U.S. 1

Multimodal/Roadway Intersection Analysis

Between SW 27th Avenue and SW 72nd Street

GPC VIII Work Order 02

TPO
Miami-Dade Transportation Planning Organization

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Prepared for:

Miami-Dade Transportation Planning Organization

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1.0 Introduction

1.0 Introduction

US 1 is an important north-south corridor in Miami-Dade County, linking residential communities to Miami's urban core. The study corridor includes the City of Miami, City of Coral Gables and the City of South Miami. Currently, US 1 experiences considerable traffic congestion, specifically between the areas of SW 72nd Street to SW 27th Avenue in Miami-Dade County, in part, due to the increase of commercial and residential development projects in the area. This Study will analyze the accessibility and mobility impacts of recently constructed and approved commercial and residential development projects in the area along the corridor.

1.1 Background

During the October 21, 2021, Miami-Dade Transportation Planning Organization (TPO) Board Meeting, Resolution #51-2021 was approved authorizing the TPO Executive Director or designee to develop a scope of services and budget to conduct a study along US 1 between SW 72nd Street to SW 27th Avenue to maximize the capacity of this corridor via multimodal and/or roadway improvements.

This Study will build upon prior efforts such as: the 2019 *FDOT US 1 Corridor Study from SW 88th Street/N Kendall Drive to Interstate 95* and the 2019 *City of Coral Gables Comprehensive Multimodal Transportation Plan*. The results of this Study will provide the necessary information to make appropriate transportation and policy decisions.

1.2 Study Purpose

The objective of this Study is to conduct a traffic analysis to assess vehicular and pedestrian crossing access along and across US 1 from SW 72nd Street to SW 27th Avenue and provide recommendations to maximize the capacity of this corridor via multimodal and/or roadway improvements.

US 1 Corridor. Photo Source: Project Team.

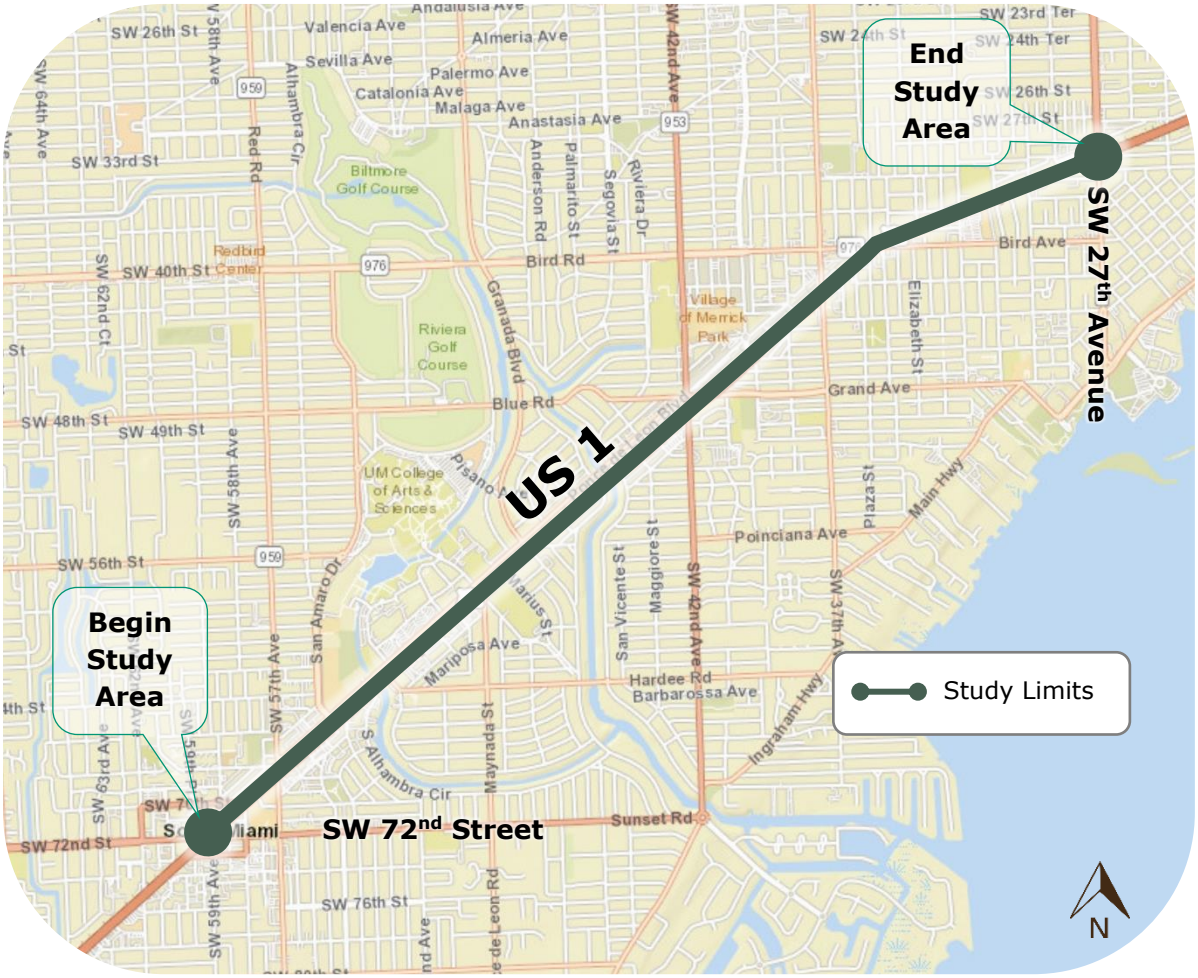
1.3 Report Layout

- **1.0 Introduction**
- **2.0 Literature Review**
- **3.0 Existing Conditions**
- **4.0 Transportation Analysis**
- **5.0 Transportation Solutions**
- **6.0 Final Recommendations**

1.4 Study Limits

The study limits are US 1 from SW 72nd Street to SW 27th Avenue (see **Figure 1-1**).

Figure 1-1 Study Limits

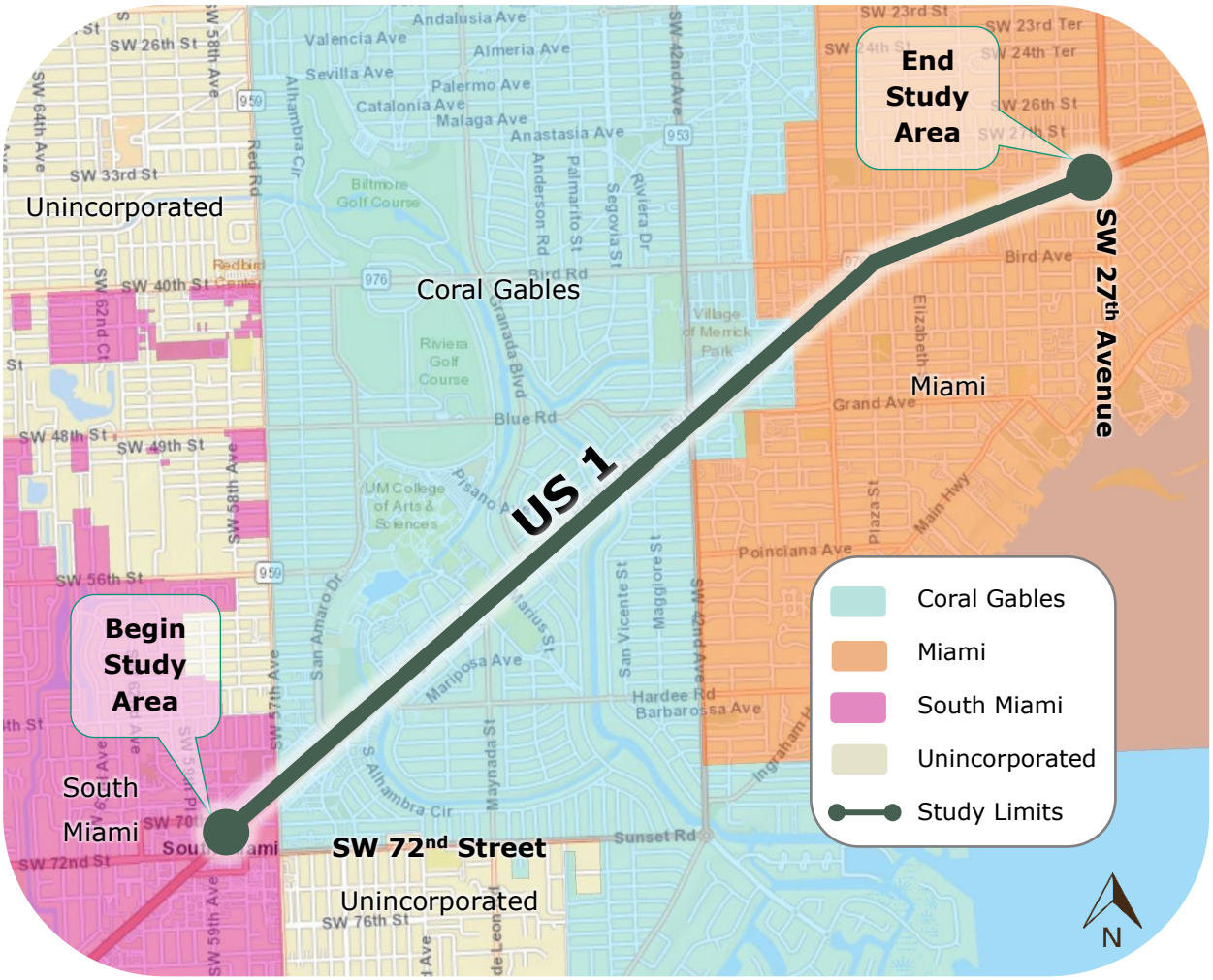


Traffic along US 1 near the University of Miami. Photo Source: Project Team.

1.5 Municipal Boundaries

The study limits are within the municipal boundaries of the City of Coral Gables, the City of Miami, the City of South Miami, and unincorporated Miami-Dade County (see **Figure 1-2**).

Figure 1-2 Municipal Boundaries



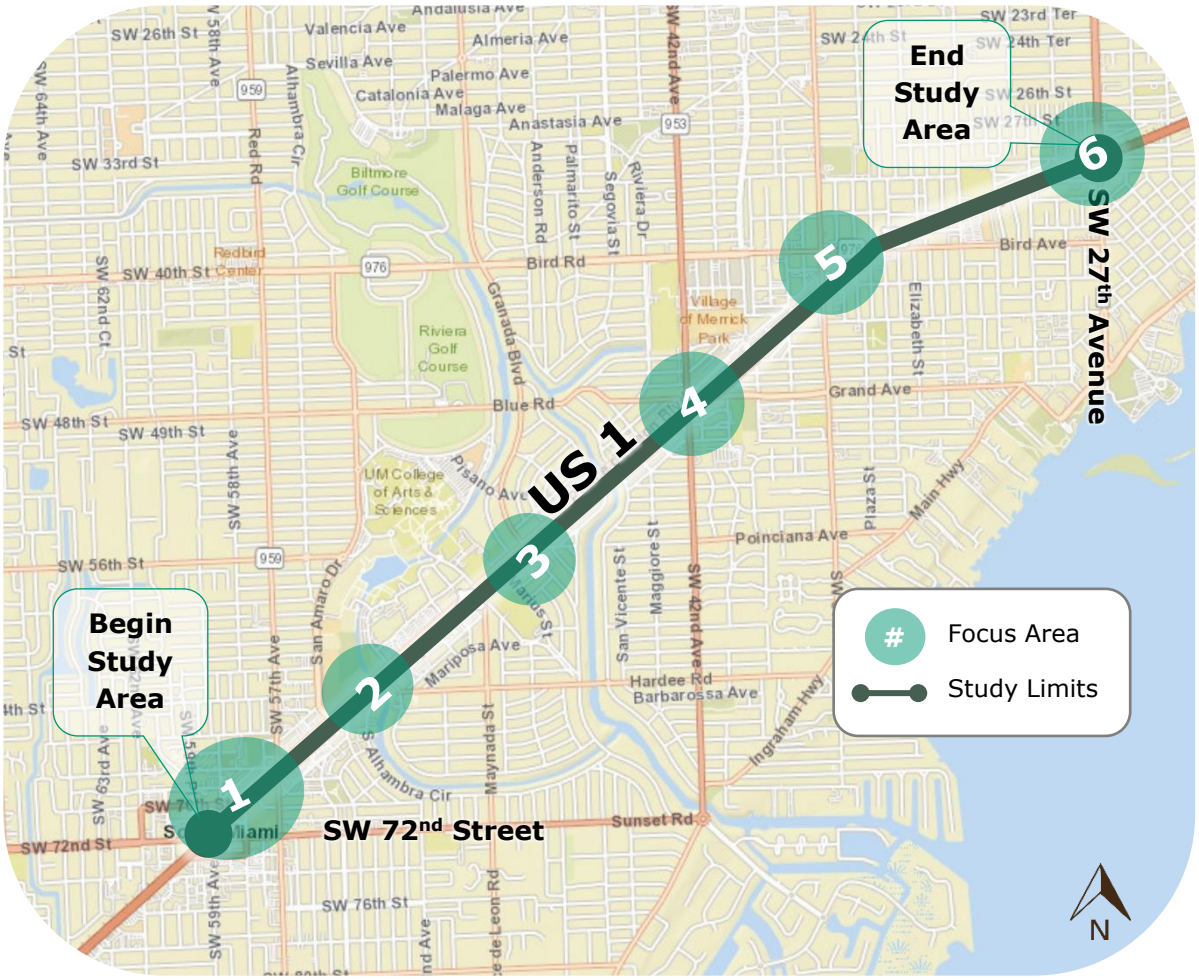
Bikes and traffic along the corridor. Photo Source: Project Team.

1.6 Study Focus Areas

The study focused on six areas that were identified to be transportation deficient/congestion hot spots for the corridor based on previous studies, available data, and guidance from the Project Working Group (PWG). These focus areas are numbered one through six from south to north in **Figure 1-3** and listed below.

- **Focus Area 1**: SW 57th Avenue/SW 72nd Street
- **Focus Area 2**: S Alhambra Circle
- **Focus Area 3**: Granda Boulevard
- **Focus Area 4**: SW 42nd Avenue/Blue Road/Grand Avenue
- **Focus Area 5**: SW 37th Avenue/SW 40th Street
- **Focus Area 6**: SW 27th Avenue

Figure 1-3 Study Focus Areas

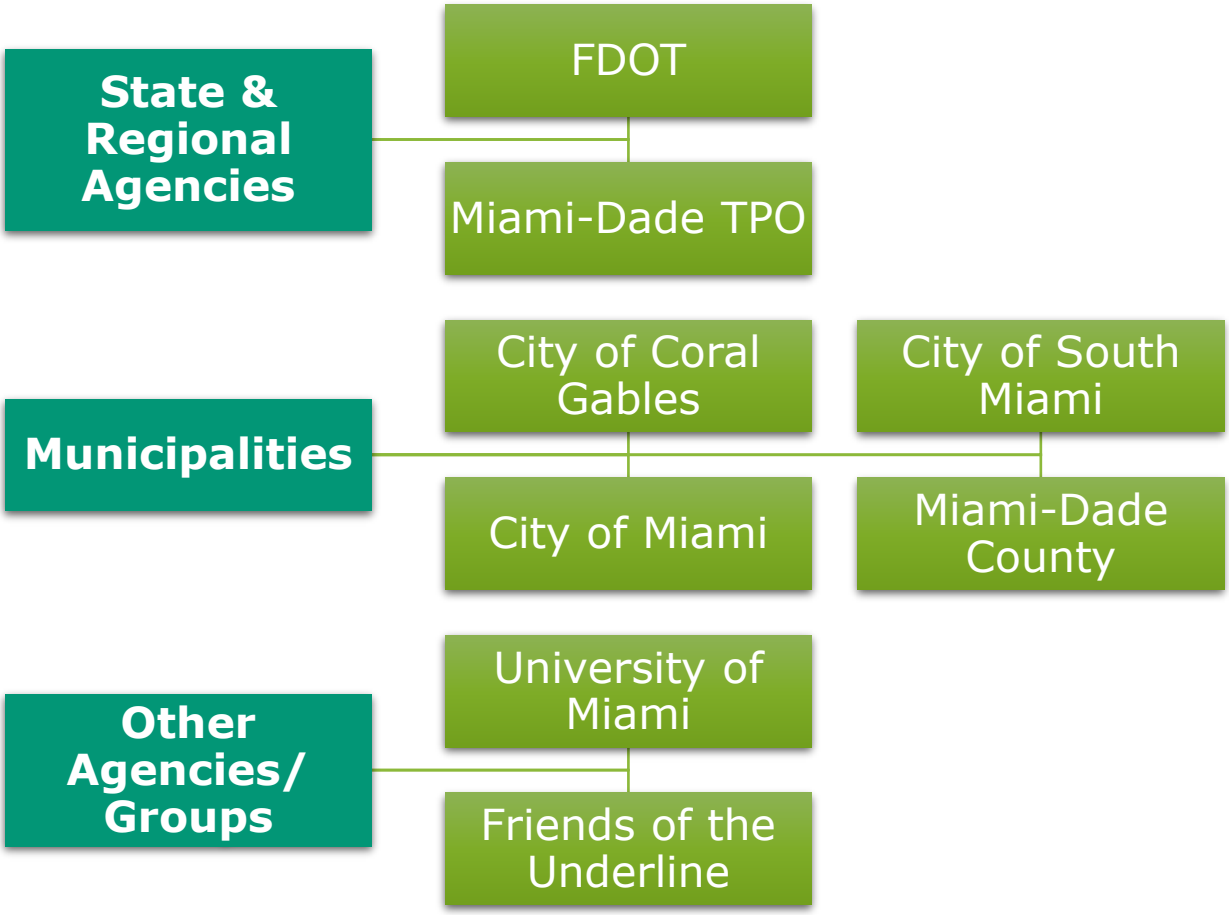


1.7 Project Working Group (PWG)

A Project Working Group (PWG) was developed to solicit feedback and review materials on all project deliverables as well as provide approval and/or endorsement of the results and recommendations for this study. The intent of the PWG is to provide an avenue for essential technical and policy guidance on the project related issues throughout the study process.

Project Working Group Meetings:

- **Meeting #1, March 4, 2022**: Study kick-off meeting that provided an overview of the project.
- **Meeting #2, June 9, 2022**: Provided an overview of the study, presented the initial findings from the literature review and data gathering task and researched concepts.
- **Meeting #3, November 7, 2022**: Presented the results of the travel demand analysis, initial results from the synchro model, researched concepts and provided an overview of potential solutions.



2.0 Literature Review

2.0 Literature Review

A localized research effort was included in this study with the purpose of assessing vehicular and pedestrian crossing patterns alongside other mobility trends between and around SW 72nd Street and SW 27th Avenue that will inform recommendations to increase safety and efficiency of the study corridor. This research effort included previous mobility studies which provided insight from public participation, safety strategy recommendations, as well as vehicular and pedestrian mobility trends. Additionally, plans concerning the development and design of The Underline Trail System were reviewed due to their congruency to the US 1 corridor and the trail's potential influence on pedestrian and bike access. Finally, comprehensive plans for surrounding areas, including the University of Miami, were also analyzed for future and ongoing transportation plans that could be used to inform best practices. The findings of the literature review are summarized in this section.

2.1 Documents Reviewed

Previous studies on the area of interest were reviewed to provide complete context for recommendations. Common themes including public input, safety, walkability, and traffic were discussed in each study. The following documents represent a comprehensive list of past recommendations as well as current conditions.

- Final Summary Report: *State Road (SR) 5/US 1/Dixie Highway from SR 94/SW 88 Street / Kendall Drive to SR 9/I-95*
    - Tech Memo 2: Existing Conditions
    - Tech Memo 4: Preliminary Strategies
    - Tech Memo 5: Conceptual Strategies
    - Tech Memo 6: Multimodal Strategy Analysis

In addition to previous transportation corridor studies, transportation elements from master plans for the City of Coral Gables and the City of South Miami were reviewed along with Miami Bicycle Master Plan, University of Miami Mobility Plan, and Miami-Dade TPO 2045 Long Range Transportation Plan in order to fully develop a profile of the study area and mobility elements that are directly related to the corridor.

- *South Miami Comprehensive Plan*
- *City of Coral Gables Comprehensive Multimodal Transportation Plan*
- *Miami-Dade TPO 2045 Long Range Transportation Plan (LRTP)*
- *University of Miami Mobility Plan*
- *Miami Bicycle Master Plan*

Finally, three documents were reviewed to better understand how the Underline Trail System will affect any plans recommended to the US 1 corridor. These documents provided guidance for design and safety recommendations as well as guidelines for the development and implementation of the Underline trail.

- *The Underline: A Community and Connectivity Study Executive Summary*
- *The Underline: Framework Plan and Demonstration Projects*
- *The Underline: Miami-Dade Road Impact Fee Study*

A common thread among most studies was the **prioritization of pedestrian and bicycle safety initiatives** due to the current volume of vehicular traffic on and through US 1 coupled with the lack of safe and accessible crosswalks. Additionally, there are many recommendations amongst the studies **featuring changes to signal timing, repainting street lines, pedestrian walkovers, and updating signage**. Lastly, many of the studies placed a large portion of responsibility on **the Underline to perform as the main mode of pedestrian mobility along the corridor**.

