BICYCLE/PEDESTRIAN Safety Plan Update

PREPARED FOR

MIAMI-DADE MPO
Metropolitan Planning Organization

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Miami-Dade Metropolitan Planning Organization

presents

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INTRODUCTION

Each year, crashes involving bicyclists and pedestrians account for 40 percent of all traffic fatalities in Miami-Dade County. Although bicycle and pedestrian injuries and fatalities have generally declined over the last two decades, recent data indicate that the County may have reached a leveling off of the injury numbers, while fatalities seem to be still slightly decreasing. The numbers show success in the emphasis on non-motorized transportation safety over the last 20 years, but more progress still needs to be made to reduce bicycle and pedestrian related injuries and deaths.

Previous research has revealed a variety of risk factors associated with bicycle and pedestrian crashes and the severity of those crashes. The identified risk factors associated with pedestrian crashes include increased roadway width, lack of nighttime roadway lighting, lack of sidewalks, high motor vehicle speed, and use of drugs and alcohol. Similarly, the identified risk factors associated with bicycle crashes include riding against motor vehicle traffic, riding on sidewalks, riding at nighttime without lights, failure to yield by motor vehicle drivers, and use of drugs and alcohol.

Bicycling is popular throughout Miami-Dade County

Schoolchildren often need better facilities for walking and bicycling to school

Different types of countermeasures can be applied to intersections and corridors in an attempt to counteract the indicated risk factors. Such countermeasures include installing median refuge islands on wide roadways to break up the crossing distance for pedestrians and installing sidewalks and bicycle lanes where gaps in these facilities exist to provide connectivity and designated spaces for each mode of transportation.

The Miami-Dade Metropolitan Planning Organization's comprehensive bicycle and pedestrian program is continually working to improve the safety and security for all modes of transportation in Miami-Dade County. The program's efforts include participation in safety education programs, bicycle and pedestrian encouragement programs, and creating safe places to walk and bicycle. The MPO's bicycle and pedestrian program has also developed several prior plans and studies related to bicycle and pedestrian mobility, facilities, and safety.

This Plan presents recommended safety countermeasures developed through technical analysis of bicycle and pedestrian traffic crashes and bicycle and pedestrian level of service to enhance safety for bicyclists and pedestrians in Miami-Dade County.

Walking for functional trips is more pleasant when crosswalks are provided

STUDY OBJECTIVE

The overall goal of this initiative is to reduce bicyclist and pedestrian fatalities in Miami-Dade County. Currently, Miami-Dade County is full of momentum toward becoming a bicycle-friendly and pedestrian-friendly community. A bicycle and pedestrian mobility plan is in place county-wide; key focus areas such as Downtown Miami and the Health District have developed even more detailed non-motorized mobility plans; the M-Path Extension project has finally eliminated the gap between the M-Path and the South Dade Trail; improvements have been constructed to several key bike routes such as Bike Route 1 and the Rickenbacker Causeway; and public interest was huge in May 2011 with front page news when the Dutch Embassy sponsored the Think Bike Miami workshop to impart the Dutch knowledge and philosophy of bicycle facility design. All of these investments will begin to increase the percentage of people who walk or ride a bicycle for transportation or recreation. With all of these exciting new opportunities comes an even more heightened need to ensure that those who choose to or must walk or ride a bicycle for any purpose are given a safe, convenient, and attractive mode of transportation.

Bicycling is a fun and enjoyable activity, especially when safe facilities are provided

The primary Plan objective is to update the 2006 Bicycle Safety Program Plan and develop the Pedestrian Safety Program Plan. The purpose of the Plan is to evaluate and recommend safety countermeasures to improve the conditions for walking and bicycling based on two (2) main types of analysis.

- An analysis of bicycle and pedestrian traffic crashes.
- An analysis of bicycle and pedestrian level of service (BLOS and PLOS).

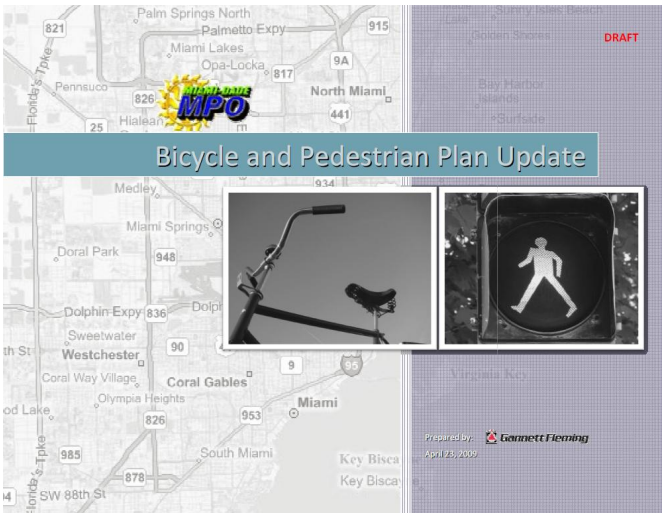
LITERATURE REVIEW

An examination of Miami-Dade's previous work regarding bicycle and pedestrian safety was conducted as a base for the Literature Research of this Plan Update. Additionally, a review of national, state, and local literature was conducted to identify countermeasures that could reasonably be implemented in Miami-Dade County. This section summarizes the key points from the prior Miami-Dade work and the best practices from the national and state work.

Miami-Dade MPO's Prior Plans and Studies

The Miami-Dade MPO's comprehensive bicycle and pedestrian program includes several prior plans and studies that serve as a foundation for this Bicycle and Pedestrian Safety Plan Update.

Bicycle/Pedestrian Mobility Plan 2009



The Bicycle/Pedestrian Mobility Plan 2009 utilized a technical analysis of the County's roadway system and public input (including from the Bicycle and Pedestrian Advisory Committee [BPAC] and a series of advertised public meetings) to define the vision, goals, and objectives for the County's bicycle and pedestrian network. In addition, a Needs Plan was defined as input to the 2035 Long Range Transportation Plan based on a weighted evaluation criteria to determine where the improvements are most needed (Very Low Need through Very High Need, by roadway segment). Recommendations developed in the Mobility Plan 2009 were divided into eight categories.

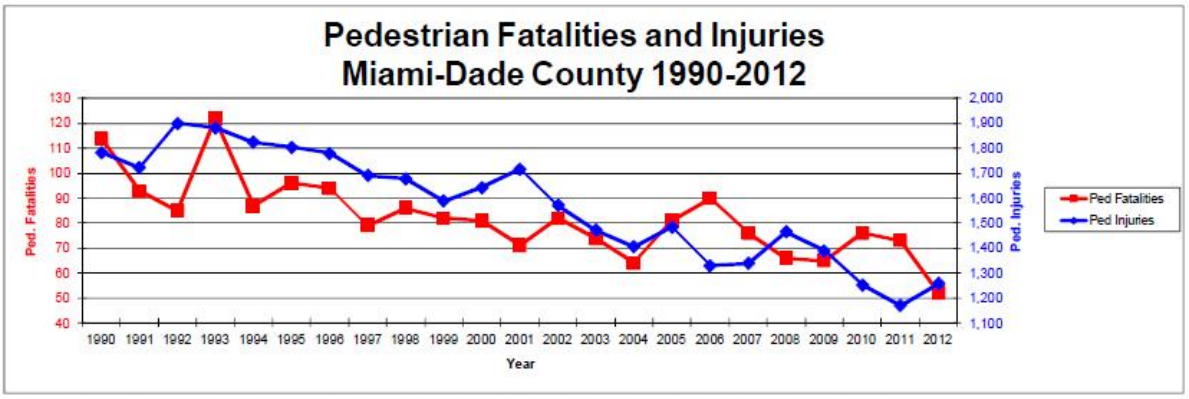
- Bicycle and Pedestrian Facilities
- Data Collection Strategies
- **Safety and Security**
- **Engineering Improvements**
- **Education and Enforcement Strategies**
- Promotion and Encouragement
- Land Use and Transit
- Funding

Safety was a major concern among those who attended public workshops and meetings for the Mobility Plan 2009. Safety recommendations made in the Mobility Plan 2009 include general statements about education needs for both motorists and non-motorized transportation users regarding the legalities of traffic law associated with the rights and responsibilities of bicyclists and pedestrians. The Mobility Plan 2009 recommended adopting the principles of Crime Prevention Through Environmental Design (CPTED) to increase security and reduce theft.

Pedestrian/Bicyclist Injuries and Fatalities Report

Pedestrian Injuries and Fatalities
Miami-Dade County

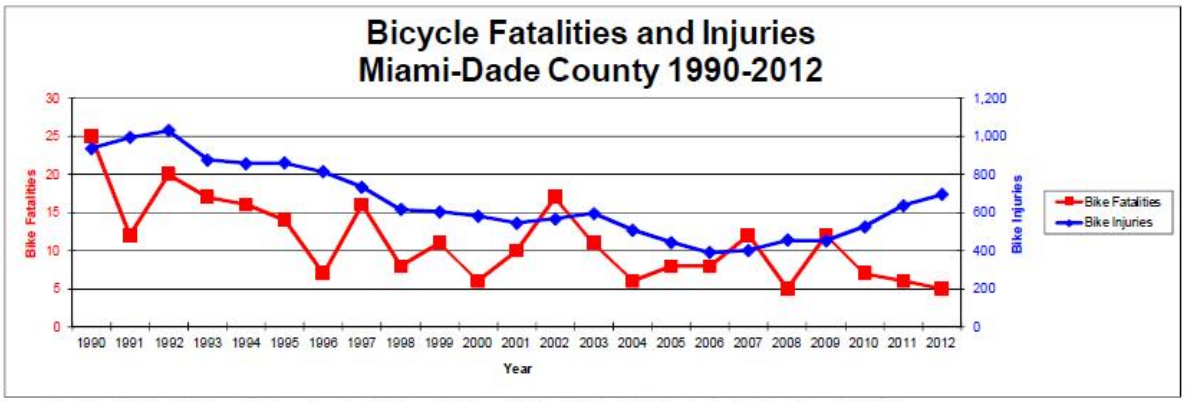
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Ped Fatalities	114	93	85	122	87	96	94	79	86	82	81	71	82	74	64	81	90	76	66	65	76	73	52
Ped Injuries	1,785	1,723	1,901	1,883	1,825	1,806	1,781	1,690	1,678	1,588	1,643	1,717	1,571	1,473	1,405	1,484	1,329	1,338	1,466	1,390	1,252	1,170	1,257



Prepared by Miami-Dade MPO from the Department of Highway Safety and Motor Vehicles' "Traffic Crash Statistics Report 2012."

Bicyclist Injuries and Fatalities
Miami-Dade County

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Bike Fatalities	25	12	20	17	16	14	7	16	8	11	6	10	17	11	6	8	8	12	5	12	7	6	5
Bike Injuries	935	993	1,030	875	857	859	813	733	616	605	582	543	566	596	508	444	391	403	454	452	525	635	693



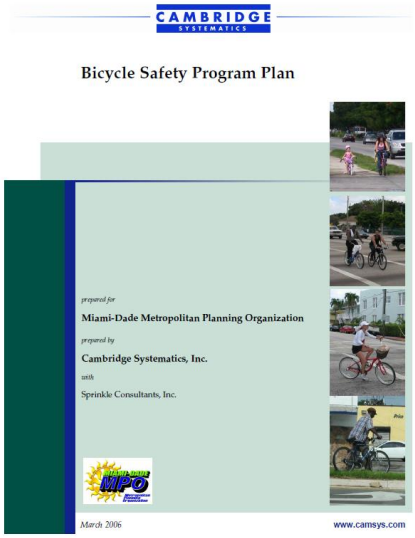
Prepared by Miami-Dade MPO from the Department of Highway Safety and Motor Vehicles' "Traffic Crash Statistics Report 2012."

The Miami-Dade MPO updates the Pedestrians and Bicyclists Injuries and Fatalities report on an annual basis from crash data obtained from the Department of Highway Safety and Motor Vehicles. A wealth of data stretching back to 1990 demonstrate that the raw number of bicyclist and pedestrian fatalities and injuries have declined significantly over the past two decades. However, very recent data indicate that Miami-Dade may have reached a leveling off (or perhaps a slight increase) of the injury numbers, while fatalities seem to be still slightly decreasing. The numbers demonstrate success in the Federal, State, and Local emphasis on non-motorized transportation safety over the last 20 years. The injury and fatality data are generally improving, but more improvement is needed.

Pedestrian fatalities in Miami-Dade have declined from approximately 100 per year in the early 1990s to 52 in 2012 (the most recent year of complete data). Pedestrian injuries have declined from approximately 1,800 per year to 1,257 over the same time period. Bicyclist fatalities have seen an even greater percentage decline from approximately 20 per year in the early 1990s to an average of 7 per year over the past five years. Bicyclist injuries declined from approximately 1,000 per year in the early 1990s to approximately 400 per year in the mid-2000s, but have increased over the past six years to 693 in 2012. Possible reasons for the increase in bicyclist injuries over the last six years include more people riding bikes (as measured in data such as the National Household Travel Survey) and crash reports being filed for a greater percentage of bicyclist crash occurrences.

Bicycle Safety Program Plan 2006

The Miami-Dade MPO prepared the Bicycle Safety Program Plan in 2006. The 2006 Plan serves as the baseline for the current Scope of Services and is the primary effort that will be updated with current crash data, updated level of service, and recommended safety countermeasures.



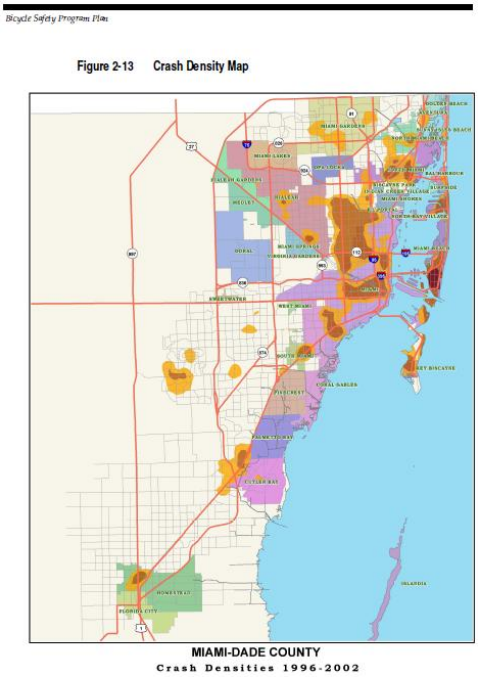
The objective of the 2006 Plan was to identify common crash types occurring at locations throughout Miami-Dade County and develop countermeasures to address the physical conditions, and bicyclist or driver behavior, at these locations to enhance safety for bicyclists. The Bicycle Safety Program

Plan utilized the software called Pedestrian and Bicycle Crash Analysis Tool (PBCAT) developed for the Federal Highway Administration (FHWA). The data used was an extensive Geographic Information Systems (GIS) database of over 4,500 crash records obtained from the Florida Department of Highway Safety and Motor Vehicles, Florida Highway Patrol, and County and municipal police departments. The database contains spatial information on the location of each crash, and specifics regarding crash circumstances. The study team visited many high crash spots around the County to perform field reviews.

