



Miami-Dade Transportation
Planning Organization

DOWNTOWN MIAMI TRANSPORTATION MASTER PLAN

Technical Memo #3

Evaluating Bicycle and Pedestrian Network Connectivity



THE CORRADINO GROUP

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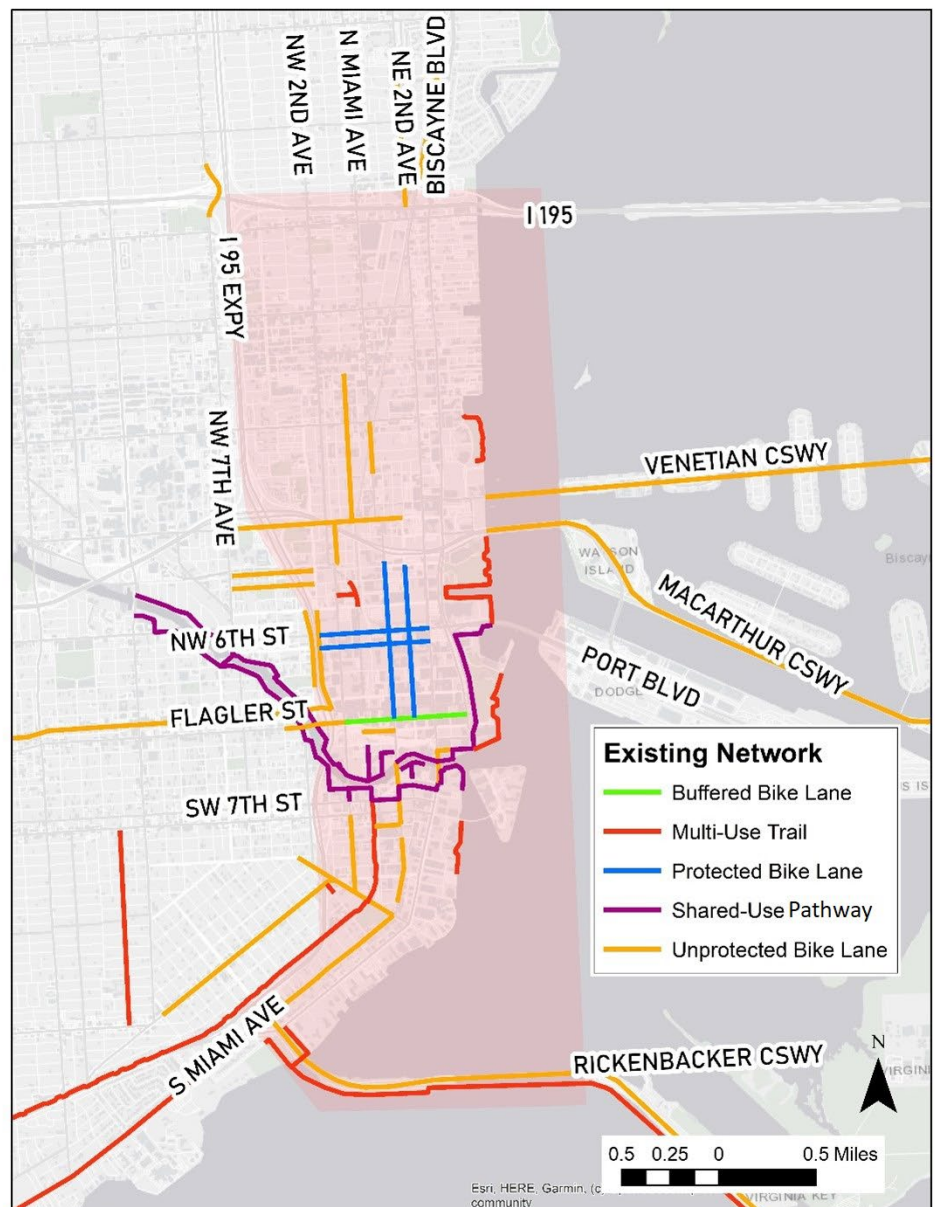
Tech Memo 3: Evaluation of Bicycle and Pedestrian Connectivity to Transit and Major Trails

Introduction

The objective of this assessment is to evaluate the pedestrian and bicycle access to Metrorail Stations, Metromover Stations, and The Underline within the study area boundaries. The evaluation begins with an overview of the existing pedestrian and bicycle network in the study area. Once the framework for the existing conditions is established, the study evaluates the planned cycling connectivity improvements to be programmed in the 2050 Long-Range Transportation Plan (LRTP).

Using a pedestrian shed analysis, an assessment was completed to identify the proximity and the types of facilities connecting to each Metromover and Metrorail station in the study area. The Transit Alliance Miami's 2023 Mobility Scorecard findings supplement the mapping analysis, providing data related to walking scores for Metrorail stations and countywide cycling crash data.

A review of the major trails in the study area, including The Underline, Rickenbacker Trail, Commodore Trail, and the Venetian Causeway, is also provided. The connectivity between the trails and the study area was assessed using the data from the existing and planned bicycle and pedestrian network. Strava Heat mapping was also used to supplement recommendations for connectivity.



Map 1: Existing Bicycle and Pedestrian Network

Existing Conditions

The existing dedicated bicycle facilities located in the study area are highlighted in **Map 1**. In total, there are approximately 22 miles of existing bicycle facilities within the seven-square-mile study area. The most common type of bicycle facility are unprotected bicycle lanes, constituting 41% of the network. Shared pedestrian and bicycle facilities (multiuse trails and shared use pathways) represent 44%, with the remaining 15% being accounted for as buffered bike lanes and protected bike lanes. **Table 1** summarizes the total mileage and percentage for each facility type within the study area.

Table 1 Summary of Existing Bicycle and Pedestrian Facilities

Facility Type	Miles	Percent
Buffered Bike Lane	0.6	3%
Multi-Use Trail	5.9	27%
Protected Bike Lane	2.7	12%
Shared Use Pathway	3.7	17%
Unprotected Bike Lane	9.0	41%

¹Source

Table 2 catalogs the existing facilities within the study area, followed by an overview of each facility type and application context within the study area. Baseline conditions are then coupled with programmed improvements to be included in the 2050 LRTP to identify gaps and opportunities for infill of the bicycle and pedestrian networks.

Table 2 Existing Bicycle and Pedestrian Facilities within the Study Area

Facility Name	From	To	Total Length (mile)	Length within Study Area (mile)	Facility Type	Roadway Speed
Biscayne Bay	SE 12 Street	SE 10 Street	0.3	0.3	Multi-Use Trail	Not Applicable
Coral Way	SW 12 Avenue	SW 15 Road	1.1	0.1	Unprotected Bike Lane	35
Linear Park	NW 8 Street	NW 10 Street	0.1	0.1	Multi-Use Trail	Not Applicable
Margaret Pace Baywalk	N Bayshore Drive	S of NE 20 Terrace	0.3	0.3	Multi-Use Trail	Not Applicable
Miami Avenue	SW 25 Road	SW 15 Road	0.8	0.8	Unprotected Bike Lane	40
Miami Ave Bridge	South of Miami River	North of Miami River	0.3	0.3	Unprotected Bike Lane	40
Miami River Greenway	MIC	Biscayne Bay	0.5	0.5	Multi-Use Trail	Not Applicable

¹ 2050 TPO Bike/Ped Plan - [Needs Assessment](#)

Facility Name	From	To	Total Length (mile)	Length within Study Area (mile)	Facility Type	Roadway Speed
Miami River Greenway	MIC	Biscayne Bay	6.4	3.7	Shared Use Pathway	Not Applicable
M-Path/The Underline	South Dadeland Station	Miami River	10.0	1.4	Multi-Use Trail	Not Applicable
Museum Park Baywalk	NE 6 Street	MacArthur Causeway	0.9	0.9	Multi-Use Trail	Not Applicable
N Miami Avenue	NW 11 Terrace	SE 1 Street	0.8	0.8	Protected Bike Lane	30 mph
N Miami Avenue	NE 17 Street	NW 20 Street	0.3	0.3	Unprotected Bike Lane	30 mph
NE 1 Avenue	NE 11 Street	SE 1 Street	0.8	0.8	Protected Bike Lane	30 mph
NE 2 Avenue	NE 37 Street	NE 42 Street	0.2	0.1	Unprotected Bike Lane	40 mph
NW 1 Avenue	NW 14 Street	NW 23 Street	0.8	0.8	Unprotected Bike Lane	30 mph
NW 1 Place	NW 11 Street	NW 14 Street	0.2	0.2	Unprotected Bike Lane	30 mph
NW 10 Street	NW 7 Avenue	NW 3 Avenue	0.4	0.1	Unprotected Bike Lane	30 mph
NW 11 Street	NW 7 Avenue	NW 3 Avenue	0.4	0.2	Unprotected Bike Lane	30 mph
NW 14 Street	NW 7 Avenue	NW 1 Avenue	0.7	0.5	Unprotected Bike Lane	35 mph
NW 3 Avenue	NW 8 Street	SW 2 Street	0.5	0.5	Unprotected Bike Lane	30 mph
NW 3 Court	NW 8 Street	SW 2 Street	0.4	0.4	Unprotected Bike Lane	30 mph
NW 5 Street	NW 3 Avenue	NE 2 Avenue	0.6	0.6	Protected Bike Lane	30 mph
NW 6 Street	NW 3 Avenue	NE 2 Avenue	0.6	0.6	Protected Bike Lane	30 mph
NW 9 Street Pedestrian Mall	NW 2 Avenue	NW 1 Avenue	0.1	0.1	Multi-Use Trail	Not Applicable
NW/NE 14 Street	NW 1 Avenue	NE 1 Avenue	0.2	0.2	Unprotected Bike Lane	35 mph
Rickenbacker Causeway	Toll Plaza	Crandon Marina	3.4	1.4	Unprotected Bike Lane	45 mph
Rickenbacker Trail	Brickell Avenue	Crandon Park	4.2	2.1	Multi-Use Trail	Not Applicable
SE 1 Street	SW 5 Avenue	SW 2 Avenue	0.3	0.1	Unprotected Bike Lane	40 mph

Facility Name	From	To	Total Length (mile)	Length within Study Area (mile)	Facility Type	Roadway Speed
South Miami Avenue	S. 14 Street	S. 10 Street	0.3	0.3	Unprotected Bike Lane	40 mph
SR 5/Brickell Avenue	SE 5 Street	SE 3 Avenue	0.2	0.2	Unprotected Bike Lane	40 mph
SR 968/W Flagler Street	SW 25 Avenue	SW 5 Avenue	2.1	0.1	Unprotected Bike Lane	45 mph
SR A1A/MacArthur Causeway	N. Bayshore Drive	Watson Island	1.1	0.4	Unprotected Bike Lane	45 mph
SW 15 Road	Coral Way	South Miami Avenue	0.4	0.4	Unprotected Bike Lane	35 mph
SW 15 Road	SW 11 Street	SW 13 Street	0.2	0.1	Unprotected Bike Lane	40 mph
SW 17 Road	SW 2nd Court	SR 972/SW 3 Avenue	0.2	0.1	Multi-Use Trail	30 mph
SW 2 Avenue	SW 15 Road	SW 8 Street	0.4	0.4	Unprotected Bike Lane	35 mph
SW 2 Street	SW 1 Avenue	South Miami Avenue	0.2	0.2	Unprotected Bike Lane	30 mph
SW 26 Road	South Miami Avenue	Rickenbacker Causeway	0.4	0.4	Unprotected Bike Lane	45 mph
SW 9 Street	SW 1 Avenue	South Miami Avenue	0.1	0.1	Unprotected Bike Lane	30 mph
SW-SE 1 Street	SW 2 Avenue	Biscayne Boulevard	0.6	0.6	Buffered Bike Lane	40 mph
Venetian Causeway	Bayshore Dr	17 Street	2.7	0.4	Unprotected Bike Lane	30 mph

²Source

BUFFERED BICYCLE LANES

Buffered bicycle lanes consist of conventional bicycle lanes paired with a designated buffer space that separates the bicycle lane from adjacent vehicular traffic or parking lanes. These lanes offer several advantages, including increased distance between motor vehicles and cyclists, enhancing safety. However, buffered lanes may primarily attract more experienced bicycle users, as studies suggest that only approximately 5-9% of riders feel safe biking in such lanes. A study performed by Portland State University found that 71% of residents in their study area said they would be more likely to travel by bicycle if these buffered lanes exist.³

Currently, only one segment within the study area is equipped with buffered bike lanes. Approximately 0.6 miles of buffered lanes are installed along SE 1 Street, stretching from SW 2 Street to Biscayne Boulevard. **Map 2** highlights this

² 2050 TPO Bike/Ped Plan - [Needs Assessment](#)

³ The Influence of Bike Lane Buffer Types on Perceived Comfort and Safety of Bicyclists and Potential Bicyclists- Portland State University, 2015

one-way segment, offering eastbound access within the study area. Additionally, **Figure 1** provides a street view of the SE 1 Avenue buffered bike lanes (depicted in green), alongside a dedicated bus lane painted in red.



