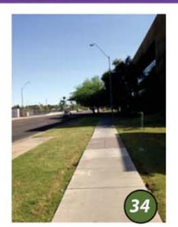
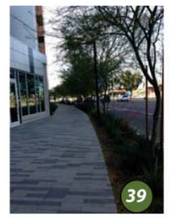
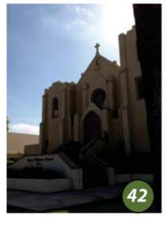


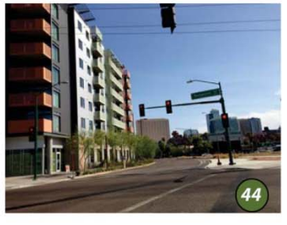


3RD STREET Site Photo Inventory-Vernon Avenue to I-10

Figure 8 - Third Street Inventory from Vernon Avenue to I-10







3rd Street
Opportunities & Constraints
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- Local School. Opportunity to enhance pedestrian areas near schools with aesthetic treatment.
- Pedestrian Crosswalk, marked for street crossing. Opportunity to enhance with aesthetic marking and treatment.
- Major Intersections, pose a potential site constraint for bicycle movement due to high vehicular traffic volume.
- Vacant Land/Properties, opportunity for redevelopment.
- No Buffer area exists between the sidewalk and street. Areas pose a site constraint for future addition of site buffer areas for comfortable pedestrian movement due to existing R.O.W. limits.
- # - Photo Number Key Location

3RD STREET Site Photo Inventory-I-10 to Garfield Street

Figure 9 - Third Street Inventory from I-10 to Garfield Street

2.3 Van Buren Street Existing Conditions

The Van Buren Street Corridor is an arterial street which runs from 7th Street to 24th street. The Van Buren Street Corridor provides connections to University of Arizona College of Medicine, Arizona State University's Downtown Campus, the Children's Museum, St. Luke's Behavior Health Center, the Arizona State Hospital and connections to Gateway Community College to the east.

Over the course of the project, multiple site visits were conducted to inventory the street elements. The inventory included the existing number of lanes (**Figure 10**), posted speed limits (**Figure 11**), intersection lane configurations for the arterial and collector roadways (**Figure 12**) within the study area. The existing conditions and context for the street are summarized in **Table 3** and depicted below in the Existing Conditions Maps (**Figure 13** through **Figure 15**). Additional information is available in the ***Final Technical Memorandum #1 – Existing and Future Conditions*** located in the **Appendix** of this report.

Table 3 - Summary of Existing Conditions for Van Buren Street

	7th Street to 16th Street	16th Street to 24th Street
Sidewalk Width	Sidewalk is 5' or greater along all segment except between 11th Pl and 11th Way on north side	Sidewalk is 5' or greater along all segment except between 20th St and 21st St on north side and between 21st St and 24th St on both sides
Sidewalk Condition	Good Condition	Good Condition
Shade	Shade provided between 7th St and 11th St on south side and minimal shade between 7th St and 11th St on the north side No shade on west side	No shade provided
Buffer	Presence of buffer varies throughout entire segment	Presence of buffer varies throughout entire segment
Continuous Sidewalk	Yes on both side of Van Buren St	Yes on both side of Van Buren St
Pedestrian Ramp Slope	Meets slope requirements except on: - NE and NW corners at 11th Pl; - SW corner at 12th St; - NW corner at 13th Pl; - NE and NW corners at 15th St	Meets slope requirements except on: - NW corner at 16th Pl; - SW corner at 18th St; - NE corner at 21st Pl; - SW corner at 22nd St; - NE and NW corners at 23rd St; - NE and NW corners at 24th St
Concrete Domes at Ramps	Located on: - NE and SW corners at 7th St; - All four corners at 11th St	Located on: - SE and SW corners at 24th St
Lighting	Present along both sides of Van Buren St	Present along both sides of Van Buren St
On Street Parking	None in segment	None in segment

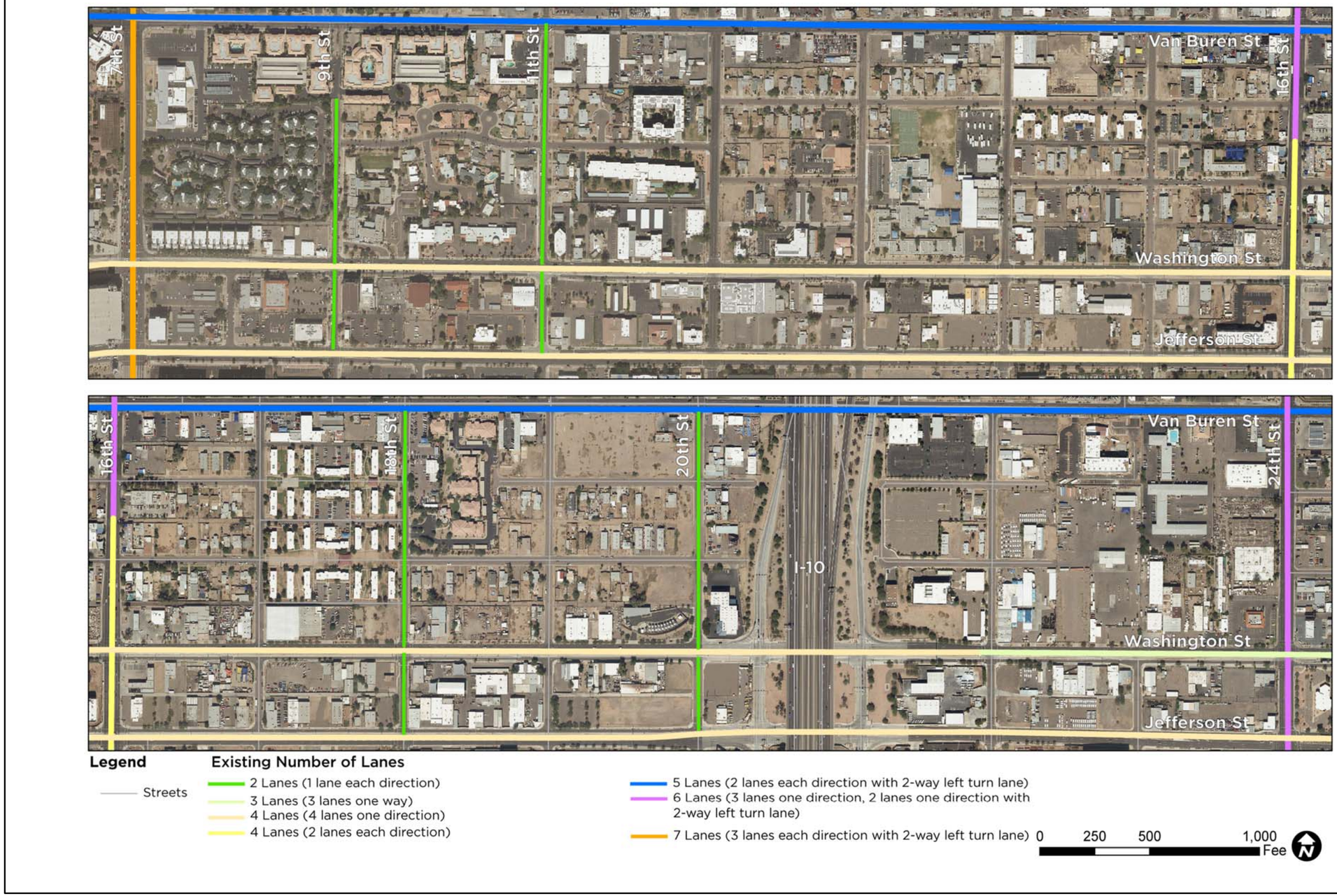

Figure 10 – Van Buren Street Corridor Existing Number of Lanes

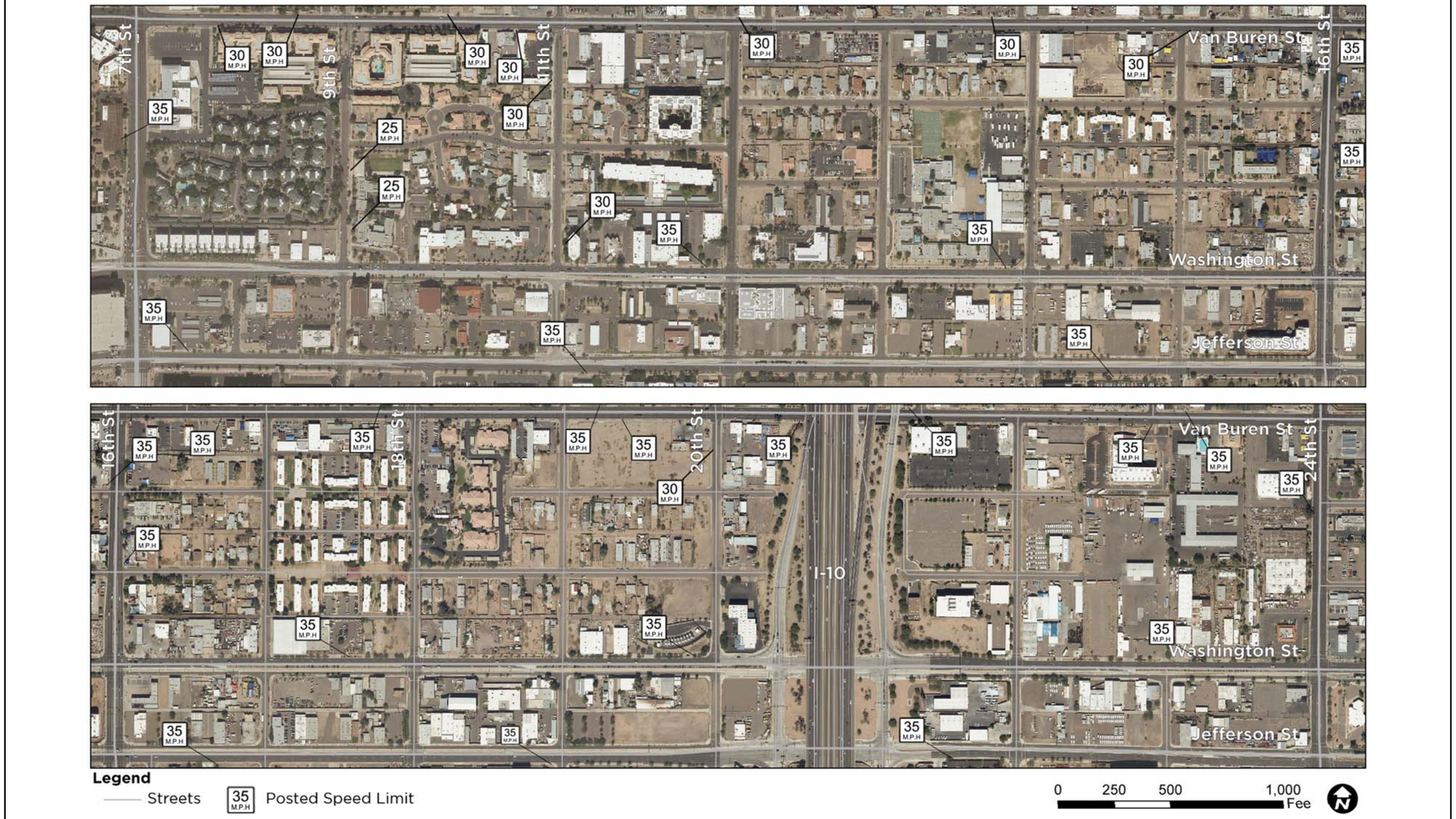

Figure 11 - Van Buren Street Corridor Speed Limits

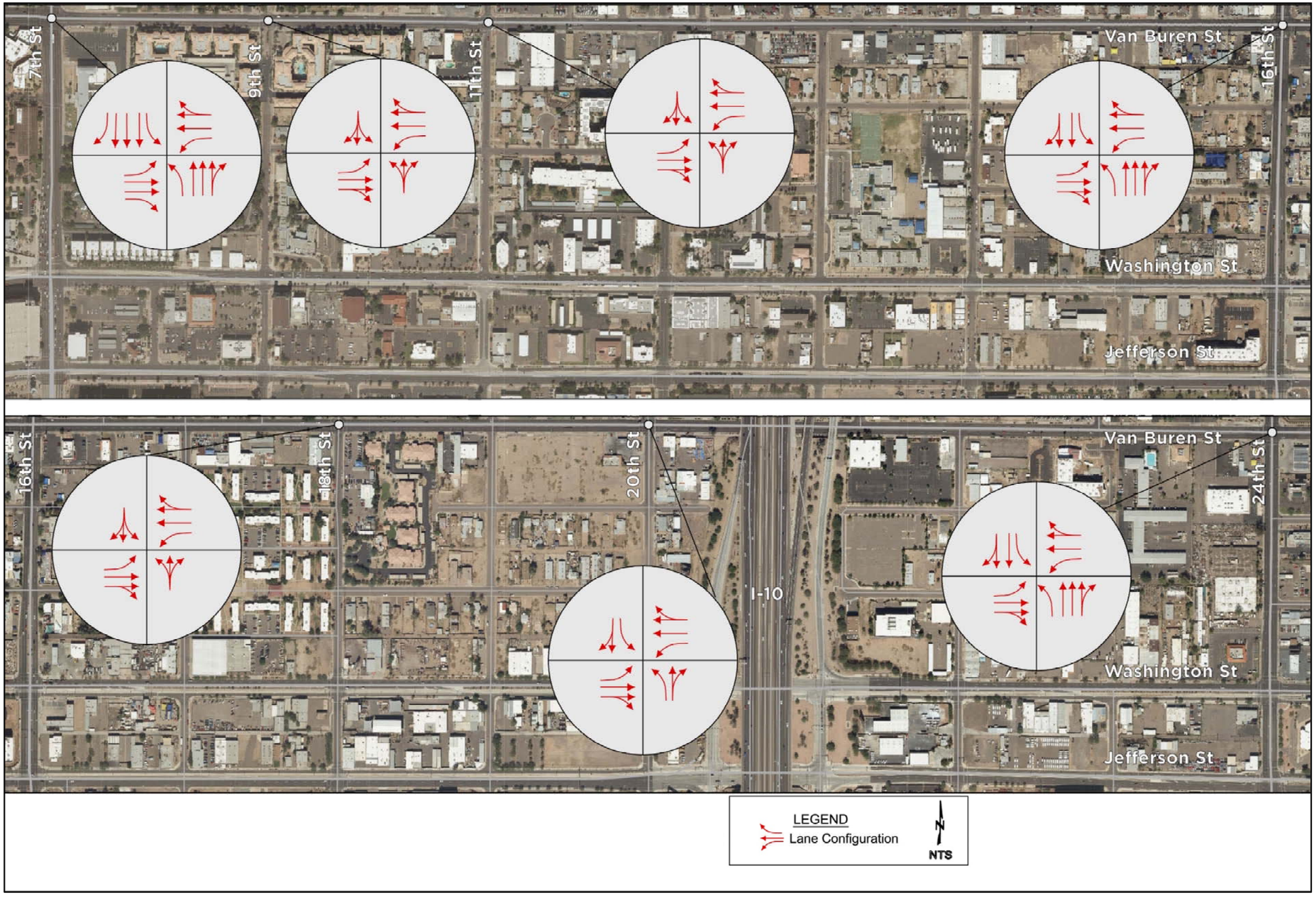

Figure 12 - Van Buren Street Corridor Signalized Intersection Lane Configuration

Van Buren Street Opportunities & Constraints Summary

- Bus Stop/Shelter, pose a site constraint for bicycle and pedestrian movement, as there are numerous locations throughout the corridor.
- School Crossing Zone, area of corridor where traffic speed is reduced. Opportunity to enhance school zone with aesthetic treatment.
- School Crosswalk, poorly marked for street crossing. Opportunity to enhance with aesthetic marking and treatment.
- Major Intersections, pose a potential site constraint for bicycle movement due to high vehicular traffic volume.
- Vacant Land/Properties, opportunity for redevelopment.
- No Buffer area exists between the sidewalk and street. Areas pose a site constraint for future addition of site buffer areas for comfortable pedestrian movement due to existing R.O.W. limits.

Not Shown - Buffer areas are reduced along the corridor by numerous driveways for business access along both sides of the street. Opportunity to consolidate driveways for consistent pedestrian movement.

- Photo Number Key Location

VAN BUREN STREET Site Photo Inventory-7th Street to 13th Street

Figure 13 - Van Buren Street Inventory from 7th Street to 13th Street

Van Buren Street
Opportunities & Constraints
Summary

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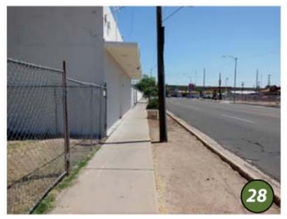
- Photo Number Key Location

VAN BUREN STREET Site Photo Inventory-13th Street to 18th Street

Figure 14 - Van Buren Street Inventory from 13th Street to 18th Street



Van Buren Street
Opportunities & Constraints
Summary

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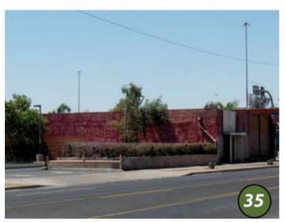

VAN BUREN STREET Site Photo Inventory-18th Street to 24th Street

Figure 15 - Van Buren Street Field Inventory from 18th Street to 24th Street

3.0 Existing Traffic Analysis Summary

This section provides a summary of the traffic analysis results under existing conditions for existing year 2015 and horizon year 2035 for the Third Street and Van Buren Street corridors. Additional information is available in the ***Final Technical Memorandum #1 – Existing and Future Conditions*** and the ***Final Technical Memorandum #2 – Analysis of Design Options*** located in the **Appendix** of this report.

3.1 Traffic Analysis Methodology

The ability of a transportation system to transmit the transportation demand is characterized as its level of service (LOS). LOS is a rating system from "A", representing the best operation, to "F", representing the worst operation. The appropriate reference for LOS operation is the *Highway Capacity Manual*, published by the Transportation Research Board. Urban Street facilities are described as having interrupted flow (signals, all-way stops, or roundabouts) at a spacing of 2 miles or less. The LOS descriptions below are applicable for arterial and collector streets. In general, LOS A and B represent no congestion, LOS C and D represent moderate congestion, and LOS E and F represent severe congestion.

LOS can be calculated for roadway segments, intersections, and freeway mainline lanes and ramps. LOS estimates also can be calculated for different periods, including daily conditions and peak hour conditions. The LOS analysis discussed in this section focuses on planning level roadway segment performance within the study area based on daily roadway segment volumes. Analysis of study area intersections based on peak hour turning movement volumes and anticipated delay is discussed in the following section.

Highway Capacity Software (HCS) was used to analyze the Third Street and Van Buren Street corridors roadway segment level-of-service. Two performance measures are used to characterize vehicular LOS for a given direction of travel along an urban street segment. One measure is travel speed for through vehicles. This speed reflects the factors that influence running time along the link and the delay incurred by through vehicles at the boundary intersection. The second measure is the volume-to-capacity ratio for the through movement at the downstream boundary intersection. These performance measures indicate the degree of mobility provided by the segment. **Table 4** shows LOS thresholds established for automobile mode on urban streets based on the *Highway Capacity Manual*.

Table 4 – LOS Thresholds for Automobile Mode on Urban Streets

Travel Speed as Percentage of Base Free-Flow Speed (%)	LOS by Volume-to-Capacity Ratio*	
	≤ 1.0	> 1.0
> 85	A	F
> 67-85	B	F
> 50-67	C	F
> 40-50	D	F
> 30-40	E	F
≤ 30	F	F

*Volume-to-capacity ratio of through movement at downstream boundary intersection

The LOS criteria used for automobile mode are different than the criteria used for nonautomobile modes (bike, pedestrian and transit) along an urban street segment. Chapter 5, Quality and Level-of-Service Concepts, of the *Highway Capacity Manual* indicates that travelers consider a wide variety of factors when they assess the quality of service provided to them as a nonautomobile mode user. Some of these factors can be described as performance measures (e.g. speed), and others can be described as basic descriptors of the urban street character (e.g. sidewalk width). The methodology for evaluating each mode provides a procedure for mathematically combining these factors into score. This score is then used to determine the LOS that is provided for a given direction of travel along a segment. **Table 5** lists the scores associated with each LOS for pedestrian travel mode. The LOS for this particular mode is determined by consideration of both the LOS score and the average pedestrian space on the sidewalk.

Table 5 – LOS Scores for the Pedestrian Travel Mode

Pedestrian LOS Score	LOS by Volume-to-Capacity Ratio*					
	> 60	> 40-60	> 24-40	> 15-24	> 8.0-15*	≤ 8.0*
≤ 2.00	A	B	C	D	E	F
> 2.00-2.75	B	B	C	D	E	F
> 2.75-3.50	C	C	C	D	E	F
> 3.50-4.25	D	D	D	D	E	F
> 4.25-5.00	E	E	E	E	E	F
> 5.00	F	F	F	F	F	F

* In cross-flow situations, the LOS E/F threshold is 13ft²/p

Table 6 lists the range of scores that are associated with each LOS for the bicycle and transit modes. **Table 6** is also applicable for determining pedestrian LOS when a sidewalk is not available.

Table 6 – LOS Scores for Bicycle and Transit Modes

Level-of-Service	Level-of-Service Score
A	≤ 2.00
B	> 2.00-2.75
C	> 2.75-3.50
D	> 3.50-4.25
E	> 4.25-5.00
F	> 5.00

The *Highway Capacity Manual* considers the average delay per vehicle as the measure to determine the LOS of a signalized intersection. The delay and LOS are calculated for the intersection, each approach, and each turning movement. **Table 7** lists the LOS criteria for signalized intersections as stated in the *Highway Capacity Manual*.

Table 7 - Level-of-Service Criteria for Signalized Intersections

Level-of-Service	Average Control Delay (s/veh)
A	≤ 10
B	> 10 - 20
C	> 20 - 35
D	> 35 - 55
E	> 55 – 80
F	> 80

3.2 Third Street Existing Traffic Conditions

Existing daily traffic volumes for the roadway segments along the Third Street Corridor were obtained from the counts collected in March 2015 by the City of Phoenix and the average daily traffic volumes from the City of Phoenix website. The existing weekday ADT volumes obtained range from the years 2012 to 2015. To obtain 2015 ADT volumes along segments where data was collected prior to 2015, a growth rate of 0.66% was applied to the ADT volumes along Third Street. The 0.66% growth rate was calculated based on existing ADT volumes obtained by the City of Phoenix. The calculated 2015 ADT volumes for Third Street are shown in **Table 8**.

Table 8 - Third Street Existing 2015 Average Daily Traffic Volumes

Segment		2015 ADT	
From	To	NB	SB
Indian School Rd	Osborn Rd	5220	4970
Osborn Rd	Earll Dr	7650	7450
Earll Dr	Thomas Rd	7140	7180
Thomas Rd	Virginia Ave	9000	8600
Virginia Ave	Palm Ln	9000	8530
Palm Ln	McDowell Rd	8800	7670
McDowell Rd	I-10	5570	7040
I-10	Roosevelt St	5030	6420

Turning movement counts were collected in fifteen minute intervals from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. The 2015 turning movement counts for the AM and PM peak periods along Third Street are shown in **Figure 16**. A detailed report of the turning movement counts are contained in the ***Final Technical Memorandum #1 – Existing and Future Conditions*** located in the **Appendix** of this report.

3.3 Third Street Existing Level-of-Service

Roadway Segment Level-of-Service

A roadway segment level-of-service analysis was completed for the existing conditions for the Third Street Corridor utilizing HCS and the same methodology discussed in the ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***. The HCS was used to analyze the 2015 existing conditions to determine automobile, pedestrian, bicycle and transit LOS. Traffic volumes and lane geometrics shown in **Figure 5** were used to calculate the roadway segment level-of-service analysis for year 2015 under existing conditions.

Table 9 depicts the LOS for the roadway segments along Third Street for the year 2015 under existing conditions. The ***Final Technical Memorandum #2 – Analysis of Design Options*** includes the existing conditions roadway segment LOS results for the Third Street Corridor.

Table 9 – Third Street Existing 2015 Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	NB	SB	NB	SB	NB	SB	NB	SB
Indian School Rd	Osborn Rd	B(B)	D(C)	D(D)	D(D)	F(F)	F(F)	-(-)	-(-)
Osborn Rd	Earll Dr	B(B)	D(D)	C(C)	D(D)	E(E)	F(F)	-(-)	-(-)
Earll Dr	Thomas Rd	D(E)	B(C)	C(D)	C(C)	F(F)	E(E)	-(-)	-(-)
Thomas Rd	Virginia Ave	C(C)	D(E)	D(D)	D(D)	E(E)	E(E)	-(-)	-(-)
Virginia Ave	Palm Ln	B(B)	B(B)	C(D)	D(D)	E(E)	E(E)	-(-)	-(-)
Palm Ln	McDowell Rd	E(E)	C(C)	E(E)	E(D)	E(E)	F(F)	-(-)	-(-)
McDowell Rd	I-10	E(D)	F(E)	B(B)	C(B)	D(D)	E(E)	-(-)	-(-)
I-10	Roosevelt St	F(D)	C(C)	B(B)	B(A)	E(E)	E(E)	-(A)	A(-)
Entire Facility		**C(C)**	**C(C)**	**C(C)**	**D(C)**	**E(E)**	**E(E)**	**-(-)**	**-(-)**

* X(X) – AM (PM) Peak Hour LOS

Signalized Intersection Level-of-Service

The LOS for the Third Street Corridor study area intersections was evaluated using *Synchro* software, which utilizes the criteria described in ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***. The 2015 LOS results for the Third Street Corridor signalized intersections are summarized in **Table 10**. The existing LOS for the signalized intersections within the study area are shown in **Figure 17** for the Third Street Corridor. The ***Final Technical Memorandum #1 – Existing and Future Conditions*** provides the complete results of the existing 2015 LOS analysis.

Table 10 – Third Street Corridor Existing 2015 Intersection Level-of Service

Intersection	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Third Street and Indian School Road												
AM Peak Hour	D	D		D	D		A	B	A	B	B	
	D			D			B			B		
	B											
PM Peak Hour	F	D		D	D		A	B	A	A	B	
	F			D			B			B		
	D											
Third Street and Osborn Road												
AM Peak Hour	C	C	C	D	D	D	B	B		B	B	
	C			D			B			B		
	C											
PM Peak Hour	C	C	C	E	D	D	B	C		B	B	
	C			D			C			B		
	C											
Third Street and Earll Drive												
AM Peak Hour	A	A		A	A		C	C		D	D	
	A			A			C			D		
	B											
PM Peak Hour	A	A		A	A		D	C		D	D	
	A			A			D			D		
	B											
Third Street and Thomas Road												
AM Peak Hour	D	D	C	C	D		B	C		C	C	
	D			D			C			C		
	C											
PM Peak Hour	D	D	D	D	D		B	C		B	C	
	D			D			C			C		
	C											
Third Street and Virginia Avenue												
AM Peak Hour	B	B		A	B		C			C		
	B			B			C			C		
	B											
PM Peak Hour	A	B		A	B		C			C		
	B			B			C			C		
	B											
Third Street and Palm Lane												
AM Peak Hour	B			A			C			C		
	B			A			C			C		
	B											
PM Peak Hour	A			B			C			C		
	A			B			C			C		
	B											
Third Street and McDowell Road												
AM Peak Hour	D	E	D	D	D	D	C	C		C	C	
	D			D			C			C		
	C											
PM Peak Hour	D	E	D	F	D	D	C	D		C	C	
	D			E			D			C		
	D											
Third Street and I-10 Ramp												
AM Peak Hour	-	B		A	B	-	-	-	-	C	-	C
	B			B			-			C		
	B											
PM Peak Hour	-	B		A	B	-	-	-	-	C	-	C
	B			B			-			C		
	B											
Third Street and Roosevelt Street												
AM Peak Hour	-	-	-	C			A			D	A	-
	-			C			A			B		
	C											
PM Peak Hour	-	-	-	C			A			D	A	-
	-			C			A			B		
	B											

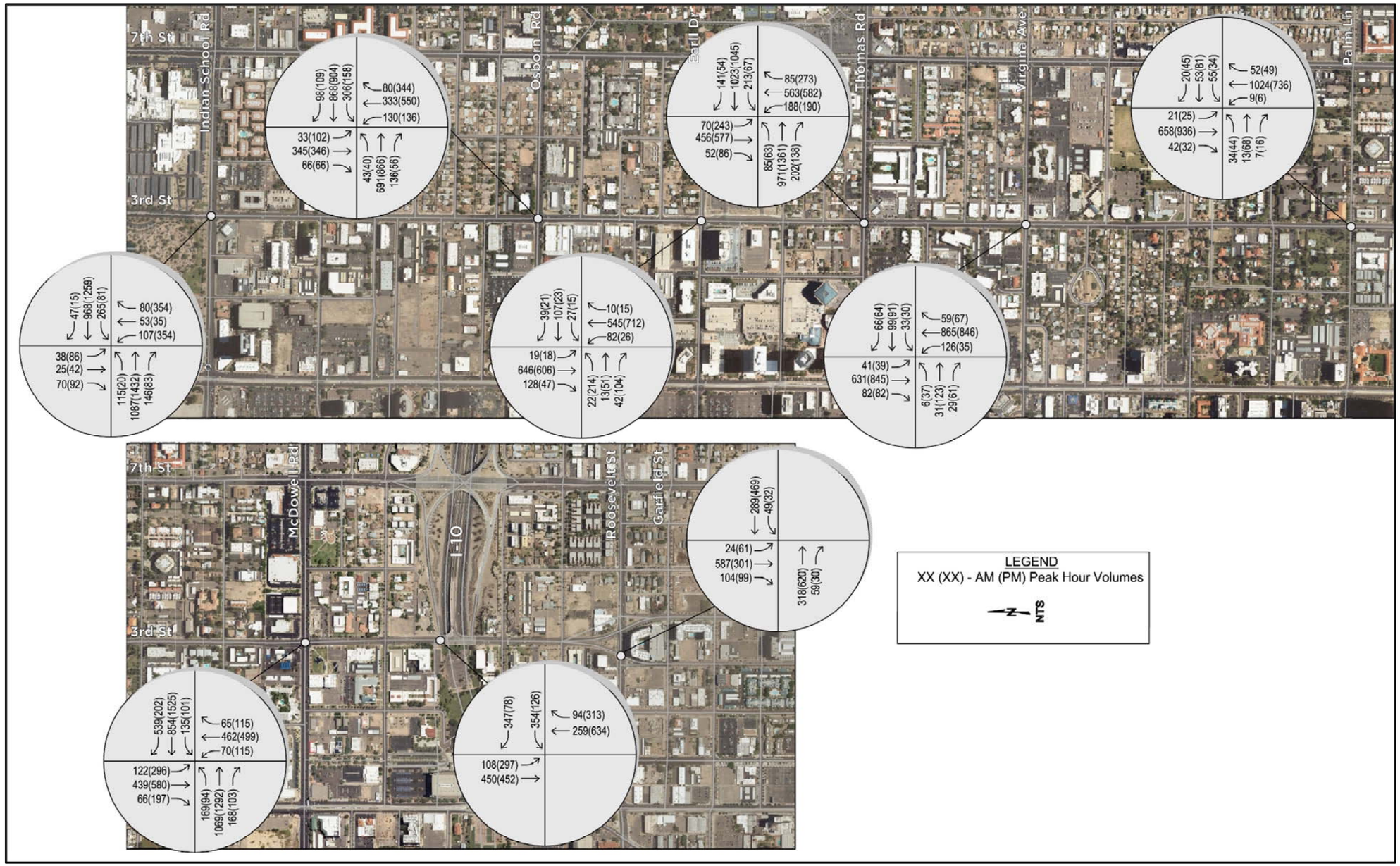

Figure 16 - Third Street Corridor Existing 2015 Intersection Turning Movement Volumes

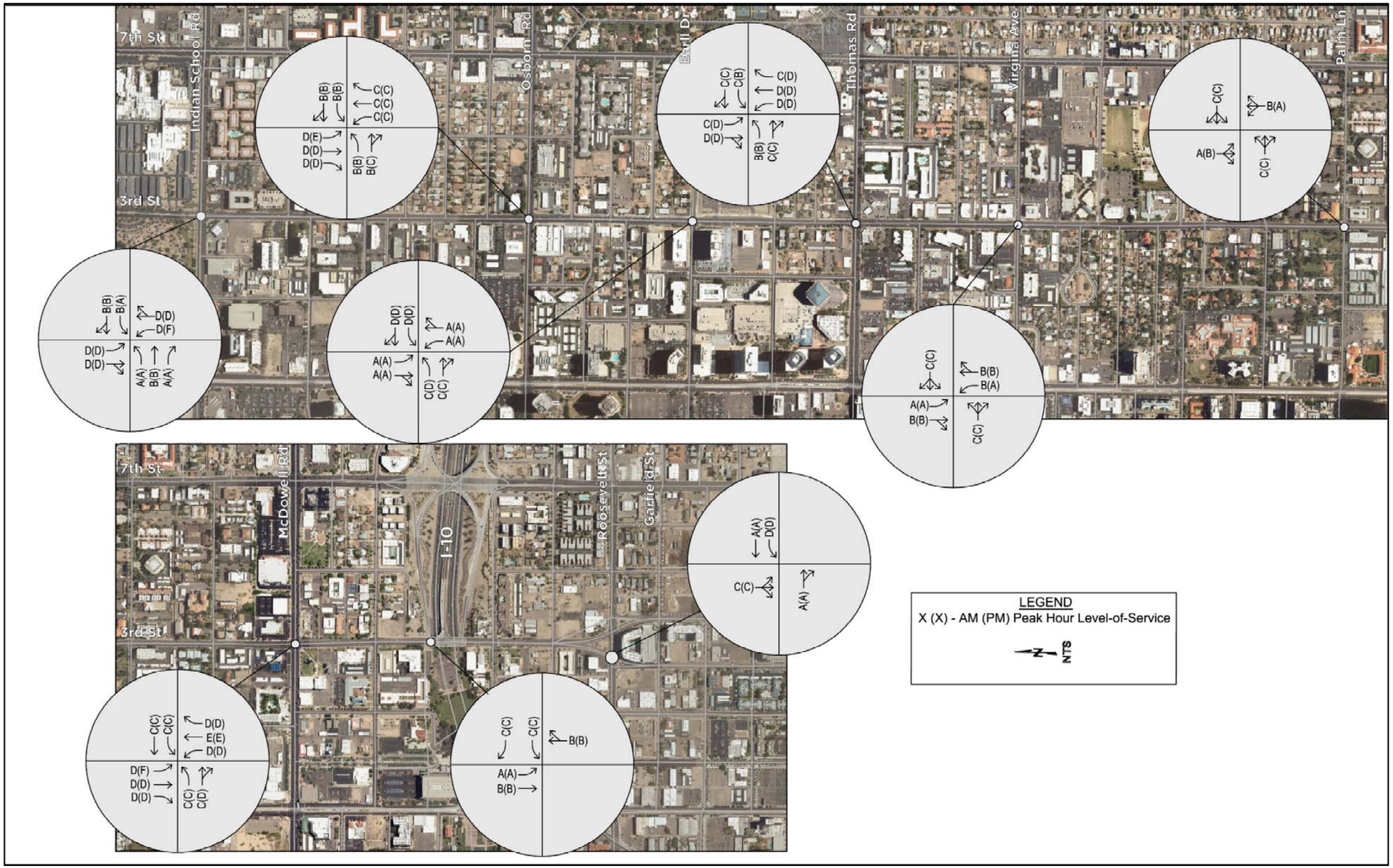

Figure 17 - Third Street Corridor Existing 2015 Intersection Level-of-Service

3.4 Van Buren Street Existing Traffic Conditions

Existing daily traffic volumes for the roadway segments along the Van Buren Street Corridor were obtained from the counts collected in March 2015 by the City of Phoenix and the average daily traffic volumes from the City of Phoenix website. The existing weekday ADT volumes obtained range from the years 2012 to 2015. To obtain 2015 ADT volumes along segments where data was collected prior to 2015, a growth rate of 1.31% was applied to ADT volumes along Van Buren Street. The 1.31% growth rates was calculated based on existing ADT volumes obtained by the City of Phoenix. The calculated 2015 ADT volumes for Van Buren Street are shown in **Table 11**.

Table 11 – Van Buren Street Existing 2015 Average Daily Traffic Volumes

Segment		2015 ADT	
From	To	WB	EB
7th Street	9th Street	8200	9720
9th Street	11th Street	8180	8460
11th Street	16th Street	9630	8580
16th Street	18th Street	9020	9620
18th Street	20th Street	7380	7690
20th Street	24th Street	7690	8690

Turning movement counts were collected in fifteen minute intervals from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. The 2015 turning movement counts for the AM and PM peak periods along Van Buren Street are shown in **Figure 18**. A detailed report of the turning movement counts are contained in the ***Final Technical Memorandum #1 – Existing and Future Conditions*** located in the **Appendix** of this report.

