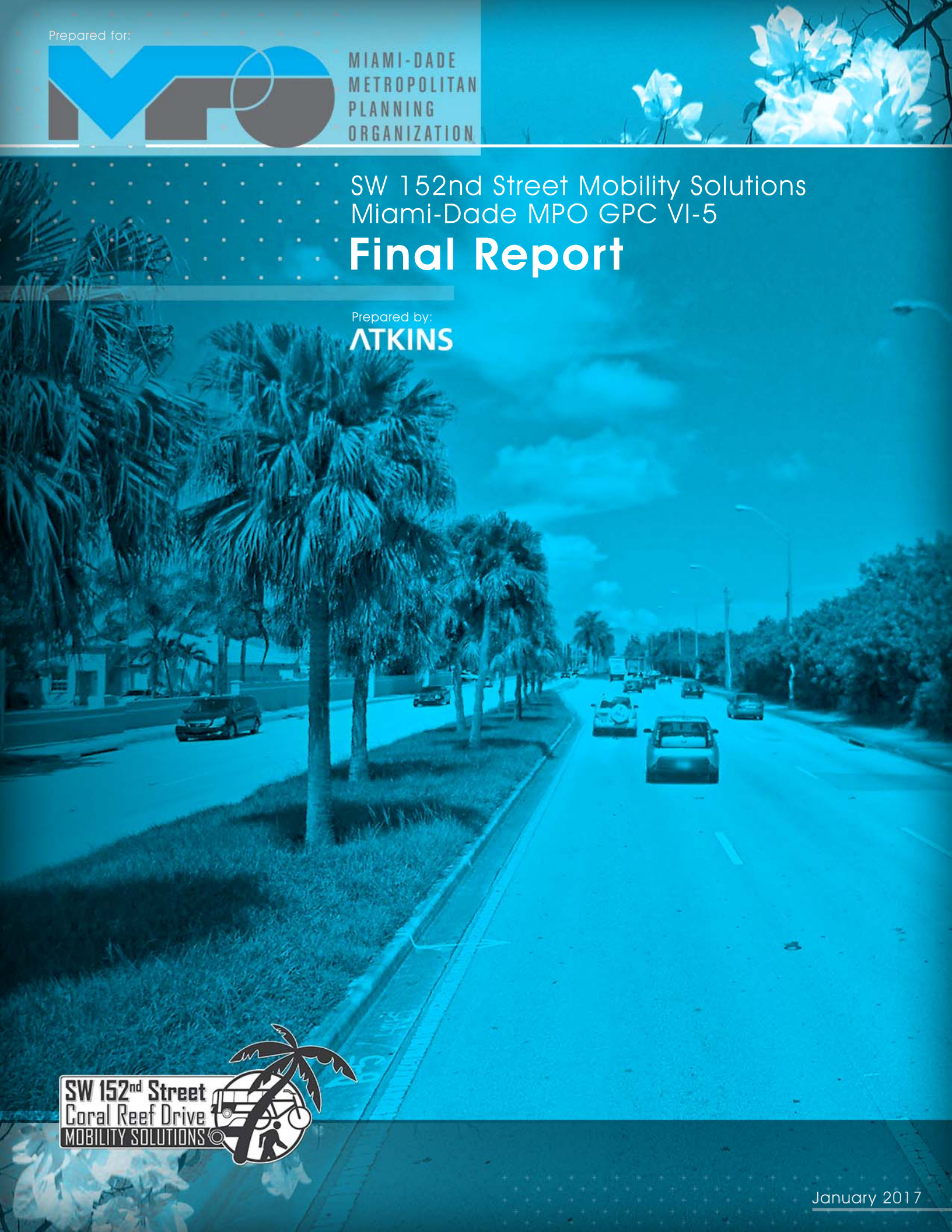
Prepared for:

MIAMI-DADE METROPOLITAN PLANNING ORGANIZATION

SW 152nd Street Mobility Solutions
Miami-Dade MPO GPC VI-5
Final Report

Prepared by:

ATKINS



SW 152nd Street Coral Reef Drive MOBILITY SOLUTIONS

January 2017

SW 152nd Street Coral Reef Drive MOBILITY SOLUTIONS

Work Order #GPC VI-5

Prepared for:

MIAMI-DADE METROPOLITAN PLANNING ORGANIZATION

Prepared by:

ATKINS

CALTRAN ENGINEERING GROUP, INC.
RENAISSANCE PLANNING GROUP, INC.
MEDIA RELATIONS GROUP, LLC

January 13, 2017

The preparation of this report has been financed in part from the U.S. Department of Transportation (USDOT) through the Federal Highway Administration (FHWA) and/or the Federal Transit Administration (FTA), the State Planning and Research Program (Section 505 of Title 23, U.S. Code) and Miami-Dade County, Florida. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

Table of Contents

Appendices

Exhibits

Tables

1.0 Introduction

Commuters using SW 152nd Street (Coral Reef Drive) routinely experience peak periods of traffic for work commute trips under congested traffic service conditions at some locations. In addition, the corridor does not provide a range of attractive mobility choices consistently along its length. The severity and duration of traffic congestion along this corridor has raised concerns about the comprehensive impact of current and future development along the corridor. To address these concerns, the Miami-Dade Metropolitan Planning Organization (MPO) commissioned this study to identify and recommend multimodal solutions that improve accessibility and mobility along Coral Reef Drive. The proposed transportation improvements will address both existing deficiencies and future demand.

The project began with a series of start-up tasks describing existing conditions and setting the groundwork for initial technical analysis and input from MPO's Transportation Planning Technical Advisory Committee (TPTAC). The TPTAC served as the steering committee for the study and supported the work of the project team, providing invaluable local knowledge from project start-up to the final study report. The study process and goals and existing conditions within the Coral Reef Drive corridor were discussed with the TPAC members during meetings on July 6, 2016 and September 7, 2016. The project team then shifted its focus to the development of multimodal alternative solution scenarios in the study corridor and related land use plan recommendations, which were presented to the TPTAC and Citizens Transportation Advisory Committee (CTAC) on November 2, 2016. The remaining work focuses on finalizing multimodal transportation recommendations, with a specific emphasis on accessibility and mobility improvement strategies in the study corridor.

1.1 Study Goals

As noted above, the study goals were developed by the study team in concurrence withe TPTAC members during a meeting held July 6, 2016. The study goals primarily focus on mobility, regional accessibility safety, affordability, choice, and livability. The objective of each goal is described below:

- **Mobility:** Move people and goods in an efficient manner. Focus on minimizing person delays across modes rather than focusing exclusively on minimizing vehicle delays.
- **Regional Accessibility:** Improve access to employment centers, educational opportunities, social and governmental services, and other modes of transportation.
- **Safety:** Reduce crash rates, severity of crashes (fatalities, serious injury crashes), and reduce conflict points.
- **Affordability:** Invest in transportation system improvements that improve the effectiveness of multimodal travel options while being cost economical to plan, design, and construct.
- **Travel Choice:** Enhance the availability and quality of other modes of transportation such as ride sharing, public transportation, bicycling, or walking, while maintaining the functionality of the existing roadway corridor.

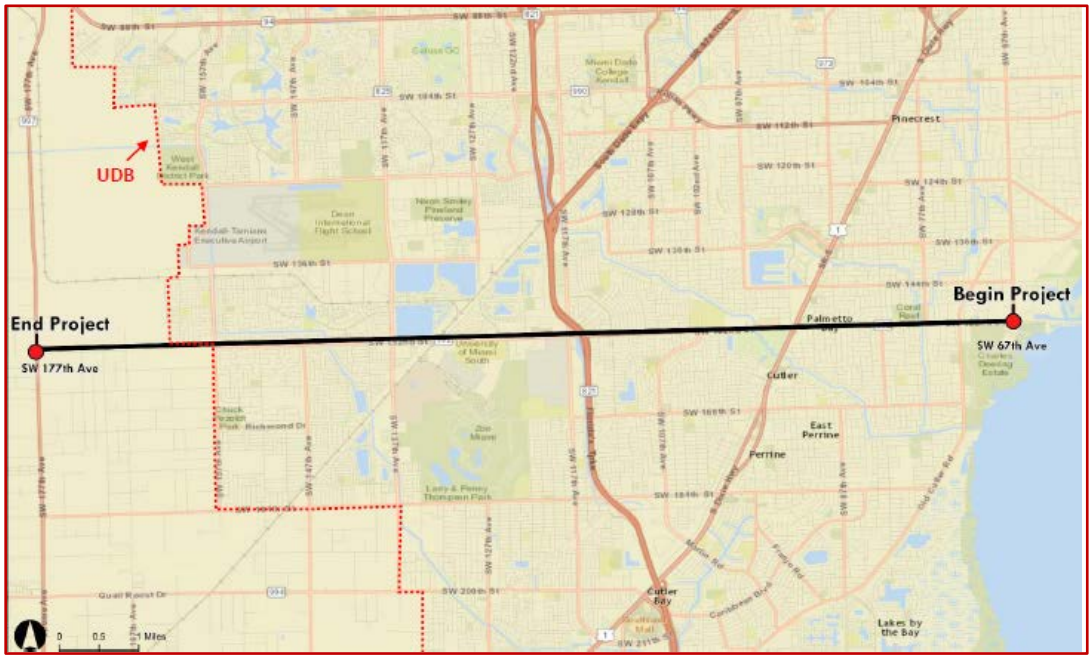
- **Livability:** Improve the quality of life and social equity by better integrating a multimodal transportation corridor into the corridor communities and their needs.

This initial screening of multimodal alternatives will be accomplished by assessing the alternative strategies and how well they meet the study goals and objectives according to general qualitative criteria.

1.2 Study Corridor Description

Coral Reef Drive lies southwest of the Miami's Central Business District. The study corridor is an 11.2-mile long roadway stretching from SW 67th Avenue (Ludlam Road) to SW 177th Avenue (State Road [SR] 997/Krome Avenue) (**Exhibit 1.1**). For analysis purposes, the study corridor is divided into three distinct sections: Eastern, Central and Western Sections.

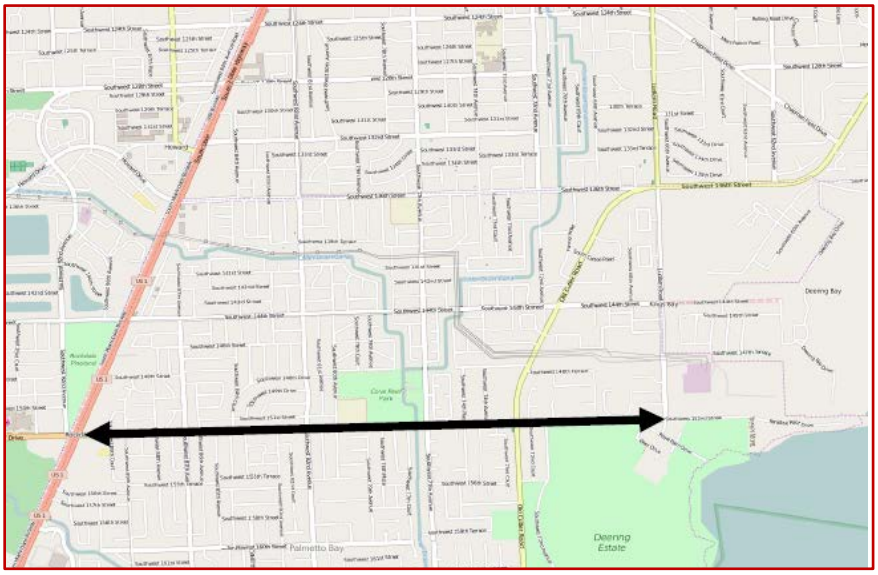
Exhibit 1.1: The Coral Reef Drive Study Corridor



1.3 Eastern Section

The eastern section of Coral Reef Drive begins at Ludlam Road in the Village of Palmetto Bay, and continues westward as a two-lane suburban street through residential areas. It passes Westminster Christian School at Ludlam Road and Coral Reef Elementary School at SW 79th Avenue with a student population of 1,072 and 834 students, respectively. Coral Reef Drive intersects Ludlam Road, Old Cutler Road, SW 77th Avenue, South Dixie Highway (U.S. Route 1[US 1]) and the adjacent South Miami-Dade Busway (**Exhibit 1.2**).

Exhibit 1.2: Eastern Section of the Study Corridor



1.4 Central Section

The central portion of SR 992/Coral Reef Drive begins at US 1 and proceeds west as a four-lane divided road, passing the residential areas of Richmond Heights and Palmetto Estates, Jackson South Community Hospital, Palmetto Golf Course, and Coral Reef Senior High School, which is located between SW 98th Court and SW 102nd Avenue (Fairway Heights Boulevard). The central segment of Coral Reef Drive ends at the Homestead Extension of Florida Turnpike (HEFT), which is also designated as SR 821 (**Exhibit 1.3)**.

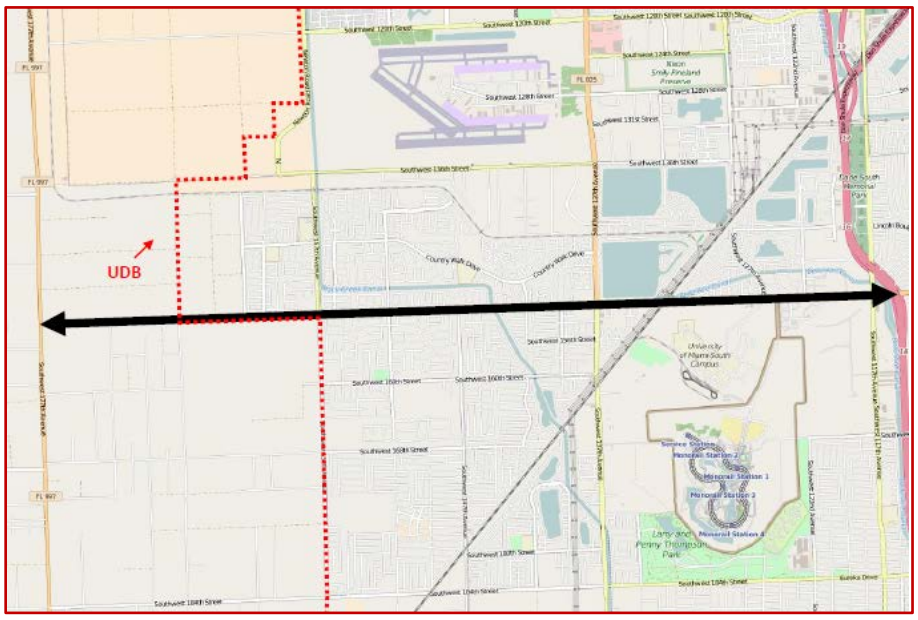
Exhibit 1.3: Central Section of the Study Corridor

1.5 Western Section

The western section of Coral Reef Drive begins at the HEFT and continues west as a six lane divided roadway until it reaches SW 137th Avenue, where it reverts to a four lane divided road until it reaches SW 147th Avenue (**Exhibit 1.4**). Between SW 147th Avenue and SW 157th Avenue, Coral Reef Drive is a two lane undivided roadway. At SW 162nd Avenue, Coral Reef Drive as a paved, platted road ends. Westward from SW 162nd Avenue, it is an unplatted and unpaved field road for approximately 1.5 miles until it reaches Krome Avenue. The western segment of Coral Reef Drive passes through three residential developments: Three Lakes, County Walk, and Richmond West. On the south side of Coral Reef Drive lies the former Richmond Naval Air Station site, now the site of the University of Miami South Campus, Gold Coast Railroad Museum and Zoo Miami. It intersects SW 177th Avenue, a CSX Homestead Subdivision rail corridor, and SW 137th Avenue (Lindgren Road).

The Comprehensive Development Master Plan (CDMP) identifies SW 162nd Avenue between SW 136th Street and Coral Reef Drive as a part of the alignment that forms the Urban Development Boundary (UDB). The UDB is a zoning tool that restricts certain types and densities of real estate development in the western and southern parts of the county, where ecologically-sensitive lands like the Everglades ecosystems, water conservation areas, and agricultural activities are located. The UDB was established as part of the 1975 land-use map of the county's CDMP. It was officially incorporated into the county's CDMP in 1983.

Exhibit 1.4: Western Section of the Study Corridor



2.0 Existing Conditions

This section of the report explores existing conditions, opportunities, and challenges in the Coral Reef Drive corridor. It addresses topics such as demographic characteristics, land use, urban form, and mobility. This section of the report represents a first step toward identifying possible

multimodal solutions for the corridor and ultimately recommendations to improve mobility in the study corridor.

2.1 Population and Demographic Trends

Population and demographic trends are primary factors affecting the land use pattern of communities, counties, and regions. The number of people, their age, the living arrangements in which they place themselves, the types of dwellings they choose to live in, and the places available to find employment all play an important role in how much land is needed to accommodate their choices. This section reviews the trends in population growth in Miami-Dade County in general and the projected population change that is expected to affect Coral Reed Drive and its use of land specifically.

Miami-Dade County includes approximately 1,946 square miles of land area, with an approximate 635 square miles covering the urbanized portion. The County is bounded on the north by Broward County, on the south by Monroe County, on the west by Collier and Monroe Counties, and on the east by the Atlantic Ocean.

Population in the County is expected to grow from 2.5 million in 2010 to 3.3 million by 2040. As of May 1, 2016, the population of Miami-Dade County, the most populous county in Florida, is estimated at 2.69 million. Since April 1, 2010, as economic conditions have improved significantly, the population has increased by an average of 32,200, or 1.3 percent, annually compared with an average increase of 14,800, or 0.6 percent, annually from July 2007 to July 2010. Net in-migration has accounted for 60 percent of population growth since 2010, when employment began to increase in the county, compared with 4 percent of growth from 2007 through 2010, a time of economic decline.

For the purposes of transportation planning studies and programs, the County TAZ structure is aggregated into six (6) transportation planning areas. The Coral Reef Drive corridor is in the southern planning area (**Exhibit 2.1**). The south planning area had the highest percentage of the total growth in the County at 50 percent while the west planning area had the lowest percentage of the total growth in the County at 13 percent. Population in the County is expected to grow by 811,067 across all planning areas. **Table 2.1** provides the expected growth by County planning area.

Exhibit 2.1: County Transportation Planning Areas

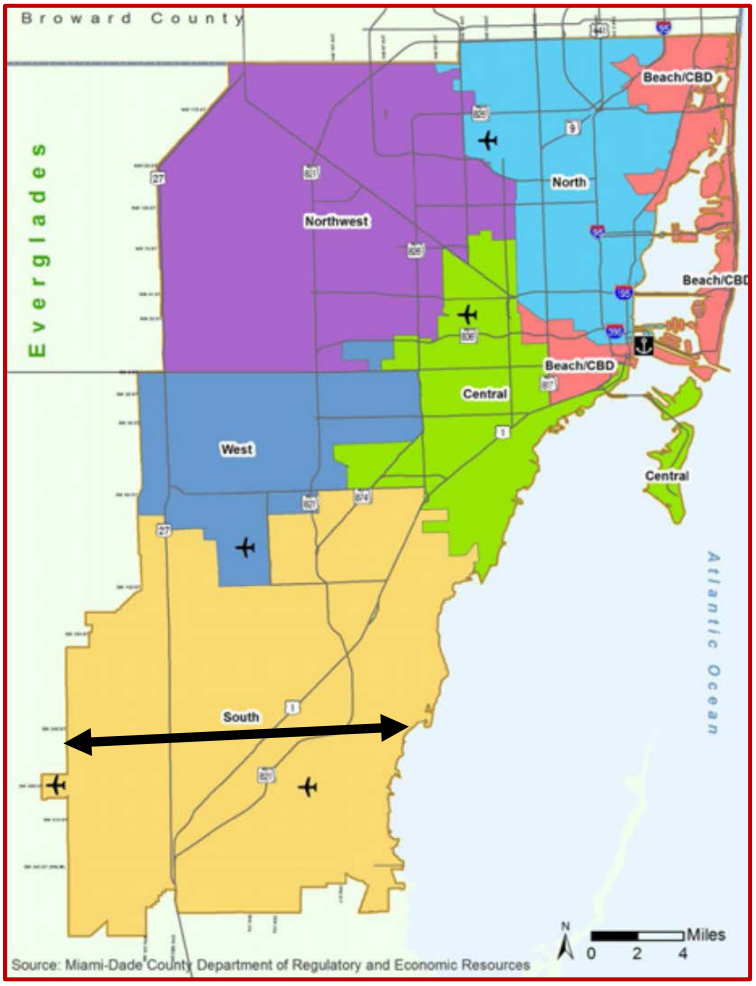


Table 2.1: County Population Growth by Transportation Planning Area

Planning Area	2010	2040	Change
Northwest	398,946 (16%)	478,861 (14.5%)	79,915 (20%)
North	513,938 (21.6%)	712,036 (21.5%)	198,098 (38.5%)
Beach/CBD	380,838 (15.3%)	543,806 (16.5%)	162,968 (42.8%)
Central	375, 758 (15.1%)	480,443 (14.5%)	104,685 (27.9%)
South	437,903 (17.6%)	654,943 (19.8%)	217,040 (49.6%)
West	386,927 (15.5%)	435,288 (13.2%)	48,361 (12.5%)
Total	2,494,310 (100%)	3,305,377 (100%)	811,067 (32.5%)

Note: Percent in columns 2010 and 2040 corresponds to percent of the total value in the column.

Table 2.2 provides the expected growth along the Coral Reef Drive corridor by section. The study corridor population is expected to grow by 23 percent between 2010 and 2040. The western section of the study corridor had the highest percentage of the total growth in the study corridor at 33 percent while the eastern section had the lowest percentage of the total growth in the study corridor at 11 percent. Overall, the population in the study corridor is expected to grow by 32,783 across all section areas.

Table 2.2: Growth in Population by Study Corridor by Section

Corridor Section	2010	2040	Change
Eastern Section	29,992 (20.6%)	33,304 (18.6%)	3,312 (11%)
Central Section	50,279 (34.5%)	58,324 (32.7%)	8,045 (16%)
Western Section	65,563 (45%)	86,989 (48.7%)	21,426 (32.7%)
Total	145,834 (100%)	178,617 (100%)	32,783 (22.5%)

Note: Percent in columns 2010 and 2040 corresponds to percent of the total value in the column.

2.2 Housing

The southwest portion of the county sprawls with low to mid-sized commercial buildings and low density housing, until ending abruptly at the Everglades. The median home value in the study corridor is currently $322,600. The Village of Palmetto Bay is quite upscale, while the Coral Reef Drive corridor in general is more middle class, and all suburbs to the south are a combination of wealthy and middle class U.S. migrants and retirees mixed in with similar strata from all over Latin America.