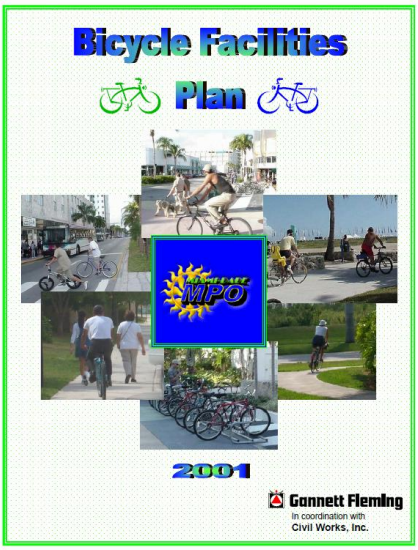
The Bicycle Safety Program Plan found that physical treatments were applicable in approximately 50 percent of the high crash locations identified. Education and enforcement programs aimed at motorists and bicyclists would be needed in combination with engineering treatments at those locations, and at the remaining locations as well. The most common behaviors that were found to be contributing causes to bicycle crashes include failure to adhere to signals and traffic control signs, riding against traffic, riding at night without lights, and motorists' failure to yield the right-of-way to bicyclists.

A bicycle crash density map was prepared utilizing the GIS data. The bicycle crash density map found that the following areas had high crash rates.

- Miami Beach
- Downtown Miami
- Model City/Brownsville
- Liberty City
- North Miami
- Coral Gables
- Coconut Grove
- South Miami
- West Kendall
- Naranja
- Homestead



Bicycle Facilities Plan 2001

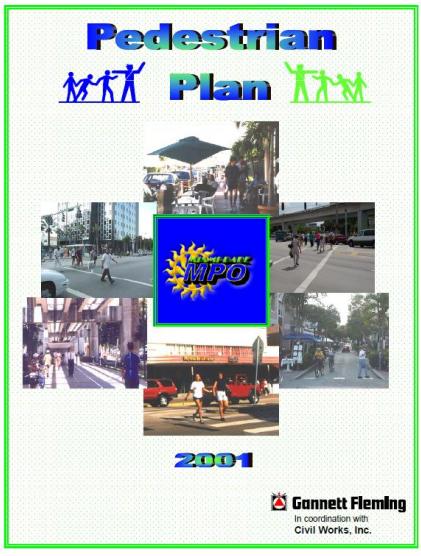


The Miami-Dade MPO's Bicycle Facilities Plan 2001 established a comprehensive set of bicycle facility needs based on a quantitative analysis, prioritized bicycle facility projects, and developed a minimum revenue plan based on projected funding to the Year 2025. The Bicycle Facilities Plan 2001 seems to be the first comprehensive attempt at prioritizing bicycle facility projects and matching facility needs to available funding. The 2001 Plan served as an update to the 1997 Bicycle Facilities Plan, which identified a set of improvements to on-road and off-road facilities for incorporation into the Transportation Improvement Program (TIP), but did not rank projects or develop a minimum revenue plan.

The Bicycle Facilities Plan 2001 developed a comprehensive bicycle level of service (BLOS) for the 2001 roadway network in the County. In addition, a latent demand score (LDS) was calculated by area of the County to provide an indication of the potential demand for bicycling trips, regardless of the status or condition of the bicycle facilities along the roadway segment.

The BPAC ranked the evaluation criteria in order of importance to the need for bicycle improvements. The results show that safety was identified as the most important factor.

Pedestrian Facilities Plan 2001



The Miami-Dade MPO's Pedestrian Facilities Plan 2001 was the first facility plan to develop a comprehensive set of pedestrian facility needs projects, prioritization rankings, and minimum revenue plan based on projected funding levels to the Year 2025. The methodology for the Pedestrian Facilities Plan 2001 follows the above description for the Bicycle Facilities Plan 2001 including pedestrian level of service (PLOS), latent demand score (LDS), and BPAC evaluations.

FHWA Concludes Pedestrian Countermeasure Study in Three Cities. Tamara Redmon. *ITE Journal, Volume 81, Number 8.* August 2011.

The Federal Highway Administration (FHWA) conducted pedestrian safety countermeasure studies in three major U.S. cities including Miami. The impacts of the countermeasures were assessed through self-evaluations by individual field teams. Researchers focused on measures of effectiveness (MOEs) related to pedestrian and driver behavior in addition to before-and-after crash data. MOEs included measured motor vehicle speed, percentage of drivers braking, percentage of pedestrians trapped in the crosswalk, percentage of drivers yielding, pedestrian delay time, and pedestrian crossing time. Countermeasures implemented as part of the FHWA research include the following.

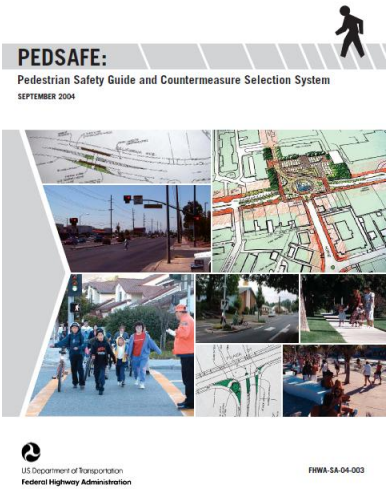
- TURNING TRAFFIC YIELD TO PEDESTRIANS signs
- In-Street Pedestrian Crossing signs
- NO TURN ON RED signs
- Portable radar speed trailers
- Pedestrian signal push buttons that confirm the press
- Automated pedestrian detection
- Rectangular rapid flashing beacons (RRFBs)
- Leading pedestrian interval
- Prohibition of permissive left-turns

Effects of Shared Lane Markings on Bicyclist and Motorist Behavior. Brady, Loskorn, Mills, Duthie, and Machemehl. *ITE Journal, Volume 81, Number 8.* August 2011.

The Manual on Uniform Traffic Control Devices (MUTCD) includes a new bicycle safety pavement marking called a shared lane marking (aka sharrow). The sharrow pavement marking is placed in a lane shared by motorists and bicyclists to encourage the bicyclists to ride at the safety position and to alert motorists of the possible presence of bicyclists. This study conducted at the University of Texas at Austin strongly suggests that shared lane markings

can improve the safety of both bicyclists and motorists on multilane facilities. The study found better riding habits by bicyclists and increased passing distance offered by motorists when overtaking a bicyclist. Researchers recommend that the sharrows be placed in the center of the travel lane unless it is possible for bicyclists and motorists to share the lane side by side with acceptable passing separation. The study found that sharrows can be installed at the MUTCD guidance spacing for approximately $4,000 per lane-mile.

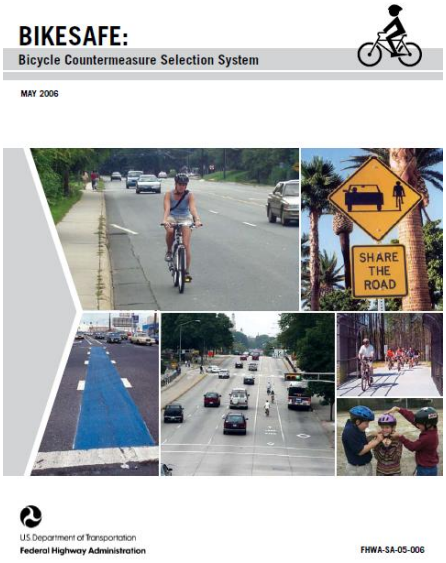
PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. Federal Highway Administration (FHWA-SA-04-003). September 2004.



The Pedestrian Safety Guide and Countermeasure Selection System provides practitioners with tailored information for improving the safety and mobility of pedestrians. Several tools are available with PEDSAFE including the following.

- Selection Tool – Find appropriate countermeasures on the basis of desired objectives.
- Interactive Matrices – View the countermeasures associated with crash types and performance objectives.
- Countermeasures – Read descriptions of the 49 engineering, education, and enforcement treatments.
- Case Studies – Review real-world examples of implemented treatments.

BIKESAFE: Bicycle Countermeasure Selection System. Federal Highway Administration (FHWA-SA-05-006). May 2006.



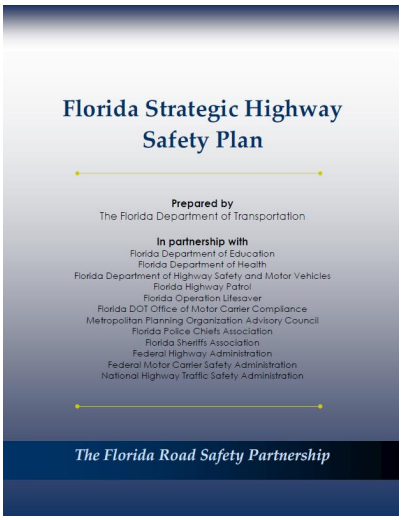
The Bicycle Countermeasure Selection System provides practitioners with tailored information for improving the safety and mobility of bicyclists. Several tools are available with BIKESAFE including the following.

- Selection Tool – Find appropriate countermeasures on the basis of desired objectives.
- Interactive Matrices – View the countermeasures associated with crash types

and performance objectives.

- Countermeasures – Read descriptions of the 50 engineering, education, and enforcement treatments.
- Case Studies – Review real-world examples of implemented treatments.

Florida Strategic Highway Safety Plan. Florida Department of Transportation (FDOT). September 2006.



The Florida Strategic Highway Safety Plan highlights the importance of improving bicycle and pedestrian safety. The plan states that in Florida in 2005 there were 580 pedestrian fatalities, the highest in the nation, and 119 bicycle fatalities. Some of the strategies to address bicycle and pedestrian safety listed in the plan include:

- Using better detection systems for bicycles at signalized intersections
- Initiating bicycle and pedestrian traffic count programs
- Determining the relationship between design, capacity, and safety
- Conducting annual training for bicycle and pedestrian design
- Minimizing conflict severity by implementation of innovative intersection design options
- Increasing the knowledge of safety related policies, laws, programs, and procedures
- Educating planners, engineers, and decision-makers on community and infrastructure design that enhances the use of transportation alternatives

Evaluation of the Miami-Dade Pedestrian Safety Demonstration Project. National Highway Traffic Safety Administration (NHTSA). June 2008.

This report evaluates the results of the Miami-Dade Pedestrian Safety Demonstration Project which consisted of 16 pedestrian safety countermeasures that were implemented in specific areas of Miami-Dade County, including South Beach, Little Havana, Liberty City and Little Haiti, and countywide. The project included predominantly educational countermeasures, with one

enforcement countermeasure, and one engineering countermeasure. The countermeasures are summarized below:

- Educating elementary-school-age children and their teachers, parents, and communities about traffic safety
- Installing pedestrian education posters in buses and Metrorail trains
- Airing public service announcements about pedestrian safety in both English and Spanish
- Distributing brochures and pamphlets about pedestrian safety tips in Haitian Creole to senior centers, schools, social service providers, and health fair events
- Providing workshops on pedestrian safety to older pedestrians and groups that work with older populations
- Distributing brochures with pedestrian safety advice in English and Spanish to the Miami-Dade School Board, hospitals, libraries, police departments, and elected officials' offices
- Displaying posters on nighttime conspicuity related to pedestrian safety in public buildings
- Conducting a study of driver yielding behavior and enforcement at four crosswalks in high-crash corridors in Miami Beach and training police officers in Miami Beach and Miami Springs on pedestrian safety and enforcement activities
- Implementing or programming over $6.5 million in engineering and roadway treatments for pedestrian safety on 12 corridors

The study was not able to identify the effect of the individual countermeasures, but instead assessed the effect of the overall pedestrian safety project from 2002 to 2004. After removing the effects of preexisting trends, the study found that the pedestrian safety project reduced countywide pedestrian crash rates by between 8.5% and 13.5%.

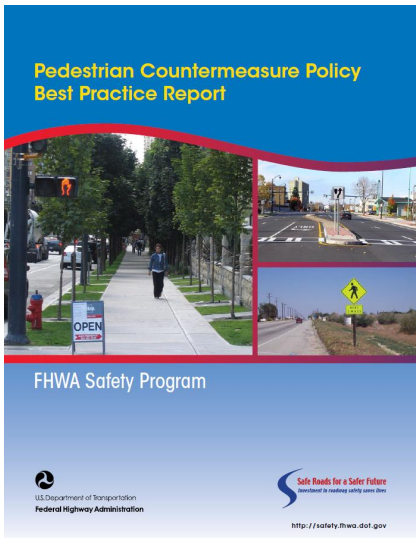
Pedestrian Safety Engineering and ITS-Based Countermeasures Program for Reducing Pedestrian Fatalities, Injury Conflicts, and Other Surrogate Measures Final System Impact Report. Federal Highway Administration (FHWA). January 2009.

This report details the implementation and evaluation of a combined pedestrian safety engineering and ITS-based

area-wide countermeasures program for reducing pedestrian fatalities, injuries, conflicts and other surrogate measures of safety in three locations: Las Vegas, Nevada; Miami-Dade County, Florida; and San Francisco, California. Phase I of the program included analyzing pedestrian crashes, selecting appropriate countermeasures, developing the implementation and evaluation plans, and collecting and analyzing baseline data. Phase II of the program included implementing and evaluating the impacts of the countermeasures. A total of 18 different pedestrian safety countermeasures (or combination of countermeasures) were implemented, ten of which were implemented in more than one of the three locations and eight of which were implemented in only one of the three locations. After evaluation of the implemented countermeasures, the following seven were classified as being "highly effective in impacting behaviors related to pedestrian safety":

- Leading pedestrian interval
- Pedestrian countdown signals
- In-street pedestrian signs
- Activated flashing beacons
- Rectangular rapid flashing beacons (RRFB)
- Call buttons that confirm the press
- Danish offset combined with high-visibility crosswalk, advance yield markings, and YIELD HERE TO PEDESTRIAN signs

Pedestrian Countermeasure Policy Best Practice Report. Federal Highway Administration (FHWA).



The Pedestrian Countermeasure Policy Best Practice Report highlights policies developed by State departments of transportation (DOTs) relating to two specific proven pedestrian safety countermeasures: raised medians and refuge islands; and walkways and paved shoulders. The report states that installing medians and refuge islands can increase safety for pedestrians and motor vehicles by:

- allowing pedestrians to cross one direction of traffic at a time
- providing space for improved lighting for pedestrian crossing
- reducing motor vehicle crashes
- decreasing motorist delays

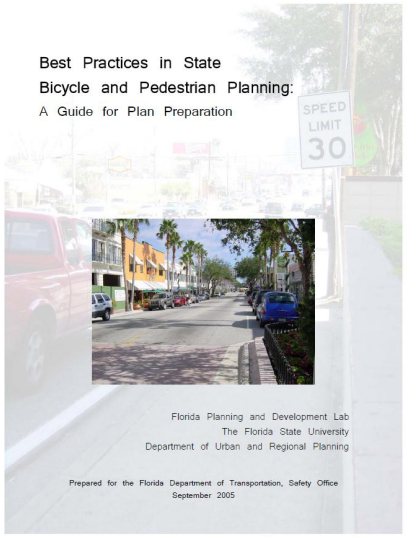
- increasing roadway capacity
- reducing vehicle speeds
- providing space for landscaping within the right-of-way.