3.5 Van Buren Street Existing Level-of-Service

Roadway Segment Level-of-Service

A roadway segment level-of-service analysis was completed for the existing conditions for the Van Buren Street Corridor utilizing HCS and the same methodology discussed in the ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***. The HCS was used to analyze the 2015 existing conditions to determine automobile, pedestrian, bicycle and transit LOS. Traffic volumes and lane geometrics shown in **Figure 18** and **Figure 12**, respectively, were used to calculate the roadway segment level-of-service analysis for year 2015 under existing conditions.

Table 12 depicts the LOS for the roadway segments along Van Buren Street for the year 2015 under existing conditions. The ***Final Technical Memorandum #2 – Analysis of Design Options*** includes the existing conditions roadway segment LOS results for the Van Buren Street Corridor.

Table 12 – Van Buren Street Existing 2015 Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	EB	WB	EB	WB	EB	WB	EB	WB
7th Street	9th Street	B(A)	A(A)	C(D)	D(D)	D(D)	D(D)	A(A)	A(A)
9th Street	11th Street	A(A)	B(B)	D(D)	D(D)	D(D)	D(D)	A(A)	B(B)
11th Street	16th Street	A(B)	A(A)	B(B)	B(B)	E(E)	F(F)	A(A)	A(A)
16th Street	18th Street	B(B)	D(E)	C(C)	D(D)	F(F)	E(E)	A(A)	A(B)
18th Street	20th Street	A(A)	B(C)	C(C)	C(D)	E(E)	E(E)	B(B)	B(B)
20th Street	24th Street	A(C)	A(A)	D(D)	D(D)	E(E)	E(E)	A(A)	A(A)
Entire Facility		**A(B)**	**B(B)**	**C(C)**	**C(C)**	**E(E)**	**E(E)**	**A(A)**	**A(A)**

* X(X) – AM (PM) Peak Hour LOS

Signalized Intersection Level-of-Service

The LOS for the Van Buren Street Corridor study area intersections was evaluated using *Synchro* software, which utilizes the criteria described in ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***. The 2015 LOS results for the Van Buren Street Corridor signalized intersections are summarized in **Table 13**. The existing LOS for the signalized intersections within the study area are shown in **Figure 19** for the Van Buren Street Corridor. The ***Final Technical Memorandum #1 – Existing and Future Conditions*** provides the complete results of the existing 2015 LOS analysis.

Table 13 - Van Buren Street Existing 2015 Intersection Level-of-Service

Intersection	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Van Buren Street and 7th Street												
AM Peak Hour	C	C		B	C	C	D	D	D	D	D	
		C			C			D			D	
					C							
PM Peak Hour	C	D		F	C	C	D	D	C	D	D	
		D			E			D			D	
					D							
Van Buren Street and 9th Street												
AM Peak Hour		C			C		A	A		A	A	
		C			C			A			A	
					A							
PM Peak Hour		C			C		A	A		A	A	
		C			C			A			A	
					A							
Van Buren Street and 11th Street												
AM Peak Hour		C			C		A	A		A	A	
		C			C			A			A	
					A							
PM Peak Hour		C			C		A	A		A	B	
		C			C			A			B	
					A							
Van Buren Street and 16th Street												
AM Peak Hour	C	D		C	D		A	B		A	B	
		D			D			B			B	
					C							
PM Peak Hour	C	C		C	D		B	C		C	C	
		C			D			C			C	
					C							
Van Buren Street and 18th Street												
AM Peak Hour		C			C		A	A		A	A	
		C			C			A			A	
					A							
PM Peak Hour		C			C		A	A		A	A	
		C			C			A			A	
					A							
Van Buren Street and 20th Street												
AM Peak Hour	E	F		F	F		A	A		A	A	
		F			F			A			A	
					E							
PM Peak Hour	F	F		F	F		B	A		A	A	
		F			F			A			A	
					F							
Van Buren Street and 24th Street												
AM Peak Hour	B	B		B	B		D	D		B	C	
		B			B			D			C	
					C							
PM Peak Hour	B	B		B	B		C	D		C	C	
		B			B			D			C	
					C							

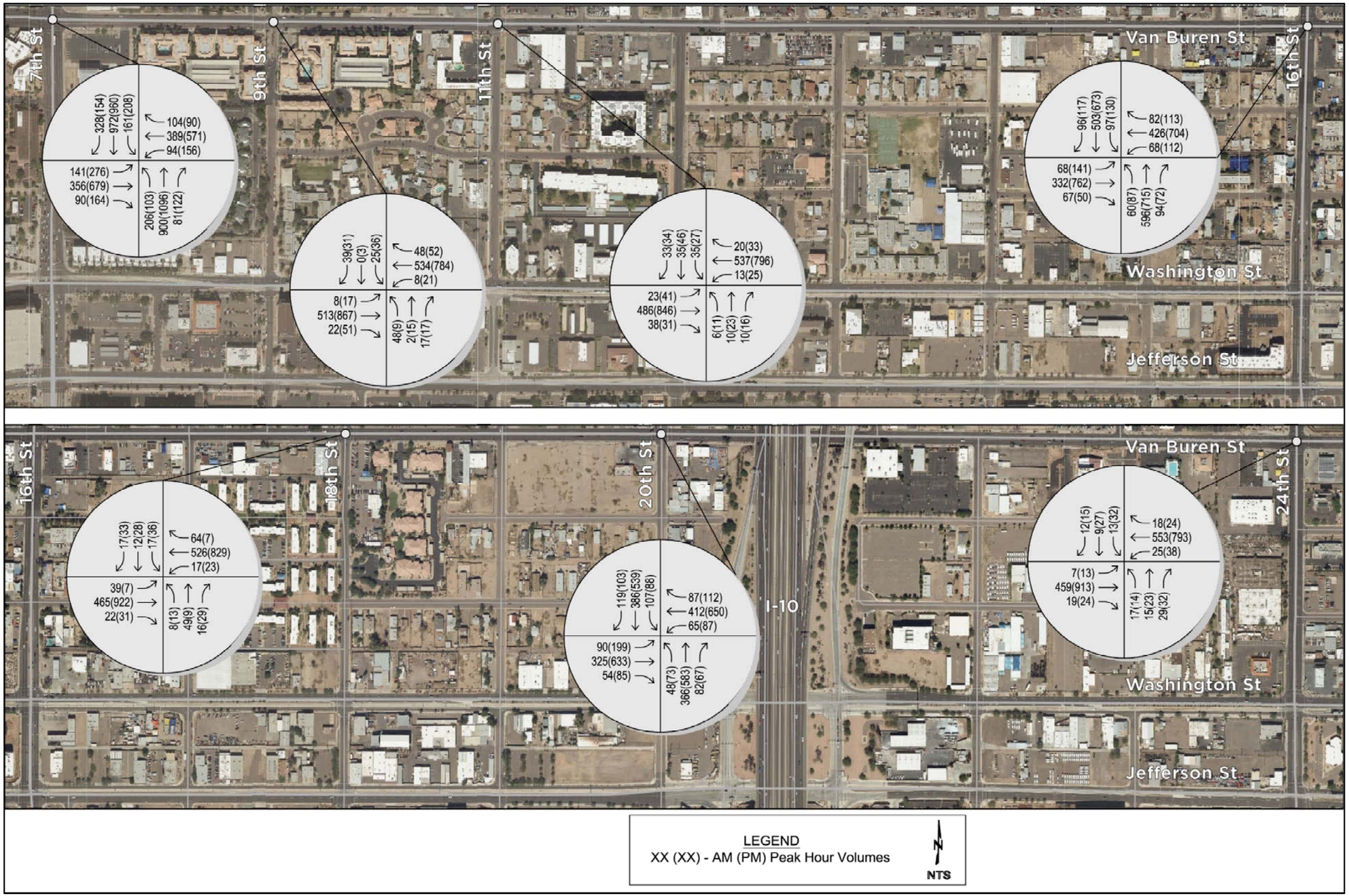

Figure 18 - Van Buren Street Corridor Existing 2015 Intersection Turning Movement Volumes

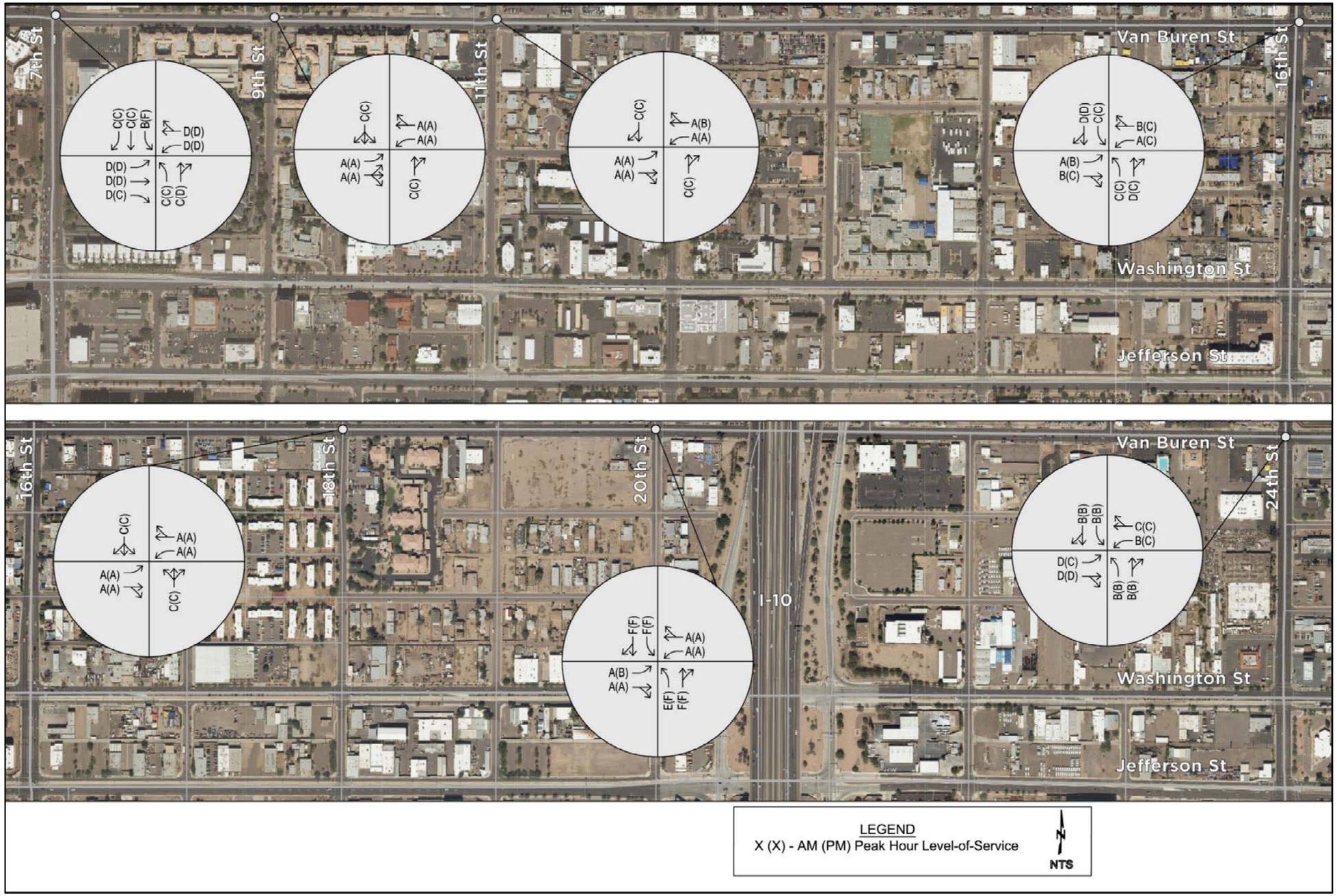

Figure 19 - Van Buren Street Corridor Existing 2015 Intersection Level-of-Service

4.0 Future Traffic Analysis Summary

4.1 Growth Rates

Existing 2015 traffic volumes and the projected 2035 traffic volumes for the Third Street Corridor and Van Buren Street Corridor were obtained from Maricopa Association of Governments (MAG) via their travel demand model. The 2015 and 2035 traffic volumes obtained from MAG were used to calculate the growth rate on Third Street and on Van Buren Street. Traffic volumes obtained from MAG and the growth rate calculations are included in the ***Final Technical Memorandum #2 – Analysis of Design Options***.

Based on the 2015 and projected 2035 traffic volumes obtained from MAG, the growth rate on Third Street is calculated to be 2.25% and the growth rate on Van Buren Street is calculated to be 1.31%.

A 2.25% exponential growth rate was applied to the existing 2015 turning movement counts on Third Street obtained from the City of Phoenix to calculate the 2035 turning movement volumes. The 2035 average daily traffic volumes on Third Street are shown in **Table 14**. The 2035 turning movement volumes on Third Street are shown in **Figure 20**.

Table 14 - Third Street 2035 Average Daily Traffic Volumes

Segment		2015 ADT	
From	To	NB	SB
Indian School Rd	Osborn Rd	8150	7760
Osborn Rd	Earll Dr	11900	11600
Earll Dr	Thomas Rd	11100	11200
Thomas Rd	Virginia Ave	14000	13400
Virginia Ave	Palm Ln	14000	13300
Palm Ln	McDowell Rd	13700	11900
McDowell Rd	I-10	8700	10900
I-10	Roosevelt St	7800	10000

A 1.31% exponential growth rate was applied to the existing 2015 turning movement counts on Van Buren Street obtained from the City of Phoenix to calculate the 2035 turning movement volumes. The 2035 average daily traffic volumes on Van Buren Street are shown in **Table 15**. The 2035 turning movement volumes on Van Buren Street are shown in **Figure 21**.

Table 15 – Van Buren Street 2035 Average Daily Traffic Volumes

Segment		2015 ADT	
From	To	WB	EB
7th Street	9th Street	10600	12600
9th Street	11th Street	10600	10900
11th Street	16th Street	12400	11100
16th Street	18th Street	11700	12400
18th Street	20th Street	9600	9900
20th Street	24th Street	10000	11200

4.2 Third Street 2035 Level-of-Service

4.2.1 Roadway Level-of-Service

The 2035 average daily traffic level-of-service was determined using the same methodologies as discussed in ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***. The 2035 average daily traffic LOS for the Third Street Corridor are shown in **Table 16**.

Table 16 – Third Street 2035 Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	NB	SB	NB	SB	NB	SB	NB	SB
Indian School Rd	Osborn Rd	C(C)	D(C)	D(D)	E(E)	F(F)	F(F)	-(-)	-(-)
Osborn Rd	Earll Dr	B(B)	E(F)	C(C)	D(D)	E(E)	F(F)	-(-)	-(-)
Earll Dr	Thomas Rd	D(E)	B(C)	D(D)	C(C)	F(F)	E(E)	-(-)	-(-)
Thomas Rd	Virginia Ave	C(C)	D(F)	D(D)	D(D)	E(E)	E(F)	-(-)	-(-)
Virginia Ave	Palm Ln	B(B)	B(C)	D(D)	D(D)	F(E)	E(E)	-(-)	-(-)
Palm Ln	McDowell Rd	E(F)	C(C)	E(E)	E(D)	E(E)	F(F)	-(-)	-(-)
McDowell Rd	I-10	F(E)	F(E)	B(B)	C(C)	E(E)	E(E)	-(-)	-(-)
I-10	Roosevelt St	F(D)	C(C)	C(B)	B(B)	E(E)	E(E)	-(A)	A(-)
Entire Facility		**D(D)**	**D(D)**	**C(D)**	**D(D)**	**E(F)**	**E(E)**	**-(-)**	**-(-)**

* X(X) – AM (PM) Peak Hour LOS

4.2.2 Intersection Level-of-Service

The projected 2035 turning movement volumes shown in **Figure 20** and the existing lane geometrics shown in **Figure 5** are used to determine the 2035 level-of-service at the signalized intersections along Third Street. The LOS for the study area intersections was evaluated using *Synchro* software, which utilizes the criteria described in **Table 7**. The 2035 LOS results for the Third Street Corridor are summarized in **Table 17** and depicted in **Figure 22**.

Table 17 – Third Street Corridor 2035 Intersection Level-of Service

Intersection	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Third Street and Indian School Road												
AM Peak Hour	E	D		D	D		D	D	C	D	C	
	E			D			D			C		
	D											
PM Peak Hour	F	D		D	D		C	D	B	D	F	
	F			D			D			F		
	F											
Third Street and Osborn Road												
AM Peak Hour	F	C	C	D	E	D	F	C		F	B	
	D			E			D			F		
	F											
PM Peak Hour	D	C	D	F	D	C	F	F		F	C	
	D			F			F			D		
	E											
Third Street and Earll Drive												
AM Peak Hour	E	A		A	B		C	C		D	D	
	B			B			C			D		
	B											
PM Peak Hour	A	A		A	A		F	D		D	D	
	A			A			F			D		
	C											
Third Street and Thomas Road												
AM Peak Hour	F	F	C	C	F		C	F		F	F	
	F			F			F			F		
	F											
PM Peak Hour	F	F	E	F	F		C	F		C	F	
	F			F			F			F		
	F											
Third Street and Virginia Avenue												
AM Peak Hour	F	B		F	B		C			C		
	D			B			C			C		
	C											
PM Peak Hour	E	B		E	B		C			C		
	B			B			C			C		
	C											
Third Street and Palm Lane												
AM Peak Hour		C			B		C			D		
		C			B		C			D		
		C										
PM Peak Hour		B			C		D			D		
		B			C		D			D		
		C										
Third Street and McDowell Road												
AM Peak Hour	D	F	D	F	E	D	F	F		E	F	
		F			E			F			F	
		F										
PM Peak Hour	E	F	D	F	F	D	D	F		D	F	
		F			F			F			F	
		F										
Third Street and I-10 Ramp												
AM Peak Hour	-	B		B	C	-	-	-	-	E	-	C
		B			B			-			D	
		C										
PM Peak Hour	-	F		C	C	-	-	-	-	C	-	C
		F			C			-			C	
		F										
Third Street and Roosevelt Street												
AM Peak Hour	-	-	-		C			B		F	C	-
		-			C			B			C	
		C										
PM Peak Hour	-	-	-		D			B		E	C	-
		-			D			B			C	
		C										

4.3 Van Buren Street

4.3.1 Roadway Level-of-Service

The 2035 average daily traffic level-of-service was determined using the same methodologies as discussed in ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***. The 2035 average daily traffic LOS for the Van Buren Street corridor are shown in **Table 18**.

Table 18 – Van Buren Street 2035 Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	EB	WB	EB	WB	EB	WB	EB	WB
7th Street	9th Street	A(A)	A(A)	D(D)	D(D)	D(D)	D(D)	A(A)	A(A)
9th Street	11th Street	A(A)	B(B)	D(D)	D(D)	D(D)	D(D)	A(A)	B(B)
11th Street	16th Street	A(B)	A(A)	B(B)	B(C)	E(F)	F(F)	A(A)	A(A)
16th Street	18th Street	B(B)	D(F)	C(C)	D(D)	F(F)	E(E)	A(A)	A(B)
18th Street	20th Street	A(C)	B(C)	D(D)	C(D)	E(E)	E(E)	B(B)	B(B)
20th Street	24th Street	A(C)	A(A)	D(D)	D(D)	E(E)	E(E)	A(A)	A(A)
Entire Facility		**A(B)**	**B(B)**	**C(C)**	**C(D)**	**E(E)**	**E(E)**	**A(A)**	**A(A)**

* X(X) – AM (PM) Peak Hour LOS

4.3.2 Intersection Level-of-Service

The projected 2035 turning movement volumes shown in **Figure 21** and the existing lane geometrics shown in **Figure 12** are used to determine the 2035 level-of-service at signalized intersections along Van Buren Street. The LOS for the study area signalized intersections was evaluated using *Synchro* software, which utilizes the criteria described in **Table 7**. The 2035 LOS for the signalized intersections along Van Buren Street are summarized in **Table 19** and depicted in **Figure 23**.

Table 19 - Van Buren Street Corridor 2035 Intersection Level-of Service

Intersection	Northboung			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Van Buren and 7th Street												
AM Peak Hour	E	C		D	C	C	F	D	D	D	E	
	D			C			D			E		
	D											
PM Peak Hour	E	D		F	D	C	F	D	C	F	F	
	D			F			D			F		
	E											
Van Buren and 9th Street												
AM Peak Hour	C			C			A	A		A	A	
	C			C			A			A		
	A											
PM Peak Hour	C			C			A	A		A	A	
	C			C			A			A		
	A											
Van Buren and 11th Street												
AM Peak Hour	C			C			A	A		A	A	
	C			C			A			A		
	A											
PM Peak Hour	C			C			A	A		A	B	
	C			C			A			B		
	B											
Van Burent and 16th Street												
AM Peak Hour	C	D		C	D		B	B		B	B	
	C			D			B			B		
	C											
PM Peak Hour	C	C		C	D		C	F		D	F	
	C			C			F			F		
	F											
Van Buren and 18th Street												
AM Peak Hour	D			C			A	A		A	A	
	D			C			A			A		
	A											
PM Peak Hour	C			C			A	B		A	A	
	C			C			B			A		
	B											
Van Buren and 20th Street												
AM Peak Hour	F	F		F	F		A	A		A	A	
	F			F			A			A		
	F											
PM Peak Hour	F	F		F	F		F	A		B	A	
	F			F			C			A		
	F											
Van Burent and 24th Street												
AM Peak Hour	B	B		B	B		D	D		C	C	
	B			B			D			C		
	C											
PM Peak Hour	B	B		B	B		C	F		C	D	
	B			B			F			D		
	F											

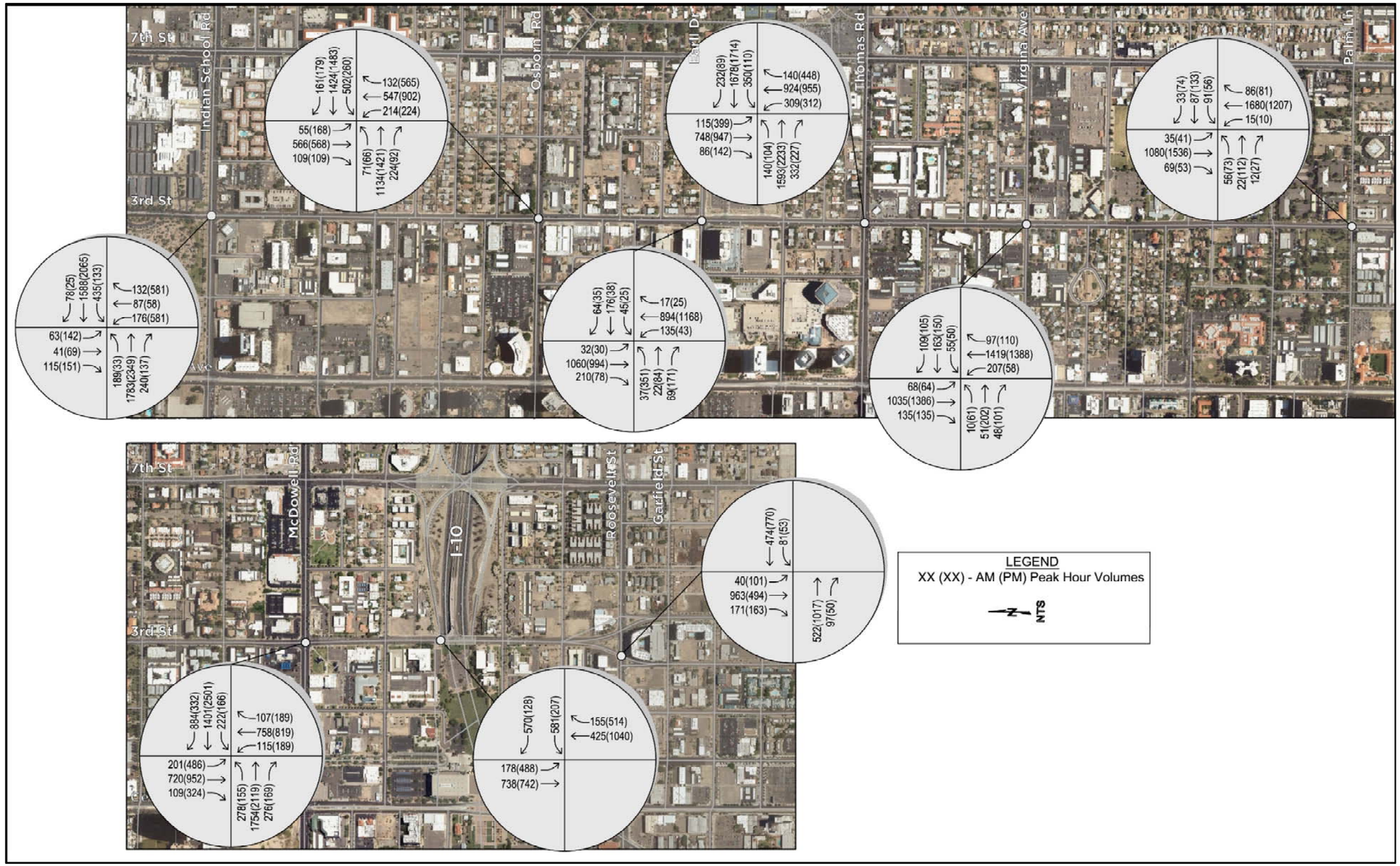

Figure 20 - Third Street Corridor 2035 Intersection Turning Movement Volumes

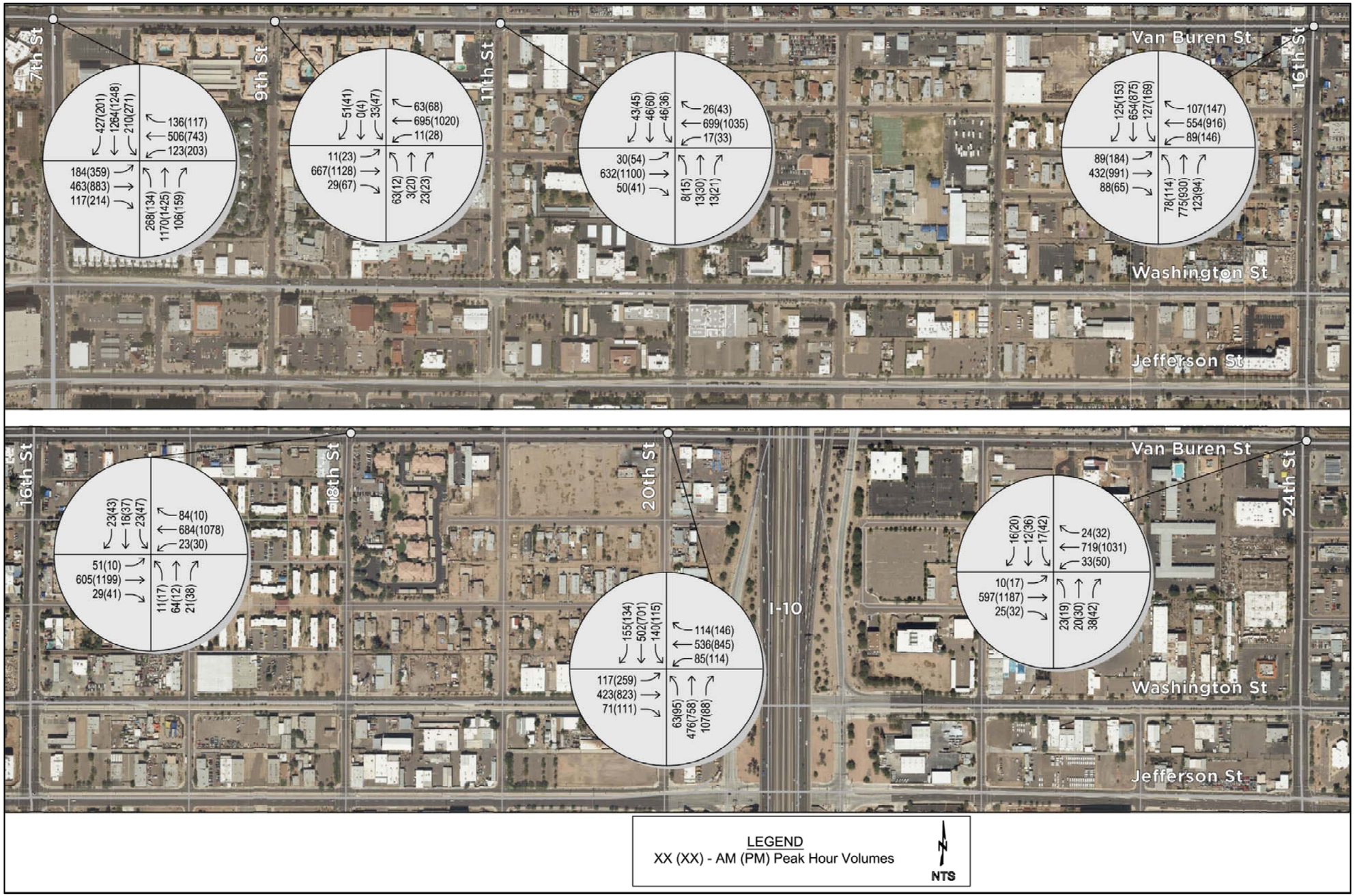

Figure 21 - Van Buren Street Corridor 2035 Intersection Turning Movement Volumes

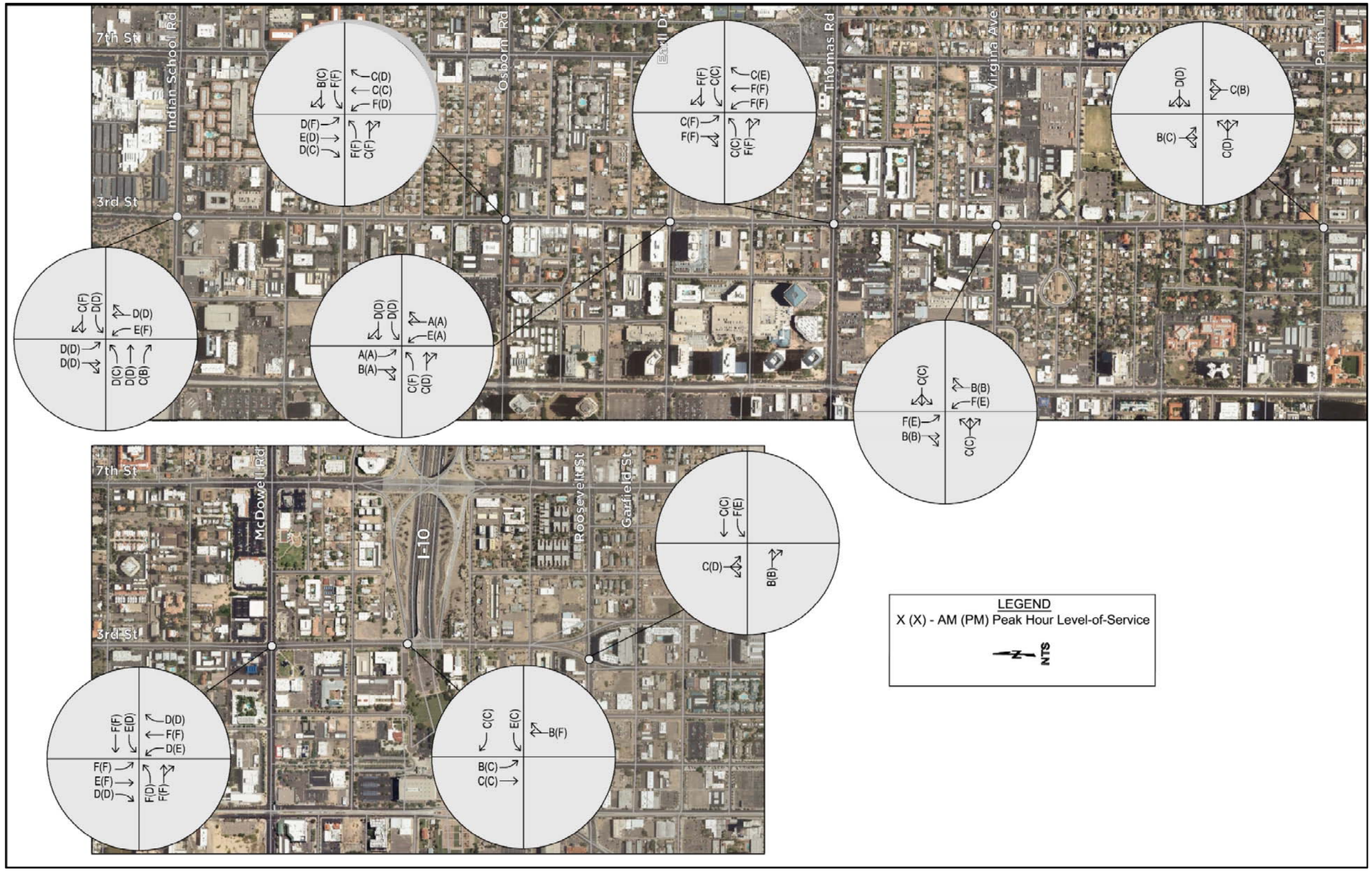

Figure 22 - Third Street Corridor 2035 Intersection Level-of-Service

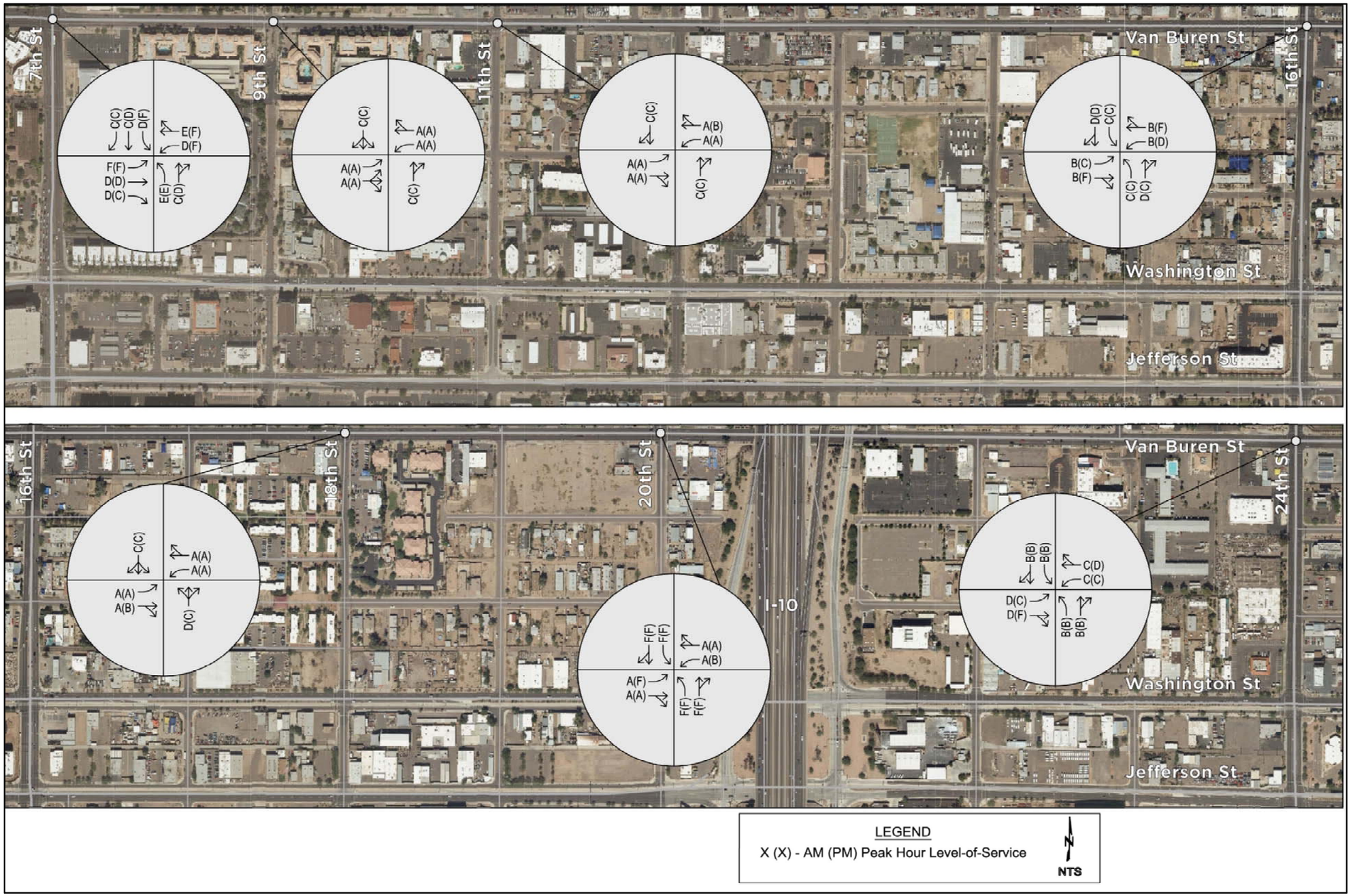

Figure 23 - Van Buren Street 2035 Intersection Level-of-Service

5.0 Design Alternatives

Alternatives were developed collaboratively by involving project team members with the goal to include bike lanes through the Third Street and Van Buren Street corridors while maintaining acceptable level-of-service for vehicular traffic. The following sections summarized the design alternatives developed for the Third Street and Van Buren Street corridors.