2.2 Key Topics

The matrix in **Table 2-1** provides an overview of the key topics covered in the documents reviewed. The key topics are color-coded and tagged throughout the document as follows:

Key Topic	Tag	Description
Design Concepts	Design	Design elements guiding future development
Community Participation	Community	Input from community engagement
Traffic Operations	Traffic	Traffic procedure, current practices, and recommendations
Vehicle Trips	Trips	Provides information on vehicle trip behavior
Non-Motorized Users	Active	Considerations for bike, pedestrian, and other active, non-motorized transportation modes
Land Use	Land Use	Offers integrated land use patterns and strategies

Table 2-1 Literature Review Summary Matrix

Plan	Design	Community	Traffic	Trips	Active	Land Use
Previous Traffic Studies						
US 1 Summary Report (2019)		X	X	X	X	
TM 2: Existing Conditions			X	X	X	
TM 4: Preliminary Strategies	X		X			
TM 5: Conceptual Strategies		X	X		X	
TM 6: Multimodal Strategy			X	X	X	
Master Plans						
South Miami Comprehensive Plan			X	X		X
Coral Gables Multimodal Plan		X	X	X	X	
Miami-Dade TPO 2045 LRTP		X	X	X	X	
University of Miami Mobility Plan	X		X	X	X	X
Miami Bicycle Master Plan	X	X	X		X	X
Underline Studies						
Community/Connectivity Study		X	X		X	X
Framework Plan/Demo Projects	X		X	X	X	
Road Impact Fee Study			X	X	X	

2.3 Previous Traffic Studies

2.3.1 US 1 Summary Report

Document Title: Final Summary Report: SR 5/US 1/Dixie Highway from SR 94/SW 88 Street/ Kendall Drive to SR 9/I-95

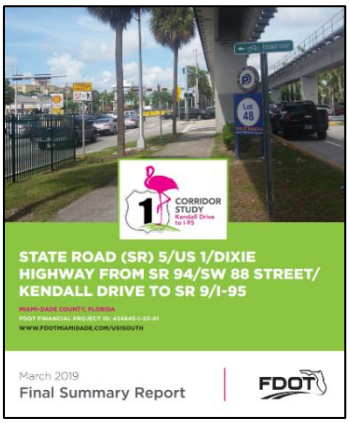
Agency: FDOT

Jurisdiction: Miami-Dade County

Document Year: 2019

Tags: Community, Traffic, Trips, Active

Document Cover:



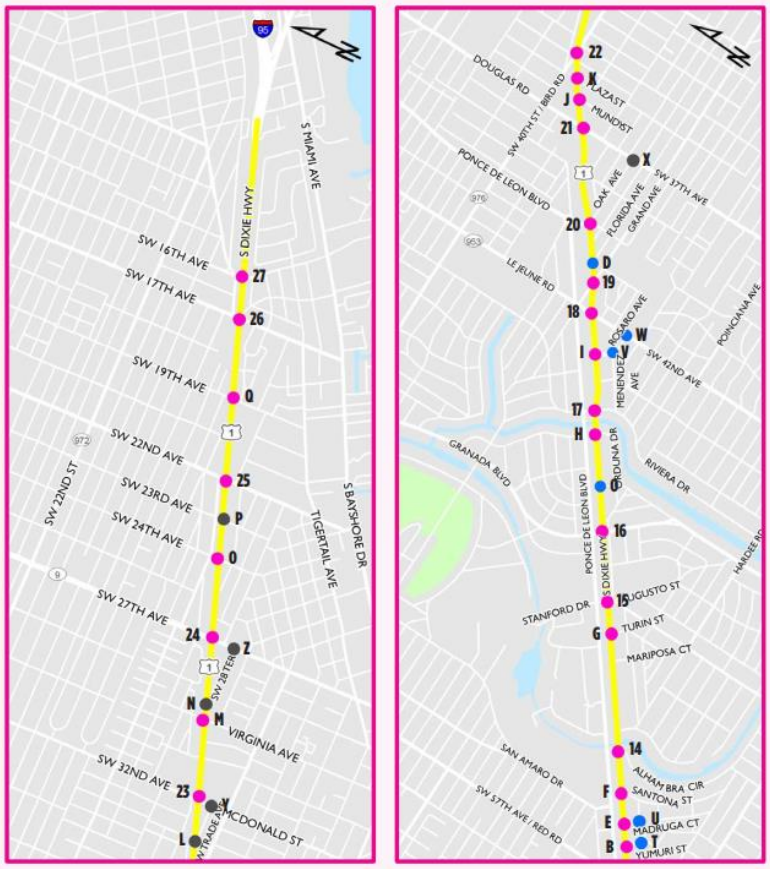
Document Summary: Compilation of findings and recommendations for walking, bicycling, driving, and transit access along US 1 between Kendall Drive and I-95. Next steps are also included.

Key Findings:

List of recommendations:

- Short term - signals/operations strategies, safety strategies, signing and striping, maintenance, ADA
- On-going- improving Underline by creating an urban trail along the northwest-side of US 1, SMART plan premium transit investments along Kendall Drive and US 1 from Dadeland to Florida City, RRR projects along US 1, conduct safety studies along US 1
- Medium- to long-term- safety strategies, signals/ operations strategies, reconstruction/ new construction, transit/ park & ride, education and enforcement, private sector-led strategies

FIGURE 23 INTERSECTIONS ANALYZED



2.3.2 Tech Memo 2: Existing Conditions

Document Title: Tech Memo 2: Existing Conditions

Agency: FDOT

Jurisdiction: Miami-Dade County

Document Year: 2017

Tags: Traffic | Trips | Active

Document Cover:

Document Summary: This document discusses the data collected to date for the *US 1 Corridor Study* and highlights some key findings from the existing conditions analysis. It is intended to serve as the foundation for the project's Purpose and Need section.

Key Findings:

- Employment in the study area is largely concentrated around Metrorail stops
- Auto-centric transportation contributes to housing unaffordability and transportation costs
- Income along the corridor varies
- Areas with better pedestrian, bicycle, and transit infrastructure and mixed land uses have higher rates of walking, biking, and using transit
- Study area residents are diverse in age with concentrations of millennials in certain areas
- 106,500 jobs located in the study area
- Most US 1 trips do not travel the full length of the study area
- Low peak-to-daily ratio, averaging around 7% and 6% north and south of Kendall Drive, respectively, during the peak hours
- Majority of intersections are operating over capacity
- Existing street lighting is auto focused
- Pavement conditions along corridor are acceptable
- Dadeland South has the highest Metrorail ridership
- Park and ride are heavily used in some areas (Dadeland South has particularly high demand)
- Only 5.5% of study area trips are made by transit
- Stakeholders expressed a desire for improvements to accommodate sustainability and mitigate sea level rise
- Drivers attributed problems from left-turn queue spillbacks to signal timing as contributing to traffic build-up

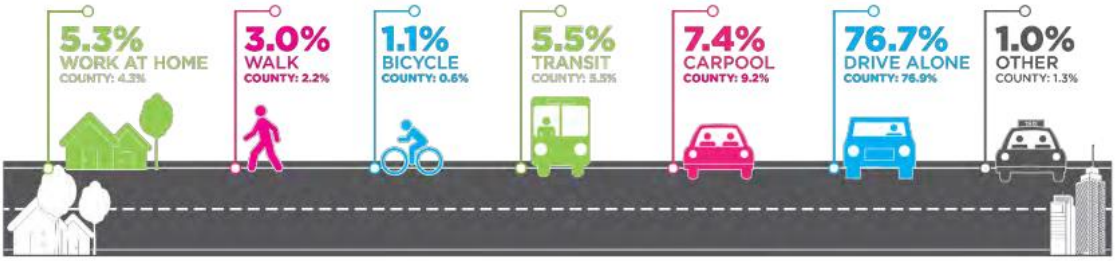


Figure 10: Commute Mode

2.3.3 Tech Memo 4: Preliminary Strategies

Document Title: Tech Memo 4 Preliminary Strategies

Agency: FDOT

Jurisdiction: Miami-Dade County

Document Year: 2019

Tags: Design Traffic

Document Cover:

Document Summary: This report details the strategies outlined in Tier 1 of developing strategies to meet the needs of the project and goes into why they decided to not include some project ideas. Included project background, corridor policy and physical context, and corridor needs and preliminary conceptual strategies.

Key Findings: Preliminary strategies were developed to address the following needs:

- Reduce the effects of daily traffic congestion
- Reduce auto crashes
- Increase safety and convenience for pedestrians and bicyclists
- Improve access to Metrorail, Metrobus, and corridor destinations by all modes

Recommended strategies to advance to Tier 2 include:

- Corridor-wide strategies:
  - Pedestrian countdown signals
  - Lighting improvements
  - Signing/marking improvement and enforcement (i.e., don't block the box)
  - Resurfacing
- Location-specific strategies:
  - Leading pedestrian intervals
  - New signalized crossings (including mid-block
  - Adjust signal timing and improve signal visibility
  - Right and left turn movement restrictions and channelization removals
  - Consolidate/reduce/ organize access points and median openings
  - Pedestrian overpasses
  - Parallel walking/biking routes (with wayfinding) along the east side of US 1
  - Create shared use path or wider sidewalks on east side of US 1
  - In-ground pedestrian lighting
  - Quality bike storage/parking at transit stations and other areas
  - Expand bikeshare locations
  - Improve connectivity to regional trails within bikeshed of corridor
  - Smart Parking technologies and signage
  - Lighting along Underline between Metrorail Stations
  - Provide seating and shade at bus stops near Metrorail Stations

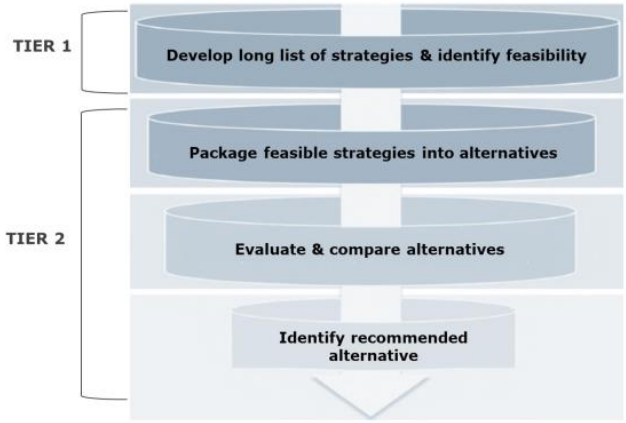


Figure 1. Strategy Identification and Recommended Alternatives Development Process

2.3.4 Tech Memo 5: Conceptual Strategies

Document Title: Tech Memo 5: Conceptual Strategies

Agency: FDOT

Jurisdiction: Miami-Dade County

Document Year: 2019

Tags: Community | Traffic | Active

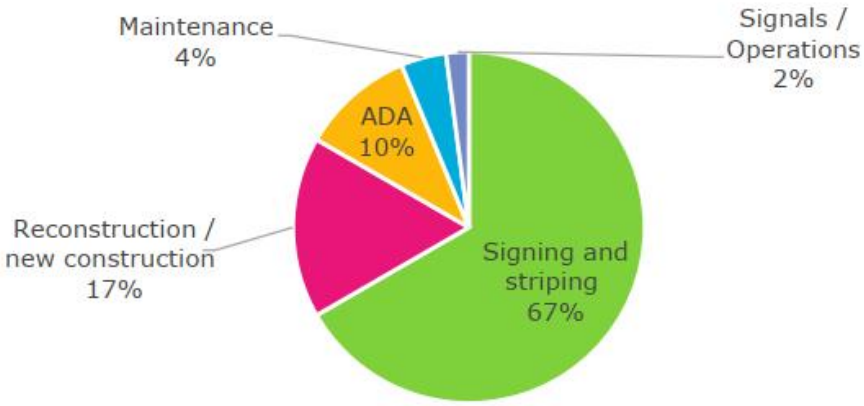
Document Cover:

Document Summary: Document includes recommendations to improve access to transit for all modes, safety and convivence for pedestrians/ bicyclists, auto trip efficiency, and reduce crashes by implementing strategies including signals, signage, in-ground lighting, and pedestrian overpasses.

Key Findings:

- Identified needs such as efficiency of auto trips, reduction of crashes, transit access improvements for all modes, and safety & convenience for pedestrians/ bicyclists
- Candidate RRR project identified SR 5/US 1 from SW 80 Street to south of Riviera Drive
- 25% of recommendations are directly related to the goal to improve access to transit by all modes
- Recommended new signals and signal modifications
- Recommended pedestrian overpasses
- Recommended in-ground lighting
- Stakeholders expressed desire for a "great space" along the corridor with recommendations including landscaping and visible entry points
- Next steps include finalizing the strategy list and further analysis of such strategies
- Appendices include Project Advisory Team feedback as well as aerial maps detailing potential strategy implementation areas

Figure 2. Programed RRR recommendations implementation breakdown



2.3.5 Tech Memo 6: Multimodal Strategies

Document Title: Tech Memo 6: Multimodal Strategies Analysis

Agency: FDOT

Jurisdiction: Miami-Dade County, FL

Document Year: 2019

Tags: Traffic | Trips | Active

Document Cover:

Document Summary: This study documents the operational impacts and benefits as well as the transit access and pedestrian/ bicycle network improvements associated with all the multimodal strategies recommended to move into further phases of the project development. Included a daily traffic congestion effects analysis, access to transit analysis, pedestrian and bicyclist safety and convenience analysis, and auto safety analysis.

Key Findings:

- Strategies considered during first round of operational analysis:
  - New Signalized Intersections
  - Right or Left Turn Restrictions
  - Removal of Channelized Right Turns
  - Removal of Turn Lanes
  - Modified Signal Phasing/Timings
  - Alternative Intersections
  - New Crosswalks
- New crosswalks crossing US 1 at SW 70 Avenue, S Alhambra Circle, Stanford Drive/Augusto Street, and Granada Boulevard are expected to have a level of service of D or better during both peak hours in 2020 and 2040
- The remainder of the document contains HCM Signalized Intersection Capacity Analysis charts

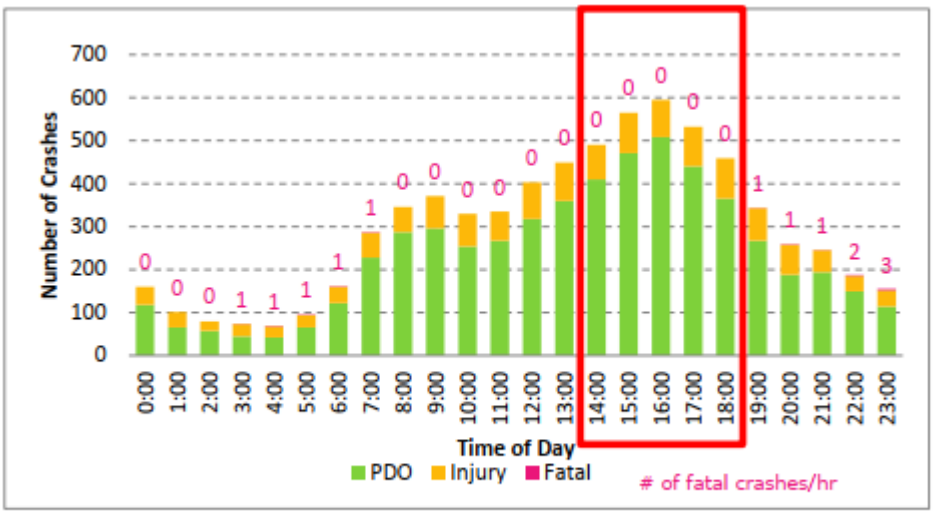


Figure 7: Crash Distribution by Time of Day

2.4 Master Plans

2.4.1 South Miami Comprehensive Plan

Document Title: South Miami Comprehensive Plan

Agency: The City of South Miami

Jurisdiction: Miami-Dade County, FL

Document Year: 2018

Tags: Traffic | Trips | Land Use

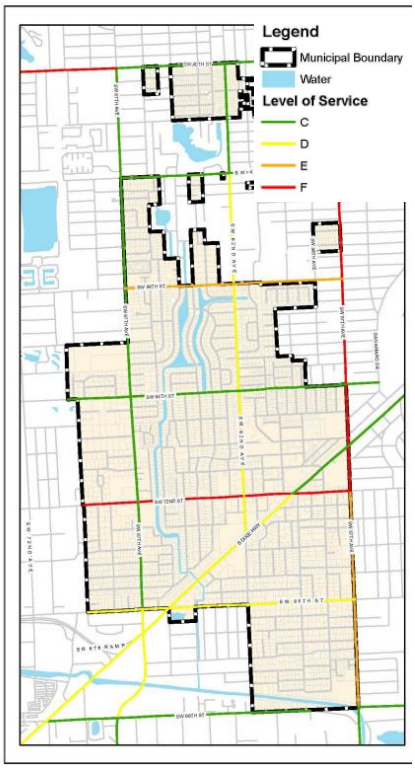
Document Cover:

Document Summary: Outlines goals, objectives, and policies related to transportation planning based off inventory and data analysis of existing conditions. South Miami's comprehensive plan aims to make streets safer and more functional for its residents. Level of Service for major roads is also outlined.

Key Findings:

- Existing local roads, which are on a grid system provided a connected street system intended for high traffic of local origin or destination, but which **receives significant and adverse cut-through traffic** by commuters seeking to bypass the congestion that occurs along US 1.
- Transportation (TRA) Policy 1.3.6: The city shall coordinate with appropriate agencies to ensure the timely provision of a pedestrian overpass that will connect the Metrorail Station to the downtown area east of US 1. In addition, the City shall provide pedestrian friendly crosswalks at all intersections.
- Within the City, the Underline site encompasses over 11 acres that run parallel to US 1.
- Given the county and state's control of the roadway systems and their respective improvements, the city is limited in its abilities to adequately respond to transportation needs (such as those along US 1).
- Current LOS of Dixie Highway (US 1) C. Future LOS (2021 and 2040) north of Kendall Drive is C, and north of Sunset Drive is D.
- Three highest crash intersections along US 1: Red Road, Sunset Drive, Davis Road

Map 2.4 Existing LOS



2.4.2 Coral Gables Multimodal Plan

Document Title: City of Coral Gables Comprehensive Multimodal Transportation Plan

Agency: City of Coral Gables

Jurisdiction: City of Coral Gables, FL

Document Year: 2019

Tags: Community, Traffic, Active, Trips

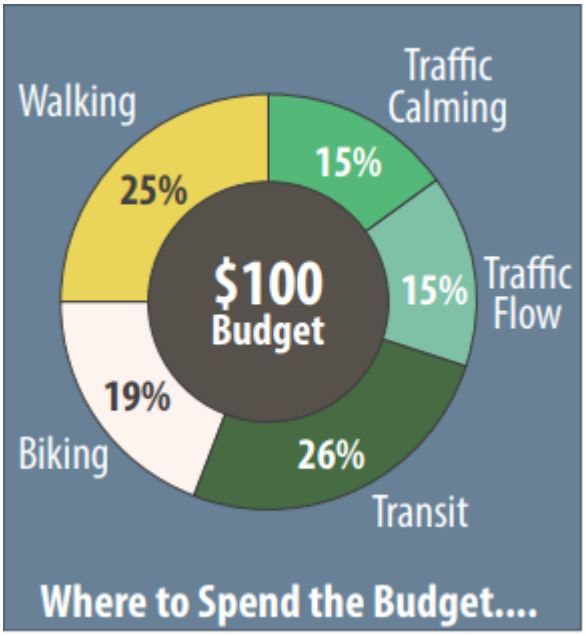
Document Cover:

Document Summary: This document summarizes the transportation goals of the City of Coral Gables including improving traffic flow, addressing traffic intrusion in neighborhood districts, looking for opportunities to improve connectivity, enhance non-auto travel modes, avoid undue environmental impacts, and continue to create attractive transportation corridors.

Key Findings:

Community input:

- Most popular walking enhancements were crosswalks, street trees, and connections
- Most popular bike changes were protected bike lanes and bike share as well as bicycle connections and parking
- Popular transit enhancements included trolly tracker, extended trolly service, and additional trolly routes
- Most popular traffic calming options were mini roundabouts, tree-lines streets, and reduced speed limit. Sharded spaces, medians, and traffic diverters were also well liked among the public.
- The most popular traffic flow improvement was traffic signal optimization. Other popular options included roundabouts and electric charging stations



- US 1 was identified as a "high need" area with request for safer pedestrian crossing
- US 1 is priority I for walking and biking improvements

2.4.3 Miami-Dade TPO 2045 LRTP

Document Title: Miami-Dade TPO 2045 Long Range Transportation Plan

Agency: Miami-Dade TPO

Jurisdiction: Miami-Dade County

Document Year: 2019

Tags: Community | Traffic | Active | Trips

Document Cover:

Document Summary: Focuses primarily on the development and implementation of the Strategic Miami Area Rapid Transit (SMART) Plan. The plan addresses the growth of Miami-Dade County and their increasing need for better transportation systems such as rapid transit corridors and other elements to increase mobility.

Key Findings:

- US 1 (Biscayne Blvd/SR 5) & NE 197 St, Dadeland North Metrorail Station at Hwy US 1, is under Priority Level II for multimodal solutions including the BERT Program and bike lanes
- The use of rideshare services, scooters, and mobile applications are highlighted to increase mobility and connectivity
- Miami-Dade County's population growth rate is estimated to be 34% and employment rate 38% by 2045
- The TPO governing board identified the advancement of the rapid transit corridors and supportive projects as the highest priority in the county
- The project area is in Transportation Planning Area 2 (Central), comprising 53 square miles
- Travel delay has increased by 12% since the 2040 LRTP and total congestion cost has increased by 18.5%
- Maximizing mobility choices is the #1 weighted LRTP goal. Objectives of this goal include:
  - Providing a transportation network with dependable and reliable options
  - Reducing congestion
  - System reliability
  - Increasing mobility choices

2.4.4 University of Miami Mobility Plan

Document Title: University of Miami Mobility Plan

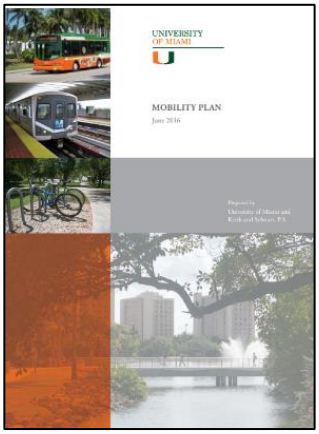
Agency: University of Miami

Jurisdiction: University of Miami

Document Year: 2016

Tags: Design, Traffic, Trips, Active, Land Use

Document Cover:



Document Summary: University of Miami's 2016 Mobility Plan demonstrates past and future congestion relieving alternatives that aim to reduce vehicular traffic on and around campus. Included on-campus residential and off-campus non-residential strategies.