Map 2. Buffered Bike Lanes within the Study Area



Figure 1: Google Street view of buffered bike lanes along SE 1 Street

MULTIUSE TRAILS AND SHARED USE PATHWAYS

Multiuse trails and shared use pathways are off-street, paved facilities that accommodate two-way travel for pedestrians and cyclists. Within the study area, these facilities represent 44%, or approximately 9.6 miles, of the existing bicycle and pedestrian network. This can be visualized in **Map 3** which depicts the current shared pathways and trails in Downtown. According to the Federal Highway Administration (FHWA), more than half of bicycle riders report feeling safe on shared pathways compared to other bicycle facilities.

Several segments of major trails within the study area are developed with shared use pathways and multiuse trail facilities, providing regional connectivity to and from Downtown Miami. These trails include:

The Underline: Spanning a total of 10 miles from South Dadeland Station to the south bank of the Miami River, approximately 1.4 miles of The Underline are located within the study area. The Brickell Backyard segment of The Underline, situated between the Miami River and SW 13 Street, features hydration stations, a bike repair station, bike racks, and shaded resting areas. **Figure 2** depicts The Underline at SW 8 Street in Downtown.

The Rickenbacker Trail: Beginning on Brickell Avenue and culminating at Crandon Park, this recreational trail covers a total of 4.2 miles and provides access to the city's beaches. Approximately 2.1 miles of this trail are within the study area's boundary. Changing rooms, bathrooms, and bike racks are provided adjacent to the trail within Hobie Beach Park.

The Miami River Greenway: Envisioning a trail circuit on the north and south banks of the Miami River, this facility is planned to extend from Bayfront Park to the Miami Intermodal Center. Approximately 4 miles of the Miami River Greenway have been developed within the study area, consisting of a mix of multiuse trail and shared use pathways facilities. **Figure 3** showcases a shared-use pathway along the Miami River Greenway by Bayfront Park.



Map 3. Multiuse trails and shared-use pathways within the study area



Figure 2: Google Street view of The Underline multiuse trail.

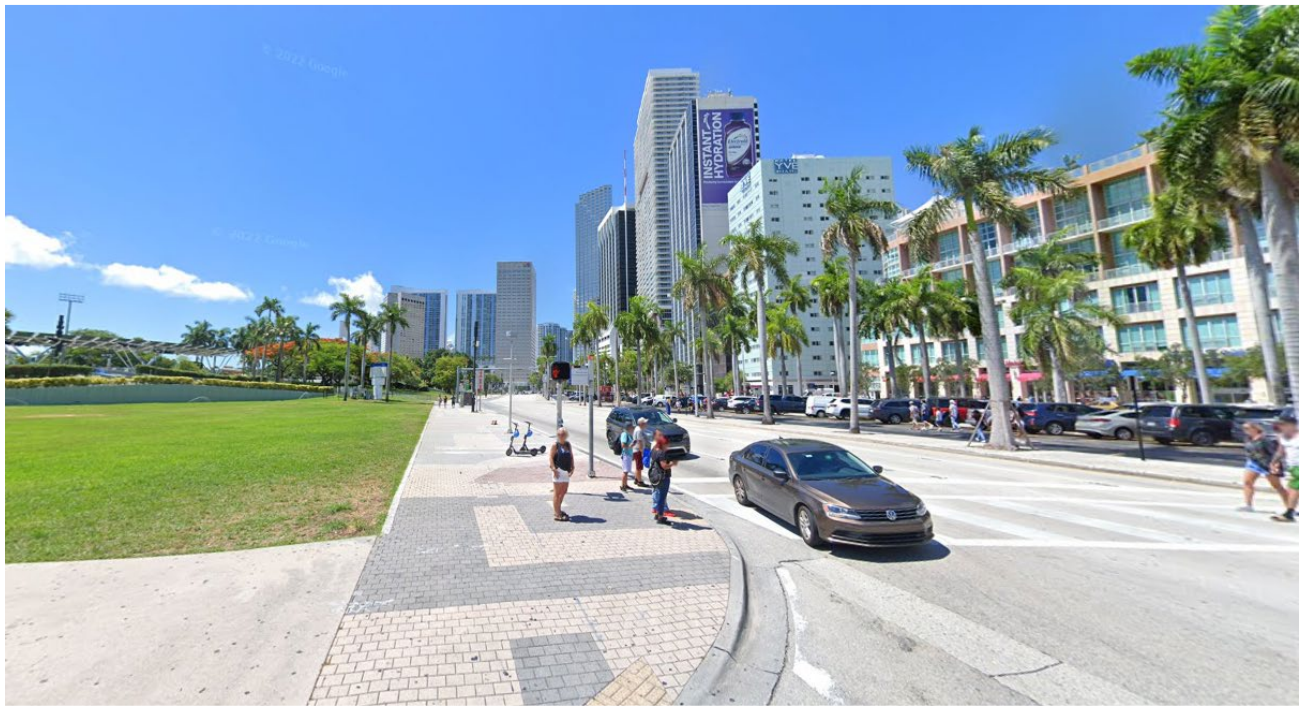


Figure 3: The Miami River Greenway fronting Bayfront Park is an example of a shared use pathway facility within the study area.

PROTECTED BICYCLE LANES

Protected bike lanes are bikeways typically installed at street level that incorporate various methods for physical protection from passing vehicular traffic. Barriers can include raised curbs, flexible posts, bollards, or even designated parking lanes. These types of bicycle facilities are commonly found in urban landscapes, and statistically, more than half of cyclists feel safe riding in them.⁴

As of 2023, there are 2.7 miles of protected bike lanes providing one-way travel within the study area boundary. **Map 4** highlights the existing facilities in the area.

The lanes on NE/NW 5 Street and NE/NW 6 Street offer protected east and west access for cyclists, extending from NW 3 Avenue to NE 2 Avenue. The Downtown Development Authority is leading efforts to enhance the existing flexible posts protecting the bicycle lanes along these corridors with a more effective barrier system. **Figure 4** illustrates the proposed installation of planters to prevent the encroachment of vehicles along these bicycle facilities.

The east and west protected bicycle lanes as seen in **Figure 5**, intersect with the north and south routes along North Miami Avenue and NE 1 Avenue. Protected bike lanes are installed from NW 11 Terrace to SE 1 Street along North Miami Avenue, providing southbound access. On NE 1 Avenue, with traffic heading northbound, protected bicycle lanes are provided in



Figure 4: Rendering of planters to be installed along the NE 5 Street and NE 6 Street protected bicycle lanes.

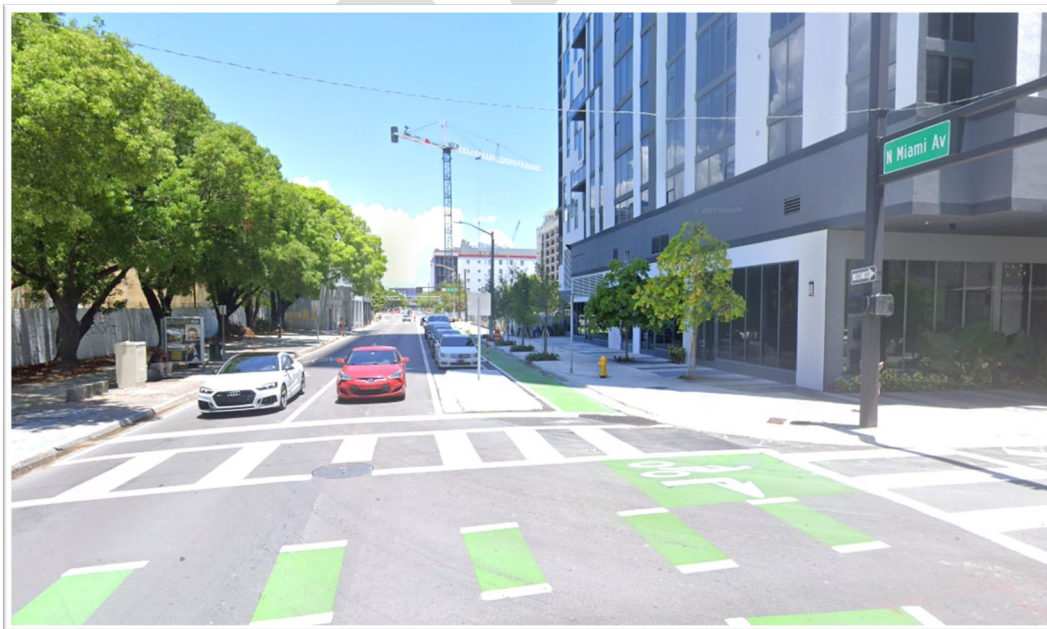


Figure 5: Google Street view of the bike lanes protected by on-street parking along North Miami Avenue.

⁴ The Influence of Bike Lane Buffer Types on Perceived Comfort and Safety of Bicyclists and Potential Bicyclists- Portland State University, 2015

the segment from SE 1 Street to NE 11 Street. Bicycle protection along these corridors is achieved through a combination of flexible posts, raised curbs, and designated parking lanes.



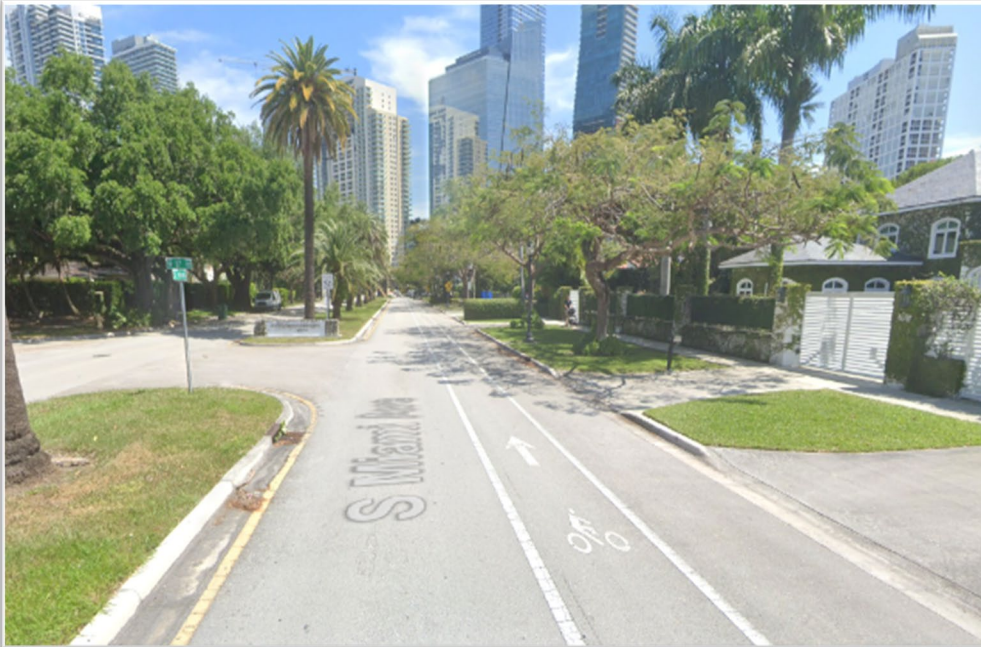
Map 4. Existing protected bicycle lanes within the study area boundary

UNPROTECTED BICYCLE LANES

Unprotected bike lanes constitute the most common type of bicycle facility within the study area, accounting for 41% of the existing bicycle network. According to recent studies documented in Volume 171 of the Accident Prevention and

Analysis, people were more likely to allow their kids to travel in bike lanes if they were protected. The same study concluded that higher speeds were seen in protected versus unprotected, painted lanes.⁵

Within the study area, unprotected bike lanes are situated on roadways with speed limits ranging from 30 mph up to 45 mph, as depicted in **Figure 6**. A significant concern with these lanes is the frequent encroachment by delivery trucks, ride-shares, food delivery cars, and even public safety vehicles into the designated bicycle spaces. Consequently, cyclists often need to maneuver onto adjacent roadways or sidewalks to complete their routes. **Map 5** provides a visual representation of existing unprotected bicycle paths within the study area.