5.1 Third Street Alternatives

5.1.1 1-1-1 Alternative with Buffered Bike Lane

The proposed approach of the 1-1-1 Alternative with Buffered Bike Lane for adding bike lanes on Third Street is to eliminate one existing traffic lane in each direction. The existing street width, exclusive turn lanes at the intersections and curb and gutter would not change. The new lane configuration would include one 12-foot travel lane in each direction with a 12-foot two-way left-turn lane. The remaining street width will be used for the 6-foot bike lane and a bike lane buffer.

However, due to the varying width of the corridor, the buffer varies from zero feet at some intersections including Indian School Road, Osborn Road and McDowell Road to 9.5 feet along the segment between Osborn Road and Earll Drive. A raised median separating the bike lane from the travel lane is ideal as it would allow for the installation of shade trees as well as gives bicyclists a sense of safety. A raised median is not practical for the entire length of the segment. Where the buffer widths are less than 5-feet as well as in segments where there is on-street parking and/or a high number of access points, it is recommended to install stamped asphalt in place of a raised median.

The 1-1-1 Alternative with Buffered Bike Lane will also include improving pedestrian amenities along the Third Street Corridor. These improvements will include installing the missing sidewalk along the west side of Third Street at the following locations:

- Palm Lane to 400’ north of Palm Lane;
- 140’ south of Alvarado Road to Alvarado Road; and
- Virginia Avenue to 140’ north of Virginia Avenue.

Other pedestrian improvements include replacing existing pedestrian ramps, installing truncated domes at pedestrian ramps, upgrading existing street lighting with LED light fixtures and installing street furnishings throughout the corridor.

5.1.2 1-1-1 Alternative with Pedestrian Buffer

The proposed approach of the 1-1-1 Alternative with Pedestrian Buffer for adding bike lanes on Third Street is to eliminate one existing traffic lane in each direction. The existing street width and exclusive turn lanes at the intersection would not change. The new lane configuration would include one 10-foot travel lanes in each direction with a 10-foot two-way left-turn lane, a 5-foot bike lane in each direction with a 3-foot striped buffer between the travel lanes and the bike lanes. A three-foot buffer was recommended to allow for future protection of bike lanes. The remaining street width will be converted to a raised pedestrian buffer between the roadway and the sidewalk.

The 1-1-1 Alternative with Pedestrian Buffer will also include improving pedestrian amenities along the Third Street Corridor. These improvements will include installing the missing sidewalk along the west side of Third Street at the following locations:

- Palm Lane to 400’ north of Palm Lane;
- 140’ south of Alvarado Road to Alvarado Road; and
- Virginia Avenue to 140’ north of Virginia Avenue.

Other pedestrian improvements include replacing existing pedestrian ramps, installing truncated domes at pedestrian ramps, upgrading existing street lighting with LED light fixtures and installing street furnishings throughout the corridor.

5.1.3 2-0-2 Alternative

The proposed approach of the 2-0-2 Alternative for adding bike lanes on Third Street is to eliminate the existing two-way left-turn lane. The new lane configuration would include two 10-foot travel lanes in each direction separated by a double yellow stripe. The remaining street width will be used for the 6-foot bike lane and a striped or decorative pavement bike lane buffer. Third Street between Oak Street and Coronado Road is currently striped with 2 lanes in each direction and no two-way left-turn lane. However, the existing roadway width of 54.5 feet will accommodate two 10-foot lanes with a 6-foot bike lane and 2.5-foot buffer in each direction.

To maintain the existing street width and curb and gutter, the striped bike lane at several study area intersections would need to be replaced with a shared travel/bike lane utilizing “sharrows”. To carry striped bike lanes through the intersection of Indian School Road, Osborn Road, Earll Drive, Thomas Road, Virginia Avenue, McDowell Road and I-10, the existing street width and curb and gutter would need to be changed to accommodate the additional width needed for the bike lanes and turn lanes.

The 2-0-2 Alternative will also include improving pedestrian amenities along the Third Street Corridor. These improvements will include installing the missing sidewalk along the west side of Third Street at the following locations:

- Palm Lane to 400’ north of Palm Lane;
- 140’ south of Alvarado Road to Alvarado Road; and
- Virginia Avenue to 140’ north of Virginia Avenue.

Other pedestrian improvements include replacing existing pedestrian ramps, installing truncated domes at pedestrian ramps, upgrading existing street lighting with LED light fixtures and installing street furnishings throughout the corridor.

5.2 Van Buren Street Alternatives

Both alternatives proposed for the Van Buren Street Corridor consist of restriping Van Buren Street to include one travel lane in each direction, a two-way left-turn lane and bike lane in each direction.

The proposed approach of the alternatives for adding bike lanes on Van Buren Street is to eliminate one existing traffic lane in each direction. The existing 56-foot street width and curb and gutter would not change. The new lane

configuration would include one travel lane in each direction with a two-way left-turn lane. The two alternatives were developed to utilize the remaining width for a bike lane buffer with shade trees or a bike lane plus on-street parking. The two alternatives were identified based on the Van Buren Corridor, Bicycle and Pedestrian Improvements Design Assistance report prepared by Gavan and Barker.

The Van Buren Street Corridor currently provides driveway spacing of 50 to 100 feet. Driveways that intersect with separated bike lanes create a potential crash risk due to the conflict between turning vehicles and through bicyclists. The risk is increased at locations where there is poor sight distance due to parked cars, landscaping, and other obstructions. Many of these conflicts can be mitigated through good design that improves visibility and consolidation or relocation of driveways and access to minimize the number of conflict points along the corridor. Therefore, it is recommended that as the corridor re-develops, existing driveways are consolidated or relocated to minimize the number of conflict points prior to the installation of raised median.

Both proposed alternatives will also include improving pedestrian amenities along the Van Buren Street Corridor. These improvements will include adding concrete pavers to widen existing sidewalks, replacing existing pedestrian ramps, installing truncated domes at pedestrian ramps, upgrading existing street lighting with LED light fixtures and installing street furnishings throughout the corridor.

5.2.1 Alternate 1-1-1 with Buffered Bike Lane

The 1-1-1 Alternative with Buffered Bike Lane consists of one 11-foot travel lane in each direction with an 11-foot two-way left-turn lane. This would allow for a 6-foot bike lane with 5-foot raised median buffer separating the travel lane from the bike lane.

5.2.2 Alternative 1-1-1 with On-Street Parking

The 1-1-1 Alternative with On-Street Parking consists of one 10-foot travel lane in each direction with a 10-foot two-way left-turn lane. This would allow for with an 8-foot wide parking space, and a 5-foot wide bike lane between the parking space and the vehicle travel lane.

6.0 Third Street Alternative Analysis

Each alternative was analyzed utilizing Highway Capacity Software and Synchro to determine automobile, pedestrian, bicycle and transit level-of-service for the roadway segment as well as the intersection level-of-service. The following sections summarizes results of the level-of-service analysis for the roadway segment and intersections for the Third Street Corridor alternatives. Additional information is available in the ***Final Technical Memorandum #2 – Analysis of Design Options*** located in the **Appendix** of this report.

6.1 1-1-1 Alternative with Buffered Bike Lane

Based on the existing roadway cross-section along the Third Street Corridor, the following lane geometry was assumed for 1-1-1 Alternative with Buffered Bike Lane and applied to the level-of-service analysis:

- One 12-foot through lane in the northbound and southbound directions between Indian School Road and Garfield Road;
- A 12-foot two-way left-turn lane between Indian Road School Road and Garfield Road;
- One 6-foot bike lane in the northbound and southbound directions between Indian School Road and Garfield Road; and
- Buffer with varying widths between the travel lanes and bike lanes.

6.1.1 Traffic Volume Adjustments for 1-1-1 Alternative with Buffered Bike Lane

For the 1-1-1 Alternative with Buffered Bike Lane analysis, the roadway cross-section along the Third Street Corridor is recommended to include one through lane in each direction with bike lanes and a two-way left-turn lane. With the change in the roadway geometry for the 1-1-1 Alternative with Buffered Bike Lane, it is expected that some of the vehicular traffic existing on the Third Street Corridor will utilize adjacent roadways, transit, walk or bike resulting in reduced vehicular volume on the Third Street Corridor.

MAG completed an assignment run of their regional transportation model assuming Third Street as a three-lane cross-section. An assignment run assumes that the origins and destinations will not change due to increased or decreased capacities in the roadway network. However, what may change are the specific routes taken to reach the origins and destinations.

Based on the adjusted lane configuration model obtained from MAG, a 25% reduction in traffic volumes was applied to the Third Street Corridor for 2015 and a 30% reduction in traffic volumes was applied for 2035. **Table 20** provides the 2015 and 2035 weekday ADT under the 1-1-1 Alternative with Buffered Bike Lane.

Table 20 – 1-1-1 Alternative 2015 and 2035 Weekday ADT along Third Street

Segment		2015 ADT		2035 ADT	
From	To	NB	SB	NB	SB
Indian School Rd	Osborn Rd	3900	3700	5700	5400
Osborn Rd	Earll Dr	5700	5600	8300	8100
Earll Dr	Thomas Rd	5400	5400	7800	7800
Thomas Rd	Virginia Ave	6800	6500	9800	9400
Virginia Ave	Palm Ln	6800	6400	9800	9300
Palm Ln	McDowell Rd	6600	5800	9600	8300
McDowell Rd	I-10	4200	5300	6100	7600
I-10	Roosevelt St	3800	4800	5500	7000

A 25% reduction was applied to the existing 2015 traffic volumes obtained from the City of Phoenix at the signalized study area intersections along the Third Street Corridor to calculate the adjusted 2015 traffic volumes. The adjusted 2015 traffic volumes for the 1-1-1 Alternative with Buffered Bike Lane along Third Street Corridor are shown in **Figure 24**.

As mentioned in ***Section 4.1*** of this report titled ***Growth Rates***, an exponential growth rate of 2.25% was applied to the existing 2015 traffic volumes on Third Street Corridor to obtain the projected 2035 traffic volumes. Based on the MAG traffic volume reductions, a 30% reduction was applied to the projected 2035 traffic volumes at intersections on the Third Street Corridor to calculate the adjusted 2035 traffic volumes for the 1-1-1 Alternative with Buffered Bike Lane. The adjusted 2035 traffic volumes for the 1-1-1 Alternative with Buffered Bike Lane for intersections along Third Street Corridor are shown in **Figure 25**.

6.1.2 1-1-1 Alternative with Buffered Bike Lane Turn Lane Recommendation at Signalized Intersections

Existing turn lanes at the study area signalized intersections along the Third Street Corridor are expected to accommodate the adjusted 2015 traffic volumes shown in **Figure 24**. Therefore, no turn lane improvements are recommended at the signalized intersections along the Third Street Corridor for the 1-1-1 Alternative with Buffered Bike Lane for the year 2015.

For the year 2035, the following turn lane improvements may be suggested and analyzed as growth and development occurs at the signalized intersections along the Third Street Corridor to accommodate the adjusted 2035 traffic volumes shown in **Figure 25**:

- Third Street and Indian School Road – additional left-turn lane in the northbound direction and
- Third Street and I-10 Ramp – exclusive right-turn lane in the northbound direction.

The lane geometry for the 1-1-1 Alternative with Buffered Bike Lane for the years 2015 and 2035 at the study area signalized intersections along the Third Street Corridor are shown in **Figure 26** and **Figure 27**, respectively.

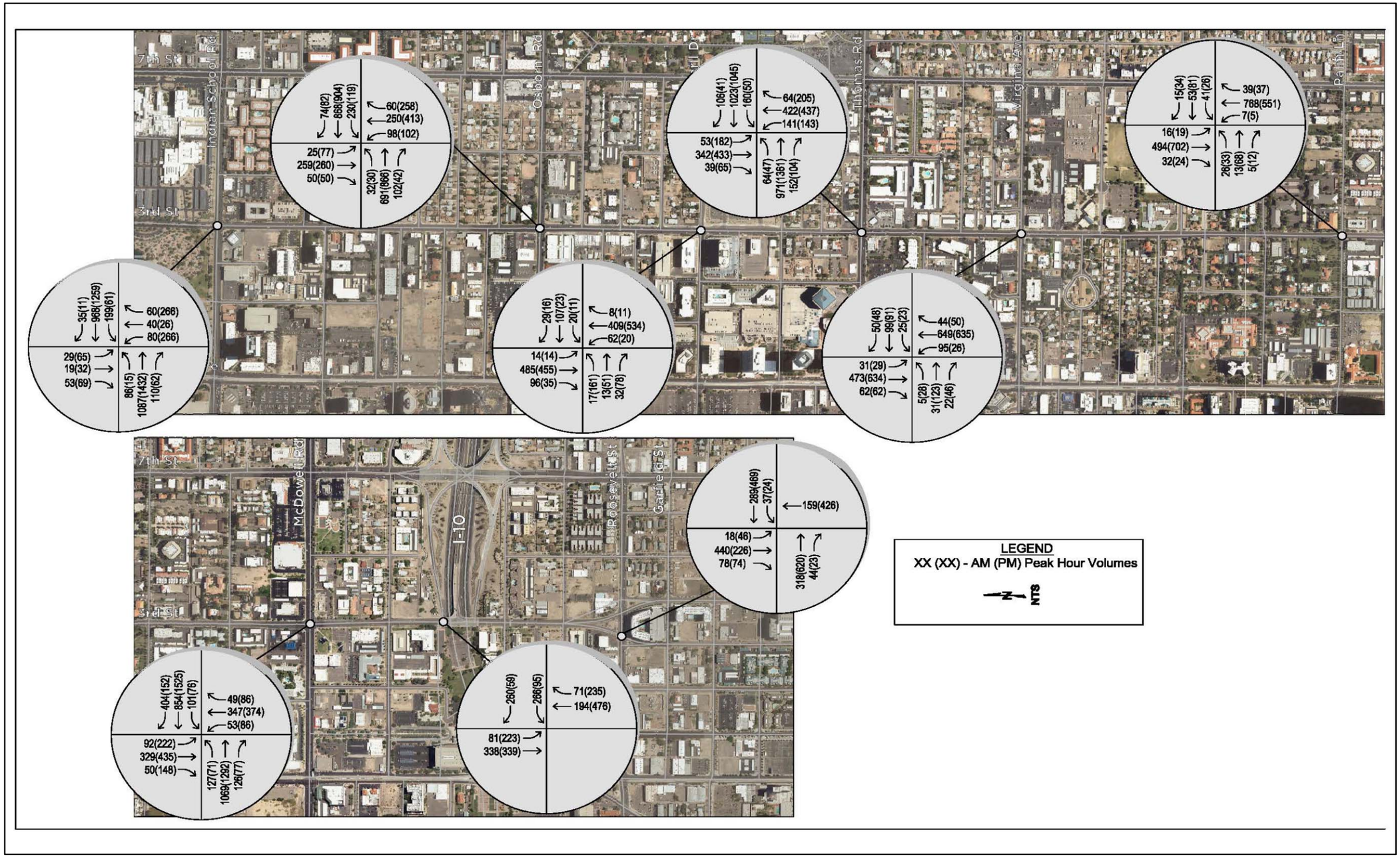

Figure 24 – 1-1-1 Alternative with Buffered Bike Lane 2015 Third Street Turning Movement Volumes

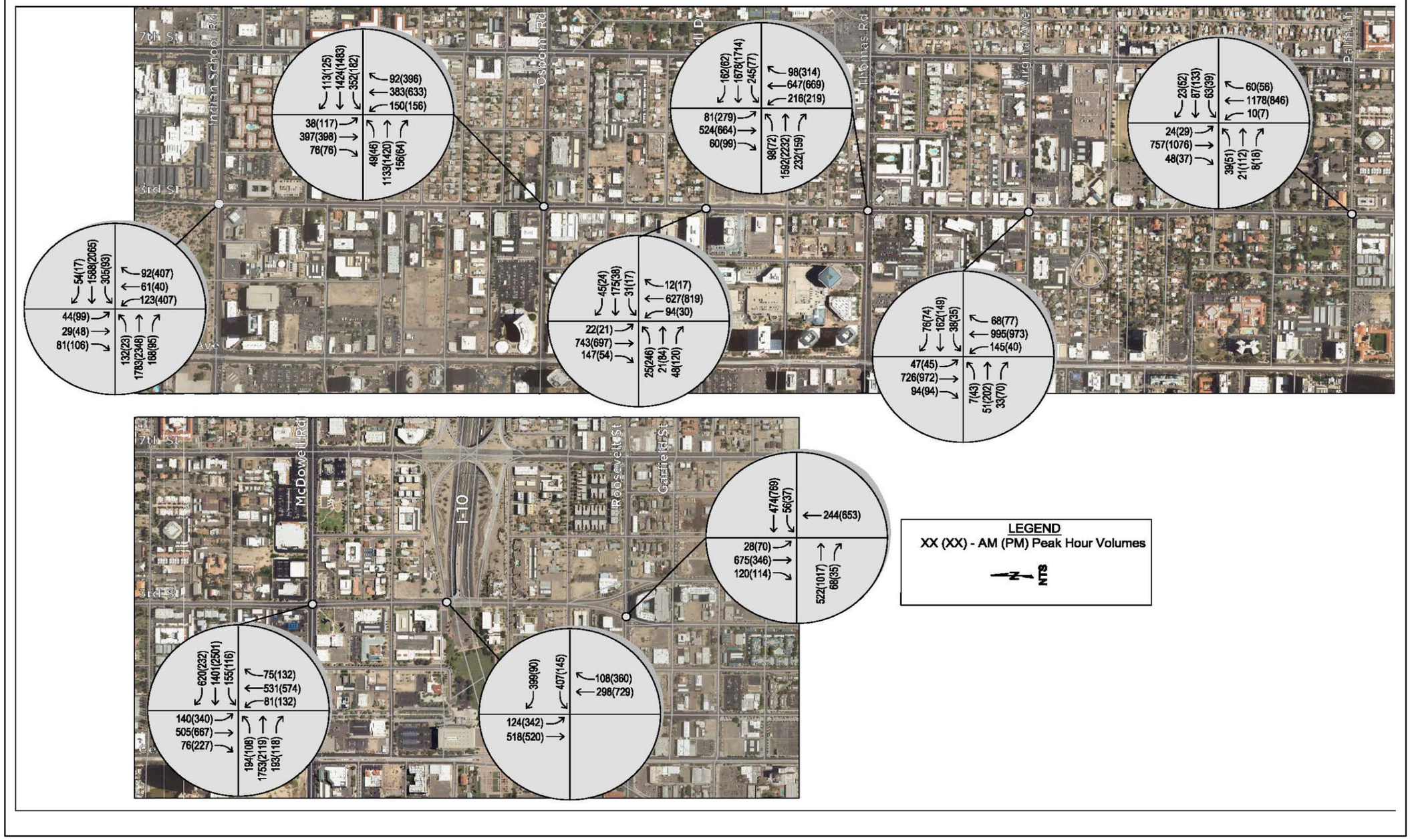

Figure 25 – 1-1-1 Alternative with Buffered Bike Lane 2035 Third Street Turning Movement Volumes

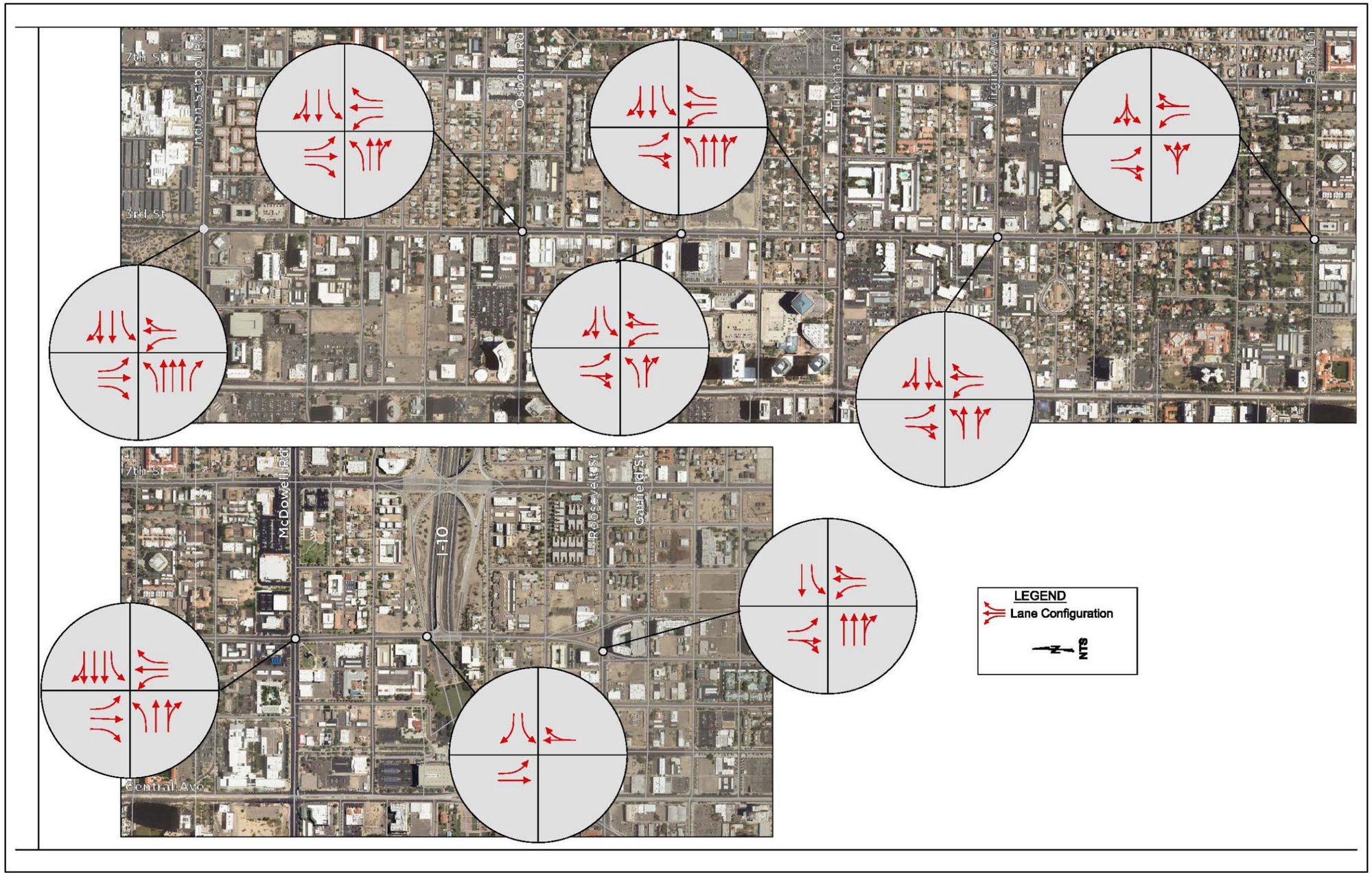

Figure 26 - 1-1-1 Alterative with Buffered Bike Lane 2015 Third Street Lane Geometry

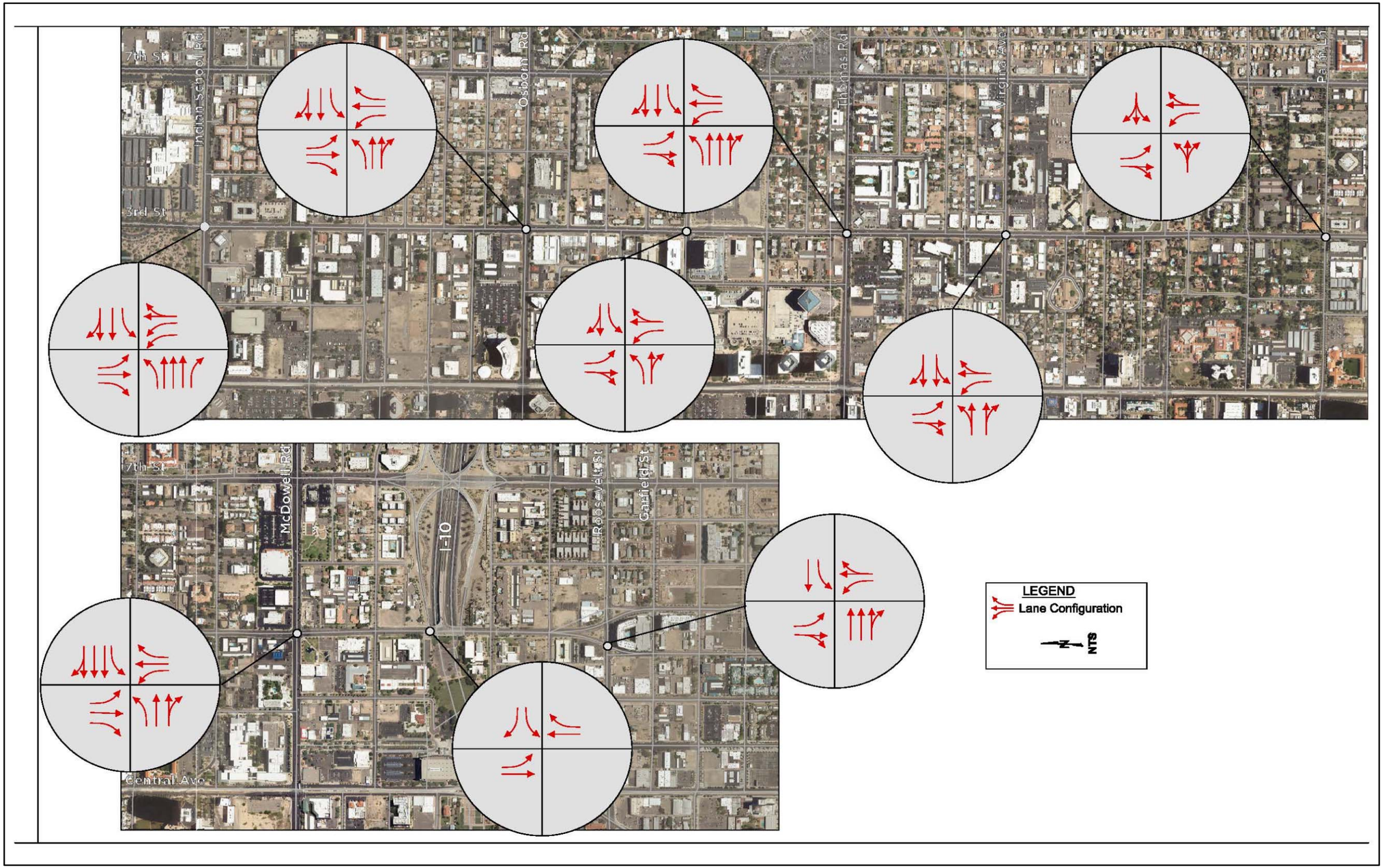

Figure 27 - 1-1-1 Alterative with Buffered Bike Lane 2035 Third Street Lane Geometry

6.1.3 1-1-1 Alternative with Buffered Bike Lane Roadway Segment Level-of-Service

The roadway segment level-of-service for the Third Street Corridor under the 1-1-1 Alternative with Buffered Bike Lane was determined using the same methodology as discussed in ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***. **Table 21** and **Table 22** depicts the roadway segment LOS for the Third Street Corridor with the 1-1-1 Alternative with Buffered Bike Lane for the years 2015 and 2035, respectively.

Table 21 – 1-1-1 Alternative with Buffered Bike Lane 2015 Third Street Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	NB	SB	NB	SB	NB	SB	NB	SB
Indian School Rd	Osborn Rd	B(B)	C(F)	D(C)	D(D)	E(E)	E(E)	-(-)	-(-)
Osborn Rd	Earll Dr	C(C)	E(E)	C(C)	D(D)	D(D)	E(E)	-(-)	-(-)
Earll Dr	Thomas Rd	D(D)	D(D)	C(D)	C(C)	E(E)	D(D)	-(-)	-(-)
Thomas Rd	Virginia Ave	C(C)	E(E)	D(D)	D(D)	D(D)	D(D)	-(-)	-(-)
Virginia Ave	Palm Ln	B(B)	B(B)	C(D)	D(D)	E(E)	D(D)	-(-)	-(-)
Palm Ln	McDowell Rd	E(E)	C(C)	D(D)	D(D)	D(D)	E(E)	-(-)	-(-)
McDowell Rd	I-10	F(E)	F(E)	B(B)	C(B)	D(D)	D(D)	-(-)	-(-)
I-10	Roosevelt St	F(E)	C(C)	B(B)	B(A)	D(D)	D(D)	-(A)	A(-)
Entire Facility		**D(C)**	**D(D)**	**C(C)**	**D(C)**	**D(D)**	**D(D)**	**-(-)**	**-(-)**

* X(X) – AM (PM) Peak Hour LOS

Table 22 – 1-1-1 Alternative with Buffered Bike Lane 2035 Third Street Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	NB	SB	NB	SB	NB	SB	NB	SB
Indian School Rd	Osborn Rd	C(C)	F(F)	D(D)	E(E)	E(E)	E(E)	-(-)	-(-)
Osborn Rd	Earll Dr	C(C)	F(F)	C(C)	D(D)	D(D)	E(E)	-(-)	-(-)
Earll Dr	Thomas Rd	E(E)	D(F)	D(C)	D(D)	E(E)	D(D)	-(-)	-(-)
Thomas Rd	Virginia Ave	B(B)	F(F)	D(D)	D(D)	D(D)	D(E)	-(-)	-(-)
Virginia Ave	Palm Ln	B(B)	B(B)	D(D)	D(D)	E(E)	D(D)	-(-)	-(-)
Palm Ln	McDowell Rd	E(F)	C(B)	E(E)	D(D)	D(D)	E(E)	-(-)	-(-)
McDowell Rd	I-10	F(C)	F(E)	B(B)	C(C)	D(D)	D(D)	-(-)	-(-)
I-10	Roosevelt St	F(F)	C(B)	C(B)	B(B)	D(D)	D(D)	-(B)	A(-)
Entire Facility		**E(D)**	**F(E)**	**C(C)**	**D(D)**	**D(E)**	**E(E)**	**-(-)**	**-(-)**

* X(X) – AM (PM) Peak Hour LOS

As shown in **Table 21**, the overall facility LOS for the Third Street Corridor is expected to be "D" or better in 2015 during the AM and PM peak hours with the adjusted 2015 traffic volumes and 1-1-1 Alternative with Buffered Bike Lane lane geometrics.

As shown in **Table 22**, the overall facility LOS for the Third Street Corridor is expected to be "E" or better in 2035 during the AM and PM peak hours with the adjusted 2035 traffic volumes and 1-1-1 Alternative with Buffered Bike Lane lane geometrics with the exception of the automobile LOS during and AM peak hour in the southbound direction.

6.1.4 1-1-1 Alternative with Buffered Bike Lane Intersection Level-of-Service

The LOS for the study area signalized intersections was evaluated using *Synchro* software, which utilizes the criteria described in **Table 7** and the 2015 and 2035 traffic volumes shown in **Figure 24** and **Figure 25**. The level-of-service for individual turning movements, approach and overall intersection level-of-service for the signalized study area intersections along the Third Street Corridor for the years 2015 and 2035 are shown in **Table 23** and **Table 24**, respectively. The 2015 and 2035 level-of-service for the signalized intersections along the Third Street Corridor for the 1-1-1 Alternative with Buffered Bike Lane are shown in **Figure 28** and **Figure 29**, respectively.

Table 23 – 1-1-1 Alternative with Buffered Bike Lane 2015 Third Street Signalized Intersections LOS

Intersection	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Third Street and Indian School Road												
AM Peak Hour	C	D		D	D	D	A	B	A	A	B	
		D			D			B			A	
					B							
PM Peak Hour	C	C		D	D	D	B	B	B	A	B	
		C			D			B			B	
					B							
Third Street and Osborn Road												
AM Peak Hour	C	C	C	C	D	C	B	C		B	B	
		C			D			C			B	
					B							
PM Peak Hour	C	C	B	C	C	C	B	C		B	B	
		C			C			C			B	
					C							
Third Street and Earll Drive												
AM Peak Hour	A	A		A	A		C	C		C	C	
		A			A			C			C	
					B							
PM Peak Hour	A	A		A	A		C	C		D	D	
		A			A			C			D	
					B							
Third Street and Thomas Road												
AM Peak Hour	C	D	C	C	D		B	C		B	C	
		C			D			C			C	
					C							
PM Peak Hour	C	D	C	C	D		C	D		C	D	
		C			D			D			D	
					D							
Third Street and Virginia Avenue												
AM Peak Hour	B	C		B	B		B			B		
		C			B			B			B	
					C							
PM Peak Hour	B	C		B	C		B			B		
		C			C			B			B	
					C							
Third Street and Palm Lane												
AM Peak Hour	A	B		A	B		C			C		
		B			B			C			C	
					B							
PM Peak Hour	A	B		A	B		C			C		
		B			B			C			C	
					B							
Third Street and McDowell Road												
AM Peak Hour	C	D	C	C	D	C	B	C		B	C	
		D			D			C			C	
					C							
PM Peak Hour	C	D	C	C	D	C	C	E		C	C	
		D			C			D			C	
					D							
Third Street and I-10 Ramp												
AM Peak Hour	-	B		A	B	-	-	-	-	C	-	B
		B			B			-			C	
					B							
PM Peak Hour	-	C		A	A	-	-	-	-	C	-	C
		C			A			-			C	
					B							
Third Street and Roosevelt Street												
AM Peak Hour		B		B	C			A		A	B	-
		B			C			A			B	
					B							
PM Peak Hour		C		C	C			A		A	B	-
		C			C			A			B	
					B							

Table 24 – 1-1-1 Alternative with Buffered Bike Lane 2035 Third Street Signalized Intersections LOS

Intersection	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Third Street and Indian School Road												
AM Peak Hour	D	D		D	D	D	C	C	B	D	C	
		D			D			C			C	
					C							
PM Peak Hour	D	D		C	D	D	C	E	B	B	F	
		D			C			E			F	
					F							
Third Street and Osborn Road												
AM Peak Hour	F	D	C	C	E	C	C	D		F	C	
		E			E			D			D	
					D							
PM Peak Hour	D	F	D	F	D	C	C	E		F	E	
		E			E			E			F	
					E							
Third Street and Earll Drive												
AM Peak Hour	D	B		A	C		C	C		C	C	
		B			C			C			C	
					C							
PM Peak Hour	A	C		B	B		C	C		C	C	
		C			B			C			C	
					C							
Third Street and Thomas Road												
AM Peak Hour	F	F	C	D	F		E	D		F	F	
		F			F			D			F	
					F							
PM Peak Hour	F	F	C	F	F		D	F		C	F	
		F			F			F			F	
					F							
Third Street and Virginia Avenue												
AM Peak Hour	B	C		B	B		C			C		
		C			B			C			C	
					C							
PM Peak Hour	A	C		B	C		C			C		
		C			C			C			C	
					C							
Third Street and Palm Lane												
AM Peak Hour	A	D		B	B		D			D		
		D			B			D			D	
					C							
PM Peak Hour	A	B		A	C		D			D		
		B			C			D			D	
					C							
Third Street and McDowell Road												
AM Peak Hour	D	F	D	F	F	D	F	F		F	D	
		F			F			F			D	
					F							
PM Peak Hour	E	F	C	F	F	C	E	F		F	F	
		F			F			F			F	
					F							
Third Street and I-10 Ramp												
AM Peak Hour	-	B	B	A	C	-	-	-	-	C	-	B
		B			B			-			C	
					B							
PM Peak Hour	-	C	B	C	B	-	-	-	-	D	-	C
		B			B			-			D	
					B							
Third Street and Roosevelt Street												
AM Peak Hour		B		B	D			C		D	E	-
		B			D			C			E	
					D							
PM Peak Hour		C		E	B			C		D	F	-
		C			C			C			F	
					F							

As shown in **Table 23**, the overall intersection level-of-service for all the signalized intersections on the Third Street Corridor is "D" or better during the AM and PM peak hours with adjusted 2015 traffic volumes and 1-1-1 Alternative with Buffered Bike Lane lane configurations for the year 2015.

The approach level-of-service shown in **Table 23** is "D" or better at the study area signalized intersections on the Third Street Corridor with the exception of the intersection of Third Street and McDowell Road. The southbound approach at the intersection of Third Street and McDowell Road operates at level-of-service "E" during the PM peak hour with the southbound left-turn movement operating at level-of-service "F".