Key Findings:

- No freshman car policy
- The University estimates that more than 1,600 students are living in the vicinity of campus and are either walking, biking, or using public transit to get to campus
- Public transit programs include Metrobus and Metrorail
- There are 8,824 parking spaces among surface lots and five parking garages
- There is a daily average vacancy of approximately 2,000 spaces during peak occupancy hours
- Campus core area (north of Lake Osceola) is the most desirable parking area
- Trip sharing programs include Zipcar, Campus Taxi Stand, App-Based Transportation Services, Car/Van Pool
- "Hurry 'Canes" Shuttle program includes on-campus shuttles, off-campus, recreational, and shopping shuttles
- Bike/ped programs include Ubike and pedestrian and bike pathways
- Parking garage located at the South Alhambra intersection off Ponce De Leon
- Over 1,600 students living in the vicinity and are either walking, biking, or using public transport to get to campus, some south of US 1
- The most successful traffic calming improvements implemented include enhanced sidewalks, medians, landscaping, lighting, and limitation of access points to the residential cross streets in the area

Hurry 'Canes Shuttle

2.4.5 Miami Bicycle Master Plan

Document Title: Miami Bicycle Master Plan

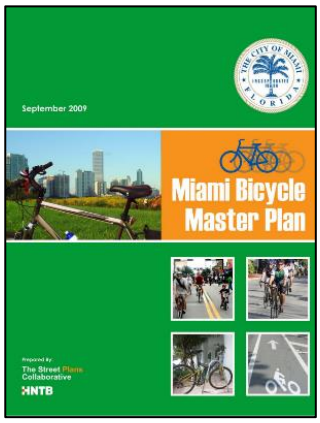
Agency: HNTB

Jurisdiction: Miami-Dade County

Document Year: 2009

Tags: Design, Community, Traffic, Active, Land Use

Document Cover:

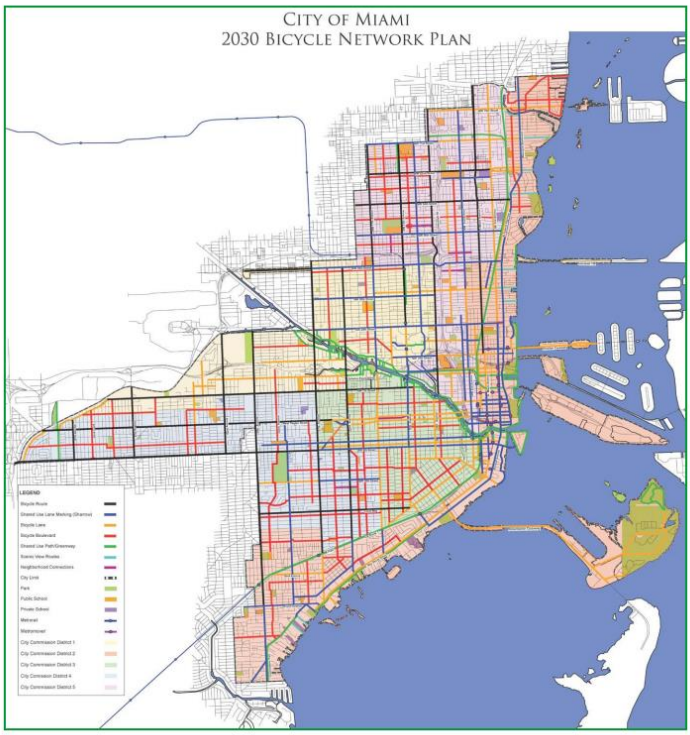


Document Summary: This study was created with the intention of making Miami a more bike-friendly city. The document consists of reviewed existing conditions as well as city staff recommendations to establish a citywide bikeway network plan, bicycle parking plan, safety and awareness actions, and evaluation tools to measure future performance and suggest improvements to the existing bicycle structure. The document serves as a guide for developing a bikeway network and parking over a 20-year period in phases of 2010, 2015, 2020, and 2030.

Key Findings:

- Most existing corridors are auto-centric
- Existing motor vehicle speeds do not provide a safe biking environment
- M-Path and Rickenbacker Causeway Bicycle Lanes both receive heavy use
- Survey returned 312 responses
- Largest barriers in biking in Miami include: 84% current lack of facilities, 76% concern for personal safety as a major impediment, 48% lack of bike parking, 12% Miami's climate
- Bicyclists in Miami want to be involved in improvements and want the process to be as transparent as possible
- The plan includes 280 miles of new or improved bikeways (about 33% of the city street network) by 2030
- Currently (2009), City of Miami bike network includes 17.12 miles of bike lanes and shared use paths/ greenways (only 1.6% of city street network)

Figure 1- 1: 2030 Bikeway Network Master Plan



2.5 Underline Studies

2.5.1 Community and Connectivity Study

Document Title: The Underline: A Community and Connectivity Study Executive Summary

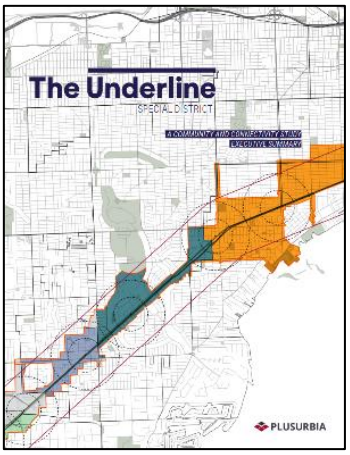
Agency: Miami-Dade County

Jurisdiction: Underline Special District

Document Year: 2020

Tags: Community, Traffic, Active, Land Use

Document Cover:

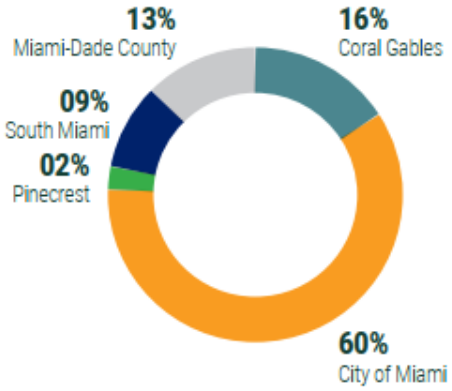


Document Summary: This document thoroughly outlines the goals and next steps in the Underline trail development plan. The trail spans from downtown Miami, into Coral Gables, through the City of South Miami, and ends in the Village of Pinecrest following the Metrorail as well as US 1.

Key Findings:

- Walking and biking survey identified unsatisfactory signalization and unsafe crossings- especially due to southbound vehicular right turns on US 1
- 2012-2017 pedestrian and bike crashes occurred at US 1 intersections at Coconut Grove Station (8 incidents), Douglas Station (40 incidents), and South Miami Station (55 incidents).
- "US 1 is a safety barrier to The Underline Corridor and its future"
- Must cross more than 6 lanes in displaced signalized crossings along US 1
- Recommendations for buffered bike lanes and safer crosswalks
- Consider improving sidewalks
- Consider narrowing traffic lanes
- Consider traffic calming measures such as speed limit reduction
- Consider limiting vehicular access on certain roads
- Consider elevated crossings on US 1

The Underline Special District seeks to improve communities along Miami's 10-mile, multi-modal, world class urban trail. Creating safer, healthier, more connected, more resilient and engaged communities that will connect people to place and each other.



aphic: Municipal breakdown within The Underline Special District boundary.

2.5.2 Framework Plan and Demo Projects

Document Title: The Underline: Framework Plan and Demonstration Projects

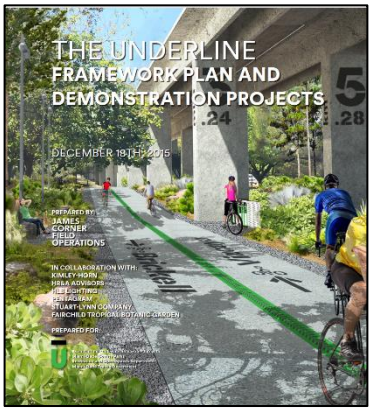
Agency: Miami-Dade County

Jurisdiction: Underline Special District

Document Year: 2015

Tags: Design, Traffic, Trips, Active

Document Cover:



Document Summary: This document is a more design-centric demonstration of potential improvements as well as aesthetic choices for the continued development of The Underline. Focus was placed on increasing pedestrian and bike accessibility and safety.

Key Findings:

- Minor intersection improvement recommendations:
  - Improve visibility and orientation
  - Provide early indicators for approaching path users (gradual grading and/or pavement marking)
  - Provided minimum 6 ft buffer space between US 1 travel lane and crossing
  - Widen crosswalks and burb openings to 18 ft in width (bike crossing space 10ft in width, pedestrian crossing space 9 ft in width, flush curb openings)
  - Consider no-turn-on-red for cross-street right-turn movement (may be required due to sight distance calculations of widened crossings, dynamic no-turn-on-red during peak travel times could be considered for the highest volume right turn movements)
  - Provide leading pedestrian interval (LPI) for Underline crossing

- Medium intersection improvement recommendations:
  - Maintain straight approach path alignment across the intersection
  - Provide early indicators for approaching path users (pavement marking and/or material changes)
  - Provide tabled crossing or lift grade of roadway to provide smooth crossing
  - Widen crosswalks and curb openings to 18 feet in width (minimum)

- Major intersection improvement recommendations:
  - Consider grade-separated crossing at highest volume intersections and/or crossings with unavoidable constraints
  - Explore strategies for significant path re-alignment associated with tactical opportunities

2.5.3 Road Impact Fee Study

Document Title: The Underline: Miami-Dade Road Impact Fee Study

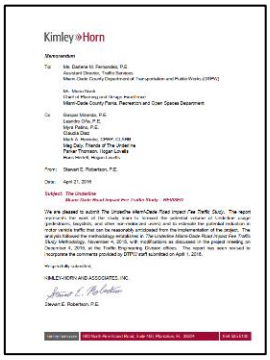
Agency: Kimley Horn

Jurisdiction: Miami-Dade County, FL

Document Year: 2016

Tags: Traffic | Trips | Active

Document Cover:


Kimley»Horn

Memorandum

To: Ms. Darlene M. Fernandez, P.E.
Assistant Director, Traffic Services
Miami-Dade County Department of Transportation and Public Works (DTPW)

Mr. Mario Nack
Chief of Planning and Design Headquarter
Miami-Dade County Parks, Recreation and Open Spaces Department

Cc: Gerardo Miranda, P.E.
Leandro Ortiz, P.E.
Ana Rosa, P.E.
Claudia Diaz
Mark G. Wanecko, CPRP, CLARB
Meg Daly, Friends of The Underline
Parker Thomson, Hogan Lovells
Miami-Dade Hogan Lovells

From: Stewart E. Robertson, P.E.

Date: April 21, 2016

Subject: The Underline
Miami-Dade Road Impact Fee Traffic Study – REVISED

We are pleased to submit The Underline Miami-Dade Road Impact Fee Traffic Study. The report represents the work of the study team to forecast the potential impact of Underline usage patterns, bicyclists, and other non-motorized users and to estimate the potential reduction in motor vehicle traffic that can be reasonably anticipated from the implementation of the project. The analysis followed the methodology established in The Underline Miami-Dade Road Impact Fee Traffic Study Methodology, November 4, 2015, with modifications as discussed in the project meeting on December 4, 2015, at the Traffic Engineering Division offices. The report has been revised to incorporate the comments provided by DTPW staff submitted on April 1, 2016.

Respectfully submitted,

KIMLEY-HORN AND ASSOCIATES, INC.

Stewart E. Robertson, P.E.

Kimley-Horn 95 North Miami Beach Blvd, Suite 100, Miami-Dade, FL 33161 Tel: 305-673-2720

Document Summary: Study conducted to analyze intersection activity and traffic trends using vehicular traffic volumes, signal timings and volumes, and pedestrian and bike lane use patterns and volumes to measure the potential impact of The Underline on US 1. The study also examined M-Path and Underline usage patterns and compared them with other trail projects such as the 606 Trail in Chicago.

Key Findings:

- The Underline is anticipated to generate approximately 8,000-9,000 users per day
- Based on an average trip length of 2 miles, The Underline will carry a volume of approximately 1,600 to 1,800 trips on average at a given point along the corridor
- Measuring the mode shift between automobile traffic and non-motorized traffic caused by the implementation of urban trails can be estimated based on methodologies established within published literature
- Vehicle substitution rates for The Underline were calculated based on a blend of two published methods.
  - Method 1 – Estimate the percentage of non-motorized transportation trips that are shifted from motor vehicle trips.
  - Method 2 – Estimate the percentage of motor vehicle trips that could be replaced by non-motorized transportation modes

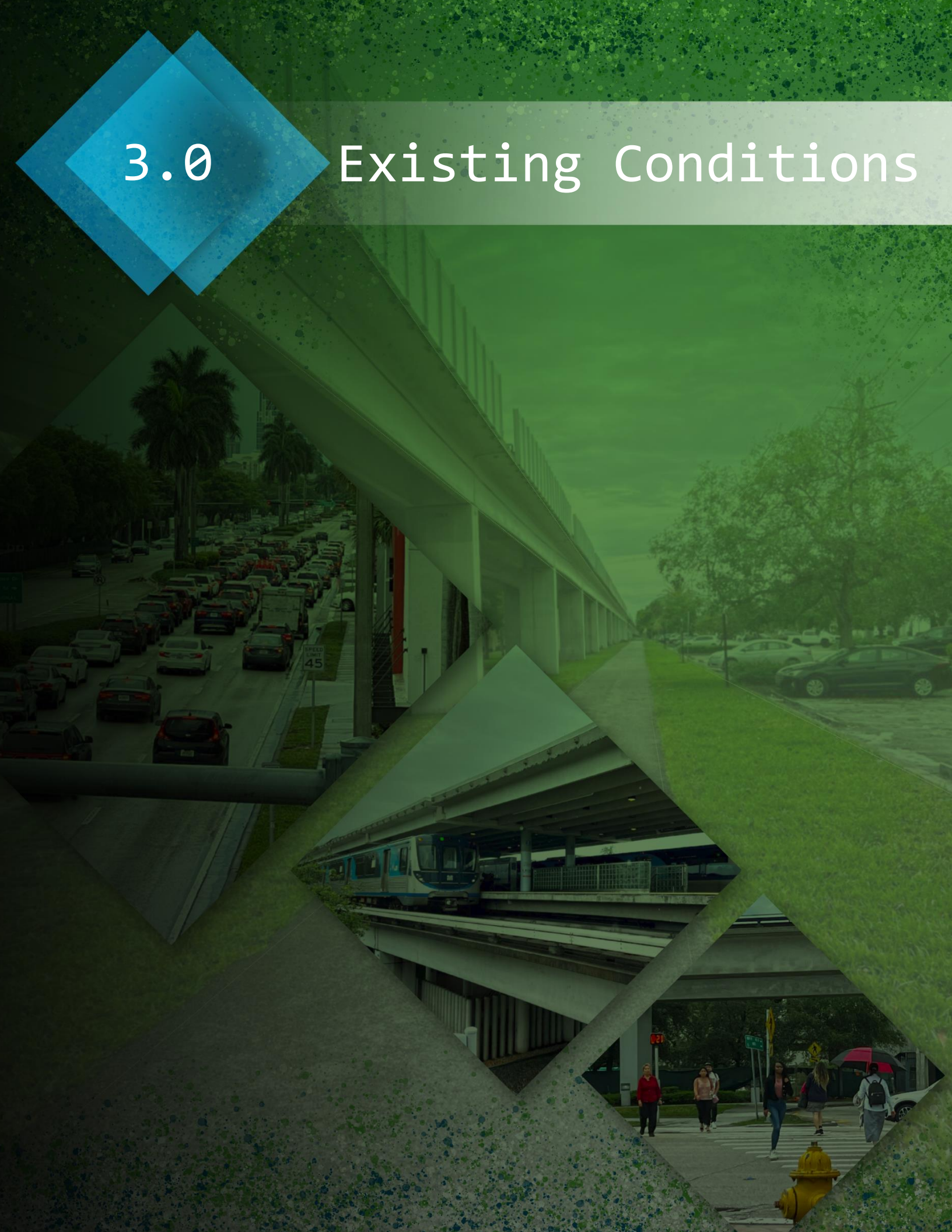
Table 5. Motor Vehicle Traffic Volume Reduction as a Result of The Underline

Count Site Number	Roadway	Location Description	AADT Opening 2019	Motor Vehicle Reduction	AADT Adjusted 2019	Percent Reduction in Traffic
870163	U.S. 1	200' south of SR 878/Snapper Creek Expressway	53,300	748	**52,552**	**-1.40%**
870164	U.S. 1	200' south of SW 80th Street/Davis Road	97,125	967	**96,158**	**-1.00%**
870127	U.S. 1	400' east of SW 57th Avenue/Red Road	81,488	889	**80,599**	**-1.09%**
870178	U.S. 1	south of Granada Boulevard	79,848	881	**78,967**	**-1.10%**
870521	U.S. 1	200' south of Grand Avenue	74,313	853	**73,459**	**-1.15%**
875037	U.S. 1	200' south of S Miami Avenue	24,395	603	**23,792**	**-2.47%**
875039	U.S. 1	200' north of Rickenbacker Causeway	27,163	617	**26,545**	**-2.27%**
875041	U.S. 1	200' south of SE 13th Street	24,088	602	**23,486**	**-2.50%**
875042	U.S. 1	200' south of SE 8th Street	30,238	633	**29,605**	**-2.09%**
875200	U.S. 1	200' south of SW 27th Avenue/Unity Blvd	90,200	933	**89,268**	**-1.03%**
875201	U.S. 1	200' north of SW 27th Avenue/Unity Blvd	84,563	904	**83,658**	**-1.07%**

Source: FDOT's Florida Traffic Online Database; Kimley-Horn and Associates, Inc.

- Motor vehicle traffic reduction on US 1 as a direct result of The Underline is anticipated to range from 643 vehicles per day to 1,007 vehicles per day
- The percentage reduction in traffic volumes on US 1 as a direct result of The Underline is anticipated to range from -1.03% to -2.50%
- Intersection capacity analyses were conducted for the weekday A.M. and P.M. peak periods at five intersections as determined during the methodology phase of this study. Intersection analyses were performed using Trafficware's Synchro 8.0 traffic engineering analysis software
- The Underline is anticipated to result in vehicle delay reductions at signalized intersections of up to -4.13% for total intersection delay in the A.M. peak period
- Reductions in individual approach delays are anticipated to range up to -6.83% for through movements on US 1

3.0 Existing Conditions



3.0 Existing Conditions

The existing conditions analysis includes a review of the existing transportation infrastructure, land use and zoning, as well as recent and approved development along the corridor. The purpose of this analysis is to establish a baseline of the current facilities while determining the adequacy of existing facilities to serve the transportation needs of all types and users.

3.1 Transportation Infrastructure

3.1.1 Study Corridor Description

US 1 from SW 72nd Street to SW 27th Avenue is a north-south roadway located in Miami-Dade County, Florida. It is functionally classified by FDOT as an **Urban Principal Arterial** and is approximately **4.5 miles** long. The study corridor includes the City of Coral Gables, the City of Miami, and the City of South Miami.

3.1.2 General Roadway Characteristics

The following list summarizes the existing roadway characteristics for the US 1 study corridor:

- FDOT functional classification of US 1 is **Urban Principal Arterial**.
- The FDOT Context Classification ranges from **C4** (Urban General) to **C5** (Urban Center)
- The facility is within an **Urbanized Area** as classified by FHWA.
- US 1 is a **six-lane** facility with center paved median.
- The posted speed limit along the corridor is **40 mph** south of the University of Miami and **45 mph** north of the University of Miami.
- **Sidewalks** are present on the entirety of the eastern side of the roadway for the length of the corridor. Sidewalks on the western side of the corridor are intermittent.
- There are **no bike lanes** along the corridor, although the M-Path (Underline) parallels.
- **Street lighting** is present along the length of the corridor.

Existing conditions along the corridor. Photo Source: Project Team.