⁵ Alexandra Knight, Samuel G. Charlton, Protected and unprotected cycle lanes' effects on cyclists' behavior, Accident Analysis & Prevention, Volume 171, 2022,

Figure 6.



Map 5. Existing Unprotected Bicycle Lanes within the Study Area

COORDINATION WITH 2050 LRTP

Table 3 catalogs bicycle and pedestrian improvements for the study area, which are to be programmed in the 2050 LRTP. These improvements encompass unbuilt needs from the 2045 LRTP, as well as projects programmed in the FY 2020 Transportation Improvement Plan (TIP). The 2050 LRTP is slated for adoption by the TPO Governing Board in summer 2024.

Table 3 Programmed Bicycle and Pedestrian Improvements in the Study Area

Facility Name	From	To	Facility Type	Category	Planning Period	Length (miles)
M-Path Greenlink	SW 67 Avenue	Miami River Greenway	Shared Use Pathway	LRTP 2045 Cost Feasible	4	0.4
SE 32 Road/Brickell Avenue - Route A	The Underline	SR 913/Rickenbacker Causeway	Shared Use Pathway	LRTP 2045 Cost Feasible	3	0.3
SE/SW 26 Road - Route B	SR 913/Rickenbacker Causeway	The Underline	Shared Use Pathway	LRTP 2045 Cost Feasible	3	0.4
The Underline	Dadeland South	Miami River	Shared Use Pathway	FY 2020 TIP	1	9.6
NW 17 Street	NW 7 Avenue	NW 7 Court	Shared Use Pathway	FY 2020 TIP	1	0.1
City of Miami I-395 Pedestrian Bay Walk Connection	Museum Park Baywalk	NE 15 Street	Shared Use Pathway	FY 2023 TIP		
SR AIA / MacArthur Causeway	East of SR -5/ Biscayne Boulevard	W. SR 907 /Alton Road	Bike Path	FY 2023 TIP		2.717
Intersection at S Miami Avenue and S 10 Street			Traffic Signal	FY 2023 TIP		
Intersection at Brickell Avenue and SE 14 Terrace			Traffic Signal	FY 2023 TIP		
Intersection at NW 1 Avenue and NW 29 Street			Traffic Signal	FY 2023 TIP		
Intersection at Coral Way and SW 2 Avenue			Traffic Signal	FY 2023 TIP		
Intersection at SE 8 Street and Brickell Bay Drive			Traffic Signal	FY 2023 TIP		
Intersection at NW 10 Avenue and NW 39 Street			Traffic Signal	FY 2023 TIP		

Facility Name	From	To	Facility Type	Category	Planning Period	Length (miles)
Intersection of NE 1 Avenue and NE 16 Street			Traffic Signal	FY 2023 TIP		
NW 2 Avenue	NW 38 Street	NW 57 Street	Protected Bicycle Lanes	LRTP 2050	5	1.2
SW 7 Avenue	SW 12 Avenue	SW 11 Street	Sidepath	LRTP 2050	5	0.7
SW 25 Road	SW 1 Avenue	SW 9 Avenue	Buffered Bike Lane	LRTP 2050	5	0.7
SW 6 Street	SW 27 Avenue	SW 5 Avenue	Sidepath	LRTP 2050	5	2.5
NW 6 Avenue	NW 40 Street	NW 47 Street	Protected Bicycle Lanes	LRTP 2050	5	0.4
NE 4 Avenue	NE 42 Street	NE 50 Street	Shared Use Pathway	LRTP 2050	5	0.7
NE 17 Street	North Miami Avenue	NE 2 Avenue	Shared Use Pathway	LRTP 2050	5	0.3
SE 1 Avenue	SE 6 Street	SE 3 Street	Shared Use Pathway	LRTP 2050	5	0.3
SE 1st Avenue	SE 1 Street	NE 1 Street	Protected Bicycle Lanes	LRTP 2050	5	0.3
N Federal Highway	NE 36 Street	NE 54 Street	Shared Use Pathway	LRTP 2050	5	1.1
NW 1 Place	NW 14 Street	NW 21 Street	Shared Use Pathway	LRTP 2050	5	0.7
NW 1 Avenue	NW 25 Street	NW 29 Street	Shared Use Pathway	LRTP 2050	5	0.2
NW 3 Avenue	NW 25 Street	NW 29 Avenue	Shared Use Pathway	LRTP 2050	5	0.2
NE 17 Street	NE 2 Avenue	Biscayne Boulevard	Shared Use Pathway	LRTP 2050	5	0.1
NE 2 Avenue	NE 17 Street	NE 17 Street	Shared Use Pathway	LRTP 2050	5	0.0
Brickell Bay Drive	SE 15 Road	SE 14 Street	Shared Use Pathway	LRTP 2050	5	0.3
Commodore Trail	N Prospect Drive	Rickenbacker Causeway	Shared Use Pathway	LRTP 2050	5	4.4
Plan Z	SE/SW 26 Road	Rickenbacker Causeway	Shared Use Pathway	LRTP 2050	5	2.4
NE 23 Street	Biscayne Boulevard	NE 4 Avenue	Shared Use Pathway	LRTP 2050	5	0.1
NE 4 Avenue	NE 22 Street	NE 24 Street	Shared Use Pathway	LRTP 2050	5	0.2
Ludlam Trail	SW 8 Street	Flagler Street	Pedestrian Bridge	LRTP 2050	2.5	5.6

⁶Source

Pedestrian Shed Analysis

The existing network and planned connectivity segments were evaluated concerning their proximity to Metromover and Metrorail stations within the study area. Additionally, the segment of The Underline within the study boundary was included in the evaluation.

A pedestrian shed analysis was conducted to assess the accessibility of bicycle facilities within walking distance of transit stations in the study area. Originating from the new urbanist movement, the concept of a pedestrian shed defines areas reachable within a five or ten-minute pedestrian catchment radius centered on a specific point. Traditionally, a quarter-mile buffer represents a five-minute walk, while half a mile signifies a ten-minute walk.⁷ This analytical approach is effective in Miami due to its gridded street system, facilitating the capture of walking distances and providing users with a predictable street pattern for easier navigation.

A cursory study of the areas reveals several findings. In the study area, blocks are typically platted so that the street-side is a greater distance than the avenue-side. For example, in Brickell, blocks adjacent to the Metrorail line have a street-side ranging from approximately 500 to 650 feet, while avenue-sides are about half that length, typically measuring 320 feet. North of I-395, this grid pattern exhibits more variety, reflecting historical land uses and the presence of at-grade railways that traverse this area.

A preliminary analysis of the 5-minute pedestrian shed around Metromover stations quickly demonstrates that most stations are located within a quarter-mile distance of another Metromover station. **Map 6** illustrates that every Metromover station, except the School Board station, is within a 5-minute walk of another Metromover station.

⁶ 2050 TPO Bike/Ped Plan -[Needs Assessment](#)

⁷ Plater-Zyberk, *The 5-minute neighborhood, 15-minute city, and 20-minute suburb*, Congress for the New Urbanism, 2024

The existing and planned connectivity analysis is complemented by the findings from the Transit Alliance Miami's 2023 Mobility Scorecard, which builds upon its 2018 predecessor by placing a greater emphasis on safety issues and metrics for pedestrians and cyclists in relation to the County's transit network.



Map 6. Metromover stations pedestrian shed analysis of existing and proposed bicycle network improvements in the study area.

As shown in **Table 4**, all Metromover stations have access to a bicycle facility within a 5-minute walk. The table also includes the planned improvements from the TPO's 2050 Needs Assessment for the LRTP. The stations located around the southern terminus (Financial District and Tenth Street Promenade), and the northern terminus (Adrienne Arsht Center, School Board, and Museum Park) of the circulator have fewer bicycle facilities. Most facilities providing north/south and east/west access within the study area are concentrated north of the Miami River and south of NE 11 Street.

The 4.4-mile Metromover system received a B rating with an average delay time of less than 2 minutes and a monthly ridership of 558,396 riders. The Metromover operates free of charge, but the typical cost per rider has been quantified at \$2.07. While the system has not been updated since 1994, proposed extensions include a route north to the Design District and east to Miami Beach. Fleet replacement, which is anticipated to deliver more reliable service, is expected to be completed by Summer 2025.