As shown in **Table 24**, the overall intersection level-of-service is expected to be "D" or better during the AM and PM peak hours at the following signalized intersections along the Third Street Corridor with adjusted 2035 traffic volumes and 1-1-1 Alternative with Buffered Bike Lane lane configurations for the year 2035:

- Third Street and Earll Drive;
- Third Street and Virginia Avenue;
- Third Street and Palm Lane; and
- Third Street and I-10 Ramp.

The overall intersection level-of-service shown in **Table 24** is expected to be "E" or "F" during the AM and/or PM peak hours at the following intersections along the Third Street Corridor with adjusted 2035 traffic volumes and 1-1-1 Alternative with Buffered Bike Lane lane configurations for the year 2035:

- Third Street and Indian School Road during the PM peak hour;
- Third Street and Osborn Road during the PM peak hour;
- Third Street and Thomas Road during both the AM and PM peak hours;
- Third Street and McDowell Road during both the AM and PM peak hours; and
- Third Street and Roosevelt Street during the PM peak hour.

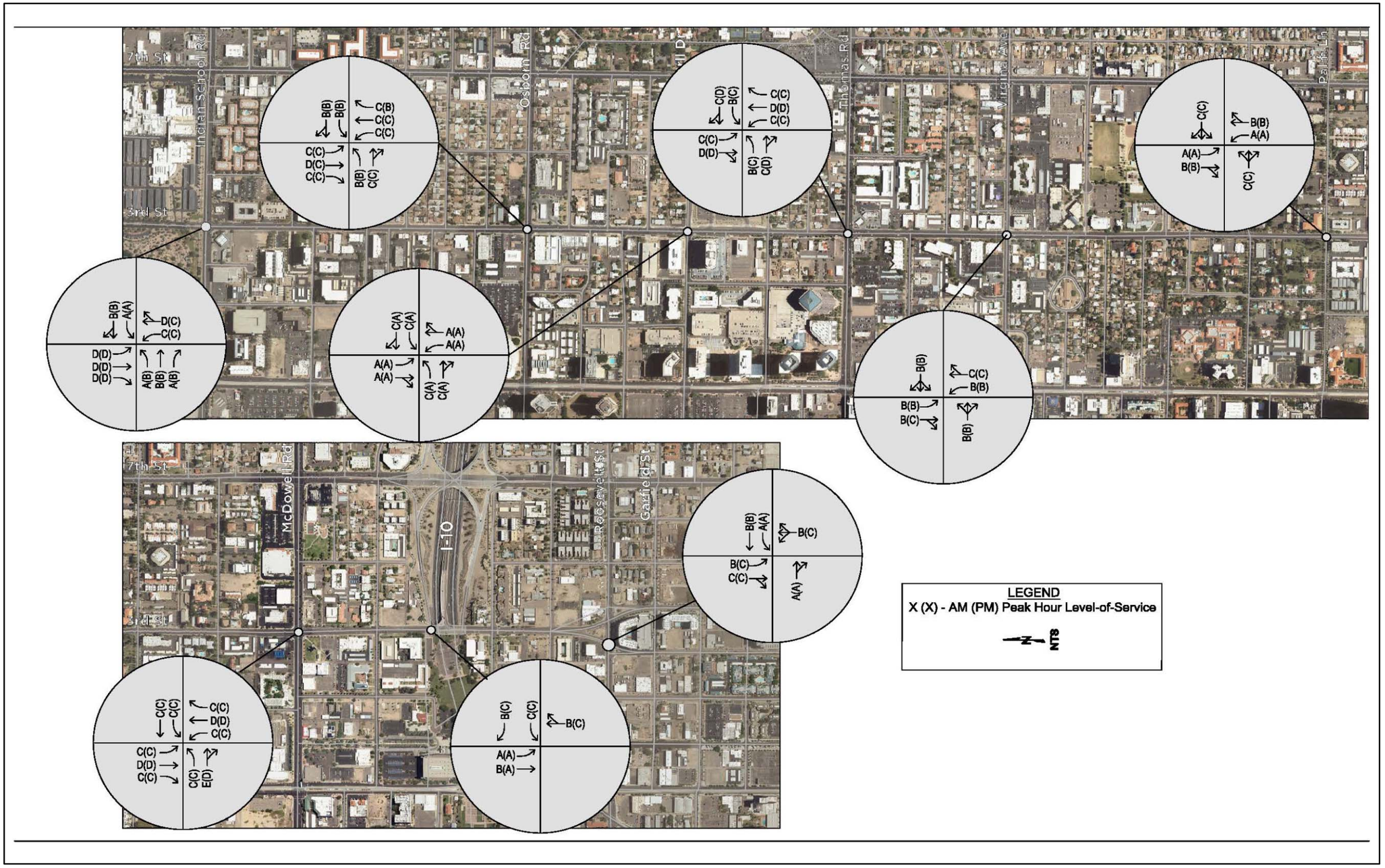

Figure 28 – 1-1-1 Alternative with Buffered Bike Lane 2015 Third Street Signalized Intersections LOS

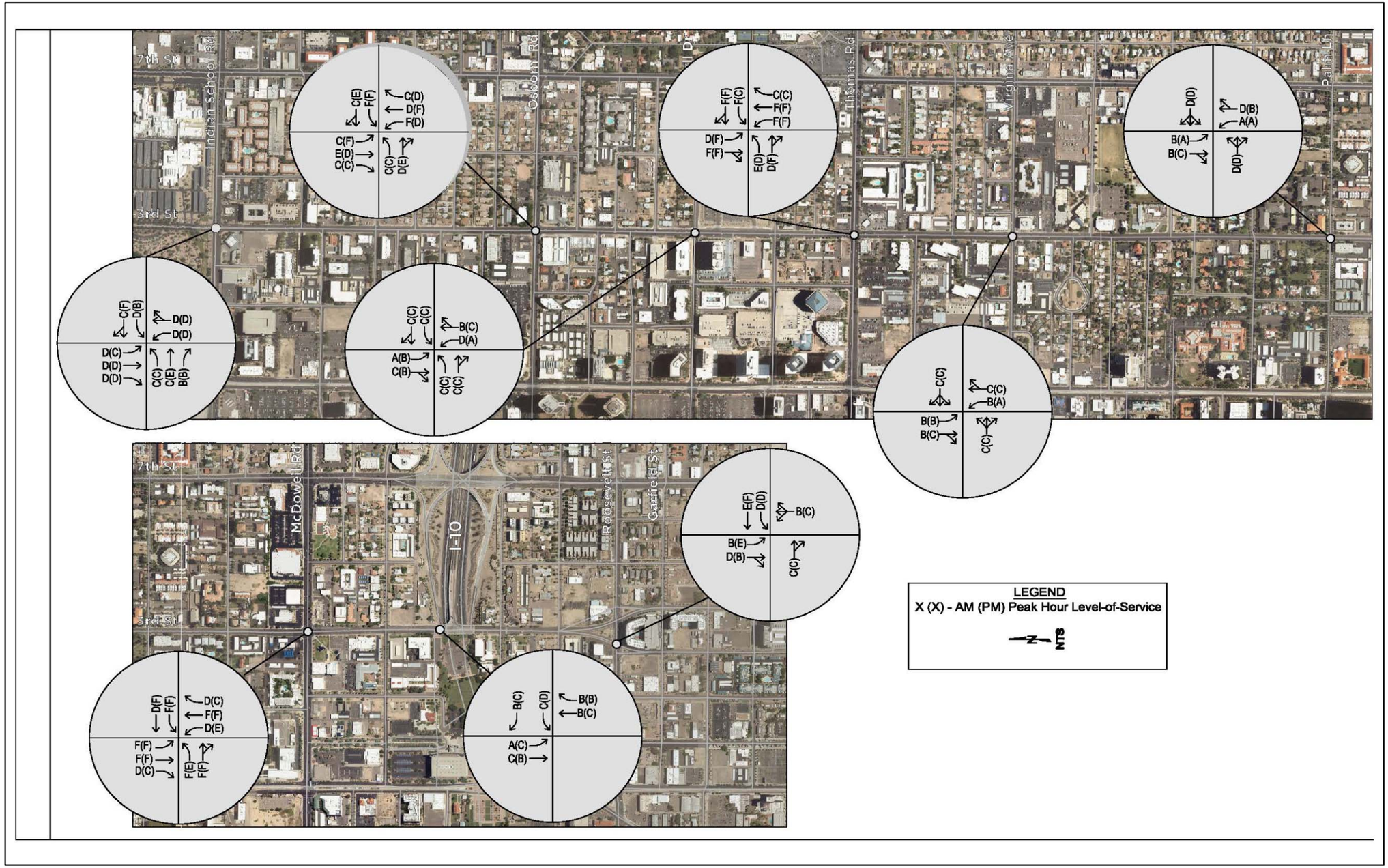

Figure 29 – 1-1-1 Alternative with Buffered Bike Lane 2035 Third Street Signalized Intersections LOS

6.2 1-1-1 Alternative with Pedestrian Buffer

Based on the existing roadway cross-section along the Third Street Corridor, the following lane geometry was assumed for Alternative 1-1-1 with Pedestrian Buffer and applied to the level-of-service analysis:

- One 10-foot through lane in the northbound and southbound directions between Indian School Road and Garfield Road;
- A 10-foot two-way left-turn lane between Indian Road School Road and Garfield Road;
- One 5-foot bike lane in the northbound and southbound directions between Indian School Road and Garfield Road;
- Three foot striped buffer between the travel lane and the bike lanes; and
- Raised pedestrian buffer with varying widths between the roadway and sidewalk.

6.2.1 Traffic Volumes Adjustment for 1-1-1 Alternative with Pedestrian Buffer

For the 1-1-1 Alternative with Pedestrian Buffer analysis, the roadway cross-section along the Third Street Corridor is recommended to include one through lane in each direction with bike lanes and a two-way left-turn lane, similar to the 1-1-1 Alternative with Buffered Bike Lane. With the change in the roadway geometry for the 1-1-1 Alternative with Pedestrian Buffer analysis, it is expected that some of the vehicular traffic existing on the Third Street Corridor will utilize other roadway alternatives resulting in reduced vehicular volume on Third Street.

The traffic volumes for the Third Street Corridor under the 1-1-1 Alternative with Pedestrian Buffer was determined using the same methodology discussed in ***Section 6.1.1*** of this report titled ***Traffic Volume Adjustment for 1-1-1 Alternative with Buffered Bike Lane***. A 25% reduction in traffic volumes was applied to the Third Street Corridor for 2015 and a 30% reduction in traffic volumes was applied for 2035. **Table 20** provides the 2015 and 2035 weekday ADT under the 1-1-1 Alternative with Pedestrian Buffer.

A 25% reduction was applied to the existing 2015 traffic volumes obtained from the City of Phoenix at the signalized study area intersections along the Third Street Corridor to calculate the adjusted 2015 traffic volumes. The adjusted 2015 traffic volumes for the 1-1-1 Alternative with Pedestrian Buffer along the Third Street Corridor are shown in **Figure 24**.

As mentioned in ***Section 4.1*** of this report titled ***Growth Rates***, an exponential growth rate of 2.25% was applied to the existing 2015 traffic volumes on the Third Street Corridor to obtain the projected 2035 traffic volumes. Based on the MAG traffic volume reductions, a 30% reduction was applied to the projected 2035 traffic volumes at intersections along the Third Street Corridor to calculate the adjusted 2035 traffic volumes for the 1-1-1 Alternative with Pedestrian Buffer. The adjusted 2035 traffic volumes for the 1-1-1 Alternative with Pedestrian Buffer for intersections along the Third Street Corridor are shown in **Figure 25**.

6.2.2 Turn Lane Recommendations at Signalized Intersections

Similar to the 1-1-1 Alternative with Buffered Bike Lane, existing turn lanes at the study area signalized intersections along the Third Street Corridor are expected to accommodate the adjusted 2015 traffic volumes shown in **Figure 24**. Therefore, no turn lane improvements are recommended at the signalized intersections along the Third Street Corridor for 1-1-1 Alternative with Pedestrian Buffer for year 2015.

For the year 2035, the following turn lane improvements may be suggested and analyzed as growth and development occurs at the signalized intersections along the Third Street Corridor to accommodate the adjusted 2035 traffic volumes shown in **Figure 25**:

- Third Street and Indian School Road – additional left-turn lane in the northbound direction and
- Third Street and I-10 Ramp – exclusive right-turn lane in the northbound direction.

The lane geometry for 1-1-1 Alternative with Pedestrian Buffer for the years 2015 and 2035 at the study area signalized intersections along the Third Street Corridor are shown in **Figure 26** and **Figure 27**, respectively.

6.2.3 1-1-1 Alternative with Pedestrian Buffer Roadway Segment Level-of-Service

The roadway segment level-of-service for the Third Street Corridor under the 1-1-1 Alternative with Pedestrian Buffer was determined using the same methodology as discussed in ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***. **Table 25** and **Table 26** depict the roadway segment LOS for the Third Street Corridor for the years 2015 and 2035, respectively, under the 1-1-1 Alternative with Pedestrian Buffer conditions.

Table 25 – 1-1-1 Alternative with Pedestrian Buffer 2015 Third Street Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	NB	SB	NB	SB	NB	SB	NB	SB
Indian School Rd	Osborn Rd	B(B)	C(C)	D(C)	D(D)	E(E)	E(E)	-(-)	-(-)
Osborn Rd	Earll Dr	C(C)	E(E)	C(C)	D(D)	D(E)	E(E)	-(-)	-(-)
Earll Dr	Thomas Rd	D(D)	D(D)	C(D)	C(C)	E(E)	D(D)	-(-)	-(-)
Thomas Rd	Virginia Ave	C(C)	E(E)	C(D)	D(D)	D(D)	E(E)	-(-)	-(-)
Virginia Ave	Palm Ln	B(B)	B(B)	C(D)	D(D)	E(E)	D(D)	-(-)	-(-)
Palm Ln	McDowell Rd	E(E)	C(C)	D(E)	D(D)	D(D)	E(E)	-(-)	-(-)
McDowell Rd	I-10	F(E)	F(E)	B(B)	C(B)	D(D)	D(D)	-(-)	-(-)
I-10	Roosevelt St	F(E)	C(C)	B(B)	B(A)	D(D)	D(D)	-(A)	A(-)
Entire Facility		**D(C)**	**D(C)**	**C(C)**	**D(C)**	**E(E)**	**E(E)**	**-(-)**	**-(-)**

Table 26 – 1-1-1 Alternative with Pedestrian Buffer 2035 Third Street Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	NB	SB	NB	SB	NB	SB	NB	SB
Indian School Rd	Osborn Rd	C(C)	C(C)	D(D)	E(E)	E(E)	E(E)	-(-)	-(-)
Osborn Rd	Earll Dr	C(C)	F(F)	C(C)	D(D)	D(E)	E(E)	-(-)	-(-)
Earll Dr	Thomas Rd	E(E)	D(F)	D(C)	D(D)	E(E)	D(D)	-(-)	-(-)
Thomas Rd	Virginia Ave	B(B)	F(F)	D(D)	D(D)	D(E)	E(E)	-(-)	-(-)
Virginia Ave	Palm Ln	B(B)	B(B)	C(D)	D(D)	E(E)	D(E)	-(-)	-(-)
Palm Ln	McDowell Rd	E(F)	C(B)	E(E)	D(D)	D(D)	E(E)	-(-)	-(-)
McDowell Rd	I-10	F(C)	F(E)	B(B)	C(C)	D(D)	D(D)	-(-)	-(-)
I-10	Roosevelt St	F(F)	C(B)	C(B)	B(B)	D(D)	D(D)	-(B)	A(-)
Entire Facility		**E(D)**	**E(E)**	**C(C)**	**D(D)**	**E(E)**	**E(E)**	**-(-)**	**-(-)**

As shown in **Table 25**, the overall facility LOS for the Third Street Corridor is expected to be "D" or better in 2015 during the AM and PM peak hours with the adjusted 2015 traffic volumes and 1-1-1 Alternative with Pedestrian Buffer lane geometrics with the exception of the bicycle mode.

As shown in **Table 26**, the overall facility LOS for the Third Street Corridor is expected to be "E" or better in 2035 during the AM and PM peak hours with the adjusted 2035 traffic volumes and 1-1-1 Alternative with Pedestrian Buffer lane geometrics.

6.2.4 1-1-1 Alternative with Pedestrian Buffer Intersection Level-of-Service

The intersection level-of-service for the Third Street Corridor under the 1-1-1 Alternative with Pedestrian Buffer was determined using the same methodology discussed in the ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***.

With the turning movement volumes, lane geometry and signal timing used for the 1-1-1 Alternative with Pedestrian Buffer analysis the same as the 1-1-1 Alternative with Buffered Bike Lane analysis, the intersection level-of-service results will also be the same and no additional analysis was completed for the intersections within the Third Street Corridor for this alternative.

The 2015 level-of-service for the signalized intersections for the 1-1-1 Alternative along the Third Street Corridor are shown in **Table 23** and **Figure 28**. The 2035 level-of-service for the intersection along Third Street Corridor for the 1-1-1 Alternative are shown in **Table 24** and **Figure 29**.

6.3 2-0-2 Alternative

Based on the existing roadway cross-section along the Third Street Corridor, the following lane geometry was assumed for the 2-0-2 Alternative and applied to the level-of-service analysis:

- Two 10-foot through lanes in the northbound and southbound directions between Indian School Road and Roosevelt Street;
- One 6-foot bike lane in the northbound and southbound directions between Indian School Road and Garfield Road;
- Buffer with varying widths between the travel lanes and bike lanes; and
- Shared travel/bike lanes at the intersections of Indian School Road, Osborn Road, Earll Drive, Thomas Road, Virginia Avenue, McDowell Road and I-10.

6.3.1 Traffic Volumes for 2-0-2 Alternative

The existing two lanes in each direction along the Third Street Corridor will remain for Alternative 2-0-2 analysis. The center two-way left-turn lane will be removed and bike lanes will be striped in the northbound and southbound directions; however, left-turn lanes will still exist at the intersections. This change in the roadway geometry for Alternative 2-0-2 is not expected to change the existing vehicular traffic patterns along the Third Street Corridor. Therefore, the existing 2015 traffic volumes for the intersections along the Third Street Corridor shown in **Figure 16** were used for the 2-0-2 Alternative analysis.

As mentioned in ***Section 4.1*** of this report titled ***Growth Rates***, an exponential growth rate of 2.25% was applied to the existing 2015 traffic volumes on the Third Street Corridor to obtain the projected 2035 traffic volumes. Projected 2035 traffic volumes at the intersections along the Third Street Corridor are shown in **Figure 20** and used for 2-0-2 Alternative analysis.

6.3.2 2-0-2 Alternative Turn Lane Recommendation at Signalized Intersections

Existing turn lanes at the study area signalized intersections along the Third Street Corridor are expected to accommodate the existing 2015 traffic volumes shown in **Figure 16**. Therefore, no turn lane improvements are recommended at the signalized intersections along the Third Street Corridor for the 2-0-2 Alternative for the year 2015.

For the year 2035, the following turn lane improvements are recommended at the signalized intersections along the Third Street Corridor to accommodate the adjusted 2035 traffic volumes shown in **Figure 20**:

- Third Street and Indian School Road – additional left-turn lane in the northbound direction and
- Third Street and I-10 Ramp – exclusive right-turn lane in the northbound direction.

The intersection control and lane geometry for the 2-0-2 Alternative for the years 2015 and 2035 at the study area signalized intersections along the Third Street Corridor are shown in **Figure 30** and **Figure 31**, respectively.

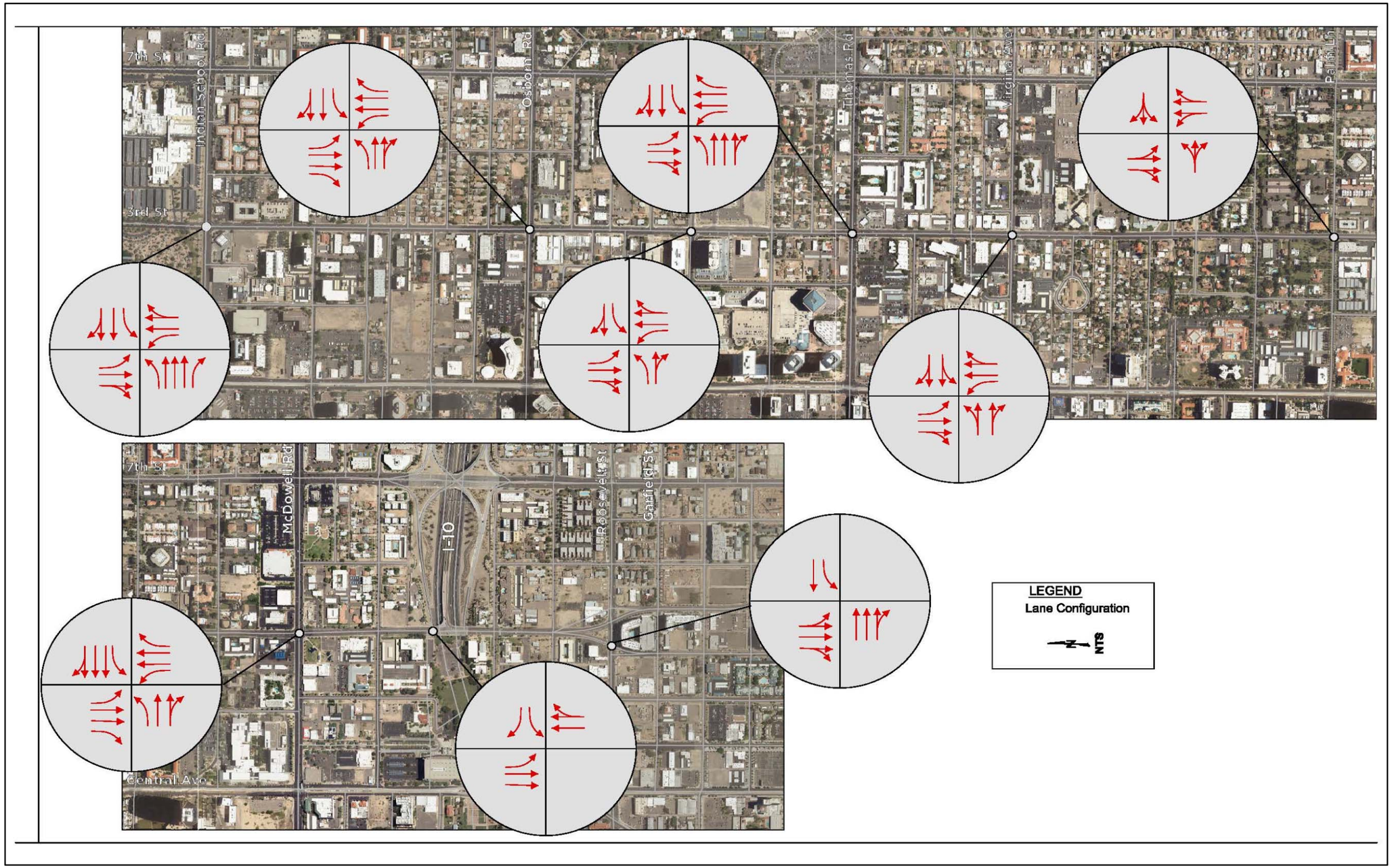

Figure 30 – 2-0-2 Alterative 2015 Third Street Lane Geometry

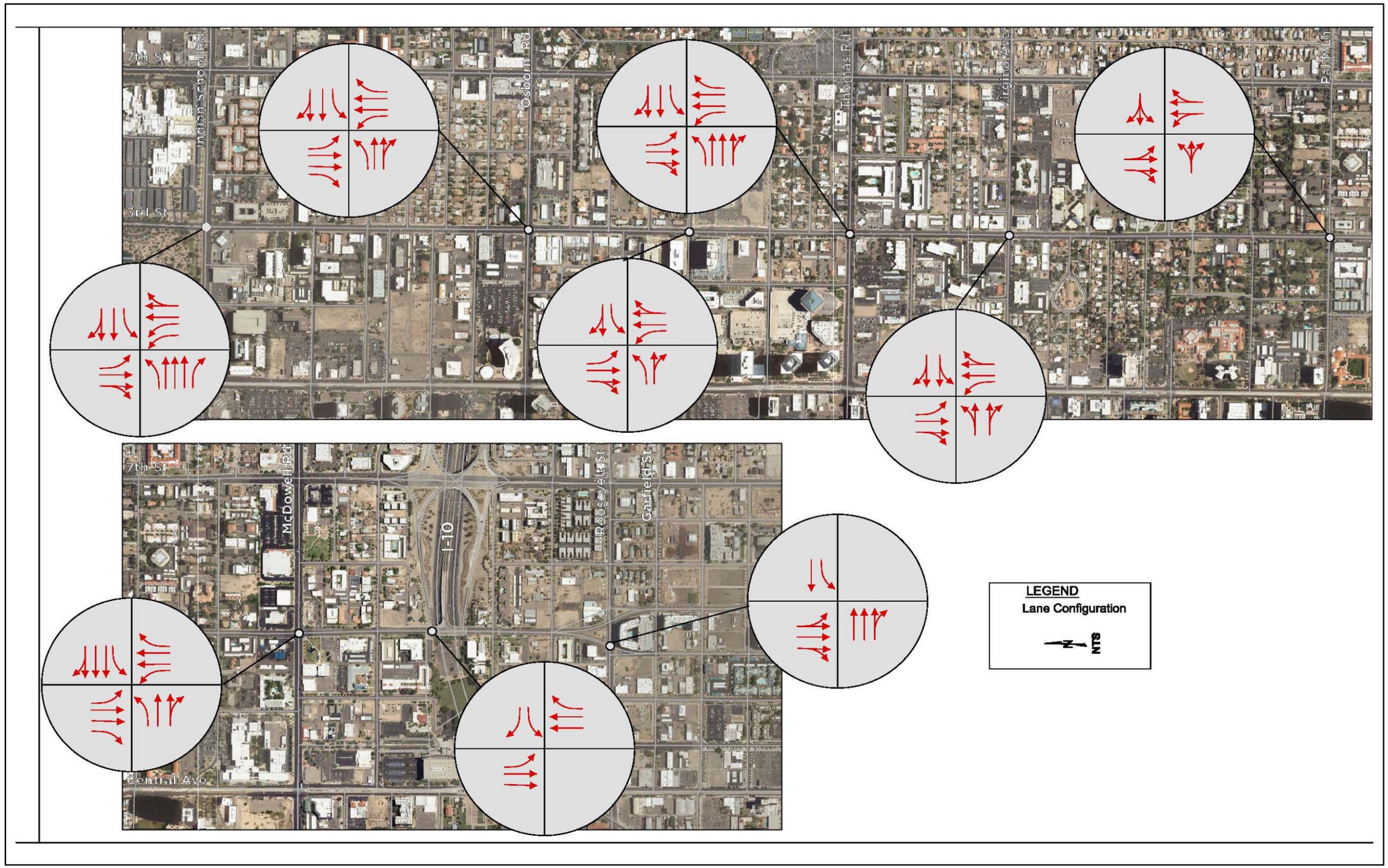

Figure 31 – 2-0-2 Alterative 2035 Third Street Lane Geometry

6.3.3 2-0-2 Alternative Roadway Segment Level-of-Service

The roadway segment level-of-service for the Third Street Corridor under the 2-0-2 Alternative was determined using the same methodology as discussed in ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***. **Table 27** and **Table 28** depict the roadway segment LOS for the Third Street Corridor for the years 2015 and 2035, respectively, under the 2-0-2 Alternative conditions.

Table 27 – 2-0-2 Alternative 2015 Third Street Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	NB	SB	NB	SB	NB	SB	NB	SB
Indian School Rd	Osborn Rd	C(B)	C(C)	D(D)	D(D)	E(E)	E(E)	-(-)	-(-)
Osborn Rd	Earll Dr	C(C)	E(D)	C(C)	C(D)	D(D)	E(E)	-(-)	-(-)
Earll Dr	Thomas Rd	D(E)	C(C)	C(D)	C(C)	E(E)	D(D)	-(-)	-(-)
Thomas Rd	Virginia Ave	C(C)	E(E)	D(D)	D(D)	D(D)	E(E)	-(-)	-(-)
Virginia Ave	Palm Ln	B(B)	B(B)	C(D)	D(D)	E(E)	D(D)	-(-)	-(-)
Palm Ln	McDowell Rd	E(E)	C(C)	D(E)	D(D)	D(D)	E(E)	-(-)	-(-)
McDowell Rd	I-10	D(D)	E(D)	B(B)	B(B)	D(D)	D(D)	-(-)	-(-)
I-10	Roosevelt St	F(D)	C(C)	B(B)	B(A)	D(D)	D(D)	-(A)	A(-)
Entire Facility		**D(C)**	**D(C)**	**C(C)**	**C(C)**	**E(E)**	**E(E)**	**-(-)**	**-(-)**

* X(X) – AM (PM) Peak Hour LOS

Table 28 – 2-0-2 Alternative 2035 Third Street Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	NB	SB	NB	SB	NB	SB	NB	SB
Indian School Rd	Osborn Rd	B(B)	D(D)	D(D)	D(E)	E(E)	E(E)	-(-)	-(-)
Osborn Rd	Earll Dr	C(C)	E(E)	C(C)	D(D)	D(D)	E(E)	-(-)	-(-)
Earll Dr	Thomas Rd	E(E)	C(D)	C(C)	D(D)	E(E)	E(E)	-(-)	-(-)
Thomas Rd	Virginia Ave	B(B)	F(F)	D(D)	D(D)	E(E)	E(E)	-(-)	-(-)
Virginia Ave	Palm Ln	B(B)	B(B)	D(D)	D(D)	E(E)	E(E)	-(-)	-(-)
Palm Ln	McDowell Rd	E(F)	C(B)	E(E)	E(D)	E(D)	F(E)	-(-)	-(-)
McDowell Rd	I-10	F(D)	F(E)	B(B)	C(C)	D(D)	D(D)	-(-)	-(-)
I-10	Roosevelt St	F(D)	C(B)	C(B)	B(A)	D(E)	D(D)	-(A)	A(-)
Entire Facility		**D(D)**	**D(D)**	**C(D)**	**D(D)**	**E(E)**	**E(E)**	**-(-)**	**-(-)**

* X(X) – AM (PM) Peak Hour LOS

As shown in **Table 27**, the overall facility LOS for the Third Street Corridor is expected to be "D" or better in 2015 during the AM and PM peak hours with the 2015 traffic volumes and 2-0-2 Alternative lane geometrics with the exception of the bicycle mode.

As shown in **Table 28**, the overall facility LOS for the Third Street Corridor is expected to be "D" or better in 2035 during the AM and PM peak hours with the 2035 traffic volumes and 2-0-2 Alternative lane geometrics with the exception of the bicycle mode.

6.3.4 2-0-2 Alternative Intersection Level-of-Service

The intersection level-of-service for the Third Street Corridor under the 2-0-2 Alternative was determined using the same methodology as discussed in ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***.

The 2015 and 2035 traffic volumes used to calculate the level-of-service at the intersections on Third Street Corridor are shown in **Figure 16** and **Figure 20**, respectively. The lane geometrics for the years 2015 and 2035 for the 2-0-2 Alternative are shown in **Figure 30** and **Figure 31**, respectively.

The level-of-service for the Third Street Corridor study area signalized intersections was evaluate using the *Synchro software,* which utilizes the criteria described in **Table 7**. The 2015 level-of-service for the signalized intersections along the Third Street Corridor for the 2-0-2 Alternative are shown in **Table 29** and **Figure 32**. The 2035 level-of-service for the signalized intersections along the Third Street Corridor for the 2-0-2 Alternative is shown in **Table 30** and **Figure 33**.

Table 29 – 2-0-2 Alternative 2015 Third Street Signalized Intersections LOS

Intersection	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Third Street and Indian School Road												
AM Peak Hour	C	D		D	D		A	B	B	B	B	
		D			D			B			B	
					B							
PM Peak Hour	C	C		C	D		B	C	B	B	C	
		C			C			C			C	
					C							
Third Street and Osborn Road												
AM Peak Hour	C	C	C	D	D	D	B	B		C	B	
		C			D			B			B	
					C							
PM Peak Hour	C	C	C	D	C	C	B	C		B	B	
		C			C			C			B	
					C							
Third Street and Earll Drive												
AM Peak Hour	A	A		A	A		C	C		C	C	
		A			A			C			C	
					B							
PM Peak Hour	A	A		A	A		C	C		D	D	
		A			A			C			D	
					B							
Third Street and Thomas Road												
AM Peak Hour	C	C	C	C	D		B	C		B	C	
		C			D			C			C	
					C							
PM Peak Hour	C	D	C	D	D		B	C		B	C	
		D			D			C			C	
					C							
Third Street and Virginia Avenue												
AM Peak Hour	C	B		B	B			B			B	
		B			B			B			B	
					B							
PM Peak Hour	B	B		B	B			B			B	
		B			B			B			B	
					B							
Third Street and Palm Lane												
AM Peak Hour		B			A			C			C	
		B			A			C			C	
					B							
PM Peak Hour		A			B			C			C	
		A			B			C			C	
					B							
Third Street and McDowell Road												
AM Peak Hour	C	D	C	C	C	C	C	C		C	C	
		D			C			C			C	
					C							
PM Peak Hour	C	C	C	D	C	C	B	F		C	D	
		C			C			E			C	
					D							
Third Street and I-10 Ramp												
AM Peak Hour	-	B		A	B	-	-	-	-	C	-	B
		B			B			-			C	
					B							
PM Peak Hour	-	B		A	A	-	-	-	-	C	-	C
		B			A			-			C	
					B							
Third Street and Roosevelt Street												
AM Peak Hour	-	-	-		C			B		D	B	-
		-			C			B			B	
					B							
PM Peak Hour	-	-	-		C			A		D	B	-
		-			C			A			B	
					B							

Table 30 – 2-0-2 Alternative 2035 Third Street Signalized Intersections LOS

Intersection	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Third Street and Indian School Road												
AM Peak Hour	D	D		D	D		D	D	C	D	C	
		D			D			D			C	
					C							
PM Peak Hour	D	D		D	D		C	E	B	E	F	
		D			D			E			F	
					F							
Third Street and Osborn Road												
AM Peak Hour	D	C	C	D	D	D	F	F		E	C	
		C			D			F			D	
					F							
PM Peak Hour	D	C	C	F	C	C	F	F		F	E	
		C			E			F			F	
					F							
Third Street and Earll Drive												
AM Peak Hour	F	A		A	B		C	C		C	D	
		B			B			C			D	
					B							
PM Peak Hour	B	B		B	B		C	B		C	C	
		B			B			C			C	
					B							
Third Street and Thomas Road												
AM Peak Hour	F	F	C	D	F		E	E		F	F	
		F			F			E			F	
					F							
PM Peak Hour	F	F	F	F	F		D	F		D	F	
		F			F			F			F	
					F							
Third Street and Virginia Avenue												
AM Peak Hour	E	A		A	A			C			D	
		B			A			C			D	
					B							
PM Peak Hour	B	B		B	B			C			C	
		B			B			C			C	
					B							
Third Street and Palm Lane												
AM Peak Hour		C			B			C			D	
		C			B			C			D	
					C							
PM Peak Hour		B			B			D			D	
		B			B			D			D	
					B							
Third Street and McDowell Road												
AM Peak Hour	E	F	D	F	F	D	F	F		F	E	
		F			F			F			E	
					F							
PM Peak Hour	F	F	D	F	F	D	F	F		F	F	
		F			F			F			F	
					F							
Third Street and I-10 Ramp												
AM Peak Hour	-	C	B	B	C	-	-	-	-	C	-	C
		C			C			-			C	
					C							
PM Peak Hour	-	C	B	D	C	-	-	-	-	D	-	C
		C			C			-			D	
					C							
Third Street and Roosevelt Street												
AM Peak Hour	-	-	-		D			C		F	D	-
		-			D			C			D	
					D							
PM Peak Hour	-	-	-		D			B		E	D	-
		-			D			B			D	
					C							

As shown in **Table 29**, the overall intersection level-of-service for all the signalized intersections on the Third Street Corridor is "D" or better during the AM and PM peak hours with existing 2015 traffic volumes and 2-0-2 Alternative lane configurations for the year 2015.

The approach level-of-service shown in **Table 29** is "D" or better at study area signalized intersections on the Third Street Corridor under the 2-0-2 Alternative conditions for the year 2015 with the exception of the intersection of Third Street and McDowell Road. The eastbound approach at the intersection of Third Street and McDowell Road operates at a level-of-service "E" during the PM peak hour with the eastbound through movement operating at a level-of-service "F".