Exhibit 2.2: Housing Units in the Study Corridor

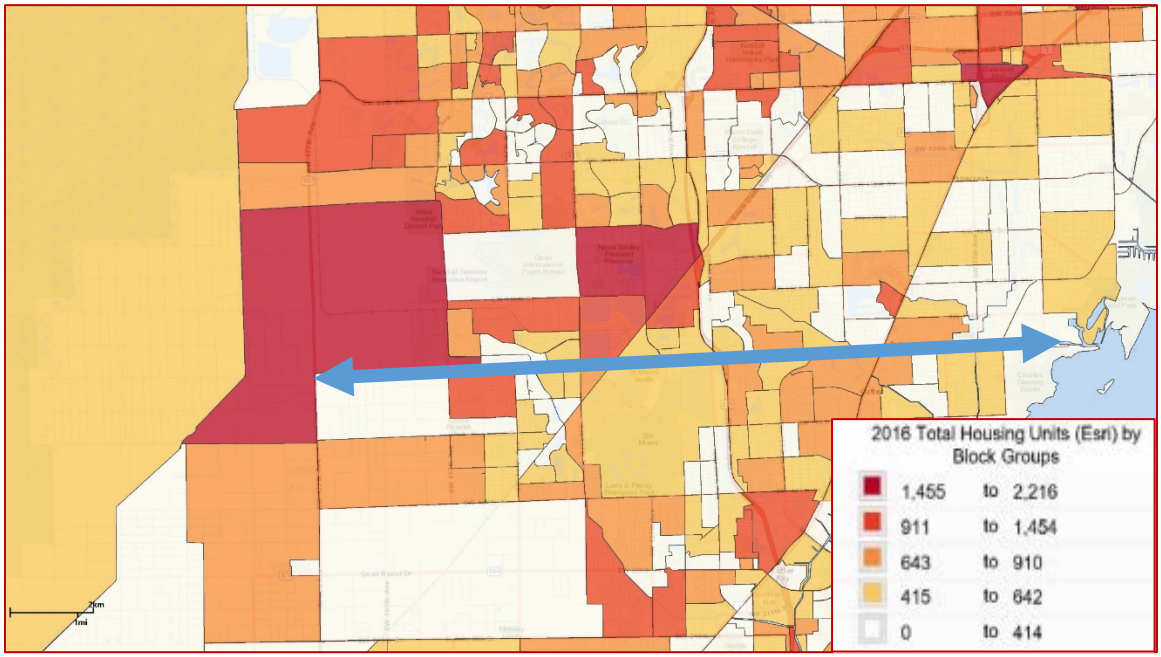
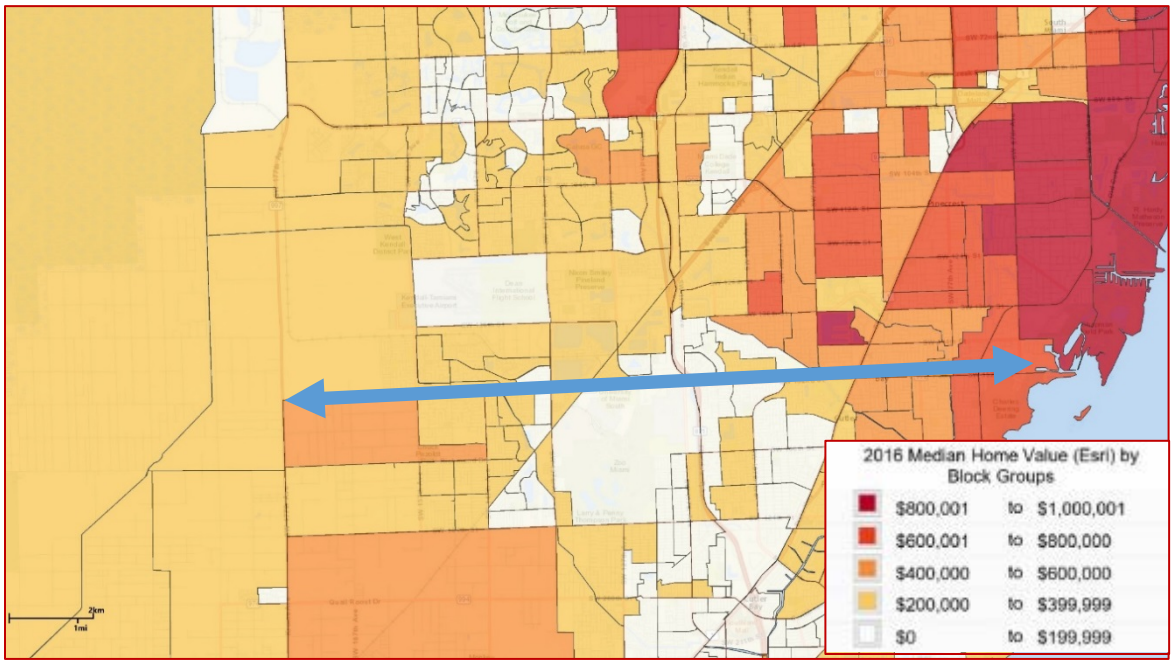


Exhibit 2.3: Median House Value in the Study Corridor



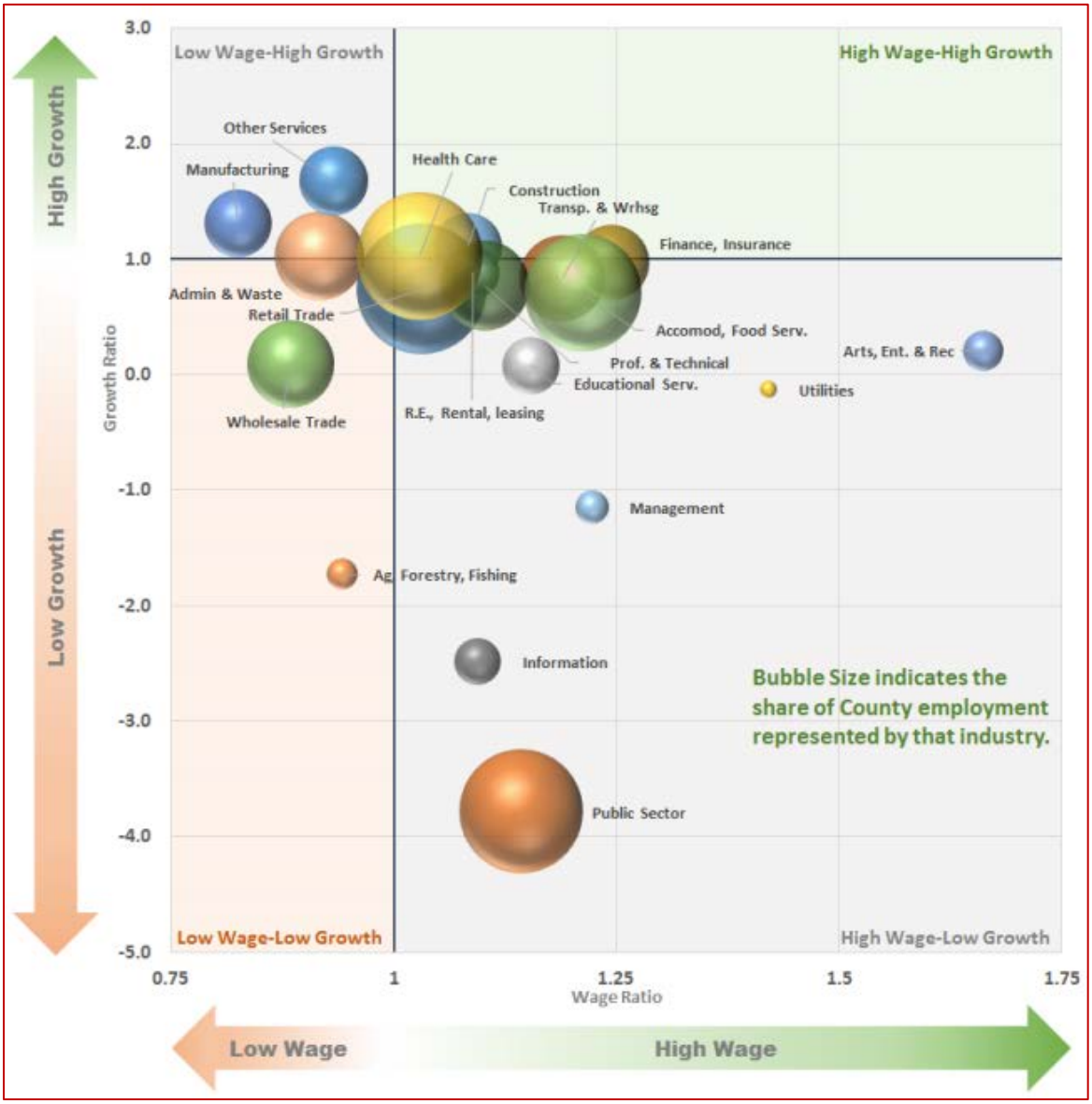
2.3 Employment

Important demographic trends will take place in the workforce over the next 10-15 years. The emerging patterns are the result of fluctuations in birthrates (low in the late 1920s and early 1930s, high in the late 1940s through the early 1960s, and modest growth in the late 1970s through the early 1990s). The population and labor force will continue to diversify, as immigration continues to account for a sizable part of population growth in Miami-Dade County.

Exhibit 2.4 below shows employment and wage growth in Miami-Dade County industries compared to the same industries statewide. Industries falling in the green quadrant on the top right are industries that have both higher average wage rates and a higher growth rate from 2014 to 2015 than the same industry statewide. At the other extreme, industries falling in the copper quadrant in the bottom left have both lower average wage rates and year-over-year growth rate than the corresponding statewide industry.

Overall, 79 percent of Miami-Dade County workers are employed in an industry with a higher average wage than their counterparts statewide. The biggest differential is in arts, entertainment and recreation, where the Miami-Dade average wage is 166 percent of the statewide average. The average wage for all workers in Miami-Dade in 2015 through the third quarter was $49,200, compared to $45,000 statewide. Just 31 percent of Miami-Dade workers are employed in an industry with a higher year-over-year growth rate than the statewide industry. Most Miami-Dade industries had growth rates very near the state industry, as can be readily seen from the exhibit, since most industry bubbles are clustered along the horizontal axis (growth ratio equal to 1). The one big exception is the public sector, where statewide growth was essentially flat (-0.3 percent), while Miami-Dade public sector employment declined 1 percent from 2014 to 2015.

Exhibit 2.4: County Industries Wage Level - Growth Rates Compared to Florida Averages



Employment opportunities in the vicinity of Coral Reef Drive are limited (**Exhibit 2.5**). The few employers in the area include Jackson South Community Hospital, Zoo Miami, Federal Correctional Institute, University of Miami South Campus, US Citizenship and Immigration Services, and numerous retail shops and small business offices bordering the Miami Executive Airport (formerly known as the Kendall Tamiami Executive Airport).

The annual economic impact of Miami Executive Airport is associated with direct impacts that come from tenants/businesses located at the airport and construction projects that are undertaken by the airport or by on-site businesses. Indirect impacts are associated with spending from visitors who arrive in the area via general aviation aircraft. The airport's total annual economic impact is depicted in **Exhibit 2.6.**

Exhibit 2.5: Employment in the Study Corridor

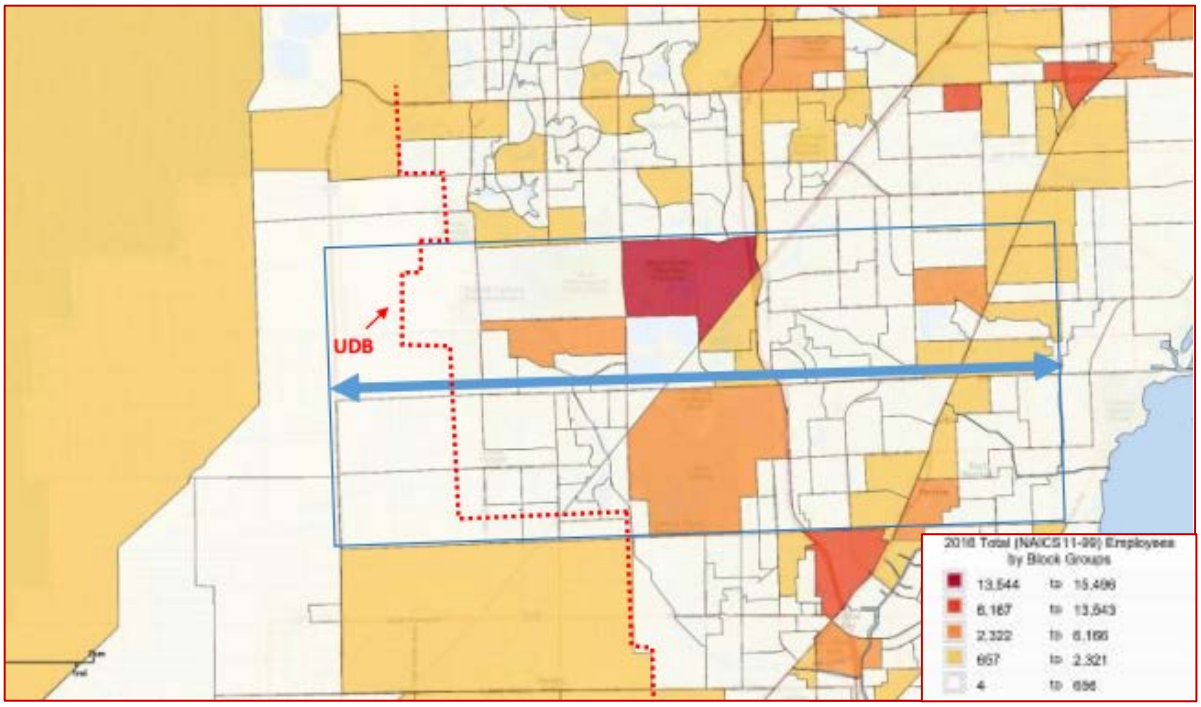
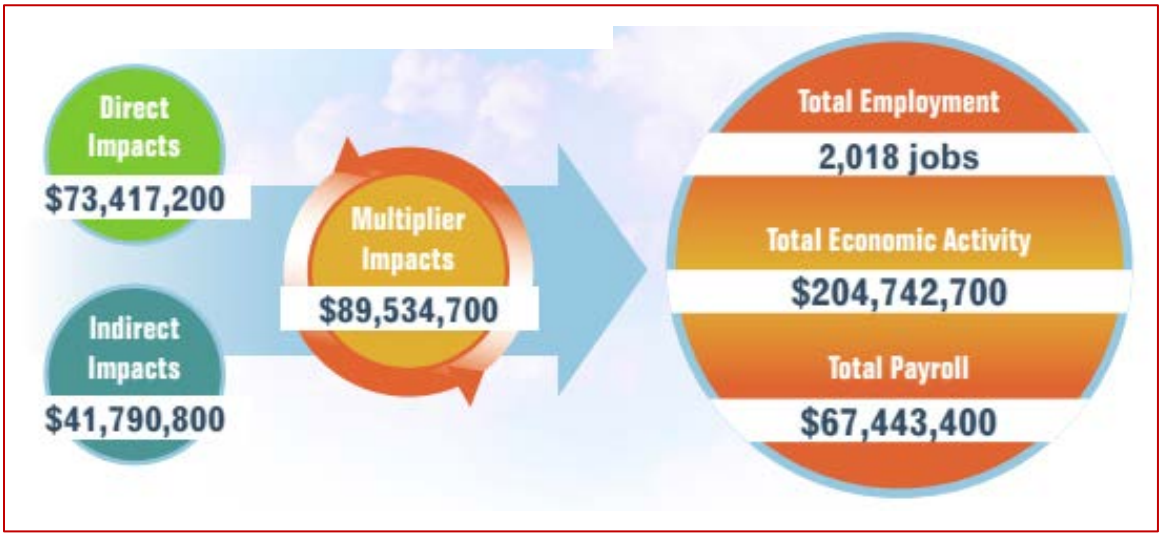


Exhibit 2.6: Miami Executive Airport Economic Impact

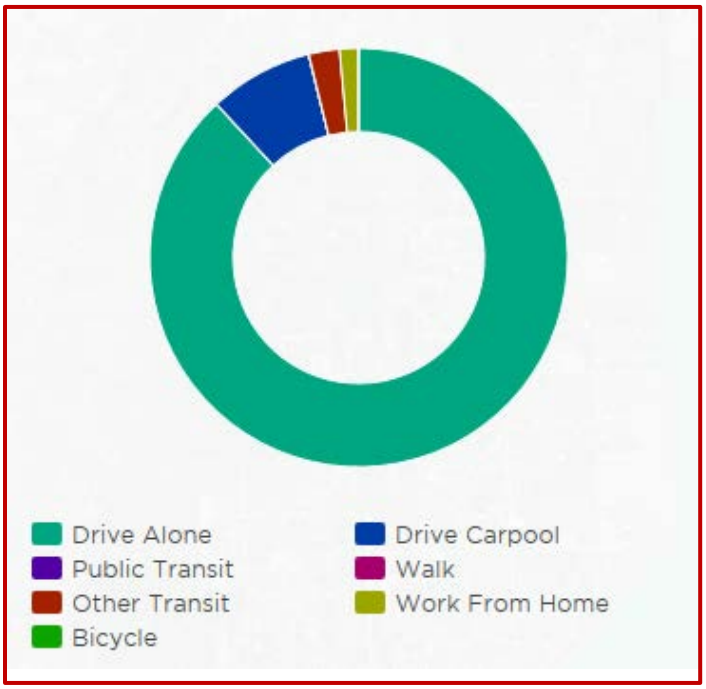


The number of vehicle miles of travel (VMT) is an indicator of the travel levels on the roadway system by motor vehicles. VMT is estimated for the given time period. This estimate is based upon traffic volume counts and roadway length. As Miami's population continues to grow, VMT has grown. However, the growth in population is not the only factor fueling the rise in travel. Other factors include economic growth, relatively affordable auto travel costs, tourism, low levels of

public transit, sprawl, and related factors. As the amount of auto travel increases, the time wasted on congested roadways, the energy used by the vehicles and total costs of auto travel increase accordingly.

For those living along the Coral Reef Drive corridor, the private automobile is the predominant form of transportation for work and other travel purposes (**Exhibit 2.7)**. The automobile has played a fundamental role in shaping where we live and how we get around. It has influenced the form and density of the communities along Coral Reef Drive and expanded the geographic range of daily travel. The percentage of workers who commute by private vehicle remained relatively stable after decades of consistent increase. For several individual years since the mid-2000s, the average number of vehicle miles traveled in the county and corridor has either increased at a slower pace than in previous decades or declined. Although such shifts in travel behavior are slight, they have captured attention because they represent a disruption in an unequivocal, decades-long pattern of increased automobile travel.

Exhibit 2.7: How Coral Reef Drive Residents Commute to Work



2.4 Land Use

Since the early 1960's Miami-Dade County has averaged over 30,000 new residents per year to make it the most populous county in the State of Florida and one of the fastest growing counties in the country. Today's population of 2.6 million people is confined to less than 25 percent of the County's 1,946 square mile CDMP, which establishes an urban growth boundary known as the UDB. The UDB works in conjunction with smart growth policies towards the development of a more compact and efficient urban form, particularly along urban transportation corridors.

Miami-Dade County has made a concerted effort to implement smart growth principles with the purpose of furthering a more compact and efficient urban form. The concept of smart growth has been incorporated into the Comprehensive Development Master Plan (CDMP), Strategic Plan and Code of Ordinances. The CDMP is a long range comprehensive plan that provides the County's growth management framework. The CDMP controls growth so that the expansion of the urban area occurs according to the following guidelines:

- At a rate commensurate with projected population and economic growth.
- In a contiguous pattern centered around a network of high-intensity urban centers well connected by multimodal intra-urban transportation facilities.
- In locations which optimize efficiency in public service delivery and conservation of valuable natural resources.

The Strategic Plan provides a roadmap for allocating resources, improving overall performance and ensuring results. The Code of Ordinances codifies the scope and process for planning around transit centers. More recently the County has integrated sustainability concepts into departmental work programs through the implementation of the GreenPrint Sustainability Plan (**Exhibit 2.8**).

Exhibit 2.8: GreenPrint Transportation Aspirational Goal

Use our land wisely creating and connecting strong sustainable neighborhoods:

Develop 15 urban center area plans and six multimodal corridor master plans. Create four transit-oriented development (TOD) on heavy rail and bus corridors. Develop level of service metrics to identify resident accessibility to parks and open space areas. Improve access through an interconnected network of shaded and safe bikeways and trails connected to neighborhoods, schools, employment centers, civic buildings, and other community destinations.

Provide more transportation options, reducing the time we spend in our cars:

Add 10 million boardings to our public transportation system through increased service, and enhancing convenience, comfort, and timely service. Increase the percentage of total trips taken by walking or bicycling from 10 percent to 16 percent of all trips. Increase resident satisfaction with the availability of sidewalks for pedestrians to 65 percent or more and add 40 miles of bicycle trails and lanes.

The Coral Reef Drive corridor is predominantly residential. Land use characteristics vary from residential estate density in the eastern portion of the corridor to residential low-density from US 1 to SW 162nd Avenue. There are also pockets of business and office sites located along Coral Reef Drive (US 1, HEFT, SW 137th Avenue, and SW 157th Avenue). Several institutional, and park and recreation sites are scattered along the corridor (Florida Power and Light, Coral Reef Park, Jackson South Memorial Hospital and Zoo Miami, and Larry and Penny Thompson Park). East of SW 162nd Avenue the land is classified as agriculture and is within the UDB (**Exhibit 2.9**).

Exhibit 2.9: Adopted Land Use in the Study Corridor

2.5 Future Development Opportunities

Significant development is planned west of the HEFT. This ongoing growth trend is mirrored throughout Miami-Dade County, but is especially evident in the southwest as vacant land in close proximity to the HEFT becomes available. These new and proposed developments have resulted in requests from developers for rezoning and land use amendments as resources are changed from Agricultural to Residential, Commercial and Planned Unit Developments. For instance, an affiliate of South Florida's AHS Development Group recently applied to rezone 4.5 acres near the Jackson South Community Hospital. The vacant land, located at 9867 SW 152nd Street is currently zoned for agriculture. AHS is seeking to rezone the land to a "Planned Area Development" to build a residential project with 175 units on the property. All of the 175 units would be for workforce housing, meaning that they would be restricted to people making no more than 80 percent of the county's average medium income.

Other examples include:

- Plans are underway for developing a major shopping and residential complex known as "Coral Reef Commons" on a 143-acre tract off Coral Reef Drive. The project combining retail and housing is located within a triangular-shaped property fronting Coral Reef Drive between the SW 124th Avenue entry road to Zoo Miami and 127th Avenue that leads to the South Campus of the University of Miami and other areas occupied by various U.S. government agencies (**Exhibit 2.10**).