3.1.3 Bicycle and Pedestrian Facilities and LOS

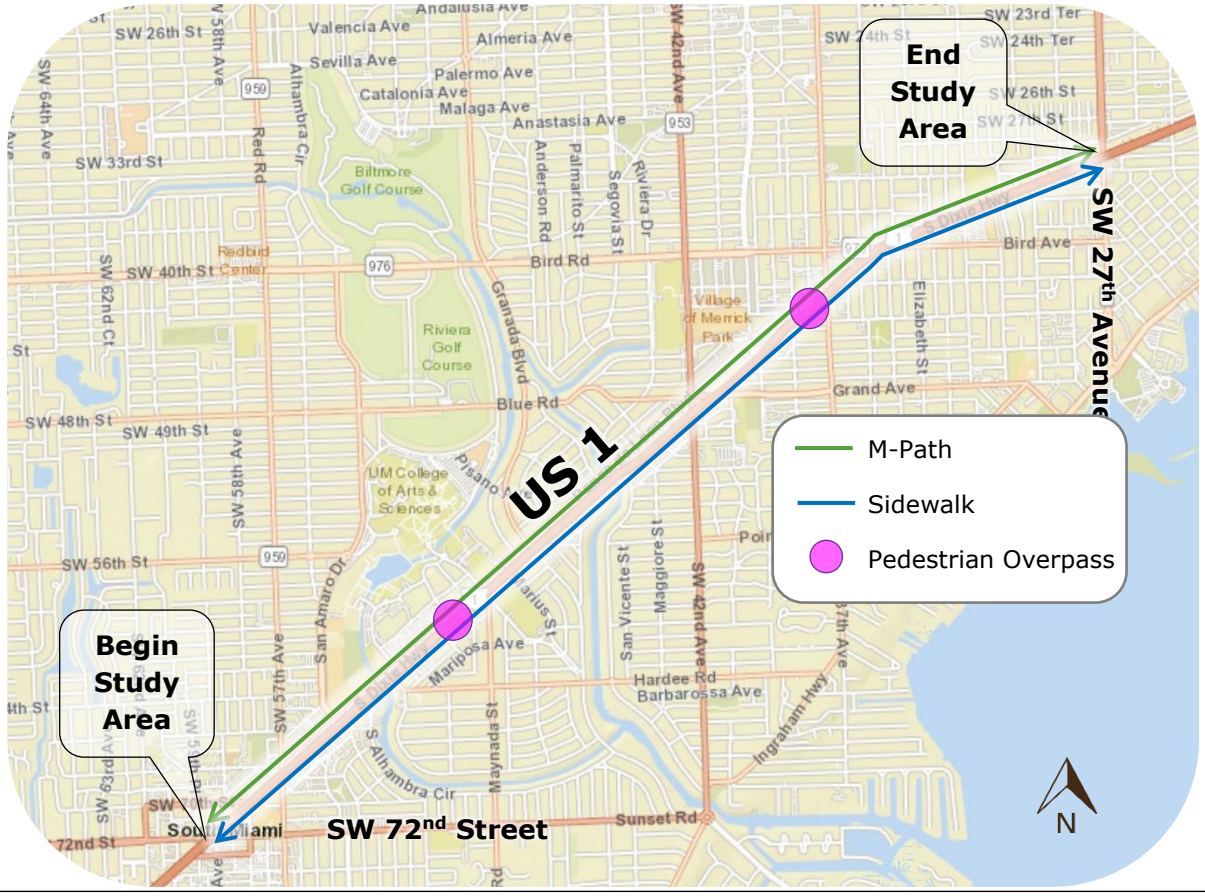
Sidewalks are present along the east side of US 1 and a paved path (M-Path/Underline) follows the Miami-Dade Transit (MDT) right-of-way under the Metrorail on the west side of the corridor (see **Figure 3-1**). Additionally, there are two pedestrian overpasses on the corridor; one for the Douglas Metrorail Station just south of SW 37th Avenue in Coconut Grove and the other for the University Metrorail Station near the University of Miami south of Maynada Street (see **Figure 3-1**).

Due to the high traffic volumes on US 1 and the lack of bicycle facilities, the Bicycle Level of Service (LOS) is F using methodologies from the 2020 FDOT Q/LOS tables. Moreover, with intermittent sidewalks on the western side (southbound), the Pedestrian LOS is also F. If the M-Path / Underline is considered as part of the sidewalk infrastructure, then the Pedestrian LOS improves to E. Similarly, if the M-Path/Underline is considered as a bicycle facility for both directions of US 1, then Bicycle LOS improves to E.

M-Path and Underline

The M-Path is a paved, multi-use Trail connecting Metrorail stations and continues south as the South Dade Trail to Florida City. The entire route forms a 31-mile corridor. The Underline is a 10-mile linear park, urban trail, and public art destination that is opening in phases through 2025 and follows the M-Path. The project corridor is within Phase 2 and 3. More details on the Underline project are included in **Section 2.0 Literature Review**. Consistency with the Underline is a key aspect of this study.

Figure 3-1 Bicycle and Pedestrian Facilities

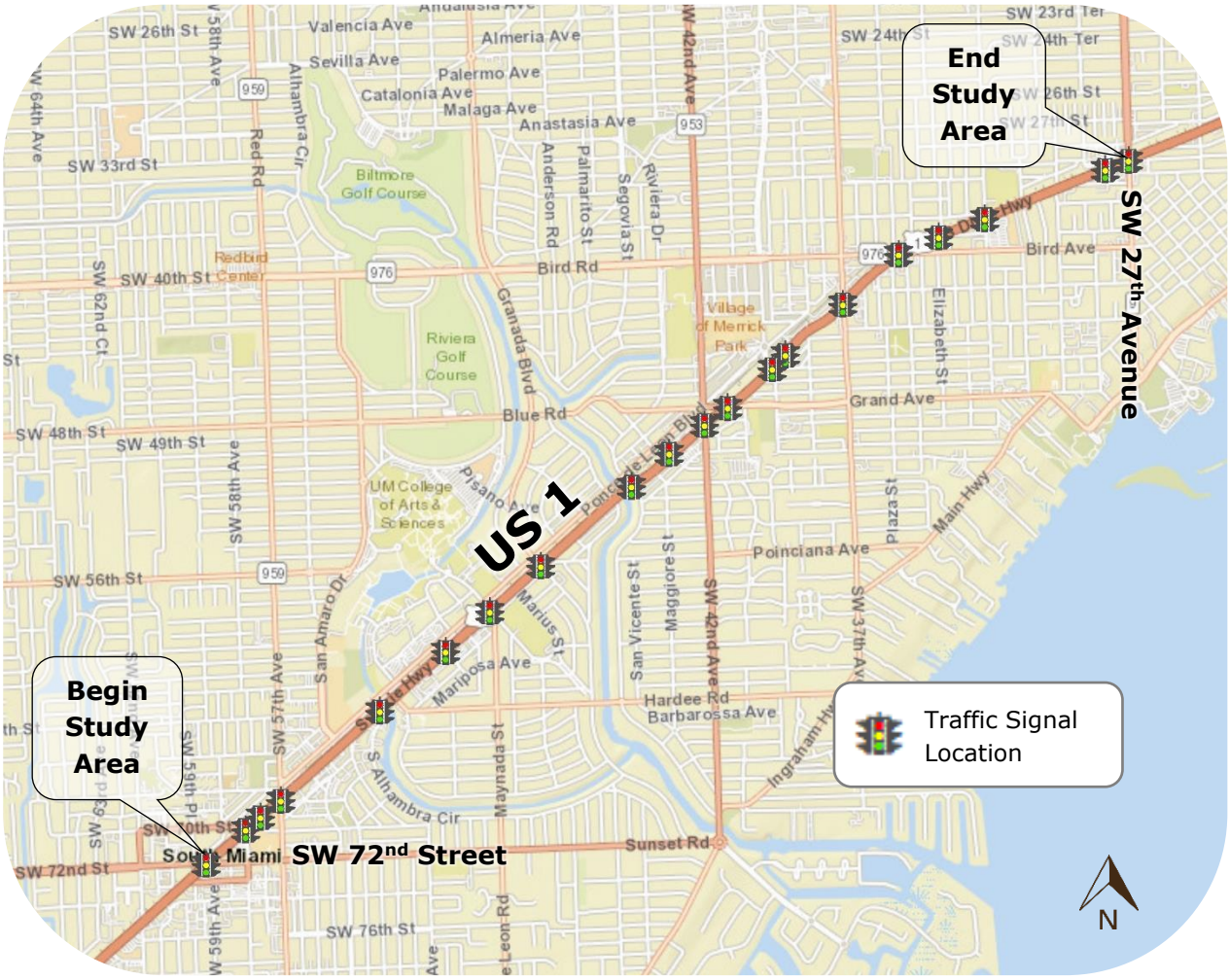


3.1.4 Traffic Signals

There are 20 traffic signals along the US 1 corridor within the study area. The locations are listed below and displayed in **Figure 3-2**.

- US 1/SW 27th Avenue
- US 1/SW 32nd Avenue
- US 1/Bird Road
- US 1/Douglas Road
- US 1/Grand Avenue
- US 1/LeJeune Road
- US 1/Riviera Drive
- US 1/Granada Boulevard
- US 1/Augusto Street/Stanford Drive
- US 1/Brooker Street/Ponce De Leon Boulevard
- US 1/Red Road
- US 1/Sunset Drive
- US 1/Alhambra Circle
- US 1/Mariposa Court
- US 1/Ponce de Leon Extension
- US 1/SW 58th Avenue/SW 70th Street
- US 1/SW 5700 Block
- US 1/500 Block (fire station)
- US 1/SW 3300 Block
- US 1/SW 2800 Block

Figure 3-2 Traffic Signals



Data Source: Traffic signal shapefile downloaded from Miami-Dade County's Open Data Hub, last updated July 7, 2022.

3.1.5 Transit

Transit to the US 1 corridor is provided by Metrobus, Metrorail, and the City of Coral Gables Trolley. Transit routes, Metrobus stops, and Metrorail stations within the US 1 corridor are displayed in **Figure 3-3**. Due to the robust services on the corridor, the Transit LOS is B.

Metrobus

Bus service is provided by Metrobus, which is operated by Miami-Dade County DTPW. There are 21 Metrobus stops within 500 feet of the project corridor. Three of these bus stops are equipped with shelters (Douglas Road Station, University Station, and South Miami Station). Six of the bus stops have benches (the three stations with shelters, plus Alhambra Circle, SW 70th Street, and SW 68th Street). Only six of the bus stops are directly on US 1; the remaining are either on Ponce de Leon Boulevard or a nearby cross-street.

Six Metrobus routes traverse or intersect the project corridor (shown in **blue** in **Figure 3-3**):

- **Route 22**: Travels from the 167 St Metrobus terminal to the Coconut Grove Metrorail station along NE 163rd Street and NW/SW 22nd Avenue, traveling through Sunshine State Industrial Park.
- **Route 27**: Travels from Miami Gardens to Coconut Grove Metrorail station along NW/SW 27th Avenue.
- **Route 37**: Travels from Hialeah to South Miami along Palm Avenue, LeJeune Road, and Douglas Road.
- **Route 56**: Travels from SW 56th Street/162nd Avenue to Nicklaus Children's Hospital through Coral Gables.
- **Route 57**: Travels from Miami International Airport Metrorail station to Palmetto Bay along NW/SW 57th Avenue.
- **Route 136**: Travels from Douglas Road Metrorail station to SW 136th Street and 89 Place (The Falls) along Old Cutler Road.

Metrorail

The Metrorail system is a 25-mile dual track heavy rail transit line that provides service to Miami International Airport (MIA) and runs from Kendall through South Miami, Coral Gables, and downtown Miami; to the Civic Center/Jackson Memorial Hospital area, and to Brownsville, Liberty City, Hialeah, and Medley in northwest Miami-Dade, with connections to Broward and Palm Beach counties by way of Tri-Rail commuter rail service.

Source: Wikimedia Commons, Metro-Tri-Rail.png

Metrorail runs along the western limits of the project corridor along US 1. There are four Metrorail stations within the study corridor located at SW 72nd Street, University of Miami, Douglas Road, and Coconut Grove (shown in **red** in **Figure 3-3**).

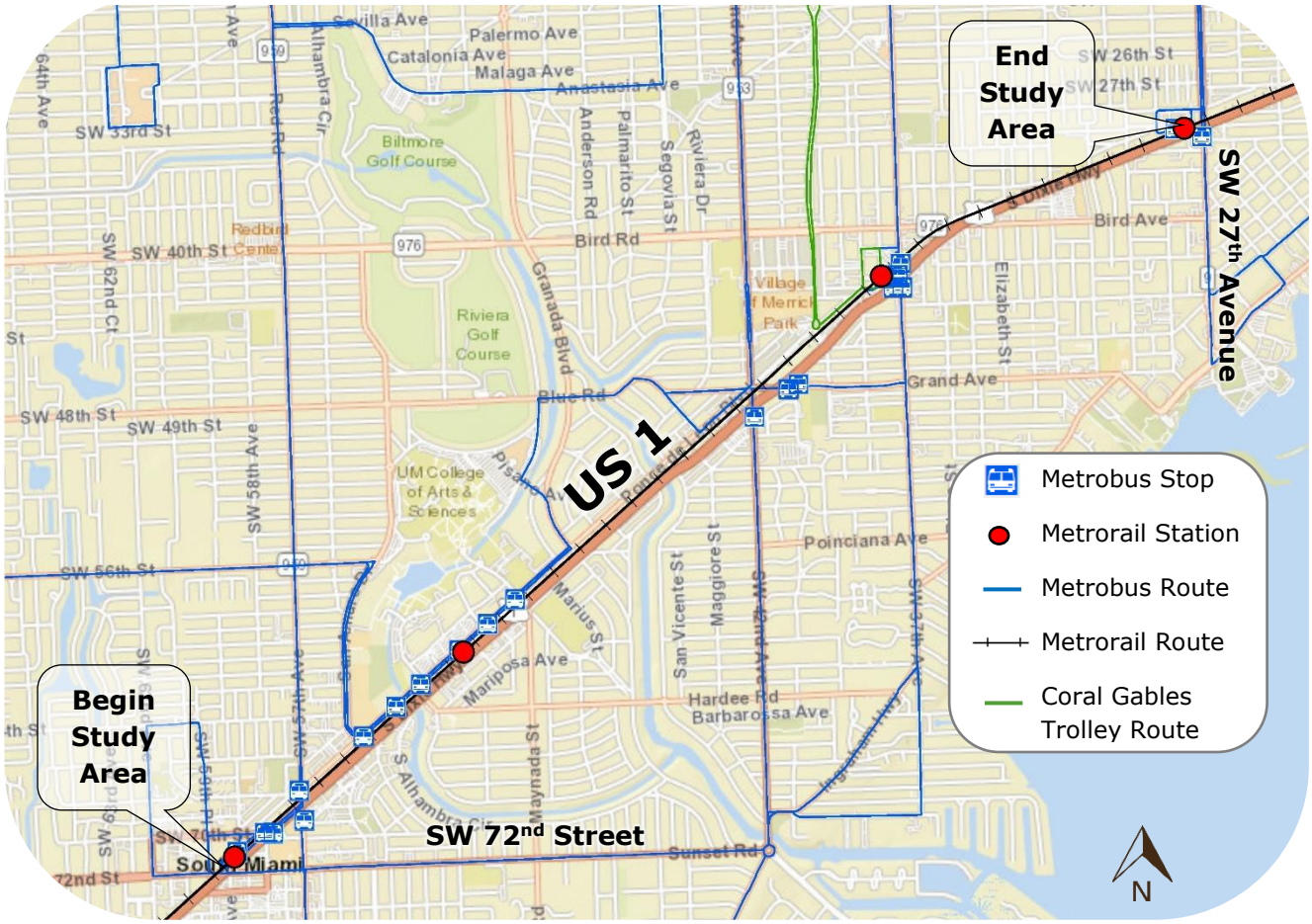
City of Coral Gables Trolley

The Coral Gables Trolley is a free service operated by the City of Coral Gables. Service runs every 10-12 minutes, weekdays, and Saturdays from 6:30 AM to 10 PM. The trolley route runs north and south on Ponce de Leon Boulevard from the Douglas Metrorail Station to Flagler Street linking downtown Coral Gables to surrounding areas.

The Coral Gables Trolley route is shown in **green** in **Figure 3-3**.

Source: Coral Gables Trolley, coralgables.com/trolley-services

Figure 3-3 Transit



Data Sources: Bus_stop (updated May 2022), bus_route (updated January 2022), Metrorail (updated November 2018) shapefiles downloaded from Miami-Dade County's Open Data Hub.

3.2 Land Use and Zoning

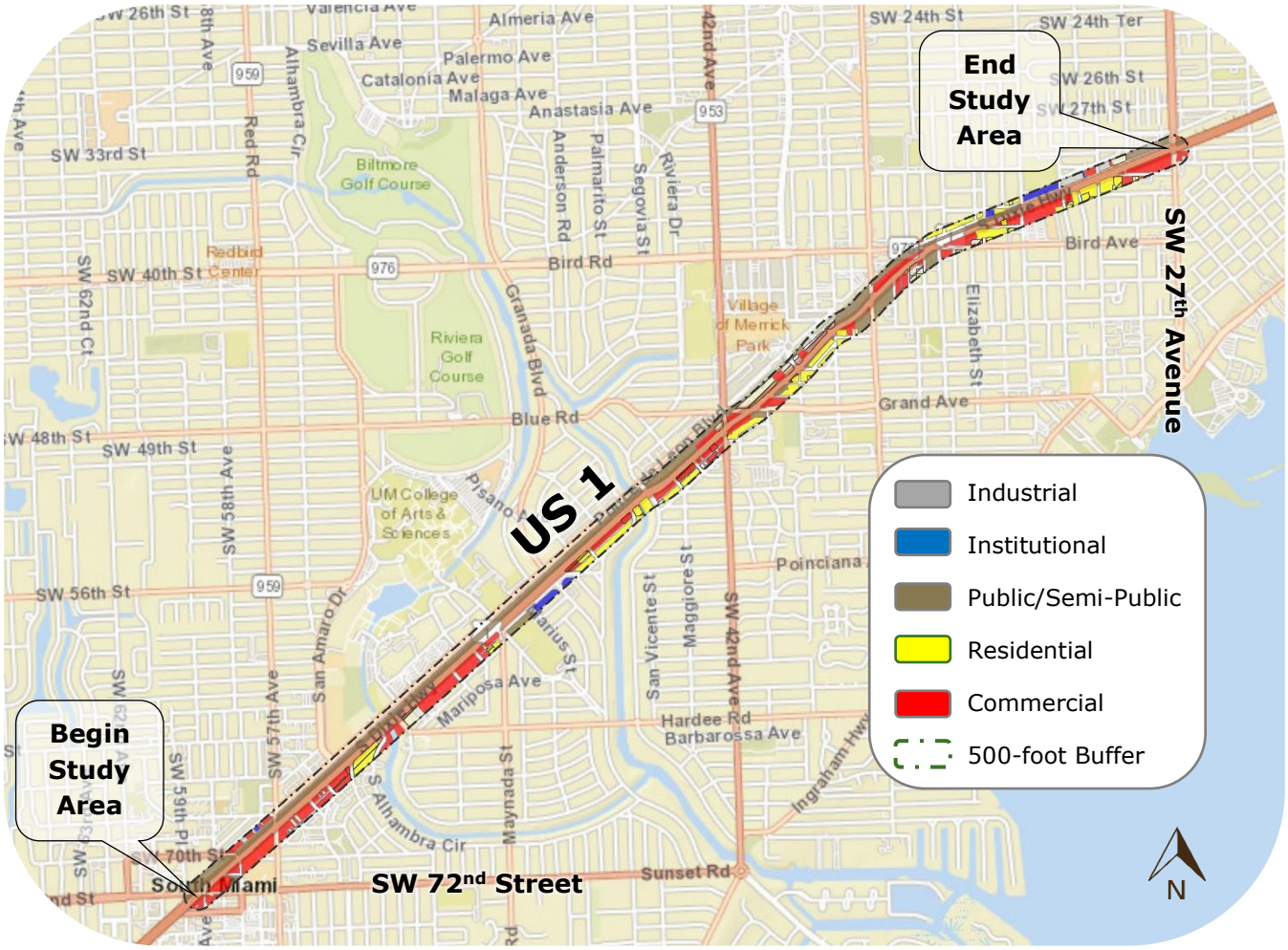
The land use and zoning for a 500-foot buffer surrounding the US 1 study corridor is provided in this section. The land use and zoning categorized were generalized for simplicity.

3.2.1 Existing Land Use

The existing land use within 500-feet of the study corridor is displayed in **Figure 3-4**. The existing land use is primarily either public/semi-public (brown), commercial (red), residential (yellow), or institutional (blue). The commercial areas become more concentrated when approaching South Miami but are also distributed throughout the corridor. Residential is primarily along the eastern side of the corridor and includes a mix of low, medium, and high densities.

The existing land use was displayed using the 2021 parcel specific land use for the FDOT. The original 99 land use classes from the parcel data have been collapsed into 15 generalized classes. (Please Note: As of 2015 there has been a change to the original FDOR 99 Land Use Values.)

Figure 3-4 Existing Land Use



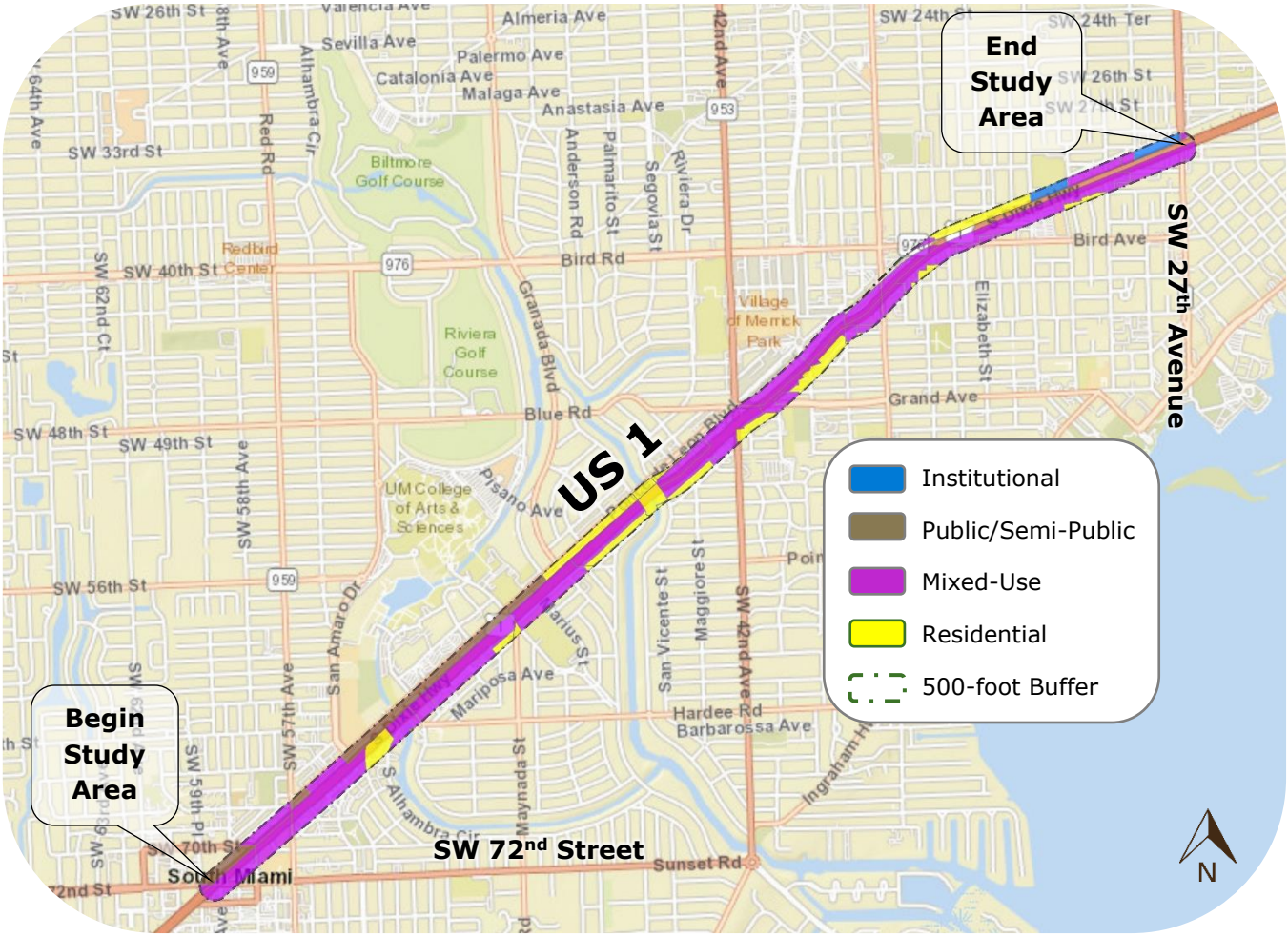
Data Source: 'Generalized Land Use Derived from 2021 Florida Parcels' shapefile downloaded from Florida Geographic Data Library (FGDL).