Table 4 Metromover Station Pedestrian Shed Analysis for Bicycle Facilities

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
Adrienne Arsht Center	Margaret Pace Baywalk from N. Bayshore Drive to S. of NE 20 Terrace	North and South
	Museum Park Baywalk from NE 6 Street to MacArthur Causeway	North and South
	Unprotected Bike Lanes on MacArthur Causeway from N. Bayshore Drive to Watson Island	East and West
	Unprotected Bike Lanes on Venetian Causeway from Bayshore Drive to 17 Street	East and West
Bayfront Park	Miami River Greenway Trail: MIC to Biscayne Bay	East and West, then North and South on Biscayne Boulevard and Biscayne Bay
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
	Unprotected Bike Lanes on Brickell Avenue from SE 5 Street to SE 3 Avenue	North and South, then West on SE 3 Avenue
Brickell	M-Path/The Underline: South Dadeland Station to the Miami River	North and South
	Unprotected Bike Lanes on SW 15 Road from SW 11 Street to South Miami Avenue	East and West
	Unprotected Bike Lanes on Miami Ave Bridge from South of the Miami River to North of the Miami River	North and South
	Unprotected Bike Lanes on Coral Way from SW 12 Avenue to SW 15 Road	North and South
	Unprotected Bike Lanes on SW 2 Avenue from SW 15 Road to SW 8 Street	North and South
	Unprotected Bike Lanes on South Miami Avenue from SW/SE 14 Street to SW/SE 10 Street	North and South up to SW/SE 12 Street, then North
	Unprotected Bike Lanes on SW 9 Street from SW 1 Avenue to South Miami Avenue	West
College/ Bayside Station	Miami River Greenway Trail: MIC to Biscayne Bay	East and West then North and South on Biscayne Boulevard and Biscayne Bay
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West
College North (Bike Miles: 3.34)	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on N. Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West
Brickell City Centre/ Eighth Street	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	M-Path/The Underline: South Dadeland Station to the Miami River	North and South
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the Miami River to North of the Miami River	North and South
	Unprotected Bike Lanes on SW 9 Street from SW 1 Avenue to South Miami Avenue	West
	Unprotected Bike Lanes on Brickell Avenue from SE 5 Street to SE 3 Avenue	North and South, then West on SE 3 Avenue
	Unprotected Bike Lanes on South Miami Avenue from SW/SE 14 Street to SW/SE 10 Street	North and South up to SW/SE 12 Street, then North
Eleventh Street	Museum Park Baywalk from NE 6 Street to MacArthur Causeway	North and South
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
Fifth Street	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	M-Path/The Underline: South Dadeland Station to Miami River	North and South
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the Miami River to North of the Miami River	North and South
	Unprotected Bike Lanes on Brickell Avenue from SE 5 Street to SE 3 Avenue	North and South, then West on SE 3 Avenue
	Unprotected Bike Lanes on SW 2 Avenue from SW 1 Avenue to South Miami Avenue	West
Financial District	M-Path/The Underline: South Dadeland Station to the Miami River	North and South
	Unprotected Bike Lanes on SW 15 Road from SW 11 Street to South Miami Avenue	East and West
	Unprotected Bike Lanes on South Miami Avenue from SW/SE 14 Street to SW/SE 10 Street	North and South up to SW/SE 12 Street, then North
	Brickell Bay Drive Shared use pathway from SE 15 Road to SE 14 Street (included in the 2050 LRTP)	North and South
First Street	Miami River Greenway Trail: MIC to Biscayne Bay	North and South
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on N. Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
Freedom Tower	Museum Park Baywalk from NE 6 Street to MacArthur Causeway	North and South
	Miami River Greenway Trail: MIC to Biscayne Bay	North and South
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
Government Center	Unprotected Bike Lanes on NW 3 Avenue from NW 8 Street to SW 2 Street	North
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Unprotected Bike Lanes on SE 1 Street from SW 5 Avenue to SW 2 Avenue	East
	Unprotected Bike Lanes on NW 3 Court from NW 8 Street to SW 2 Street	South
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Unprotected Bike Lanes on SW 2 Street from SW 1 Avenue to South Miami Ave	West
	Unprotected Bike Lanes on W Flagler Street from SW 25 Avenue to SW 5 Avenue	West
Knight Center	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	Unprotected Bike Lanes on Miami Ave Bridge from South of the Miami River to North of the Miami River	North and South
	Unprotected Bike Lanes on Brickell Avenue from SE 5 Street to SE 3 Avenue	North and South, then West on SE 3 Avenue
	Unprotected Bike Lanes on SW 2nd Street from SW 1 Avenue to South Miami Avenue	West
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
Miami Avenue	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
	Unprotected Bike Lanes on SE 1 Street from SW 5 Avenue to SW 2 Avenue	East
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the Miami River to North of the Miami River	North and South
	Unprotected Bike Lanes on SW 2 Street from SW 1 Avenue to South Miami Avenue	West
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
Museum Park	Museum Park Baywalk from NE 6 Street to MacArthur Causeway	North and South
	Unprotected Bike Lanes on MacArthur Causeway from N. Bayshore Drive to Watson Island	East and West
Park West	Museum Park Baywalk from NE 6 Street to MacArthur Causeway	North and South
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on N. Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West
Riverwalk	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	M-Path/The Underline Trail: South Dadeland Station to the Miami River	North and South
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the Miami River to North of the Miami River	North and South
	Unprotected Bike Lanes on Brickell Avenue from SE 5 Street to SE 3 Avenue	North and South, then West on SE 3 Avenue
	Unprotected Bike Lanes on SW 2 Street from SW 1 Avenue to South Miami Avenue	West
	Buffered Bike Lanes on SW/SE 1 Street from SW 2 Avenue to Biscayne Boulevard	East
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
School Board	Unprotected Bike Lane on N 14 Street from NW 7 Avenue to NE 1 Avenue	East and West
	Unprotected Bike Lane on NW 1 Avenue from NW 14 Street to NW 23 Street	North and South
	Unprotected Bike Lane on North Miami Avenue from NE 17 Street to NW 20 Street	North and South
	Protected Bike Lane on NE 17 Street from North Miami Avenue to NE 2 Avenue (included in the 2050 LRTP)	North
	Protected Bike Lane on NE 2 Avenue from NE 17 Street to NE 17 Street (included in the 2050 LRTP)	East
	Shared Use Pathway on NE 17 Street from NE 2 Avenue to Biscayne Boulevard (included in the 2050 LRTP)	East and West
Tenth Street/ Promenade	M-Path/The Underline Trail: South Dadeland Station to the Miami River	North and South
	Shared use Pathway Biscayne Bay from SE 12 Street to SE 10 Street	North and South
	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the River to North of the Miami River	North and South
	Unprotected Bike Lanes on South Miami Avenue from SW/SE 14 Street to SW/SE 10 Street	North and South up to SW/SE 12 Street, then North
	Unprotected Bike Lanes on SW 9 Street from SW 1 Avenue to South Miami Avenue	West
Third Street	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the Miami River to North of the Miami River	North and South
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Unprotected Bike Lanes on Brickell Avenue from SE 5 Street to SE 3 Avenue	North and South, then West on SE 3 Avenue
	Unprotected Bike Lanes on SW 2 Street from SW 1 Avenue to South Miami Avenue	West
	Protected Bike Lane on SE 1 Avenue from SE 1 Street to NE 1 Street (included in the 2050 LRTP)	North
	Shared-Use Path on SE 1 Avenue from SE 6 Street to SE 3 Street (included in the 2050 LRTP)	North and South
Wilkie D. Ferguson, Jr	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West
	Linear Pak (between NW 1 Court and Arena Boulevard) from NW 8 Street to NW 10 Street	North & South

A pedestrian shed analysis which can be seen in **Table 5** was completed for Metrorail stations in and adjacent to the study area to evaluate bicycle connectivity, including an analysis of existing and programmed improvements for implementation. Metrorail stations within the study area appear to be adequately served by pedestrian and bicycle facilities, particularly the Brickell and Historic Overtown/ Lyric Theatre Metrorail Stations. As demonstrated in **Map 7**, Metrorail stations northwest of the study area, including Allapattah, Santa Clara, and Civic Center, lack designated bicycle facilities providing east/west connections into the study area.

Pedestrian access to Metrorail stops was ranked by ridership and walking score in the Transit Alliance Mobility scorecard for 2023. There are three Metrorail stations within the study area. These are the Historic Overtown/Lyric Theater, Government Center, and Brickell Metrorail Stations. The Government Center Metrorail Station has the highest ridership of all the Metrorail stops with a walking score of 94, followed by the Brickell Metrorail Station with the second highest ridership and a 99-walking score. In contrast, the Historic Overtown/Lyric Theater station has a comparatively less ridership, ranking 12th in ridership with a 93-walking score.

Regarding mass transit services provided, Metrorail scored a C rating, averaging a 49.2% on-time arrival/departure performance. A Metrorail system's expansion has been proposed as part of the Strategic Miami Area Rapid Transit (SMART) Plan, including the Northeast Corridor, the North Corridor, the Baylink; and the South Corridor Bus Rapid Transit (BRT), which is under construction. Recommendations for system improvements include increasing frequency, upzoning land around stations to encourage development, and improving connectivity from stations to population centers with better bus and trolley connections, additional biking infrastructure, and crossing improvements for pedestrians.

Based on projects to be included in the 2050 LRTP, new bicycle and pedestrian improvements are being considered near the Brickell and Vizcaya Metrorail Stations, within a 5-minute walk of each station. However, the proposed projects have

a significant regional impact, expanding access to The Underline from other facilities and connecting to the regional network. These improvements are further addressed in the report, detailing how they link to The Underline.

Table 5 Metrorail Station Pedestrian Shed Analysis for Bicycle Facilities

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
Culmer	Unprotected Bike Lane on NW/NE 14 Street from NW 7 Avenue to NE 1 Avenue	East and West
	Unprotected Bike Lane on NW 11 Street from NW 7 Avenue to NW 3 Avenue	West
	Unprotected Bike Lane on NW 10 Street from NW 7 Avenue to NW 3 Avenue	East
Historic Overtown/ Lyric Theatre	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Unprotected Bike Lanes on NW 3 Avenue from NW 8 Street to SW 2 Street	North
	NW 9 Street Pedestrian Mall from NW 2 Avenue to NW 1 Avenue	East and West
	Linear Pak (between NW 1 Court and Arena Boulevard) from NW 8 Street to NW 10 Street	North and South
Government Center	Unprotected Bike Lanes on NW 3 Avenue from NW 8 Street to SW 2 Street	North
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Unprotected Bike Lanes on SE 1 Street from SW 5 Avenue to SW 2 Avenue	East
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Unprotected Bike Lanes on SW 2 Street from SW 1 Avenue to South Miami Avenue	West
	Unprotected Bike Lanes on NW 3 Court from NW 8 Street to SW 2 Street	South
	Unprotected Bike Lanes on W Flagler Street from SW 25 Avenue to SW 5 Avenue	West
Brickell	M-Path/The Underline: South Dadeland Station to the Miami River	North and South
	Unprotected Bike Lanes on SW 9 Street from SW 1 Avenue to South Miami Avenue	West
	Unprotected Bike Lanes on South Miami Avenue from SW/SE 14 Street to SW/SE 10 Street	North and South up to SW/SE 12 Street, then North
	Unprotected Bike Lanes on SW 2 Avenue from SW 15 Road to SW 8 Street	North and South
	Unprotected Bike Lanes on Coral Way from SW 12 Avenue to SW 15 Road	North and South
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the Miami River to N of the Miami River	North and South

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
	Unprotected Bike Lanes on SW 15 Road from SW 11 Street to South Miami Avenue	East and West
Vizcaya	Unprotected Bike Lanes on Coral Way from SW 12 Avenue to SW 15 Road	North and South
	M-Path/The Underline: South Dadeland Station to the Miami River	North and South
	Commodore Trail: Mercy Way to SE 32 Road	North and South



Map 7. Metrorail stations pedestrian shed analysis of existing and proposed bicycle network improvements in the study area

Within the study area, public transit is supported by the County's Metrobus system, City of Miami trolley, and point-to-point services like Freebee and GoConnect. According to the Transit Alliances Mobility Scorecard, the City of Miami's trolley service has the highest ridership rate for any municipality in the County, estimated at over 2.6 million riders, followed by Miami Beach and the Coral Gables trolley service. The Miami trolley has a frequency of fifteen to thirty minutes, and it averages a \$4.13 cost per rider. Overall, the municipal trolley system in the County received an F-rating in the 2023 scorecard prepared by the Transit Alliance. Moreover, the County's Metrobus received a D-rating due to being identified as being on time 32.4% of the time, with most delayed trips happening in Downtown Miami and Miami Beach.

Overall, the Transit Alliance rated cycling and bicycle facilities in Miami-Dade County an F, with 919 crashes, 845 serious injuries, and 17 fatalities. As of 2022, the County has a total of 207.77 miles of bicycle lanes. Of these, 95% are unprotected, and only 5% or 11.2 miles are buffered or protected lanes. Paved paths and multiuse trails are also part of the network, accounting for another 178.23 miles countywide.

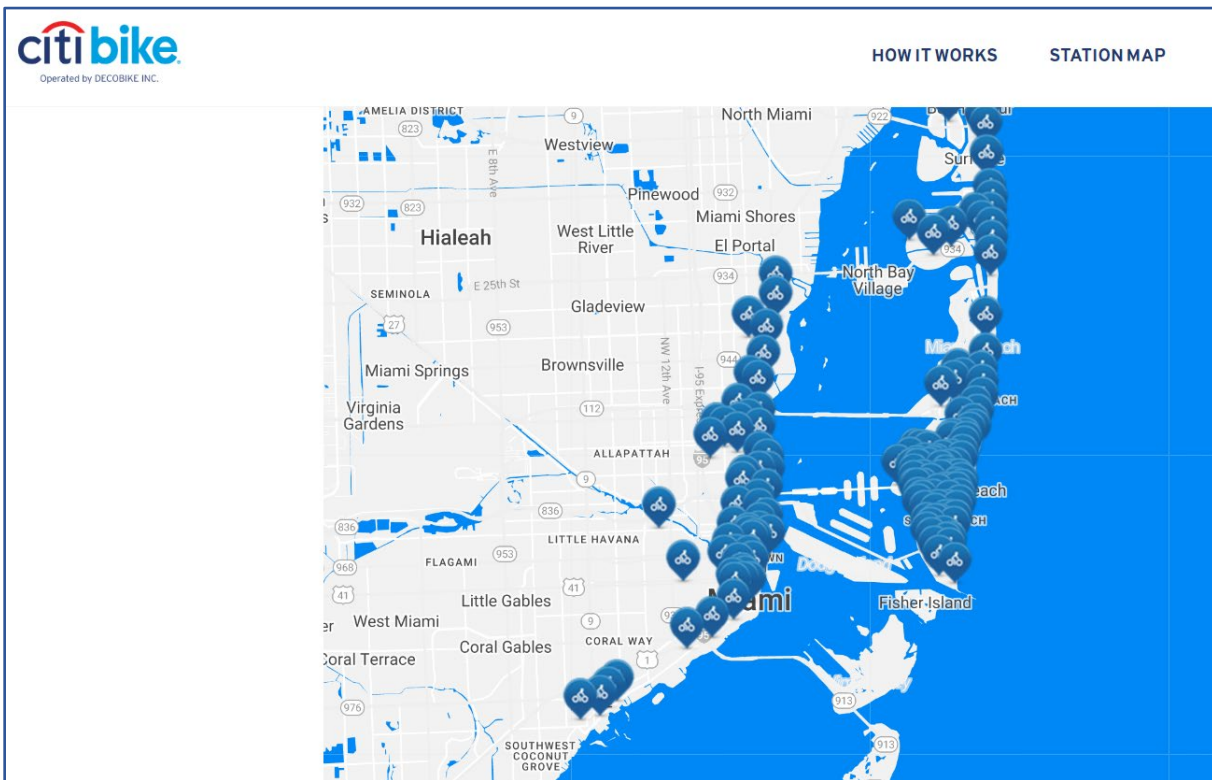
The study reveals a decline in bike and pedestrian facilities in Miami-Dade and Florida in general, while the national trend indicates an increase in incidents. Between 2018 and 2022, a total of 2,943 pedestrian and bike crashes were recorded in Miami-Dade. Among these, 283 resulted in serious injuries, and 112 led to fatalities.