Exhibit 2.10: Coral Reef Commons Site

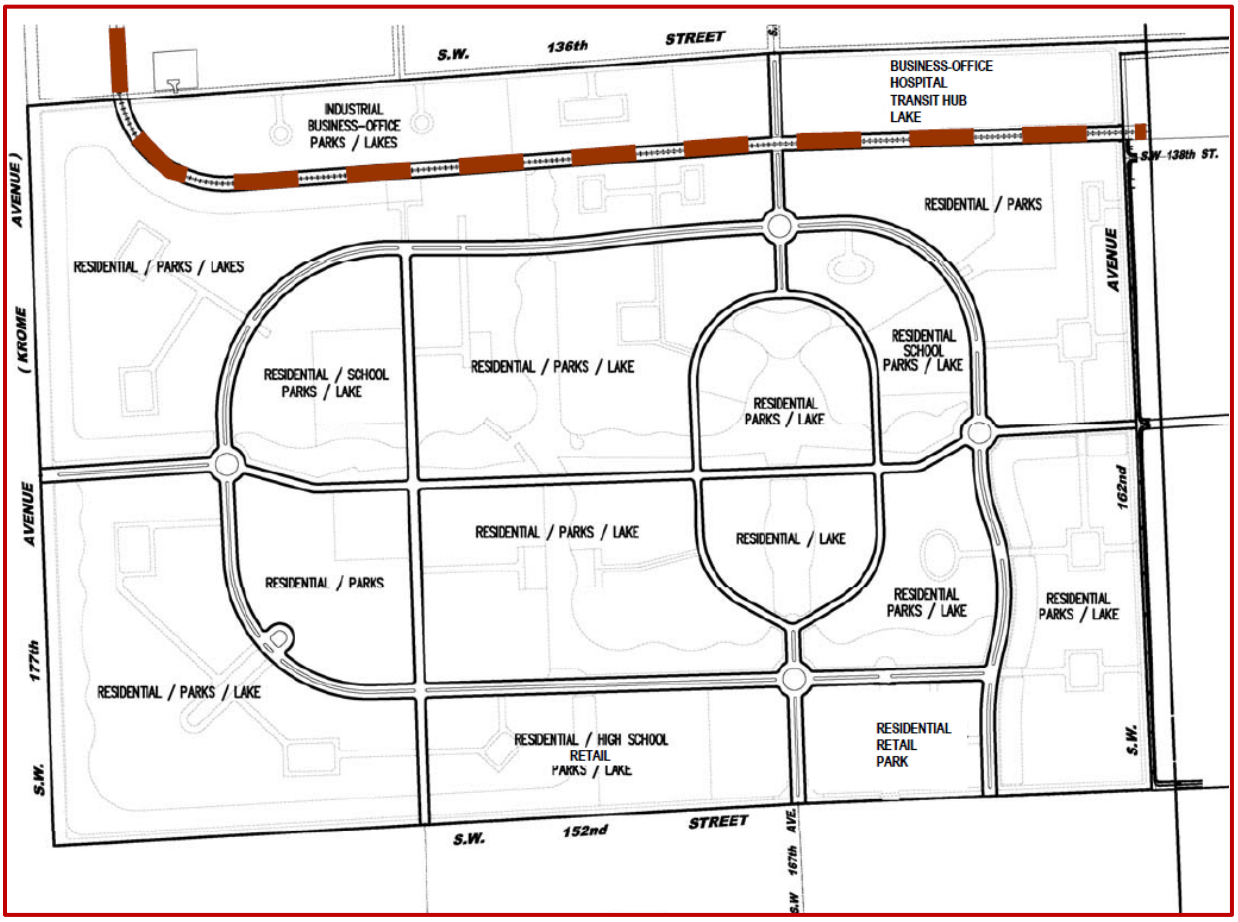
- Zoo Miami's main entrance is SW 124th Avenue (Zoo Drive), just off of Coral Reef Drive, and services both Zoo Miami and the Gold Coast Railroad Museum. Since 1997, Miami-Dade County has expressed interest in developing the area around Zoo Miami as a recreation destination. In 2006, the Board of County Commissioners acquired a 39-acre portion of the U.S. Coast Guard (USCG) property adjacent to current zoo property for the purpose of developing a family entertainment center near the zoo. In 2009, the USCG formally issued the criteria for completely replacing the base, under which the five active Coast Guard missions comprising the Base must be located

elsewhere, and the land considered for discount conveyance to the County. The County has since been in negotiations with federal authorities to acquire additional portions of the base. In March of 2012, the Miami-Dade County Department of Parks, Recreation and Open Spaces put out an invitation to negotiate to attract potential developers. Miami Wilds LLC was selected to develop the Zoo Miami entertainment area complex which includes a resort hotel, conference center, a theme park, and a water park (**Exhibit 2.11**). In July 2015, the project was placed on hold following environmental concerns raised by U.S. Department of Interior about the need to protect the nearby pine Rockland Trees and the presence of endangered species living on this property.

Exhibit 2.11: Rendering of the Zoo Miami Development

- The proposed Parkland Development site consist of 961.15 acres is located between SW 162nd Avenue and Krome Avenue, from SW 136 Street to SW 152nd Street. The proposed Parkland project would include the construction of 6,941 residential homes, 200,000 square feet of retail space, 100,000 square feet of medical offices, a 200 room hospital, 550,000 square feet of industrial space, schools, parks and other miscellaneous public facilities (**Exhibit 2.12**). The project has been on hold since December 2008.

Exhibit 2.12: Parkland Development Site



As the pressure for development along the Coral Reef Drive corridor increases over the next two decades, urban infrastructure will be under immense pressure, partly in anticipation of growth, and partly to catch up after years of deferred investment. Most experts expect that even more funding will be needed to meet future needs. How can these funds best be spent to accommodate growth and avoid stressing the local environment, fiscal, and social resources? In particular, how can we use the next round of transportation investment to help us plan for a more sustainable future?

The link between transportation and urban growth patterns presents two different issues. On the one hand, the Coral Reef Drive corridor's rapidly growing urban areas need to support higher densities, and one way to do so is with walking or transit-oriented developments (e.g., at South Miami-Dade Busway at the Coral Reef Drive Station). On the other hand, car travel will remain the dominant mode of transportation for the foreseeable future, and Miami-Dade County has a pressing need to manage congestion bottlenecks that threaten economic vitality and quality of life. Taken together, these two issues summarize concerns about growth in the corridor and growth at the fringe of Miami metropolitan areas.

2.6 Existing Roadway Network

Roadway supply is the existing roadway network, including information as existing typical sections to determine existing capacities, roadway features (such as medians, landscape, lighting, etc.), and existing roadway classification and access characteristics of the roadway. **Table 2.3** highlights the functional roadway classification of the roadway network of Coral Reef Drive.

Table 2.3: Coral Reef Drive Roadway Classification

Classification	From	To	Description
Urban Collector	South Dixie Highway (US 1)	SW 67 Ave (Ludlam Rd.)	From South Dixie Highway/SR 5/US 1 to SW 67th Ave. is an urban two-lane undivided facility with a posted speed limit of 35 mph. This section of Coral Reef Drive is under the jurisdiction of the County.
Principal Arterial	137th Ave.	US 1	From the Florida's Turnpike to South Dixie Highway/SR 5/US 1 is an urban State Road (SR 992/Section 87039000 MP: 0.000 to MP 2.462) is a two lane road in each direction separated by a raised median with a posted speed limit of 45 mph.
Urban Collector	SW 157th Ave.	137th Ave.	From SW 172nd Ave. to the HEFT is an urban two-lane undivided facility with a posted speed limit of 40 mph. This section of Coral Reef Drive is under the jurisdiction of the County.

The capacity of a road is defined to be the maximum number of vehicles and people that a facility can accommodate with reasonable safety within a specified timeframe, typically 15 minute intervals. Capacity is dependent upon the number of intersection approaches, the number of lanes for various movements, and the traffic-signal timing at signalized intersections. The qualitative measure of operation for these facilities is evaluated using the term "Level of Service," or LOS. The LOS is categorized from A through F, with "A" being the optimal efficiency of the roadway and "F" indicating a breakdown of the roadway system where over-saturation occurs. "E" indicates capacity is reached at the highest density.

According to the FDOT Quality Level of Service Handbook, the acceptable LOS for state roads in urbanized areas with a population over 500,000, which is the case of Miami-Dade County, is a LOS "D" for all roadways and LOS "E" for roadways with parallel exclusive transit systems. A LOS "E" would be acceptable for US 1 in Coral Reef Drive area, since it runs parallel to the South Miami-Dade Busway.

For the purposes of reviewing LOS and travel times in the study corridor, Coral Reef Drive was divided into six segments. **Exhibit 2.13** depicts the traffic segment limits.

Exhibit 2.13: Coral Reef Drive Segments

2.7 Traffic Data Collected

A review was conducted of count data and histories collected by FDOT, and included on the *Florida Traffic Online* website. There are six count locations along the Coral Reef Drive corridor, as well as other locations on adjacent and intersecting roads. **Table 2.4** provides 2015 Average Annual Daily Traffic (AADT) counts along the corridor, as well as the corresponding daily level of service (LOS), calculated using the 2012 FDOT Quality/Level of Service Handbook tables.

Table 2.4: Existing AADT and Daily LOS

Count Station ID	Traffic Count Station Location	2015 AADT	Capacity at LOS D	2016 Daily LOS
878274	Coral Reef Dr. east of US 1	11,000	17,700	C
871106	Coral Reef Dr. west of US 1	33,500	39,800	C
870056	Coral Reef Dr. east of SW 112th Ave.	36,000	39,800	C
877010	Coral Reef Dr. west of SW 117th Ave.	61,500	59,900	F
877082	Coral Reef Dr. west of SW 137th Ave.	29,500	39,800	C
878369	Coral Reef Dr. east of SW 147th Ave.	15,600	17,700	C

As depicted on the table, the majority of the corridor is functioning at an acceptable LOS. The only exception is on Segment 4, between SW 137th Avenue and SW 117th Avenue. This is the only segment on the corridor that is currently six lanes, and yet still experiences regular congestion. However, it is worth noting that a field review revealed that much of the traffic turns on and off the corridor between SW 122nd Avenue and SW 127th Avenue, meaning that the congestion is localized. Furthermore, this section of the corridor has an adopted LOS standard by Miami-Dade County of "EE," meaning that 120% of the maximum volume at LOS E is

considered acceptable for concurrency purposes. Based on this standard, the maximum capacity of the segment between SW 117th Avenue and SW 137th Avenue would be 71,880.

While the regular data collected by FDOT is useful for general analysis, it is too limited for use in conducting detailed peak period traffic analysis. As such, additional traffic data was collected on the corridor in May 2016. The data included 72-hour counts, peak period intersection turning movement counts, and classification counts. This data was used in the existing peak period traffic analysis discussed below, and is included in **Appendix A.**

2.8 Existing Peak Period Traffic Conditions

The morning and evening peak periods are often when roadways are most congested. As such, a detailed analysis of the corridor was conducted using Synchro 9 traffic simulation software which utilizes the Highway Capacity Manual 2010 methodology to calculate intersection LOS and signal delay. Both intersection delay and arterial travel times were used as measures of effectiveness when evaluating existing conditions, as well as future year conditions and potential corridor improvements described later in the report.

Intersection LOS ratings are a qualitative measure that describes traffic operational conditions on roadways indicating the level of driver satisfaction and roadway congestion. Level of Service is measured on a six-level, ordinal scale with ratings ranging from LOS A (free flowing) to LOS F (forced or breakdown flow). An intersection delay of less than or equal to 10 seconds is considered to be LOS A, whereas a delay of greater than 80 seconds is considered to be LOS F.

Intersection delay was evaluated at the 13 intersections where turning movement counts were collected. A summary of existing (2016) intersection delay is shown on the **Table 2.5**, and the Synchro summary tables can be found in **Appendix B**.

Table 2.5: 2016 AM and PM Peak Hour Intersection LOS and Delay

Peak Period	Coral Reef Drive Intersections	Signal Delay/LOS
AM Peak	SW 157th Ave.	81.9 / F
	SW 137th Ave.	100.1 / F
	SW 117th Ave.	92.4 / F
	West Turnpike Ramp	11.2 / B
	East Turnpike Ramp	12.6 / B
	SW 112th Ave.	47.3 / D
	SW 107th Ave.	7.8 / A
	SW 93rd Ave.	9.0 / A
	US 1 / S Dixie Hwy	71.0 / E
	SW 87th Ave.	17.6 / C
	SW 82nd Ave.	34.9 / C
	SW 77th Ave.	11.1 / B
	Old Cutler Rd.	48.4 / D
PM Peak	SW 157th Ave.	27.0 / C
	SW 137th Ave.	75.2 / E
	SW 117th Ave.	79.6 / E
	West Turnpike Ramp	13.2 / B
	East Turnpike Ramp	11.4 / B
	SW 112th Ave.	40.3 / D
	SW 107th Ave.	12.1 / B
	SW 93rd Ave.	31.9 / C
	US 1 / S Dixie Hwy	70.5 / E
	SW 87th Ave.	23.6 / C
	SW 82nd Ave.	57.2 / E
	SW 77th Ave.	22.1 / C
	Old Cutler Rd.	40.4 /D

In the morning, delay is highest at the SW 137th Avenue intersection, while in the evening it is highest at the SW 117th Avenue intersection.

While intersection LOS is a useful measure for transportation professionals, the general public primarily understands travel time. As such, a travel time analysis was conducted for the entire corridor. SimTraffic simulation was used to evaluate the estimated existing (2016) travel times, as well as future travel times discussed later in the report. For this evaluation, the study segments identified on **Exhibit 2.13** above were used to localize where travel time differences were occurring. It is worth noting that due to the lack of signals west of SW 157th Avenue, the westernmost segment was not evaluated. Furthermore, Segment One in the travel time analysis extends east only to Old Cutler Road. The 2016 AM and PM peak hour travel times from the Synchro model can be found in **Table 2.6**

Table 2.6: 2016 AM and PM Peak Hour Corridor Travel Times

Pike Period	Segment	Travel Time (In Minutes)
AM Peak	SW 157th Ave. to SW 137th Ave.	6:13
	SW 137th Ave. to SW 117th Ave.	6:45
	SW 117th Ave. to SW 112th Ave.	1:29
	SW 112th Ave. to US 1	13:02
	US 1 to Old Cutler Rd.	4:26
	Total	31:56
PM Peak	SW 157th Ave. to SW 137th Ave.	4:41
	SW 137th Ave. to SW 117th Ave.	6:12
	SW 1178th Ave. to SW 112th Ave.	1:26
	SW 112th Ave. to US 1	7:40
	US 1 to Old Cutler Rd.	4:39
	Total	24:39

2.9 Crash Analysis

A generalized analysis of historical crash data was performed for Coral Reef Drive from SW 172nd Avenue to SW 67th Avenue. Crash data from the latest available five-year period from January 2011 to December 2015 was analyzed (**Exhibits 2.14 – 2.16**). The data was extracted from the Signal Four Analytics database, which is an interactive, web-based system developed by the University of Florida.

Exhibit 2.14: Crash Heat Map - Eastern Section of the Study Corridor

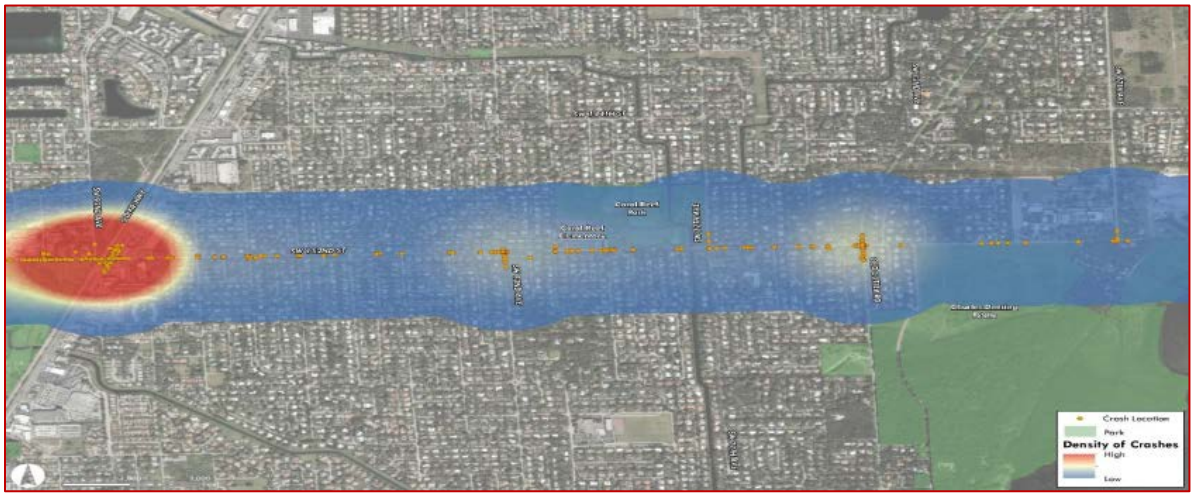


Exhibit 2.15: Crash Heat Map – Central Section of the Study Corridor

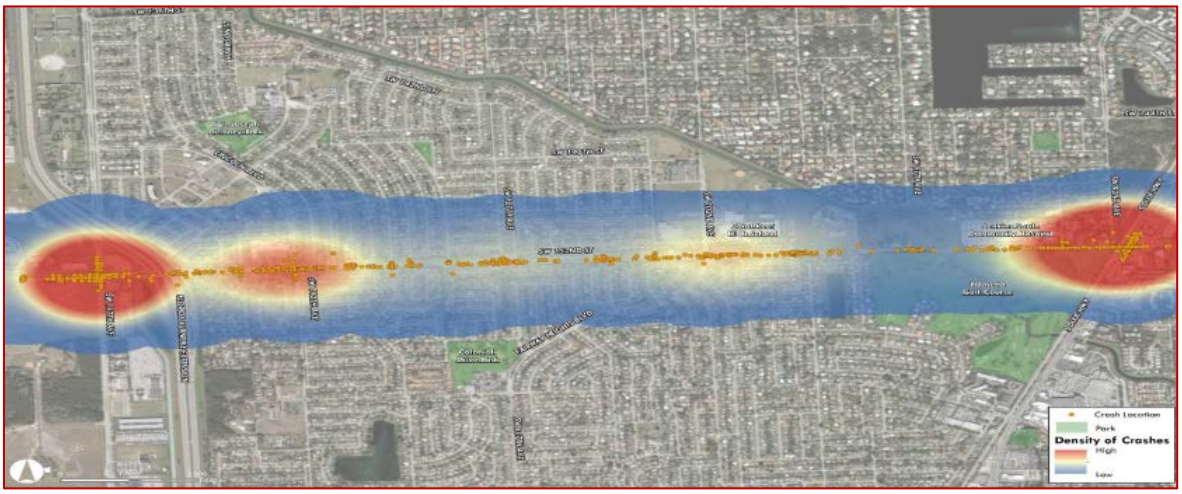


Exhibit 2.16: Crash Heat Map – Western Section of the Study Corridor

Using the crash data obtained from Signal Four Analytics database, crash summaries were developed for the five- year analysis period. Review of the crash summaries provides insight into the historical crash patterns along the study corridor. Based on the crash data reviewed, a total of 2,786 crashes were documented along the study roadway segment during the referenced study period. A total of 280 crashes were reported in 2011, 393 crashes in 2012, 621 crashes in 2013, 774 crashes in 2014, and 718 crashes in 2015.

Based on crash severity, of the 2,786 crashes reported, 613 (22 percent) were injury type crashes, 2,163 (77.6 percent) were property damage only crashes and 10 (0.4 percent) were fatal crashes. There were a total of 623 (22 percent) night/dusk/dawn crashes reported which is lower than the statewide average for all roadways of 30 percent. A total of 345 (12.4 percent) of the total crashes reported occurred under wet/slippery pavement conditions which is lower than the statewide average for all roadways of 14 percent. A total of 17 pedestrian crashes and 12 bicycle crashes

were reported during the study period. Three of the pedestrian crashes resulted in fatalities. These pedestrian fatality crashes occurred at the SW 112nd Avenue, SW 107th Avenue, and SW 93rd Avenue intersections.

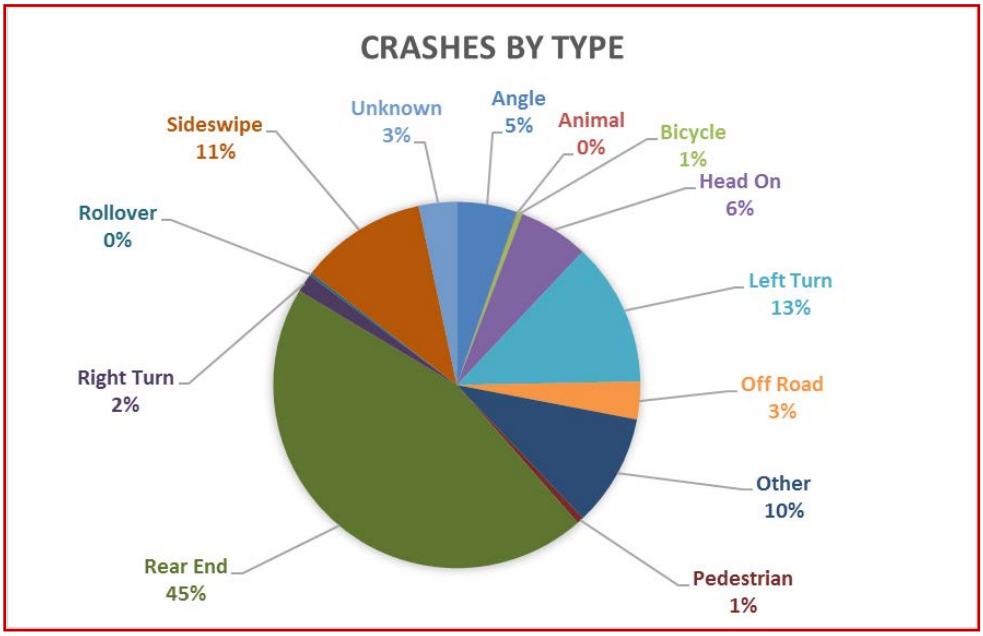
The predominant crash types reported along the segment are rear-end (45 percent) followed by left-turn (13 percent), and sideswipe crashes (11 percent). **Exhibit 2.17** shows the crash distribution by type.

The top five locations with the highest concentration of crashes were:

- SW 152nd Street at SR 825/SW 137th Avenue with 417 crashes.
- SW 152nd Street at SW 122nd Avenue with 156 crashes.
- SW 152nd Street at SW 117th Avenue with 388 crashes.
- SR 992/SW 152nd Street at SW 93rd Avenue with 164 crashes.
- SR 992/SW 152nd Street at South Dixie Highway/SR 5/US 1 with 310 crashes.

In addition, a review of the latest available (2014) high crash list for FDOT District 6, revealed that the intersections with SW 93rd Avenue and South Dixie Highway/SR 5/US 1 were listed as high crash locations in 2011, 2012, and 2013. In addition, the intersections with Florida's Turnpike and SW 102nd Avenue were listed as high crash locations in 2013 and the intersection with SW 112nd Avenue intersection was listed as a high crash location in 2012.

Exhibit 2.17: Crash Distribution by Type



In addition to the general crash analysis, a more comprehensive evaluation was conducted. The analysis identified crash clusters along the corridor at the following locations:

- SW 137th Avenue
- SW 122nd Avenue

- SW 117th Avenue
- SW 93rd Avenue / South Dixie Highway

The full evaluation, included in **Appendix C,** recommends conducting detailed safety studies at several of these locations.

2.10 Transit Network

Transit network is the existing transit routes, transit features such as transit stops, schedules, and operating characteristics such as headways, number of stops, travel times, and park and ride lots.

Transit services provided along Coral Reef Drive consist of Metrobus service provided by Department of Transportation and Public works (DTPW). The existing transit network is depicted in **Exhibit 2.18** revealing five existing routes (35, 52, 57, 137, and 252) operating within and in the vicinity of the study corridor along with a number of routes in the South Miami-Dade Busway. Busway stations between SW 152nd Street and Dadeland South Metrorail stops are only served during off-peak weekday rush hours. During peak weekday hours, service along the South Miami-Dade Busway is nonstop.

The new DTPW system map introduces a color coding system: north-south local routes are blue, east-west local routes are teal, express routes are red, and circulator routes are brown. **Table 2.7** provides the existing bus route name and key service destinations. **Table 2.8** provides the average daily boardings for Routes 35, 52, 57, 137, and 252. **Appendix D** includes route maps for lines 35, 52, 57, 137, and 252.

There is a Park and Ride facility at 9300 Coral Reef Drive (at the Palmetto Golf Course on SW 152nd Street) for commuters to connect to bus routes: 31 Busway Local, 34 Busway Flyer, 38 Busway MAX, 52, 57, 252 Coral Reef MAX, and 287 Saga Bay MAX. Only 100 spaces are available at this location. Commuters use the lots during the workweek and on weekends patrons of the golf course use the lot. There is lot located on the west side of the Turnpike at SW 152nd Street and 117th Avenue that offers parking capability as well.