3.2.2 Zoning

The generalized zoning along the corridor is displayed in **Figure 3-5**. The zoning is primarily mixed-use (purple) with some residential (yellow), public/semi-public (brown) and institutional (blue). The mixed-use category is comprised of a variety of zoning districts such as transit-oriented development districts, urban center districts, and mixed-use districts. The residential districts include single and multi-family zoning with variety of densities. The public/semi-public districts include the university campus district.

Uses along US-1. Photo Source: Project Team.

Figure 3-5 Zoning



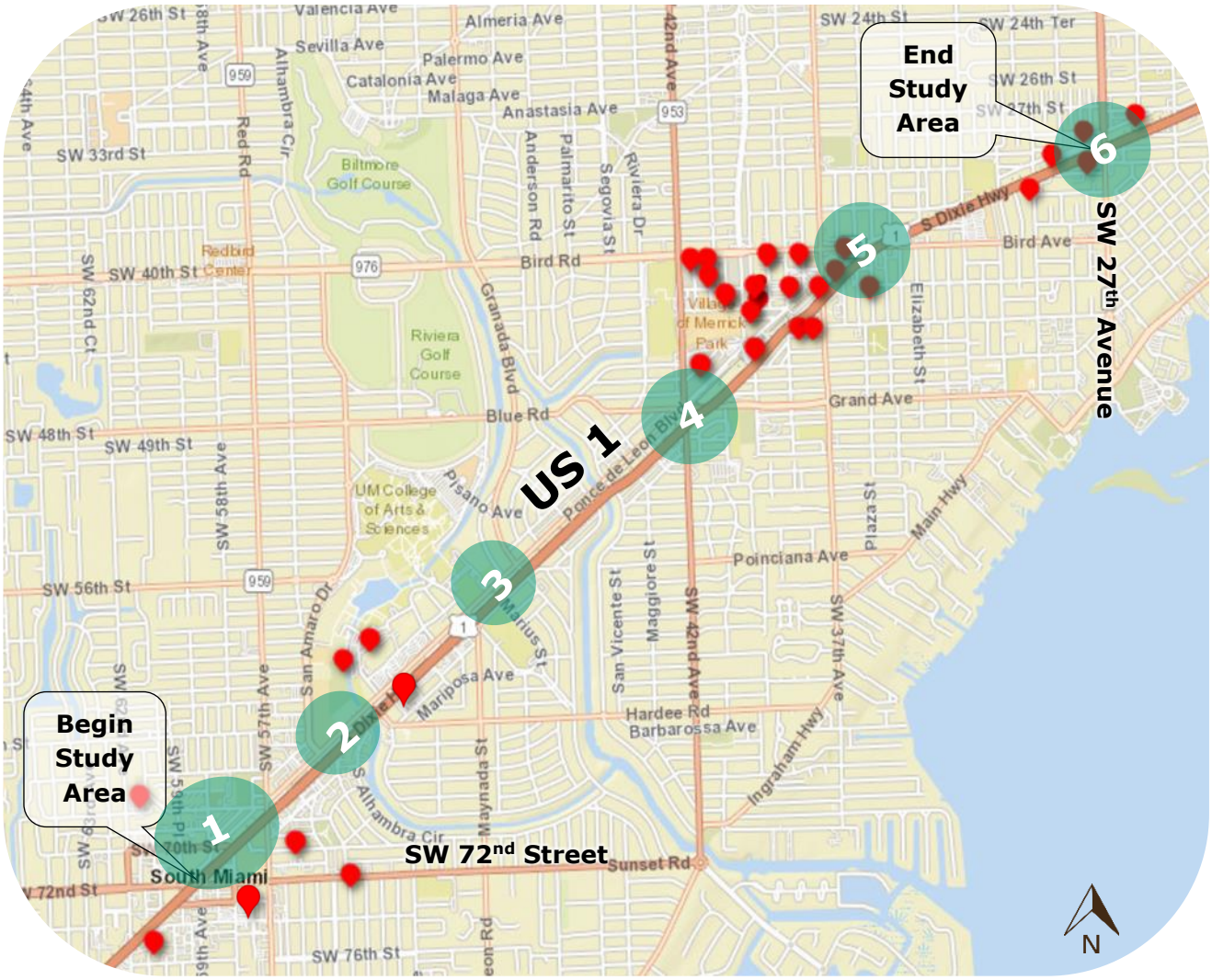
Data Source: Municipal_Zone shapefile downloaded from Miami-Dade County's Open Data Hub.

3.3 Recent and Approved Development

Recent and approved developments were inventoried along the project corridor to assess their impact on traffic patterns on the study corridor. The projects were grouped based on the study focus areas. These developments ranged in time from 2019 to 2023 and consumed a 1 square mile radius around the study area. Each study area has a radius of one mile and developments were arranged in categories including "under review", "commission approved", "permitted or under construction", or "approved status" based on how the municipalities categorized them.

There was a total of 30 developments identified. The general location of these developments is shown in **Figure 3-6** and further details are provided in this section. Much of the new development is clustered between Focus Areas 4 and 5 near the Villages of Merrick Park. There were no recent developments identified near Focus Area 3.

Figure 3-6 Recent and Approved Development



3.3.1 Focus Area 1: South Miami

The recent developments within Focus Area 1 are located in the City of South Miami and were researched using the city's municipal website. These projects were categorized on the city's municipal website by "approved status" without timeline to 2022 completion. Three developments were identified near Focus Area 1 (**Table 3-1**) including two public works projects for park improvements and a redevelopment project known as the Shops at Sunset Place.

Figure 3-7 Focus Area 1 Developments

Shops at Sunset Place

The 9.7-acre property currently has 524,180 square feet of retail, 15,000 square feet of office and 40 residential units. The new proposal has same density but significant design changes. Under the redevelopment plan, the retail space would be reduced to 440,148 square feet and the office space would increase to 32,840 square feet. The developer would also build 414 apartments in two buildings, a 182-room hotel, a two-story expansion to the parking deck, and 216 new structured and valet parking spaces. The developers will contribute $250,000 to the city for improvements to public spaces, such as benches, and another $1.5 million towards a pedestrian bridge over US 1.

Shops at Sunset Place public plaza rendering (Zyscovich Architects). Source: South Florida Business Journal.

Table 3-1 Focus Area 1 Developments

#	Project Name	Location	Public/ Private	Est. Completion	Description
1	Shops at Sunset Place	5701 SW 72nd Street	Private	Approved	Mixed-use redevelopment: 414 apartments, 182-room hotel, parking deck expansion.
2	South Miami Dog Park	6380 SW 78th Street	Public	TBC 2022	Turf replacement.
3	Park Improvements	Marshall Williamson Park	Public	TBC 2022	Landscaping, sidewalk, ADA and safety improvements.

To be constructed (TBC)

3.3.2 Focus Area 2: Alhambra Circle

The recent developments within Focus Areas 2, 3, and 4 are located in the City of Coral Gables. Developments were researched using the City of Coral Gables interactive project development map. The city categorized developments as either "under review", "commission approved" or "permitted or under construction".

Five developments were identified near the Focus Area 2 (**Table 3-2**) including a new fire station, a new 345-space parking garage, a University of Miami (UM) Theater Arts Addition and a student housing development known as UM Centennial Village with 274 student beds.

Figure 3-8 Focus Area 2 Developments

Fire House and UM Centennial Village renderings. Source: City of Coral Gables Planning website.

Table 3-2 Focus Area 2 Developments

#	Project Name	Location	Public/ Private	Status	Description
4	Fire House #4	1345 Sunset Drive	Public	Permitted or under construction	New construction of 3-story, 3 bay Fire House.
5	San Remo Baptist Parking	1540 San Remo Avenue	n/a	Permitted or under construction	9-level parking garage with 345 spaces.
6	UM Theater Arts Addition	1238 Dickenson Drive	Private	Permitted or under construction	10,655 square feet of academic space.
7	UM Centennial Village	1239 Dickenson Drive	Private	Permitted or under construction	274 student beds; 88' high.
8	Paseo de la Rivera	1350 South Dixie Highway	Private	Constructed 2018	Mixed use project incl. 204 apartment units and 245 hotel rooms.

3.3.3 Focus Area 4: SW 42nd Avenue/Blue Road/Grand Avenue

There were six developments identified near Focus Area 4 including three mixed use developments (two of which include Assisted/Independent Living Facilities (ALFs/ILFs), a 240,000 square foot commercial development, and a 135-room hotel (see **Table 3-3**).

These developments are clustered around Bird Road and the Village of Merrick Park north of the US 1 Corridor (see **Figure 3-9**).

Figure 3-9 Focus Area 4 Developments

ZOM Senior Living, 250 Merrick renderings. Source: City of Coral Gables Planning website.

Table 3-3 Focus Area 4 Developments

#	Project Name	Location	Public/ Private	Status	Description
9	Gables Living	390 Bird Road	Private	Permitted or under construction	Mixed use with 118 residential units and 8,195 commercial sf.
10	250 Merrick	250 Bird Road	Private	Permitted or under construction	215 residential units.
11	Belmont Village	4111 Salzedo Street	Private	Permitted or under construction	Mixed use with 232 ALF units and 18,157 commercial sf.
12	ZOM Senior Living	363 Granello Avenue	Private	Permitted or under construction	Mixed use senior living with 63 ALF units, 20 memory care, 103 ILF units, 10,000 commercial sf.
13	Jaguar	163 S. Dixie Highway	Private	Permitted or under construction	240,394 sf commercial development.
14	Merrick Park Hotel	4241 Aurora Street	Private	Adopted	135 hotel rooms.

3.3.4 Focus Area 5: SW 37th Avenue/SW 40th Street

Focus Areas 5 and 6 are located within the City of Miami and recent developments were catalogued using *South Florida Crane Watch* from the *South Florida Business Journal.* Eleven developments were identified within the vicinity of the two Focus Areas totaling approximately 3,236 residential units, 110,000 square feet in retail, 310,000 square feet in office, and 2,000 new parking spaces.

Notable development is the transit-oriented development (TOD) *Platform 3750* which is an eight-story mixed use development connected to Metrorail with 191 apartments, retail, office space, and parking spaces and *Link at Douglas* with 1,500 residential units in up to 38 stories and 250,000 square feet of office.

Figure 3-10 Focus Area 5 Developments

Table 3-4 Focus Area 5 Developments

#	Project Name	Location	Public/ Private	Status	Description
15	Coral Gables Office	4225 Ponce de Leon Blvd	Private	Application Submitted	Mixed use with 5,400 sf office, 55,900 sf commercial, 3 residential units.
16	Coconut Grove Gateway	3841 Day Avenue	Private	Rezoning Request	Rezoning request for 1.07 acres to increase density of existing duplexes from 19 units to 39 units.
17	Platform 3750	3750 Dixie Highway	Private	TBC 2022	Mixed use TOD connecting to Metrorail with 191 apartments, 21,000 sf retail, 19,500 sf office, 400 parking spaces.
18	West Grove Multifamily	3095 Plaza Street	Private	Rezoning Request	Rezoning request to increase density from 14 units to 58 units.
19	3650 Bird Road	3650 Bird Road	Private	Not specified	Mixed use project with 615 residential units and ground-floor retail.
20	Shoma Douglas	3650 Bird Road	Private	Not specified	Mixed use 18 story building with 391 apartments, 4,088 sf office for live/work, and 536 parking spaces.
21	Link at Douglas	3060 SW 37th Court	Private	TBC 2024	Mixed use with 1,500 residential units in up to 38 stories, 25,000 retail sf, 250,000 office sf, 750 parking spaces.
22	Shipping Avenue Apartments	3811 Shipping Avenue	Private	Not specified	Residential development with 254 apartments and 824 retail sf in 20 stories.
23	Merrick Towers	3898 Shipping Avenue	Private	Not specified	Mixed use with 268 apartments, 29,600 sf office, 6,342 sf retail, and 288 parking spaces in 20 stories.
24	Self-Storage	3095 SW 39th Avenue	Private	Not specified	82,461 sf of self-storage and 836 retail sf.
25	Gables Auto Vault	3851 Bird Road	Private	Not specified	14 luxury car condominiums and ground floor retail for Tesla.

3.3.5 Focus Area 6: SW 27th Avenue

There were five recent developments identified in Focus Area 6 including two mixed-use developments with over 530 apartments, 340,000 square feet of commercial, a parking garage with 1,250 parking spaces, a new CVS Pharmacy, and a self-storage facility.

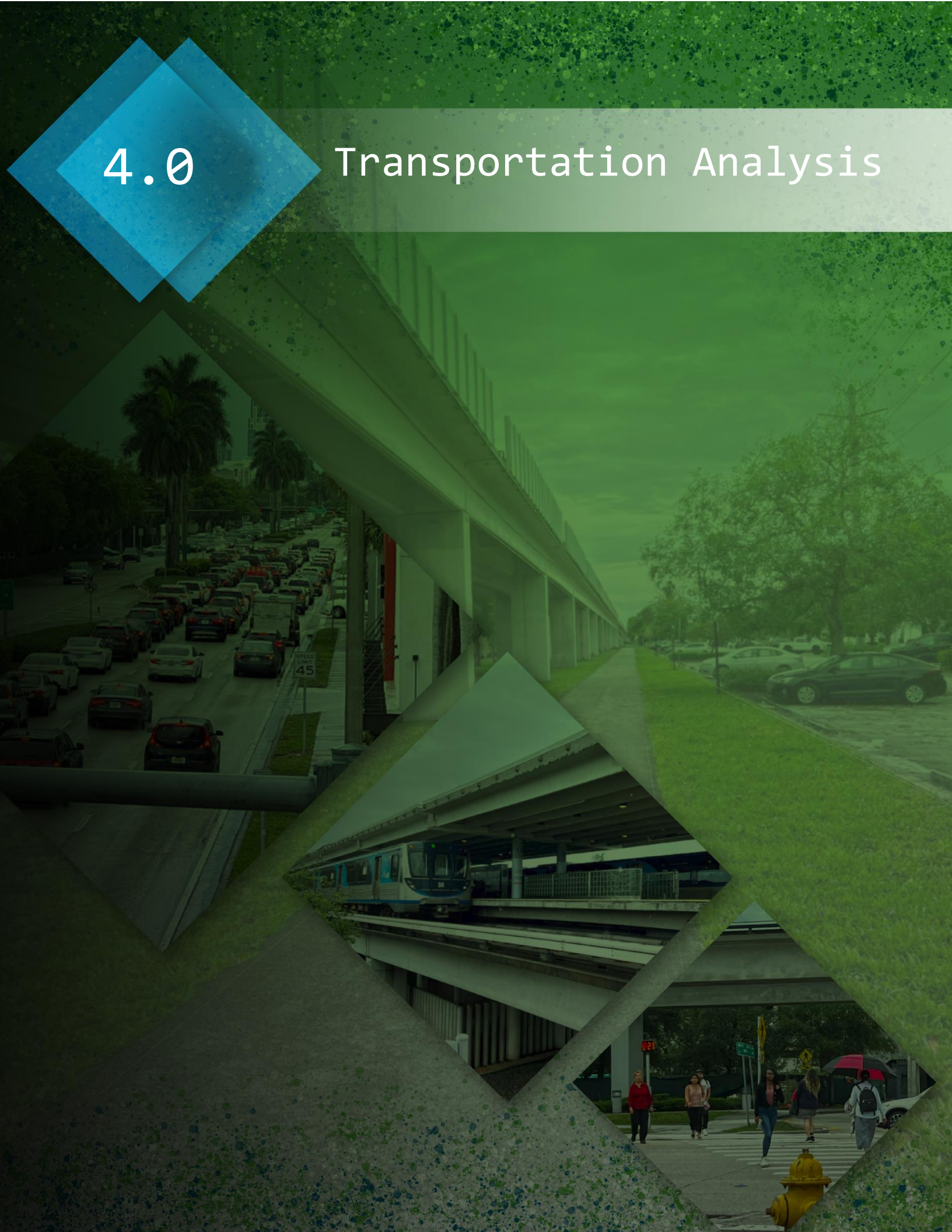
Figure 3-11 Focus Area 6 Developments

Casa Grove and CVS Pharmacy renderings. Source: South Florida Business Journal website.

Table 3-5 Focus Area 6 Developments

#	Project Name	Location	Public/ Private	Status	Description
26	Virginia Street Redevelopment	2890 Virginia Street	Private	Rezoning Request	Rezoning existing apartments from residential to hotel/ commercial.
27	Miami City Self Storage	2600 SW 28th Lane	Private	Not specified	147,000 sf self-storage facility.
28	Grove Central	2789 SW 27th Avenue	Private	TBC 2023	Mixed use with 402 apartments, 170,000 retail sf, and 1,250 space parking garage.
29	CVS Pharmacy	2775 SW 28th Terrace	Private	Not specified	Two-story 13,016 sf retail and pharmacy.
30	Casa Grove	SW 28th Lane	Private	Completed 2019	Mixed use with 130 apartments and 12,000 retail sf.

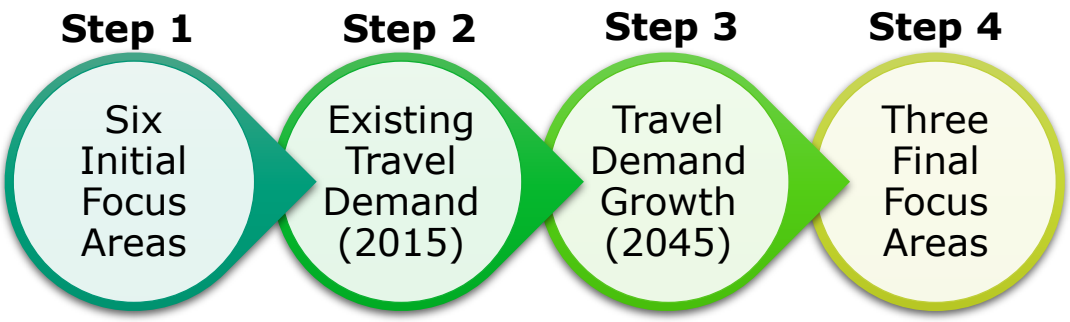
4.0 Transportation Analysis



4.0 Transportation Analysis

4.1 Travel Demand Analysis

Based on existing data and traffic analysis tools, a transportation analysis was performed along the corridor with an additional emphasis on the six study focus areas. This analysis included reviewing existing daily travel demand as well as the 2045 growth using the Southeast Regional Planning Model (SERPM). Based on those results, three of the study focus areas (57th Avenue/SW 72nd Street, Granada Boulevard, and SW 42nd/LeJeune Road) were selected from the six to further develop transportation solutions for those locations. A summary of the travel demand analysis is provided in this section. A technical memorandum detailing the analysis process is provided in **Appendix A**.



4.1.1 Travel Demand Key Findings

SERPM Version 8.513 was used to perform the travel demand analysis. This was the adopted model in early 2022, when the analysis was conducted. The land use growth around the corridor and the historical traffic volumes were utilized in understanding the corridor travel patterns.