Common characteristics were identified for roadway segments with high fatalities. Over 85% of fatal and severe crashes occurred on "*stroads*". A "*stroad*" is a type of thoroughfare with a mix of street and road characteristics that typically prioritize vehicular traffic. They are often too wide and fast, with speed limits exceeding 40 mph, have multiple intersections to facilitate vehicular traffic flow efficiently, and frequently allow right turns on a red signal. Pedestrian and cycling amenities are minimal, sidewalks lack buffers, crosswalks are poorly marked, and very little shade or tree cover is provided. Typically occurring at intersections and driveways, conflicts noted in the study area include drivers often looking towards oncoming traffic or initiating a turn before looking for pedestrians or cyclists coming from the other direction on the sidewalk. Despite these characteristics, no roadway in the study area was identified as a high bicycle crash segment.

The bicycle network's fragmentation and lack of continuity limit its full potential. Most bicycle pathways or lanes are for leisure, and the system could benefit by connecting to job centers, places of interest, or other regional amenities. With an expanded network, bicycling and walking could potentially replace trips under three miles, which account for over a third of vehicular trips in Miami-Dade County.

The area's access to bicycle amenities is augmented by a bike-sharing program. Bike-sharing programs typically come in two main formats: docking and dockless systems. Docking systems involve renting bikes from designated stations, known as docks, which are equipped with technology-enabled bicycle racks. Users can pick up a bike from one dock and return it to another within the system. Dockless systems, on the other hand, operate without fixed stations, relying instead on smart technology to locate and unlock available bikes.

In Miami, the CitiBike program offers a docking system bike-sharing program that also extends into Miami Beach, adjacent to the study area. There are more than 160 bike station locations that are available year-round. Use of the CitiBike system is through a membership pass or an hourly rental. Individuals registered with the program and nonmembers that have the application on their phones can acquire a bike at any of the stations. **Map 8** showcases the over 160 current station locations where the public can rent bicycles through the CitiBike sharing system.



Map 8. Citi Bike Miami station locations.

Of the 160 stations, thirty-nine stations were identified within the study area, and a total of 75,692 bicycle rentals were documented for the CitiBike stations for the period between January 2023 to July 2023.

The three top performing stations with the greatest use are located at:

1. N. Bayshore Drive between SW 17 Street and SW 18 Street (6,055 rides)
2. NE 1 Street and Herald Plaza (5,610 rides)
3. Biscayne Boulevard and NE 15 Street (4,424 rides)

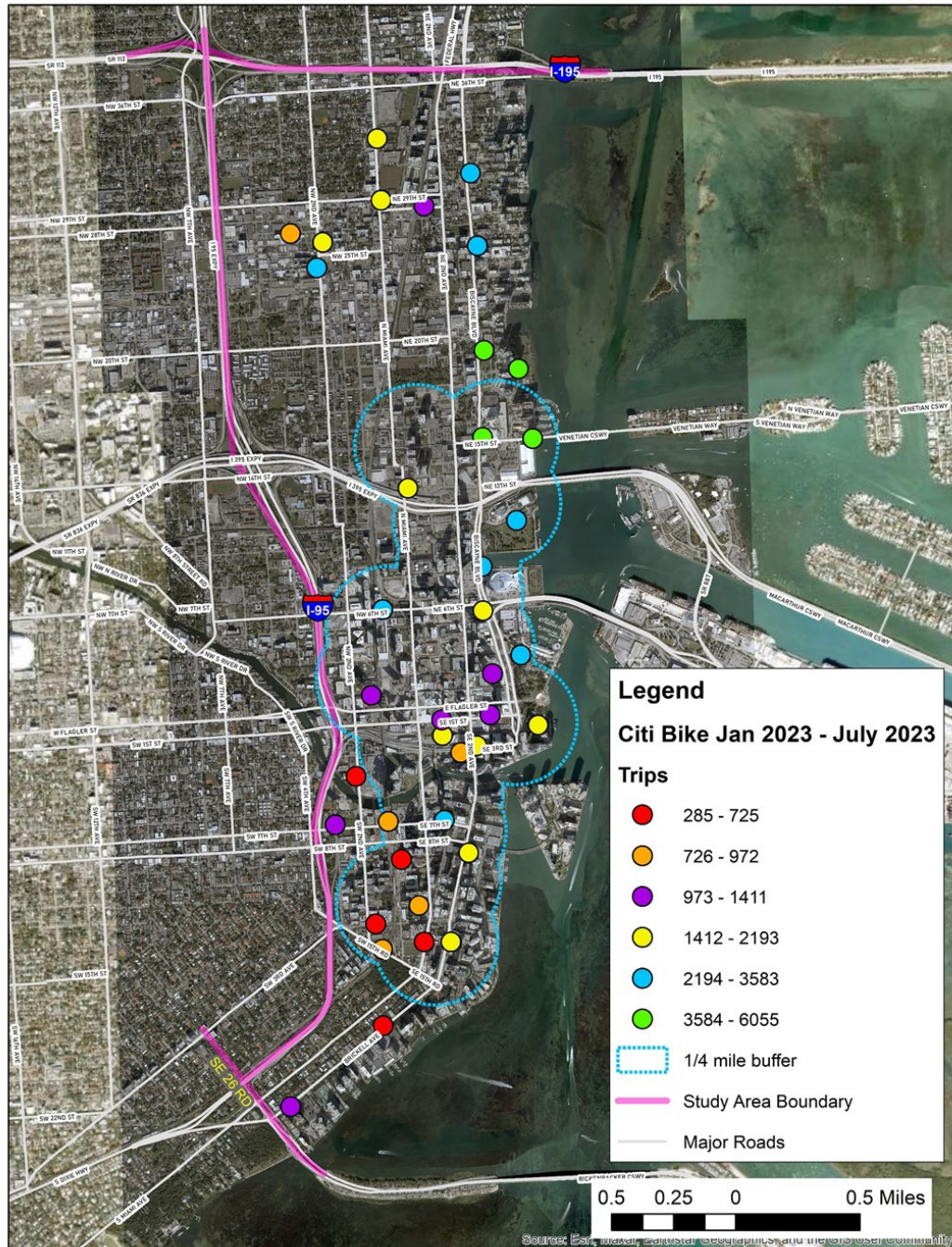
These three stations are located near the Venetian Causeway. This correlates with the findings from Strava pedestrian and cyclist heat maps, highlighting that the causeway is a frequent and preferred path for users.

The three stations with the lowest rentals or rides were located at:

1. Miami River Side Center at 444 SW 2 Avenue (285 rides)
2. SE 14 Street and South Miami Avenue (545 rides)
3. SW 13 Street and SW 2 Avenue (641 rides)

These locations are mostly in the Brickell area.

Of the 39 stations, 25 are located within a ¼ mile of a Metromover station and can be an effective first- and last-mile option. Map 9 shows the bikeshare station locations within study area. It must be noted, CitiBikes are not permitted on the Metrorail or Metromover systems. Miami-Dade Transit Security and local police are authorized to stop anyone who fails to comply and may retain the bike(s).



Map 9. Map of Citi Bike station locations within study area.



Map 10. Major pedestrian and bicycle trails connecting to the study area

CONNECTIVITY TO MAJOR TRAILS

The assessment includes an evaluation of bicycle and pedestrian connectivity to The Underline, and the overall connectivity of the Rickenbacker Trail, the Commodore Trail, and the Venetian Trail to The Underline and the general study area. Map 10 depicts this study's boundaries.

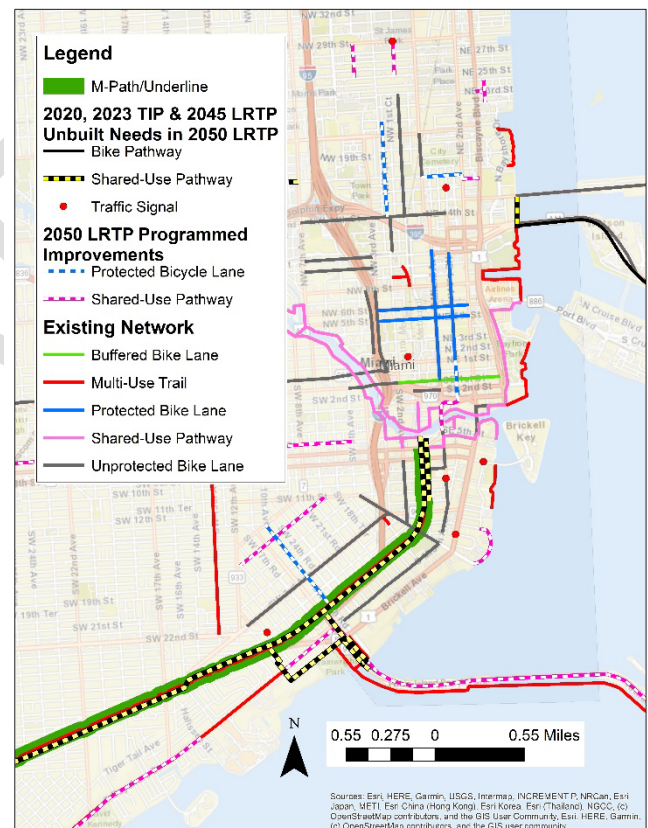
The Underline serves as the vital spine in the intricate network of regional trails. **Map 11** illustrates The Underline's seamless linkages to completed and proposed trail connections. Spanning approximately 10 miles, the trail follows the Metrorail line overhead, functioning as a linear park and a unifying thread for the diverse communities it connects, including Downtown, Brickell, Coconut Grove, and the South Miami-Dade communities.

In addition to its role as a trail, The Underline significantly enhances accessibility by seamlessly integrating with various modes of transportation, including the Metromover, Metrorail, Metrobuses, and municipal trolleys. This connectivity extends to a total of eight of the 23 Metrorail stations.

The Underline also connects with The Commodore Trail along SE 32 Avenue and South Miami Avenue. A shared use pathway is planned to improve that connection in the 2050 LRTP. **Map 10** illustrates the overall existing and programmed bicycle network in relation to The Underline. Based on the network reviewed, adequate connections are provided from The Underline to the Miami River Greenway. However, the Venetian Causeway is limited to a connection between Herald Plaza, NE 15 Street, and MacArthur Causeway.

Overall, only approximately 1.5 miles of The Underline are within the study area. **Map 11** shows the portion of the segment that runs from the south bank of the Miami River to SE 26 Road, or the southern boundary of the study area. Improvements programmed for implementation are needed in the area and will reinforce connections to other regional trails like the Rickenbacker Trail and the Commodore Trail.