Exhibit 2.18: Transit Network in the Study Corridor

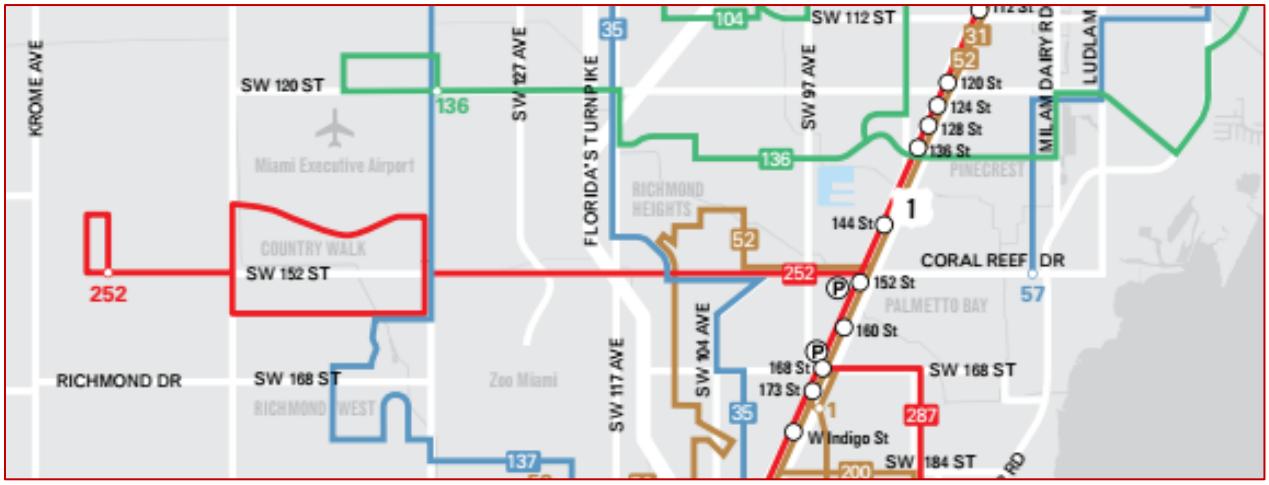


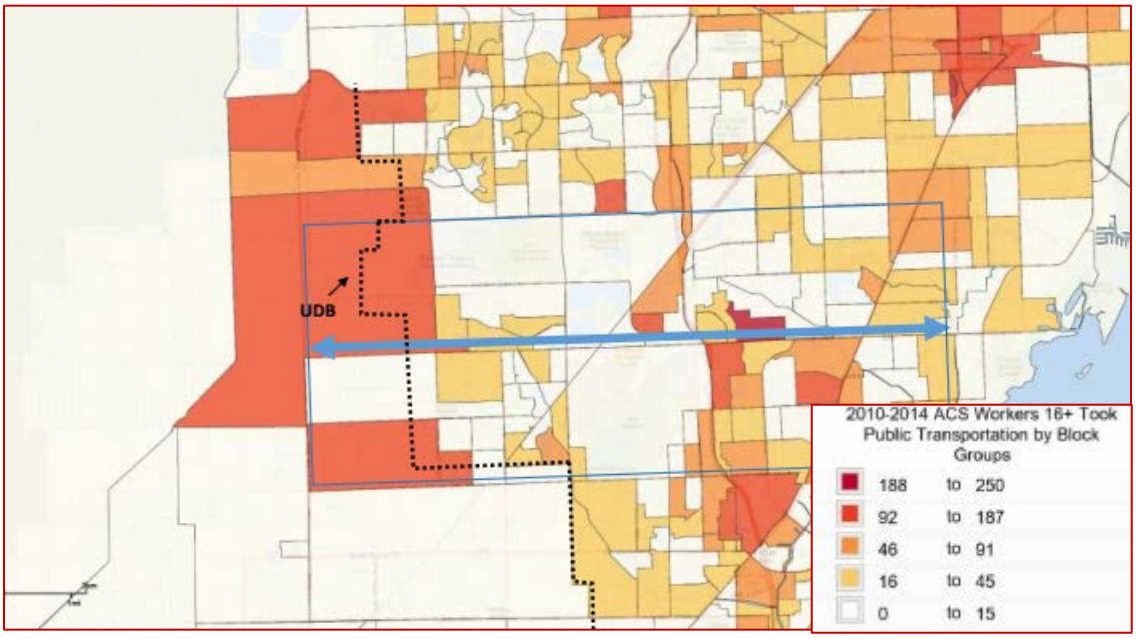
Table 2.7: Bus Routes and Service Destinations

Bus Route No.	Route Common Name	Key Service Destinations
35	Busway MAX	Miami Dade College Kendall Campus, Richmond Heights, Busway at SW 184th St., Southland Mall, South Miami-Dade Govt. Center, Homestead Hospital, Florida City, Homestead High School. Route 35 connects with 16 other DTPW bus routes and operates with approximate 30-minute headways during peak periods.
52	NA	Dadeland North Metrorail Station, Dadeland Mall, Dadeland South Metrorail Station, Busway at SW 104th St. to SW 144th St., Richmond Heights, Perrine Shopping Center, Robert Morgan Tech., Dept. of Children and Families (weekdays only), Southland Mall Park & Ride Lot, South Miami-Dade Govt. Center, Old Cutler Rd., Health Center. Route 52 connects with 21 other DTPW bus routes and operates with approximate 35-minute headways during peak periods.
57	NA	Weekday service only. Tri-Rail Airport Station, Miami International Airport Metrorail station, South Miami Metrorail station, Red Rd. (NW/SW 57th Ave.), Busway at SW 152nd St., SW 152nd St. Park & Ride Lot, Jackson South Hospital. Route 57 connects with 21 other DTPW bus routes and operates with approximate 10-minute headways.
137	West Dade Connection	Dolphin Mall, Miami International Mall, Sweetwater, Kendall Lakes, Miami Executive Airport, Tamiami/Pineland Industrial Park, SW 147th Ave./180th St., Serena Lakes, Larry and Penny Thompson Memorial Park, Southland Mall, South Dade Govt. Center. Route 137 connects with 11 other DTPW bus routes and operates with approximate 20-minute headways during peak periods.
252	Coral Reef Max	Country Walk, SW 152nd St./Coral Reef Dr., Zoo Miami, SW 117th Ave. Park & Ride Lot, SW 152nd St. Park & Ride Lot, South Miami-Dade Busway (enters at 144th St.), Dadeland South Metrorail station. Route 252 connects with 10 other DTPW bus routes and operates with approximate 25-minute headways during peak periods.

Table 2.8: Average Daily Boardings by Bus Route

Average Weekday Ridership			
Route	June 2016	June 2015	Percent Change
35	2,199	2,293	-4.1%
52	1,428	1,610	-11.3%
57	520	561	-7.3%
137	1,839	1,988	-7%
252	989	1,019	-2.9%

Exhibit 2.19: Number of Workers Commuting by Public Transit in the Study Corridor



Existing transit features on Coral Reef Drive consist of 49 transit stops designated by a transit sign which includes the routes that serve that location. There are also eight bus shelters along the central section of Coral Reef Drive (SR 992) between US 1 and the Turnpike. Where possible, it is desirable to provide shelters for passengers waiting at bus stops. They should be designed to accommodate the maximum number of passengers normally waiting, and to provide adequate protection from the weather. They should be well lit and ventilated, and approaching buses should be visible from inside the shelter. Where waiting times may be long it may be desirable to provide seating. A well-designed, comfortable shelter can make waiting for a bus a pleasant experience.

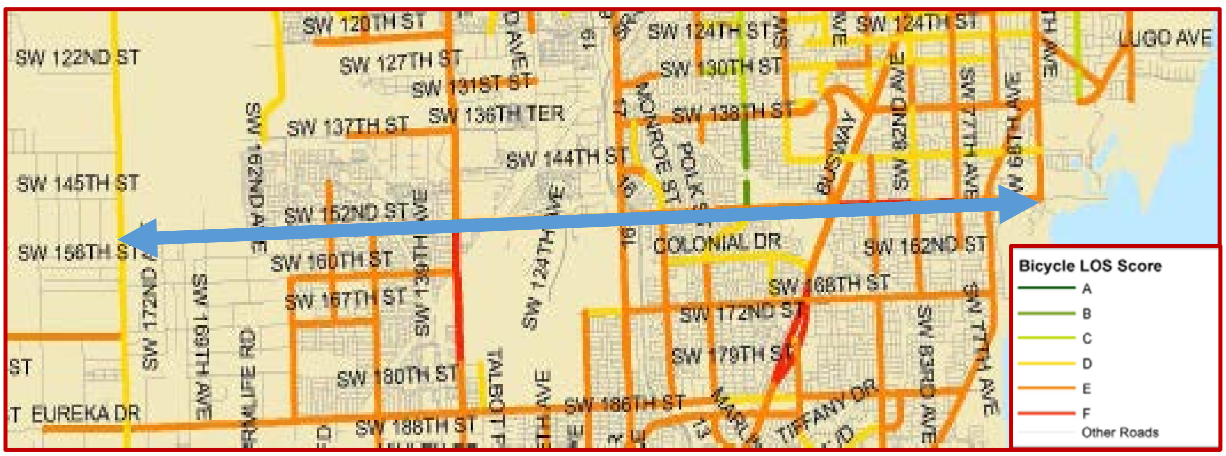
Exhibit 2.20: Bus Stops in the Vicinity of the Study Corridor

2.11 Bicycle and Pedestrian Network

The demand for bicycling and pedestrian walkways in the county are growing on a daily basis. Through documents such as the CDMP, the Park and Open Master Plan, the LRTP, and the Green Plan Community-wide Sustainability Plan, the County's planning infrastructure calls for a comprehensive greenway network.

Within the study corridor, there is a low amount of bicycle and pedestrian activity occurring along the corridor which can be attributed to the scale, density, and urban design characteristics of adjacent development (**Exhibit 2.21**). For instance, Coral Reef Senior High School, a mega-magnet school located at the intersection of SW 99th Court and Coral Reef Drive, has nearly 3,088 enrolled students. Although there are sidewalks serving the school, there are no dedicated bicycle facilities.

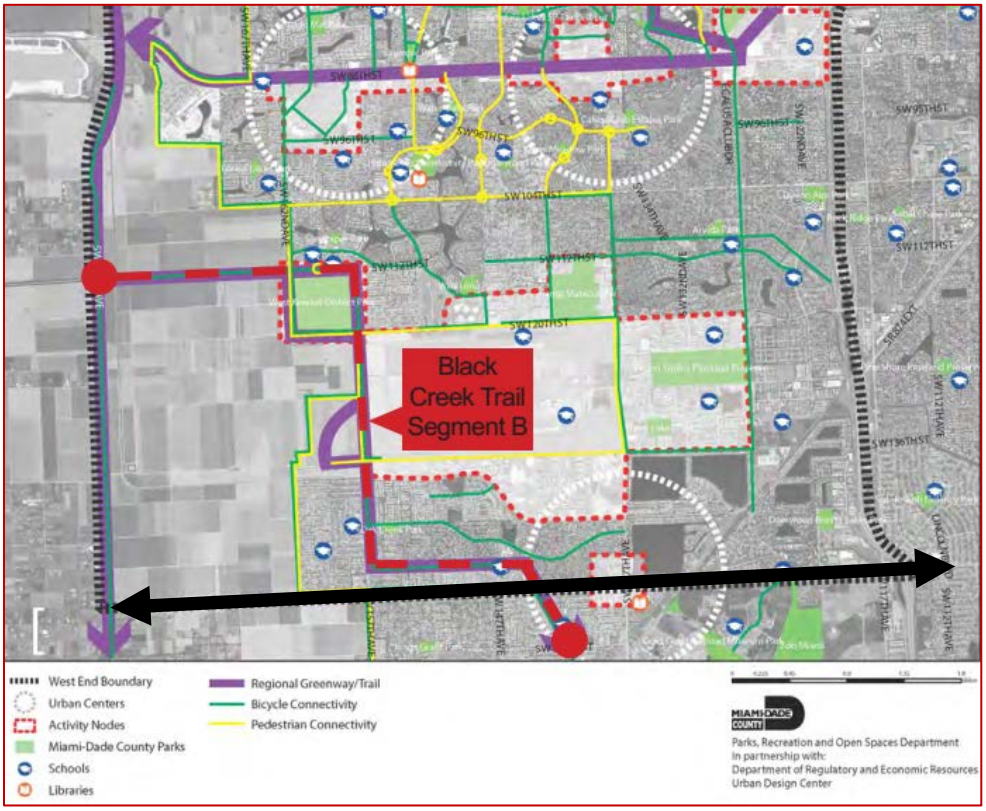
Exhibit 2.21: Bicycle LOS in the Study Corridor



Except along the south side of SW 152nd Street between SW 157th Avenue to 162nd Avenue, generally a 5-foot wide continuous sidewalk exists along both sides of the study corridor. However, the access to these sidewalks is only from the street intersections and there is no provision for direct access from adjacent residential developments.

An assessment indicates that some parts of these sidewalks and transit facilities may not be in compliance with the requirements under the Americans with Disabilities Act (ADA). A July 1995 Metro-Dade Facility Plan proposes short-range on-road bicycle facilities along Coral Reef Drive from SW 157th Avenue to the Zoo Miami entrance. The *West End Connectivity Master Plan* (2015) identified local and regional bicycle and pedestrian paths that intersect the western end of SW 152nd Street (**Exhibit 2.22)**. The 9.2 mile long "shared use" 12 feet wide Black Creek Trail (Segment B) that runs along the Miami Executive Airport is a Priority II project in the 2040 LRTP. Segment B is linked to Segment A that extends the Black Creek Trail 8.4 miles north of SW 184th Street.

Exhibit 2.22: Black Creek Trail



The existing pedestrian system along Coral Reef Drive is made up of sidewalks, paved shoulder walkways, paved separated walkways, and multi-use trails. Pedestrian facilities exist along most of the arterial road network which has been built out with sidewalks or paved designated walkways on at least one side of the roadways.

The existing bicycle network along the study corridor includes both on-street and off-street facilities including bike lanes and multi-use trails. Bikeway gaps exist in various forms, ranging from short segments on a specific street or path corridor, to larger geographic areas with few or no facilities at all. **Exhibits 2.23 and 2.24** display the existing bicycle and pedestrian facilities in the study corridor.

Exhibit 2.23: Existing Bicycle Faculties in the Vicinity of Coral Reef Drive

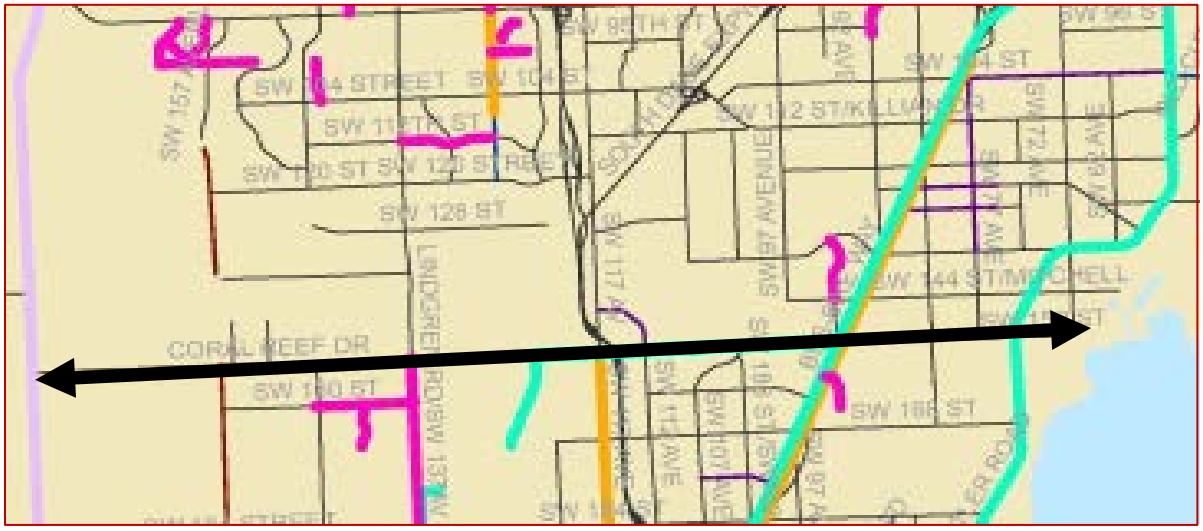
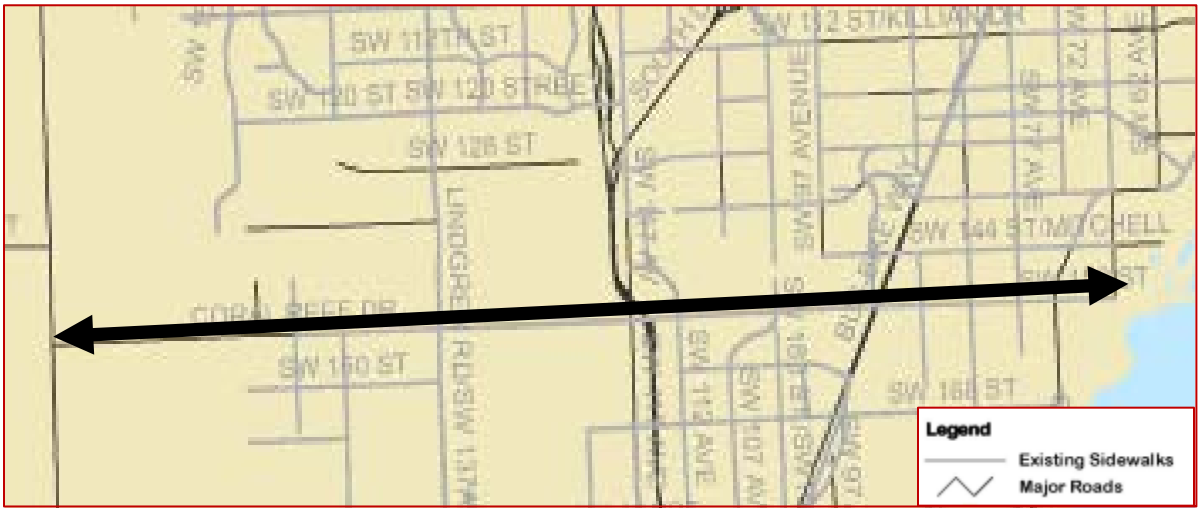


Exhibit 2.11.4: Existing Pedestrian Facilities in the Vicinity of Coral Reef Drive



The South Dade Greenway and Old Cutler Trail, which intersects the Coral Reef Drive corridor, provides a bicycle and pedestrian network that is pleasant, safe and has direct access to community destinations including parks and schools, commercial and civic services and facilities, and transportation facilities.

The South Dade Greenway (bicycle path) runs adjacent and parallel to the South Miami-Dade Busway (primarily on the west side within the Busway right-of-way) for almost the entire 19.8 miles of the Busway resulting in at-grade, ten-foot wide greenway crossings of each cross street. It traverses the cities of Homestead and Florida City and runs adjacent to the Village of Pinecrest, Village of Palmetto Bay, and Town of Cutler Bay. Neighborhoods within unincorporated Miami-Dade County and adjacent to the Busway include: Continental Park, the Falls, Richmond Heights,

Perrine, South Miami Heights, Redlands, Goulds, Princeton, Naranja, and Leisure City. Nine marked midblock type pedestrian and greenway crossings are located along the Busway.

The 11-mile Old Cutler trailhead is located at the traffic circle at the convergence of Old Cutler Road, Sunset Road, and LeJune Road in Coral Gables. The southern trailhead is located at the junction of SW 87th Avenue and Old Cutler Road in Cutler Bay. From its southern end, you can connect to the 2.7-mile Biscayne Trail, which provides a pleasant route down to the Biscayne Bay. Popular stops along the way include Matheson Hammock Park, Fairchild Tropical Garden, and Pinecrest Gardens.

3.0 Planned Improvement Projects in the Study Corridor

The next step in the study process is to review existing plans developed by local, regional, and statewide agencies to determine their possible impact on the Coral Reed Drive corridor. This ensures consistency and coordination of proposed study recommendations to existing local, regional and statewide transportation plans.

3.1 2040 LRTP Improvement Projects

The Miami-Dade 2040 Long Range Transportation Plan (LRTP) includes information regarding on-going and planned multimodal improvement projects along the Coral Reef Drive corridor and nearby roadways. A summary of the projects in the 2040 LRTP are highlighted in **Table 3.1** and their location in relationship to the study corridor is shown on **Exhibit 3.1**.

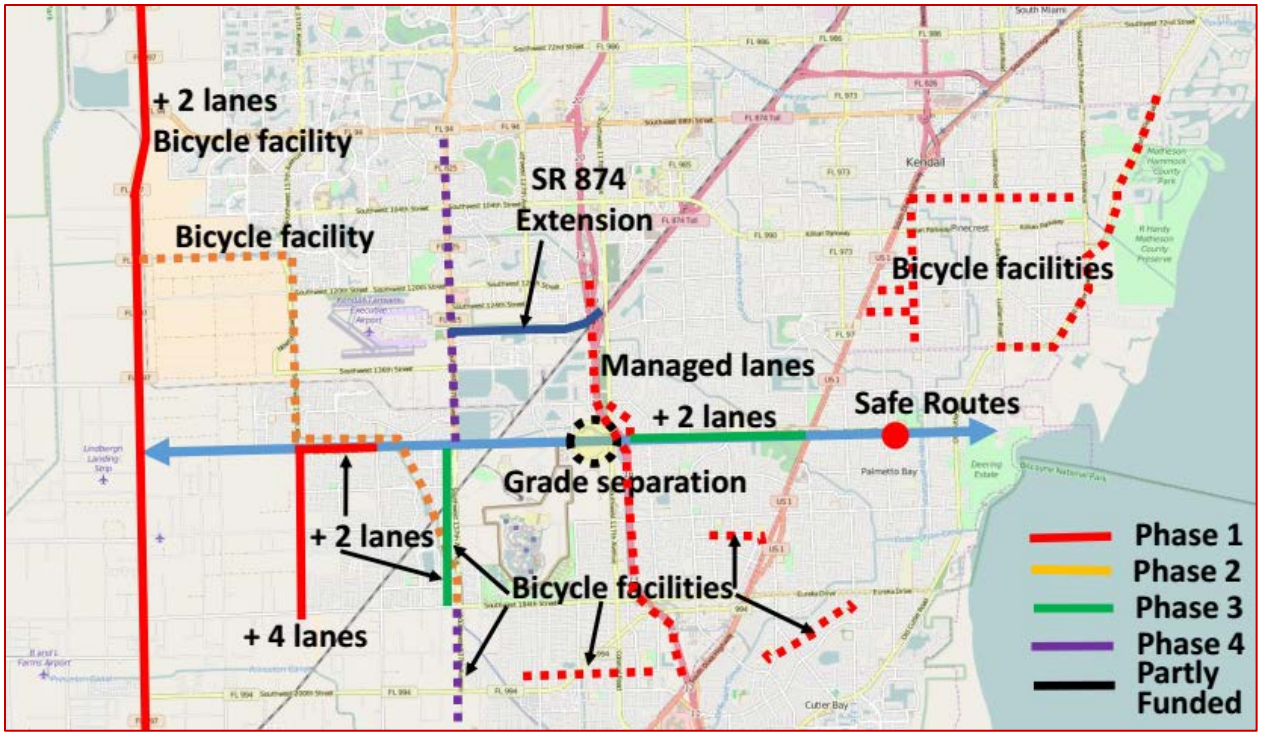
Table 3.1: 2040 LRTP Recommended Projects in the Study Corridor

No.	Project	From	To	Improvement
Priority 1 Projects				
1	SW 152nd St.	SW 157th Ave.	SW 147th Ave.	Add 2 lanes
2	SW 157th Ave.	SW 184th St.	SW 152nd St.	New 4 lane road
3	SW 112th Ave.	SW 117th Ave.	SW 152nd St.	Bicycle facility improvements
4	Coral Reef Elementary			Safe routes to school
Priority 2 Projects				
5	Expand Park & Ride Facility	9700 SW 152nd St.		New parking garage with 500 parking spaces
6	Black Creek Trail Segment B	Larry & Penny Thompson Park	Krome Trail	Trail improvements
Priority 3 Projects				
7	SW 147th Ave.	SW 184th St.	SW 152nd St.	Add 2 lanes
Priority 4 Projects				
8	SW 152nd St.	SR 821/HEFT	US 1	Add 2 lanes
Partially Funded Projects				
9	SW 117th Ave./SW 152nd St.	SW 117th Ave.	SW 152nd St.	Grade separation

Notes:

- Priority 1 (TIP and 2020). Projects are scheduled to be funded for construction by 2020. This group includes projects in the TIP (2015-2019) and the highest ranked projects.
- Priority 2 (2021 – 2025). Projects are scheduled to be completed by 2025.
- Priority 3 (2026 – 2030). Projects are scheduled to be completed by 2030.
- Priority 4 (2031 – 2040). Projects are scheduled to be completed by 2040.
- Partially Funded Projects identified in the "Needs Plan" without revenues available to fund the projects through construction. Therefore, revenue is applied to an earlier phase or part of a phase.
- Bicycles/Pedestrian projects will be funded through the Bicycle/Pedestrian set-aside.