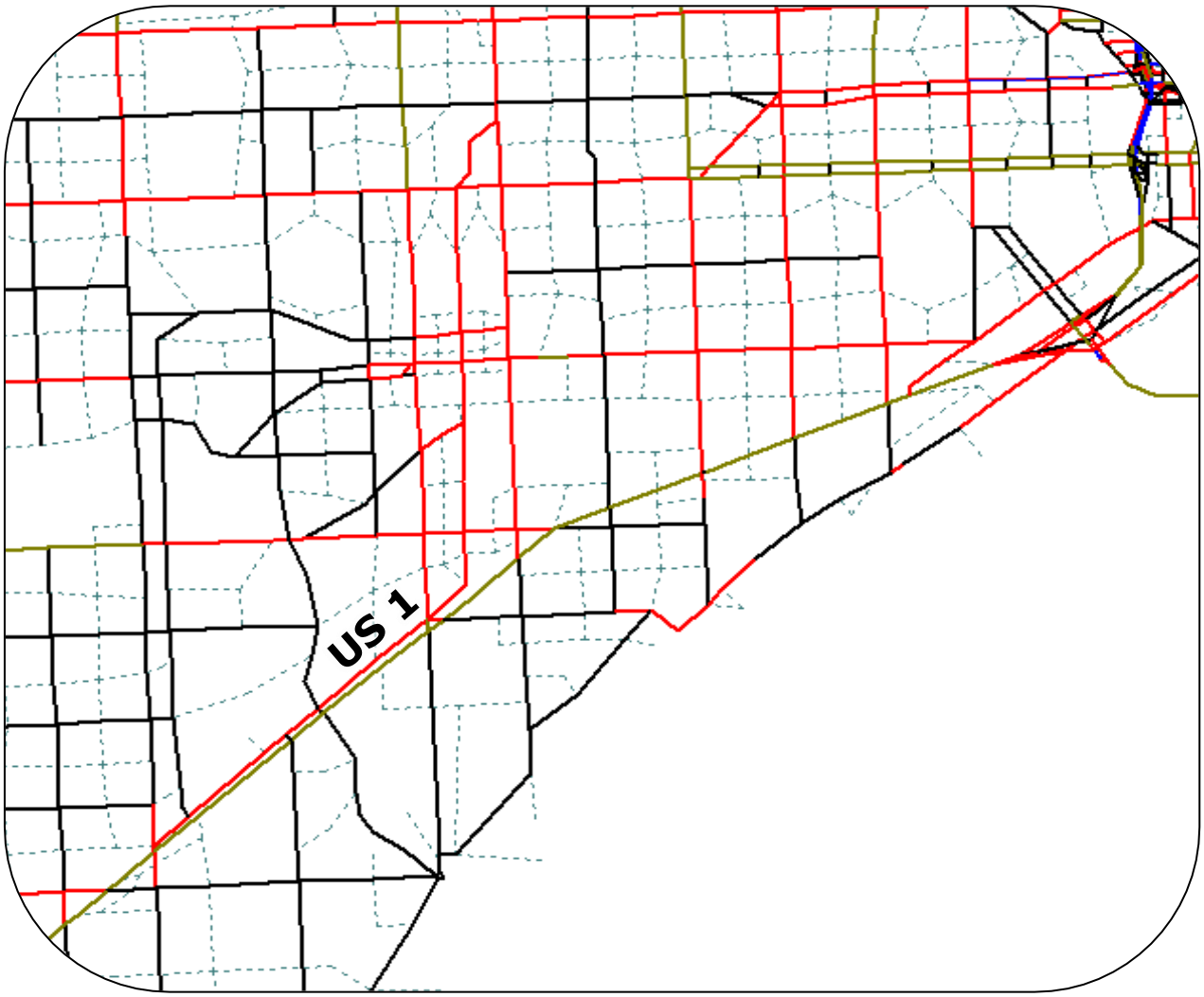
Based on the traffic volumes along the US 1 and Ponce de Leon corridors, the following key observations were made:

- US 1 Segments
  - SERPM overestimated 2015 traffic volume on US 1 by 13%
  - Minimal traffic growth from 2015 to 2019
  - Traffic down 15-25% from 2019 to 2020*
  - Study area segments are over capacity and SERPM has small growth (4%) in overall traffic volume by 2045
  - The volume-to-capacity ratio increases from 1.43 in 2015 to 1.49 in 2045
- Ponce De Leon
  - SERPM significantly overestimated 2015 traffic on Ponce De Leon *(incorrect speed limit coded)*
  - No traffic growth from 2015 to 2019
  - Traffic down 10% from 2019 to 2020*
  - SERPM forecasts 30% growth in traffic volume from 2015 to 2045

- Cross-streets
  - SERPM shows cross streets are currently almost at capacity
  - Minimal growth in traffic from 2015 to 2019
  - Traffic down 10-15% from 2019 to 2020*
  - SERPM forecasts 18% increase in traffic volumes by 2045
  - Volume to capacity will increase from 1.03 in 2015 to 1.23 in 2045

* Note potential COVID impacts on traffic during the 2019-2020 time period.

The growth in travel demand from 2015-2045 in SERPM is due in large part to the growth in population and employment throughout Miami-Dade County. Most of the recent development along the US 1 corridor was factored into the 2045 model's socio-economic data, along with much of the permitted and proposed development. While the corridor has experienced significant dense redevelopment, the growth in traffic has been less because the corridor is already saturated/congested.



Screenshot from SERPM network.

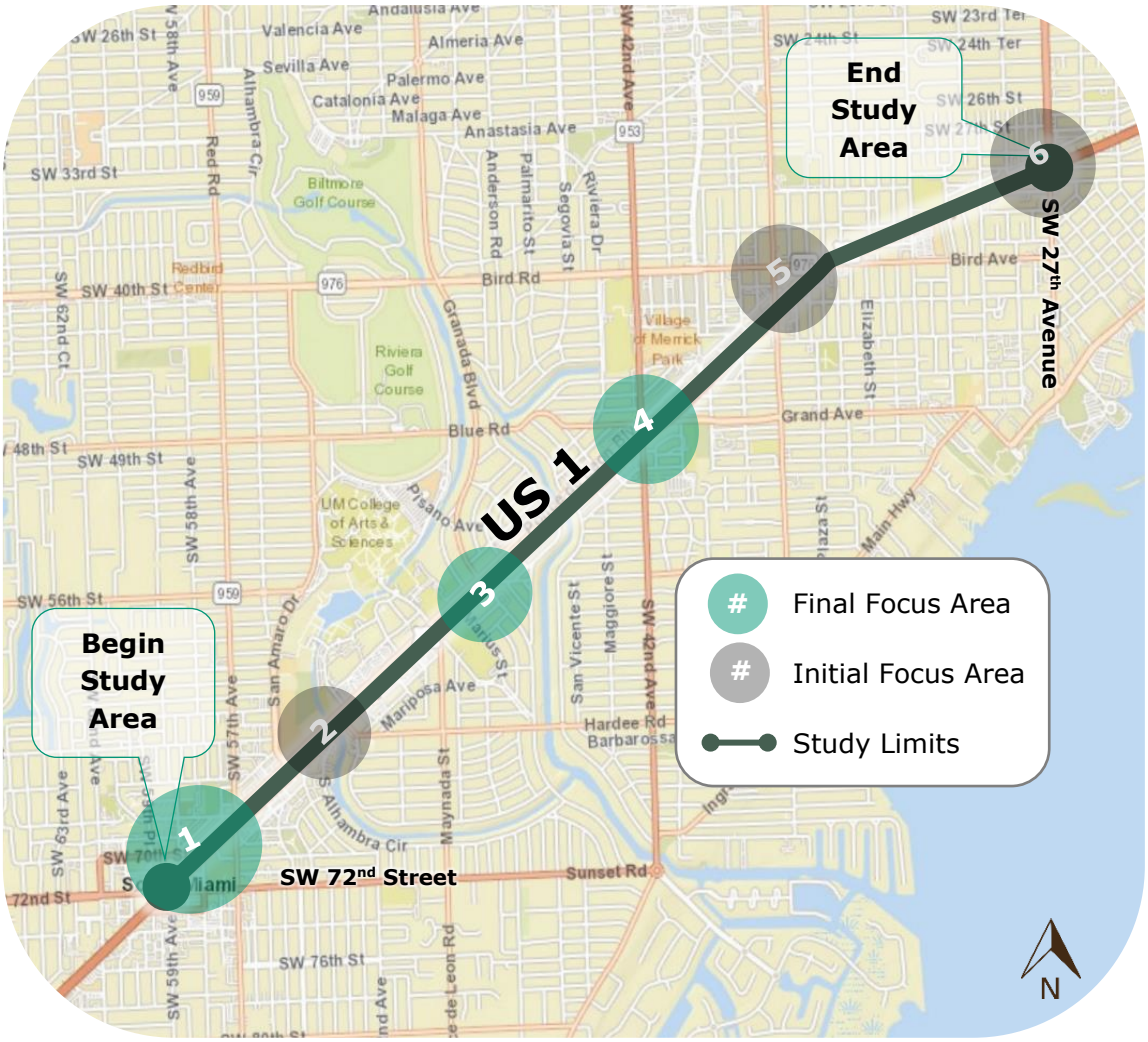
4.1.2 Final Focus Areas

Based on the results of the travel demand analysis, the project team, with concurrence from the PWG, selected three areas to further focus on and develop enhancements for. The three areas have problematic traffic circulation issues, relatively heavy bicycle and pedestrian activity and recent development pressures. Each also offers an opportunity for transformational mobility enhancements that can begin to reshape the US 1 corridor as a gateway boulevard to/from the urban heart of Miami. These corridors are listed below and displayed in **Figure 4-1**:

- **Focus Area 1**: SW 57th Avenue/SW 72nd Street
- **Focus Area 3**: Granada Boulevard
- **Focus Area 4**: SW 42nd Avenue/Le Jeune Road/Grand Avenue

These focus areas were carried over to the next phase of the study, which tested potential transportation solutions (**Section 5.0**). These transportation solutions evolved to the final recommendations for the study (**Section 6.0**).

Figure 4-1 Final Focus Areas



4.2 Traffic Analysis

The study area growth patterns from the travel demand modeling effort were used to develop a traffic model of the study intersections for estimating future 2045 traffic operations conditions and planning for what future transportation users may expect while traveling the area during peak hours if no action is made. The purpose of the traffic analysis is to not only understand the levels of delay and congestion motorists will face in 2045 but the analysis serves as a baseline to develop capacity improvement solutions aimed at reducing pedestrian crossing delay which in turn improves pedestrian signal compliance and safety.

4.2.1 Traffic Operations Assessment

The traffic operations assessment evaluated the performance of alternatives aimed at either improving capacity deficiencies or improving pedestrian operations. The 2045 No-Build scenario was developed using growth rates applied by facility type and based upon the travel demand model findings to best replicate the unique growth patterns of each corridor within the study area. Through this evaluation of operational traffic performances, corridor design alternatives were developed and compared to the existing condition operations. The modeling effort included the twelve study intersections along the US 1 and Ponce de Leon Boulevard corridors.

The weekday AM and PM peak hours were used in this analysis. For the 2045 No-Build scenario there were no geometric improvements included, however, it was assumed that future signal timing adjustments would be completed to account for the ongoing traffic growth. Further details on the traffic operations assessment analyses are referenced throughout the document and are provided in **Appendix B**.

4.2.2 Intersection Operations Summary

The traffic model results for 2021 Existing and 2045 No-Build conditions are provided in **Table 4-1** and **Table 4-2**, respectively. The intersection operations were evaluated using intersection delay, intersection level of service (LOS), and volume-to-capacity (V/C) ratios as performance measures. The deficiently served movements, where V/C is greater than 1, are summarized to provide further clarity of the main causes of congestion at each intersection.

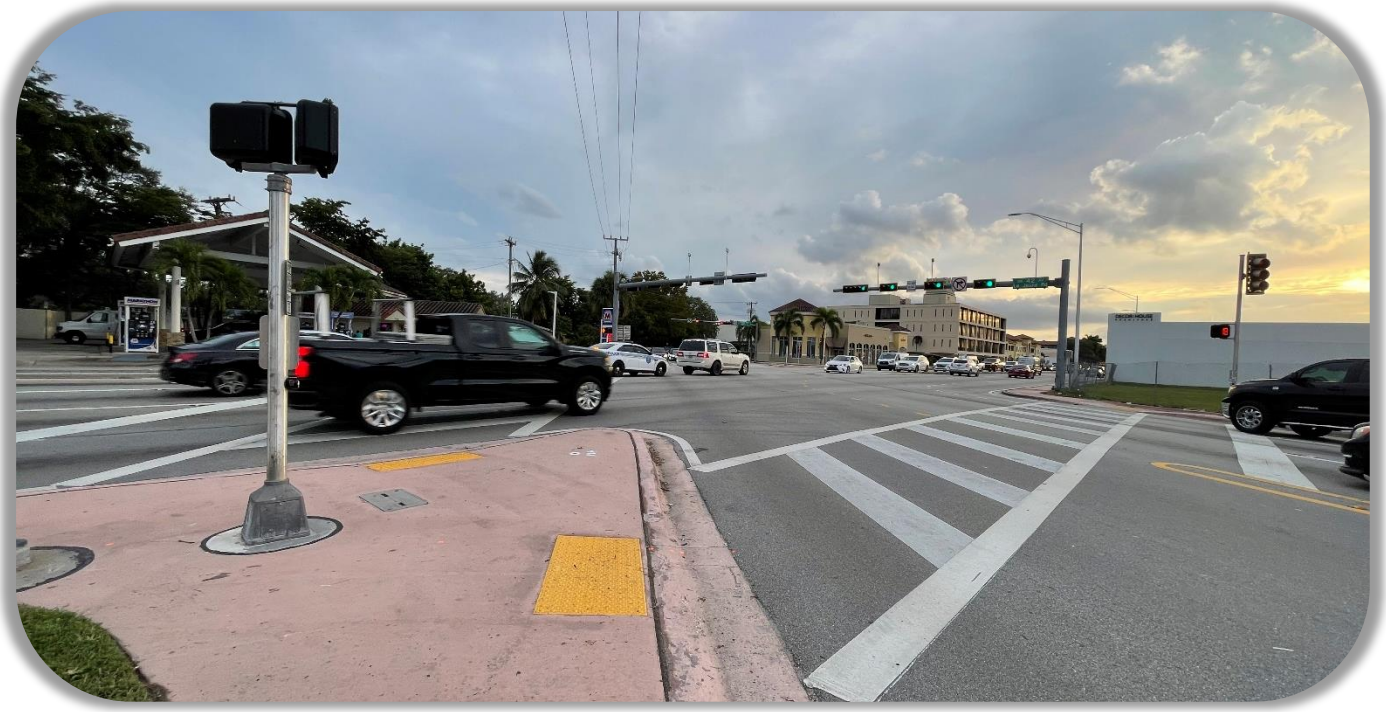
For the 2021 Existing AM and PM peak conditions, the overall intersection LOS for most of the study intersections was LOS D or better, except for the SW 42nd Avenue and SW 57th Avenue intersections along Ponce De Leon Boulevard which operates at LOS E and LOS F.

The future 2045 No-build AM and PM peak conditions are estimated to result in an even greater amount of intersections operating as LOS E and LOS F during the peak periods. The PM peak period is estimated to result in overall worse performance compared to the AM peak period with higher intersection delays occurring between the SW 37th Avenue and SW 27th Avenue intersections. There were several instances where the intersection delay or volume capacity ratios improve between 2022 Existing and 2045 No-Build scenarios. This is due to a combination of increased traffic along the lower delay approaches and the sensitivity of signal timing adjustments in an area with a high density of signalized intersections.

Table 4-1 2021 Existing Intersection Operations Summary

Roadway/ Intersection		AM Peak				PM Peak			
		Delay[1]	LOS	Max V/C	Deficiencies[2]	Delay[1]	LOS	Max V/C	Deficiencies[2]
US 1	SW 72nd St. / Sunset Dr.	27.1	C	0.92	--	23.1	C	0.92	--
	SW 57th Ave. / Red Rd.	44.1	D	0.96	--	47.8	D	0.92	--
	Granada Blvd.	13.0	B	0.83	US-1: SWL	29.2	C	0.91	--
	SW 42nd Ave. / S Le Jeune Rd.	35.8	D	1.62	US 1: SWL SW 42nd Ave: NBT	46.9	D	0.95	--
	Grand Ave.	51.9	D	1.03	US 1: NER	25.2	C	0.98	--
	SW 37th Ave. / Douglas Rd.	27.8	C	1.36	US-1: SWL	45.6	D	1.21	US-1: SWL, NEL Douglas Rd: NBL
	SW 40th St. / Bird Rd.	44.0	D	1.02	Bird Rd.: EBL, EBT SW 40th St: WBL	32.6	C	0.97	--
	SW 27th Ave.	46.8	D	1.49	US-1: WBL SW 27th Ave.: SBL	54.9	D	1.26	US-1: WBT SW 27th Ave: SBL
Ponce de Leon Blvd.	SW 57th Ave. / Red Rd.	13.6	B	0.37	--	140.3	F	1.24	Ponce de Leon: SWR
	Stanford Dr.	11.1	B	0.46	--	19.6	B	0.71	--
	Granada Blvd.	24.9	C	0.81	--	29.9	C	0.90	--
	SW 42nd Ave.	69.6	E	0.85	--	71.4	E	0.87	--

[1]Delay reported as seconds per vehicle. [2]Deficiencies are over-capacity movements where V/C > 1.
***LOS:** Level of Service, V**/C:** Volume-to-Capacity Ratio*



SW 42nd Avenue intersection. Photo Source: Project Team.

Table 4-2 2045 No-Build Intersection Operations Summary

Roadway/ Intersection		AM Peak				PM Peak			
		Delay[1]	LOS	Max V/C	Deficiencies[2]	Delay[1]	LOS	Max V/C	Deficiencies[2]
US 1	SW 72nd St. / Sunset Dr	34.9	C	0.98	--	24.5	C	0.97	--
	SW 57th Ave. / Red Rd.	43.3	C	1.00	US-1: NET	39.6	D	0.96	--
	Granada Blvd.	24.0	C	1.10	US-1: SWL	28.3	C	1.15	US-1: SWL
	SW 42nd Ave. / S Le Jeune Rd.	48.4	D	1.14	US-1: NEL SW 42nd Ave.: NBT	44.6	D	0.99	--
	Grand Ave.	40.3	D	1.09	Grand Ave.: EBTR US 1: NET	15.5	B	0.92	--
	SW 37th Ave. / Douglas Rd.	52.2	D	1.41	US 1: SWL, SWT	76.6	E	1.19	US 1: SWL, SWT, NEL Douglas Rd: NBL, NBT
	SW 40th St. / Bird Rd.	50.1	D	1.10	Bird Rd.: EBL, EBT SW 40th St.: WBL US 1: SWT	28.1	C	1.01	Bird Rd.: EBT SW 40th St.: WBL US-1: SWT
	SW 27th Ave.	81.2	F	1.13	US 1: EBT, WBT SW 27th Ave.: SBL	97.2	F	1.20	US 1: EBT, WBT SW 27th Ave.: NBT
Ponce de Leon Blvd.	SW 57th Ave. / Red Rd.	11.3	B	0.39	--	108.7	F	1.17	Ponce de Leon: SWL
	Stanford Dr.	10.1	B	0.63	--	24.6	C	0.94	--
	Granada Blvd.	16.6	B	0.83	--	62.0	E	1.03	Ponce de Leon: SWT
	SW 42nd Ave.	32.9	C	0.78	--	68.1	E	0.96	--

[1]Delay reported as seconds per vehicle. [2]Deficiencies are over-capacity movements where V/C > 1.
***LOS:** Level of Service, V**/C:** Volume-to-Capacity Ratio*

Grand Avenue intersection. Photo Source: Project Team.

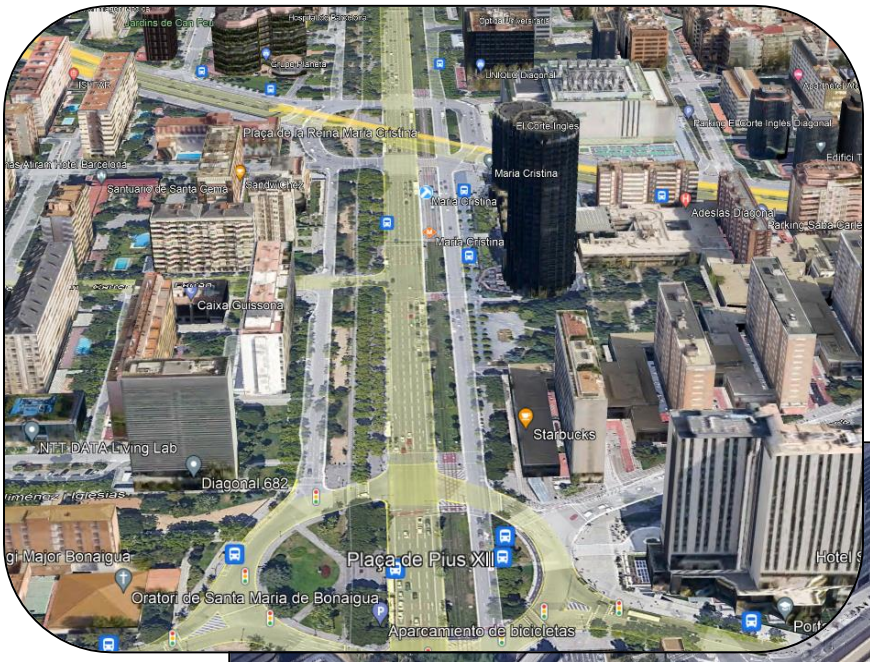
5.0 Transportation Solutions

5.0 Transportation Solutions

Throughout the study process, potential transportation solutions were conceptualized and tested for viability. Some of the concepts developed for the US 1 corridor include multi-way boulevards, pedestrian walkover bridges, and roundabouts. These potential transportation solutions were modeled based on systems that have proven effective in European cities, such as Barcelona (see **Figure 5-1)**.

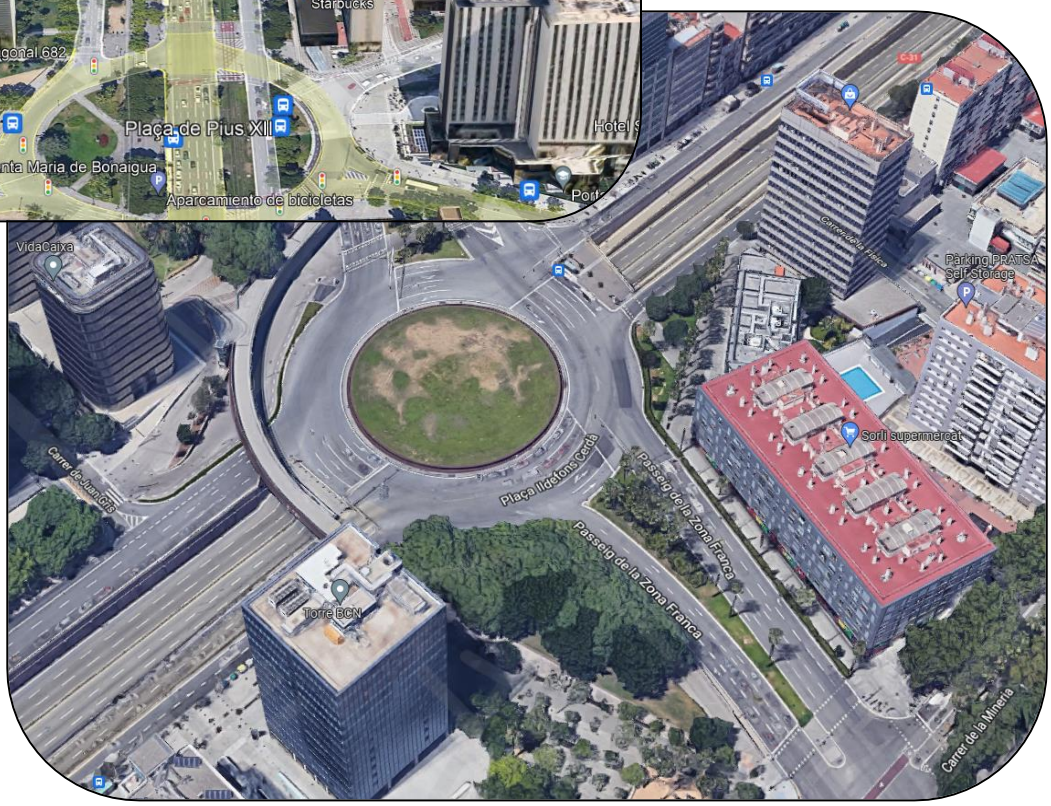
The solutions tested throughout the study are documented in this section. The solutions that demonstrated the opportunity to be a viable improvement to the corridor are included in the recommendations section of this report (**Section 6.0**).