Based on data from two previous FHWA reports, "walking along roadway" crashes account for almost 8 percent of all fatal pedestrian crashes and providing walkways that are separated from the travel lanes could alleviate up to 88 percent of this type of crash. The benefits of shoulders for pedestrians and motorists listed in the report include:

- reducing numerous crash types
- improving roadway drainage
- increasing effective turning radii at intersections
- reducing shoulder maintenance requirements
- providing emergency stopping space for broken down vehicles, providing space for maintenance operations and snow storage
- providing and increased level of comfort bicyclists

Best Practices in State Bicycle and Pedestrian Planning. Florida Planning and Development Lab, The Florida State University, Department of Urban and Regional Planning. September 2005.

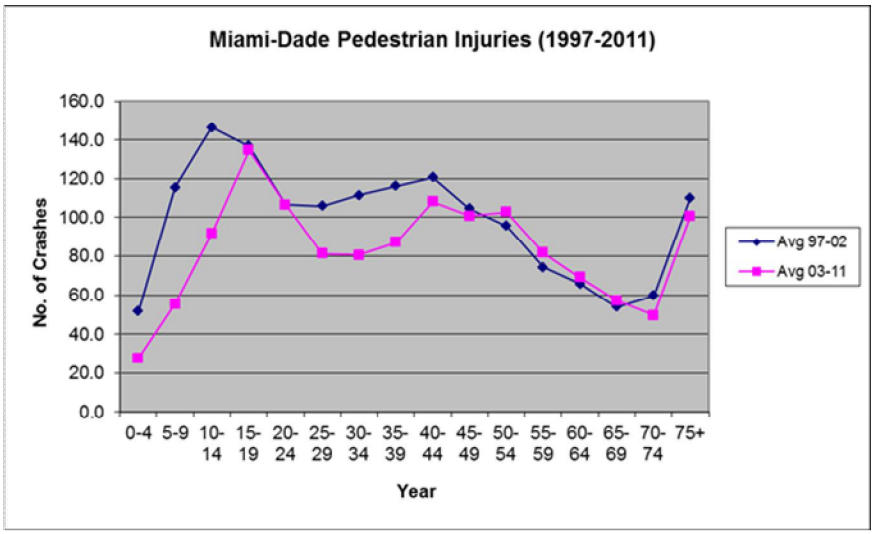
This report was prepared by the Florida Planning and Development Lab to present the best practices in bicycle and pedestrian planning that are most suitable for the State of Florida and give recommendations to the Florida Department of Transportation. The project reviewed bicycle and pedestrian plans from 18 other states across the country for best practice policies. The recommendations from the project were grouped into three categories: intervention, implementation, and evaluation. Below are a few of the recommendations:



- Intervention
    - Targeting pedestrian and bicyclist safety education programs at motorists, roadway design professionals, and law enforcement officers
    - Enforcing unsafe motor vehicle driver and bicyclist behaviors
    - Increasing bikeway and walkway width standards

  - Adopting roadway standards that allow the construction of narrower streets
  - Prioritizing projects that provide for exclusive pedestrian phases at intersections
- Implementation
  - Connecting land use planning and bicycle and pedestrian planning
  - Fostering intergovernmental coordination of bicycle and pedestrian planning
  - Promoting bicycle and pedestrian planning with MPOs and local agencies
  - Targeting capital improvements to high risk geographical areas
- Evaluation
  - Collecting data related to the percentage of Floridians who travel by bicycling or walking during daily activities
  - Collecting data related to the percentage of streets in urban areas with adequate pedestrian and bicycle facilities
  - Using direct digital input of all crash-related information at the scene of a crash

The University of Miami Miller School of Medicine WalkSafe Program



The WalkSafe Program was developed in 2001 to improve juvenile pedestrian safety, encourage children to walk to and from school to increase physical activity levels, and improve the walkability in and around elementary schools. The program began with pilot project implementation in 4 schools in 2002 and spread to 16 schools in February of 2003, followed by 203 schools throughout Miami-Dade County in October of 2003. The measured benefits of the WalkSafe Program can be seen by comparing the average number of pedestrian injuries by age range before and after the program was initiated. In addition to the decrease measured between the two time periods for school-age children, there is another large differential between the two time periods for the age groups from 25 to 44. This is a possible indirect effect on the age groups of parents that may be getting the information from their children that have been trained by the WalkSafe Program.

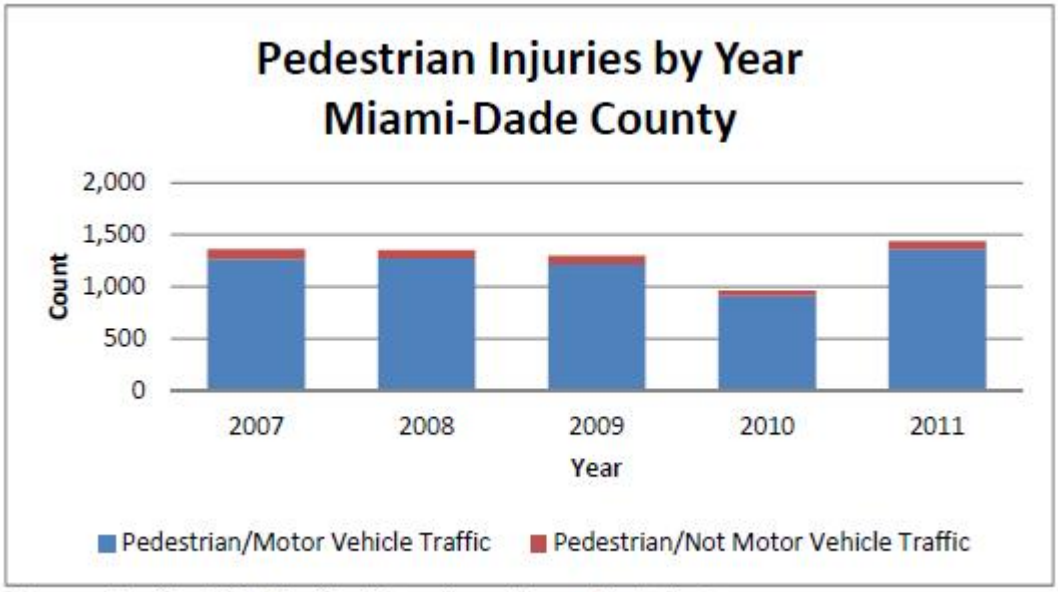
DATA COLLECTION AND ANALYSIS

Two primary data collection and analysis activities were conducted for this Plan Update. Health-related and crash data was collected for a safety analysis and roadway characteristic data was collected to evaluate the Bicycle Level of Service (BLOS) and Pedestrian Level of Service (PLOS) of the major roadways within the county.

Health-Related Data Analysis

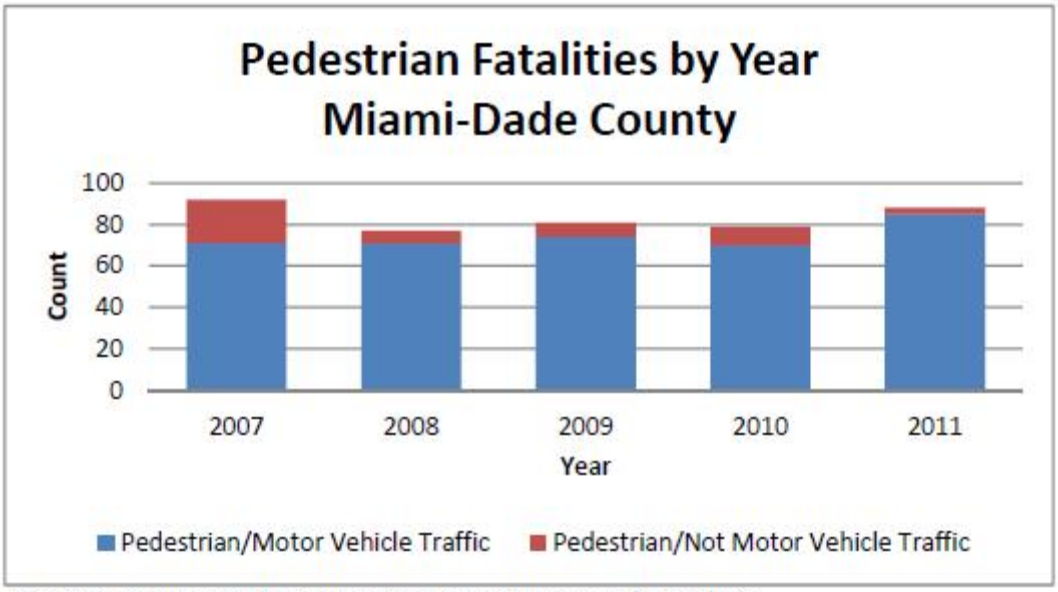
Miami-Dade County data for pedestrian and pedalcyclist (bicycle) fatalities, hospitalizations, and emergency department admissions was retrieved from the Department of Health's (DOH) Florida Injury Surveillance Data System. The system categorizes the events as resulting from either a motor vehicle traffic accident or a non-motor vehicle accident. Figures 1 and 2 present the number of yearly pedestrian injuries and fatalities, respectively, from 2007 to 2011. The figures show that the majority of pedestrian injuries and fatalities involved a motor vehicle.

Figure 1: Pedestrian Injuries in Miami-Dade County 2007-2011



Source: Florida DOH Florida Injury Surveillance Data System

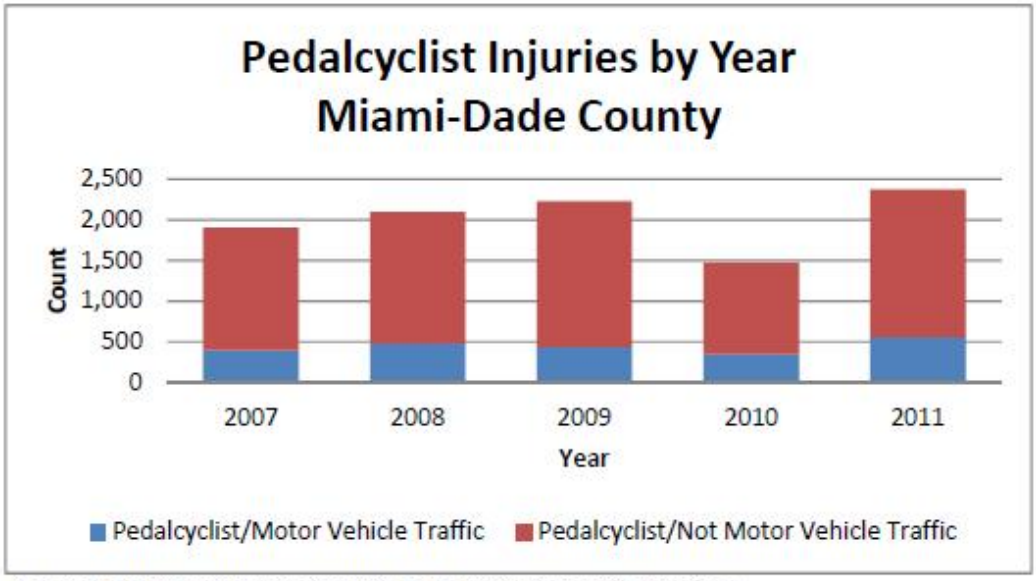
Figure 2: Pedestrian Fatalities in Miami-Dade County 2007-2011



Source: Florida DOH Florida Injury Surveillance Data System

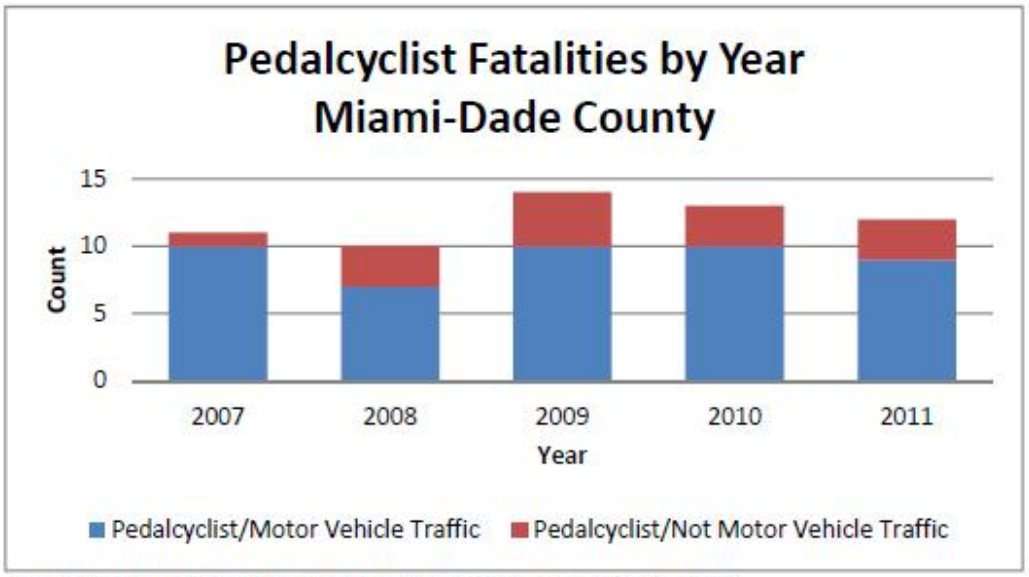
Figures 3 and 4 present the number of yearly pedalcylist injuries and fatalities, respectively, from 2007 to 2011. The figures show that the majority of pedalcylist injuries did not involve a motor vehicle; however, the majority of pedalcyclist fatalities involved a motor vehicle.

Figure 3: Pedalcyclist Injuries in Miami-Dade County 2007-2011



Source: Florida DOH Florida Injury Surveillance Data System

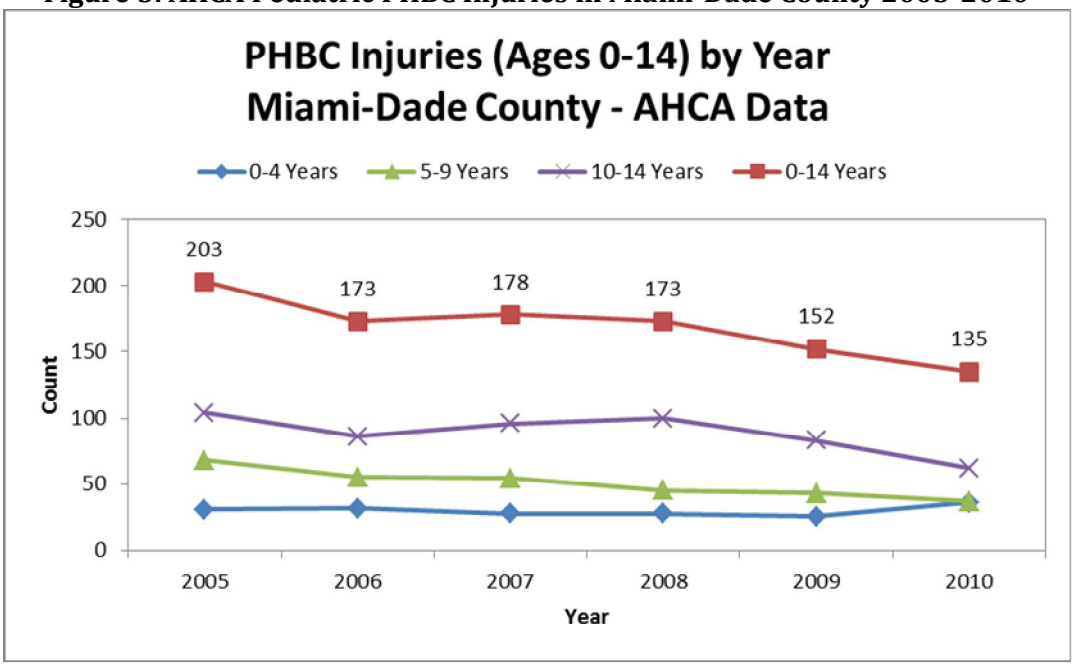
Figure 4: Pedalcyclist Fatalities in Miami-Dade County 2007-2011



Source: Florida DOH Florida Injury Surveillance Data System

Along with the DOH data, pediatric pedestrians hit by car (PHBC) injury data was obtained from the Agency for Health Care Administration (AHCA) from 2005 to 2010. This data, presented in Figure 5, shows a decreasing trend in the number of pediatric PHBC injuries.