Exhibit 3.1: Location of 2040 LRTP Projects in the Vicinity of the Study Corridor



3.2 Other Projects Underway or Being Considered

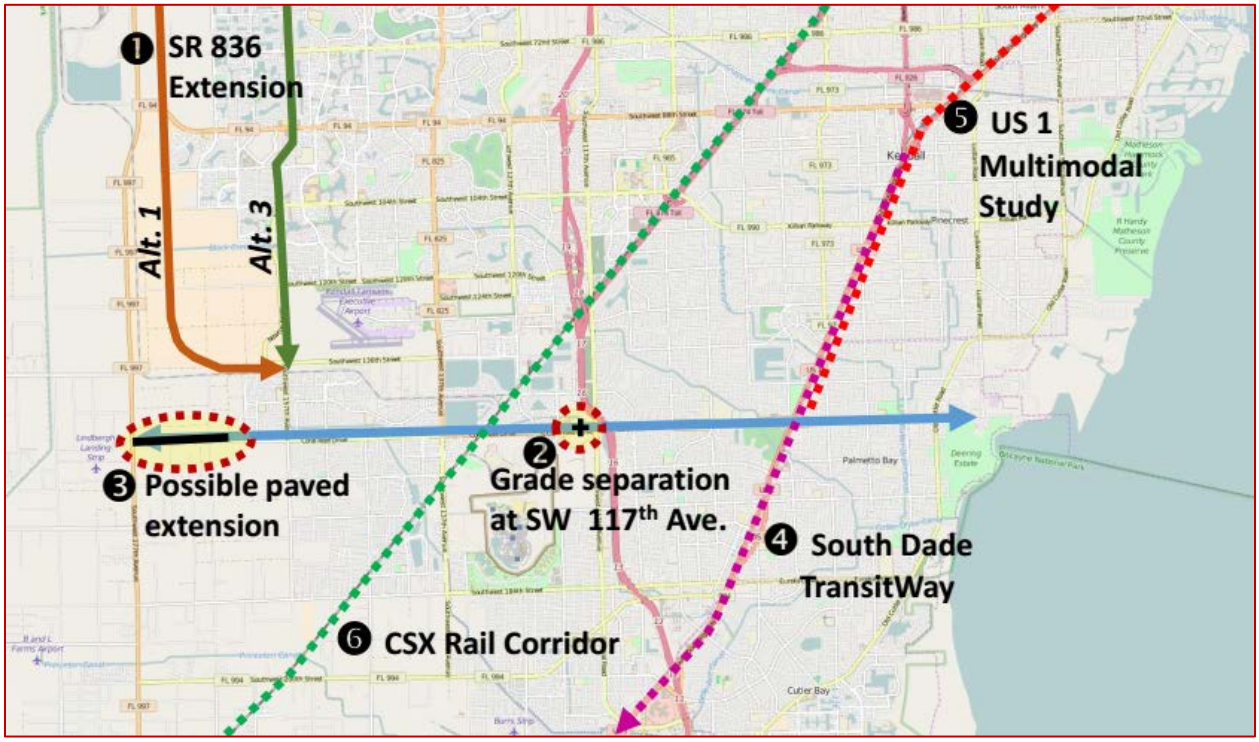
The southwest area of Miami-Dade County has experienced unprecedented growth over the last 20 years, but the development of the transportation infrastructure has not kept pace with growth patterns and increased transportation demands. The Turnpike cannot by itself address the capacity needed to provide mobility to the local communities along Coral Reef Drive. Traffic flow from developments in the western edges of Miami-Dade County is limited to a few major east-west arterial roads, connecting to highly congested north-south major highways located east of these communities. Existing demand on the roadway network is exceeding capacity resulting in operational deficiencies, which translate into longer commutes and a negative impact on the quality-of-life for Miami-Dade residents and businesses.

There are other miscellaneous projects that are underway or are being considered that would improve connectivity, enhance accessibility and mobility, provide an opportunity for express transit service and relieve congestion on the highway grid in the southwestern suburbs of along Coral Reef Drive Corridor and Miami-Dade County (**Table 3.2** and **Exhibit 3.2**).

Table 3.2: Other Improvement Projects in the Vicinity of the Study Corridor

Project	From	To	Improvement	Status
FDOT 5-Year Work Program				
SW 152 St.	SW 93 Ave.	US 1	Intersection improvements	Study completed
SW 152 St.	SR 821/HEFT NB Ramp	US 1	Resurfacing	Project initiated
SR 5/US 1 Multimodal Study	SW 152 St.	SR 9/I-95	Identify recurring congestion locations; and evaluate multimodal transportation improvement needs based on future travel demand.	Study initiated
Department of Public Transportation and Public Works				
Coral Reef Enhanced Bus	Dadeland North Metrorail Station	SW 152 Ave./SW 152 St.	Implement limited stop enhanced bus service	On hold pending identification of funding source
Miami-Dade Expressway Authority (MDX)				
US 1 Managed Lanes	SW 344 St.	Dadeland South Metrorail Station	Add new managed lanes within the right-of-way of the South Miami-Dade Busway	Partially funded
SR 836 Southwest Extension	The proposed study area is roughly bounded by NW 12 St. on the north, SW 136 St. on the south, SW 152 Ave. on the east, and Krome Ave. on the west.		It would improve north-south access and mobility throughout the southwestern section of Miami-Dade County.	Study initiated in 2009. Alternatives being considered.
MPO				
South Dade TransitWay	Kendall Drive	SW 344 St.	Converting the US 1 Busway from EBS to Light Rail Transit and/or appropriate premium transit technology	Study funded
CSX Homestead Subdivision	Miami International Airport (at the Oleander Junction)	Homestead	Shifting freight operations from the busy suburban area should reduce traffic interruption and noise due to freight operations, creating opportunity for alternate uses of the existing Homestead Subdivision right-of-way.	No action taken. There has been community opposition to added rail traffic, even passenger services, on the CSX corridor.

Exhibit 3.2: Location of Other Projects in the Vicinity of the Study Corridor



3.3 Relationship to Previous Studies

The MPO and FDOT have both sponsored Coral Reef Drive corridor studies. The MPO *SW 152nd Street Corridor Transportation Study* was completed in July 2008. The study focused on a 7.5-mile long stretch of Coral Reef Drive from SW 162nd Avenue to SW 89th Court, just east of US 1. The study identified the following series of mobility improvements along the Coral Reef Drive corridor that were scheduled to be implemented over time (**Table 3.3**).

Table 3.3: SW 152nd St Corridor Transportation Study Recommended Projects

Improvement Timeframe	Recommendation	Status
Near-Term Improvements	Closing curb cuts for better traffic operations were recommended between SW 112th Ave. and SW 107th Ave.	This recommendation has not been advanced since it requires additional analysis.
	Transit stop infrastructure improvements are recommended at stops at major intersections.	Recommendation carried forward to the current study.
	Enhancements to the Park-and-Ride Lot at SW 117th Ave. and Coral Reef Dr.: For the eastbound Coral Reef Max service, left-turns are needed to enter and exit this lot.	The County Department of PTPW, FDOT and the Turnpike Enterprise are coordinating improvements at the intersection of Coral Reef Dr. and SW 117th Ave. The plans should involve analysis of transit access to and from the park-and-ride lot at SW 152nd Ave. and SW 117th Ave.
Mid-Term Improvements	Capacity improvement projects recommended along SW 162nd Ave. and SW 157th Ave.	This recommendation has not been advanced since it requires additional analysis.
	The following roadway links should be widened to increase their capacity: SW 162nd Ave., between SW 152nd St. and SW 136th St., and SW 157th Ave., between SW 120th St. and SW 184th St.	This recommendation has not been advanced since it requires additional analysis.
	The widening of Coral Reef Dr. from SW 117th Ave. to US 1 is the most effective alternative to relieving congestion along the study corridor.	Currently, this is a Priority 3 project in the 2040 RTP and is programmed to be implemented between 2016 and 2020.
	Express bus service on the HEFT to FIU is an attractive transit strategy to build overall transit system ridership. The service can originate from the park-and-ride lot at SW 117th Ave. or from SW 177th Ave.	This recommendation has not been advanced since it requires additional analysis.
Long-Term Improvements	SW 136th St. connection to SR-874 improves mobility in the study area which will provide significant indirect benefits to the study corridor.	This recommendation has not been advanced since it requires additional analysis.
	BRT along Coral Reef Dr. from SW 137th Ave. to SW 177th Ave. to Dadeland South Metrorail Station	DTPW plans on implementing enhanced bus service in the future.
	On or off-road bicycle facilities from SW 162nd Ave. to the Zoo Miami entrance.	Recommendation carried forward to the current study.

FDOT's *SR 992/SW 152 Street/Coral Reef Drive Study from SR 821/HEFT to SR 5/US-1/South Dixie Highway Corridor Street Study* was completed in March 2016. The report summarizes planned and programmed improvements along the SR 992/Coral Reef Drive/SW 152 Street corridor. Based on the capacity, queuing, and volume to capacity, and arterial analyses under future conditions the following improvements in **Table 3.4** were recommended.

Table 3.4: Recommended Improvements to SR 992/Coral Reef Drive

Location of Proposed Improvement	Recommendation
SW 112th Ave.	• Extend the southbound left-turn lane to approximately 225 feet. • Re-designate the southbound approach to provide one (1) shared right-turn/through lane, one (1) through lane, and one (1) exclusive left-turn lane. • Construct an additional northbound left-turn lane to provide dual northbound left-turn lanes. • Provide protected-only northbound left-turn phasing. • Replace northbound traffic signal mast arm. • Replace the eastbound protected/permitted phasing with protected-only phasing.
SW 102 Ave.	• Extend the westbound left-turn lane by approximately 100 feet to maximize the turn lane length.
SW 93 Ave.	• Extend the eastbound left-turn lane to approximately 527 feet including taper. • Provide westbound protected/permitted left-turn phasing. Replace westbound mast arm.
SR 5/US-1/South Dixie Highway	• Provide an additional westbound left-turn lane. Replace westbound traffic signal mast arm at northwest corner. • Re-designate the eastbound approach to consist of dual left-turn lanes, one (1) shared left/through lane, and one (1) channelized right-turn lane. Replace the eastbound traffic signal mast arms at the southeast and southwest corners. • Restrict park-and-ride lot access to a right-in and right-out only driveway. This will require a westbound protected/permitted left-turn phase to provide improved access to the park-and-ride lot. • Extend the northbound left-turn lanes to 425 feet. The improvement will require a public hearing as a median opening will be closed. • Install an advanced overhead cantilever sign on eastbound approach.

3.4 Future Year Traffic

The first step in developing future year traffic is analyzing growth projections and determining recommended growth rates for a future year "no-build" scenario. Several data sources were evaluated, including traffic count histories from FDOT, population projections from the Bureau of Economic and Business Research (BEBR) at the University of Florida, and socioeconomic and traffic volume data from the 2040 Southeast Florida Regional Planning Model (SERPM).

AADT counts on SW 152nd Street, similar to many other corridors throughout Florida, have been flat or even declined over the past 10 years. Some roadways have seen a small increase in traffic volumes over the past few years, given lower gas prices and a more robust economy, but this has not been the case with SW 152nd Street. As such, using traffic count histories to project future traffic on the corridor may not be viable.

As shown on **Table 3.5,** population in the area has grown recently and is projected to continue through 2040. While 2010 Census and 2015 Estimates are available for cities in the area, future projections from BEBR are only available countywide. Using the commonly used BEBR Medium projections, the growth rate in Miami-Dade is expected to be approximately 29% over the next 25 years, or 1.16% per year.

Table 3.5: BEBR Population Projections

City/County	2010 Census Population	2015 Estimated Population	2010-2015 Growth Rate	2040 Low Population Projection	2040 Low Growth Rate	2040 Medium Population Projection	2040 Medium Growth Rate	2040 High Population Projection	2040 High Growth Rate
Miami-Dade	2,496,435	2,653,934	6.31%	2,865,100	7.96%	3,423,600	29.00%	3,979,700	49.95%
South Miami	11,657	13,656	17.15%						
Cutler Bay	40,286	44,109	9.49%						
Palmetto Bay	23,410	23,843	1.85%						

Finally, we examined the 2040 SERPM data in the area. As shown on **Table 3.6**, population and employment east of the HEFT is expected to grow far less rapidly than the county as a whole, while west of the HEFT is similar to the countywide growth rate at just over 1% annually. Employment projections west of the HEFT are also in line with BEBR population projections, with jobs expected to increase by nearly 1% per year.

Table 3.6: Population and Employment Projections from SERPM

Zone	Year	2010	2040	Growth Rate	Annual Growth
Zone 1 (West)	Population	65,563	86,989	33%	1.09%
	Workers	31,482	40,704	29%	0.98%
Zone 2 (Central)	Population	50,279	58,324	16%	0.53%
	Workers	21,841	26,553	22%	0.72%
Zone 3 (East)	Population	29,992	33,304	11%	0.37%
	Workers	14,189	16,898	19%	0.64%

In addition to evaluating 2040 population and employment projections from SERPM, AADT volumes were also summarized. As shown on **Table 3.7**, traffic volume projections along the corridor vary from west to east, but generally average about 15% over the 30 years (or 0.5% per year).

Table 3.7: 2040 SERPM Volumes for SW 152nd Street Corridor

Roadway Segment	2010 AADT	2040 AADT	Total Growth	Annual Growth
SW 152nd east of 157th Ave.	8,440	12,407	47%	1.57%
SW 152nd east of 147th Ave.	27,003	30,708	14%	0.46%
SW 152nd west of 136th Ave.	31,110	36,711	18%	0.60%
SW 152nd east of 136th Ave.	42,232	40,763	-3%	-0.12%
SW 152nd east of SW 124th Ave.	61,146	65,820	8%	0.25%
SW 152nd west of SW 117th Ave.	63,698	69,361	9%	0.30%
SW 152nd west of SW 112th Ave.	37,898	44,852	18%	0.61%
SW 152nd west of SW 102nd Ave.	30,559	39,064	28%	0.93%
SW 152nd west of SW 93rd Ave.	39,037	47,782	22%	0.75%
SW 152nd east of US 1	12,902	13,520	5%	0.16%
SW 152nd west of SW 87th Ave.	13,794	15,227	10%	0.35%
SW 152nd west of 82nd Ave.	10,342	9,647	-7%	-0.22%
SW 152nd west of Palmetto Rd.	9,254	8,029	-13%	-0.44%
SW 152nd west of Old Cutler Rd.	7,144	6,752	-5%	-0.18%
SW 152nd east of Old Cutler Rd.	5,085	5,529	9%	0.29%

3.5 Recommended Growth Rates

A recent study conducted for FDOT District Six on the SW 152nd Street from the HEFT to US 1 applied a 0.5% annual growth factor to the corridor, which seems appropriate for this portion of the corridor. East of US 1, a decision was made to show no growth in traffic, so future year volumes are similar to the existing counts. With the potential for more growth west of the HEFT, applying a high growth rate is recommended. After discussion with the MPO, it was determined that a 0.75% annual growth rate would be applied to existing traffic counts between SW 117th Avenue and SW 137th Avenue, and a 1% annual growth rate would be applied west of SW 137th Avenue.

3.6 Future Year Traffic Analyses

Using the agreed upon growth rates for the corridor, 2025 and 2040 peak hour traffic volumes were developed and input into the Synchro model. Two different scenarios were tested: a true no-build alternative, and one that included committed improvements.

The No-Build alternative was analyzed for design years 2016, 2025, and 2040. This alternative serves as the “do nothing” or baseline alternative of which the other alternatives were compared to. The current 2016 lane geometry and intersection configurations were used for the alternative.

The Committed Alternative includes roadway improvements that are currently under construction or committed to be built in the next five years. Major improvements are currently being made to the area around the Turnpike interchanges with Coral Reef Drive. Since these improvements would be made after 2016, the alternative was analyzed only for design years 2025 and 2040.

The following changes were made to the intersections in the area:

- **SW 117th Avenue –** The southbound inside right-turn lane was converted to a free-flowing condition.

- **Turnpike South Bound Ramps** – A second westbound left-turn lane and two eastbound through lanes and were added.
- **Turnpike North Bound Ramps** – Adding two westbound through lanes. A second lane was added to the eastbound and northbound left-turn lanes.

As with the Existing Conditions analysis described in Chapter 2, Synchro 9 was used to evaluate the future year No-Build and Committed scenarios. Intersection LOS and signal delay (in seconds) are shown on **Table 3.8**. In 2025, the SW 117th Avenue and SW 137th Avenue intersections fail in both the AM and PM peak hours, and the US 1 intersection fails in the PM peak hour. There is very little difference between the No-Build and Committed scenarios. By 2040, the SW 157th Avenue intersection is also projected to fail.

Table 3.8: Future Year Intersection LOS and Delay

Peak Period	Segment	2016	2025 No-Build	2025 Committed	2040 No-Build	2040 Committed
AM Peak	SW 157th Ave.	81.9	103.7	103.7	142.3	142.3
		F	F	F	F	F
	SW 137th Ave,	100.1	127.2	123.2	171.1	172.8
		F	F	F	F	F
	SW 117th Ave.	92.4	111.6	122.3	147.0	161.7
		F	F	F	F	F
	West Turnpike Ramp	11.2	11.3	19.8	12.0	21.2
		B	B	B	B	C
	East Turnpike Ramp	12.6	13.0	19.9	14.2	35.7
		B	B	B	B	D
	SW 112th Ave.	47.3	50.5	50.5	60.2	60.2
		D	D	D	E	E
	SW 107th Ave.	7.8	7.8	7.8	8.4	8.4
		A	A	A	A	A
	SW 93rd Ave.	9.0	9.9	11.2	13.7	14.8
		A	A	B	B	B
	US 1 / S Dixie Hwy	71.0	77.9	79.5	92.0	94.1
		E	E	E	F	F
	SW 87th Ave.	17.6	17.6	17.6	17.6	17.6
		B	B	B	B	B
	SW 82nd Ave.	34.9	34.9	34.9	34.9	34.9
		C	C	C	C	C
	SW 77th Ave.	11.1	11.1	11.1	11.1	11.1
		B	B	B	B	B
	Old Cutler Rd.	48.1	48.1	48.1	48.1	48.1
		D	D	D	D	D
PM Peak	SW 157th Ave.	27.0	32.0	32.2	47.8	47.8
		C	C	C	D	D
	SW 137th Ave.	75.2	95.6	95.6	146.4	144.1
		E	F	F	F	F
	SW 117th Ave.	79.6	90.1	85.0	121.2	114.4
		E	F	F	F	F
	West Turnpike Ramp	13.2	24.1	22.0	14.5	22.6
		B	C	C	B	C
	East Turnpike Ramp	11.4	11.8	19.2	12.5	14.6
		B	B	B	B	B
	SW 112th Ave.	40.3	43.3	43.3	50.0	50.0
		D	D	D	D	D
	SW 107th Ave.	12.1	12.7	12.7	15.7	13.9
		B	B	B	B	B
	SW 93rd Ave	31.9	34.9	34.9	42.7	42.7
		C	C	C	D	D
	US 1 / S Dixie Hwy	70.5	84.7	81.4	103.4	101.3
		E	F	F	F	F
	SW 87th Ave.	23.6	23.6	23.6	23.6	23.6
		C	C	C	C	C
	SW 82nd Ave.	57.2	57.2	57.2	57.2	57.2
		E	E	E	E	E
	SW 77th Ave.	22.1	22.1	22.1	22.1	22.1
		C	C	C	C	C
	Old Cutler Rd.	40.4	43.2	40.4	40.4	40.4
		D	D	D	D	D

In addition, expected delay at some intersections may actually increase, due in part to transitioning several left-turn phases from protected-permissive phasing into protected-only phasing where single left-turn lanes were changed to dual left-turn lanes. Changing intersection left-turn phases will at times require greater amounts of green time dedicated to protected left-turns since the permissive period of green is removed.

As noted in Section 2, the general public is mainly concerned with travel time. **Table 3.9** summarizes travel times from SimTraffic for the various scenarios tested in 2016, 2025, and 2040.

Table 3.9 Future Year AM and PM Peak Hour Corridor Travel Times

		Eastbound Travel Time (In minutes)					Westbound Travel Times (In minutes)				
		2016	2025		2040		2016	2025		2040	
	Segment	No-Build	No-Build	Committed	No-Build	Committed	No-Build	No-Build	Committed	No-Build	Committed
AM Peak	SW 157th Ave.-to SW 137th Ave.	6:13	7:55	7:49	17:44	16:07	4:49	5:47	6:47	8:11	10:05
	SW 137th Ave. to SW 117th Ave.	6:45	8:52	14:51	9:57	16:24	4:47	4:46	4:48	4:38	4:50
	SW 117th Ave. to SW 112th Ave.	1:29	1:39	1:29	1:42	1:34	7:21	11:23	4:21	16:39	10:22
	SW 112th Ave. to US 1	13:02	14:18	11:52	13:05	9:29	4:08	4:08	4:20	5:09	4:32
	US 1 to Old Cutler Rd.	4:26	4:29	4:25	4:27	4:27	4:56	5:16	5:10	5:28	5:49
	Total	31:56	37:13	40:26	46:54	48:01	26:00	31:21	25:26	40:06	35:39
	% Change			+8.6%		+2.4%			-18.9%		-11.1%
PM Peak	SW 157th Ave. to SW 137th Ave.	4:41	5:07	4:43	5:06	4:45	4:11	4:25	4:28	4:19	4:46
	SW 137th Ave. to SW 117th Ave.	6:12	4:40	4:23	5:54	4:56	5:05	5:51	5:53	5:25	9:08
	SW 117th Ave. to SW 112th Ave.	1:26	1:30	1:50	1:27	1:34	3:54	7:01	3:52	10:20	3:10
	SW 112th Ave. to US 1	7:40	5:48	8:05	5:51	7:17	4:36	5:26	4:47	9:35	5:06
	US 1 to Old Cutler Rd.	4:39	4:21	4:31	4:37	4:23	5:44	6:16	5:29	7:09	6:48
	Total	24:39	21:26	23:33	22:55	22:54	23:30	28:58	24:29	36:48	28:59
	% Change			+9.9%		-0.1%			-15.5%		-21.2%

As the table depicts, corridor travel times are expected to increase significantly, even with minimal growth in traffic volumes. Signal optimization was used in the future year analysis to somewhat ameliorate the impacts. Since SimTraffic uses a micro-simulation method of calculating individual vehicle movements, even intersections with no altered lane configurations may show slight differences in their simulated travel time metrics. This variance can be attributed to slight differences in signal timing splits, left turn phasing sequences, and intersection signal timing offsets which are all dependent on Synchro's coordination optimization.