In addition to The Underline trail, the Commodore Trail, Rickenbacker Trail, and the Venetian Causeway were evaluated to assess their connectivity and access to Downtown Miami.



Map 11. The Underline and existing bicycle network

The Rickenbacker Trail



The Rickenbacker Trail connects the City of Miami with Bill Baggs Cape Florida State Park and runs a total of 8.5 miles. It is developed through a mix of on-street bicycles lanes, paved multiuse pathways, and sidewalks. It provides access to cultural sites, educational facilities, and plenty of water sports opportunities. **Figure 7** is a map prepared by Miami Dade County highlighting the points of interest along the trail.

The multiuse/shared use pathway portion of the trail runs for an approximate length of 4.2 miles, beginning at Brickell Avenue and SE 26 Road and extending to near the Crandon Park Marina. Users can continue and connect to the Village of Key Biscayne through the portion of the Trail (approximately 2.4 miles) that traverse through Crandon Beach Park and culminates at Rickenbacker Circle on Crandon Boulevard/SR 913. To access, users must cross Crandon Boulevard/SR 913 at the designated crosswalk near the trails-end at the Marina. The multiuse trail provides off-road access for cyclists and pedestrians for a total of 6.6 miles, which are complemented by on-road, unprotected bicycle lanes that follow the same route of the trail on both directions of the Rickenbacker Causeway and Crandon Boulevard/SR 913.

The Rickenbacker Trail stands as one of the busiest bicycling and running routes in Miami-Dade County. According to the Miami-Dade Department of Transportation and Public Works (DTPW), cyclist and pedestrian counts for Rickenbacker Causeway are estimated at approximately 500,000 cyclists and 250,000 pedestrians per year.

Connections between the Rickenbacker Trail and The Underline are being improved through the following unbuilt LRTP 2045 Cost Feasible Projects to be included in the 2050 LRTP:

- 0.91 mile shared use pathway on SW/SE 26 Road from SW/SE 32 Road, crossing South Miami Avenue and connecting to Brickell Avenue and the Rickenbacker Causeway.

Within the study area, a segment of the Commodore Trail (4.37 miles total) is proposed. The shared-use path segment on South Miami Avenue between SW/SE 32 Road and the Rickenbacker Causeway will connect the three trails: The Underline, the Rickenbacker Trail, and the Commodore Trail.

The 2050 LRTP will also include the following unbuilt LRTP 2045 Needs Plan project improving connections to the Rickenbacker Trail:

Figure 7: Proposed location map for Rickenbacker Causeway Master Plan

- Improvements to the shared use pathway on the Rickenbacker Causeway/SR 913 from South Miami Avenue to Crandon Boulevard for a total length of 3.96 miles.

The TPO has also identified Plan Z, shared use pathway project for inclusion in the 5-year planning period. Plan Z was developed by architect and urban planner Bernard Zyscovich, envisioning turning the Rickenbacker Causeway into a *“scenic road through a park,”* by prioritizing bicycle and pedestrian facilities and spaces. The proposed plan was designed to comply with the Miami-Dade Parks, Recreation and Open Space (PROS) Master Plan, and has been approved by the Miami-Dade Metropolitan Planning Organization’s Bicycle and Pedestrian Advisory Committee. Renderings of the proposed Plan Z segments with the study area are illustrated in **Figure 8**.



Figure 8: [Rendering of Plan Z](#)

Additionally, DTPW is in the process of finalizing a Master Plan that will develop a holistic planning framework for the Rickenbacker Causeway. The study area extends along SW/SE 26 Road and the Rickenbacker Causeway from I-95’s northbound on-ramp to the Key Biscayne Village boundary, and includes coordination with the Village of Key Biscayne, the Miami-Dade County Police Department (MDPD), and PROS. **Figure 9** depicts the proposed improvements to the Rickenbacker Causeway pedestrian and toll booth designs.

Key features of the Rickenbacker Causeway Master Plan will include:

- Coastal resiliency, vehicular traffic flow, bicycle and pedestrian safety, and recreation improvements along the Rickenbacker Causeway to preserve the Causeway’s beauty, heritage, and function.
- Addressing roadway and bridge storm surge and sea level rise impacts.
- Performing a traffic lanes analysis and redesign to provide improved vehicle access on and off Virginia Key and the Village of Key Biscayne.
- Improving traffic flow and public safety, including creating separated and dedicated bicycle and pedestrian pathways.

- The expansion of parkland and beachfront along the Rickenbacker Causeway.

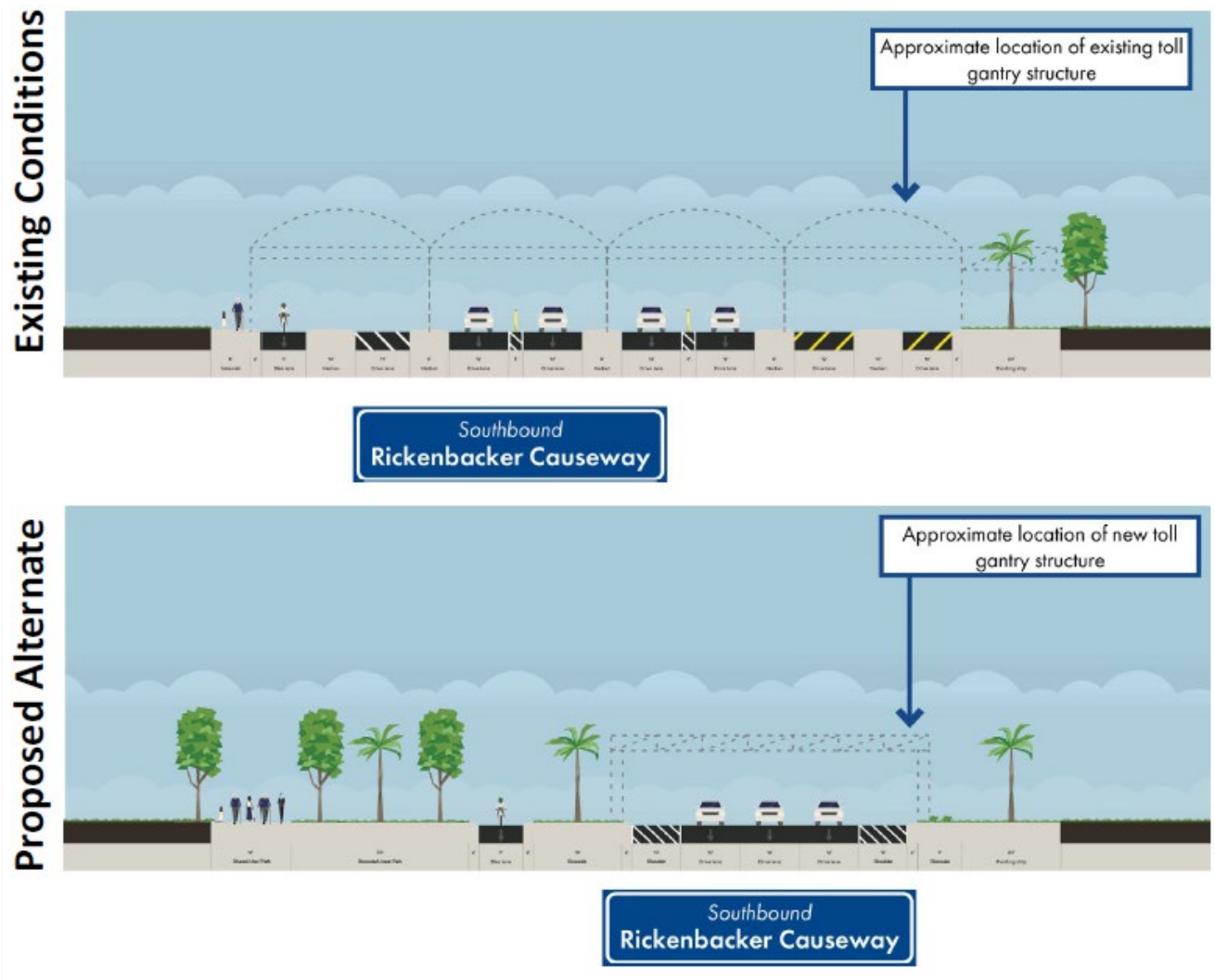


Figure 9: Example of proposed pedestrian and bicycle improvements to toll plaza on Rickenbacker Causeway being analyzed as part of the Master Plan.

Venetian Causeway

East and west access from the study area to Miami Beach is provided through three routes: the MacArthur Causeway, the Julia Tuttle Causeway, and the Venetian Causeway. The MacArthur Causeway is equipped with unprotected bike lanes and has a maximum speed limit of 45 mph. The Julia Tuttle is less bicycle friendly, equipped with paved shoulders for bike access and has a maximum speed limit of 55 mph. Alternatively, the Venetian Causeway cuts through the mostly residential Venetian Islands and has a maximum speed limit of 30 mph, making it a preferred route for pedestrians and cyclists.

The Venetian Causeway begins at the bridge on NE 15 Street, one block east of Herald Plaza, and traverses approximately 3 miles through the Venetian Islands, culminating at Dade Boulevard, near Lincoln Road in Miami Beach. **Figure 10** depicts the Venetian Causeway heading South toward Downtown Miami. Both, the east and west roadways are equipped with unprotected bike lanes. Improvements have been programmed in the TIP to replace the bridges along the Venetian Causeway to address storm surge and sea level rise impacts, improve the safety of pedestrians and cyclists, and ensure the traveling safety of Venetian Island residents and visitors.

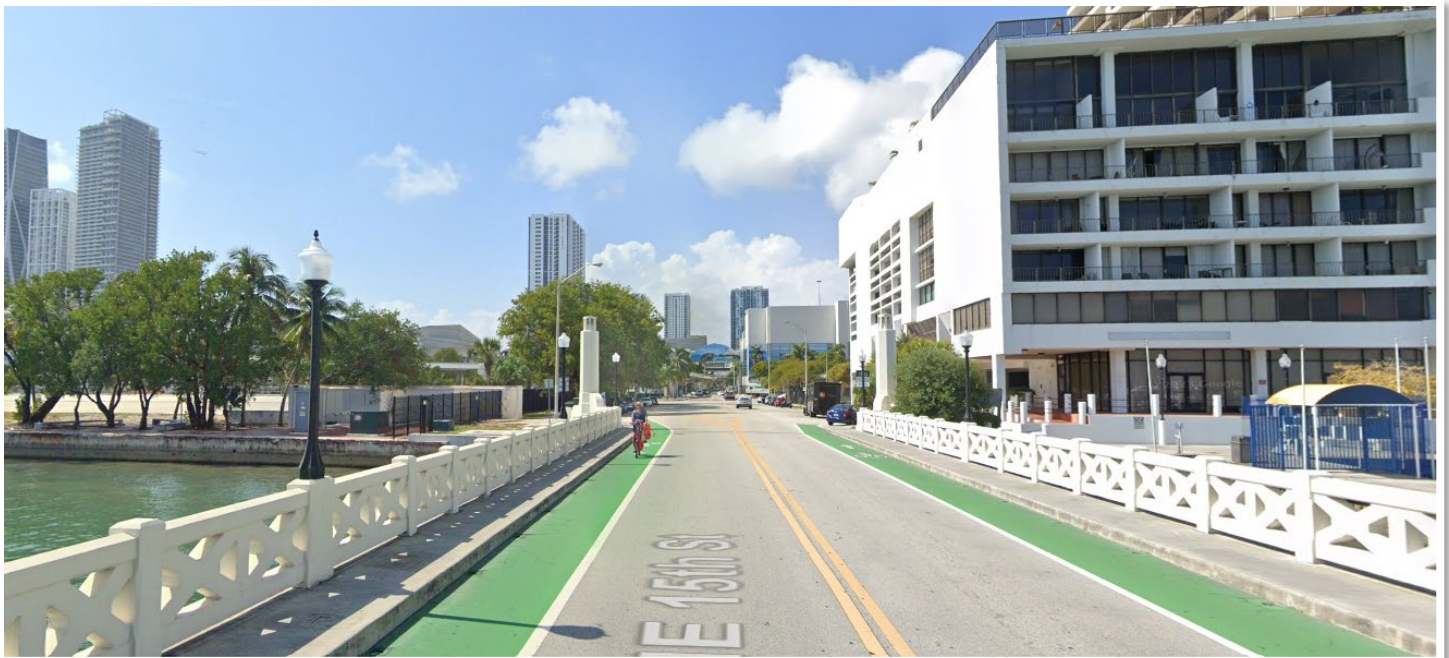


Figure 10: Google Street View of Venetian Causeway heading west towards Miami.