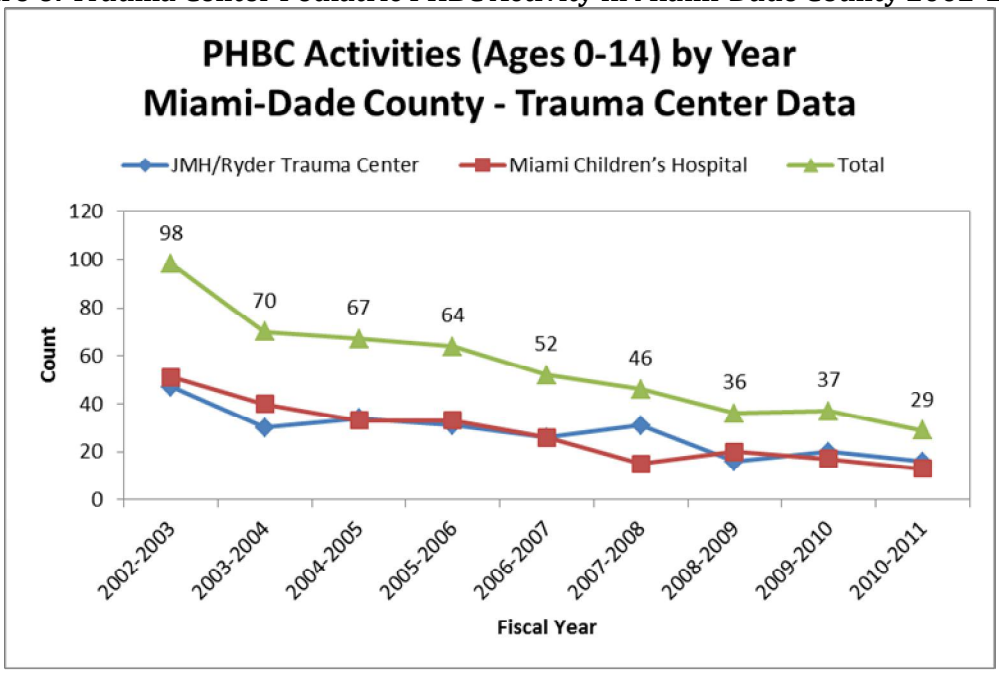
Figure 5: AHCA Pediatric PHBC Injuries in Miami-Dade County 2005-2010



In addition to the AHCA PHBC data, pediatric PHBC data was obtained from the emergency room logs at Jackson Memorial Hospital Ryder Trauma Center and Miami Children's Hospital from 2002

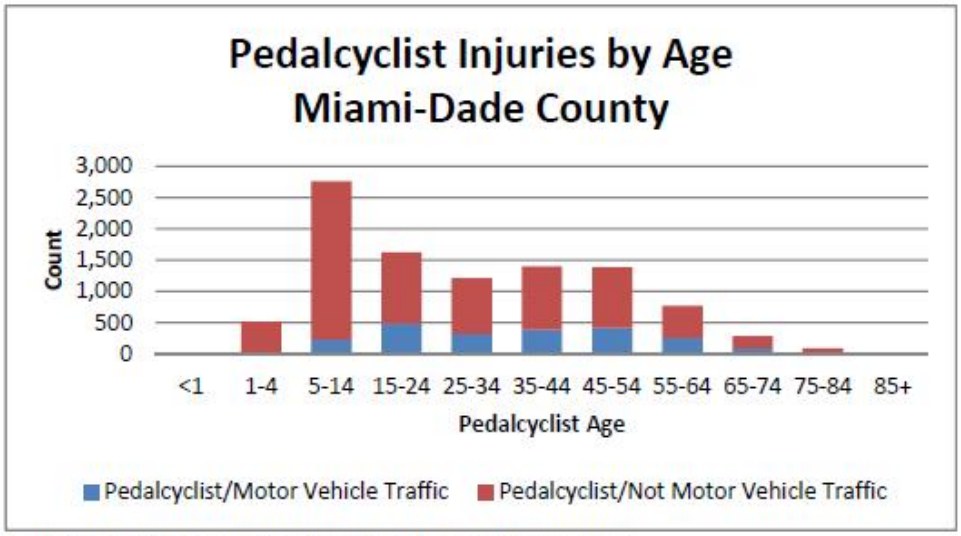
to 2011. As seen in Figure 6, the number of children hit by cars that are being sent to these Level I trauma centers has decreased by 70 percent since 2002.

Figure 6: Trauma Center Pediatric PHBC Activity in Miami-Dade County 2002-2011



The DOH pedalcyclist injury by age data in Figure 7 shows a large number of non-motor vehicle injuries for the 5-14 year-old age group.

Figure 7: Pedalcyclist Injuries by Age in Miami-Dade County 2007-2011



Source: FDOH, Florida Injury Surveillance Data System

The health-related data is shown in its entirety in Appendix A.

Crash Data Descriptive Statistics

Miami-Dade County pedestrian and bicycle crash data as reported to the DHSMV were obtained from the University of Florida (UF) Department of Urban and Regional Planning for the most recent seven years of available data. From 2005 through 2011, there were an average of 1412 pedestrian crashes, 70 pedestrian fatalities, 538 bicycle crashes, and 8 bicycle fatalities each year.

A series of statistical analyses were performed to identify crash characteristics that were associated with higher occurrences of pedestrian or bicycle crashes and fatalities. The charts in this section, Figures 8 through 29, display the seven years of data based on different crash characteristics such as the time of day, alcohol/drug use, lighting condition, month of the year, and age. From these charts, several apparent conclusions can be made about the relationships between the crash characteristics and the likelihood of pedestrian and bicycle crashes in Miami-Dade County. The time of day data show that approximately 35 percent of all pedestrian and bicycle crashes occurred between the hours of 3 P.M. and 8 P.M. (Figures 9 and 21), while fatal crashes tended to occur later at night as approximately 40 percent of pedestrian and bicycle fatalities occurred between the hours of 7 P.M. and 12 A.M (Figures 10 and 22).

Although only five percent of all pedestrian and bicycle crashes in Miami-Dade County between 2005 and 2011 were related to alcohol/drug use (Figures 11 and 23), the proportion of crashes with alcohol/drug involvement increases to 25 percent when examining pedestrian and bicycle fatalities (Figures 12 and 24). An examination of police crash reports for pedestrian fatalities involving alcohol/drug use revealed that the driver was approximately twice as likely to be the party for which alcohol/drug use was a factor than the pedestrian (Figure 13). Furthermore, the driver was the party more likely to be responsible for the contributing cause/circumstance for the crash, although there were a significant number of crashes where both the driver and the pedestrian were cited for contributing causes/circumstances (Figure 14).

Based on the distribution of pedestrian and bicycle fatalities with respect to lighting conditions, it was found that darker lighting conditions were associated with higher occurrences of pedestrian and bicycle fatalities (Figures 16 and 26). Pedestrian crashes most often occurred in January, while the highest number of bicycle crashes occurred in the months of March and October (Figures 17 and 27). The highest number of pedestrian fatalities occurred in the month of January, while the summer months with more daylight hours experienced fewer fatalities (Figure 18).

The age distribution of pedestrian crashes shows that people between the ages of 15 and 19 were the most likely to be involved in a crash, as this age range encompasses 10 percent of all pedestrian crashes (Figure 19). The dip in the number of crashes for the three age groups between the ages of 25 and 39 may be attributed to the possibility that people in these age groups are parents of school-age children who are being taught pedestrian safety skills in school (WalkSafe) and are bringing the information home to their parents. The ages of bicycle crashes show a similar distribution, but the age group with the highest percentage of crashes was the 20-24 year old group (Figure 29). This group made up 12.6 percent of the total amount of bicycle crashes. Note that Figure 29 depicts the ages for bicycle crashes in 2011 only, as this was the only year that age data were available for bicyclist crashes.