The westbound simulated travel times for the Committed Alternative model were shorter than the No-Build westbound simulated travel times, but the eastbound simulated travel times for the Committed Alternative model were longer than the No-Build eastbound simulated travel times.

Synchro summary sheets, containing more information on the future year No-Build and Committed analyses, are included in **Appendix E**.

4.0 Summary of Existing and Projected Conditions in the Study Corridor

The need for the multimodal projects stems from existing and expected transportation problems along the Coral Reef Drive corridor related to limited transit service, poor bicycle and pedestrian facilities, and high traffic volumes. These deficiencies limit accessibility and are not supportive of the desired mobility, livable, and substantiality along the corridor.

The existing carrying capacity of the Coral Reef Drive corridor is constrained. People traveling by automobile experience congestion and delays; people traveling by transit experience infrequent service as well as delays because of traffic congestion. Integrated multimodal improvements are needed to support the anticipated continuous levels of residential growth. County comprehensive plans envision this growth in the form of focused, pedestrian-and transit-oriented development. Without transportation capacity improvements that encourage pedestrian and transit travel, it is unlikely that the projected growth can be accommodated within the corridor, and the associated economic opportunity of additional jobs and residents will be limited. The following sections describe the needs in more detail.

4.1 Transit Service

Existing transit service in the corridor does not meet the needs of current and future residents, which yields low rate of transit use. On an average weekday, only 1.3 percent of all trips are made using transit. This is well below the regional average of 2.3 percent transit mode share.

Challenges with the existing transit service include:

- **Transit travel time is not competitive with automobile:** Frequent stops and congested segments of roadway make transit travel both slower and more unpredictable than auto travel, with bus travel times increasing significantly during peak hours.
- **Dwell time at stops and peak period congestion delays transit:** Traffic congestion introduces significant delays for buses in both directions; dwell time at stops increases total transit travel time by about 20 percent, as compared to both transit travel time without dwell and general traffic.

The corridor needs attractive, high-quality transit service to improve local and regional mobility. High quality transit would reduce travel time and increase frequency, reliability, and attractiveness.

4.2 Pedestrian and Bicycle Facilities

Existing pedestrian facilities are disjointed and discontinuous, limiting pedestrian travel and reducing access to transit. Very few residents walk to access transit or to other local destinations. The poor accommodation for cyclists is reflected in a very low rate of cycling in the corridor. The US Census estimates that just 1% of commuters along the Coral Reef Drive corridor use a bicycle to get to work. This compares with 1.83% In Miami-Dade County, according to the 2010 Census. Specific pedestrian and bicycle needs include:

- **Facilities for non-auto travel are limited, substandard, and unable to compete with the attractiveness and efficiency of single occupancy vehicle travel**: The sidewalk

facilities are largely unbuffered from the heavy traffic along the study corridor. ADA accommodations to pedestrian destinations such as bus stops are missing and/or substandard in several locations. Pedestrian ramps and detectable warning pads are not provided in portions of the corridor.

- **Pedestrian crossings are infrequent, wide, and not near existing transit stops:** Crosswalks are spaced at significant distances from one another. Crossing distance commonly exceeds 75 feet.
- **Bicycle access is difficult with few alternative paths:** Few bicycle facilities currently exist along Coral Reef Drive. The study corridor can be characterizes as a "corridor of caution" -- a route where bicyclists are urged to exercise extra caution due to narrow shoulders or lanes, poor sight distances, high traffic volumes, or other challenging characteristics."

Attractive, high-quality pedestrian and bicycle facilities are needed to accommodate the future planned growth, and appropriately meet the diverse travel demands and abilities of local residents and stakeholders. Improved bicycle and pedestrian facilities will also improve transit access along the corridor to connect transit with surrounding uses via safe and continuous pathways.

4.3 Traffic Problems and Vehicular Operations Needs

Users experience significant congestion along Coral Reef Drive during peak periods and on weekends. Specific vehicular needs include:

- **Users experience significant congestion along Coral Reef Drive during peak periods:** Presently, eight signalized intersections along the 11.2-mile corridor experience significant congestion and are considered "failing", operating at a LOS E or F in the AM or PM peak hour. In 2040, there are nine intersections operating at a LOS of E or F during the AM and PM peak period (the induced demand concept - new roads create new drivers).
- **Travel times are highly variable and unpredictable:** Volume to capacity (v/c ratio) is a measure of congestion. A v/c ratio less than 0.85 generally indicates that adequate capacity is available and vehicles are typically not expected to experience significant queues and delays. During the AM peak hour under existing conditions, eight signalized intersections in the study area have v/c ratios greater than 0.85.

With increased population and employment growth, the corridor needs to maintain adequate vehicular accommodation to improve travel time reliability.

The corridor needs a clear plan for investment in transportation services and infrastructure that will accommodate expected growth (mix of uses and residents) and provide the basis for ongoing private investment in the corridor. It also needs to define coordinated land use and transportation policies and programmed improvements to facilitate high capacity transit investment and appropriate transit oriented development.

5.0 Potential Corridor Improvement Projects

Based on the data collection, field reviews, existing transportation network, results of the TPTAC meetings and input from different stakeholders, a series of potential improvements were identified for the Coral Reef Drive corridor. As a base for the proposed improvements, the study team

reviewed and considered the projects included in the County's 2040 LRTP and the FDOT's Five-Year Work Program highlighted in Section 4 above.

5.1 Initial Testing of Potential Projects

In order to evaluate the effectiveness of some of the potential improvement projects, pre-screening traffic analyses were conducted. The projects tested included the potential installation of roundabouts on Coral reef Drive east of US 1, modifications to the intersection of Coral Reef Drive and SW 117th Avenue, and extension of Coral Reef Drive as a two-lane road from SW 162nd Avenue to Krome Avenue. Each of these are described in more detail below.

Installation of Roundabouts east of US 1

The Town of Palmetto Bay has been interested in making multimodal circulation and aesthetic improvements to Coral Reef Drive between US 1 and Old Cutler Road. As part of this study, single-lane roundabouts were evaluated at both the SW 82nd Avenue and Old Cutler Road intersections, which are currently four-legged signalized intersections. A concept design was developed for a potential roundabout at the Coral Reef Drive and Old Cutler Road intersection. As shown on **Exhibit 5.1**, a roundabout would just fit within the existing right of way (ROW), but some minimal ROW acquisition might be needed for sidewalks or utilities. Given that this intersection is the largest east of US 1, and that a roundabout barely fit, a concept was not developed for the SW 82nd Avenue intersection, or any others in Palmetto Bay.

Exhibit 5.1: Coral Reef Drive at Old Cutler Road Roundabout Concept

In addition to developing a concept, both intersections were evaluated in Synchro to determine if roundabouts would improve mobility. **Table 5.1** illustrates the difference in total intersection delay when comparing the roundabout alternative to the No-Build alternative. The intersection delays are given in seconds using Synchro's HCM 2010 delay calculation capability. The simulation **resulted** in increased delay at both intersections with roundabouts as compared to the existing

configurations. Since the roundabout alternative evaluation resulted in larger delays compared to No-Build condition, the roundabout option was not considered for the remainder of the traffic analysis.

Table 5.1: 2025 Peak Hour Intersection Delay with and without Roundabouts

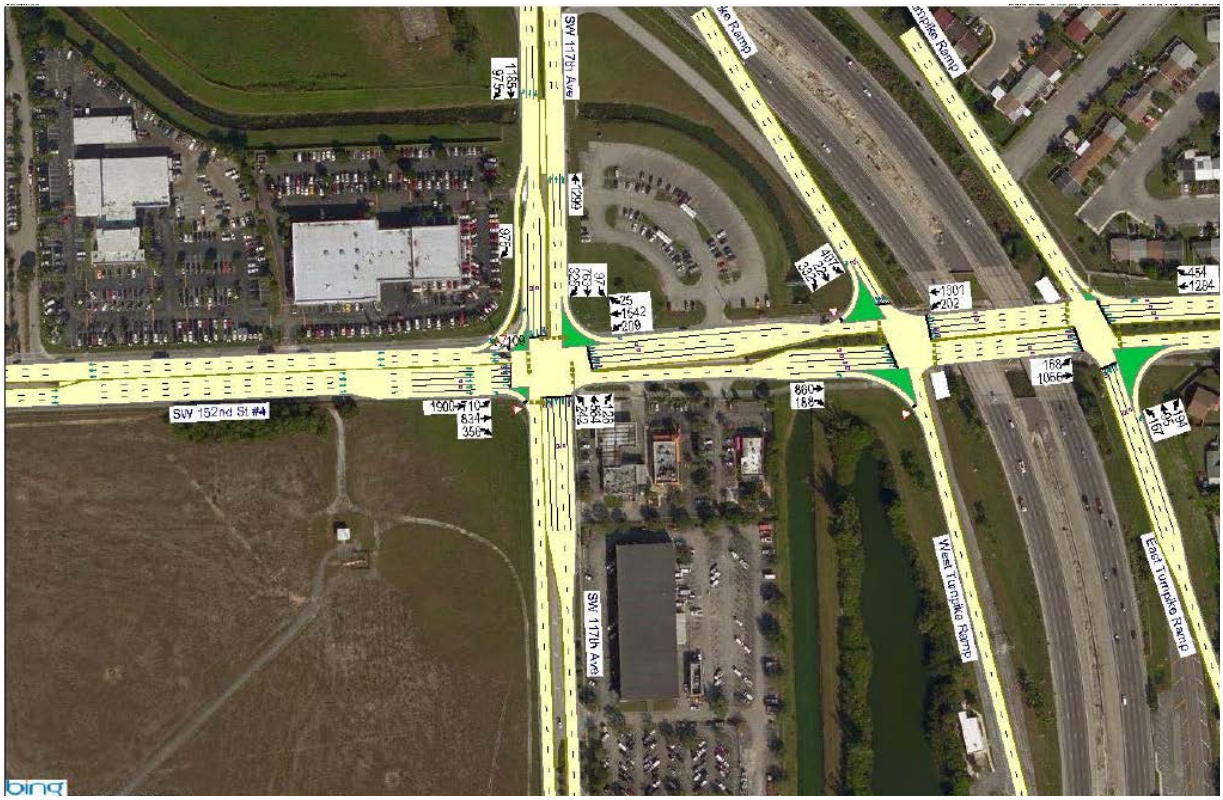
Intersection	Analysis Period	Intersection Delay (In Seconds)	
		No-Build	Roundabout
SW 82nd Ave.	2025 AM Peak	34.9	75.0
	2025 PM Peak	57.2	163.5
Old Cutler Rd.	2025 AM Peak	48.1	115.3
	2025 PM Peak	43.2	49.2

Modifications to the Coral Reef Drive at SW 117th Avenue Intersection

As noted in Section 3 of this report, improvements are currently under construction on Coral Reef Drive between SW 112th Avenue and SW 117th Avenue. These improvements are primarily focused on access to and from the Turnpike, and unfortunately will only have a minimal positive effect on the congested Coral Reef Drive at SW 117th Avenue intersection. A review of the existing ROW at the intersection revealed that there may be available space to make additional modifications. In addition to those currently under construction, the following modifications to the SW 117th Avenue intersection were tested:

- Eastbound left turn bay extended.
- Westbound dual left added, changed signal phasing from protected/permissive to protect only.
- Northbound dual left added, changed signal phasing from protected/permissive to protect only.
- Eastbound right turn lane added, channelized right with yield condition
- South bound left turn bay extended.

Exhibit 5.2: 117th Avenue Modifications



These modifications were put into the Synchro model and AM and PM peak hour analyses were conducted **(Appendix F)**. Since these modifications are not contained in any adopted plans, it was determined that the modifications would not likely be implemented before 2025, and were only analyzed for 2040 horizon year of this study. **Exhibit 5.2** provides a summary of the results for each intersection along the corridor.

As shown in **Table 5.2**, the potential modifications do improve delay at the SW 117th Avenue intersection; however, the difference is not likely to constitute a significant travel time reduction. In addition, while modifications were only made to SW 117th Avenue intersection, reported delay at other intersections may have been affected due to signal optimization within the Synchro model.

Table 5.2: 2040 Intersection Delay by Alternative

Peak Period	Alternative:	No-Build	Committed	Turnpike Alternative
AM Peak	SW 157th Ave.	142.3 F	142.3 F	142.3 F
	SW 137th Ave.	171.1 F	172.8 F	168.2 F
	SW 117th Ave.	147.0 F	161.7 F	155.1 F
	West Turnpike Ramp	12.0 B	21.2 C	21.3 C
	East Turnpike Ramp	14.2 B	35.7 D	18.9 B
	SW 112th Ave.	60.2 E	60.2 E	60.2 E
	SW 107th Ave.	8.4 A	8.4 A	8.4 A
	SW 93rd Ave.	13.7 B	14.8 B	14.8 B
	US 1 / S Dixie Hwy	92.0 F	94.1 F	94.1 F
	SW 87th Ave.	17.6 B	17.6 B	17.6 B
	SW 82nd Ave.	34.9 C	34.9 C	34.9 C
	SW 77th Ave.	11.1 B	11.1 B	11.1 B
	Old Cutler Rd.	48.1 D	48.1 D	48.1 D
PM Peak	SW 157th Ave.	47.8 D	47.8 D	47.8 D
	SW 137th Ave.	146.4 F	144.1 F	144.1 F
	SW 117th Ave.	121.2 F	114.4 F	106.7 F
	West Turnpike Ramp	14.5 B	22.6 C	22.6 C
	East Turnpike Ramp	12.5 B	14.6 B	19.4 B
	SW 112th Ave.	50.0 D	50.0 D	50.0 D
	SW 107th Ave.	15.7 B	13.9 B	13.9 B
	SW 93rd Ave.	42.7 D	42.7 D	42.7 D
	US 1 / S Dixie Hwy	103.4 F	101.3 F	101.3 F
	SW 87th Ave.	23.6 C	23.6 C	23.6 C
	SW 82nd Ave.	57.2 E	57.2 E	57.2 E
	SW 77th Ave.	22.1 C	22.1 C	22.1 C
	Old Cutler Rd.	40.4 D	40.4 D	40.4 D

Table 5.3 provides a summary of expected 2040 peak hour travel times along the Coral reef Drive corridor under the various alternatives.

Table 5.3: 2040 Peak Hour Corridor Travel Times

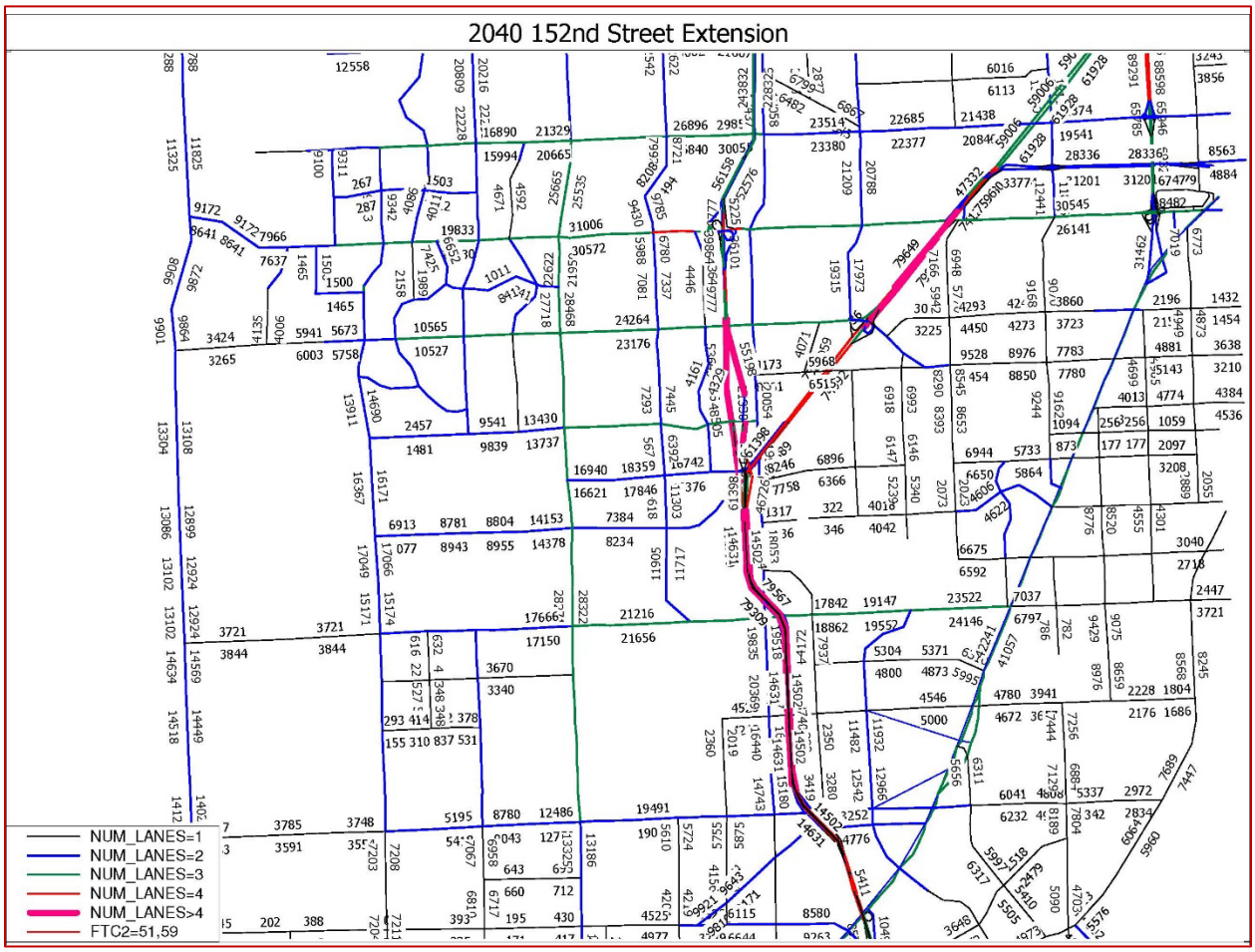
Peak Period		Eastbound			Westbound		
Segment		No-Build	Committed	Turnpike Alternative	No-Build	Committed	Turnpike Alternative
AM Peak	5	17:44	16:07	17:02	8:11	10:05	10:32
	4	9:57	16:24	6:48	4:38	4:50	5:11
	3	1:42	1:34	2:03	16:39	10:22	13:23
	2	13:05	9:29	10:25	5:09	4:32	5:08
	1	4:27	4:27	4:23	5:28	5:49	5:42
	Total	46:54	48:01	40:41	40:06	35:39	39:56
	% Change		+2.4%	-13.3%		-11.1%	-0.4%
PM Peak	5	5:06	4:45	4:41	4:19	4:46	4:44
	4	5:54	4:56	4:36	5:25	9:08	12:43
	3	1:27	1:34	2:03	10:20	3:10	3:42
	2	5:51	7:17	7:39	9:35	5:06	5:42
	1	4:37	4:23	4:31	7:09	6:48	6:17
	Total	22:55	22:54	23:30	36:48	28:59	33:09
	% Change		-0.1%	+2.5%		-21.2%	-9.9%

Since SimTraffic uses a micro-simulation method of calculating individual vehicle movements, even intersections with no altered lane configurations may show slight differences in their simulated travel time metrics. This variance can be attributed to slight differences in signal timing splits, left turn phasing sequences, and intersection signal timing offsets which are all dependent on Synchro's coordination optimization. The simulated travel times for the Turnpike Alternative 1 model were somewhat better than the No-Build and Committed scenarios, with the exception of the eastbound direction in the PM peak hour. This potential project should be explored further and is included in the refined list below.

Coral Reef Drive Extension west to Krome Avenue

The final potential improvement project tested was the extension of Coral Reef Drive from its western terminus at SW 162nd Avenue to Krome Avenue. The extension, envisioned as a two-lane roadway with bicycle and pedestrian facilities, was evaluated using the 2040 SERPM travel demand model. As shown on **Exhibit 5.3**, the extension drew approximately 7,600 vehicles per day in the model, which is well within the two-lane capacity from the FDOT Quality/Level of Service handbook of 17,700.

Exhibit 5.3: 2040 SERPM Daily Volumes with Coral Reef Drive Extension



Surprisingly, the extension had very little effect on the surrounding roadway network. Volumes on some roads near the extension decreased while others increased, but the net effect on the system as a whole was negligible. Furthermore, significant concern was expressed by TPTAC and CTAC members about extending the roadway beyond the Urban Development Boundary (UDB), as it could lead to sprawl development. The extension was not carried forward into the refinement and screening phase.

5.2 Refinement and Screening of Potential Projects

Table 5.4 lists the proposed improvements and **Exhibits 5.4 – Exhibit 5.6** depict the location of the projects by corridor section: Eastern, Central and Western. Improvements identified are multimodal in nature and include bicycle, pedestrian, transit, vehicular, ADA and safety improvements, and land use related actions.

A preliminary list of multimodal improvement alternatives was presented to members of TPTAC and CTAC on November 2, 2016 for input, comments and suggested additions. Based on their

feedback and recommendation the list of multimodal project was accepted with the exception that the extension of Coral Reef Drive westward from SW 162nd Avenue to Krome Avenue should be deleted from the list.

The next step was to rank the list of multimodal improvement alternatives by project score – highest to lowest (**Table 5.5**). The recommended multimodal projects set a new paradigm to provide a balanced transportation system with greater investments toward alternative modes such as bicycle and pedestrian facilities, and transit oriented development policies. With this established paradigm, a ranking process was developed to reflect the increased emphasis on transit, the mobility hub concept, and multimodal transportation.

The selection of a set of preferred list of multimodal alternatives is the conclusion of a two-stage evaluation process. First, a long list of alternative strategies was narrowed down to a set of alternatives showing the greatest promise in meeting the multimodal needs of the Coral Reef Drive corridor. This initial screening of alternatives was accomplished by assessing the alternative strategies according to general qualitative criteria. The criteria were based on the proposed study goals and objectives (see **Section 1.1** above) and reflects the most critical aspects of each objective. To better understand the correlation between the stated goals and objectives, and the criteria and measures of effectiveness used to evaluate how well each goal is met.

Table 5.4 displays the evaluation criteria (at the top of the table) developed for the assessment of all proposed alternatives. The overall evaluation of alternative investment strategies requires that estimated values of evaluation measures be transformed, combined, and arrayed in a manner that permits a consistent comparison of alternatives. The evaluation framework provides a set of rules and a format with which to evaluate alternatives according to a pre-selected set of criteria. This framework functions to permit the identification of clearly superior alternatives and highlight characteristics of alternatives showing the greatest differences. Attributes desirable in selecting an evaluation framework include an ability to provide a systematic, reproducible method for reaching conclusions. The evaluation process allows a full range of quantitative and qualitative evaluation measures to be used in combination, while avoiding the need to quantify measures that are best described qualitatively.

Each alternative was evaluated against each of the criteria elements and based on that assessment received a rating or score of one (“1”) through four (“4”), with four (“4”) being the most important and zero (“0”) being the least important. A weight was then applied to each score to give a relative value of importance of the rating. Symbols were used to visual communication qualitative information:

- ● The alternative received a score of 4. The alternative may produce positive impact if implemented in the study corridor and meets a majority of the goals and objectives of the project.
- ◕ The alternative received a score of 3. The alternatives may produce a positive impact in the study corridor and nearly meets all of the goals and objectives of the project.
- ◑ The alternative received a score of 2. The alternatives may produce a positive impact in the study corridor and meets some of the goals and objectives of the project.