As shown in **Table 30**, the overall intersection level-of-service is expected to be "D" or better during the AM and PM peak hours at the following signalized intersections on the Third Street Corridor with projected 2035 traffic volumes and 2-0-2 Alternative lane configurations for the year 2035:

- Third Street and Earll Drive;
- Third Street and Virginia Avenue;
- Third Street and Palm Lane;
- Third Street and I-10 Ramp; and
- Third Street and Roosevelt Street.

As shown in **Table 30**, the overall intersection level-of-service is expected to be "F" during the AM and/or PM peak hours at the following intersections on the Third Street Corridor with projected 2035 traffic volumes and 2-0-2 Alternative lane configurations for the year 2035:

- Third Street and Indian School Road during the PM peak hour;
- Third Street and Osborn Road during both the AM and PM peak hours;
- Third Street and Thomas Road during both the AM and PM peak hours; and
- Third Street and McDowell Road during both the AM and PM peak hours.

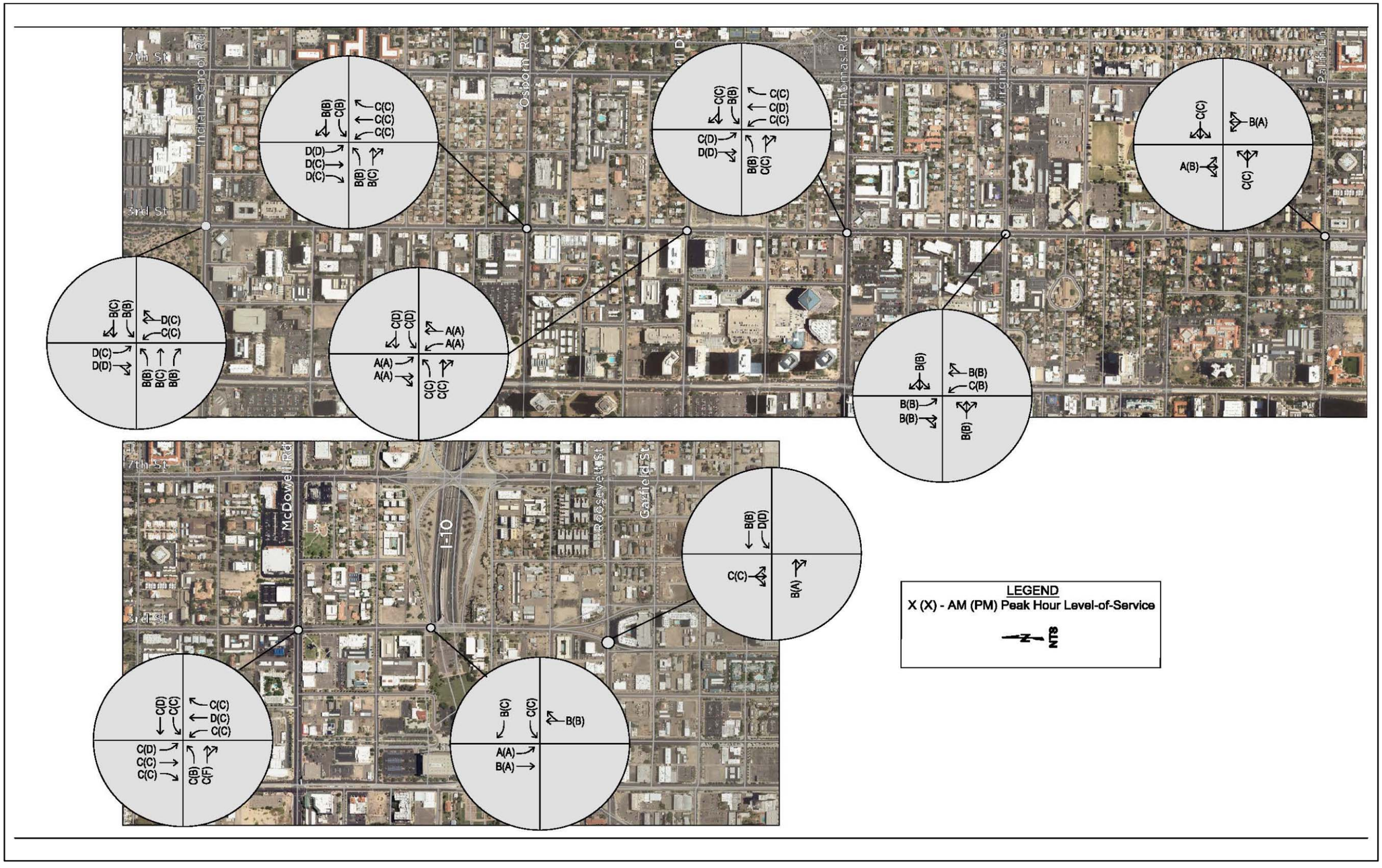

Figure 32 – 2-0-2 Alternative 2015 Third Street Signalized Intersections LOS

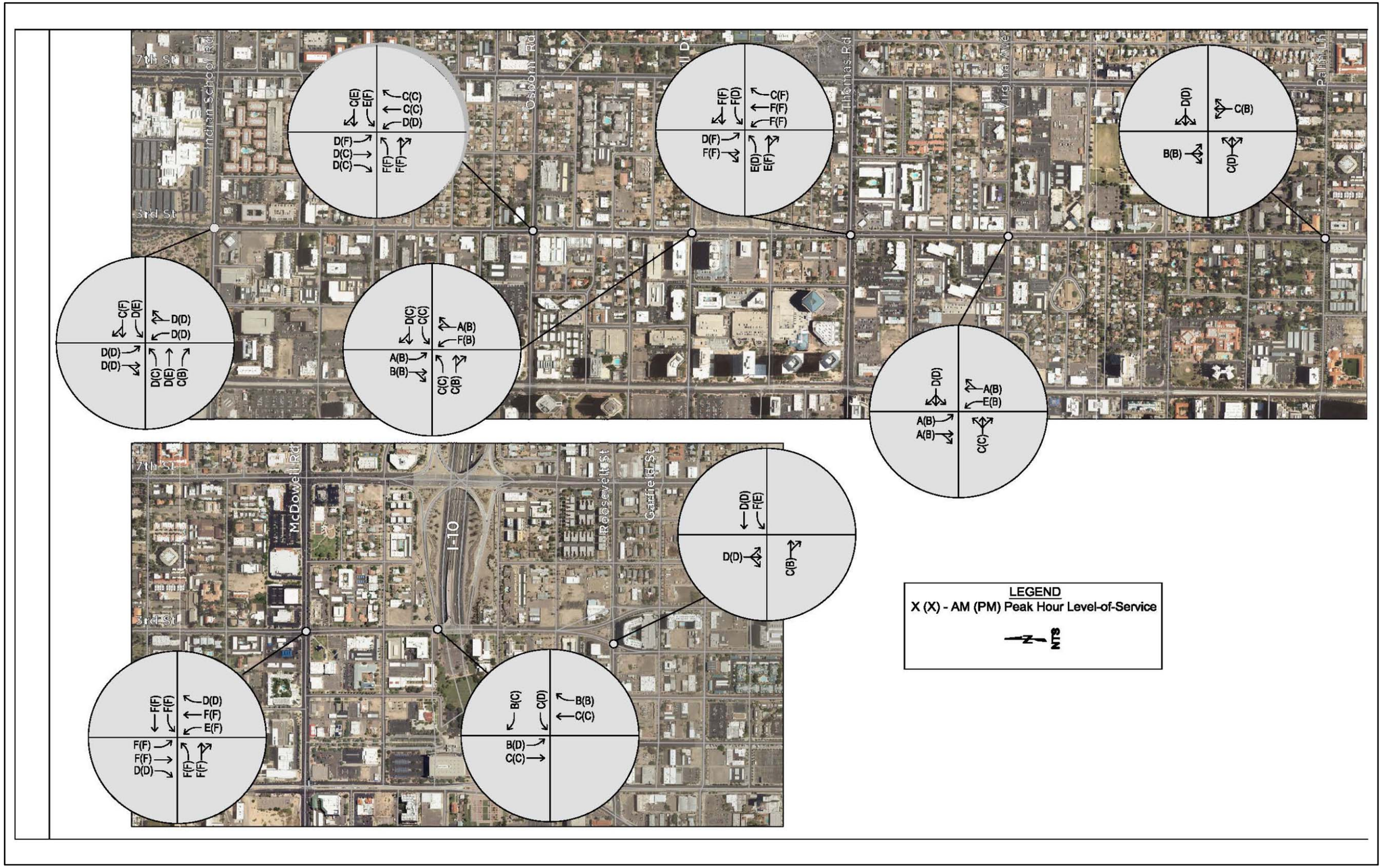

Figure 33 – 2-0-2 Alternative 2035 Third Street Signalized Intersections LOS

6.4 Summary of Level-of-Service Analysis

The following section provides a summary of the roadway segment and intersection level-of-service analysis comparing the results of the analysis of the 1-1-1 Alternative with Buffered Bike Lane, 1-1-1 Alternative with Pedestrian Buffer and the 2-0-2 Alternative with the No Build Alternative.

Table 31 – 2015 Third Street Corridor Roadway Segment LOS Comparison by Facility

LOS Type	No-Build				1-1-1 Alternative with Bike Buffer				1-1-1 Alternative with Ped. Buffer				2-0-2 Alternative			
	NB		SB		NB		SB		NB		SB		NB		SB	
	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score
Auto	C(C)	2.45(2.44)	C(C)	2.41(2.46)	D(C)	2.50(2.45)	D(D)	2.46(2.48)	D(C)	2.50(2.46)	D(C)	2.46(2.44)	D(C)	2.49(2.45)	D(C)	2.48(2.44)
Pedestrian	C(C)	3.39(3.42)	D(C)	3.54(3.47)	C(C)	3.32(3.37)	D(C)	3.55(3.46)	C(C)	3.30(3.37)	D(C)	3.57(3.48)	C(C)	3.33(3.36)	C(C)	3.46(3.39)
Bike	E(E)	4.74(4.78)	E(E)	4.77(4.78)	D(D)	4.12(4.17)	D(D)	4.17(4.19)	E(E)	4.29(4.33)	E(E)	4.34(4.38)	E(E)	4.35(4.37)	E(E)	4.40(4.38)
Transit	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)

Table 32 – 2035 Third Street Corridor Roadway Segment LOS Comparison by Facility

LOS Type	No-Build				Alternative 1-1-1 with Bike Buffer				Alternative 1-1-1 with Ped. Buffer				Alternative 2-0-2			
	NB		SB		NB		SB		NB		SB		NB		SB	
	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score
Auto	D(D)	2.50(2.48)	D(D)	2.48(2.52)	E(D)	2.54(2.49)	F(E)	2.69(2.59)	E(D)	2.54(2.49)	E(E)	2.55(2.48)	D(D)	2.47(2.47)	D(D)	2.49(2.47)
Pedestrian	C(D)	3.50(3.56)	D(D)	3.73(3.67)	C(C)	3.46(3.49)	D(D)	3.80(3.67)	C(C)	3.44(3.47)	D(D)	3.82(3.69)	C(D)	3.47(3.50)	D(D)	3.70(3.63)
Bike	E(F)	4.86(5.02)	E(E)	4.87(4.94)	D(E)	4.22(4.26)	E(E)	4.26(4.27)	E(E)	4.36(4.43)	E(E)	4.40(4.45)	E(E)	4.44(4.46)	E(E)	4.46(4.45)
Transit	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)	-(-)

The automobile mode is anticipated to operate the best under the No Build condition for year 2015 and under the 2-0-2 Alternative for year 2035. Under 1-1-1 Alternative with Buffered Bike Lane and the 1-1-1 Alternative with Pedestrian Buffer, the automobile LOS worsens due to the reduction in the number of travel lanes. It should be noted that the LOS under the 1-1-1 Alternative with Buffered Bike Lane and the 1-1-1 Alternative with Pedestrian Buffer worsens only slightly due to the anticipated reduction in vehicular traffic along the corridor.

The pedestrian mode is anticipated to operate the best under the 1-1-1 Alternative with Pedestrian Buffer. This is due to the reduction in road crossing difficulty factor with the pedestrian having to cross less lanes of traffic as well as the reduced roadway width. All three alternatives do improve the operation of the pedestrian mode due to the reduction in road crossing difficulty factor.

The bicycle mode is anticipated to operate the best under 1-1-1 Alternative with Buffered Bike Lane. Even though all three alternatives provide bike lanes along the corridor, 1-1-1 Alternative with Buffered Bike Lane will provide a raised buffer between the travel lane and the bike lane providing a more bike friendly feel to the corridor. The buffer between the travel lanes and the bike lanes under the 1-1-1 Alternative with Buffered Bike Lane is also the widest of all alternatives.

It should be noted that HCM 2010 Multi-Modal LOS (MMLOS) model is a quantitative model that is data intensive and very analytical. ADT volumes is a more heavily weighted factor in the MMLOS model. Even segments with moderate traffic volumes (8,000 – 14,000 ADT) have a hard time scoring an above average bike and pedestrian LOS. Only segments with very low volumes (4,000 - 6,000 ADT) score well for bike and pedestrian LOS.

Additionally, on lower speed roadways (35 MPH or less), the MMLOS model does not produce good scores for bike and pedestrian LOS due to implementation of speed reduction measures. It is only sensitive on higher speed roadways (40 MPH and higher). Therefore, results do not show any appreciable change in LOS between the alternatives. However, in real world, speed reduction (35 MPH to 30 MPH), and increased pedestrian or bike buffer (with shaded trees and benches) will lead to increase in bike and pedestrian comfort and safety.

Table 33 and **Table 34** compares the No Build, 1-1-1 Alternative and 2-0-2 Alternative intersection LOS for the entire Third Street Corridor for the years 2015 and 2035, respectively

Table 33 – 2015 Third Street Corridor Overall Intersection LOS Comparison

Intersection	No-Build	1-1-1 Alternative	2-0-2 Alternative
Third Street and Indian School Road	B(D)	B(B)	B(C)
Third Street and Osborn Road	C(C)	B(C)	C(C)
Third Street and Earll Drive	B(B)	B(B)	B(B)
Third Street and Thomas Road	C(C)	C(D)	C(C)
Third Street and Virginia Avenue	B(B)	C(C)	B(B)
Third Street and Palm Lane	B(B)	B(B)	B(B)
Third Street and McDowell Road	C(D)	D(D)	C(D)
Third Street and I-10 Ramp	B(B)	B(B)	B(B)
Third Street and Roosevelt Street	C(B)	B(B)	B(B)

Table 34 – 2035 Third Street Corridor Overall Intersection LOS Comparison

Intersection	No-Build	1-1-1 Alternative	2-0-2 Alternative
Third Street and Indian School Road	D(F)	C(F)	C(F)
Third Street and Osborn Road	F(E)	D(E)	F(F)
Third Street and Earll Drive	B(C)	C(C)	B(B)
Third Street and Thomas Road	F(F)	F(F)	F(F)
Third Street and Virginia Avenue	C(C)	C(C)	B(B)
Third Street and Palm Lane	C(C)	C(C)	C(B)
Third Street and McDowell Road	F(F)	F(F)	F(F)
Third Street and I-10 Ramp	C(F)	B(B)	C(C)
Third Street and Roosevelt Street	C(C)	D(F)	D(C)

The overall intersection LOS improved or stayed the same when comparing the No Build to the 1-1-1 Alternative and the 2-0-2 Alternative at the study area intersection for 2015 with the exception of the following locations:

- Third Street and Thomas Road for 1-1-1 Alternative during the PM peak hour;
- Third Street and Virginia Avenue for 1-1-1 Alternative; and
- Third Street and McDowell Road for 1-1-1 Alternative during the AM peak hour.

The slight decrease in operation is due to the reduction in number of travel lanes through the intersection under the 1-1-1 Alternative.

The overall intersection LOS improved or stayed the same when comparing the No Build to the 1-1-1 Alternative and the 2-0-2 Alternative at the study area intersection for 2035 with the exception of the following locations:

- Third Street and Osborn Road for 2-0-2 Alternative during the PM peak hour;
- Third Street and Earll Drive for 1-1-1 Alternative during the AM peak hour;
- Third Street and Roosevelt Street for 1-1-1 Alternative; and
- Third Street and Roosevelt Street for 2-0-2 Alternative during the AM peak hour.

The slight decrease in operation at Earll Drive and Roosevelt Street between the No Build and the 1-1-1 Alternative is due to the reduction in number of travel lanes through the intersection under the 1-1-1 Alternative. The slight decrease in operation at Osborn Road and Roosevelt Street between the No Build and the 2-0-2 Alternative is due to the revised signal timing and lack of coordination along the east-west crossroads. With adjustments to the signal timing to maintain existing coordination along the crossroads, the level-of-service could improve at these locations.

7.0 Van Buren Street Alternative Analysis

Each alternative was analyzed utilizing Highway Capacity Software and Synchro to determine automobile, pedestrian, bicycle and transit level-of-service for the roadway segment as well as the intersection level-of-service. The following sections describes the methodology for determine the level-of-service along the roadway segment and at the intersections and summarizes the results of the level-of-service analysis for the Van Buren Street Corridor alternatives. Additional information is available in the ***Final Technical Memorandum #2 – Analysis of Design Options*** located in the **Appendix** of this report.

The Van Buren Street Corridor currently provides driveway spacing of 50 to 100 feet. Driveways that intersect with separated bike lanes create a potential crash risk due to the conflict between turning vehicles and through bicyclists. The risk is increased at locations where there is poor sight distance due to parked cars, landscaping, and other obstructions. Many of these conflicts can be mitigated through good design that improves visibility and consolidation or relocation of driveways and access to minimize the number of conflict points along the corridor. Therefore, it is recommended that as the corridor re-develops, existing driveways are consolidated or relocated to minimize the number of conflict points prior to the installation of raised medians.

7.1 1-1-1 Alternative with Buffered Bike Lane

Based on the existing roadway cross-section along the Van Buren Street Corridor, the following lane geometry was assumed for the 1-1-1 Alternative with Buffered Bike Lane and applied to the level-of-service analysis:

- One 11-foot through lane in the eastbound and westbound directions between 7th Street and 24th Street;
- An 11-foot two-way left-turn lane between 7th Street and 24th Street;
- One 6-foot bike lane in the eastbound and westbound directions between 7th Street and 24th Street; and
- A 5-foot raised median buffer between the travel lanes and bike lanes in the eastbound and westbound directions.

7.1.1 Traffic Volume Adjustment for 1-1-1 Alternative with Buffered Bike Lane

For the 1-1-1 Alternative with Buffered Bike Lane analysis, the roadway cross-section along the Van Buren Street Corridor is recommended to include one through lane in each direction with bike lanes and a two-way left-turn lane. With the change in the roadway geometry for the 1-1-1 Alternative with Buffered Bike Lane analysis, it is expected that some of the vehicular traffic existing on the Van Buren Street Corridor will utilize other roadway alternatives resulting in reduced vehicular volume on Van Buren Street.

MAG completed an assignment run of their regional transportation model with Van Buren Street as a three-lane cross-section. An assignment run assumes that the origins and destinations will not change due to increased or decreased capacities in the roadway network. However, what may change are the specific routes taken to reach the origins and destinations.

Based on the adjusted lane configuration model obtained from MAG, a 28% reduction in traffic volumes was applied to the Van Buren Street Corridor for 2015 and a 30% reduction in traffic volumes was applied for 2035. **Table 35** provides the 2015 and 2035 weekday ADT under the 1-1-1 Alternative with Buffered Bike Lane.

Table 35 – 2015 and 2035 Adjusted Weekday ADT along Van Buren Street

Segment		2015 ADT 1-1-1 Alternative		2035 ADT 1-1-1 Alternative	
From	To	WB	EB	WB	EB
7th Street	9th Street	5900	7000	7400	8800
9th Street	11th Street	5900	6100	7400	7600
11th Street	16th Street	6900	6200	8700	7800
16th Street	18th Street	6500	6900	8200	8700
18th Street	20th Street	5300	5500	6700	6900
20th Street	24th Street	5500	6300	7000	7800

A 28% reduction was applied to the existing 2015 traffic volumes obtained from the City of Phoenix at the signalized study area intersections along the Van Buren Street Corridor to calculate the adjusted 2015 traffic volumes. The adjusted 2015 traffic volumes for the 1-1-1 Alternative with Buffered Bike Lane along the Van Buren Street Corridor are shown in **Figure 34**.

As mentioned in ***Section 4.1*** of this report titled ***Growth Rates***, an exponential growth rate of 1.3% was applied to the existing 2015 traffic volumes on the Van Buren Street Corridor to obtain the projected 2035 traffic volumes. Based on the MAG traffic volume reductions, a 30% reduction was applied to the projected 2035 traffic volumes at intersections on the Van Buren Street Corridor to calculate the adjusted 2035 traffic volumes for the 1-1-1 Alternative with Buffered Bike Lane. The adjusted 2035 traffic volumes for the 1-1-1 Alternative with Buffered Bike Lane for signalized intersections along the Van Buren Street Corridor are shown in **Figure 35**.

7.1.2 Turn Lane Recommendation at Signalized Intersections

Existing turn lanes at the study area signalized intersections along the Van Buren Street Corridor are expected to accommodate the adjusted 2015 and 2035 traffic volumes shown in **Figure 34** and **Figure 35**, respectively. Therefore, no turn lane improvements are recommended at the signalized intersections along the Van Buren Street Corridor for 1-1-1 Alternative with Buffered Bike Lane.

The lane geometry for 1-1-1 Alternative with Buffered Bike Lane for the years 2015 and 2035 at the study area signalized intersections along the Van Buren Street Corridor are shown in **Figure 36**.

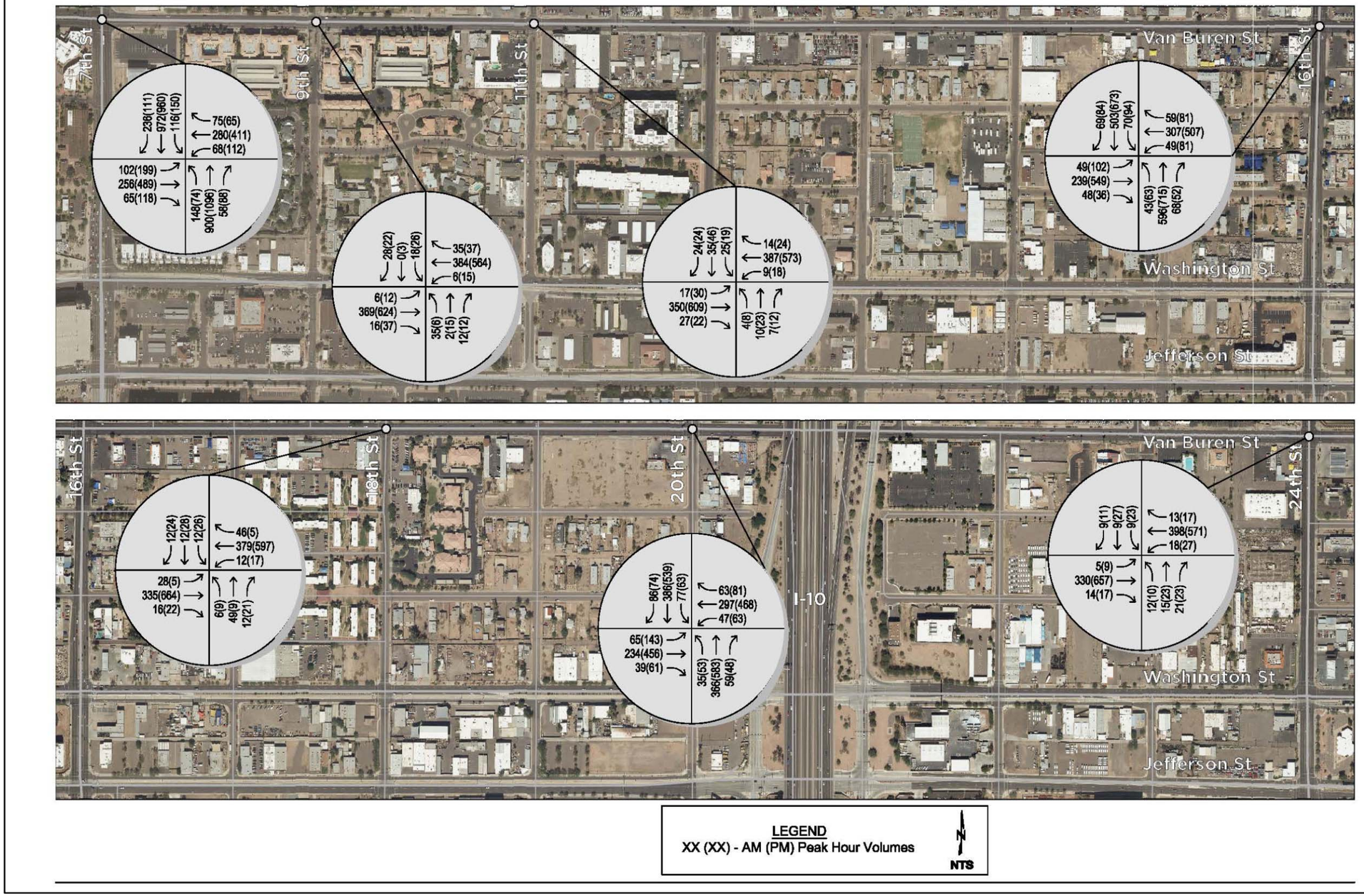

Figure 34 – 1-1-1 Alternative 2015 Van Buren Street Turning Movement Volumes

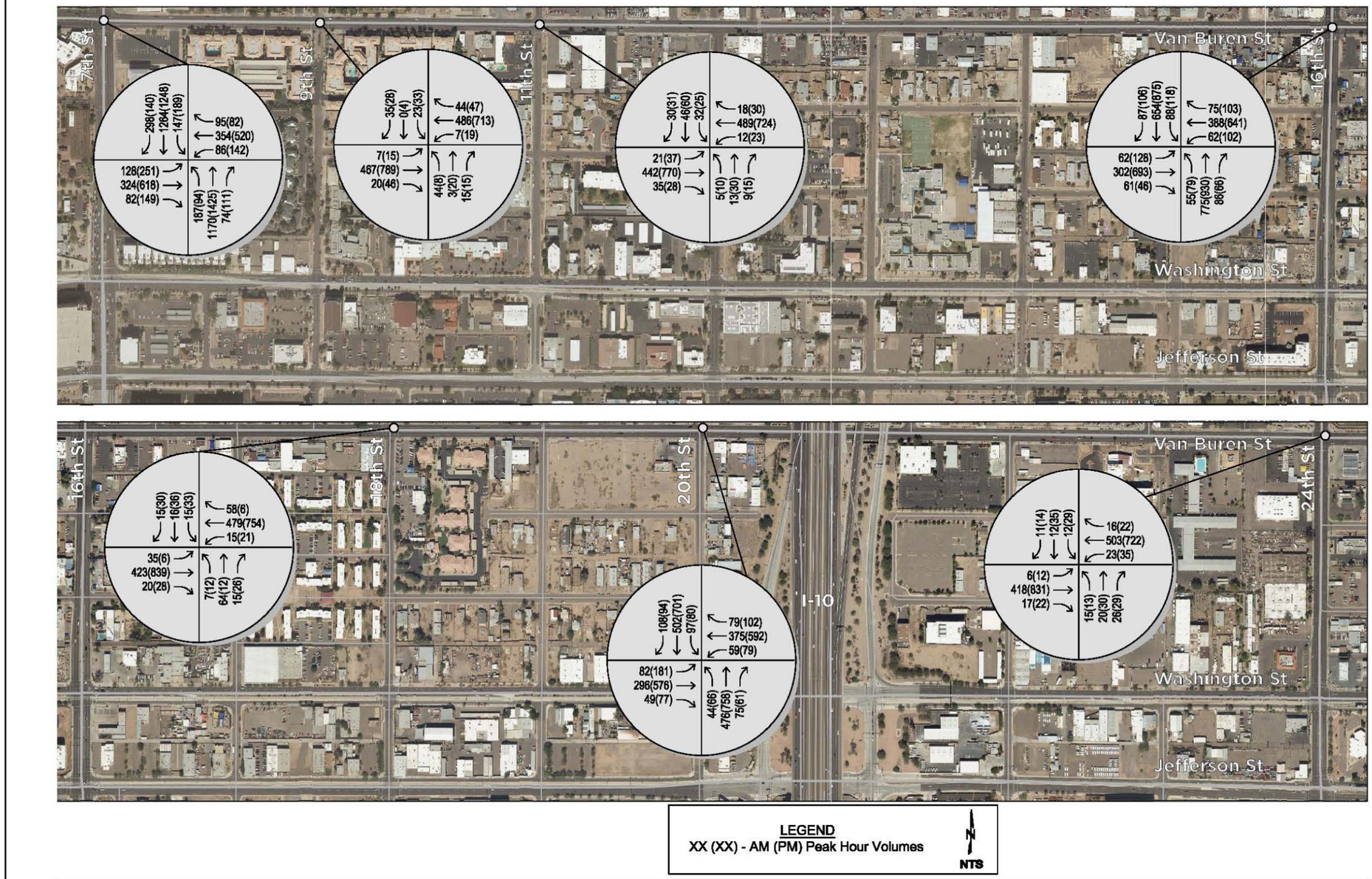

Figure 35 – 1-1-1 Alternative 2035 Van Buren Street Turning Movement Volumes

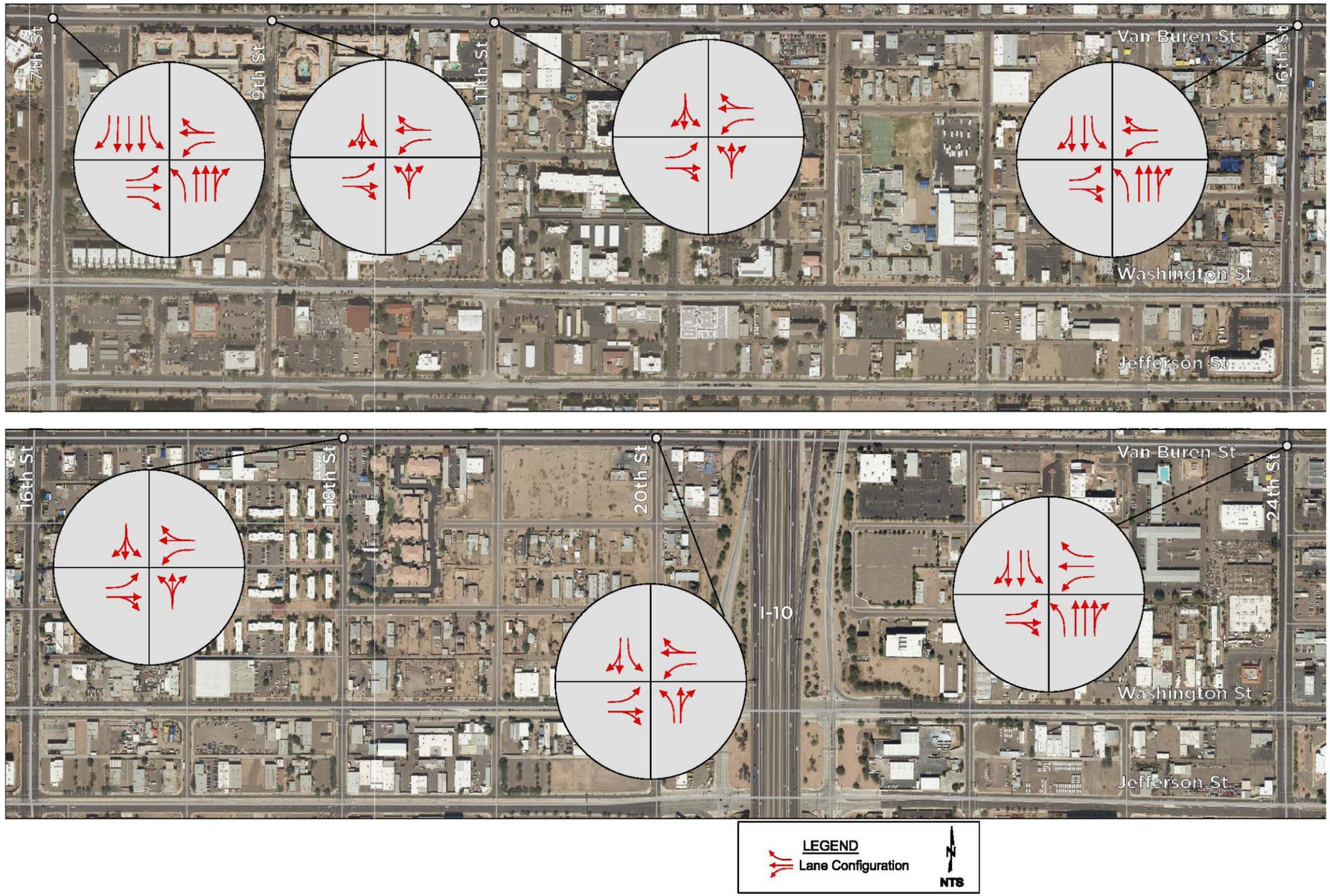

Figure 36 – 1-1-1 Alternative 2015 and 2035 Van Buren Street Lane Geometry

7.1.3 1-1-1 Alternative with Buffered Bike Lane Roadway Segment Level-of-Service

The roadway segment level-of-service for the Van Buren Street Corridor under the 1-1-1 Alternative with Buffered Bike Lane was determined using the same methodology as discussed in ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***. **Table 36** and **Table 37** depict the roadway segment LOS for the Van Buren Street Corridor for the years 2015 and 2035, respectively, under the 1-1-1 Alternative with Buffered Bike Lane conditions.

Table 36 – 1-1-1 Alternative with Buffered Bike Lane 2015 Van Buren Street Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	EB	WB	EB	WB	EB	WB	EB	WB
7th Street	9th Street	A(B)	A(A)	C(D)	D(D)	C(C)	C(C)	A(A)	A(A)
9th Street	11th Street	A(A)	C(C)	C(C)	C(C)	C(C)	C(C)	A(A)	A(A)
11th Street	16th Street	A(B)	A(A)	B(B)	B(B)	D(D)	E(E)	A(A)	A(A)
16th Street	18th Street	B(A)	C(F)	C(C)	D(D)	E(E)	D(E)	A(A)	A(A)
18th Street	20th Street	A(B)	B(C)	C(C)	C(D)	D(D)	D(D)	B(B)	B(B)
20th Street	24th Street	A(B)	A(B)	D(C)	D(D)	D(D)	D(D)	A(A)	A(A)
Entire Facility		**A(B)**	**B(D)**	**C(C)**	**C(C)**	**D(D)**	**D(D)**	**A(A)**	**A(A)**

XX(XX) – AM(PM) Peak Hour LOS

Table 37 – 1-1-1 Alternative with Buffered Bike Lane 2035 Van Buren Street Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	EB	WB	EB	WB	EB	WB	EB	WB
7th Street	9th Street	A(B)	A(A)	D(D)	D(D)	C(C)	C(C)	A(A)	A(A)
9th Street	11th Street	A(A)	C(C)	C(C)	C(C)	C(C)	C(C)	A(A)	A(A)
11th Street	16th Street	A(B)	A(A)	B(B)	B(B)	D(D)	E(E)	A(A)	A(A)
16th Street	18th Street	B(A)	C(F)	C(C)	D(D)	E(E)	D(E)	A(A)	A(A)
18th Street	20th Street	A(A)	B(C)	C(C)	C(D)	D(D)	D(D)	B(B)	B(B)
20th Street	24th Street	A(B)	A(F)	D(D)	D(D)	D(D)	D(D)	A(A)	A(A)
Entire Facility		**A(B)**	**B(D)**	**C(C)**	**C(C)**	**D(D)**	**D(D)**	**A(A)**	**A(A)**

XX(XX) – AM(PM) Peak Hour LOS

As shown in **Table 36**, the overall facility LOS for the Van Buren Street Corridor is expected to be "D" or better in 2015 during the AM and PM peak hours with the 2015 traffic volumes and 1-1-1 Alternative lane geometrics.

As shown in **Table 37**, the overall facility LOS for the Van Buren Street Corridor is expected to be "D" or better in 2035 during the AM and PM peak hours with the 2035 traffic volumes and 1-1-1 Alternative lane geometrics.

7.1.4 1-1-1 Alternative with Buffered Bike Lane Intersection Level-of-Service

The intersection level-of-service for the Van Buren Street Corridor under the 1-1-1 Alternative with Buffered Bike Lane conditions was determined using the same methodology as discussed in ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***.

The 2015 and 2035 traffic volumes used to calculate the level-of-service at the intersections on the Van Buren Street Corridor are shown in **Figure 34** and **Figure 35**, respectively. The intersection control and lane geometrics for the years 2015 and 2035 for the 1-1-1 Alternative with Buffered Bike Lane is shown in **Figure 36**.