Pedestrian Crash Data Descriptive Statistic Charts

Figure 8: Pedestrian Crashes and Fatalities in Miami-Dade County 2005 to 2011

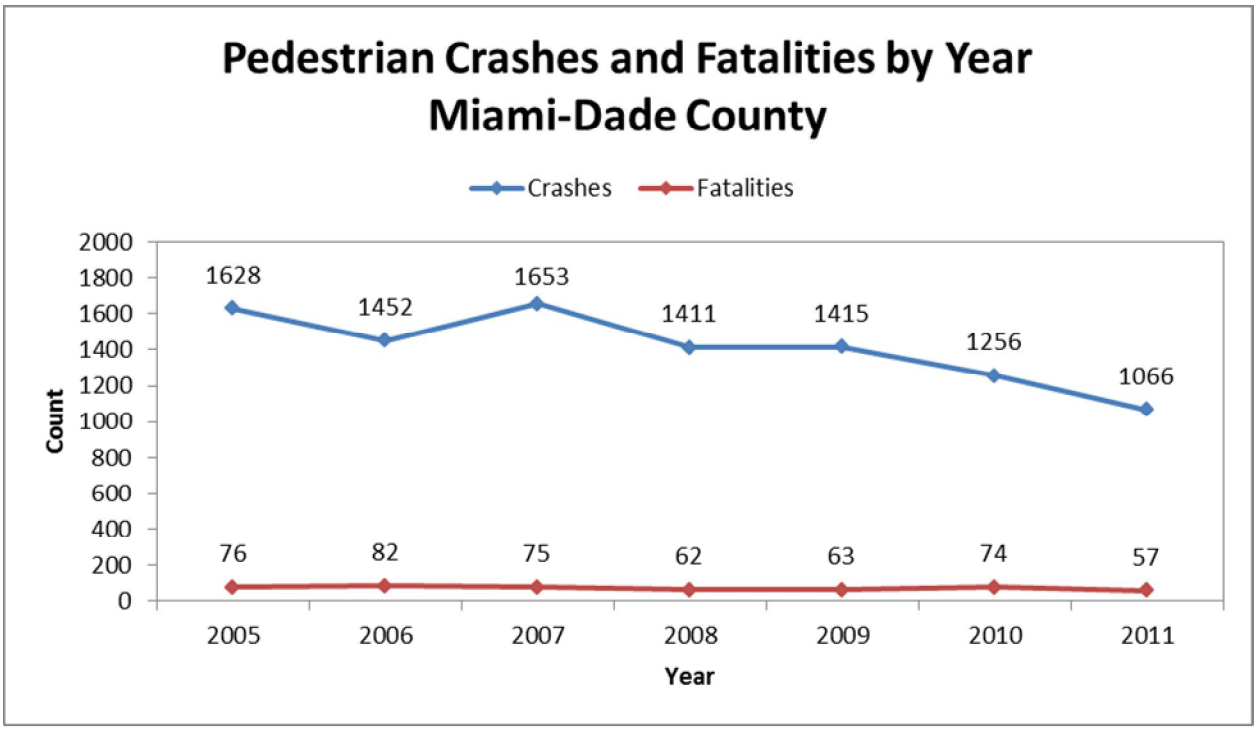


Figure 9: Pedestrian Crashes by Hour in Miami-Dade County 2005-2011

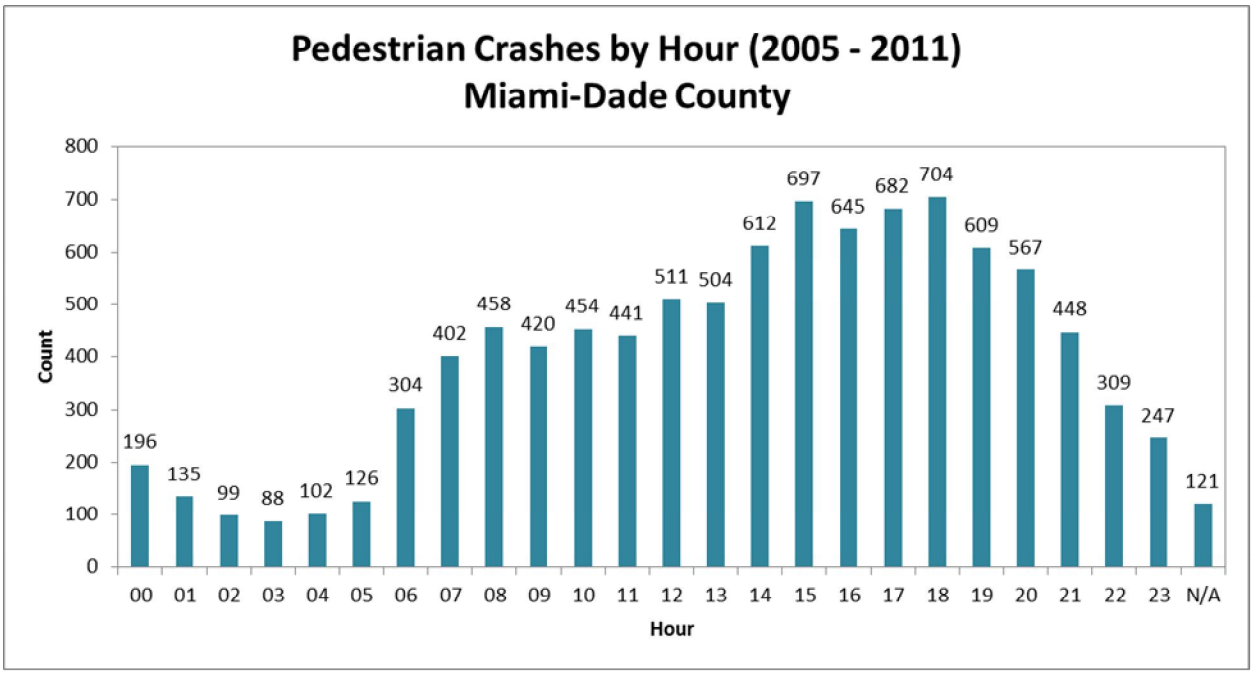


Figure 10: Pedestrian Fatalities by Hour in Miami-Dade County 2005-2011

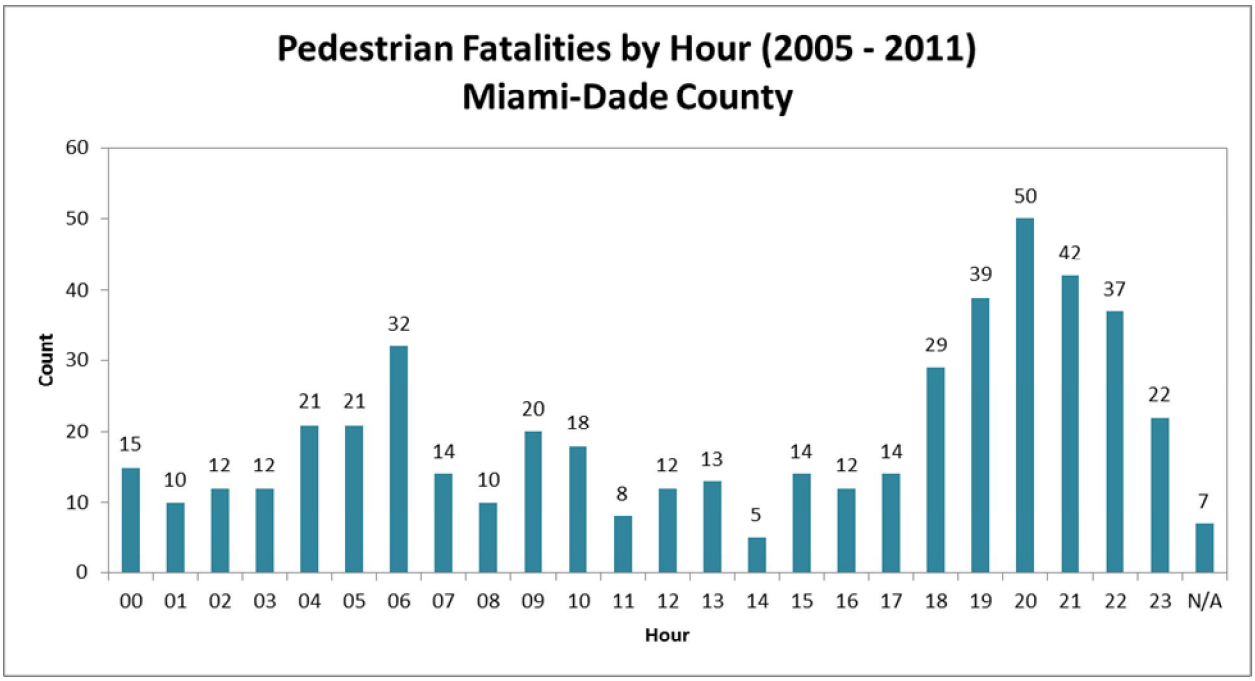


Figure 11: Pedestrian Crashes by Alcohol/Drug Use in Miami-Dade County 2005-2011

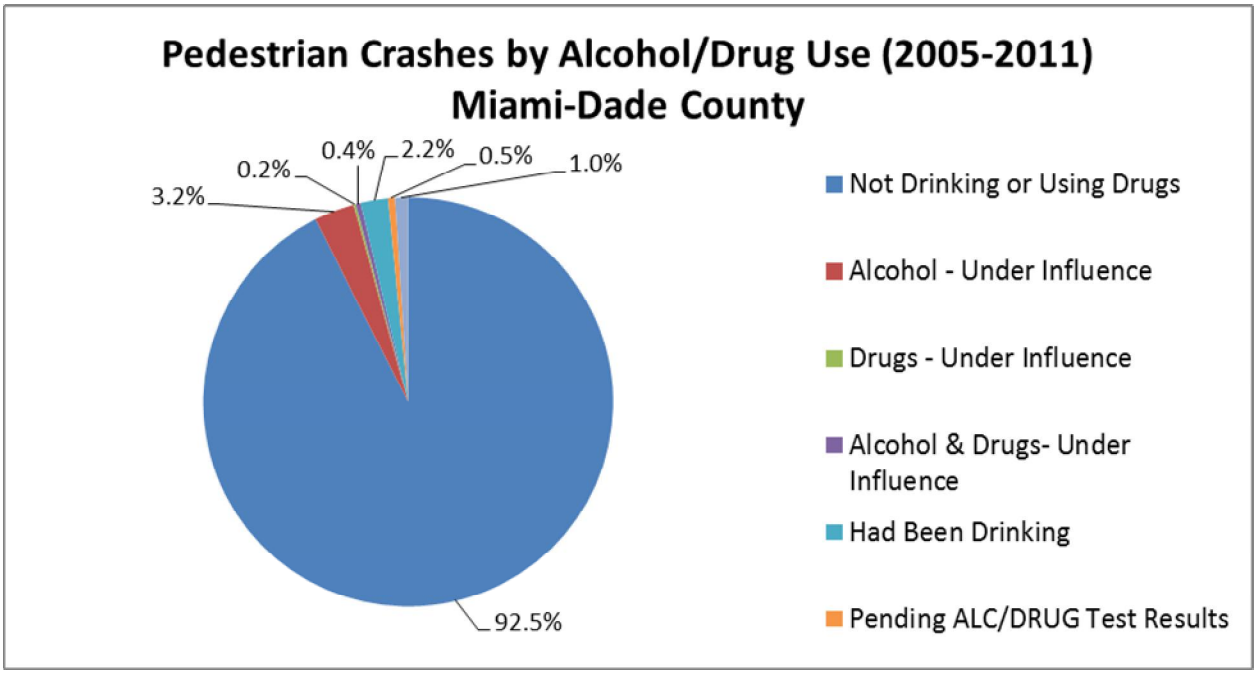


Figure 12: Pedestrian Fatalities by Alcohol/Drug Use in Miami-Dade County 2005-2011

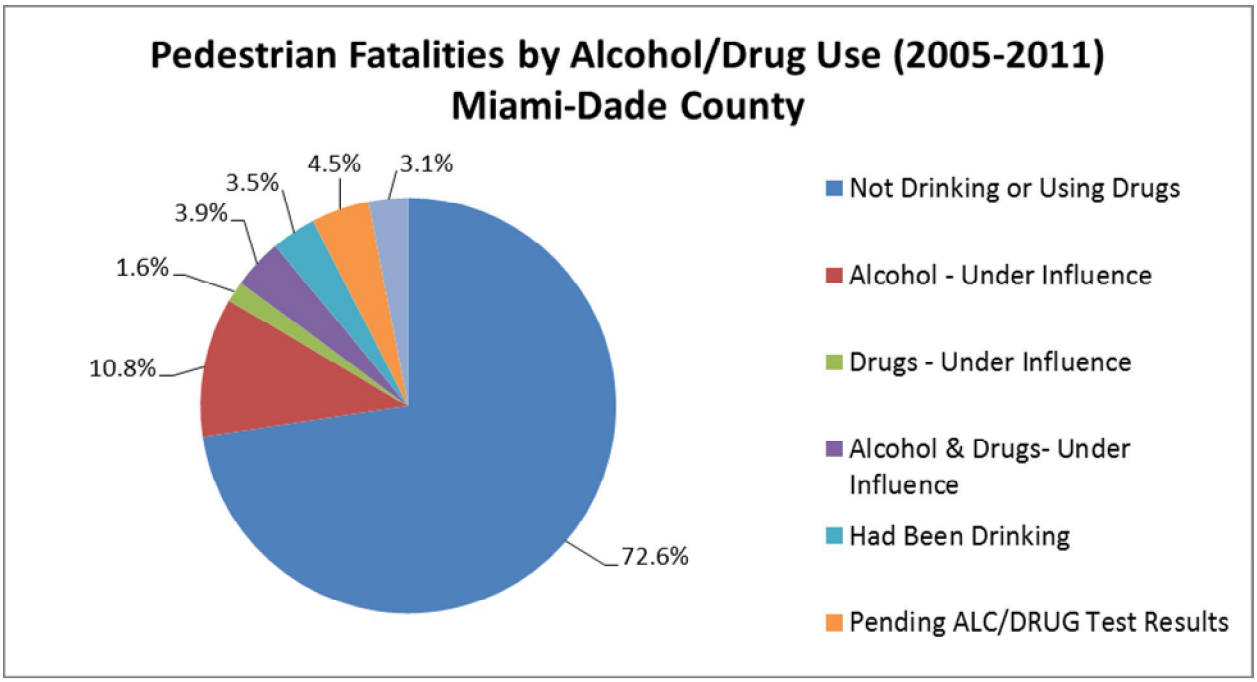
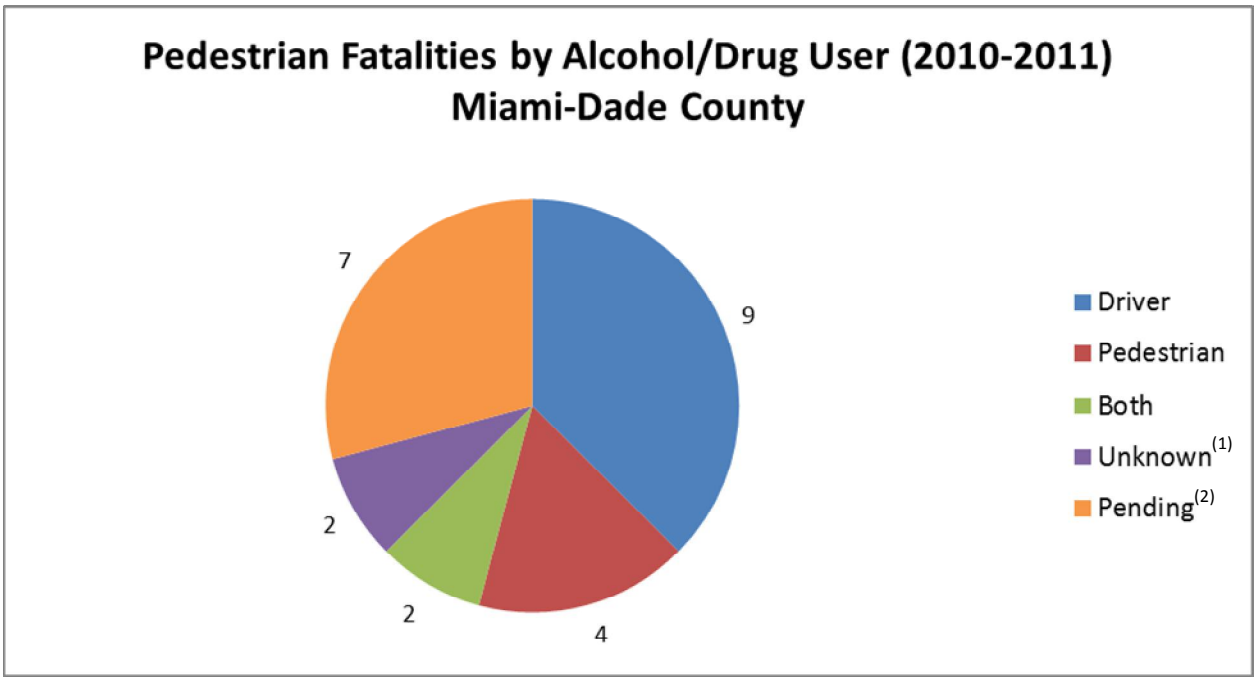


Figure 13: Pedestrian Fatalities by Alcohol/Drug User in Miami-Dade County 2010-2011



(1) "Unknown" are generally hit-and-run crashes involving a suspicion of alcohol/drug use on the part of the driver
(2) "Pending" are crashes where the results of the blood/toxicology tests were not provided at the time of the crash report and no report update is available

Figure 14: Pedestrian Fatalities by Person Responsible for Contributing Cause/Circumstance in Miami-Dade County 2010-2011

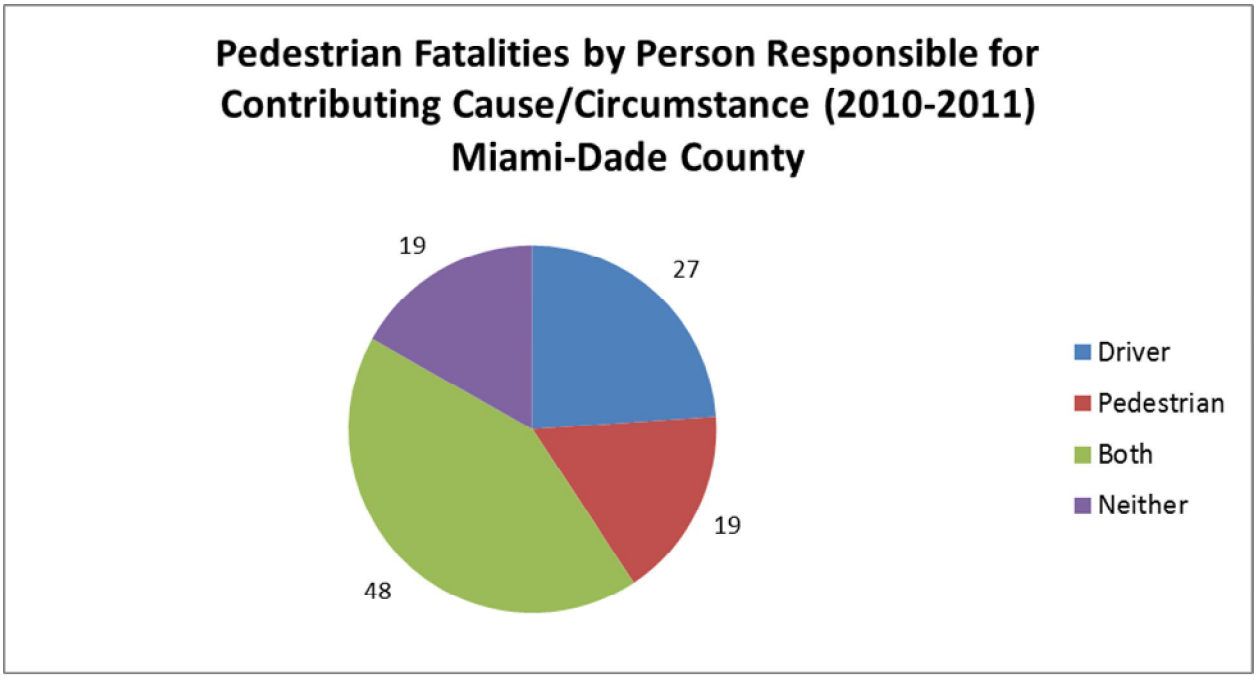


Figure 15: Pedestrian Crashes by Lighting Condition in Miami-Dade County 2005-2011