- The alternative received a score of 1. The alternatives may produce a positive impact in the study corridor and minimally supports the goals and objectives of the project.
- The alternative received a score of 0. The alternatives may produce no positive impact in the study corridor and does not support the goals and objectives of the project.

Another part of the screening phase was to determine the prospect of "fatal flaws" in any of the proposed alternatives. Fatal flaws are defined as: severe constraints or combinations of constraints that affect alternatives so that they no longer appear to be realistic or viable in addressing improved transportation in the corridor. These strategies were ruled out. The criterion addresses only fatal flaws early in the study process to reduce the number of alternatives that warrant further study. It also serves as a means of differentiating between alternatives in which a variety of factors not represented in other criteria pose fatal flaws to implementation.

Examples of fatal flaws related to environmental concerns could include the taking of endangered species habitat, taking of public parklands or wildlife management areas, or impacts on historic sites eligible for the National Register. Often, the mitigation costs are extremely high, or amending the alternative(s) is so impractical as to prohibit further consideration of the alternative(s).

Table 5.4: Recommended Multimodal Improvement Projects in the Study Corridor

Project ID Code	Project Name	Description	Study Goals	Evaluation Criteria												Project Score (max. = 100)	Planning Level Cost Estimate ($000)
				Travel Time	Costs	Connectivity/Accessibility			Safety			Aesthetic Enhancement	Economic Development	Social Equity	Consistency w/Current Plans		
						Bicycle & Pedestrian	Transit	Auto	Bicycle	Pedestrian	Auto						
Eastern Section: SW 67th Avenue (Ludlam Road) to South Dixie Highway (US 1)																	
E1	Bicycle Facilities	Install a minimum 4 ft. wide bike lane on the north and south side of Coral Reef Dr. from Ludlam Rd. to US 1.	Mobility/Regional Accessibility/ Safety/Choice	◔	◑	●	◔	◔	●	◔	◔	◔	○	◔	●	50	595
E2	Bus Stop Improvements	Replace bus stops (19) with ADA compliant shelters, NextBus information, bicycle parking, and benches.	Affordability/ Livability	○	◑	◑	●	◔	◑	◑	◔	◔	○	●	◑	46	494
E3	Pedestrian Improvements	Install ADA compliant pedestrian ramps and detectable warning pads at all existing crosswalks along this section of the corridor. Replace damaged sidewalks. Install signage, push-button pedestrian signals in all directions at signalized intersections.	Mobility/Safety/ Affordability/ Choice/Livability	○	◕	◕	◔	○	◑	●	◔	◔	○	●	●	49	738
E4	Shared-use Path	Install multi-use path from SW 72nd Ave. to Old Cutler Rd. to provide a buffer space between pedestrians and vehicular traffic to create a shared-use path that may be used by pedestrians, bicyclists, skaters, and other nonmotorized users.	Mobility/Safety/ Choice/Livability	◔	◔	●	◔	○	●	●	◔	◔	○	◔	◕	48	77
Central Section - US 1 to SW 117th Avenue																	
C1	Bicycle Facilities	Install a minimum 4 ft. wide in street bicycle lane on north side of Coral Reef Dr. frontage road from SW 102nd Ave. to SW 112th Ave.	Mobility/Regional Accessibility/Safety	◔	◔	●	◔	◔	●	◔	◔	◔	○	◑	◔	40	152
C2	Bus Stop Improvements	Replace bus stops at SW 93 Ave., SW 97 Ave., SW 98 Ave., SW 112 Ave. and SW 99 Ct. with ADA compliant shelters, NextBus information, bicycle parking, and benches.	Affordability/Choice /Livability	○	◔	◑	●	◔	◑	◑	◔	◔	○	●	◑	44	130
C3	Enhanced Bus Service (EBS)	Implement the Coral Reef EBS to provide premium limited-stop transit service along Coral Reef Dr. and SW 137th Ave. between the intersection of SW 162nd Ave. and SW 136th St., the Kendall-Tamiami Executive Airport, and the South Miami-Dade Busway Coral Reef Dr. Station.	Mobility/Regional Accessibility/Affordability/Choice/Livability	○	●	◔	●	◔	◔	◔	◔	○	○	○	●	44	Capital Cost: 43,000 Operating Costs: 3,000
C4	Pedestrian Improvements	Install ADA compliant pedestrian ramps and detectable warning pads at all existing crosswalks along this section of the corridor. Replace damaged sidewalks. Install signage, push-button pedestrian signals in all directions at signalized intersections.	Mobility/Safety/ Affordability/Choice /Livability	○	◕	◕	◔	○	◑	●	◔	◔	○	●	●	49	738
C5	Pedestrian Improvements	Install mid-block pedestrian crosswalks near SW 98th Ave., SW 104th Ave., and SW 109th Ave. intersections. Install ADA compliant pedestrian ramps and detectable warning pads at crosswalks.	Mobility/Safety/ Affordability/Choice /Livability	◔	◑	◕	◑	○	◑	●	◔	◔	○	●	◑	46	468
C6	Pedestrian Improvements	Extend sidewalk at the Park & Ride facility adjacent to the HEFT to SW 117th Ave. intersection.	Mobility/Safety/ Affordability/ Choice/Livability	◔	◔	◕	◕	○	◑	●	◔	◔	○	●	●	53	13
C7	Pedestrian Improvements	Install new pedestrian crosswalks, signage, push-button pedestrian signals in all directions at the intersection of SW 117th Ave.	Mobility/Safety/ Affordability/Choice /Livability	◔	◔	◕	◑	○	◑	●	◔	◔	○	●	◑	44	26
C8	Pedestrian Improvements	Provide marked pedestrian crosswalks, signage, and activated signals in all directions at all signalized intersections along the corridor. Install ADA compliant pedestrian ramps and detectable warning pads at crosswalks.	Mobility/Safety/ Affordability/Choice /Livability	○	◔	◕	◔	○	◑	●	◔	◔	○	●	●	45	208

Project ID Code	Project Name	Description	Study Goals	Evaluation Criteria												Project Score (max. = 100)	Planning Level Cost Estimate ($000)
				Travel Time	Costs	Connectivity/Accessibility			Safety			Aesthetic Enhancement	Economic Development	Social Equity	Consistency w/Current Plans		
						Bicycle & Pedestrian	Transit	Auto	Bicycle	Pedestrian	Auto						
C9	Pedestrian Improvements	Add landscaping to median where practical to partially or fully control crossing points of pedestrians. Low shrubs in commercial areas and near schools can be used to channel pedestrians to crosswalks or crossing areas.	Mobility/Safety/ Affordability/Choice /Livability	○	◔	◔	◔	○	◔	●	◔	◕	○	◔	◔	27	260
C10	Roadway Improvements	Improvements to SW 112th Ave: Extend the southbound left-turn lane to approximately 225 ft., re-designate the southbound approach to provide one shared right-turn/through lane, one through lane, and one exclusive left-turn lane. Construct an additional northbound left-turn lane to provide dual northbound left-turn lanes. Provide protected-only northbound left-turn phasing. Replace northbound traffic signal mast arm. Replace the eastbound protected/permitted phasing with protected-only phasing.	Mobility/Regional Accessibility/ Choice/Livability	◑	●	○	◑	●	◔	◔	◑	○	○	◑	◕	49	2,585
C11	Roadway Improvements	Extend the westbound left-turn lane at SW 102nd Ave. by approximately 100 ft. to maximize the turn lane length.	Mobility/Regional Accessibility/ Choice/Livability	◑	●	○	◑	●	◔	◔	◑	○	○	○	◕	47	1,200
C12	Roadway Improvements	Extend the eastbound left-turn lane at SW 93rd Ave. to approximately 525 ft. including taper. Provide westbound protected/permitted left-turn phasing. Replace westbound signal mast arm.	Mobility/Regional Accessibility/ Choice/Livability	◑	◕	○	◑	●	◔	◔	◑	○	○	○	◕	45	900
C13	Roadway Improvements	At US 1 provide an additional westbound left-turn lane. Replace westbound traffic signal mast arm at northwest corner. Re-designate the eastbound approach to consist of dual left-turn lanes, one shared left/through lane, and one channelized right-turn lane. Replace the eastbound traffic signal mast arms at the southeast and southwest corners. Restrict park-&-ride lot access to a right-in and right-out only driveway. This will require a westbound protected/permitted left-turn phase to provide improved access to the park-&-ride lot. Extend the northbound left-turn lanes to 425 ft. The improvement will require a public hearing as a median opening will be closed. Install an advanced overhead cantilever sign on eastbound approach.	Mobility/Regional Accessibility/ Choice/Livability	◑	●	○	◑	●	◔	◔	◑	○	○	○	◕	47	2,585
C14	Safety Improvements	Conduct a safety study that focuses on the intersections of SW 93rd Ave. and US 1 to recommend improvements to mitigate identified crash patterns.	Safety/ Affordability/ Livability	◔	◔	◑	◑	◑	●	●	●	○	●	○	◔	53	50
C15	Shared-use Path	Extend the pathway on the south side of Coral Reef Dr. from SW 98 Ave. (along the Palmetto Golf Course) to US 1.	Mobility/Safety/ Choice/Livability	◔	●	●	◔	○	●	●	◔	◔	○	◔	◑	51	1,068
C16	Transit Oriented Development (TOD)	Explore TOD opportunities at the South Miami-Dade Busway Coral Reef Dr. Station and Park & Ride facility to achieve sustainable transportation.	Mobility/ Regional Accessibility/ Choice/Livability	◔	●	◑	●	◑	◑	◑	◔	●	●	◔	●	65	TBD
C17	TOD	Construct parking garage with complementary commercial uses at SW 117th Ave. Park & Ride. It is also recommend a feasibility study be conducted to determine the prospects of joint development/TOD at this location.	Mobility/Regional Accessibility/ Choice/Livability	◔	●	◑	●	◑	◑	◑	◔	●	●	◔	◕	62	TBD

Project ID Code	Project Name	Description	Study Goals	Evaluation Criteria												Project Score (max. = 100)	Planning Level Cost Estimate ($000)
				Travel Time	Costs	Connectivity/Accessibility			Safety			Aesthetic Enhancement	Economic Development	Social Equity	Consistency w/Current Plans		
						Bicycle & Pedestrian	Transit	Auto	Bicycle	Pedestrian	Auto						
C18	Turnpike Modifications	Monitor traffic service at Turnpike ramps and SW 117th Ave. intersections for potential additional lane and modifications identified in the study if warranted.	Mobility/Regional Accessibility/ Choice/Livability	◑	●	◔	◑	●	◔	◔	◑	◔	◔	◔	○	44	TBD
Western Section: SW 117th Avenue to SW 177th Ave (Krome Avenue)																	
W1	Bus Stop Improvements	Replace bus stops (17) with ADA compliant shelters, NextBus information, bicycle parking, and benches.	Affordability/ Choice/Livability	○	◑	◑	●	◔	◑	◑	◔	◔	○	●	◑	46	442
W2	Pedestrian Improvements	Provide marked pedestrian crosswalks, signage, and activated signals in all directions at all signalized intersections along this section of the corridor. Install ADA compliant pedestrian ramps and detectable warning pads at crosswalks. Replace damaged sidewalks along corridor.	Mobility/Safety/ Affordability/Choice /Livability	○	◔	◕	◔	○	◑	●	◔	◔	○	●	●	45	234
W3	Pedestrian Improvements	Provide marked mid-block pedestrian crossings at the intersections of SW 120th Ave., SW 129th Ave., Cascada Blvd., SW 149 Ave., SW 158th Ave., SW 160th Ave., SW 130th Pl. and 134th Pl. Install ADA compliant pedestrian ramps and detectable warning pads at crosswalks.	Mobility/Safety/ Affordability/ Choice/Livability	◔	◑	◕	◔	○	◑	◕	◔	◑	○	●	◑	42	1,144
W4	Pedestrian Improvements	Provide new marked pedestrian crosswalks and signage in all directions at SW 162nd Ave. Install ADA compliant pedestrian ramps and detectable warning pads at crosswalks.	Mobility/Safety/ Affordability/ Choice/Livability	◔	●	◕	◑	○	◑	●	◔	◔	○	●	◑	50	26
W5	Roadway Improvements	Install continuous raised median and landscape from SW 137th Ave. to SW 147th Ave. to aide in preventing accidents caused by crossover traffic, reduce headlight glare distraction, and separate left-turning traffic from through lanes when combined with left-turn lanes.	Mobility/ Regional Accessibility/ Choice/Livability	◔	◑	◔	○	◑	●	●	●	●	◔	○	○	44	429
W6	Roadway Improvements	Widen the 2-lane roadway to 4-lane divided roadway from SW 147th Ave. to SW 157th Ave. incorporating complete street concepts including pedestrians, bicyclists, transit users and motorists elements, to the extent appropriate for the land use or the context of the street elements.	Mobility/ Regional Accessibility/ Choice/ Livability	●	●	◑	◑	◑	◑	◑	◑	●	◑	○	◑	58	8,850
W7	Roadway Improvements	Monitor Zoo Miami and other development projects in the area. Traffic studies should be identified needed capacity mitigation and supporting transit bicycle, pedestrian and TDM requirements.	Mobility/ Regional Accessibility/ Choice/ Livability	○	◔	◑	◑	◑	◑	◑	◑	◔	◑	◕	◔	41	125
W8	Safety Improvements	Conduct a safety study at the intersections of SW 137 Ave., SW 122 Ave., and SW 117 Ave. to identify crash patterns and develop improvements that are suitable and cost effective.	Safety/ Affordability/ Livability	○	◔	◑	◑	◑	●	●	●	○	◑	●	◔	53	100
W9	Shared-use Path	Widen sidewalks to 8 ft.to 10 ft. from SW 137th Ave. to SW 147th Ave.to provide a buffer space between pedestrians and vehicular traffic to create a shared-use paths that may be used by pedestrians, bicyclists, skaters, and other nonmotorized users.	Mobility/Safety/ Choice/Livability	◔	◑	●	◔	○	●	●	◔	◑	○	◑	◔	46	630
W10	Enhanced Bus Service (EBS)	Implement the Coral Reef EBS to provide premium limited-stop transit service along Coral Reef Dr. and SW 137th Ave. between the intersection of SW 162nd Ave. and SW 136th St., the Kendall-Tamiami Executive Airport, and the South Miami-Dade Busway Coral Reef Dr. Station.	Mobility/ Regional Accessibility/ Affordability/ Choice/Livability	○	●	◔	●	◔	◔	◔	◔	○	○	○	●	44	Capital Cost: 43,000 Operating Costs: 3,000

Project ID Code	Project Name	Description	Study Goals	Evaluation Criteria												Project Score (max. = 100)	Planning Level Cost Estimate ($000)
				Travel Time	Costs	Connectivity/Accessibility			Safety			Aesthetic Enhancement	Economic Development	Social Equity	Consistency w/Current Plans		
						Bicycle & Pedestrian	Transit	Auto	Bicycle	Pedestrian	Auto						
Off-Corridor																	
O1	Roadway Improvements	Extend SW 127th Ave. from SW 114th Ave. across CSX railroad tracks (may need to be overpass).	Mobility/ Regional Accessibility/ Choice/Livability	◕	●	◑	◑	●	◔	◔	◔	○	◑	◔	●	59	12,705
O2	Roadway Improvements	Extend SW 122nd Ave. (2-lanes) from SW 168th Ave. and connect with SW 124th Ave. north of Zoo Miami.	Mobility/ Regional Accessibility/ Choice/Livability	◑	●	◑	◔	●	◔	◔	◔	○	◑	◑	○	43	4,590
O3	Premium Transit Service	Implement premium transit service on HEFT per the Smart Plan.	Mobility/ Regional Accessibility/ Choice/Livability	◑	●	◔	●	◔	○	○	◑	○	○	◔	●	47	TBD
O4	Premium Transit Service	Convert the US-1 Busway from Enhanced Bus Service to Light Rail Transit corridor and/or appropriate premium transit technology.	Mobility/ Regional Accessibility/ Affordability/ Choice/Livability	●	●	◔	●	◔	◔	◔	◔	◑	●	◑	●	60	BRT Capital Cost: 115,000 Operating Costs: 21,000/LRT Capital Costs 1.5 Billion Operating Costs 46,000
O5	Premium Transit Service	Investigate long-term role of incorporating passenger rail service in the CSX Homestead Subdivision corridor.	Mobility/ Regional Accessibility/ Affordability/ Choice/Livability	●	●	◔	●	◔	◔	◔	◔	◔	●	◔	◑	52	Capital Cost 435,000 Operating Cost 25,000