The following project will help improve the connectivity of the Venetian Causeway within the study area. The project was identified in the 2050 Bicycle and Pedestrian Master Plan's assessment and are anticipated for inclusion in the 2050 LRTP.

- The Underline/M-Path connection from SW 12 Street via Miami Avenue up to NE 17 Street. The project is an LRTP 2045 Needs Plan under the SMART Plan Terminal Connector unbuilt facilities.

The Commodore Trail

The Commodore Trail is a 5-mile-long pedestrian and bicycle trail connecting Old Cutler Road to the Rickenbacker Causeway as seen in **Figure 11**. The north-south route provides two-way travel along the trail located on the east side of SW 37 Avenue/Main Highway/South Bayshore Drive/South Miami Avenue. The Commodore Trail is a popular route that provides a shaded trail connecting Coconut Grove with Brickell. A master plan to redevelop the trail is in process, where existing concerns identified include repair and maintenance of asphalt, and poor crossing intersection at South Miami Avenue and SE 32 Road. This intersection connects the Commodore Trail to The Underline, and the encroachment of the trail by street vendors and golf carts, particularly around the Mercy Hospital and the Vizcaya Museum and Gardens.

Guiding principles for the redevelopment of the trail include the protection of existing trees and an increase in canopy coverage with more shade trees. Protection of historic elements is critical and shall only be altered if they threaten trail users' safety or limit ADA accessibility. A reduction of lane widths, asphalt, and, in some cases, the excess vehicular capacity, wherever possible, were recommended to improve the corridor for all users.

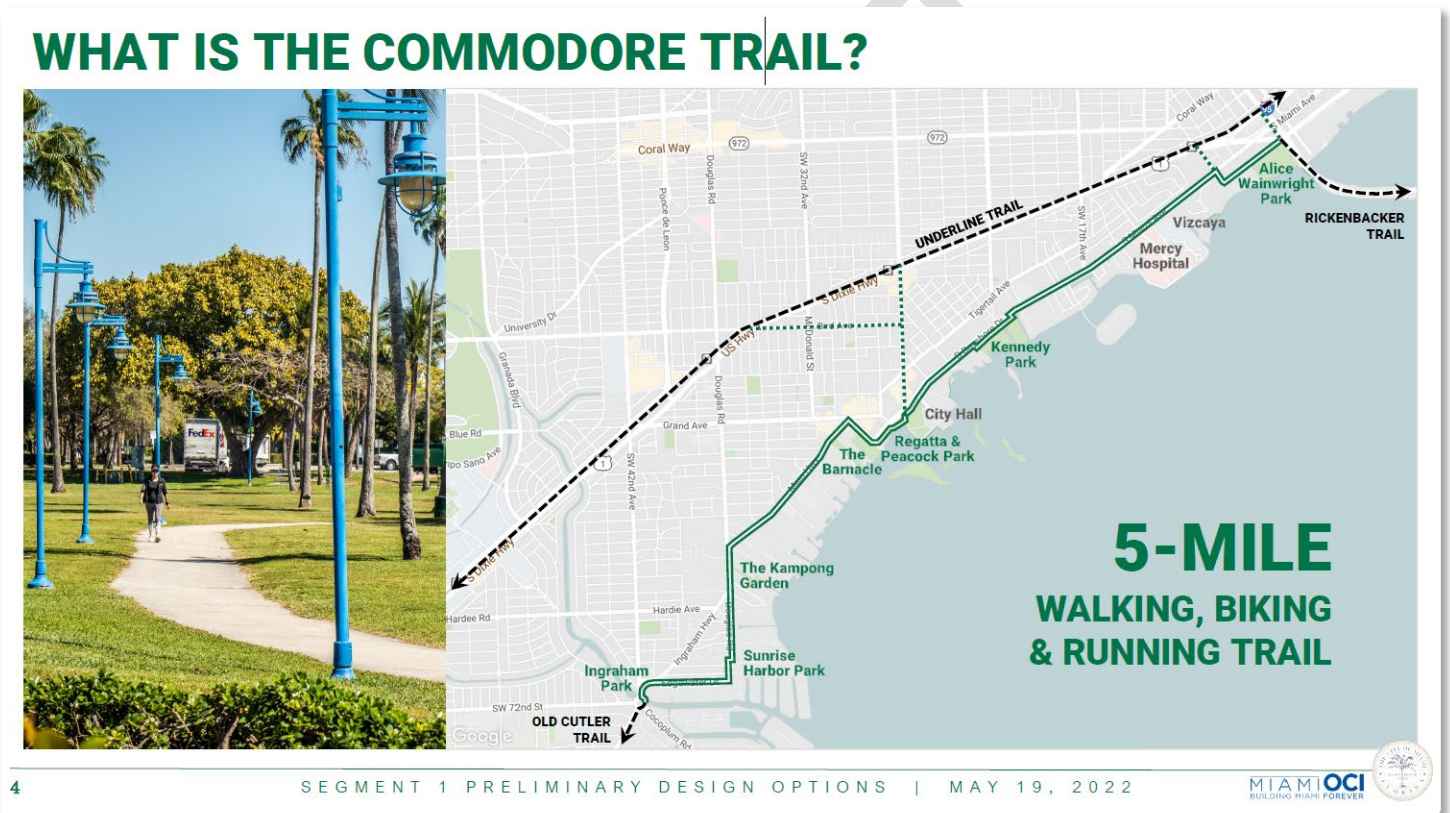
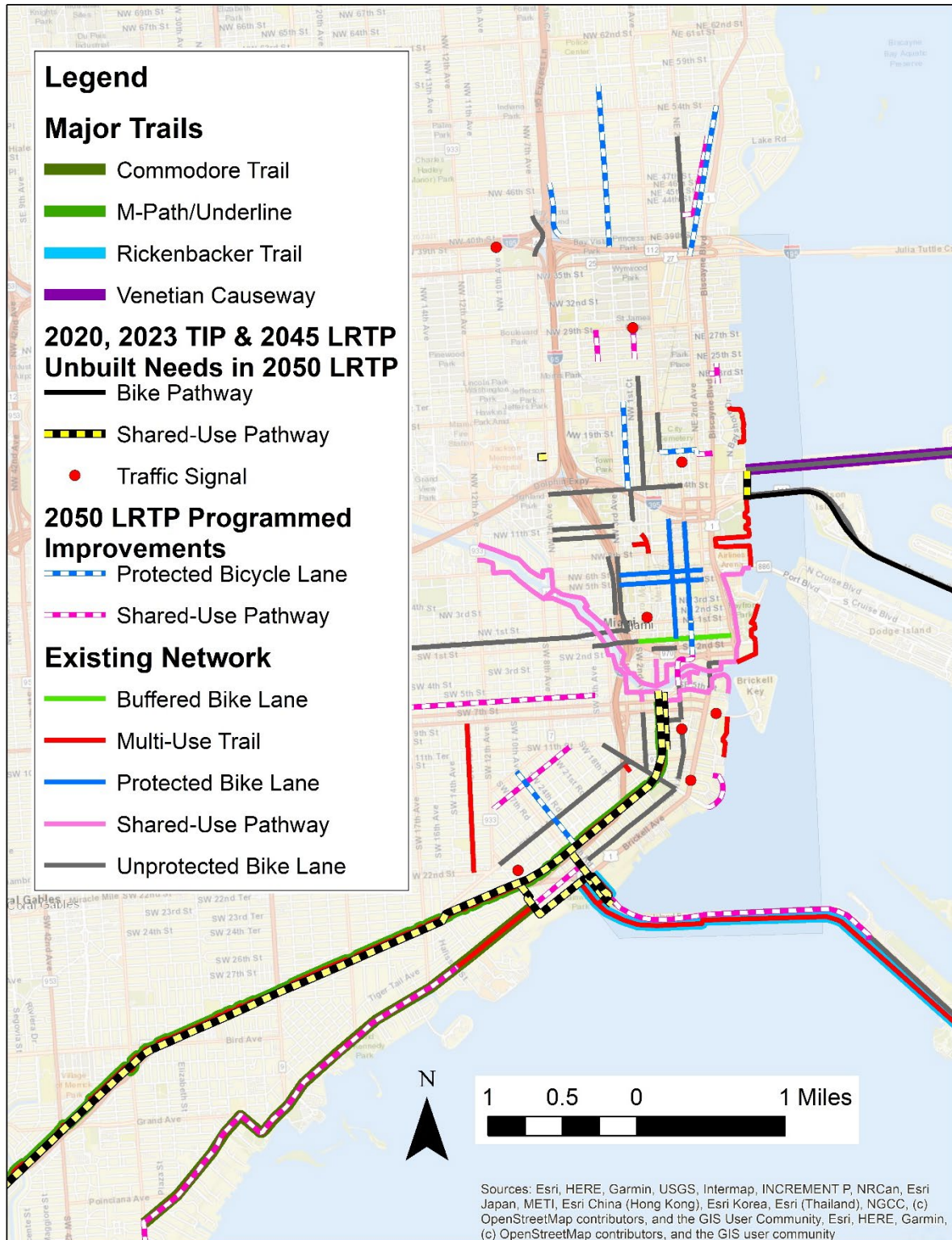


Figure 11: Map of the Commodore Trail

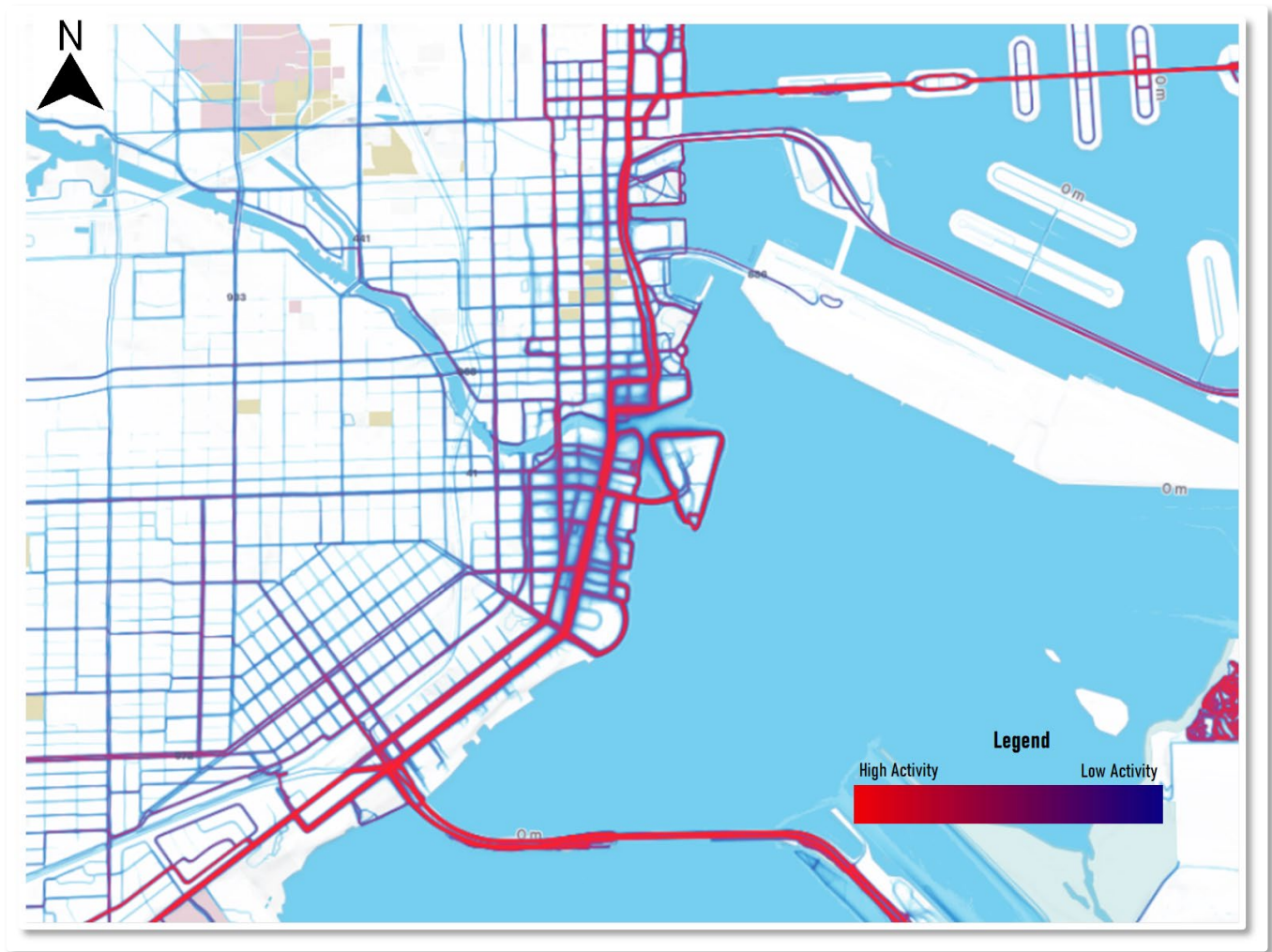
As demonstrated in **Map 12**, The Underline has established connections to major trails but can improve with more dedicated ped/bicycle facilities connecting to it. Improvements outside the study area can also enhance its functionality and connections to major trails by the surrounding neighborhoods. For instance, "The Roads" neighborhood has a planned bicycle lane route leading into The Underline. On the other hand, the Venetian Causeway is a heavily used trail but it lacks connectivity once it culminates in the City of Miami, particularly lacking connections directly south of NE 15 Street with continuous dedicated facilities to west of the Omni area.