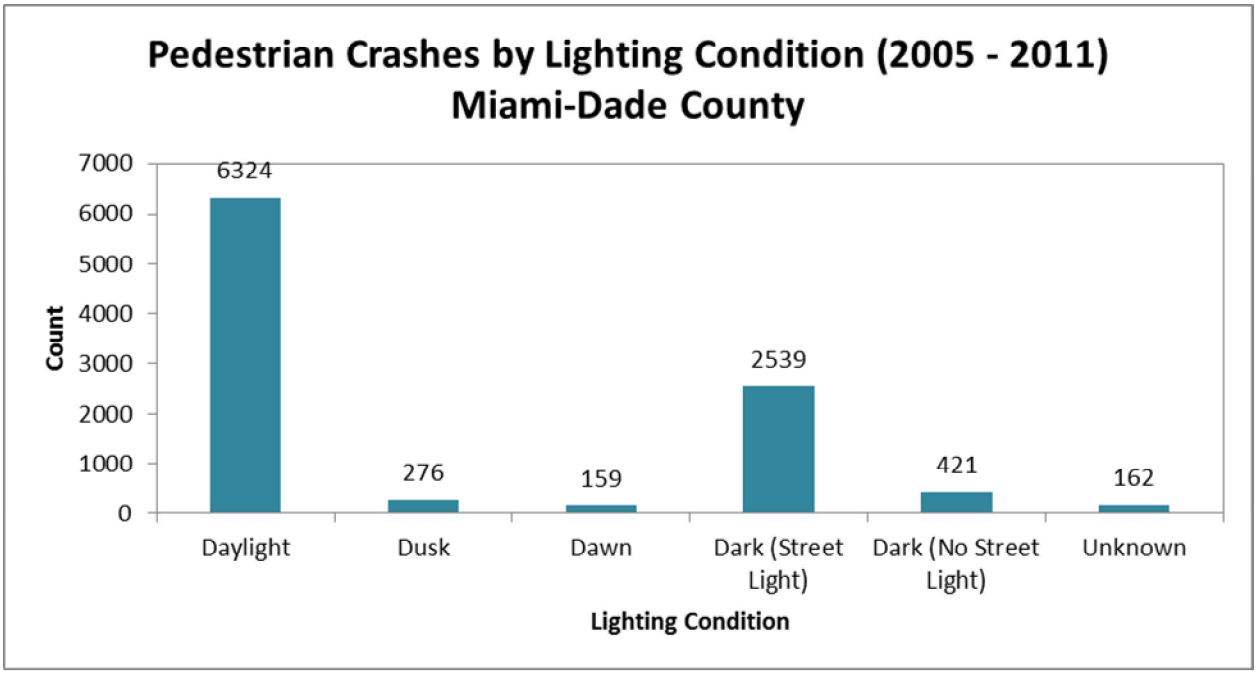


Figure 16: Pedestrian Fatalities by Lighting Condition in Miami-Dade County 2005-2011

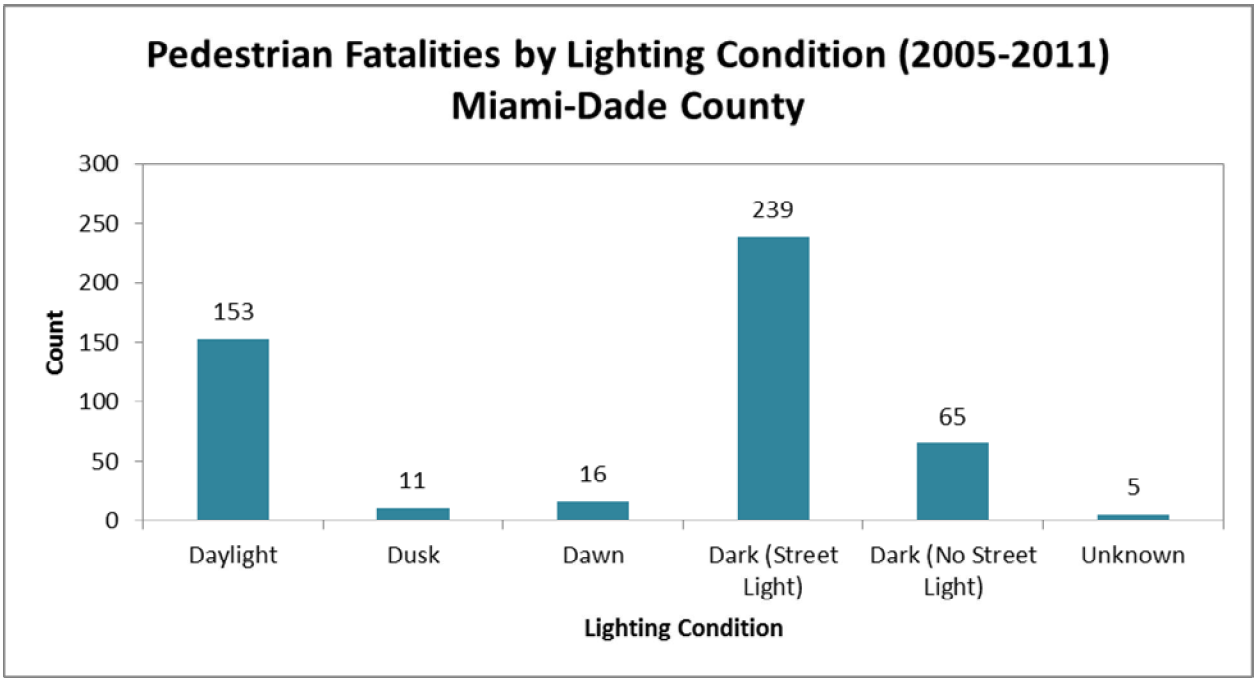


Figure 17: Pedestrian Crashes by Month in Miami-Dade County 2005-2011

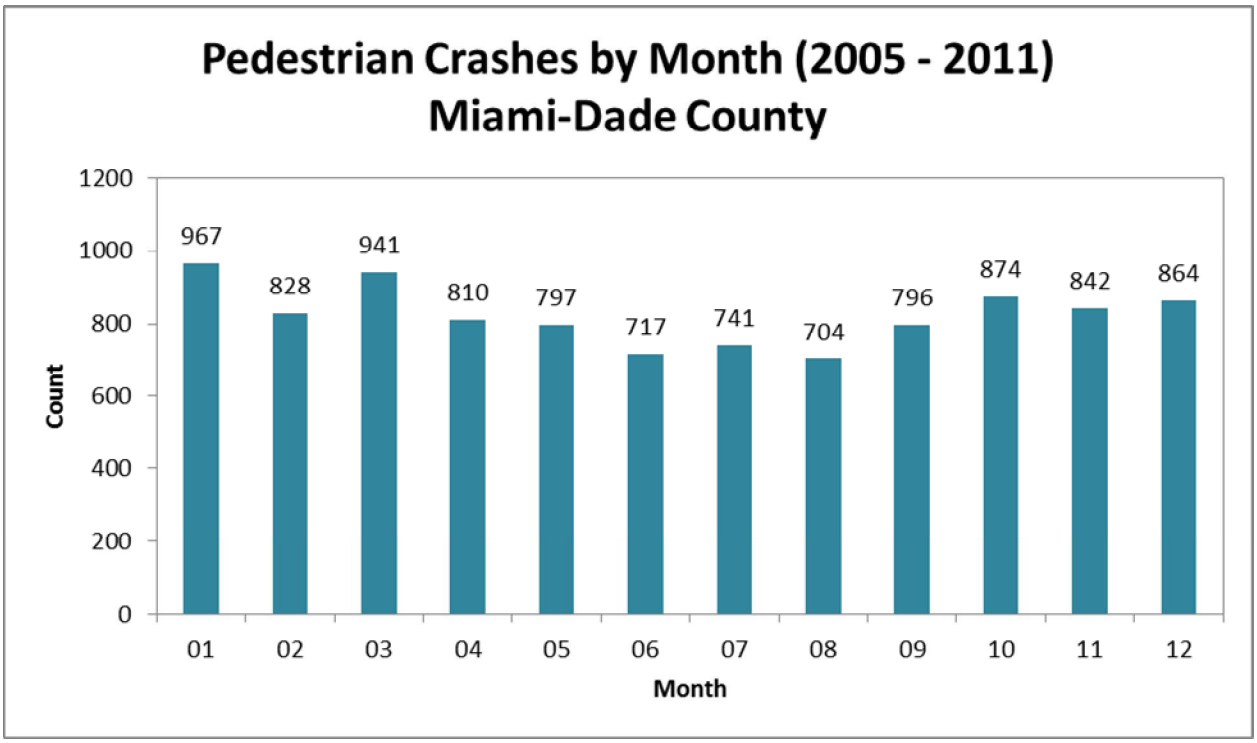


Figure 18: Pedestrian Fatalities by Month in Miami-Dade County 2005-2011

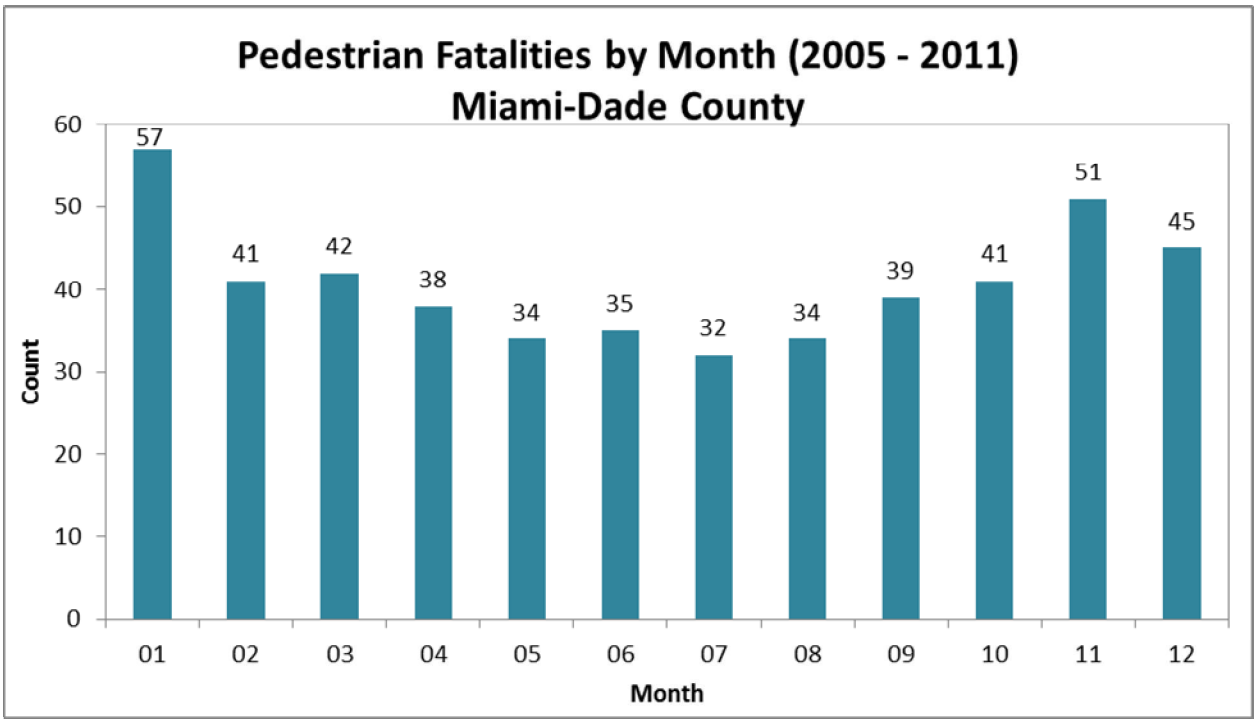
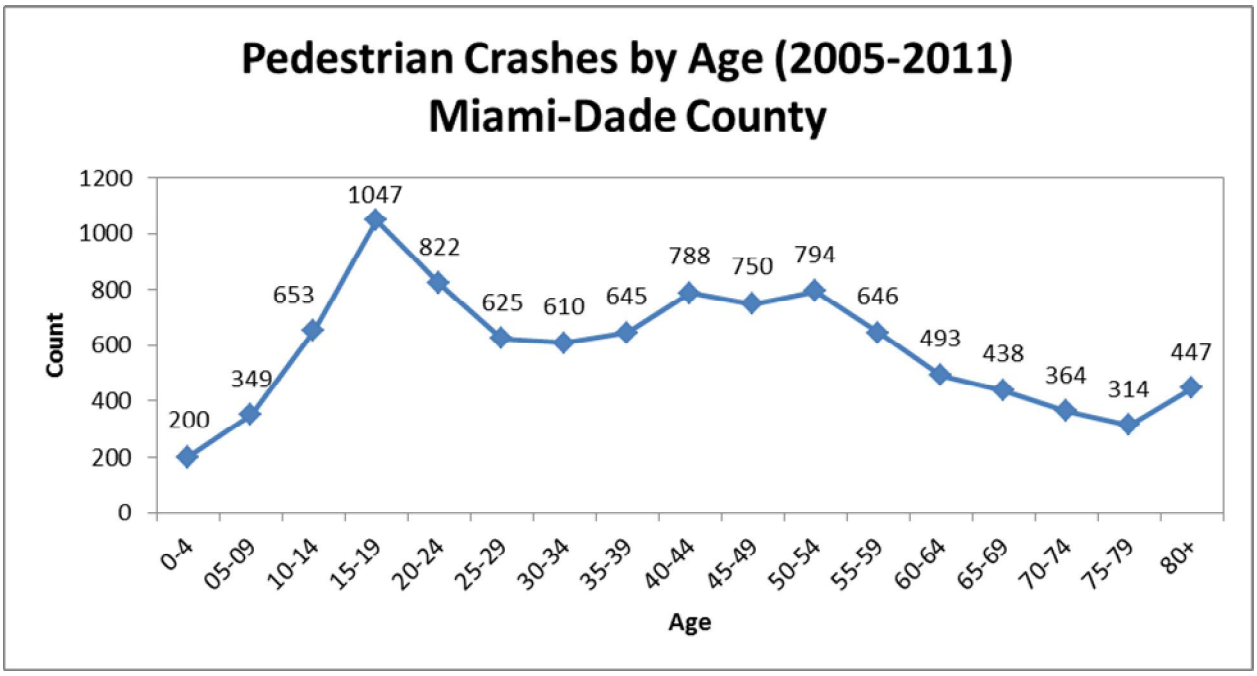