The level-of-service for the Van Buren Street Corridor study area intersections was evaluate using the *Synchro software,* which utilizes the criteria described in **Table 7**. The 2015 level-of-service for the signalized intersections along the Van Buren Street Corridor is shown in **Table 38** and **Figure 37**. The 2035 level-of-service for the signalized intersections along the Third Street Corridor for 1-1-1 Alternative with Buffered Bike Lane are shown in **Table 39** and **Figure 38**.

Table 38 – 1-1-1 Alternative with Buffered Bike Lane 2015 Van Buren Street Intersection LOS

Intersection	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Van Buren Street and 7th Street												
AM Peak Hour	D	D		C	D	C	B	C	B	B	C	
	D			D			B			C		
	C											
PM Peak Hour	C	D		D	D	C	C	D	C	C	D	
	D			D			C			D		
	D											
Van Buren Street and 9th Street												
AM Peak Hour	A			A			B	B		B	B	
	A			A			B			B		
	B											
PM Peak Hour	B			B			A	C		A	B	
	B			B			C			B		
	B											
Van Buren Street and 11th Street												
AM Peak Hour	A			A			B	B		B	B	
	A			A			B			B		
	B											
PM Peak Hour	B			B			B	C		B	B	
	B			B			C			B		
	B											
Van Buren Street and 16th Street												
AM Peak Hour	B	C		B	C		B	B		B	C	
	C			C			B			B		
	C											
PM Peak Hour	C	C		C	D		B	D		B	D	
	C			D			D			D		
	C											
Van Buren Street and 18th Street												
AM Peak Hour	A			A			B	B		B	B	
	A			A			B			B		
	B											
PM Peak Hour	B			B			A	C		B	B	
	B			B			C			B		
	B											
Van Buren Street and 20th Street												
AM Peak Hour	A	A		A	A		B	C		B	C	
	A			A			C			C		
	B											
PM Peak Hour	B	D		C	D		C	B		A	B	
	D			D			B			B		
	C											
Van Buren Street and 24th Street												
AM Peak Hour	B	B		B	B		B	C		B	C	B
	B			B			C			C		
	C											
PM Peak Hour	C	C		C	C		B	C		B	C	B
	C			C			C			C		
	C											

Table 39 – 1-1-1 Alternative with Buffered Bike Lane 2035 Van Buren Street Intersection LOS

Intersection	Northbound			Southbound			Eastbound			Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Van Buren Street and 7th Street												
AM Peak Hour	D	C		C	D	C	C	C	C	B	D	
	D			C			C			D		
	C											
PM Peak Hour	C	D		D	C	C	D	D	C	C	D	
	D			C			D			D		
	D											
Van Buren Street and 9th Street												
AM Peak Hour	A			A			A	B		A	B	
	A			A			B			B		
	B											
PM Peak Hour	A			A			B	B		B	B	
	A			A			B			B		
	B											
Van Buren Street and 11th Street												
AM Peak Hour	A			A			B	B		B	B	
	A			A			B			B		
	B											
PM Peak Hour	A			A			B	B		B	B	
	A			A			B			B		
	B											
Van Buren Street and 16th Street												
AM Peak Hour	C	C		C	D		B	C		B	C	
	C			D			B			C		
	C											
PM Peak Hour	C	C		C	D		B	C		C	C	
	C			D			C			C		
	C											
Van Buren Street and 18th Street												
AM Peak Hour	A			A			B	B		A	B	
	A			A			B			B		
	B											
PM Peak Hour	A			A			B	B		B	B	
	A			A			B			B		
	B											
Van Buren Street and 20th Street												
AM Peak Hour	A	B		B	B		D	C		B	C	
	B			B			C			C		
	B											
PM Peak Hour	F	D		F	D		F	C		B	C	
	D			D			D			C		
	D											
Van Buren Street and 24th Street												
AM Peak Hour	C	C		C	C		B	B		A	B	A
	C			C			B			B		
	B											
PM Peak Hour	C	C		C	C		B	B		B	C	B
	C			C			B			C		
	C											

As shown in **Table 38**, the overall intersection level-of-service for all the signalized intersections on the Van Buren Street Corridor is expected to be "C" or better during the AM and PM peak hours with adjusted 2015 traffic volumes and 1-1-1 Alternative lane configurations with the exception of the intersection of Van Buren and 7th Street. The intersection of Van Buren Street and 7th Street is expected to operate at level-of-service "D" during the PM peak hour.

The approach level-of-service shown in **Table 38** is expected to be "D" or better during the AM and PM peak hours at the study area signalized intersections on the Van Buren Street Corridor with adjusted 2015 traffic volumes and 1-1-1 Alternative lane configurations.

As shown in **Table 39**, the overall intersection level-of-service for all the signalized intersections on the Van Buren Street Corridor is expected to be "C" or better during the AM and PM peak hours with adjusted 2035 traffic volumes and 1-1-1 Alternative lane configurations with the exception of the intersection of Van Buren Street and 7th Street and the intersection of Van Buren Street and 20th Street. The intersections of Van Buren Street and 7th Street and Van Buren Street and 20th Street are expected to operate at level-of-service "D" during the PM peak hour.

The approach level-of-service shown in **Table 39** is expected to be "D" or better during the AM and PM peak hours at the study area signalized intersections on the Van Buren Street Corridor with adjusted 2035 traffic volumes and 1-1-1 Alternative land configurations.

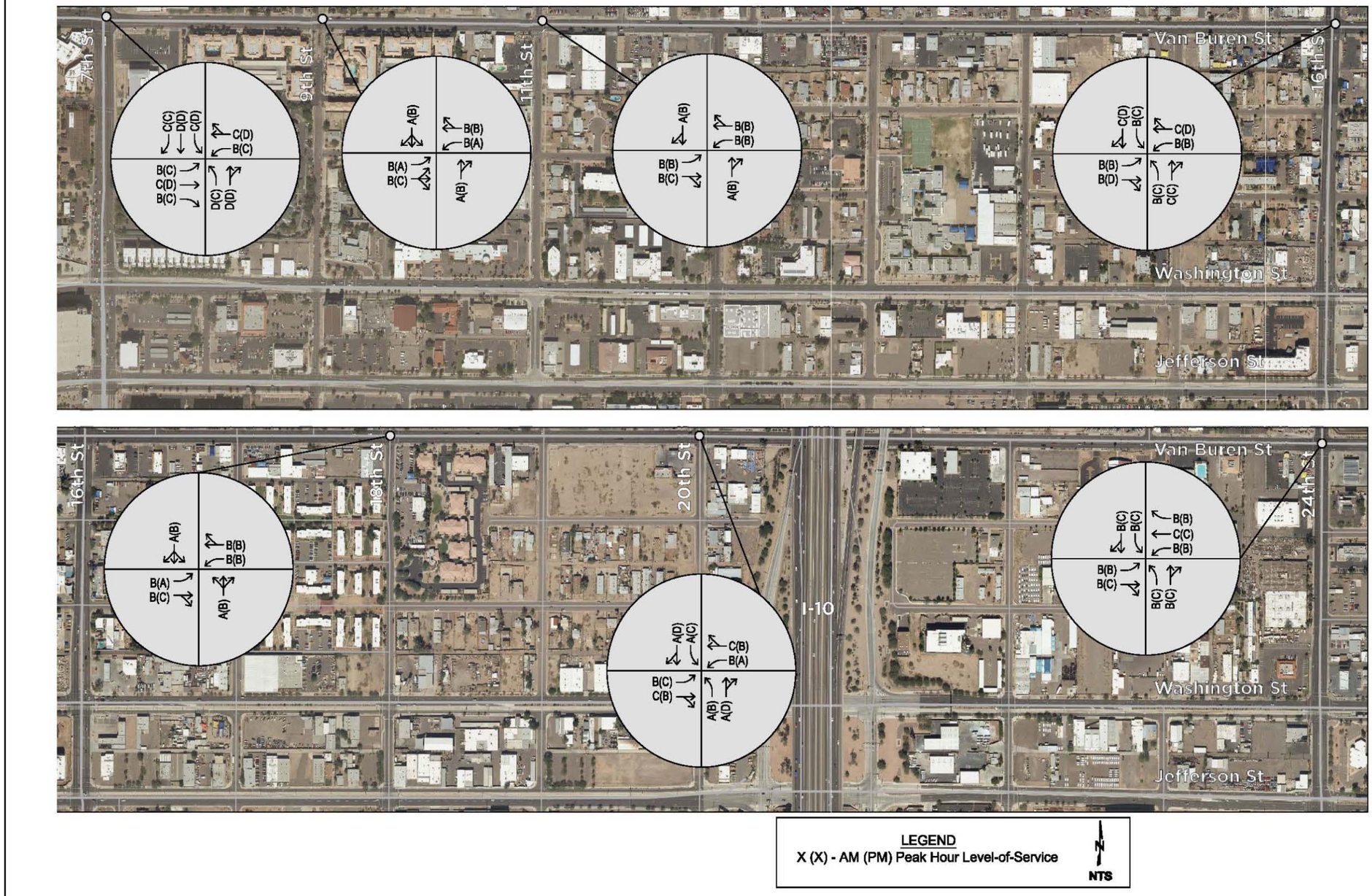

Figure 37 – 1-1-1 Alternative with Buffered Bike Lane 2015 Van Buren Street Intersection LOS

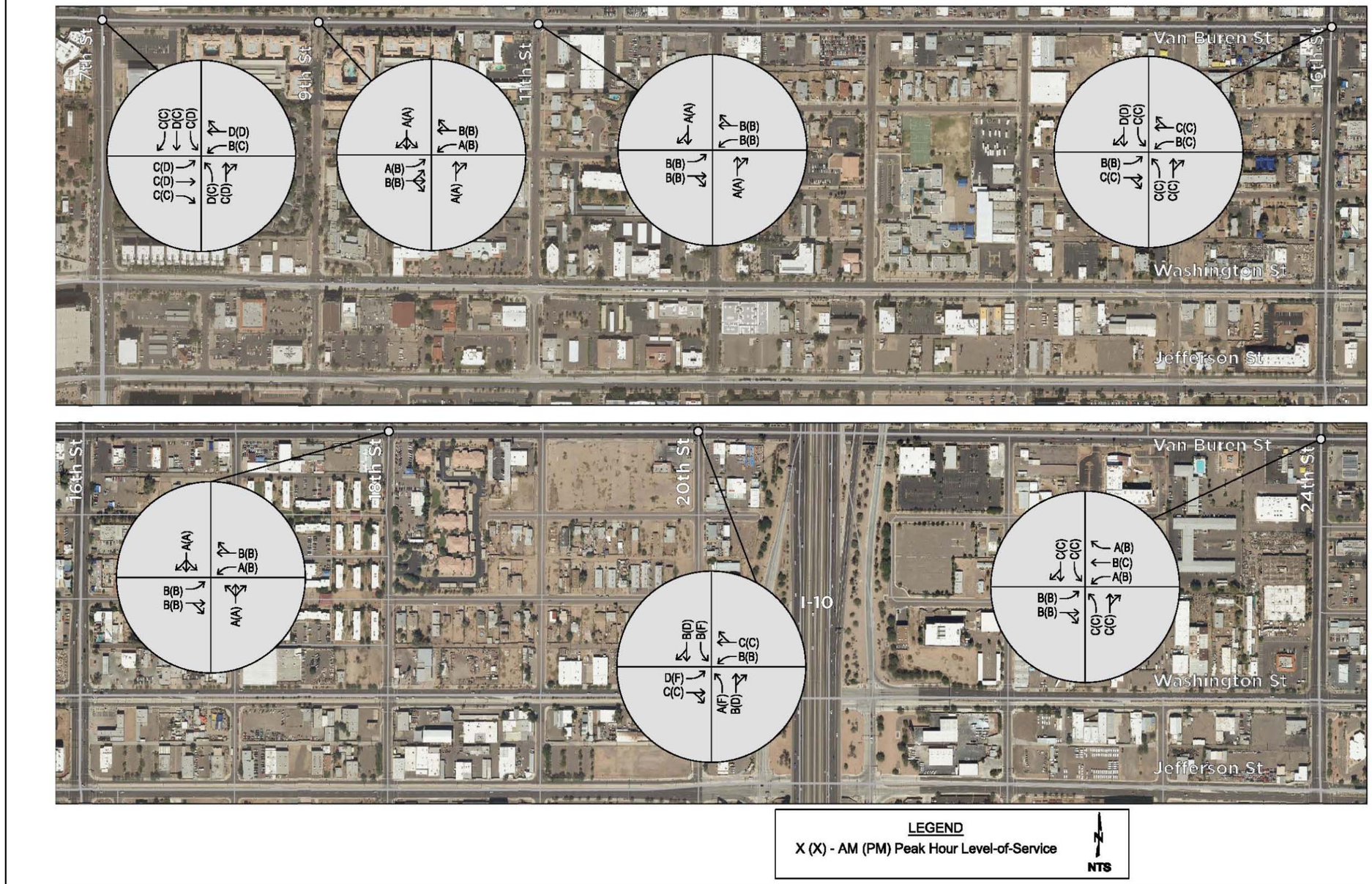

Figure 38 – 1-1-1 Alternative with Buffered Bike Lane 2035 Van Buren Street Intersection LOS

7.2 1-1-1 Alternative with On-Street Parking

Based on the existing roadway cross-section along the Van Buren Street Corridor, the following lane geometry was assumed for the 1-1-1 Alternative with On-Street Parking and applied to the level-of-service analysis:

- One 10-foot through lane in the eastbound and westbound directions between 7th Street and 24th Street;
- A 10-foot two-way left-turn lane between 7th Street and 24th Street;
- One 5-foot bike lane in the eastbound and westbound directions between 7th Street and 24th Street; and
- A 8-foot shoulder for on-street parking between bike lane and curb.

7.2.1 Traffic Volumes for 1-1-1 Alternative with On-Street Parking

For the 1-1-1 Alternative with On-Street Parking analysis, the roadway cross-section along the Van Buren Street Corridor is recommended to include one through lane in each direction with bike lanes and a two-way left-turn lane, similar to the 1-1-1 Alternative with Buffered Bike Lane. With the change in the roadway geometry for the 1-1-1 Alternative with On-Street Parking analysis, it is expected that some of the vehicular traffic existing on the Van Buren Street Corridor will utilize other roadway alternatives resulting in reduced vehicular volume on Van Buren Street.

The traffic volumes for the Van Buren Street Corridor under the 1-1-1 Alternative with On-Street Parking was determined using the same methodology discussed in the ***Section 7.1.1*** of this report titled ***Traffic Volumes Adjustment for 1-1-1 Alternative with Buffered Bike Lane***. A 28% reduction in traffic volumes was applied to the Van Buren Street Corridor for 2015 and a 30% reduction in traffic volumes was applied for 2035. **Table 35** provides the 2015 and 2035 weekday ADT under the 1-1-1 Alternative with On-Street Parking.

A 28% reduction was applied to the existing 2015 traffic volumes obtained from the City of Phoenix at the study area signalized intersections along the Van Buren Street Corridor to calculate the adjusted 2015 traffic volumes. The adjusted 2015 traffic volumes for the 1-1-1 Alternative with On-Street Parking along the Van Buren Street Corridor are shown in **Figure 34**.

As mentioned in the growth rate section of the report titled ***Final Technical Memorandum #1 – Existing and Future Conditions***, an exponential growth rate of 1.3% was applied to the existing 2015 traffic volumes on the Van Buren Street Corridor to obtain the projected 2035 traffic volumes. Based on the MAG traffic volume reductions, a 30% reduction was applied to the projected 2035 traffic volumes at intersections on the Van Buren Street Corridor to calculate the adjusted 2035 traffic volumes for the 1-1-1 Alternative with On-Street Parking. The adjusted 2035 traffic volumes for the 1-1-1 Alternative with On-Street Parking for intersections along the Van Buren Street Corridor are shown in **Figure 35**.

7.2.2 Turn Lane Recommendation for Signalized Intersections

Similar to the 1-1-1 Alternative with Buffered Bike Lane, existing turn lanes at the study area signalized intersections along the Van Buren Street Corridor are expected to accommodate the adjusted 2015 and 2035 traffic volumes shown in **Figure 34** and **Figure 35**, respectively. Therefore, no turn lane improvements are recommended at the signalized intersections along the Van Buren Street Corridor for 1-1-1 Alternative with On-Street Parking.

The lane geometry for 1-1-1 Alternative with On-Street Parking for the years 2015 and 2035 at the study area signalized intersections along the Van Buren Street Corridor are shown in **Figure 36**.

7.2.3 1-1-1 Alternative with On-Street Parking Roadway Segment Level-of-Service

The roadway segment level-of-service for the Van Buren Street Corridor under the 1-1-1 Alternative with On-Street Parking was determined using the same methodology as discussed in ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***. **Table 40** and **Table 41** depict the roadway segment LOS for the Van Buren Street Corridor for the years 2015 and 2035, respectively, under the 1-1-1 Alternative with On-Street Parking conditions.

Table 40 – 1-1-1 Alternative with On-Street Parking 2015 Van Buren Street Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	EB	WB	EB	WB	EB	WB	EB	WB
7th Street	9th Street	A(B)	A(A)	C(D)	C(C)	D(D)	D(D)	A(A)	A(A)
9th Street	11th Street	A(A)	C(C)	C(C)	C(C)	D(D)	D(D)	A(A)	A(A)
11th Street	16th Street	A(B)	A(A)	B(B)	B(B)	E(E)	E(F)	A(A)	A(A)
16th Street	18th Street	B(A)	C(F)	C(C)	C(D)	E(F)	E(F)	A(A)	A(A)
18th Street	20th Street	A(C)	B(C)	C(C)	C(D)	E(E)	D(E)	B(B)	B(B)
20th Street	24th Street	A(B)	A(B)	C(C)	D(D)	E(E)	E(E)	A(A)	A(A)
Entire Facility		**A(B)**	**B(E)**	**C(C)**	**C(C)**	**E(E)**	**E(E)**	**A(A)**	**A(A)**

XX(XX) – AM(PM) Peak Hour LOS

Table 41 – 1-1-1 Alternative with On-Street Parking 2035 Van Buren Street Roadway Segment LOS

Segment		Auto LOS		Pedestrian LOS		Bicycle LOS		Transit LOS	
From	To	EB	WB	EB	WB	EB	WB	EB	WB
7th Street	9th Street	A(B)	A(A)	C(D)	C(C)	D(D)	D(D)	A(A)	A(A)
9th Street	11th Street	A(A)	C(C)	C(C)	C(C)	D(D)	D(D)	A(A)	A(A)
11th Street	16th Street	A(B)	A(A)	B(B)	B(B)	E(E)	E(F)	A(A)	A(A)
16th Street	18th Street	B(A)	C(F)	C(C)	C(D)	E(F)	E(E)	A(A)	A(A)
18th Street	20th Street	A(A)	B(C)	C(C)	C(D)	E(E)	E(E)	B(B)	B(B)
20th Street	24th Street	A(B)	A(F)	C(C)	D(D)	E(E)	E(E)	A(A)	A(A)
Entire Facility		**A(B)**	**B(E)**	**C(C)**	**C(C)**	**E(E)**	**E(E)**	**A(A)**	**A(A)**

XX(XX) – AM(PM) Peak Hour LOS

As shown in **Table 40**, the overall facility LOS for the Van Buren Street Corridor is expected to be "D" or better in 2015 during the AM and PM peak hours with the 2015 traffic volumes and 1-1-1 Alternative lane geometrics with the exception of the automobile mode in the westbound direction and the bicycle mode. The automobile mode is anticipated to operate an LOS "E" during the PM peak hour in the westbound direction. The bicycle mode is anticipated to operate at an LOS "E" during both AM and PM peak hours in the eastbound and westbound direction.

As shown in **Table 41**, the overall facility LOS for the Van Buren Street Corridor is expected to be "C" or better in 2035 during the AM and PM peak hours with the 2035 traffic volumes and 1-1-1 Alternative lane geometrics with the exception of the automobile mode in the westbound direction and the bicycle mode. The automobile mode is anticipated to operate an LOS "E" during the PM peak hour in the westbound direction. The bicycle mode is anticipated to operate at an LOS "E" during both AM and PM peak hours in the eastbound and westbound direction.

7.2.4 1-1-1 Alternative with On-Street Parking Intersection Level-of-Service

The intersection level-of-service for the Van Buren Street Corridor under the 1-1-1 Alternative with On-Street Parking was determined using the same methodology as discussed in ***Section 3.1*** of this report titled ***Traffic Analysis Methodology***.

With the turning movement volumes, lane geometry and signal timing used for the 1-1-1 Alternative with On-Street Parking analysis the same as the 1-1-1 Alternative with Buffered Bike Lane analysis, the intersection level-of-service results will also be the same and no additional analysis was completed for the intersections within the Van Buren Street Corridor for this alternative.

The 2015 level-of-service for the signalized intersections along the Van Buren Street Corridor for the 1-1-1 Alternative is shown in **Table 38** and **Figure 37**. The 2035 level-of-service for the signalized intersections along the Van Buren Street Corridor for the 1-1-1 Alternative is shown in **Table 39** and **Figure 38**.

7.3 Summary of Level-of-Service Analysis

The following sections provide a summary of the roadway segment and intersection level-of-service analysis comparing the results of the analysis of the 1-1-1 Alternative with Buffered Bike Lane and 1-1-1 Alternative with On-Street Parking to the No Build conditions.

Table 42 and **Table 43** compares the No Build, 1-1-1 Alternative with Buffered Bike Lane and 1-1-1 Alternative with On-Street Parking roadway segment LOS for the entire Van Buren Street Corridor for the years 2015 and 2035, respectively.

Table 42 – 2015 Van Buren Street Roadway Segment LOS Comparison by Facility

LOS Type	No-Build				1-1-1 Alternative with Buffered Bike Lane				1-1-1 Alternative with On-Street Parking			
	EB		WB		EB		WB		EB		WB	
	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score
Auto	A(B)	1.88(2.01)	B(B)	2.01(2.11)	A(B)	1.82(2.02)	B(D)	2.01(2.17)	A(B)	1.82(2.02)	B(E)	2.01(2.20)
Pedestrian	C(C)	3.25(3.27)	C(C)	3.29(3.45)	C(C)	3.12(3.15)	C(C)	3.15(3.47)	C(C)	2.98(3.01)	C(C)	2.99(3.30)
Bike	E(E)	4.63(4.73)	E(E)	4.63(4.74)	D(D)	3.95(4.00)	D(D)	3.95(4.06)	E(E)	4.45(4.67)	E(E)	4.45(4.65)
Transit	A(A)	1.40(1.67)	A(A)	1.74(1.88)	A(A)	1.34(1.35)	A(A)	1.56(1.72)	A(A)	1.27(1.27)	A(A)	1.48(1.64)

Table 43 – 2035 Van Buren Street Roadway Segment LOS Comparison by Facility

LOS Type	No-Build				1-1-1 Alternative with Buffered Bike Lane				1-1-1 Alternative with On-Street Parking			
	EB		WB		EB		WB		EB		WB	
	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score
Auto	A(B)	1.81(2.12)	B(B)	2.01(2.11)	A(B)	1.82(1.93)	B(D)	2.01(2.24)	A(B)	1.82(1.93)	B(E)	2.01(2.29)
Pedestrian	C(C)	3.27(3.29)	C(D)	3.33(3.54)	C(C)	3.15(3.18)	C(C)	3.21(3.48)	C(C)	3.01(3.04)	C(C)	3.05(3.29)
Bike	E(E)	4.68(4.83)	E(E)	4.68(4.83)	D(D)	3.97(4.00)	D(D)	3.98(4.05)	E(E)	4.49(4.64)	E(E)	4.50(4.63)
Transit	A(A)	1.41(1.68)	A(A)	1.75(1.93)	A(A)	1.36(1.36)	A(A)	1.58(1.72)	A(A)	1.28(1.28)	A(A)	1.51(1.63)

The automobile mode is anticipated to operate the best under the No Build condition for both year 2015 and 2035. Under the 1-1-1 alternatives, the automobile LOS worsens slightly due to the reduction in the number of travel lanes. Under the 1-1-1 Alternative with On-Street Parking, the decrease in automobile LOS is also due to increased side friction because of the on-street parking activity.

The pedestrian mode is anticipated to operate the best under the 1-1-1 Alternative with On-Street Parking. This is due to the added buffer between the travel lanes and existing sidewalk with the addition of the on-street parking.

The bicycle mode is anticipated to operate the best under 1-1-1 Alternative with Buffered Bike Lanes. Even though both the 1-1-1 alternatives provide bike lanes along the corridor, 1-1-1 Alternative with Buffered Bike Lane will provide a buffer between the travel lane and the bike lane. The 1-1-1 Alternative with On-Street Parking will result in minimal buffer between the travel lane and the bike lane and will additionally cause more conflict points between the bicyclist and on-street parking.

Table 44 and **Table 45** compares the No Build and the 1-1-1 alternatives signalized intersections LOS for the entire Van Buren Street Corridor for the years 2015 and 2035, respectively.

Table 44 – 2015 Van Buren Street Overall Intersection LOS Comparison

Intersection	No-Build	Alternative 1-1-1
Van Buren Street and 7th Street	C(D)	C(D)
Van Buren Street and 9th Street	A(A)	B(B)
Van Buren Street and 11th Street	A(A)	B(B)
Van Buren Street and 16th Street	C(C)	C(C)
Van Buren Street and 18th Street	A(A)	B(B)
Van Buren Street and 20th Street	E(F)	B(C)
Van Buren Street and 24th Street	C(C)	C(C)

Table 45 – 2035 Van Buren Street Overall Intersection LOS Comparison

Intersection	No-Build	Alternative 1-1-1
Van Buren Street and 7th Street	D(E)	C(D)
Van Buren Street and 9th Street	A(A)	B(B)
Van Buren Street and 11th Street	A(B)	B(B)
Van Buren Street and 16th Street	C(F)	C(C)
Van Buren Street and 18th Street	A(B)	B(B)
Van Buren Street and 20th Street	F(F)	B(D)
Van Buren Street and 24th Street	C(F)	B(C)

The overall intersection LOS improved or stayed the same when comparing the No Build to the 1-1-1 alternatives at the study area signalized intersections for 2015 with the exception of the following locations:

- Van Buren Street and 9th Street during both AM and PM peak hours;
- Van Buren Street and 11th Street during both AM and PM peak hours; and
- Van Buren Street and 18th Street during both AM and PM peak hours.

The overall LOS at these locations is anticipated to be a "B". The slight decrease in operation under the 1-1-1 Alternative is due to the reduction in number of travel lanes through the intersection.

The improvement in the overall LOS on the Van Buren Street Corridor at the remaining intersections in the year 2015 under the 1-1-1 Alternative is due to reduced traffic volume projections and improved signal timing.

The overall signalized intersections LOS improved or stayed the same when comparing the No Build to the 1-1-1 alternatives at the study area intersections for 2035 with the exception of the following locations:

- Van Buren Street and 9th Street during both AM and PM peak hours;
- Van Buren Street and 11th Street during the AM peak hour; and
- Van Buren Street and 18th Street during the AM peak hour.

The overall LOS at these locations is anticipated to be a "B". The slight decrease in operation under the 1-1-1 Alternative is due to the reduction in number of travel lanes through the intersection.

The improvement in the overall LOS on Van Buren Street Corridor at the remaining intersections in the year 2035 under the 1-1-1 Alternative is due to reduced traffic volume projections and improved signal timing.

8.0 Environmental Summary

It is anticipated that federal funding from the Federal Highway Administration (FHWA) and local funding would be used for construction. With the use of federal funding, the project must comply with the National Environmental Policy Act (NEPA) and other environmental authorities, including statutes, regulations, and executive orders.

Section 771.117(c) of 23 Code of Federal Regulations (CFR) identifies activities that are categorically excluded under NEPA but may be subject to review under other authorities. The project, as envisioned, would be covered under one or more of these identified activity categories.

The following sections summarize the environmental issues identified to date in the project corridor and the additional analysis and documentation that would likely be needed with the use of FHWA funding for construction. All references cited are listed in the **Final Technical Memorandum #2 – Analysis of Design Options** located in the Appendix of this report.

8.1 Third Street Corridor Background

The Third Street Corridor is within a fully developed urban area. Adjacent land uses include single- and multi-family residential, commercial, institutional recreation, and transportation. Commercial uses include office, retail, restaurant, medical, and entertainment. Institutional uses include churches and schools, and some vacant lots are present. Lands adjacent to the study area are owned by the City of Phoenix and private parties. The City of Phoenix owns the Third Street right-of-way; the Arizona Department of Transportation owns the Interstate 10 right-of-way. Points of interest include Steele Indian School Park, Margaret T. Hance Park, Saint Mary's High School, Monterrey Park Elementary School, Khalsa Montessori School, and various historic residential districts.

8.1.1 Historic Preservation

Data from the Maricopa County Assessor (Assessor) and CoreLogic (a comprehensive property and financial database) (CoreLogic 2015) were used to determine the presence of historic-age properties adjacent to the proposed improvements. Additional sources, including the National Register of Historic Places (National Register), the Phoenix Historic Property Register (Phoenix Register), the City of Phoenix Historic Preservation website, and other online resources, provided information regarding building morphology, architectural elements and styles, and construction dates and methods. The AZSITE cultural resource database was reviewed to determine the presence of previously documented surveys and assessments, and cultural resources, including archaeological sites that are adjacent to or intersect the study area.

Data from the Assessor and CoreLogic indicate that 44 historic-age properties are situated adjacent to the existing City of Phoenix–owned right-of-way and are shown in **Figure 39**. Improvements and construction activities occurred between 1910 and 2010.

A review of the National and Phoenix registers resulted in the identification of two listed individual properties on the Third Street Corridor and are shown in **Figure 39**. The two individual properties that are situated adjacent to or intersect the Third Street Corridor include:

- Grace Lutheran Church: This two-story late Gothic Revival building was constructed in 1928. The building is of stone construction, exhibits an asphalt roof, and is sheathed with scored plaster. In 1993, the church was listed in the National Register under Criterion C, Criteria Consideration A, and is considered to be the most dramatic example of Gothic Revival Architecture in the city of Phoenix (Woodward and Osmon 1993). Grace Lutheran Church also is listed in the Phoenix Register.
- Villa del Coronado Apartment Complex: This multi-family residence was constructed in 1958 and listed in the National Register in 2009 (National Register of Historic Places 2009). No further information regarding criteria for National Register listing, building history, or architectural detail was located during this cursory study.

A review of the National and Phoenix registers also identified the following historic residential districts adjacent to or intersecting the Third Street Corridor. These districts are listed in both registers:

- Alvarado Historic District: This residential historic district was listed in the National Register in 1994 under Criteria A and C. This historic residential district's period of significance extends from 1912 to 1950, and most of the buildings were constructed between 1924 and 1932. This district is one of the oldest residential areas in the city of Phoenix and includes urban estates designed for elite community members. The predominantly narrow streets are lined with palm trees, and the shallow front yards are unfenced. The area includes bungalows and one-story ranches. Architectural styles include American Colonial Revival, Elizabethan/Tudor Revival, Spanish Colonial Revival, Monterey Revival, Mission Revival, and Mediterranean Revival (Historic Phoenix 2015a, Edge and others 1994a).
- Ashland Place Historic District: This residential historic district was listed in the National Register in 1994 under Criteria A and C. The period of significance extends from 1920 to 1931, and most of the residences were constructed during the 1920s. The district is characterized by detached garages, narrow lots, shallow front lawns, mature ash trees, and historic streetlight fixtures. The area includes bungalows and exhibits architectural styles such as Mission Revival, Spanish Colonial Revival, Pueblo Revival, Monterey Revival, and Tudor Revival (Historic Phoenix 2015b, Edge and others 1994b).
- East Alvarado Historic District: This residential historic district was listed in the National Register in 2000 under Criteria A and C. The period of significance extends from 1924 to 1948, and most of the residences were constructed between 1937 and 1945. The district includes rear garages, uniform lots and front yard setbacks, and mature landscaping. Architectural styles include Monterey-influenced Early Ranch, Spanish Colonial Revival, and French Provincial (Historic Phoenix 2015c, Taxter 2000).
- La Hacienda Historic District: This residential historic district was listed in the National Register in 2009 under Criteria A and C, The development exhibits mature vegetation and uniform 20- to 30-foot-deep front yard setbacks. Parts of the neighborhood include landscaped buffers between the sidewalk and the roadway, and some of the front lawns extend directly onto the street. Architectural styles include Contemporary, International, Pueblo, Southwest, and Ranch. Revival styles include Monterey, Mission, Spanish Colonial, American Colonial, and Mediterranean (Historic Phoenix 2015d, Stokes and others 2009).
- Los Olivos Historic District: This residential historic district was listed in the National Register in 2010, and most of the homes were constructed during the 1920s along a single street. The development exhibits deep front yard setbacks and detached garages, and the street is lined with palm and olive trees. Architectural styles include Craftsman, Spanish Eclectic, and American Colonial Revival (Historic Phoenix 2015e).

A review of the AZSITE (2015) online database did not result in the identification of any archaeological sites or other historic or prehistoric cultural resources adjacent to or intersecting the Third Street Corridor study area.

The proposed improvements would use federal funds administered by FHWA; therefore, they are considered an undertaking requiring review pursuant to Section 106 of the National Historic Preservation Act of 1966 (Section 106). Once the preferred alternative is selected, the locations of planned improvements and/or proposed new right-of-way would be compared to the map of historic-age properties to identify any locations where the proposed work could potentially alter a property's eligibility for listing in the Phoenix and National registers. Architectural assessments may be required for those potentially affected properties not previously assessed for eligibility. Effect assessments would need to be completed for each of the potentially affected historic-age properties. Reports would need to document the results of these assessments for use in Section 106 consultation. The following considerations have been identified:

- Under all three 3rd Street alternatives, with the construction of new ADA ramps and installation of new sidewalk within historic districts an evaluation would be required to determine whether these additions would be an effect on the district(s).
- The relocation of existing traffic signal poles, which may be required for the 1-1-1 Alternative with Landscape Buffer for Pedestrians and the 1-1-1 Alternative with Landscape Buffer for Bikes, would not likely create an appreciable impact (effect) because the traffic signal poles are already present in the setting.
- The intersections that might be widened as part of the 2-0-2 Alternative (i.e., Indian School Road, Osborn Road, Earll Drive, Thomas Road, Virginia Avenue, McDowell Road, I-10) are not within historic districts.
- Though not anticipated, if removal of curb/gutter with 1-1-1 Alternative with Pedestrian Buffer has potential to affect existing sidewalks in an historic district, an evaluation would be required to determine whether the sidewalk is a contributing element to the district.

Because the Third Street Corridor is completely urbanized, it is unlikely that a Class III pedestrian cultural resources survey would be required because a survey would not yield any new information.

8.1.2 U.S. Department of Transportation Act, Sections 4(f) and 6(f)

Section 4(f) of the US Department of Transportation Act of 1966 states that the Secretary of Transportation:

"…may approve a transportation program or project…requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if …there is no prudent and feasible alternative to using that land and the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use" (49 United States Code [U.S.C.] 303[c]).

A "use" of a Section 4(f) resource, as defined in Code of Federal Regulations Title 23, Part 771.135(p) occurs:

a) when property is permanently incorporated into a transportation facility;
b) when there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose; or
c) when there is a constructive use of a Section 4(f) property.

The Land and Water Conservation Fund Act (LWCFA) of 1965 regulates user fees at certain recreational areas and establishes a fund in the US Department of the Treasury to subsidize governmental acquisition of lands and waters for recreational and conservation purposes (16 U.S.C. 460l-4 et seq.). Under Section 6(f) of the LWCFA, any conversion to nonrecreational uses for recreational lands and waters that used LWCFA funds during facility acquisition, establishment, or improvements requires the prior approval of the National Park Service and Arizona State Parks. Any recreational facilities that would be impacted by project construction would be evaluated to determine whether LWCFA funds were used at the facilities. The Section 4(f) and 6(f) findings and any required coordination and agency approvals would be summarized in the environmental clearance document.

A number of Section 4(f) properties and potential Section 4(f) properties are located adjacent to the 3rd Street Corridor. Those historic properties determined eligible for or listed in the National and Phoenix registers are protected under Section 4(f). These would include the Grace Lutheran Church and the Villa del Coronado apartment complex, and five historic residential districts: Alvarado Historic District, Ashland Place Historic District, East Alvarado Historic District, La Hacienda Historic District, and Los Olivos Historic District. Figure 40 depicts the locations of these properties. In addition, approximately 40 historic-age properties, as noted in the Cultural Resources section that have not be assessed for eligibility have the potential to be considered Section 4(f).