Map 12. The Underline Project Area with the Other Trails and Programmed Mobility Improvements

Heatmap Analysis

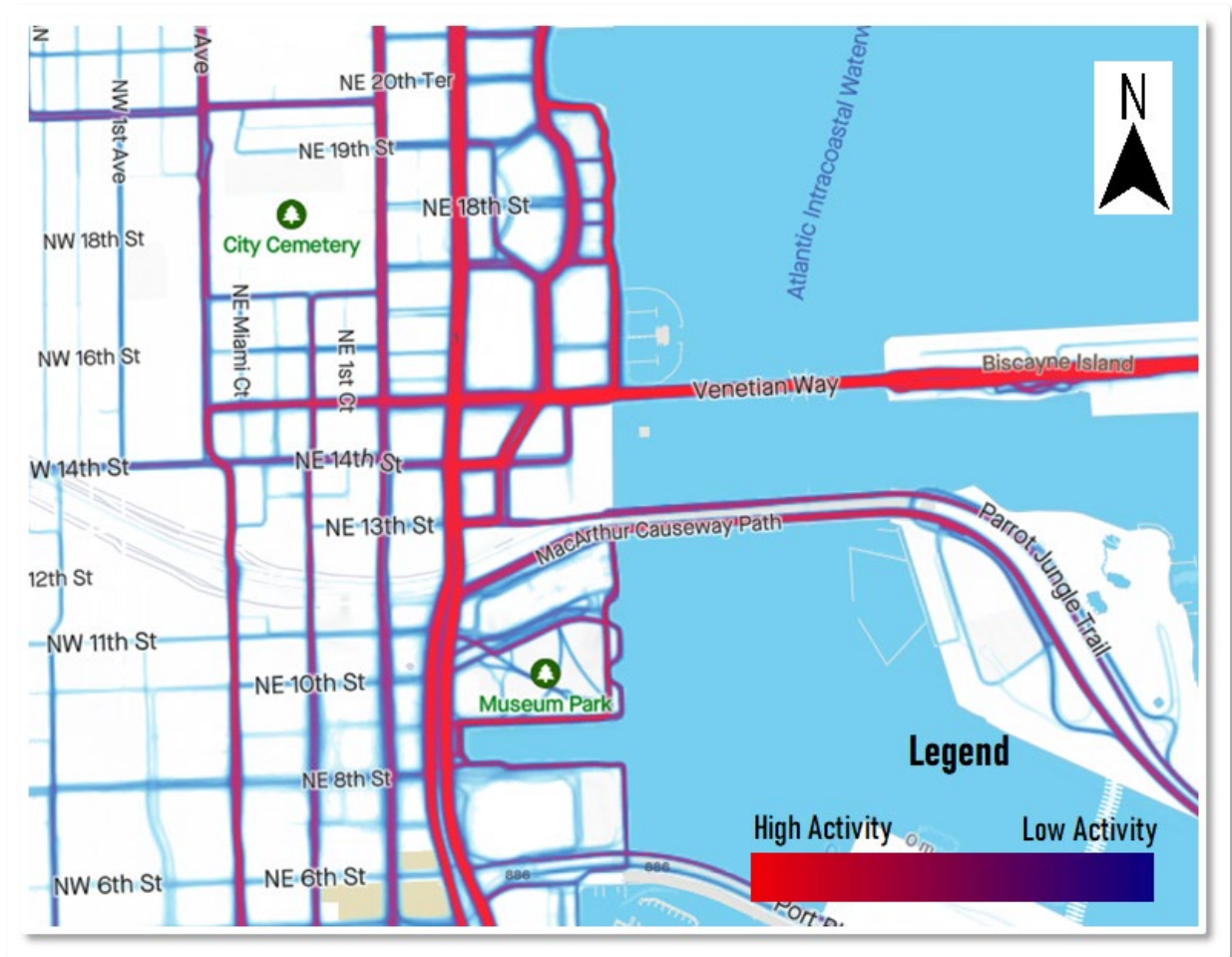
In addition to the connectivity evaluation, a heatmap analysis using Strava METRO data supplements the assessment by highlighting the routes most frequently used by cycling and pedestrian users as seen in **Map 13**. While Strava METRO data is self-reported by users, it provides valuable insights into areas where frequent users feel more encouraged or comfortable walking or cycling.



Map 13. A Strava heatmap showing routes where bicycle and pedestrian use is concentrated

The Rickenbacker and Commodore trails experience heavy usage. Planned improvements in the 2050 LRTP target areas with demonstrated high demand, as indicated on the heat map. For example, a shared use pathway is proposed to connect the Rickenbacker Trail to The Underline at SW 32 Road. Additionally, facilities are required to extend past South Miami Avenue along SW 26 Road. The 2050 LRTP includes provisions for protected bicycle lanes along SW 26 Road from the Rickenbacker Causeway to South Miami Avenue.

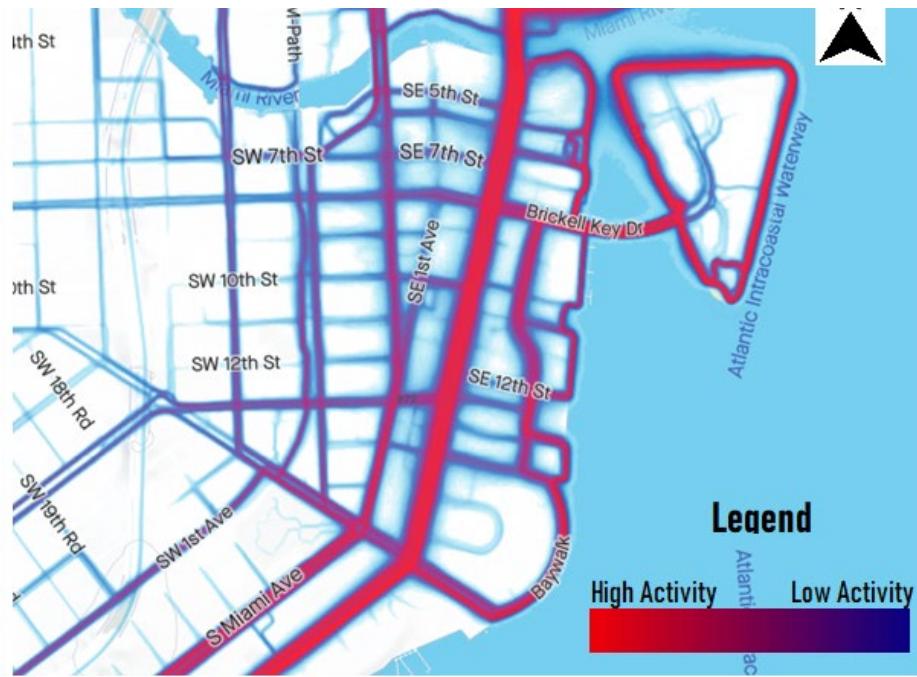
Connections to The Underline within Brickell primarily utilize SW 14 Street, SW 20 Street, SE 7 Street, and SW 8 Street. Currently, there are no existing or planned facilities along these routes. An unprotected bike lane is present on SE 9 Street to South Miami Avenue.



Map 14. Strava Heatmap of northeast quadrant of study area showing of the Venetian Causeway

The Venetian Causeway heat map analysis demonstrates that there is a demand by pedestrians and cyclists as seen in **Maps 13-16**. Needed improvements shall be provided between Biscayne Boulevard and North Miami Avenue. Also, north of the route, there is frequent ridership on east-west roadways taking place on roads without bicycle amenities such as bicycle lanes or shared pathways. **Map 13** also shows the user propensity to go through Herald Plaza and connect to NE 14 Street. There are no bicycle facilities providing connections in these areas.

Map 15. Segment of the Underline between SE 15 Road and the Miami River



Map 15. Segment of the Underline between SE 15 Road and the Miami River



Map 16. Heatmap of the Rickenbacker Causeway

Conclusion

The study assessed the connections between the existing and programmed bicycle and pedestrian improvements to transit and regional trails within the study area. Findings show the core and Metromover facilities are adequately connected to bicycle facilities within a quarter-mile buffer or a 5-minute walk. Metrorail facilities within the study area are also adequately served by facilities within the same distance. However, stations adjacent to the study area can benefit from east-west connections into the study area. Major trails connecting to and within the study area were evaluated and determined that program improvements are in line with user demand. Heatmap analysis compared to the map of programmed improvements corroborated these assumptions. Future connections to trails should consider the replacement of unprotected bicycle lanes with enhanced protection features or separation and look to make access to The Underline more porous. There is a noted lack of bicycle amenities in the north and west areas of the study. Planned improvements mitigate the north-south connections but severely lack east and west accessibility. Improvements should be considered for NE 36 Avenue and NE 29 Street for east/west connections through to Biscayne Boulevard.

When feasible, facilities should also be constructed north and south of I-395 and coordinated with the proposed improvements recommended in The Underdeck Plan. Interstate highways and the Miami River continue to be barriers to the study area. Improvements like the Miami River Greenway and the side path proposed from SW 27 Avenue to SW 5 Avenue along SW 6 Street will encourage access to adjacent communities.

Recommendations:

1. Explore east-west connections toward Biscayne Bay, with pathways facilitating bicycle access south of I-395, and north-south access via the Margaret Pace and Bicentennial Park trails, connecting the School Board to the Venetian Causeway.
2. Utilize the Adrienne Arsht Center as a center point for uniting north and south regions, as well as for facilitating crucial east-west connections between Overtown and Biscayne Bay.
3. Provide the Museum Park area with both east and west connections to enhance its accessibility within the surrounding area.
4. Establish an east-west connection for NW/NE Eleventh Street, as this will become imperative for improving its integration within the transportation network.
5. Streamline transportation services and access to the Park West area, as this will be a precursor to east-west connectivity.
6. Strategize southern access points to and from historic and iconic destinations, e.g. The Freedom Tower, to enhance accessibility and convenience for visitors and occupants alike.
7. Vision, prioritize, and actualize the establishment of regional connections, with particular emphasis on facilitating access to The Underline and other major transit corridors, to enhance transportation efficiency and connectivity within the region.