Exhibit 5.4 Proposed Projects Located in Eastern Section of the Study Corridor

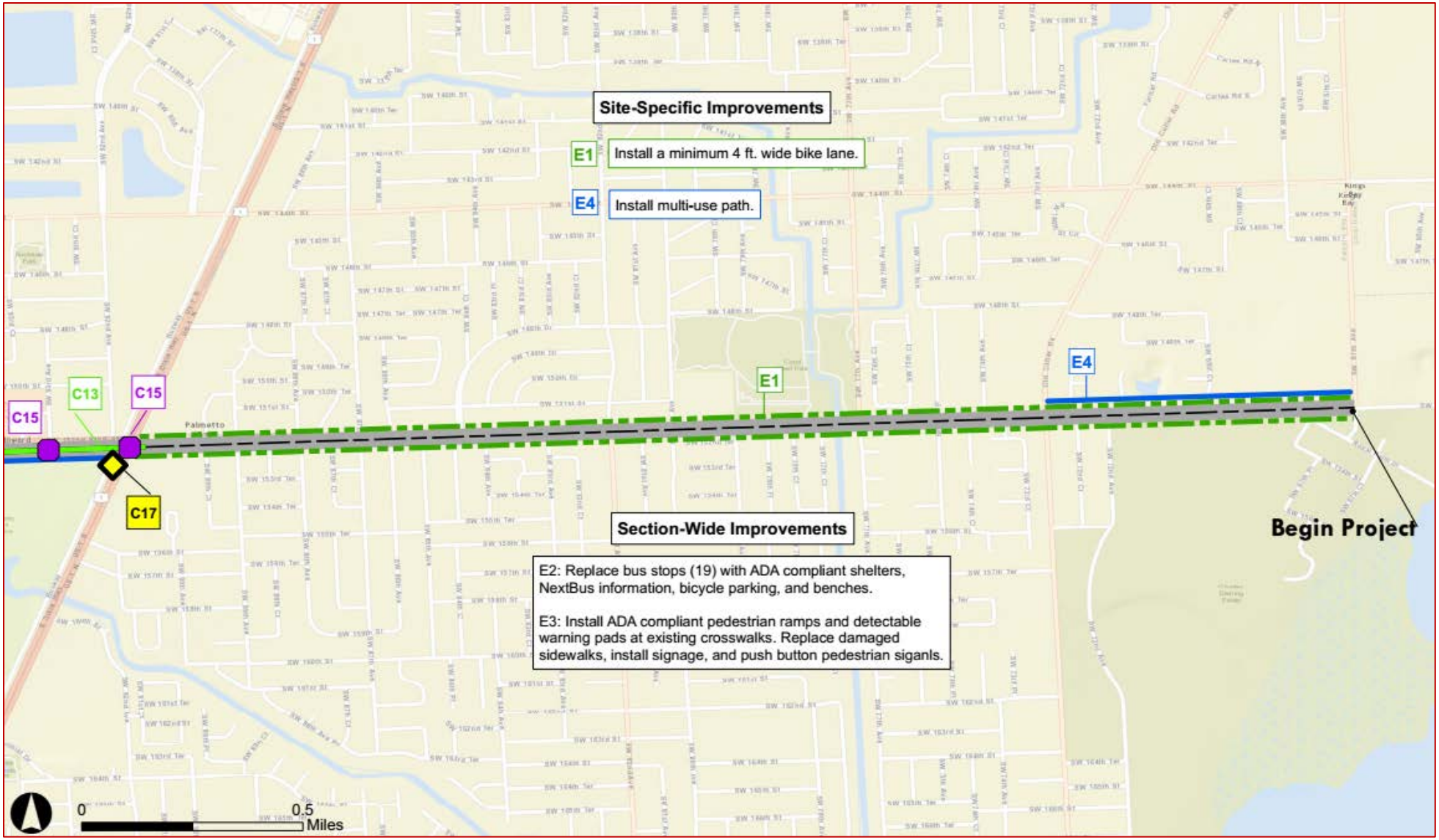


Exhibit 5.5 Proposed Projects Located in Central Section of the Study Corridor

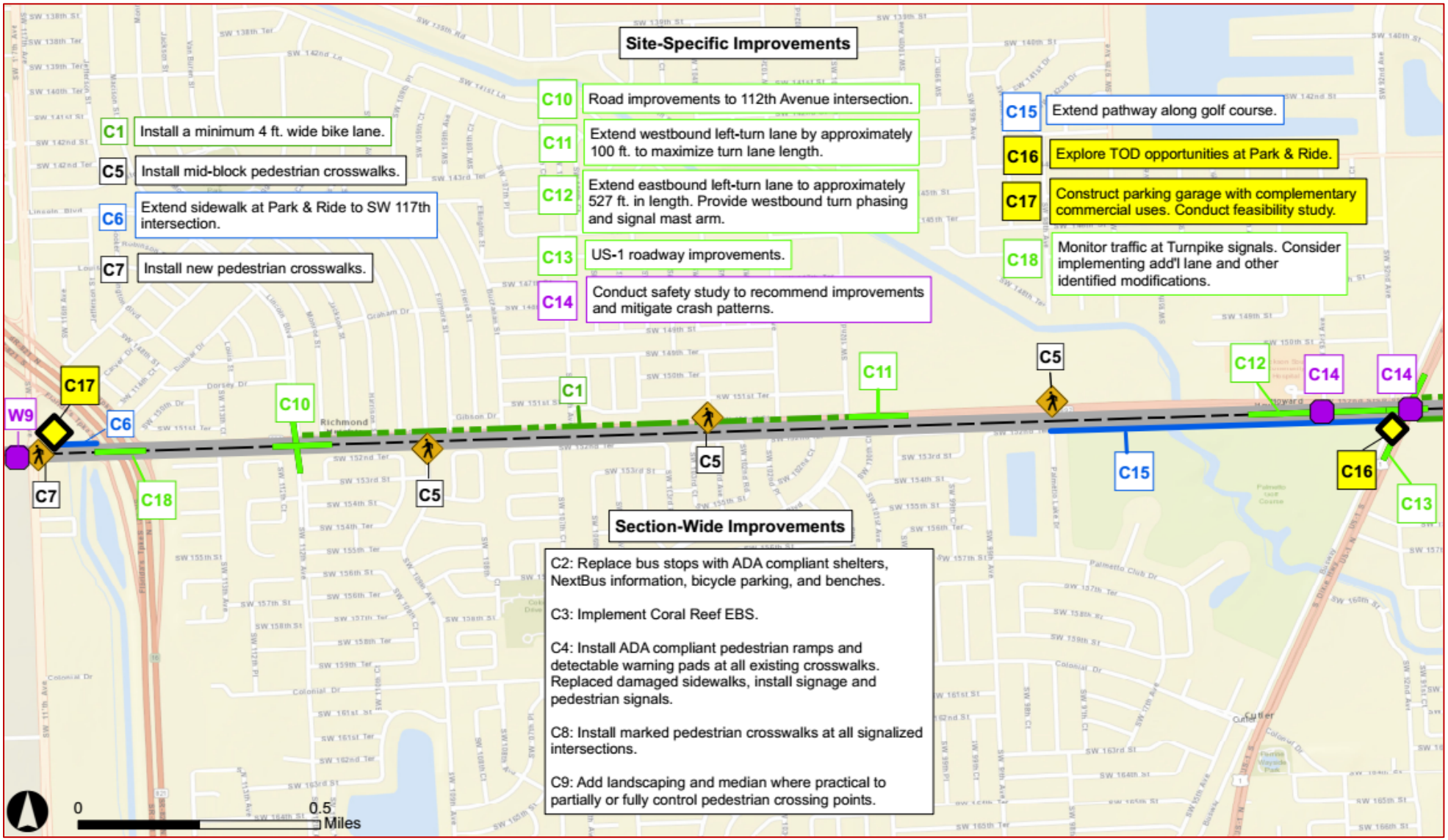


Exhibit 5.6 Proposed Projects Located in Western Section of the Study Corridor

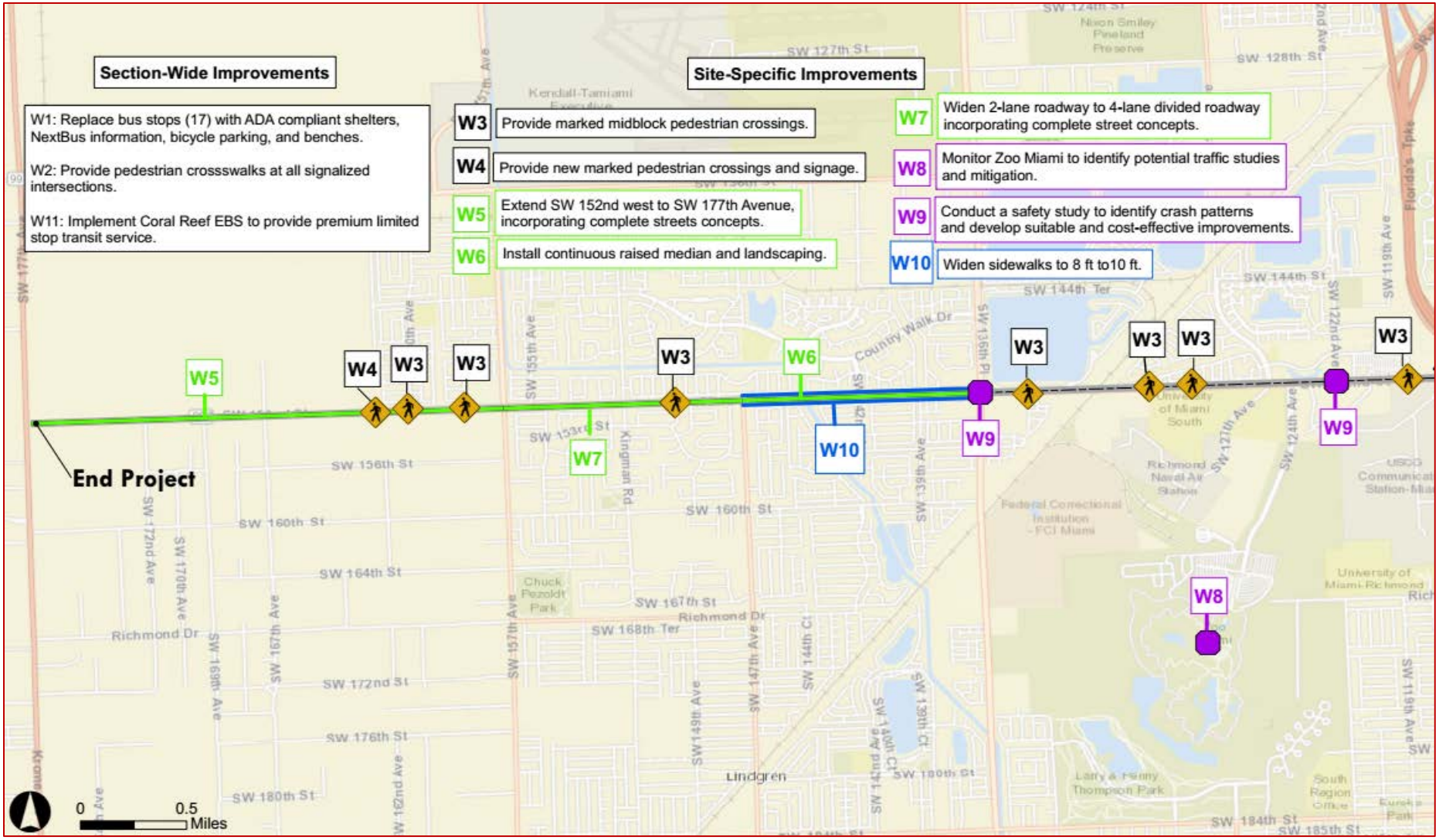


Table 5.5 Ranking the List of Recommended Multimodal Projects

Corridor Section	Project Name	Description	Study Goals	Project Score (max. = 100)	Planning Level Cost Estimate ($000)
Central	Transit Oriented Development (TOD)	Explore TOD opportunities at the South Miami-Dade Busway Coral Reef Dr. Station and Park & Ride facility to achieve sustainable transportation.	Mobility/Regional Accessibility/ Choice/Livability	65	TBD
Central	TOD	Construct parking garage with complementary commercial uses at SW 117th Ave. Park & Ride. It is also recommend a feasibility study be conducted to determine the prospects of joint development/TOD at this location.	Mobility/Regional Accessibility/ Choice/Livability	62	TBD
Western	Roadway Improvements	Widen the 2-lane roadway to 4-lane divided roadway from SW 147th Ave. to SW 157th Ave. incorporating complete street concepts including pedestrians, bicyclists, transit users and motorists elements, to the extent appropriate for the land use or the context of the street elements.	Mobility/Regional Accessibility/ Choice/ Livability	58	8,850
Central	Pedestrian Improvements	Extend sidewalk at the Park & Ride facility adjacent to the HEFT to SW 117th Ave. intersection.	Mobility/Safety/ Affordability/ Choice/Livability	53	13
Central	Safety Improvements	Conduct a safety study that focuses on the intersections of SW 93rd Ave. and US 1 to recommend improvements to mitigate identified crash patterns.	Safety/ Affordability/ Livability	53	50
Western	Safety Improvements	Conduct a safety study at the intersections of SW 137 Ave., SW 122 Ave., and SW 117 Ave. to identify crash patterns and develop improvements that are suitable and cost effective.	Safety/ Affordability/ Livability	53	100
Central	Shared-use Path	Extend the pathway on the south side of Coral Reef Dr. from SW 98 Ave. (along the Palmetto Golf Course) to US 1.	Mobility/Safety/ Choice/Livability	51	1,068
Eastern	Bicycle Facilities	Install a minimum 4 ft. wide bike lane on the north and south side of Coral Reef Dr. from Ludlam Rd. to US 1.	Mobility/Regional Accessibility/ Safety/Choice	50	595
Western	Pedestrian Improvements	Provide new marked pedestrian crosswalks and signage in all directions at SW 162nd Ave. Install ADA compliant pedestrian ramps and detectable warning pads at crosswalks.	Mobility/Safety/ Affordability/ Choice/Livability	50	26
Eastern	Pedestrian Improvements	Install ADA compliant pedestrian ramps and detectable warning pads at all existing crosswalks along this section of the corridor. Replace damaged sidewalks. Install signage, push-button pedestrian signals in all directions at signalized intersections.	Mobility/Safety/ Affordability/ Choice/Livability	49	738
Central	Pedestrian Improvements	Install ADA compliant pedestrian ramps and detectable warning pads at all existing crosswalks along this section of the corridor. Replace damaged sidewalks. Install signage, push-button pedestrian signals in all directions at signalized intersections.	Mobility/Safety/ Affordability/Choice /Livability	49	738
Central	Roadway Improvements	Improvements to SW 112th Ave: Extend the southbound left-turn lane to approximately 225 ft., re-designate the southbound approach to provide one shared right-turn/through lane, one through lane, and one exclusive left-turn lane. Construct an additional northbound left-turn lane to provide dual northbound left-turn lanes. Provide protected-only northbound left-turn phasing. Replace northbound traffic signal mast arm. Replace the eastbound protected/permitted phasing with protected-only phasing.	Mobility/Regional Accessibility/ Choice/Livability	49	2,585
Eastern	Shared-use Path	Install multi-use path from SW 72nd Ave. to Old Cutler Rd. to provide a buffer space between pedestrians and vehicular traffic to create a shared-use path that may be used by pedestrians, bicyclists, skaters, and other nonmotorized users.	Mobility/Safety/ Choice/Livability	48	77
Central	Roadway Improvements	Extend the westbound left-turn lane at SW 102nd Ave. by approximately 100 ft. to maximize the turn lane length.	Mobility/Regional Accessibility/ Choice/Livability	47	1,200
Central	Roadway Improvements	At US 1 provide an additional westbound left-turn lane. Replace westbound traffic signal mast arm at northwest corner. Re-designate the eastbound approach to consist of dual left-turn lanes, one shared left/through lane, and one channelized right-turn lane. Replace the eastbound traffic signal mast arms at the southeast and southwest corners. Restrict park-&-ride lot access to a right-in and right-out only driveway. This will require a westbound protected/permitted left-turn phase to provide improved access to the park-&-ride lot. Extend the northbound left-turn lanes to 425 ft. The improvement will require a public hearing as a median opening will be closed. Install an advanced overhead cantilever sign on eastbound approach.	Mobility/Regional Accessibility/ Choice/Livability	47	2,585
Eastern	Bus Stop Improvements	Replace bus stops (19) with ADA compliant shelters, NextBus information, bicycle parking, and benches.	Affordability/ Livability	46	494
Central	Pedestrian Improvements	Install mid-block pedestrian crosswalks near SW 98th Ave., SW 104th Ave., and SW 109th Ave. intersections. Install ADA compliant pedestrian ramps and detectable warning pads at crosswalks.	Mobility/Safety/ Affordability/Choice /Livability	46	468
Western	Bus Stop Improvements	Replace bus stops (17) with ADA compliant shelters, NextBus information, bicycle parking, and benches.	Affordability/ Choice/Livability	46	442

Corridor Section	Project Name	Description	Study Goals	Project Score (max. = 100)	Planning Level Cost Estimate ($000)
Western	Shared-use Path	Widen sidewalks to 8 ft.to 10 ft. from SW 137th Ave. to SW 147th Ave.to provide a buffer space between pedestrians and vehicular traffic to create a shared-use paths that may be used by pedestrians, bicyclists, skaters, and other nonmotorized users.	Mobility/Safety/ Choice/Livability	46	630
Central	Pedestrian Improvements	Provide marked pedestrian crosswalks, signage, and activated signals in all directions at all signalized intersections along the corridor. Install ADA compliant pedestrian ramps and detectable warning pads at crosswalks.	Mobility/Safety/ Affordability/Choice /Livability	45	208
Central	Roadway Improvements	Extend the eastbound left-turn lane at SW 93rd Ave. to approximately 525 ft. including taper. Provide westbound protected/permitted left-turn phasing. Replace westbound signal mast arm.	Mobility/Regional Accessibility/ Choice/Livability	45	900
Western	Pedestrian Improvements	Provide marked pedestrian crosswalks, signage, and activated signals in all directions at all signalized intersections along this section of the corridor. Install ADA compliant pedestrian ramps and detectable warning pads at crosswalks. Replace damaged sidewalks along corridor.	Mobility/Safety/ Affordability/Choice /Livability	45	234
Central	Bus Stop Improvements	Replace bus stops at SW 93 Ave., SW 97 Ave., SW 98 Ave., SW 112 Ave. and SW 99 Ct. with ADA compliant shelters, NextBus information, bicycle parking, and benches.	Affordability/Choice /Livability	44	130
Central	Enhanced Bus Service (EBS)	Implement the Coral Reef EBS to provide premium limited-stop transit service along Coral Reef Dr. and SW 137th Ave. between the intersection of SW 162nd Ave. and SW 136th St., the Kendall-Tamiami Executive Airport, and the South Miami-Dade Busway Coral Reef Dr. Station.	Mobility/Regional Accessibility/ Affordability/Choice /Livability	44	Capital Cost: 43,000 Operating Costs: 3,000
Central	Pedestrian Improvements	Install new pedestrian crosswalks, signage, push-button pedestrian signals in all directions at the intersection of SW 117th Ave.	Mobility/Safety/ Affordability/Choice /Livability	44	26
Central	Turnpike Modifications	Monitor traffic service at Turnpike ramps and SW 117th Ave. intersections for potential additional lane and modifications identified in the study if warranted.	Mobility/Regional Accessibility/ Choice/Livability	44	TBD
Western	Roadway Improvements	Install continuous raised median and landscape from SW 137th Ave. to SW 147th Ave. to aide in preventing accidents caused by crossover traffic, reduce headlight glare distraction, and separate left-turning traffic from through lanes when combined with left-turn lanes.	Mobility/Regional Accessibility/ Choice/Livability	44	429
Western	Enhanced Bus Service (EBS)	Implement the Coral Reef EBS to provide premium limited-stop transit service along Coral Reef Dr. and SW 137th Ave. between the intersection of SW 162nd Ave. and SW 136th St., the Kendall-Tamiami Executive Airport, and the South Miami-Dade Busway Coral Reef Dr. Station.	Mobility/Regional Accessibility/ Affordability/ Choice/Livability	44	Capital Cost: 43,000 Operating Costs: 3,000
Western	Pedestrian Improvements	Provide marked mid-block pedestrian crossings at the intersections of SW 120th Ave., SW 129th Ave., Cascada Blvd., SW 149 Ave., SW 158th Ave., SW 160th Ave., SW 130th Pl. and 134th Pl. Install ADA compliant pedestrian ramps and detectable warning pads at crosswalks.	Mobility/Safety/ Affordability/ Choice/Livability	42	1,144
Western	Roadway Improvements	Monitor Zoo Miami and other development projects in the area. Traffic studies should be identified needed capacity mitigation and supporting transit bicycle, pedestrian and TDM requirements.	Mobility/Regional Accessibility/ Choice/ Livability	41	125
Central	Bicycle Facilities	Install a minimum 4 ft. wide in street bicycle lane on north side of Coral Reef Dr. frontage road from SW 102nd Ave. to SW 112th Ave.	Mobility/Regional Accessibility/Safety	40	152
Central	Pedestrian Improvements	Add landscaping to median where practical to partially or fully control crossing points of pedestrians. Low shrubs in commercial areas and near schools can be used to channel pedestrians to crosswalks or crossing areas.	Mobility/Safety/ Affordability/Choice /Livability	27	260
Off-Corridor					
Off the Corridor	Premium Transit Service	Convert the US-1 Busway from Enhanced Bus Service to Light Rail Transit corridor and/or appropriate premium transit technology.	Mobility/Regional Accessibility/ Affordability/ Choice/Livability	60	BRT Capital Cost: 115,000 Operating Costs: 21,000/LRT Capital Costs 1.5 Billion Operating Costs 46,000
Off the Corridor	Roadway Improvements	Extend SW 127th Ave. from SW 114th Ave. across CSX railroad tracks (may need to be overpass).	Mobility/Regional Accessibility/ Choice/Livability	59	12,705

Corridor Section	Project Name	Description	Study Goals	Project Score (max. = 100)	Planning Level Cost Estimate ($000)
Off the Corridor	Premium Transit Service	Investigate long-term role of Incorporating passenger rail service in the CSX Homestead Subdivision corridor.	Mobility/Regional Accessibility/ Affordability/ Choice/Livability	52	Capital Cost 435,000 Operating Cost 25,000
Off the Corridor	Premium Transit Service	Implement premium transit service on HEFT per the Smart Plan.	Mobility/Regional Accessibility/ Choice/Livability	47	TBD
Off the Corridor	Roadway Improvements	Extend SW 122nd Ave. (2-lanes) from SW 168th Ave. and connect with SW 124th Ave. north of Zoo Miami.	Mobility/Regional Accessibility/ Choice/Livability	43	4,590

Conceptual renderings for three of the projects depicted on the exhibits above, one for each section of the corridor, were developed. **Exhibit 5.7** depicts the addition of bike lanes to Coral Reef Drive east of US 1 (**Table 5.4, Project E1**). **Exhibit 5.8** depicts the addition of a buffered bike lane to the frontage road on the northern side of Coral Reef Drive from SW 102nd Avenue to SW 112th Avenue (**Table 5.4, Project C1**). Note that the frontage road is disconnected between SW 105th Avenue and SW 112th Avenue, but there is a utility easement that could accommodate a multi-use path. **Exhibit 5.9** depicts the addition of a raised median to Coral Reef Drive between SW 137th Avenue and SW 147th Avenue (**Table 5.4, Project W6**).

Exhibit 5.7 Before and After Rendering of Bike Lanes on Coral Reef Drive East of US 1

Exhibit 5.8 Before and After Rendering of Buffered Bike Lane along Frontage Road

Exhibit 5.9 Before and After Rendering of Raised Median on Coral Reef Drive

6.0 Transit Oriented Development

One alternative strategy carried forward is the concept of having TOD along the South Miami-Dade Busway at Coral Reef Drive Station and the adjacent Park and Ride Facility. Transit stations offer a unique opportunity for development to be simultaneously locally and regionally oriented. This powerful combination is fundamental to what makes distinguishes transit oriented development from other types of urban infill projects.

TOD is designed to increase the number of residents, employees, and potential transit riders that have convenient access to transit. A complementary mix of uses, activities, and services located in close proximity to each other allow TOD residents to commute to work, run errands, recreate, and meet basic needs without needing a car. A variety of moderate and higher density housing options located within easy walking distance from a centrally-located transit station or transit corridor (about 1/4 mile, 10 minutes) are typically a part of the mix. Transit riders generally begin and end their trips by walking. As a result, a network of safe and convenient walkways that connect transit, residences and other uses, and an attractive pedestrian environment are a hallmark of TOD development. A well-designed bicycle system and facilities can increase the radius that people will travel to access transit. Community spaces, plazas, activities and attractive design are also important components in drawing people to TOD development.

An assessment of the proposed TOD project readiness was conducted and the results are highlighted below.

Understanding Opportunities for Transit Oriented Development: *An Analysis of Readines*

What is the TOD Readiness Tool?

Achieving transit oriented development (TOD) around a transit station is an evolutionary process with many factors driving readiness for TOD to take place. The TOD readiness tool:

- Provides planners with a simple assessment of readiness for any area - urban or rural, large or small, with or without existing or proposed transit service (below)
- Helps planners determine strategies to increase readiness in response to the assessment (see back page)

The following 20 measures assess how 'ready' an area is for TOD to happen. The goal is not necessarily to achieve full circles for every measure, but rather to understand the strengths and weaknesses of the area and build upon them. The accompanying User Guide describes how to evaluate each measure. The measures are sensitive to the different station area place types as defined in the Framework for TOD in Florida[1].

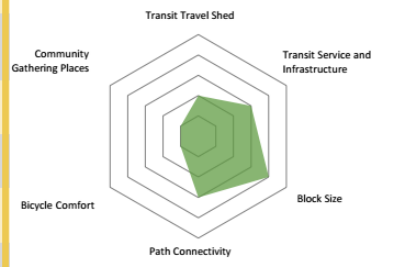
LEGEND:
- Conditions in earliest stage of development
- Conditions moving towards TOD
- Conditions supportive of TOD

Station Area

Local Government: *City of Palmetto Bay*
Station Area Name: *152nd Street Busway Station*
Station Area Type: *Neighborhood Center*
Future Transit Type: *Light Rail*

20 MEASURE ASSESSMENT

	EXISTING CONDITIONS	READINESS
POLICY	**Compelling Vision:** A clearly articulated adopted vision of the scale, intensity, character, amenities, and locale of development is a paramount first step towards TOD.	
	Supportive Regulations: Land use and land development regulations that control densities, land use mix, pedestrian-oriented design and parking strategies are the regulatory 'teeth' to implement the vision.	
	Predictable and Consistent Political and Development Context: Cities with a consistent and receptive approach towards development and a predictable timeline for approval and permitting processes are more attractive to developers.	
	Affordable Housing Policies: Policies to maintain a diverse housing stock with workforce housing increases access to transit and ridership potential.	
	Public Investment: Capital program planning, infrastructure investments and related financial incentives ensure adequate capacity for higher density development and demonstrate public sector commitment.	
MARKET	**Recent Development Activity:** Proposed, under construction, and new residential, mixed-use and commercial development indicate developer interest.	
	Redevelopment Potential: The ease with which redevelopment can occur based on underutilized or vacant parcels, land uses, parcel size, and ownership.	
	Real Estate Values: Property values measure market strength and the desire for compact development.	
	Financial Incentives for Development: Mixed-use TOD projects are typically more expensive to construct and may require financial incentives to bridge the gap in a project's pro forma.	
	Trends in Income and Educational Attainment Data: Increases in income and education levels indicate a growing interest in the neighborhood and the potential for capturing choice ridership.	
PHYSICAL	**Transit Travel Shed:** The number of jobs accessible by transit influences how desirable a station area is to potential new businesses or residents.	
	Transit Service and Infrastructure: Areas with existing or funded transit service are more likely to attract development. The type of transit service and the amenities at the station are also influential.	
	Block Size: Smaller block sizes promote pedestrian scaled development and walkability.	
	Path Connectivity: Physical barriers to connectivity inhibit pedestrian and bicyclist access to transit, shopping, jobs, and services.	
	Bicycle Comfort: Accommodating bicyclists can expand transit station catchment areas far beyond the typical pedestrian shed.	
	Community Gathering Places: Parks, public plazas and squares, and other areas of public open space are essential amenities and social catalysts for TOD.	
SOCIAL	**Diversity of Existing Uses:** A measure of whether daily errands can be made by walking as determined by Walk Score.	
	Civic or Educational Uses: Civic, cultural and educational institutions can function as anchors for development and as destinations attracting people to the station area.	
	Community Events and Branding: Hosting community events can develop an identity for the area, celebrating its unique character and market the area as an attractive place.	
	Housing and Transportation Affordability: Affordability of living in a location depends on the combined costs of housing and transportation, and captures the location-efficiency of the area.	



ASSESSMEI

STRENGTHS:

The station area is located along one of Miami-Dade County's SMART Plan Corridors. This station contains a variety of uses and excellent opportunities for redevelopment. The station area is relatively well connected and contains a mix of uses.

WEAKNESSES:

The station contains opportunities for establishing a strong vision and updated policies, creating financial incentives, overcoming the 152nd street and Dixie Highway pedestrian barriers, and improving bicycle safety.

Transit-oriented developments have the potential to provide residents with improved quality of life and reduced household transportation expenses while providing the region with stable mixed income neighborhoods that reduce environmental impacts and provide real alternatives to traffic congestion. New research clearly shows that this kind of development can reduce household transportation costs, thereby making housing more affordable.

7.0 Conclusion

The study defines key transportation issues for local and through travelers, and considers a range of transportation solutions to address the needs along Coral Reef Drive. These solutions include a combination of transit, roadway, and pedestrian and bicycle improvements. Solutions also consider the future of land use and development on the corridor. Through stakeholder participation and technical analysis, the study results in a recommended program of multimodal transportation improvements for consideration by the Miami-Dade MPO.

The recommendations of this study recognize that many related regional and local corridor improvements are either being studied or are already underway. Roadway widening, a program of pedestrian and bicycle improvements, intersection upgrades, and possible transit service refinements are examples of the ongoing improvements being carried out in the study corridor by MDX, FDOT, MPO, and DTPW.