Several parks with the potential to be considered Section 4(f) properties are located along the 3rd Street Corridor: Steele Indian School Park, Townsend Park, and Monterrey Park (the Margaret T. Hance Park is not a Section 4(f) property, as confirmed by the FHWA). Outdoor sports fields associated with publically owned schools can also be considered Section 4(f) resources if open to the public after schools hours. Potential Section 4(f) properties within 0.25 mile of the project limits would be identified during the environmental clearance process and the associated ownership, use, and public access characteristics considered to determine if the property would be protected under Section 4(f).

8.1.3 Floodplain Management

A review of Federal Emergency Management Agency Flood Insurance Rate Map 04013C2205L dated October 16, 2013, indicated that no areas of the 100-year floodplain (Zone A and Zone AH) are present within the Third Street Corridor study area. Therefore, the proposed improvements would not result in an encroachment or impact on 100-year floodplains.

8.1.4 Wetland Protection

A review of recent aerial photography confirmed that no wetlands or riparian areas are present within the Third Street Corridor.

8.1.5 Coastal Zone Management Act

There are no coastal barrier resources in Arizona; therefore, the project would not impact coastal zones.

8.1.6 Sole Source Aquifers

Based on recent US Environmental Protection Agency mapping, the project is not within the boundaries of any sole source aquifer.

8.1.7 Endangered Species Act

A qualified biologist, EcoPlan Associates, Inc., reviewed the Arizona Game and Fish Department (AGFD) Arizona Environmental Online Review Tool Report and the US Fish and Wildlife Service (USFWS) Information, Planning,

and Conservation System website on May 12, 2015, to determine whether sensitive species and/or habitats potentially occur in the study area and to obtain an official list of federally protected species with the potential to occur within the project limits. Recent aerial photography was also reviewed.

The study area is within and surrounded by highly developed urban zones and does not support natural vegetation communities. The AGFD Arizona Environmental Online Review Tool Report indicated that there is a bat colony within 2 miles of the study area. Sabra Tonn (AGFD Heritage Data Management System program supervisor, personal communication, February 17, 2015) provided information on bat roosts along Interstate 10, which crosses the southern end of the Third Street Corridor study area. Tonn indicated that bats are known to roost in the State Capitol and in a building on the Arizona State University (ASU) campus. In addition, the Western yellow bat *(Lasiurus xanthinus)* has been observed to roost in palm trees along the Salt River and on the ASU campus. These sites are well removed from the Third Street Corridor study area and will not be impacted by proposed project activities. It is expected that species-specific protocol surveys and Endangered Species Act Section 7 consultation with the USFWS would not be required. A review of the selected alternative would confirm whether the project would have "no effect" or be "not likely to adversely affect" any federally protected (listed or proposed) threatened or endangered species or adversely modify designated critical habitats.

8.1.8 Wild and Scenic Rivers Act

Reaches of Fossil Creek and the Verde River are the only designated Wild and Scenic Rivers in Arizona. The project would not affect these resources.

8.1.9 Clean Air Act

The project is within the Phoenix Non-Attainment Areas for Particulate Matter and 8-hour Ozone, and the Phoenix Maintenance Area for Carbon Monoxide. Sensitive air quality receptors, including residences, are within 1,000 feet of the project limits.

The purpose of the project is to implement pedestrian and bicycle improvements to create a bicycle- and pedestrian-friendly corridor to facilitate the movement of pedestrians and bicyclists to and from the downtown area. Regarding air quality, pedestrian and bicycle improvements are listed as exempt from the requirement to determine conformity to transportation plans and improvement programs (40CFR 93.126, Exempt Projects). However, consideration should be given to whether changes in lane configurations could result in increased air emissions. The project would not be exempt if there could be potentially adverse emissions effects of the project.

8.1.10 Farmland Protection Policy Act

Based on a review of aerial photography and a field investigation, no agricultural land is in the study area. Compliance with the Farmland Protection Policy Act would not be required.

8.1.11 Environmental Justice (Executive Order 12898)

Title VI of the Civil Rights Act of 1964 and related statutes assure that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, and disability. Executive Order 12898 on environmental justice (EJ), dated February 11, 1994, directs that programs, policies, and activities not have a disproportionately high and adverse human health or environmental effect on minority and low-income populations.

The project is in a fully developed urban area with residential, commercial, institutional, recreation, and transportation uses. The purpose of the project is to implement pedestrian and bicycle improvements. The presence of Title VI/EJ populations was not determined because the project would have no new effects on these residents or on the surrounding area. The need for additional analysis would be evaluated once the preferred alternative is selected.

Temporary minor modifications of vehicular and pedestrian traffic patterns on local streets within the project limits are anticipated during construction. It is anticipated that at least one driveway per property would be maintained throughout construction, and detours for vehicles and pedestrians would be provided, if required. The adjacent property owners should be notified of potential impacts two weeks prior to modifying or otherwise restricting traffic patterns or access.

8.1.12 Noise

Sensitive noise receptors, including residences, are within 1,000 feet of the project limits. The purpose of the project is to implement pedestrian and bicycle improvements to create a bicycle-and pedestrian-friendly corridor to facilitate the movement of pedestrians and bicyclists to and from the downtown area. The project would not add through traffic lanes or result in substantial horizontal or vertical shifts in roadway alignment. Furthermore, the proposed facilities would be expected to reduce motor vehicle traffic by supporting alternative modes of transportation through the corridor. Therefore, it is expected that a qualitative noise evaluation would be appropriate for project compliance; quantitative analyses would not be required. The project scope for the preferred alternative should be reviewed and evaluated to confirm that no proposed project features would warrant a quantitative noise analysis.

8.1.13 Hazardous Materials

The project involves the construction of pedestrian and bicycle facilities and would not expose buildings or occupants to any hazardous, toxic, or radioactive materials or substances. In support of environmental compliance, the potential presence of hazardous, toxic, or radioactive materials and substances would need to be assessed in accordance with FHWA guidelines. A qualified hazardous materials specialist would review results of a hazardous materials database record search, conduct a field visit, and assess the need for sampling for asbestos-containing materials and lead-based paint. A Preliminary Initial Site Assessment would be prepared to document the potential for hazardous materials to affect the project.

8.1.14 Airport Runway Protection Zones and Accident Potential Zone

The Third Street Corridor is more than 1 mile from Phoenix Sky Harbor International Airport; however, the corridor is not within an airport Runway Protection Zone (Randy Payne, project manager, Planning Environment and Capital Management Division, City of Phoenix Aviation Department, personal communication, May 18, 2015).

8.1.15 Clean Water Act

A review of US Geological Survey mapping and recent aerial photography and a site visit identified no potential Waters of the United States within the project limits. Therefore, no Clean Water Act Section 404 permitting or Section 401 water quality certification would be required for project construction. It is expected that project construction would disturb 1 or more acres of land; therefore, a Clean Water Act Section 402 Stormwater

Pollution Prevention Plan and an Arizona Pollutant Discharge Elimination System construction general permit would be required.

Figure 39 depicts the Third Street Corridor historic and potential historic resources.

Figure 39 – Third Street Corridor Historic and Potential Historic Resources

8.2 Van Buren Street Corridor Background

The Van Buren Street Corridor is within a fully developed urban area. Adjacent land uses include single- and multi-family residential, commercial, institutional, and transportation. Commercial uses include, retail, wholesale, restaurant, service, and lodging. Institutional uses include medical and educational, and some vacant lots and buildings are present. Lands adjacent to the study area are owned by the City of Phoenix and private parties. The City of Phoenix owns the Van Buren Street right-of-way, and the Interstate 10 right-of-way is owned by the Arizona Department of Transportation. Points of interest include Verde Park, the Arizona State University Preparatory Academy, St. Luke's Medical Center, the Arizona State Hospital, and the Children's Museum of Phoenix.

8.2.1 Historic Preservation

Data from the Assessor and CoreLogic (a comprehensive property and financial database) (CoreLogic 2015) were used to determine the presence of historic-age properties adjacent to the proposed improvements. Additional sources, including the National Register, the Phoenix Register, the City of Phoenix Historic Preservation website, and other online resources, provided information regarding building morphology, architectural elements and styles, and construction dates and methods. The AZSITE cultural resource database was reviewed to determine the presence of previously documented surveys and assessments, and cultural resources, including archaeological sites that are adjacent to or intersect the study area.

Data from the Assessor and CoreLogic indicate that 64 historic-age properties are situated adjacent to the existing City of Phoenix–owned right-of-way and are depicted in **Figure 40**. Improvements and construction activities occurred between 1910 and 2010.

A review of the National and Phoenix registers resulted in the identification of two listed individual properties and two historic residential districts that are situated adjacent to or intersect the Van Buren Street Corridor and are shown in **Figure 40**. The two individual properties that are situated adjacent to or intersect the Van Buren Street Corridor include:

- Monroe School: This two-story Neoclassical Revival school building was constructed in 1914. The building was assigned ASM site designation AZ T:12:41 (ASM) and was listed in the National Register in 1977 (National Register 1977). Monroe School exhibits a steel frame, and the original brick-clad shell remains intact. The school is distinguished by a central portico with Corinthian columns (Downtown Phoenix Journal 2015). Monroe School also is listed in the Phoenix Register.
- Pay'n Takit #13: This retail building was constructed in 1928 and was listed in the National Register in 1985. The retail store is of brick construction and exhibits a wood truss roof and a brick front façade. This building is listed only in the National Register (Garrison 1984).

The following historic residential districts are adjacent to or intersecting the Third Street Corridor and are listed in both the National and Phoenix registers (City of Phoenix 2015):

- Garfield Historic District: This residential historic district was listed in the National Register in 2010 under Criterion A and was developed between 1883 and 1955. This district is part of the Dennis Addition to the original Phoenix Townsite. The development of this area was directly related to the establishment of a local streetcar line. Architectural styles include a variety of period revivals, pyramid cottages, vernacular residences, and one-story ranches.
- Phoenix Union High School Historic District: This residential historic district was listed in the National Register in 1994 under Criteria A and C. The period of significance extends from 1920 to 1931, and most of the residences were constructed during the 1920s. The district is characterized by detached garages, narrow lots, shallow front lawns, mature ash trees, and historic streetlight fixtures. The area includes bungalows and exhibits architectural styles such as Mission Revival, Spanish Colonial Revival, Pueblo Revival, Monterey Revival, and Tudor Revival (Meyers and Garrison 1982).

A review of the AZSITE (2015) online database indicated that only a few small surveys for cultural resources have been conducted near the Seventh Street intersection with Van Buren Street. The review also resulted in the identification of the eight additional cultural resources that are situated adjacent to or intersect the Van Buren Street Corridor study area. The identified resources include one historic building, one historic roadway alignment, the original Phoenix Townsite, one addition to the Phoenix Townsite, and four archaeological sites:

- AZ FF:9:17 (ASM), Historic State Route 80: This historic roadway alignment is coincident with Van Buren Street in the project vicinity (AZSITE 2015).
- AZ T:12:1 (ASM), La Ciudad: This prehistoric archaeological site is a habitation with features including a ball court, room block, pit houses, middens, and artifact scatters (AZSITE 2015).
- AZ T:12:70 (ASM), Pueblo Patricio: This archaeological habitation site includes trash pits, charcoal stains, and possible pit houses (AZSITE 2015).
- AZ T:12:72 (ASM): This property includes historic components and was the site of an electric trolley plant, and residential buildings (AZSITE 2015). Some historic buildings are still present and the property currently functions as a public park.
- AZ T:12:41 (ASM), The Monroe School: This historic building is listed in the Phoenix and National registers and is discussed earlier in this document (AZSITE 2015).
- AZ T:12:42 (ASM), Phoenix Townsite: The original Phoenix Townsite, which was established in the late 1800s, is situated adjacent to the Van Buren Street Corridor study area at the southeast corner of the intersection of Van Buren Street and Seventh Street. The area immediately adjacent to the proposed improvements is urbanized; no elements from the establishment of the townsite are present (AZSITE 2015).
- AZ T:12:217 (ASM), Dennis Addition: This addition to the original Phoenix Townsite is adjacent to the study area at the northeast corner of the intersection of Van Buren Street and Ninth Street. The addition was acquired through a US Land Patent in 1874 and encompasses the Garfield Historic District (AZSITE 2015).
- NA10688: According to the AZSITE online database, this archaeological site has been almost completely destroyed. The prehistoric component included adobe structures, ball courts, pit houses, irrigation canals, and ceramic and chipped stone artifacts. At one time, a historic component was situated at the southern end (AZSITE 2015).

The proposed improvements would use federal funds administered by FHWA; therefore, they are considered an undertaking requiring review pursuant to Section 106.

Once the preferred alternative is selected, the locations of planned improvements and/or proposed new right-of-way would be compared to the map of historic-age properties to identify any locations where the proposed

work could potentially alter a property's eligibility for listing in the Phoenix and National registers. Architectural assessments may be required for those potentially affected properties not previously assessed for eligibility. Effect assessments would need to be completed for each of the potentially affected historic-age properties. Reports would need to document the results of these assessments for use in Section 106 consultation.

Because the Van Buren Street Corridor is completely urbanized, it is unlikely that a Class III pedestrian cultural resources survey would be required because a survey would not yield any new information.

8.2.2 U.S. Department of Transportation, Sections 4(f) and 6(f)

Section 4(f) of the US Department of Transportation Act of 1966 states that the Secretary of Transportation:

"…may approve a transportation program or project…requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if …there is no prudent and feasible alternative to using that land and the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use" (49 United States Code [U.S.C.] 303[c]).

A "use" of a Section 4(f) resource, as defined in Code of Federal Regulations Title 23, Part 771.135(p) occurs:

a) when property is permanently incorporated into a transportation facility;
b) when there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose; or
c) when there is a constructive use of a Section 4(f) property.

The Land and Water Conservation Fund Act (LWCFA) of 1965 regulates user fees at certain recreational areas and establishes a fund in the US Department of the Treasury to subsidize governmental acquisition of lands and waters for recreational and conservation purposes (16 U.S.C. 460l-4 et seq.). Under Section 6(f) of the LWCFA, any conversion to nonrecreational uses for recreational lands and waters that used LWCFA funds during facility acquisition, establishment, or improvements requires the prior approval of the National Park Service and Arizona State Parks. Any recreational facilities that would be impacted by project construction would be evaluated to determine whether LWCFA funds were used at the facilities. The Section 4(f) and 6(f) findings and any required coordination and agency approvals would be summarized in the environmental clearance document.

A number of Section 4(f) properties and potential Section 4(f) properties are located adjacent to the Van Buren Street Corridor. Those historic properties determined eligible for or listed in the National and Phoenix registers are protected under Section 4(f). Potential Section 4(f) properties identified include Monroe School, Pay'n Takit #13, the Phoenix Union High School Historic District, Garfield Historic District, and the Dennis Addition to the Phoenix Townsite. In addition, at least three historic-age buildings and structures are present within the limits of Verde Park. There Figure 41 depicts the locations of these properties. In addition, approximately 60 historic-age properties identified in the Cultural Resources section that have not be assessed for eligibility have the potential to be considered Section 4(f).

Two parks with the potential to be considered Section 4(f) properties were identified along the Van Buren Street Corridor: Verde Park and Sohu Park. Outdoor sports fields associated with publically owned schools can also be considered Section 4(f) resources if open to the public after schools hours. Potential Section 4(f) properties within 0.25 mile of the project limits would be identified during the environmental clearance process and the associated ownership, use, and public access characteristics considered to determine if the property would be protected under Section 4(f).

8.2.3 Floodplain Management

A review of Federal Emergency Management Agency Flood Insurance Rate Map 04013C2210L dated October 16, 2013, indicated that no areas of the 100-year floodplain (Zone A and Zone AH) are present within the Van Buren Street Corridor study area. Therefore, the proposed improvements would not result in an encroachment or impact on 100-year floodplains.

8.2.4 Wetland Protection

A review of recent aerial photography confirmed that no wetlands or riparian areas are present within the Van Buren Street Corridor study area.

8.2.5 Coastal Zone Management Act

There are no coastal barrier resources in Arizona; therefore, the project would not impact coastal zones.

8.2.6 Sole Source Aquifers

Based on recent US Environmental Protection Agency mapping, the project is not within the boundaries of any sole source aquifer.

8.2.7 Endangered Species Act

A qualified biologist, EcoPlan Associates, Inc., reviewed the AGFD Arizona Environmental Online Review Tool Report and the USFWS Information, Planning, and Conservation System website on May 12, 2015, to determine whether sensitive species and/or habitats potentially occur in the study area and to obtain an official list of federally protected species with the potential to occur within the project limits. Recent aerial photography was also reviewed.

The study area is within and surrounded by highly developed urban zones and does not support natural vegetation communities. The AGFD Arizona Environmental Online Review Tool Report indicated that there is a bat colony within 2 miles of the study area. Sabra Tonn (AGFD Heritage Data Management System program supervisor, personal communication, February 17, 2015) provided information on bat roosts along Interstate 10, which crosses the southern end of the Van Buren Street Corridor study area. Tonn indicated that bats are known to roost in the State Capitol and in a building on the Arizona State University (ASU) campus. In addition, the Western yellow bat *(Lasiurus xanthinus)* has been observed to roost in palm trees along the Salt River and on the ASU campus. These sites are well removed from the Van Buren Street Corridor study area and will not be impacted by proposed project activities. It is expected that species-specific protocol surveys and Endangered Species Act Section 7 consultation with the USFWS would not be required. A review of the selected alternative would confirm whether the project would have "no effect" or be "not likely to adversely affect" any federally protected (listed or proposed) threatened or endangered species or adversely modify designated critical habitats.

8.2.8 Wild and Scenic Rivers Act

Reaches of Fossil Creek and the Verde River are the only designated Wild and Scenic Rivers in Arizona. The project would not affect these resources.

8.2.9 Clean Air Act

The project is within the Phoenix Non-Attainment Areas for Particulate Matter and 8-hour Ozone, and the Phoenix Maintenance Area for Carbon Monoxide. Sensitive air quality receptors, including residences, are within 1,000 feet of the project limits.

The purpose of the project is to implement pedestrian and bicycle improvements to create a bicycle- and pedestrian-friendly corridor to facilitate the movement of pedestrians and bicyclists to and from the downtown area. Regarding air quality, pedestrian and bicycle improvements are listed as exempt from the requirement to determine conformity to transportation plans and improvement programs (40CFR 93.126, Exempt Projects). However, consideration should be given to whether changes in lane configurations could result in increased air emissions. The project would not be exempt if there could be potentially adverse emissions effects of the project.

8.2.10 Farmland Protection Policy Act

Based on a review of aerial photography and a field investigation, no agricultural land is in the study area. Compliance with the Farmland Protection Policy Act would not be required.

8.2.11 Environmental Justice (Executive Order 12898)

Title VI of the Civil Rights Act of 1964 and related statutes assure that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, and disability. Executive Order 12898 on environmental justice (EJ), dated February 11, 1994, directs that programs, policies, and activities not have a disproportionately high and adverse human health or environmental effect on minority and low-income populations.

The project is in a fully developed urban area with residential, commercial, institutional, recreation, and transportation uses. The purpose of the project is to implement pedestrian and bicycle improvements. The presence of Title VI/EJ populations was not determined because the project would have no new effects on these residents or on the surrounding area. The need for additional analysis would be evaluated once the preferred alternative is selected.

Temporary minor modifications of vehicular and pedestrian traffic patterns on local streets within the project limits are anticipated during construction. It is anticipated that at least one driveway per property would be maintained throughout construction, and detours for vehicles and pedestrians would be provided, if required. The adjacent property owners should be notified of potential impacts two weeks prior to modifying or otherwise restricting traffic patterns or access.

8.2.12 Noise

Sensitive noise receptors, including residences, are within 1,000 feet of the project limits. The purpose of the project is to implement pedestrian and bicycle improvements to create a bicycle-and pedestrian-friendly corridor to facilitate the movement of pedestrians and bicyclists to and from the downtown area. The project would not add through traffic lanes or result in substantial horizontal or vertical shifts in roadway alignment. Furthermore, the proposed facilities would be expected to reduce motor vehicle traffic by supporting alternative modes of transportation through the corridor. Therefore, it is expected that a qualitative noise evaluation would be appropriate for project compliance; quantitative analyses would not be required. The project scope for the preferred alternative should be reviewed and evaluated to confirm that no proposed project features would warrant a quantitative noise analysis.

8.2.13 Hazardous Materials

The project involves the construction of pedestrian and bicycle facilities and would not expose buildings or occupants to any hazardous, toxic, or radioactive materials or substances. In support of environmental compliance, the potential presence of hazardous, toxic, or radioactive materials and substances would need to be assessed in accordance with FHWA guidelines. A qualified hazardous materials specialist would review results of a hazardous materials database record search, conduct a field visit, and assess the need for sampling for asbestos-containing materials and lead-based paint. A Preliminary Initial Site Assessment would be prepared to document the potential for hazardous materials to affect the project.

8.2.14 Airport Runway Protection Zones and Accident Potential Zone

The Van Buren Street Corridor is 0.5 mile from Phoenix Sky Harbor International Airport; however, the corridor is not within an airport Runway Protection Zone (Randy Payne, project manager, Planning Environment and Capital Management Division, City of Phoenix Aviation Department, personal communication, May 18, 2015).

8.2.15 Clean Water Act

A review of US Geological Survey mapping and recent aerial photography and a site visit identified no potential Waters of the United States within the project limits. Therefore, no Clean Water Act Section 404 permitting or Section 401 water quality certification would be required for project construction. It is expected that project construction would disturb 1 or more acres of land; therefore, a Clean Water Act Section 402 Stormwater Pollution Prevention Plan and an Arizona Pollutant Discharge Elimination System construction general permit would be required.

Figure 40 depicts the Van Buren Street Corridor historic and potential historic resources.

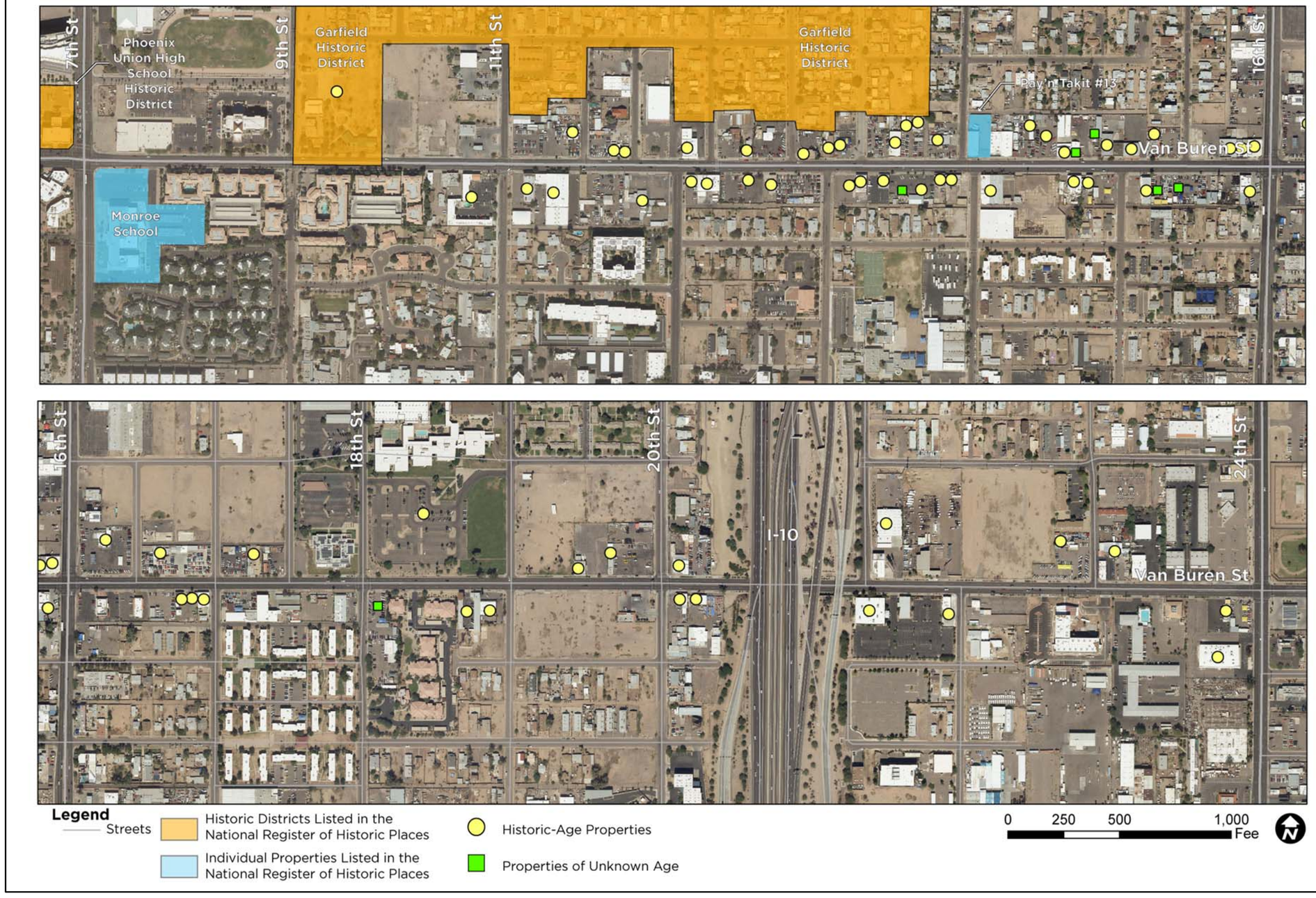

Figure 40 – Van Buren Street Corridor Historic and Potential Historic Resources

9.0 Benefit/Cost Analysis

9.1 Comparative Planning Level Cost Estimate

A comparative planning level cost estimate was prepared for each alternative for the Third Street and Van Buren Street corridors. **Table 46** and **Table 47** present the order of magnitude cost estimate for each alternative developed for the Third Street and Van Buren Street corridors, respectively. Detailed estimates for the alternatives may be found in the ***Final Technical Memorandum #2 – Analysis of Design Options*** located in the **Appendix** of this report.

Table 46 – Summary of Third Street Corridor Estimates

Alternative	Order of Magnitude Cost Estimate
1-1-1 Alternative with Buffered Bike Lane	$3,456,800
1-1-1 Alternative with Pedestrian Buffer	$4,197,000
2-0-2 Alternative	$2,998,600

Table 47 - Summary of Van Buren Street Corridor Estimates

Alternative	Order of Magnitude Cost Estimate
1-1-1 Alternative with Buffered Bike Lane	$3,554,100
1-1-1 Alternative with On-Street Parking	$2,945,400

9.2 Benefits/Cost Ratio

The benefit/cost ratio is obtained by dividing the benefits for each facility by the costs for that facility. The following table provides the summary of benefits and costs and the resultant benefit/cost ratio. Additional information on the development of benefit/cost ratios is available in the ***Final Technical Memorandum #2 – Analysis of Design Options*** located in the **Appendix** of this report.

Table 48 – Summary of Benefit/Cost Ratio

Benefit/Cost	Third Street			Van Buren Street	
	1-1-1 Alternative		2-0-2 Alternative	With Buffered Bike Lane	With On-Street Parking
	With Buffered Bike Lane	With Ped. Buffer			
Benefit		$15,347,107		$13,397,317	$13,720,630
Cost	$3,453,792	$4,196,999	$2,998,649	$3,554,082	$2,945,392
Benefit/Cost Ratio	4.4	3.7	5.1	3.8	4.7

The projects have favorable benefit/cost ratios. The benefit/cost ratios for Third Street are 4.4 for the 1-1-1 Alternative with Buffered Bike Lane, 3.7 for the 1-1-1 Alternative with Pedestrian Buffer and 5.1 for the 2-0-2 Alternative. The benefit/cost ratios for Van Buren Street are 3.8 for the 1-1-1 Alternative with Buffered Bike Lane and 4.7 for the 1-1-1 Alternative with On-Street Parking.

10.0 Evaluation of Alternatives

10.1 Evaluation Criteria

The criteria used to evaluate the alternatives described in this report were developed and reviewed by the project team for further discussion. The three alternatives for Third Street and the two alternatives for Van Buren Street along with the no-build alternative were evaluated using the following criteria:

- Corridor Aesthetics - This evaluation factor considers the ability of each alternative to enhance aesthetic character of the corridor for all roadway users.
- Pedestrian Buffer and Amenities - The alternatives were evaluated based on the ability to provide adequate buffer between pedestrian and vehicular traffic and on the ability to provide pedestrian amenities such as benches, shaded trees, and lighting along the corridor.
- Pedestrian Roadway Crossing Ease - The alternatives were evaluated based on the ability to provide reduced crosswalk widths and median refuge islands along the marked and unmarked pedestrian crossings within the corridor.
- Bicycle Buffer and Amenities - The alternatives were evaluated based on the ability to provide adequate buffer between bicycle and vehicular traffic and on the ability to provide bicycle amenities such as parking area, shaded trees, and lighting along the corridor.
- Entire Facility Level-of-Service - Each of the alternatives were evaluated to determine the impacts on the overall auto, pedestrian, bicycle and transit level-of-service along the corridor.
- Safety - Each of the alternatives were evaluated to determine the impacts on safety and the crash reduction factor for all users along the corridor.
- Maintenance – Each of the alternatives were evaluated to determine the impacts on street maintenance.
- Drainage - Each of the alternatives were evaluated to determine the impacts on existing drainage along the corridor.
- Utilities - Each of the alternatives were evaluated to determine the impacts on existing utilities and potential relocation of utilities along the corridor.
- Driveway Conflicts - Each of the alternatives were evaluated to determine the impacts on existing driveways along the corridor.
- Environmental Impacts – Each of the alternatives were evaluated to determine the impacts on cultural resources (historic and prehistoric), floodplains, wetlands, biological resources, air quality, farmlands, Environmental Justice, noise, hazardous and toxic materials, airport runway protection zones, and waters of the US.
- Cost - A comparative planning level cost estimate was developed for each alternative including design and construction of pavement, medians, traffic control, signage, markings, decorative pavement for bicycles, pedestrian lighting and fixtures.

10.2 Evaluation Results

Table 49 and **Table 50** summarize the analysis of the Third Street and Van Buren Street alternatives, respectively. The summary includes a narrative and qualitative rating of each alternative based on the rating scale listed below. The overall focus of this high-level analysis was to compare the relative advantages and disadvantages of impacts in each of the alternatives. In order to maintain consistency when applying the rating scale, the options were evaluated directly against the criterion and no specific weightings of the criteria were developed.

- Strong Advantage
- Advantage
- Neutral
- Disadvantage
- Strong Disadvantage

The advantage and disadvantage ratings shown in **Table 49** and **Table 50** are graphically summarized in **Figure 41** and **Figure 42**, respectively. The alternative that provides the greatest advantage will be carried forward as the recommended preferred alternative.

Table 49 - Third Street Corridor Alternative Evaluation

Evaluation Criteria	No Build	1-1-1 Alternative with Buffered Bike Lane	1-1-1 Alternative with Pedestrian Buffer	2-0-2 Alternative
Corridor Aesthetics	Under the no-build conditions there are no bike lanes and a limited pedestrian buffer. Additionally, pedestrian connectivity is challenged to due lack of sidewalks along certain segments. There are fewer pedestrian amenities such as benches, trash receptacles, lighting, shaded trees and open spaces.	Advantage: This alternative alignment will allow for an improved aesthetic enhancement for the corridor. Buffer lanes with decorative pavement will allow for a bicycle travel improvement and will visually delineate a barrier between vehicular travelers and bicyclists. Median buffer areas will be implemented in areas of the corridor where existing alignment widths permits. These areas will allow for the establishment of an improved aesthetic street character, with specific tree and landscape material unique to the corridor. Median buffer areas will also tie in existing landscape character, in order to create a consistent aesthetic theme throughout the corridor. Implementation of this alternative will add an improved aesthetic character to the corridor while also encouraging a bicycle and pedestrian friendly route through Third Street. Disadvantage: This alternative alignment will provide an overall aesthetic improvement, but mostly designated towards bicycle access and connectivity. Pedestrian aesthetic improvements are limited to areas where median buffers provide barrier and shade. Cost of implementing aesthetic elements will be higher due to use of decorative pavement and landscape/irrigation items.	Advantage: This alternative alignment will allow for an extensive improved aesthetic enhancement for the corridor. Pedestrian buffers will parallel the existing curb and gutter through many segments of the corridor. The pedestrian buffers will allow for an improved aesthetic street character, with specific tree and landscape material unique to the corridor. A Continuous street character landscape theme will aesthetically enhance the corridor for bicyclists, pedestrians, travelers and surrounding communities. Buffer lanes with decorative pavement will allow for a bicycle travel improvement and will visually delineate a barrier between vehicular travelers and bicyclists. Implementation of this alternative will create a highly improved aesthetic character to the corridor while also encouraging a strong bicycle and pedestrian friendly connectivity through Third Street. This alternative meets the project goals in addressing and balancing bicyclist and pedestrian needs. Disadvantage: Cost of implementing aesthetic elements will be higher due to the extensive use of decorative pavement and landscape/irrigation items throughout the 2.5 mile corridor.	Advantage: This alternative alignment will allow for an improved aesthetic enhancement for the corridor. Buffer lanes with decorative pavement will allow for a bicycle travel improvement and will visually delineate a barrier between vehicular travelers and bicyclists. The use of decorative pavement will visually and aesthetically strengthen the corridor character with a linear pattern and color. Implementation of this alternative will create an improved aesthetic character to the corridor while delineating a bicycle friendly route through Third Street. Cost of implementing aesthetic elements will be lower due to use of decorative pavement to address aesthetic design. No landscape/irrigation items will be required. Disadvantage: This alternative alignment will provide an overall aesthetic improvement, but an improvement designated towards bicycle access and connectivity only. Pedestrian aesthetic improvements will be minimal.
	Disadvantage	**Advantage**	**Advantage**	**Neutral**
Pedestrian Buffer and Amenities	Under the no-build conditions the existing pedestrian buffer varies from 0 to 10 feet. The existing buffer consists of grass, rocks and shrubs throughout most of the corridor. In a few locations, shade trees are present.	This alternative does not provide any additional buffer between the bike lane and the pedestrian sidewalk nor does it provide any additional pedestrian amenities other than what already exists.	This alternative provides 3 to 9.5 feet of additional buffer width between the bike lane and the pedestrian sidewalk along the corridor. This additional buffer will help in increasing the comfort of sidewalk users by adding benches, shaded trees, street lighting and other public amenities.	This alternative does not provide any additional buffer between the bike lane and the pedestrian sidewalk nor does it provide any additional pedestrian amenities other than what already exists.
	Disadvantage	**Neutral**	**Advantage**	**Neutral**
Pedestrian Roadway Crossing Ease	Under the no-build condition, the pedestrians will have to cross five travel lanes that are 10-12 feet wide with the ability to use the central two-way left-turn lane as a refuge area.	This alternative requires pedestrian to cross three travel lanes that are 12 feet wide with the ability to use the central two-way left-turn lane as a refuge area.	This alternative requires pedestrians to cross three travel lanes that are 10 feet wide with the ability to use the central two-way left-turn lane as a refuge area.	This alternative requires pedestrians to cross four travel lanes that are 10 feet wide with no central median refuge area.
	Disadvantage	**Neutral**	**Advantage**	**Neutral**

Table 49 – Third Street Corridor Alternative Evaluation (continued)