Figure 19: Pedestrian Crashes by Age in Miami-Dade County 2005-2011



Bicycle Crash Data Descriptive Statistic Charts

Figure 20: Bicycle Crashes and Fatalities in Miami-Dade County 2005 to 2011

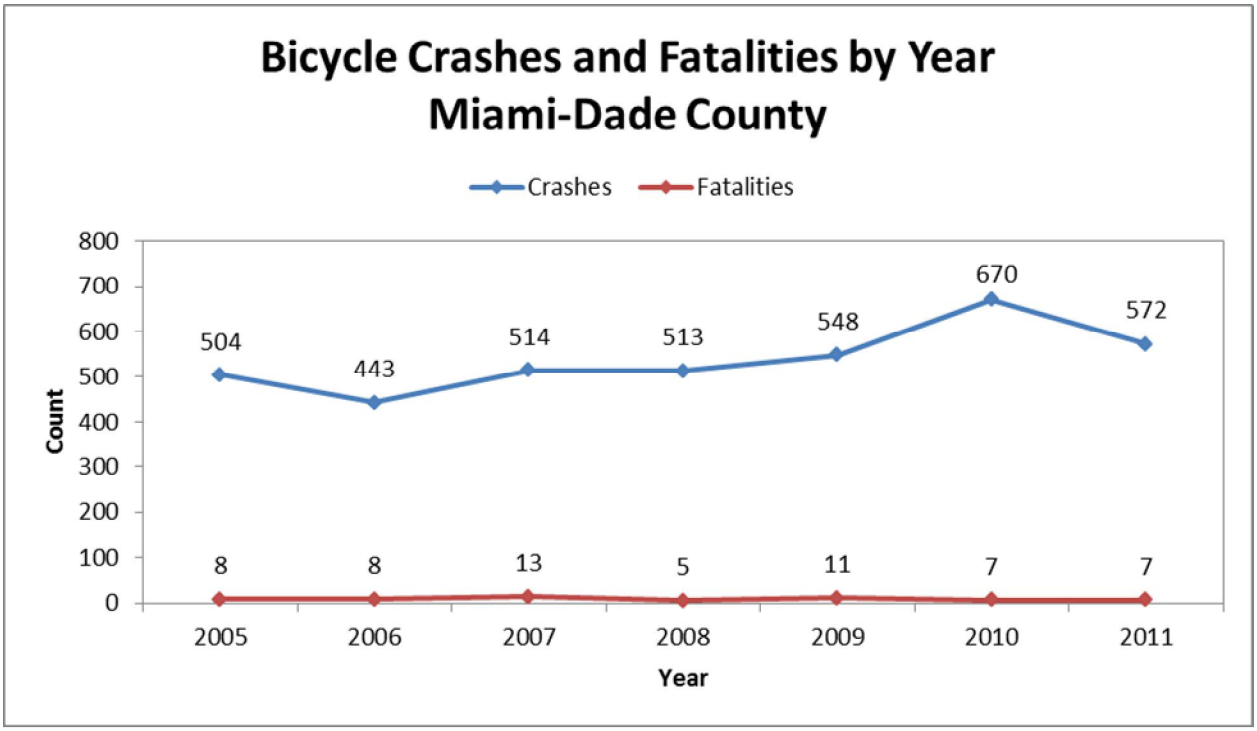


Figure 21: Bicycle Crashes by Hour in Miami-Dade County 2005-2011

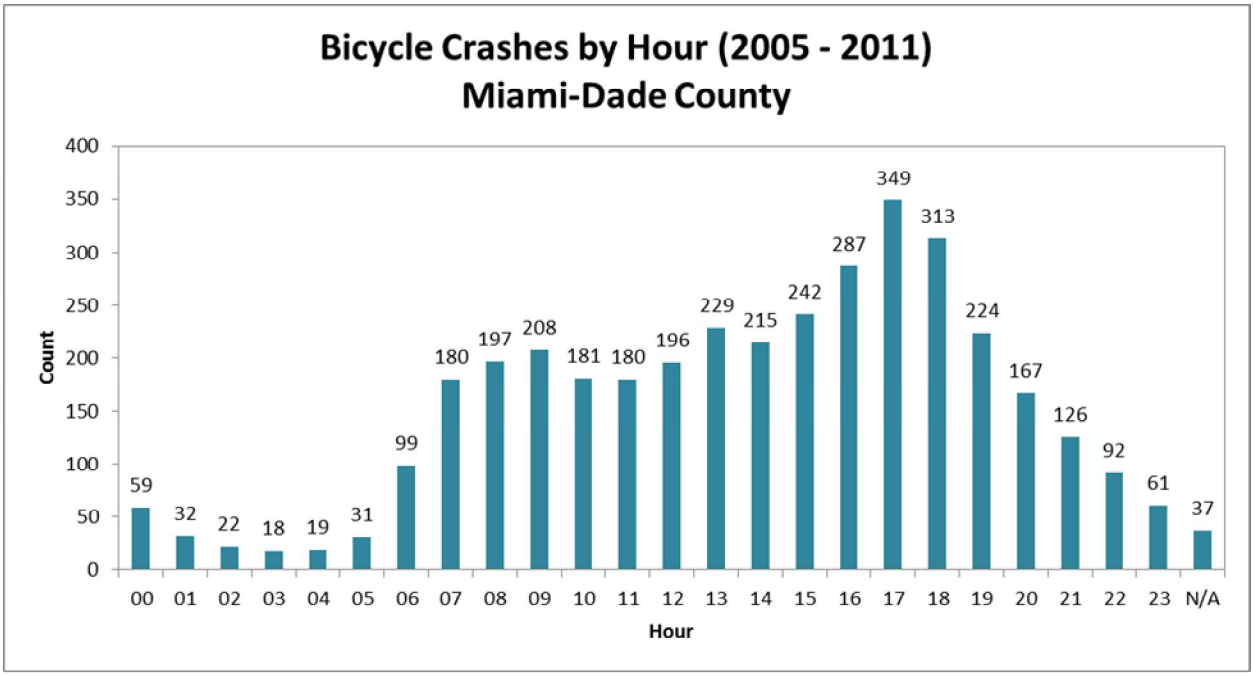


Figure 22: Bicycle Fatalities by Hour in Miami-Dade County 2005-2011

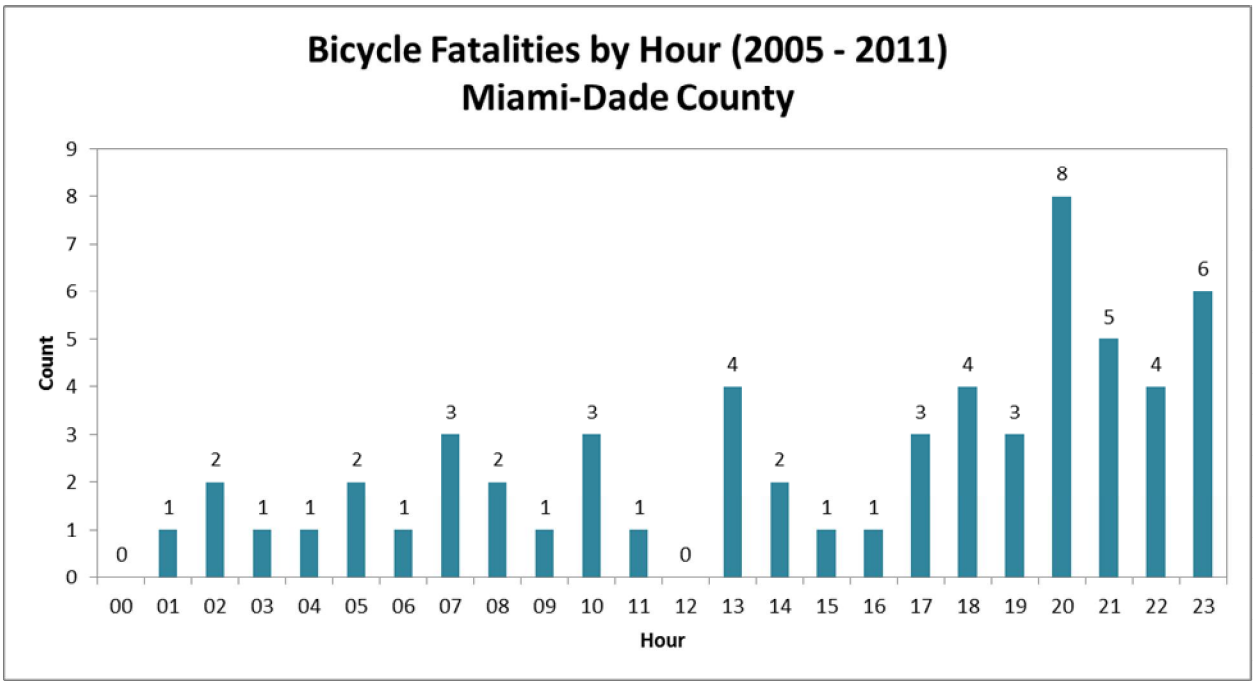


Figure 23: Bicycle Crashes by Alcohol/Drug Use in Miami-Dade County 2005-2011

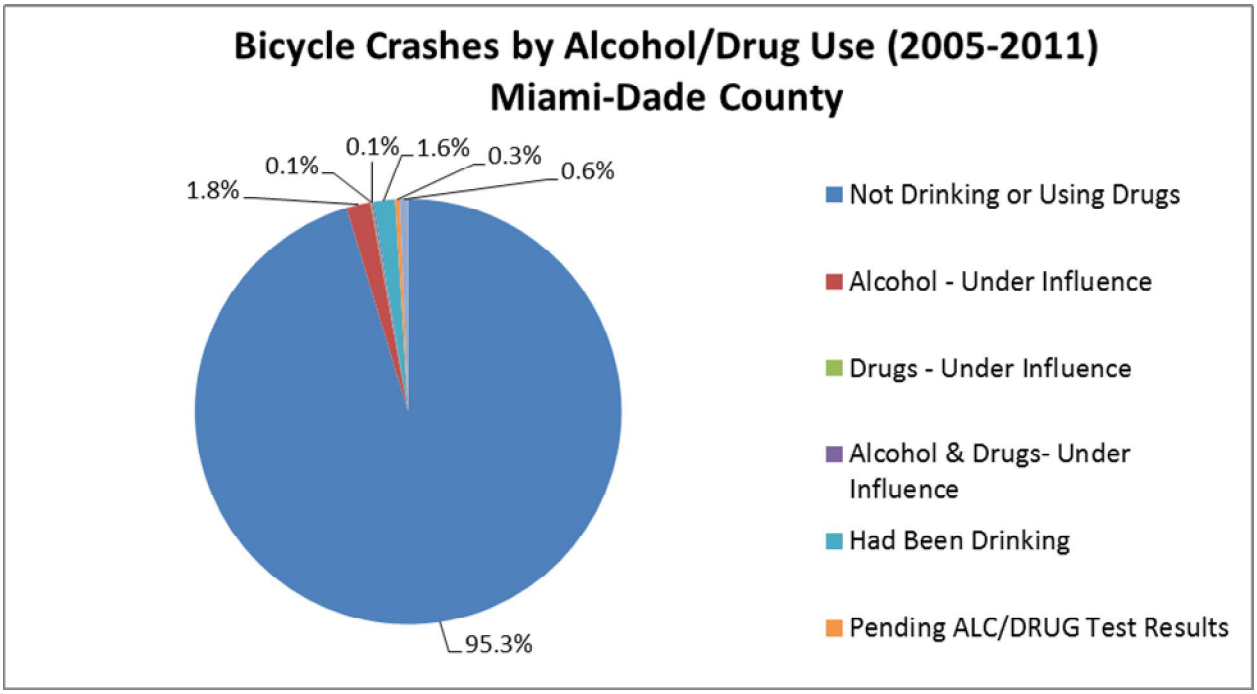


Figure 24: Bicycle Fatalities by Alcohol/Drug Use in Miami-Dade County 2005-2011

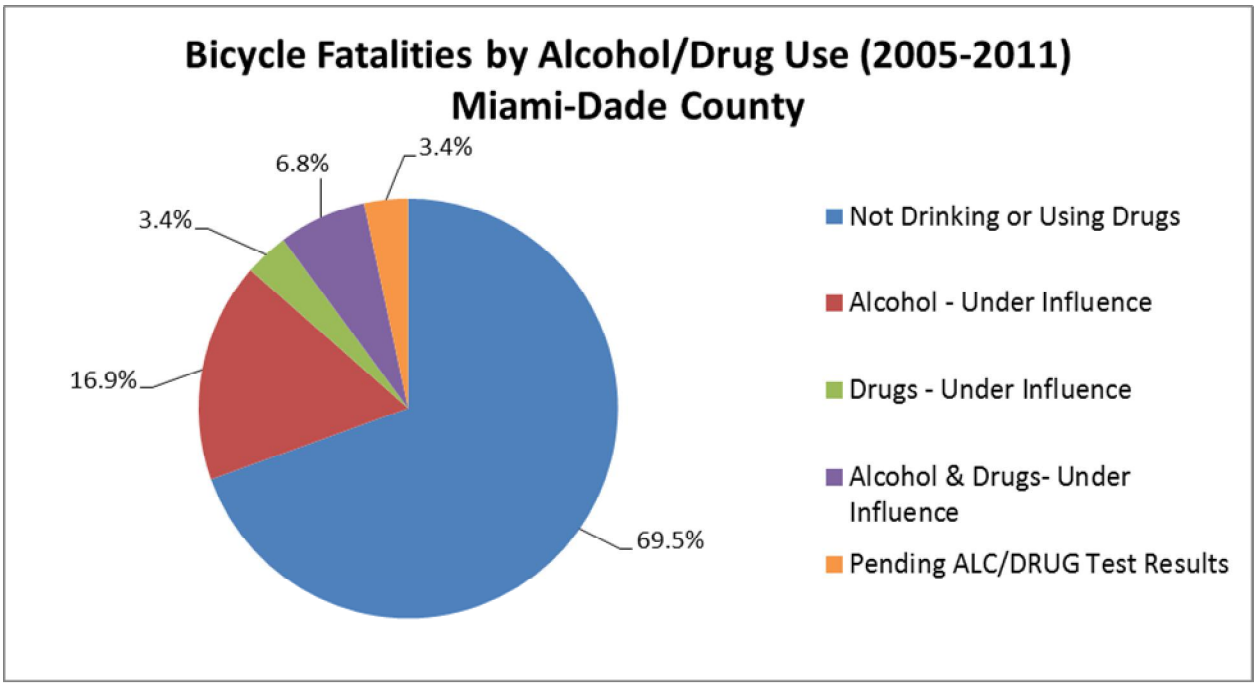


Figure 25: Bicycle Crashes by Lighting Condition in Miami-Dade County 2005-2011

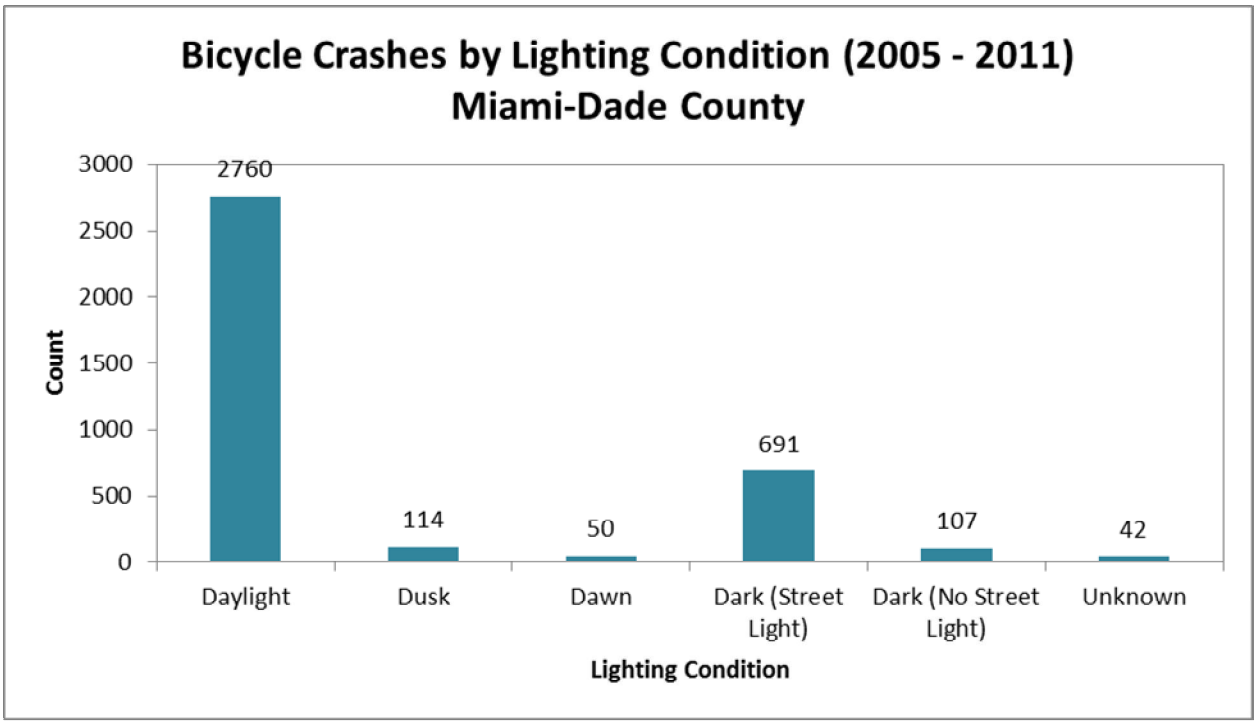


Figure 26: Bicycle Fatalities by Lighting Condition in Miami-Dade County 2005-2011