Figure 5-1 Barcelona Inspiration



Multiway Boulevard in Barcelona (left).

Roundabout in Barcelona (below).



5.1 Multi-Way Boulevards

What is a multi-way boulevard? The term "boulevard" is broadly used to describe a street or promenade planted with trees, but it is also a highly valuable piece of roadway that can accommodate multiple users and types of movement. The multi-way boulevard has three essential elements including central through lanes, parallel frontage lanes (coupled with inviting pedestrian space), and landscaped tree lawns (used to buffer traffic). Central through lanes accommodate vehicular capacity while frontage lanes create a clam, multi-use environmental that lends itself to urban commercial and mixed-use development opportunities. Boulevards are especially appropriate where there is a need to carry both slow, local traffic and fast, through-moving traffic.

There are six contexts for boulevards in the U.S.

1. Major and existing inner-city streets.
2. Existing strip development streets or suburban commercial arterials
3. Existing expressways and freeways, especially those that cut thru the city
4. Existing suburban residential arterials that are already wide and planted with medians.
5. Major traffic streets in new urban or suburban developments.
6. Existing boulevards of the late 19th and early 20th century that have fallen into disrepair

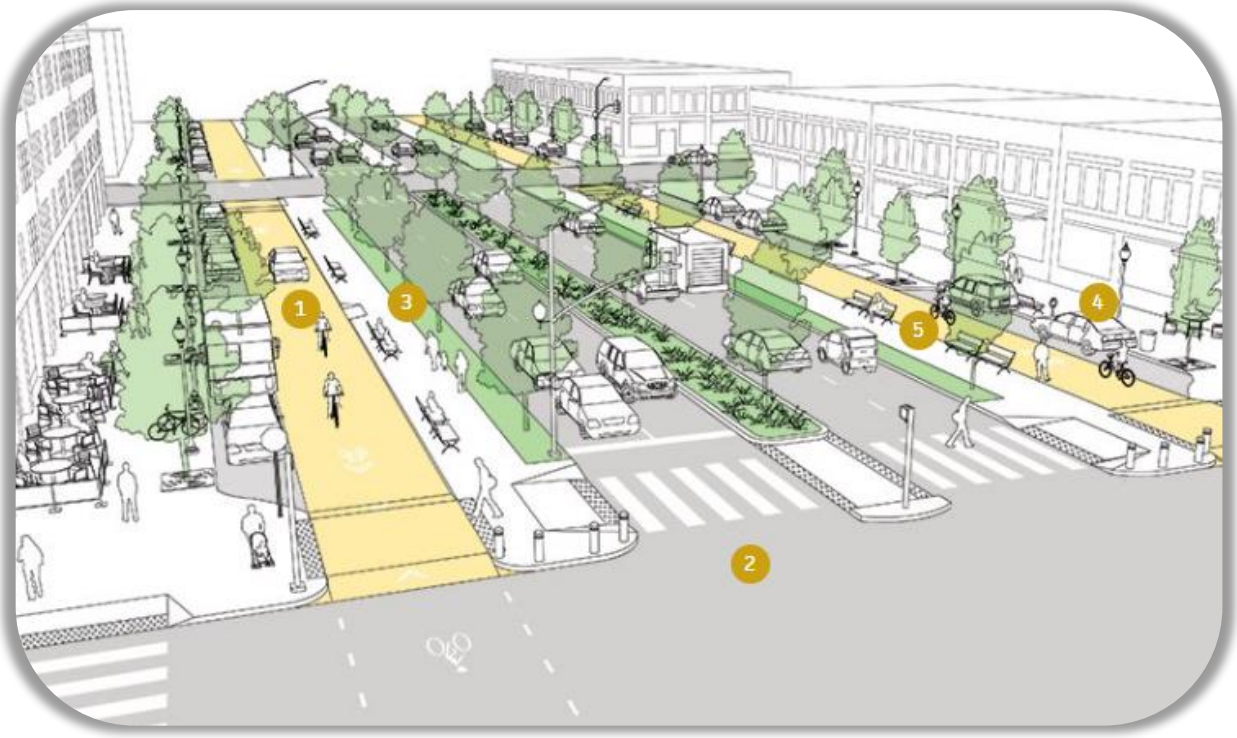
Advantages

- Aesthetically pleasing ✓
- Can assist in building character (sense of place) ✓
- Accommodates on-street parking without interfering with through traffic ✓
- Opportunity for built environment to interact with street ✓
- Good for high traffic volumes ✓
- Functional and safe for pedestrians ✓
- Slower "access" lanes can be used for slower traffic, pedestrians, bicyclists, and transit ✓
- Social and aesthetic appeal ✓

Disadvantages

- Higher cost ✗
- Potential need for right-of-way ✗
- Must carefully consider turning conflicts and intersection crossings (well marked intersections needed) ✗

Figure 5-2 Multi-Way Boulevard Examples



Multi-way Boulevard renderings for Octavia Boulevard in San Francisco CA.

Source: [Boulevard | National Association of City Transportation Officials (nacto.org)]

5.2 Pedestrian Overpasses

Pedestrian overpasses are structures built over high-traffic roads to encourage safe pedestrian access without stopping traffic and limiting the number of pedestrians crossing major roadways. However, due to their history of being long and difficult to maneuver, pedestrian bridges are often underused due to inconvenience. Some argue that the implementation of pedestrian bridges promotes a "car-centric" attitude by further discouraging foot traffic.

Advantages

- Access to views ✓
- Safe crossing over high traffic roadways ✓
- Access available to frequently flooded areas ✓
- Potential for direct connection with vertical development ✓
- Potential to provide interconnected network of bridges ✓

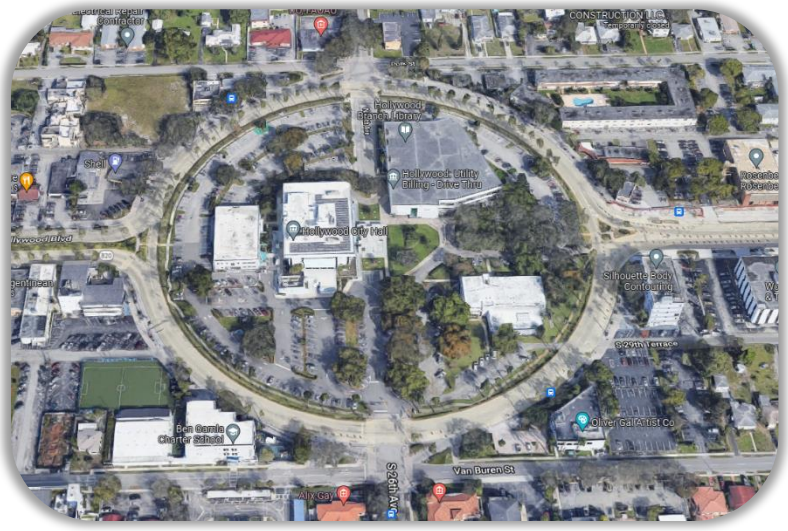
Disadvantages

- Often underused ✗
- ADA compliance needs a gently sloping ramp or elevators ✗
- Increased cost if the bridge requires long ramps for accessibility ✗
- Potential for crime ✗
- Prioritizes vehicular travel ✗

Existing pedestrian walkover bridge near UM. Photo source: Project Team.

5.3 Triple Traffic Circle

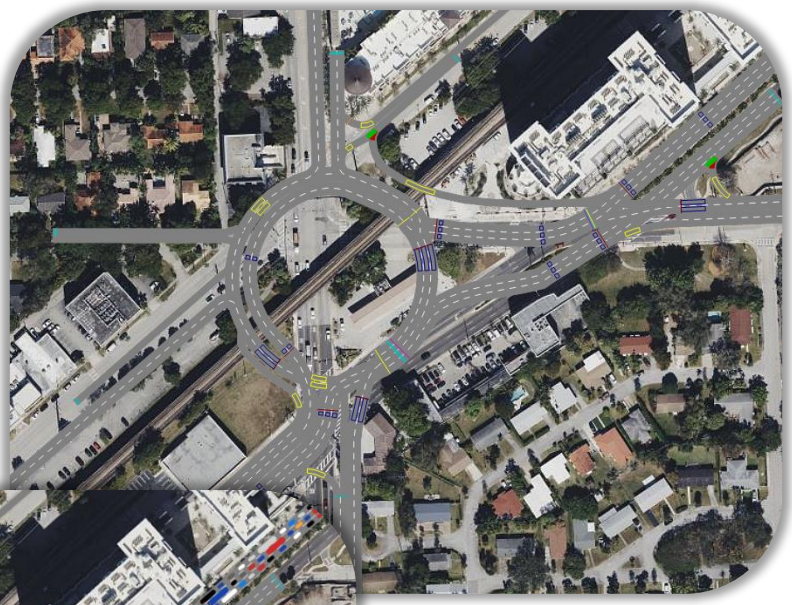
A large-scale triple traffic circle was conceptualized for the US 1/Lejeune/42nd/Grand Avenue focus area that brought three intersections together in a large circle. The resulting traffic circle would be similar to the SR 820/Hollywood Boulevard traffic circle (pictured right). This concept would require the acquisition of the existing gas station in the middle of the triangle of the three intersections.



SR 820/Hollywood Boulevard traffic circle.

However, several iterations of this triple traffic circle were evaluated through VISSIM, all of which resulted in heavy traffic at the southern US 1 leg with major congestion and cross-movements.

Therefore, this concept was not carried forward in the recommendations for this intersection.

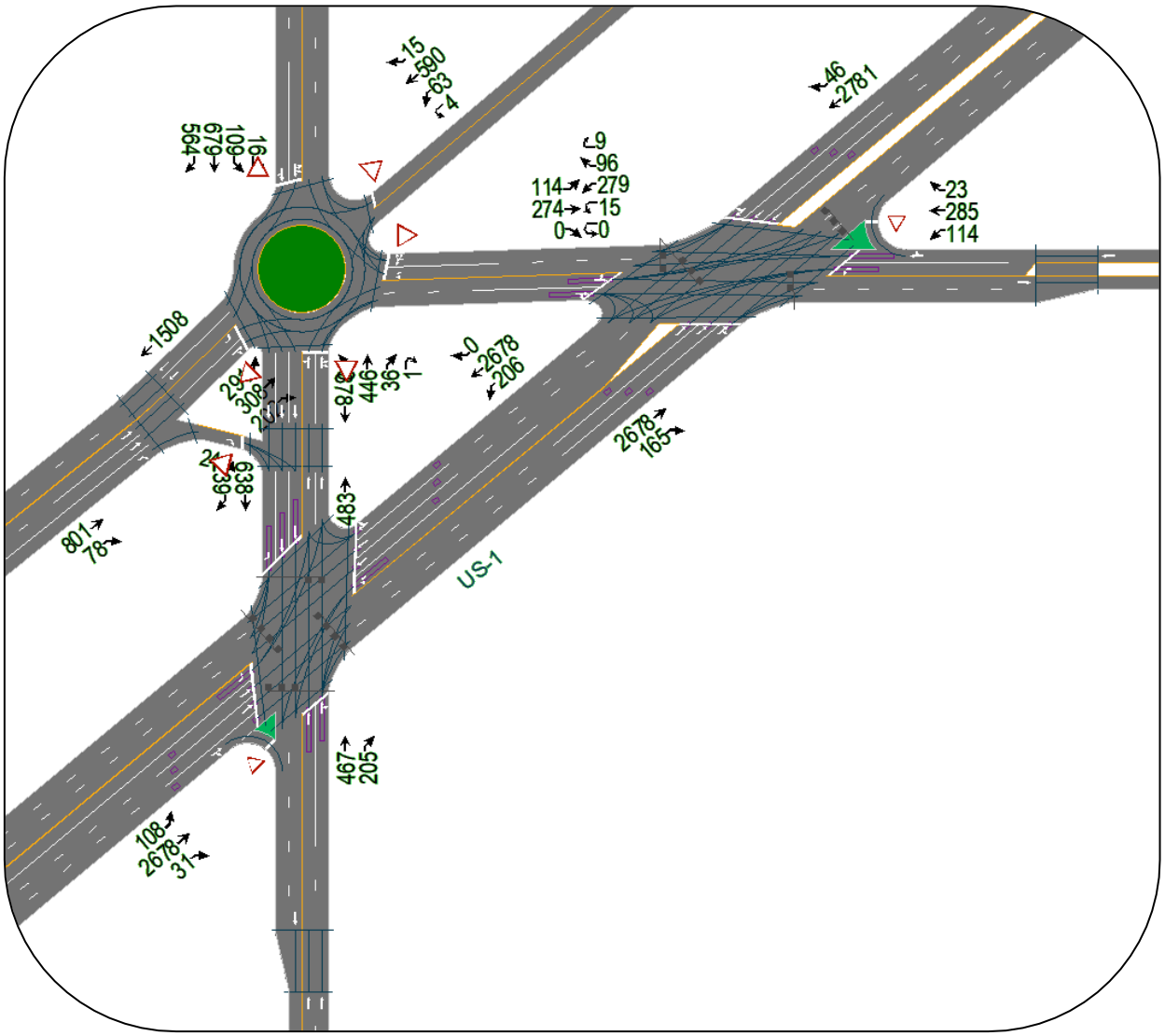


Triple traffic circle concept (above).

Triple traffic circle modeling results (left).

5.3.1 Roundabout Alternative

Due to the results of the modeling results of the triple traffic circle, a roundabout alternative was developed and evaluated through Synchro and SimTraffic. This roundabout focused on the northwestern corner of the intersections versus all three intersections.



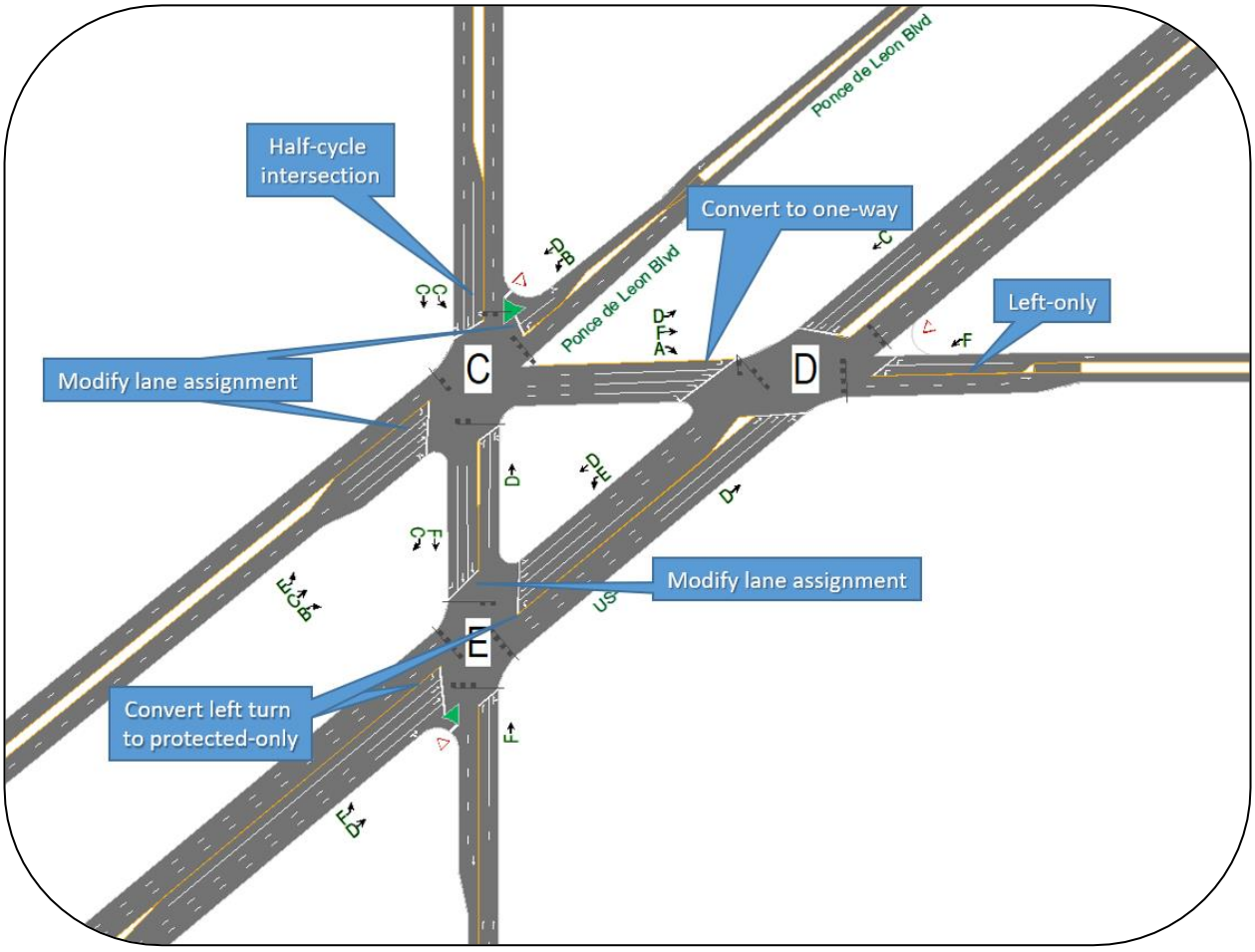
Existing with roundabout PM Synchro snapshot.

5.3.2 Potential Circulation Changes

Due to the underperformance of the triple traffic circle at the traffic modeling stage, other options were developed that have the potential to alleviate some congestion issues at this key convergence along the study corridor (see **Figure 5-3**). These potential changes resulted in improving the vehicular LOS for all three intersections, however, circulation options are reduced. Some of these changes include converting Grand Avenue between US 1 and 42nd Avenue/Lejeune to one-way, modifying various lane assignments, and a half-cycle intersection treatment. A half-cycled intersection runs a cycle length that is half of what the adjacent signalized corridor runs. Half-cycled intersections run through all the intersection movements twice for a duration equal to a single cycle for overall system.

These changes also would not materially improve bicycle and pedestrian circulation and as such, are not being recommended.

Figure 5-3 Potential Circulation Changes

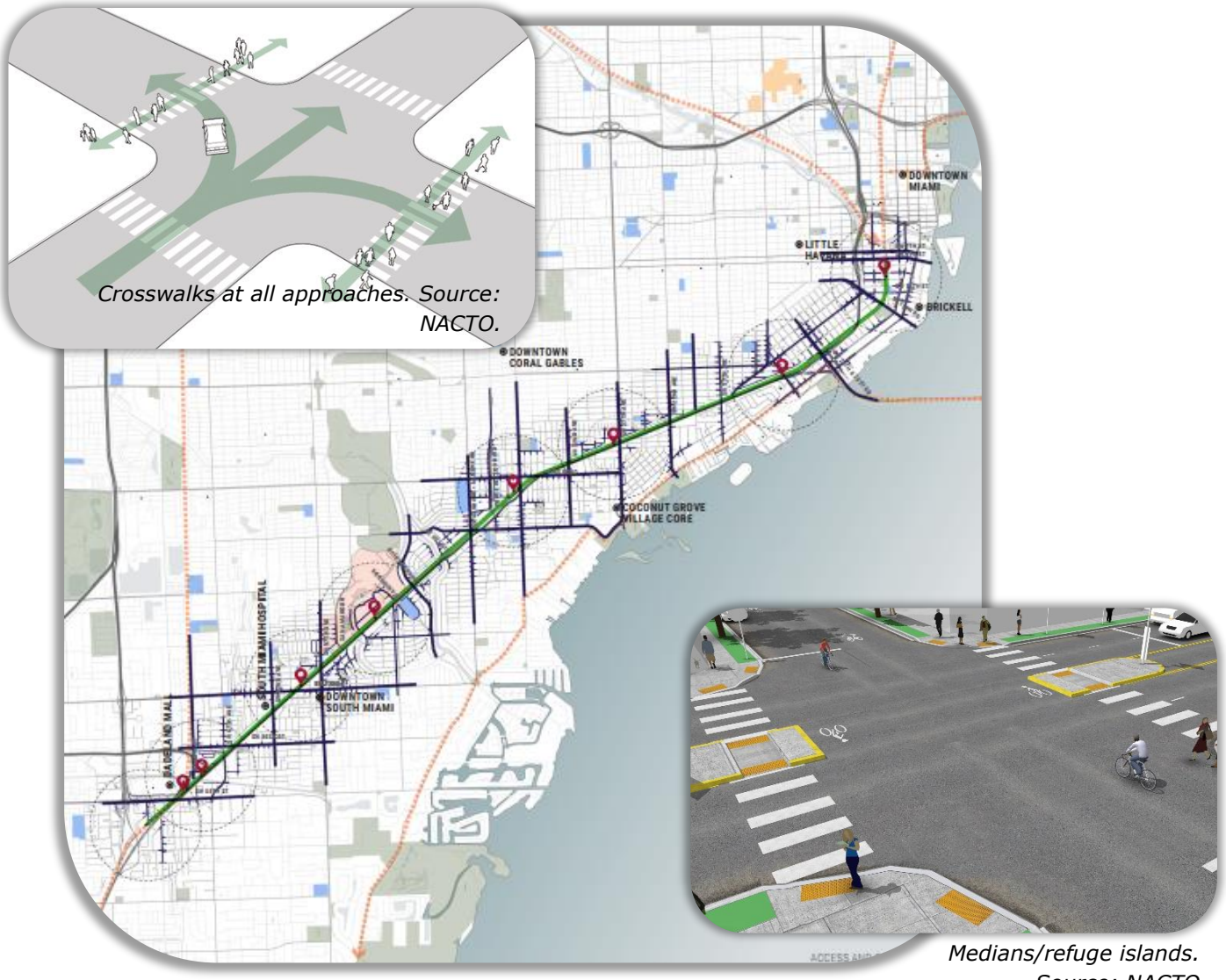


5.4 Other Potential Solutions

The following other potential solutions were also discussed throughout the study process, as a way to enhance bicycle and pedestrian circulation:

- Implement crosswalks for all approaches at every intersection
- Construct continual sidewalks along southbound US 1
- Install Leading Pedestrian Interval phasing at signals
- Extend medians, where possible, to provide pedestrian refuges
- Develop unifying aesthetic theme / design for US 1 and Ponce de Leon
- Focus on The Underline as corridor spine and implement bike/ped enhancements emanating from it
- Construct elevated bike paths / crossings at key locations

Figure 5-4 Other Potential Solution Examples



Crosswalks at all approaches. Source: NACTO.