Evaluation Criteria	No Build	1-1-1 Alternative with Buffered Bike Lane	1-1-1 Alternative with Pedestrian Buffer	2-0-2 Alternative
Bicycle Buffer and Amenities	Under the no-build condition there are no bike lanes, buffer or amenities. **Strong Disadvantage**	This alternative will provide a 3 to 9.5 feet of landscape buffer between the travel lane and bike lane. This buffer would support shaded trees and lighting but no bike racks. **Strong Advantage**	This alternative will provide a 3-foot paved buffer between the travel lane and the bike lane. This buffer would not support bike racks, shaded trees, and lighting. **Advantage**	This alternative will provide 0 to 4 feet of paved buffer between the travel lane and bike lane. This buffer will not be able to support any amenities for bikes. **Neutral**
Entire Facility Level-of-Service	The auto mode operates the best under the no build condition at LOS C in 2015. The auto mode operates the second best at LOS D in 2035. The pedestrian mode operates the second worst under 2015 conditions and the worst under 2035 conditions at a LOS D or better. The bicycle mode operates the worst under 2015 and 2035 conditions at a LOS E and LOS F or better, respectively. **Neutral**	The auto mode operates the worst under the 1-1-1 Alternative with Buffered Bike Lanes in 2015 and 2035 at LOS D or better and LOS F or better, respectively. The pedestrian mode operates the second best under 2015 and 2035 conditions at a LOS D or better. The bicycle mode operates the best under 2015 and 2035 conditions at a LOS D and LOS E or better, respectively. **Advantage**	The auto mode operates the worst under the 1-1-1 Alternative with Pedestrian Buffer in 2015 and 2035 at LOS D or better and LOS E or better, respectively. The pedestrian mode operates the best under 2015 and 2035 conditions at a LOS D or better. The bicycle mode operates the second best under 2015 and 2035 conditions at a LOS E or better. **Advantage**	The auto mode operates the second best under the 2-0-2 Alternative in 2015 at LOS D or better and best in 2035 at a LOS D. The pedestrian mode operates the second worst under 2015 and 2035 conditions at a LOS D or better. The bicycle mode operates the second worst under 2015 and 2035 conditions at a LOS E. **Neutral**
Safety	Under no build conditions, there are no bike lanes along the corridor and the pedestrians have to cross five travel lanes with a central median refuge area. No added safety features are included under the no build condition. **Disadvantage**	A road diet, reducing the number of lanes from 5 lanes to 3 lanes or 4 lanes to 3 lanes, is anticipated to **reduce** the number of crashes by approximately 20%. Installing protected bike lanes or a cycle track is anticipated to **reduce** the number of crashes by approximately 69%. To obtain the full benefit of the raised median buffer, the driveways along the corridor will need to be consolidated with re-development. Consolidating driveways, reducing the number of driveways by 25%, could **reduce** the number of crashes from approximately 4% to 13% depending on the crash type and severity. **Strong Advantage**	A road diet, reducing the number of lanes from 5 lanes to 3 lanes or 4 lanes to 3 lanes, is anticipated to **reduce** the number of crashes by approximately 20%. Installing protected bike lanes or a cycle track is anticipated to **reduce** the number of crashes by approximately 69%. **Advantage**	Installing bike lanes will only have a slight to negative impact on safety in the corridor. With the installation of protected bike lanes, it is anticipated that the number of crashes will be **reduced** by approximately 69%. Studies have shown that with the installation of a two-way left-turn lane, the number of crashes is anticipated to reduce by approximately 56%. Therefore, with the removal of a two-way left-turn lane as recommended under this alternative, the number of crashes will **increase** by approximately 56%. **Neutral**
Maintenance	There will be no maintenance issues. **Neutral**	With the raised median buffer separating the travel lanes and bike lane, maintenance will need to require a small street sweeper to maintain the bike lanes. There are also additional cost for maintenance with upkeep of raised median buffer and landscape. **Disadvantage**	With the pedestrian buffer being added to the outside of the travel way, the landscape maintenance can be coordinated with future developers as opposed to the City having to maintain the new landscaping. **Neutral**	There will be no maintenance issues added under this alternative **Advantage**

Table 49 – Third Street Corridor Alternative Evaluation (continued)

Evaluation Criteria	No Build	1-1-1 Alternative with Buffered Bike Lane	1-1-1 Alternative with Pedestrian Buffer	2-0-2 Alternative
Utilities	There will be no utility impacts. **Neutral**	The proposed raised median buffer will allow for future landscape such as shrubs and shade trees. This could have impacts on existing underground utilities running along the corridor. As long as the proposed location of the two-way left-turn lane remains near existing, minimal impacts to existing signals are anticipated under this alternative. **Neutral**	As long as the proposed location of the two-way left-turn lane remains near existing, minimal impacts to existing signals are anticipated under this alternative. If curb returns at intersections are relocated to match new curb and gutter alignment, pedestrian push buttons will need to be adjusted. **Disadvantage**	There will be no utility impacts under this alternative. **Advantage**
Drainage	There will be no drainage impacts. **Neutral**	The new median buffer will need to provide drainage needs for the corridor as it has the potential to block existing drainage facilities. **Disadvantage**	Existing drainage facilities will need to be extended or relocated to match new curb and gutter location. **Disadvantage**	There will be no drainage impacts under this alternative. **Neutral**
Driveway Conflicts	There will be no conflicts with existing driveways. **Neutral**	With the proposed raise median buffer, driveways along the corridor will need to be consolidated for buffer to be effective. **Disadvantage**	With relocation of existing curb and gutter, driveway locations will also be relocated. **Disadvantage**	There will be no conflicts with existing driveways. **Neutral**
Environmental Impacts	There will be no environmental impact. **Neutral**	The construction of new ADA ramps and new sidewalk within historic districts would require an evaluation to determine whether these additions would be an effect on the district(s). The relocation of traffic signal poles within an historic district(s) would not likely create an appreciable impact (effect) because the traffic signal poles are already present in the setting. All environmental categories are neutral or essentially equal to other alternatives. **Neutral**	The construction of new ADA ramps and new sidewalk within historic districts would require an evaluation to determine whether these additions would be an effect on the district(s). The relocation of traffic signal poles within an historic district(s) would not likely create an appreciable impact (effect) because the traffic signal poles are already present in the setting. If removal of curb/gutter has potential to affect existing sidewalks in an historic district (not expected), an evaluation would be required to determine whether the sidewalk is a contributing element to the district. All environmental categories are neutral or essentially equal to other alternatives. **Neutral**	The construction of new ADA ramps and new sidewalk within historic districts would require an evaluation to determine whether these additions would be an effect on the district(s). The intersections that might be widened as part of this alternative (i.e., Indian School Road, Osborn Road, Earll Drive, Thomas Road, Virginia Avenue, McDowell Road, I-10) are not within historic districts. All environmental categories are neutral or essentially equal to other alternatives. **Neutral**
Cost	There will be no additional cost. **Neutral**	The preliminary opinion of probable cost for this alternative is $3,453,800. **Neutral**	The preliminary opinion of probable cost for this alternative is $4,197,000. **Neutral**	The preliminary opinion of probable cost for this alternative is $2,998,600. **Neutral**

Evaluation Criteria	Third Street Alterntives			
	No Build	1-1-1 with Buffered Bike Lane	1-1-1 with Pedestrian Buffer	2-0-2
Corridor Aesthetics				
Pedestrian Buffer and Amenities				
Pedestrian Roadway Crossing Ease				
Bicycle Buffer and Amenities				
Entire Facility Level-of-Service				
Safety				
Maintenance				
Utilities				
Drainage				
Driveway Conflicts				
Environmental Impacts				
Cost				

Legend: Strong Advantage Advantage Neutral Disadvantage Strong Disadvantage

Figure 41 - Third Street Alternative Evaluation Results

Alternative with Buffered Bike Lane and 1-1-1 with Pedestrian Buffer will provide the most advantage of the Third Street design options. However, per discussions with the City, it is believed that the 1-1-1 Alternative with Pedestrian Buffer will result in confusion with the extra paved shoulder during the interim conditions. It is believed that this paved shoulder will be misused as on-street parking until re-development occurs along the corridor and the raised pedestrian buffer and new curb and gutter can be constructed in its ultimate configuration.

The 1-1-1 Alternative with Buffered Bike Lane will allow the City to provide future on-street parking as the need presents itself with re-development of the corridor. Therefore, the 1-1-1 Alternative with Buffered Bike Lane will be carried forward as the recommended preferred alternative for the Third Street Corridor. During the interim condition, 10-foot travel lanes will be striped to allow for 8-foot bike lanes and a 5- to 6-foot buffer. As on-street parking is needed, the 8-foot bike lane can be used as on-street parking with the 5- to 6-foot buffer becoming the bike lane.

Table 50 – Van Buren Street Corridor Alternative Evaluation

Evaluation Criteria	No Build	1-1-1 Alternative with Buffered Bike Lane	1-1-1 Alternative with On-Street Parking
Corridor Aesthetics	Under the no-build conditions there are no bike lanes and a 4-foot sidewalk with limited pedestrian buffer that varies (3-7 feet).	Advantage: This alternative alignment will allow for a highly improved aesthetic enhancement for the corridor. Median buffer areas will run along both travel directions to separate travel and bicycle lanes. The median buffers will allow for an improved aesthetic street character, with specific tree and landscape material unique to the corridor. A Continuous street character landscape theme will aesthetically enhance the corridor for bicyclists, pedestrians, travelers and surrounding communities. Implementation of this alternative will add a much improved aesthetic character to the corridor while also encouraging a strong bicycle and pedestrian friendly route through Van Buren Street. This alternative meets the project goals in addressing and balancing bicyclists and pedestrian needs. Disadvantage: This alternative alignment will provide an overall aesthetic improvement for bicyclists and pedestrians travelers, however consideration will need to be made in preserving and maintaining access to numerous businesses and unique corridor signage. Landscape treatments near these areas will need to be limited for visual access. Cost of implementing aesthetic elements will be higher due to the extensive use of landscape/irrigation items throughout the 2 mile corridor.	Advantage: This alternative alignment will allow for an improved aesthetic enhancement for the corridor. Median buffer areas with designated areas for parking will run along the existing curb and gutter. Median buffers will be spotted along the corridor, which will provide an improved aesthetic street character, with specific tree and landscape material per parking space. A Continuous street character landscape theme will aesthetically enhance the corridor for bicyclists, pedestrians, travelers and surrounding businesses. This alternative will allow for a balance of a landscape aesthetic improvement while providing businesses and future development with visual access and on street parking. Implementation of this alternative will add a much improved aesthetic character to the corridor while also encouraging a bicycle and pedestrian friendly route through Van Buren Street. Cost of implementing aesthetic elements will be lower due to less area for landscape/ irrigation items and use of porous pavers for parking bays. Disadvantage: This alternative alignment will provide an overall aesthetic improvement for bicyclist and pedestrians travelers, however there will be few buffer areas separating the bike lanes and travel lanes.
	Disadvantage	**Advantage**	**Advantage**
Pedestrian Buffer and Amenities	Under the no-build conditions there is a 3-7 foot buffer between the travel lane and pedestrian sidewalk along the corridor. Under the no build conditions, the existing pedestrian amenities which includes trees, shrubs and ground cover is inconsistent along the corridor.	This alternative provides 3-7 feet of buffer between the bike lane and the pedestrian sidewalk along the corridor. This alternative does not provide any additional pedestrian amenities than those that already existing in the form of trees, shrubs and ground cover along the corridor.	This alternative provides an additional 8 feet of parking stall buffer between the bike lane and the pedestrian sidewalk along the corridor. The additional 8 foot pedestrian buffer will help in increasing the comfort of sidewalk users by adding benches, shaded trees, street lighting and other public amenities.
	Disadvantage	**Neutral**	**Advantage**
Pedestrian Roadway Crossing Ease	Under the no-build condition, the pedestrians will have to cross five travel lanes that are 11 feet wide with the ability to use the central two-way left turn lanes as a refuge area.	This alternative requires pedestrians to cross three travel lanes that are 11 feet wide with the ability to use the central two-way left-turn lane and bike median buffer as a refuge area.	This alternative requires pedestrians to cross three travel lanes that are 10 feet wide with the ability to use the central two-way left-turn lane as a refuge area.
	Disadvantage	**Advantage**	**Advantage**

Table 50 – Van Buren Street Corridor Alternative Evaluation (continued)

Evaluation Criteria	No Build	1-1-1 Alternative with Buffered Bike Lane	1-1-1 Alternative with On-Street Parking
Bicycle Buffer and Amenities	Under the no-build condition there are no bike lanes, buffer and bicycle amenities. **Strong Disadvantage**	This alternative provides 5 feet of buffer between the bike lane and the travel lane along the corridor. This buffer would support shaded trees and lighting but no bike racks. **Strong Advantage**	This alternative provides 8 feet of buffer between the bike lane and the pedestrian sidewalk along the corridor. This buffer would support bike racks, shaded trees, and lighting. **Neutral**
Entire Facility Level-of-Service	The auto mode operates the best under the no build condition at LOS B or better in 2015 and 2035. The pedestrian mode operates the worst under 2015 conditions and 2035 conditions at a LOS C and LOS D or better, respectively. The bicycle mode operates the worst under 2015 and 2035 conditions at a LOS E. **Neutral**	The auto mode operates the second best under the 1-1-1 Alternative with Buffered Bike Lanes in 2015 and 2035 at LOS D or better. The pedestrian mode operates the second best under 2015 and 2035 conditions at a LOS C. The bicycle mode operates the best under 2015 and 2035 conditions at a LOS D. **Advantage**	The auto mode operates the worst under the 1-1-1 Alternative with On-Street Parking in 2015 and 2035 at LOS E or better. The pedestrian mode operates the best under 2015 and 2035 conditions at a LOS C. The bicycle mode operates the second best under 2015 and 2035 conditions at a LOS E. **Advantage**
Safety	Under no build conditions, there are no bike lanes along the corridor and the pedestrians have to cross five travel lanes with a central median refuge area. No added safety features are included under the no build condition. **Disadvantage**	A road diet, reducing the number of lanes from 5 lanes to 3 lanes, is anticipated to **reduce** the number of crashes by approximately 20%. Installing protected bike lanes or a cycle track is anticipated to **reduce** the number of crashes by approximately 69%. To obtain the full benefit of the raised median buffer, the driveways along the corridor will need to be consolidated with re-development. Consolidating driveways, reducing the number of driveways by 25%, could **reduce** the number of crashes from approximately 4% to 13% depending on the crash type and severity. **Strong Advantage**	A road diet, reducing the number of lanes from 5 lanes to 3 lanes, is anticipated to **reduce** the number of crashes by approximately 20%. Installing protected bike lanes or a cycle track is anticipated to **reduce** the number of crashes by approximately 69%. To obtain the full benefit of the raised median buffer, the driveways along the corridor will need to be consolidated with re-development. Consolidating driveways, reducing the number of driveways by 25%, could **reduce** the number of crashes from approximately 4% to 13% depending on the crash type and severity. Studies have shown that with the removal of on-street parking, the number of crashes is anticipated to reduce by approximately 32%. Therefore, with the installation of on-street parking as recommended under this alternative, the number of crashes will **increase** by approximately 32%. **Neutral**
Maintenance	There will be no maintenance issues. **Neutral**	With the raised median buffer separating the travel lanes and bike lane, maintenance will need to require a small street sweeper to maintain the bike lanes. There are also additional cost for maintenance with upkeep of raised median buffer and landscape. **Disadvantage**	With the raised medians separating the parking stalls, maintenance will need to require a small street sweeper to maintain the bike lanes. There are also additional cost for maintenance with upkeep of raised median buffer and landscape. **Neutral**

Table 50 – Van Buren Street Corridor Alternative Evaluation (continued)

Evaluation Criteria	No Build	1-1-1 Alternative with Buffered Bike Lane	1-1-1 Alternative with On-Street Parking
Utilities	There will be no utility impacts. **Neutral**	The proposed raised median buffer will allow for future landscape such as shrubs and shade trees. This could have impacts on existing underground utilities running along the corridor. As long as the proposed location of the two-way left-turn lane remains near existing, minimal impacts to existing signals are anticipated under this alternative. **Neutral**	The proposed raised median to separate parking stalls will allow for future landscape such as shrubs and shade trees. This could have impacts on existing underground utilities running along the corridor. As long as the proposed location of the two-way left-turn lane remains near existing, minimal impacts to existing signals are anticipated under this alternative. **Neutral**
Drainage	There will be no drainage impacts. **Neutral**	The new median buffer will need to provide drainage needs for the corridor as it has the potential to block existing drainage facilities. **Disadvantage**	The new medians separating parking stalls will need to provide drainage needs for the corridor as it has the potential to block existing drainage facilities. **Disadvantage**
Driveway Conflicts	There will be no conflicts with existing driveways. **Neutral**	With the proposed raise median buffer, driveways along the corridor will need to be consolidated for buffer to be effective. **Disadvantage**	With the proposed on-street parking, driveways along the corridor will need to be consolidated for on-street parking to be installed. **Disadvantage**
Environmental Impacts	There will be no environmental impact. **Neutral**	Excavation and other ground disturbance (e.g., installation of new trees, construction of new ADA ramps, relocation of traffic signal poles), could result in the potential to impact (affect) prehistoric cultural resources, a disadvantage common to both alternatives. All other environmental categories are neutral or equal to other alternative. **Neutral**	Excavation and other ground disturbance (e.g., installation of new trees, construction of new ADA ramps, relocation of traffic signal poles), could result in the potential to impact (affect) prehistoric cultural resources, a disadvantage common to both alternatives. All other environmental categories are neutral or equal to other alternative. **Neutral**
Cost	There will be no additional cost. **Neutral**	The preliminary opinion of probable cost for this alternative is $3,554,100. **Neutral**	The preliminary opinion of probable cost for this alternative is $2,945,400. **Neutral**

Evaluation Criteria	Van Buren Street Alterntives		
	No Build	1-1-1 with Buffered Bike Lane	1-1-1 with On-Street Parking
Corridor Aesthetics			
Pedestrian Buffer and Amenities			
Pedestrian Roadway Crossing Ease			
Bicycle Buffer and Amenities			
Entire Facility Level-of-Service			
Safety			
Maintenance			
Utilities			
Drainage			
Driveway Conflicts			
Environmental Impacts			
Cost			

Legend: Strong Advantage Advantage Neutral Disadvantage Strong Disadvantage

Figure 42 – Van Buren Street Alternative Evaluation Results

Both build alternatives will provide an advantage for Van Buren Street. However, per discussions with the City, it is believed that the 1-1-1 Alternative with On-Street Parking will result in greater maintenance issues during the ultimate conditions and will be difficult to implement in the interim due to the existing driveway conflicts. Therefore, the 1-1-1 Alternative with Buffered Bike Lane will be carried forward as the recommended preferred alternative for the Van Buren Street Corridor.

The 1-1-1 Alternative with Buffered Bike Lane will allow the City to provide future on-street parking as the need presents itself with re-development of the corridor. During the interim conditions, 10-foot travel lanes will be striped to allow for 8-foot bike lanes and a 6-foot buffer. As on-street parking is needed, the 8-foot bike lane can be used as on-street parking with the 6-foot buffer becoming the bike lane.

11.0 Design Guidelines

The following sections describe the design guidelines for the 1-1-1 Alternative with Buffered Bike Lane for the Third Street and Van Buren corridors.

11.1 Third Street Corridor

11.1.1 Vehicular Facilities

The new vehicular travel lanes will consist of a 10 to 12 foot through lane in each direction plus a 10 to 12 foot continuous two-way left turn lane. Additionally, a 10 to 12 foot exclusive right-turn lane will be maintained at Indian School Road, Osborn Road, Thomas Road, McDowell Road and Roosevelt Street. Shared right-turn/bike lanes will be striped at Earll Drive, Thomas Road and Virginia Avenue.

11.1.2 Bicycle Facilities

The bicycle facility shall be created with the use of following items below:

Bike Lane

The bike lane shall be 8 feet wide with 6.5 feet of asphalt paving and 1.5 feet of gutter. The bike lane striping shall be continuous except at street intersections, and where it merges with right-turn lanes. Bike lane signage will be required along with "Bike Lane Ends" signs at each end of the project.

Green Bike Lane

It is recommended that the bike lane be painted green in high conflict zones such as driveways and at intersections with high right-turn traffic. This will raise awareness among the motorist and bicyclist of their crossing paths.

Bike Buffer

The bike buffer varies between 3-9.5 feet in each direction along the corridor. In the interim condition, we recommend a continuously striped buffer that shall be discontinued at street intersections and major driveways. The buffer shall include diagonal white lines to distinguish the buffer area from the vehicular travel lane.

As development occurs and on-street parking is desired, the 8-foot bike lane can become on-street parking while the 5- to 6-foot buffer area can transition to a bike lane.

As new development occurs and funds are available, the buffer areas shall be gradually upgraded to raised hardscape/landscape buffer in areas where on-street parking is not desired or cannot be accommodated due to limited roadway widths. Curbing shall meet the City standards and shall be designed to account for street drainage and to facilitate street sweeper maintenance.

Bike Box

Bike box is recommended at an intersection that provide cross street bicycle connectivity and is expected to attract left turning bicycle traffic. A 12 to 16 foot painted bike box with the appropriate bike symbol and left-turn arrow is recommended at Indian School Road and Virginia Avenue.

Bike Crossing

At major signalized intersections, the bike crossings shall be delineated with 4-inch wide white skip striping that is 2 feet long with a 6-foot gap. This delineation will guide bicyclist through the intersection in a straight and direct path. Additionally, this will raise awareness for both bicyclist and motorist to potential conflict areas.

11.1.3 Pedestrian Facilities

The pedestrian facility shall be improved incrementally with the use of following items below:

Sidewalks

As sidewalks along the corridor are improved gradually over a period of time, it is important to maintain the existing sidewalk alignment. Sidewalk repairs and replacement should match existing sidewalk width and finish. All sidewalk improvements within the public right-of-way shall meet the following ADA requirements:

- Maximum cross slope of two percent
- Maximum longitudinal slope of five percent
- No stairways, curds or barriers

All new sidewalks associated with new developments/improvements shall be a minimum of 6 feet wide with a 3.5-foot pedestrian buffer added at the back of the existing/new curb.

Lighting

Pedestrian lighting will be added to encourage pedestrian activity into the evening hours. Pedestrian fixtures will be installed on existing street/utility light poles, at a minimum and paired across Third Street. Since APS owns and maintains the lighting along the Third Street Corridor, it is recommended that pedestrian lighting be installed per APS Detail 8027 and 8030 for lighting needs between Garfield Street and I-10 and per APS Detail 8048 for lighting needs north of I-10. The City of Phoenix and APS tested the viability of a BetaLED fixture as a street light and determined that it did not meet the City's requirements. All new lighting will comply with dark sky ordinances and recommendations.

Street Furniture

Street furnishings, including benches, trash receptacles from Indian School Road to Virginia Avenue will represent a sleek contemporary style. The site furnishings from Virginia Avenue to McDowell Road will be preferably the same site furnishings as between Indian School Road and Virginia Avenue. However, the color or texture could be different to represent each residential character of the southern zone. In order for site furnishings to be installed within the right-of-way, the Third Street Business Alliance, or other entity, will need to develop a maintenance program for such items. **Figure 43** depicts the conceptual Third Street furnishings.

Figure 43 – Third Street Furnishings

Wayfinding

The wayfinding signage will be a unifying theme throughout the Third Street Corridor. Wayfinding signage recommended include banners, orientation maps, and direction signs. Wayfinding would be mounted on street light poles or freestanding poles. Wayfinding signage installed within the right-of-way would need to have a maintenance program developed by the Third Street Business Alliance or other entity. **Figure 44** depicts the conceptual Third Street wayfinding.

Figure 44 – Third Street Wayfinding

Planting in Pedestrian Zones

At maturity street trees create a canopy over the street, provide shade and aesthetic appeal, and define and unify the street as a district. The incorporation of three tree species are recommended to allow for diversity, so as not to create a monoculture that may be susceptible to disease. One species will be evergreen to provide a lush appearance year-round while others will be deciduous to provide dense shade in summer while allowing for sun in the cooler months. Tree planting and spacing shall follow the City of Phoenix Street Transportation planting requirements. **Figure 45** depicts the conceptual Third Street tree character.

Figure 45 – Third Street Tree Character

Planting strips not within historic districts will include decomposed granite and approved ADWR low water-use plant material. All planting material shall follow the required densities outlined by the City of Phoenix Street Transportation landscape requirements. Planting material near driveways shall follow City of Phoenix sight distance line visibility requirements.

11.1.4 Landscaping

The corridor has several areas of opportunity to incorporate existing landscape character areas and future development plans into the proposed corridor theme and planting design. These areas include Steele Indian School Park, Historic districts and neighborhoods, Roosevelt Street development and future business and multi-unit development along 3rd Street. Blending of the existing landscape character and proposed future landscape character will establish a consistent linear aesthetic flow throughout the corridor.

11.2 Van Buren Street

11.2.1 Vehicular Facilities

The new vehicular travel lanes will consist of a 10-foot through lane in each direction plus a 10-foot continuous two-way left-turn lane for the interim condition. A shared right-turn/bike lane will be striped at 11th Street, 16th Street, 18th Street and 20th Street.

11.2.2 Bicycle Facilities

The bicycle facility shall be created with the use of following items below:

Bike Lane

The bike lane shall be 8 feet wide with 6.5 feet of asphalt paving and 1.5 feet of gutter. The bike lane striping shall be continuous except at street intersections and where it merges with right-turn lanes. Bike lane signage will be required along with “Bike Lane Ends” signs at each end of the project.

Green Bike Lane

It is recommended that the bike lane be painted green in high conflict zones such as driveways and at intersections with high right-turn traffic. This will raise awareness among the motorist and bicyclist of their crossing paths.

Bike Buffer

The bike buffer is 6 feet in each direction along the corridor. In the interim condition, we recommend a continuously striped buffer that shall be discontinued at street intersections and major driveways. The buffer shall include diagonal white lines to distinguish the buffer area from the vehicular travel lane.

As development occurs and on-street parking is desired, the 8-foot bike lane can become on-street parking while the 6-foot buffer area can transition to a bike lane.

As new development occurs and funds are available, the buffer areas shall be gradually upgraded to raised 7-foot landscape buffer in areas where on-street parking is not desired. Curbing shall meet the City standards and shall be designed to account for street drainage and to facilitate street sweeper maintenance.

Bike Box

Bike box is recommended at an intersection that provide cross street bicycle connectivity and is expected to attract left turning bicycle traffic. A 12 to 16 foot painted bike box with the appropriate bike symbol and left-turn arrow is recommended at 11th Street and 20th Street.

Bike Crossing

At major signalized intersections, the bike crossings shall be delineated with 4-inch wide white skip striping that is 2 feet long with a 6-foot gap. This delineation will guide bicyclist through the intersection in a straight and direct path. Additionally, this will raise awareness for both bicyclist and motorist to potential conflict areas.

11.2.3 Pedestrian Facilities

The pedestrian facility shall be improved incrementally with the use of following items below:

Sidewalks

As sidewalks along the corridor are improved gradually over a period of time, it is important to maintain the existing sidewalk alignment. Sidewalk repairs and replacement should match existing sidewalk width and finish. All sidewalk improvements within the public right-of-way shall meet the following ADA requirements:

- Maximum cross slope of two percent
- Maximum longitudinal slope of five percent
- No stairways, curds or barriers

All new sidewalks associated with new developments/improvements shall be a minimum of 6 feet wide with a 3.5-foot pedestrian buffer added at the back of the existing/new curb.

Sidewalk Pavers

Decorative concrete pavers shall be used in pedestrian zones to provide a cohesive thread that will tie the street character together as development occurs. A light paver color shall be used since there is a prevalence of light grays and other light colors used within the Van Buren Corridor. The paver design will be consistent with accentuated geometric shapes and grid patterns consistent with mid-century pavement design. The paver layout pattern shall utilize a grid, stacked bond pattern. **Figure 46** depicts the conceptual Van Buren Street material character.

Figure 46 – Van Buren Street Material Character

Lighting

Lighting will be selected to provide visual interest and increased nighttime safety for pedestrians and vehicles; as well as complement and unify the existing streetscape within the City's right-of-way. The pole and fixture selection for the pedestrian and street light will reference the mid-century theme. **Figure 47** depicts the conceptual Van Buren Street light fixtures.

Figure 47 - Van Buren Street Light Fixtures

Street Furniture

Street furnishings include benches, trash receptacles, and bike racks will be placed in proximity to shade provided by street trees and buildings. Street furnishings will complement the existing bus structures, and will be coordinated with the City Public Transportation Department for long term maintenance. Site furnishings represented at the 11th Street and Van Buren project shall be incorporated into the design of site furnishing along the Van Buren Street Corridor. **Figure 48** depicts the conceptual Van Buren Street furnishings.

Figure 48 – Van Buren Street Furnishings

Wayfinding

The design theme for wayfinding signage will reference the iconic motel strip signage and highlight the existing historical signage throughout the Van Buren Street corridor. In addition to wayfinding signage, it is encouraged that private property owners help strengthen the corridor identity by incorporating this theme into their site signage. **Figure 49** depicts the conceptual Van Buren Street wayfinding.

Figure 49 – Van Buren Street Wayfinding

Planting in Pedestrian Zones

Street trees will reinforce a unified street character and establish a sense of place for the Van Buren Street Corridor. The incorporation of three drought tolerant tree species are recommended to unify the existing plant palette so that there is not a chaotic mix of plant material. Tree planting and spacing shall follow the City of Phoenix Street Transportation planting requirements. **Figure 50** depicts the conceptual Van Buren Street tree character.

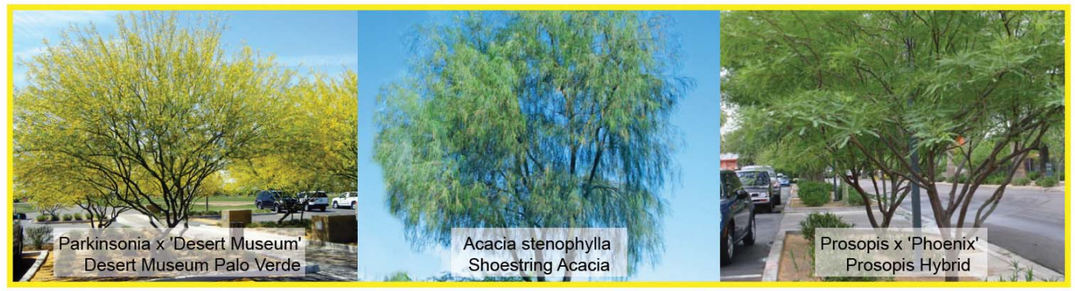

Figure 50 – Van Buren Street Tree Character

The buffer landscape planter shall consist of a standard curb and gutter on the vehicle traffic side, and a 1-1/2 – foot wedge curb on the bike lane side. The standard traffic side curb shall have occasional openings to allow street drainage to percolate into the landscape planter. The width of the planter and the wedge curb shall be designed to facilitate street sweeper maintenance. All new plant material will be drought tolerant, low-water use plants that support water conservation and shall follow the required densities outlined by the City of Phoenix Street Transportation landscape requirements. Planting material near driveways shall follow City of Phoenix sight distance line visibility requirements.

11.2.4 Landscaping

The corridor has several areas of opportunity to incorporate existing landscape character areas and future development plans into the proposed Corridor theme and planting design. These areas include the corridor link to 11th Street, Verde Park, Camden Copper Square, Garfield neighborhood historic district, St. Luke's Medical Center facility development and future business and vacant land development. Blending of the existing landscape character and proposed future landscape character will establish a consistent linear aesthetic flow throughout the corridor.

12.0 Implementation Plan

Implementing the Third Street and Van Buren Street bicycle and pedestrian improvements will require a long term phased approach given the limited financial resources and the nature of redevelopment process. At this time, we have many unknown factors that make it impractical to set a strict timeline. These factors include, but are not limited to:

- Impact of the proposed improvements on drainage;
- Unforeseen utility conflicts and relocation cost;
- Future land use development/redevelopment along the corridor;
- Consolidation and elimination of access driveways along the corridor; and
- Maintenance cost and issues associated with new bike and pedestrian infrastructure.

Therefore, the initial phase of improvement will be limited to restriping the two corridors to include painted buffers and bike lanes. This initial phase will also provide an opportunity to observe how vehicular traffic will react to travel lane reduction, and to monitor the use of new bike lanes. Additionally, this phase will address existing gaps in pedestrian connectivity by constructing new sidewalks in area where sidewalks are missing. However, this phase will not provide any amenities to the bicyclist and pedestrians in terms of shade trees, seating benches, bike racks for short-term parking, new street lighting, street furniture, and wayfinding signage. Preliminary 15% design plans for the initial phase are found in the **Appendix** of this report.

The second phase will include constructing raised landscape buffers between the travel lane and bike lane as well as landscaped medians separating on-street parking areas. This phase can have a significant impact to street drainage and require significant utility relocation. The drainage improvement and utility relocation can occur incrementally as a part of City's capital improvement projects, private development projects, and scheduled upgrade or replacement of utility lines.

The third phase will include enhancement of the pedestrian facilities and street character by widening sidewalks with the use of decorative pavers, new street and pedestrian lighting, new street furniture, planting trees, and wayfinding signage.

The following is a summary of improvements in each phase. Due to the high cost of utility and drainage improvements, phases two and three could be interchanged within the various segments of the two corridors depending on how these corridors develop in the future.

Phase One Improvements

- Street resurfacing – mill and overlay along the entire length of the two corridors;
- Stripe new travel lane configuration;
- Stripe new bike buffer and bike lanes;
- Stripe new bike boxes and bike crossings as appropriate;
- Install new bike lane signage; and
- Fix pedestrian connectivity and accessibility – construct new sidewalk as needed.

Phase Two Improvements

- Install curbed landscape and planting in the bike buffer areas;
- Install curbed landscape planters to separate on-street parking areas;
- Plant trees in landscaped buffer area that are 7 feet or wider;
- Provide colored bike lane in high conflict area such as major driveways and approaches to an intersection; and
- Adjust street signage as needed.

Phase Three Improvements

- Widen the sidewalks with the use of decorative pavers;
- Construct 3.5-foot pedestrian landscape buffer between the back of the curb and the sidewalk;
- Plant trees in landscaped area that are at least 7 feet wide;
- Install new street and pedestrian lighting;
- Install street furniture;
- Provide bike racks for short term parking in locations where needed; and
- Install wayfinding signage.

12.1 Corridor Aesthetics Future Objectives and Goals

As stated above, the aesthetic design guidelines outlined in this report and the ***Final Technical Memorandum #2 – Analysis of Design Options***, located in the **Appendix** of this report, will be implemented in the Phase Two and Phase Three Improvements for the Third Street and Van Buren project scopes. The purpose of the aesthetic design guidelines is to assist the future designer in establishing an aesthetic continuity for each corridor. Designer will have opportunities to enhance the corridors with street trees, planting buffers, sidewalk pavers, decorative pavement, permeable pavers, street lighting, street furnishing, wayfinding signage and public art installation. The intent of the aesthetic design guidelines is to provide the future designer with a framework to start the design implementation, while also giving consideration to future development plans and projects.

The planning and blending of the existing aesthetics with the future development plans will be key in allowing for the successful design integration for each corridor, while also creating a unique identity and theme. Six foot wide raised medians for planting will be designated at certain locations throughout the corridors. Landscape medians will allow for the implementation of the planting design guidelines and will also allow for the future designer to consider surrounding existing and future development planting character and material.

Coordination will be needed with project stakeholders and design consultants in order to collaborate and implement the aesthetic design guidelines with future development projects, in instances were landscape medians are not implemented, due to roadway alignment and utility constraints. The future designer will collaborate with other design consultants on projects that are being developed along each corridor. A collaborative approach will be key in providing opportunities to extend the future development project's landscape aesthetics into the Third Street and Van Buren Street design theme. This effort will allow for the successful integration of varying aesthetic elements into one linear theme for each corridor.

The following are key development projects to be considered for aesthetic partnership and collaboration:

Third Street (Project #, Site Address, Names)

- Project 14-3224, 401 E. Roosevelt Street, Phoenix, AZ 85004, 5 Day Roosevelt Container Café and WURTH.
- Project 06-3185, 905 N. 4th Street, Phoenix, AZ 85004, Fate Restaurant
- Project 14-1565, 1002 N. 3rd Street, Phoenix, AZ 85004, Barrow Chesterfield Apartments and Iluminate Apartments
- Project 04-3033, 1011 N. 3rd Street, Phoenix, AZ 85004, Canvas at 101
- Project 00-3390, 4010 N. 3rd Street, Phoenix, AZ 85004, EBAY Date Center
- Project 11-3874, 129 E. Alvarado Road, Phoenix, AZ 85004, Offices at Alvarado

Van Buren Street (Project #, Site Address, Names)

- Project 11-3075, 1326 E. Van Buren Street, Phoenix, AZ 85006, Retail Property/Tire Shop
- Project 07-865, 1476 E. Van Buren Street, Phoenix, AZ 85006, Van Buren Car Lot
- Project 08-1302, 2324 E. Van Buren Street, Phoenix, AZ 85006, Doehrman Storage Addition
- Project 14-3128, 2327 E. Van Buren Street, Phoenix, AZ 85006, 5 Day Arellano Event Hall

The primary goal for future phases will be to efficiently implement the aesthetic design guidelines and to create a unique theme to each corridor while embracing the existing and future development plans and character. This future vision will provide a visual and aesthetic upgrade to local business and communities.

12.2 Next Steps for Environmental Approval Process

The following steps outline the environmental evaluation and approval process required with the use of FHWA funding:

- A project kickoff meeting would be conducted among ADOT and City of Phoenix representatives and their environmental and design consultants, if appropriate;
- A description of the project purpose and need and scope of work would be prepared, and the maximum project construction limits would be established;
- Scoping letters would be distributed to appropriate agencies/stakeholders and, as warranted, to adjacent landowners to describe the project and solicit input;
- Field visits would be conducted by environmental specialists;
- Technical evaluations, studies, and consultation forms/letters would be prepared, as warranted, for the topics of biological resources, cultural resources, hazardous materials, air quality, and noise; and
- An environmental clearance document (in the format to be determined by ADOT/FHWA) would be prepared by the City or their consultant for approval by ADOT/FHWA.