Underline connections.

Medians/refuge islands. Source: NACTO

6.0 Recommendations

6.0 Final Recommendations

In collaboration with TPO Project Manager and the PWG, short-term and long-term recommendations were developed for the final three focus areas. As this is a planning-level study, many of these recommendations require a more detailed analysis to confirm construction feasibility. Coordination with FDOT including additional study and analysis is necessary to move many of these recommendations forward from the planning stage.

6.1 US 1/SW 57th Avenue Intersection

6.1.1 Short-Term Recommendations

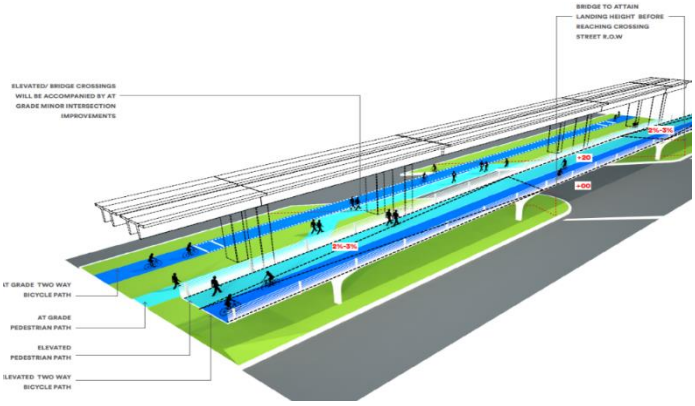
The short-term recommendations displayed in **Figure 6-1** include extending the curb lines and create bulb-outs at the intersections to shorten the pedestrian crossing distance, adding high-emphasis crosswalks, adding pavement to the medians to create pedestrian refuges, staggering the stop bars for vehicles, eliminate right-turn slip lanes, and implement the Underline.

Figure 6-1 SW 57th Avenue Intersection Short-Term Recommendations

6.1.2 Long-Term Recommendations

The long-term recommendations for the SW 57th Avenue intersection displayed in **Figure 6-2** include an elevated bike path consistent with the *Friends of the Underline* concept. This includes pedestrian walkovers across US 1 and 57th Avenue.

Figure 6-2 SW 57th Avenue Intersection Long-Term Recommendations



6.2 US 1/Granada Boulevard

6.2.1 Short-Term Recommendations

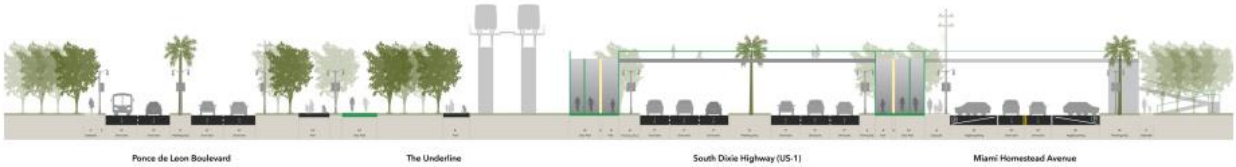
Similar to the SW 57th Avenue focus area, the short-term recommendations include tightening the intersections with pavement such as extending the curb lines, creating bulb outs, and eliminating the right-turn slip lanes to shorten the pedestrian crossing distance, adding and enhancing crosswalks, adding pavement to medians to create pedestrian refuges, implementing The Underline, and creating a unified aesthetic and landscape theme across Ponce de Leon, The Underline, US 1, and Miami Homestead Avenue inspired by the multi-way boulevard concept (see **Figure 6-3**).

Figure 6-3 Granada Boulevard Intersection Short-Term Recommendations

6.2.2 Long-Term Recommendations

The long-term recommendations for the Granada Boulevard Focus Area include an elevated bike path featuring a circular elevated path across US 1 to The Underline (see **Figure 6-4**). The multi-way boulevard concept featuring a unified aesthetic and landscape theme would also be carried through Granada Boulevard.

Figure 6-4 Granada Long-Term Recommendations

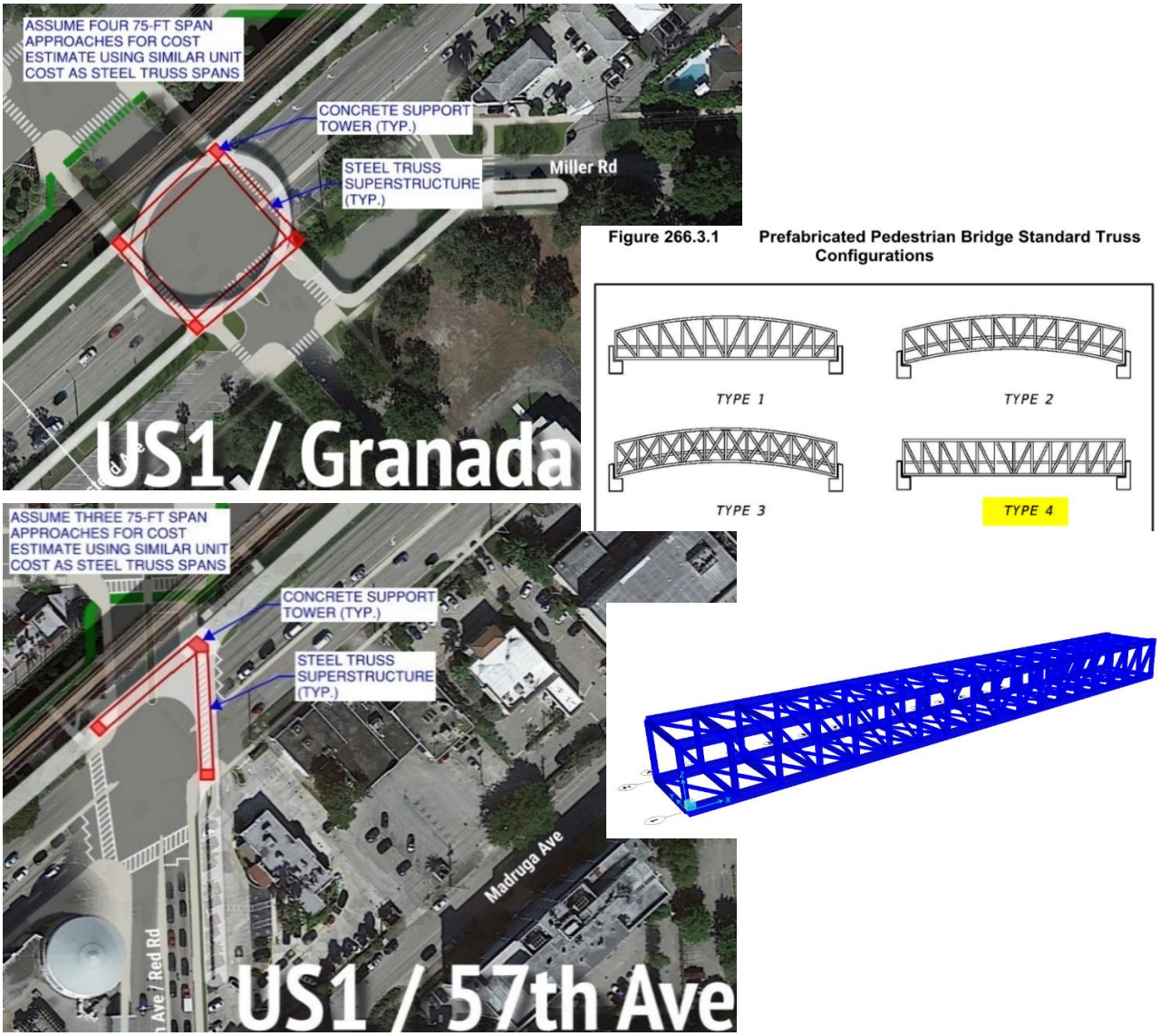


Preliminary Structures Analysis

A preliminary structures analysis was conducted for the pedestrian walkovers across US 1/ SW 57th Avenue and US 1/Granada Boulevard intersections (see **Figure 6-5**) using historical averages for prefabricated steel truss pedestrian bridges. The cost for US 1/SW 57th Avenue was estimated to be **$7.7 million,** and the US 1/Granada Boulevard intersection was estimated to be **$13.2 million**. Six-month statewide averages and adjustments for market volatility and inflation were assumed (15% increase total). Aesthetics were calculated as 10% of the structures cost.

The cost estimates did not include the following: cost of walls, drainage items, approach slabs, maintenance of traffic, mobilization, project contingencies, owner's soft costs (such as right-of-way, financing, administrative), temporary fencing or other security measures during construction, unforeseen conditions (unstable soil conditions, etc.), and costs related to construction delays or claims. Further details regarding these cost estimates are provided in ***Appendix C****.*

Figure 6-5 Pedestrian Walkovers



6.3 US 1/LeJeune Road/SW 42nd Avenue/Grand Avenue

6.3.1 Short-Term Recommendations

Consistent with the SW 57th Avenue and Granada Boulevard intersection recommendations, the short-term recommendations for the LeJeune Road/SW 42nd Avenue/Grand Avenue intersections include adding and enhancing crosswalks, adding pavement to the medians to create pedestrian refuges, and tightening the intersections with extra pavement to decrease the pedestrian crossing distance (see **Figure 6-6**).

Figure 6-6 LeJeune Road Intersection Short-Term Recommendations

6.3.2 Long-Term Recommendations

Since the original concept of the triple traffic circle did not result as a viable solution for this location, a modified, smaller intersection concept was developed (see **Figure 6-7**) and then evaluated using Synchro. The intersection concept was shifted east to avoid the Metrorail pillars and includes the intersections of Ponce de Leon Boulevard and SW 42nd Avenue/LeJeune Road. There are still traffic concerns when the US 1/SW 42nd Avenue signal backs up, but this improves safety for all users at this unique intersection.

Figure 6-7 LeJeune Road Intersection Long-Term Recommendations

6.4 Other Potential Operational Modifications

Additional operational modifications were developed for the corridor study area. These modifications are displayed in **Table 6-1** below.

Table 6-1 Potential Operational Modifications

Intersection	Re-orient ped crossings at right angles	Widen curbs & curb extensions	Elimination of right-turn slips	Prohibit Right-Turn on Red	Lead Pedestrian Intervals	Lane Modification Notes	Pavement Marking Notes	Vehicle Capacity Constraints
US 1 & SW 72nd Street/ Sunset Drive	-	-	-	NBR due to distance from movement and downstream crosswalk.	Sunset Dr WB	Prohibit US 1 NE left turn or consider protected only due to approach angle.	Add pedestrian crossing pavement markings for the crossing along the Sunset Dr EB approach.	**AM and PM Peak** - Heavy Sunset Dr east-west volume, LOS F and E.
US 1 & SW 57th Avenue/Red Road	Re-orient US 1 crossing on west and east sides of intersection.	Curb extension at the SW 57th NBR movement. Close private development entrance.	- NE and SW right turn slips accommodate the minimum turning radii due to intersection skew.		Capacity Constrained - LPIs on all approaches would increase overall intersection delay by 30% during the AM peak due to level of saturation			**AM and PM Peak** - SW 57th Ave North and South approaches LOS F. - US 1 left turns LOS due to insufficient green time.
US 1 & Granada Boulevard				Can be used along with LPIs to ensure pedestrian protection.	Capacity Constrained - LPIs on all approaches would increase overall intersection delay by 36% during the PM peak due to level of saturation			**AM and PM Peak** - Granada Blvd north and south approaches LOS F and E. - US 1 southwest Left turn LOS F during PM peak.
US 1 & SW 42nd Avenue/S Le Jeune Road	Re-orient US 1 crossing on east side of int.; Re-orient Le Jeune Rd. crossing on north side.		US 1 NE right turn slip could be removed and restrict right turns.			Prohibit US 1 NE right turn.		**AM and PM Peak** - Le Jeune Rd approaches LOS F - US 1 EBL LOS F
US 1 & Grand Avenue	Re-orient Grand Ave and US 1 crossings							

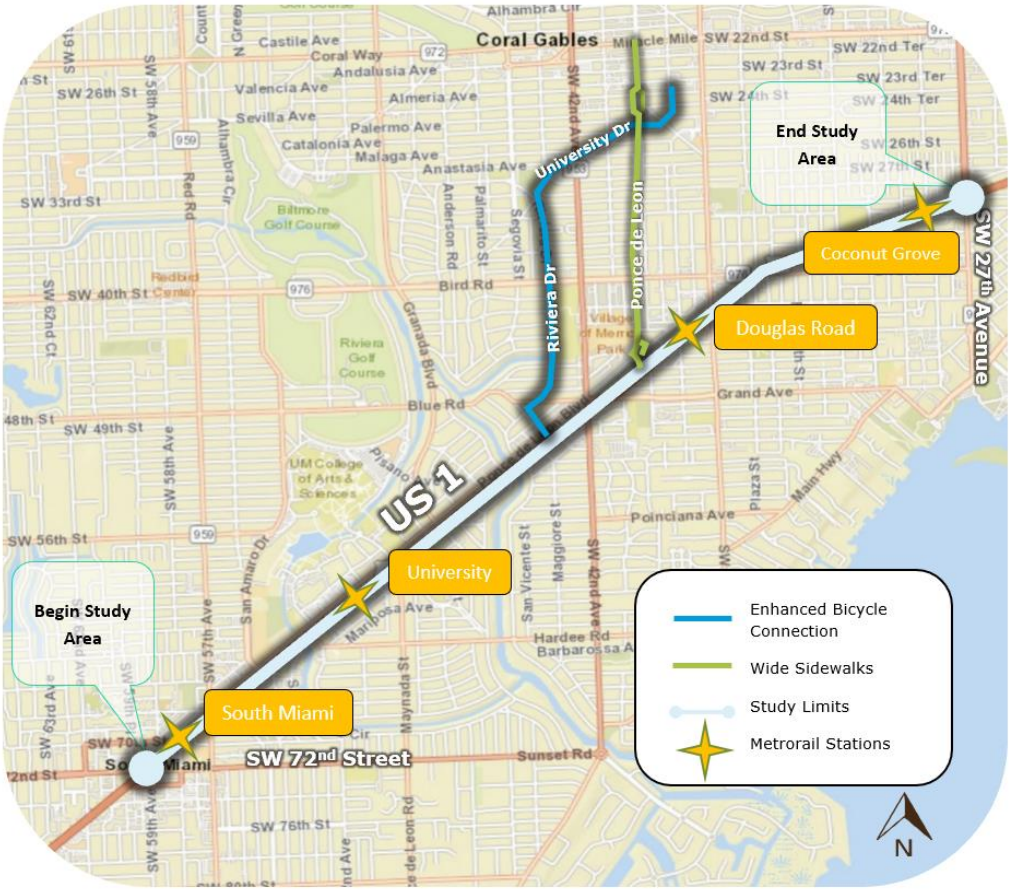
Intersection	Re-orient ped crossings at right angles	Harden curbs & curb extensions	Elimination of right-turn slips	Prohibit Right-Turn on Red	Lead Pedestrian Intervals	Lane Modification Notes	Pavement Marking Notes	Vehicle Capacity Constraints
US 1 & SW 37th Avenue/ Douglas Road	Re-orient US 1 western crossing	Curb extension for the NBR movement.		Prohibit Douglas Rd NBR/SBR on red due to distance from crossing and intersection skew.		Prohibit US 1 NE right turn - low volume.		
US 1 & Bird Road/SR-976	Straighten the SW 27th Ave northern crossing.				LPIs for the Bird Rd crossings.			
US 1 & SW 27th Avenue					LPIs for the SW 27th Ave crossings			
Ponce de Leon & SW 57th Avenue/Red Road								
Ponce de Leon & Stanford Drive					Lower saturation, good candidate for LPIs		Provide pavement markings for the northern Stanford Dr crossing.	
Ponce de Leon & Granada Boulevard					Lower saturation, good candidate for LPIs			

Abbreviations: East-Bound Left (EBL), Lead Pedestrian Interval (LPI), Northbound Right (NBR)

6.5 Coral Gables Bicycle Connection

In addition to the transportation solutions evaluated in this study, it was determined that a more robust bicycle connection from the Metrorail stations and the Underline to downtown Coral Gables was needed. As shown on **Figure 6-8**, two options have been identified in this study.

Figure 6-8 Coral Gables Bicycle Connection



The blue route shown starts at the Underline and follows Suarez Street, Riviera Drive, and University Drive. Designated bicycle lanes and/or slow-speed neighborhood greenways are envisioned the for this route. It is important to note that, while a residential area, many of the homes do not front on Riviera Drive. As such, the bicycle lanes would generally be along the sides of residential lots. The enhanced bicycle connection also provides access to Coral Gables High School, the library, and the youth center. East of Ponce de Leon, the route connects into the downtown core using the recently rebuilt Malaga Avenue and Galiano Street.

An alternative to this route, which more directly connects downtown Coral Gables with the Underline and the Douglas Road Metrorail station, uses Ponce de Leon. Sidewalks on both sides of the corridor are a minimum of 10 feet wide. This expanse provides space for bicyclists to share the sidewalk with pedestrians. Designating a portion of the sidewalk for bicyclists should be considered. The first example shown on **Figure 6-9** depicts a two-way facility in Valencia, Spain, but a one-way designation, similar to the one recently constructed on SW 152nd Street, would be more appropriate for Ponce de Leon in Coral Gables.

In addition to the enhanced bicycle connection between the Underline and downtown Coral Gables, the study recommends providing increased multi-modal options at the Coconut grove, Douglas Road, University, and South Miami Metrorail Stations. This can be accomplished in part through the Miami-Dade TPO's SMART Demonstration Program, as well as micromobility.

Figure 6-9 Examples of Designated Bicycle Facilities on Sidewalks

Photo source: Project Team.

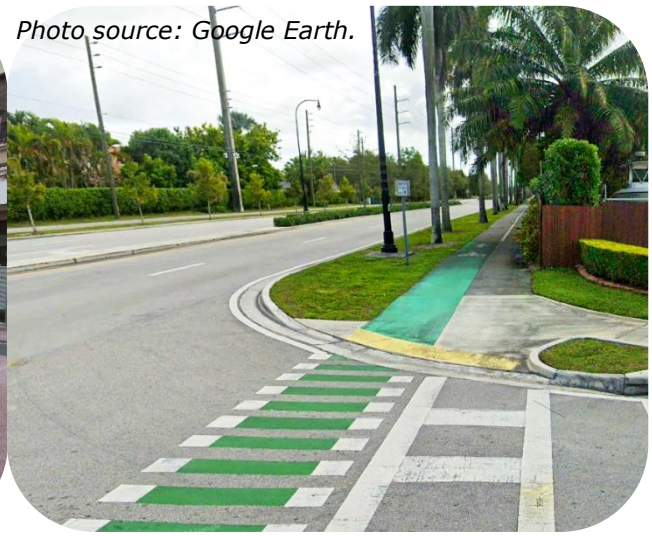


Photo source: Google Earth.

6.6 Next Steps

The overarching goal of this study was to identify opportunities to enhance the crossing of the US 1 corridor for bicyclists and pedestrians as well as vehicles. During the effort, a larger vision of transforming US 1 into a boulevard developed. Similar to many of the grand boulevards around the world, US 1 connects Miami's urban core with dense mixed-use suburbs. One city to consider as a model for the US 1 vision is Barcelona. The Avinguda Diagonal corridor integrates multiple modes seamlessly and includes a central six-lane roadway, paralleling streets that provide on-street parking and property access, a streetcar/light rail line, and a wide pedestrian promenade. Avenida 9 de Julio in Buenos Aires is another example of a major thoroughfare that also serves to connect the city's urban fabric.

The US 1 corridor through Coral Gables includes many similar features as these examples: the Metrorail line, the Underline, and a parallel access street (Ponce de Leon). Land uses and development along the corridor have been rapidly evolving, which further incentivizes the evolution of the corridor into a more urban pedestrian-supportive environment. The recommendations in this report are consistent with this vision, but serve as just the beginning of the transformation process.

Additional and more detailed analyses need to be conducted, including signal warrant and timing studies, as well as geometric and engineering examinations. Furthermore, obtaining broad community support, along with collaboration from local municipalities and transportation agencies, is crucial. Some of the smaller enhancements identified in this study can be incorporated with resurfacing projects and other operational modifications when a collective consensus between the cities, the county, and FDOT for a grander treatment of the US 1 corridor is reached. All investments should be made with the larger vision in mind.