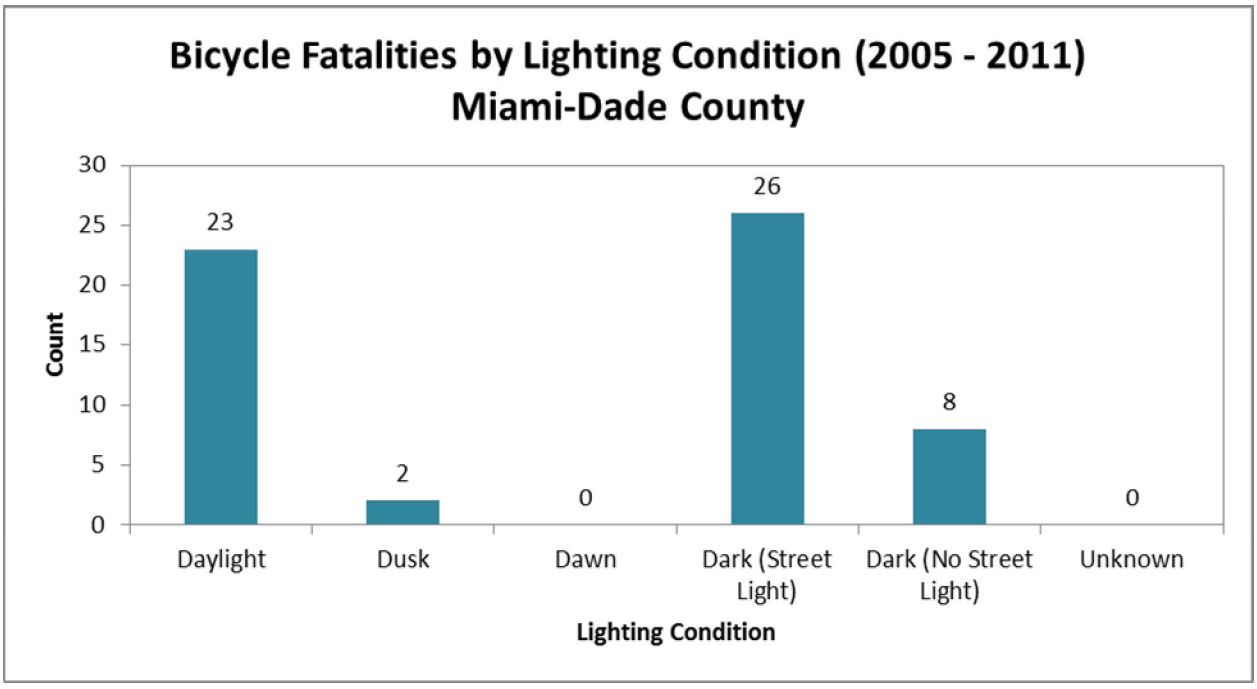


Figure 27: Bicycle Crashes by Month in Miami-Dade County 2005-2011

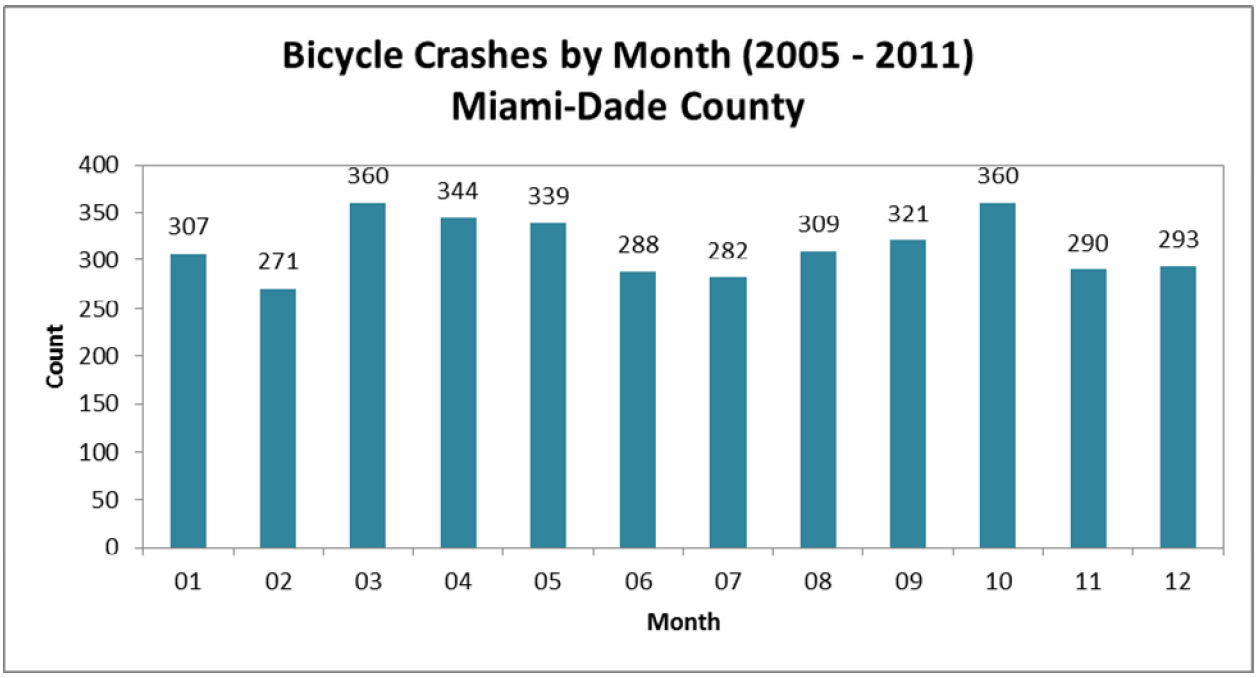


Figure 28: Bicycle Fatalities by Month in Miami-Dade County 2005-2011

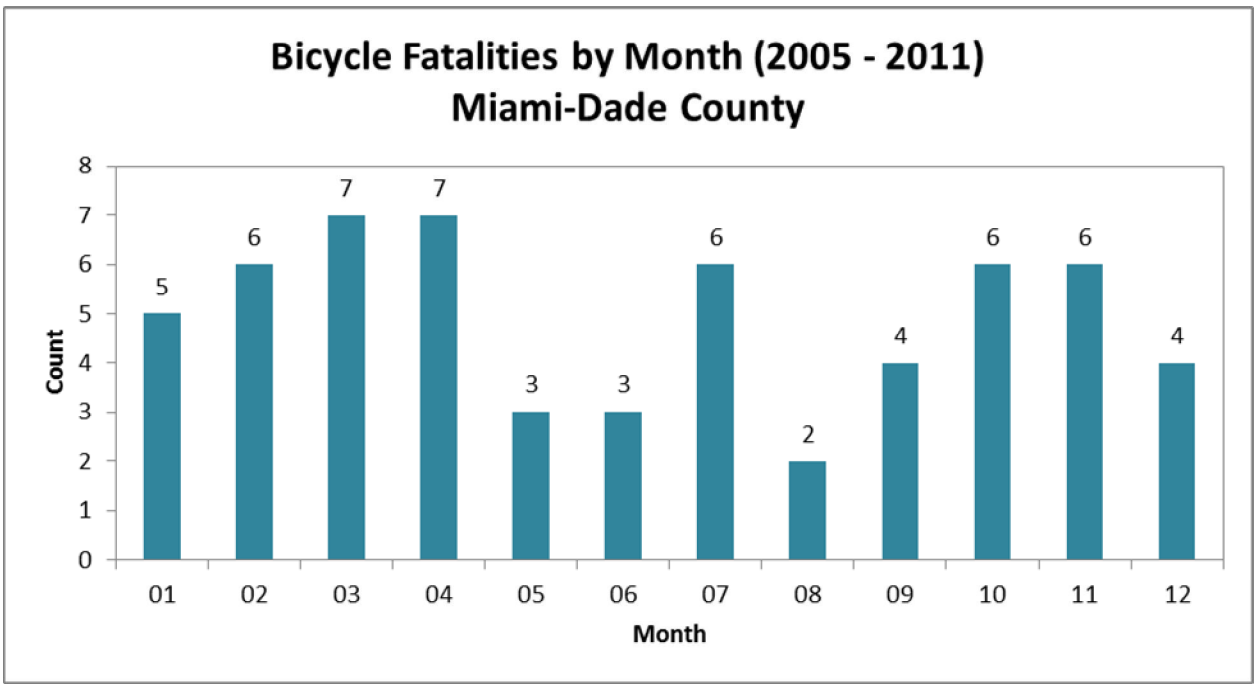
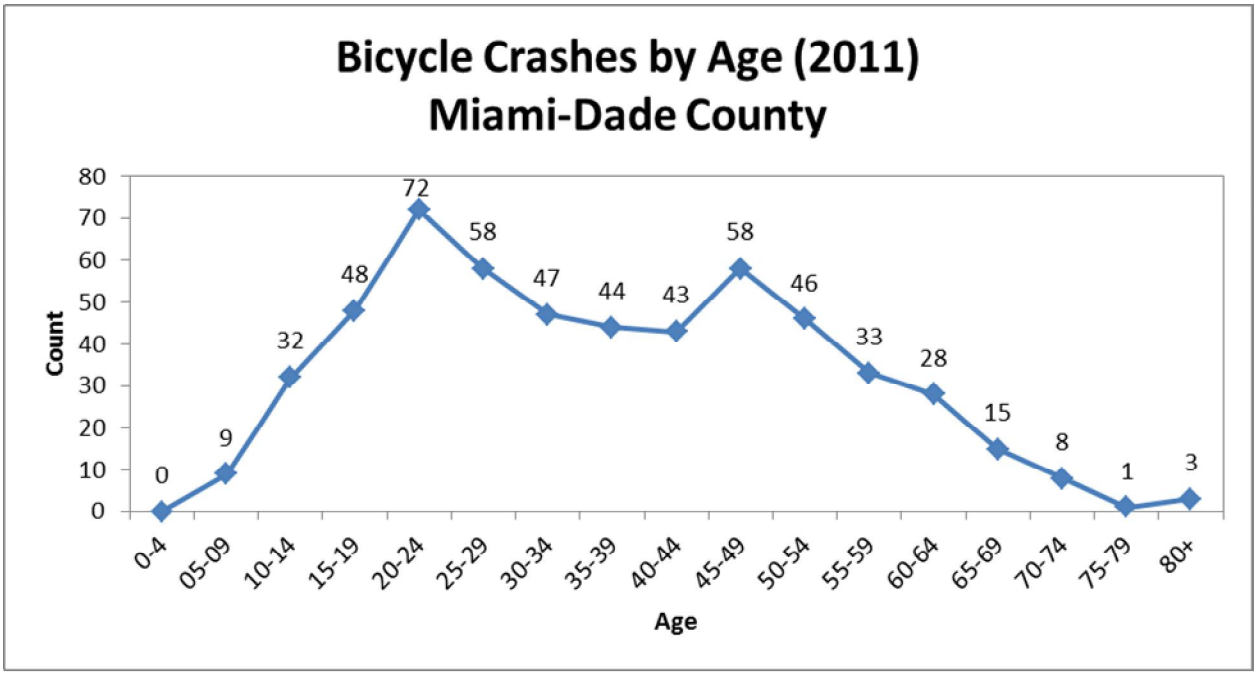


Figure 29: Bicycle Crashes by Age in Miami-Dade County 2011



Where Crashes Occur

High crash clusters were identified based on geographic information systems (GIS) crash data mapping. The locations of crashes and fatalities were mapped for pedestrian and bicycle crashes within Miami-Dade County from 2005 to 2011. The density of crashes and fatalities were also mapped to depict the spread of pedestrian or bicycle-related crashes within Miami-Dade County from 2005 to 2011. The darker clusters on the density maps show the areas with higher concentrations of pedestrian or bicycle-related crashes. To identify the high crash areas for bicycle-related and pedestrian-related crashes, the density maps were altered to show only the top 5 percent crash density areas. Individual maps depicting the crashes within each of the high crash areas identified in the density maps are included in Appendix B.

In addition to the density maps for all bicycle and pedestrian crashes, the density of several specific crash types were also mapped.

Alcohol/Drug-Use Crash Density

Figures 34 and 42 depict the densities of pedestrian and bicycle crashes that involved alcohol and/or drug-use within Miami-Dade County from 2005 to 2011, respectively. Figure 34 presents the areas with high concentrations of alcohol/drug-use related pedestrian crashes including South Beach, Little Havana, North Beach, and Homestead. As shown in Figure 42 the South Beach area had the highest concentration of alcohol/drug-use related bicycle crashes during the seven years of crash data.

Age Groups Crash Density

The densities specific age groups of pedestrian crashes within Miami-Dade County were also analyzed. The two specific age groups studied were juvenile (ages 18 and below) and elderly (ages 65 and above) pedestrians. Note that the age-specific crash densities were not mapped for bicycle crashes because the age data for bicyclists was only available for the year 2011 crashes. The juvenile pedestrian crash density map shown in Figure 35 highlights the areas of high juvenile pedestrian crash concentrations including Model City, Little Haiti, Miami Gardens, and North Miami. Figure 36 depicts the areas of high elderly pedestrian crash concentrations including Little Havana, South Beach, North Beach, Flagami, Hialeah, and Sunny Isles Beach.

Nighttime Crash Density

Figures 37 and 43 illustrate the densities of nighttime (between the hours of 8:00 P.M. to 6:00 A.M.) pedestrian and bicycle crashes within Miami-Dade County from 2005-2011, respectively. Both density maps show the highest concentration of nighttime crashes within the South Beach area.

The top crash intersections for several types of crashes in Miami-Dade County from 2005-2011 were identified using the GIS crash data for crashes within 300 feet of an intersection. Tables 1 through 4 list the top 10 intersections for pedestrian, bicycle, juvenile pedestrian, and elderly pedestrian crashes, respectively.

Table 1: Top Pedestrian Crash Intersections

Rank	Intersection (Municipality)	Pedestrian Crashes (2005-2011)
1	Miami Gardens Drive & NW 27th Avenue (Miami Gardens)	23
2	US 1 & SW 27th Avenue (Miami)	21
3	W 16th Avenue & W 49th Street (Hialeah)	19
4	NE 125th Street & NE 6th Avenue (North Miami)	18
5	NW 27th Avenue & NW 79th Street (unincorporated)	17
6	N Miami Avenue & N 79th Street (Miami)	16
7	NW 22nd Avenue & NW 36th Street (Miami)	15
7	Collins Avenue & Lincoln Road (Miami Beach)	15
7	Collins Avenue & 174th Street (Sunny Isles Beach)	15
7	Collins Avenue & 178th Street (Sunny Isles Beach)	15

Table 2: Top Bicycle Crash Intersections

Rank	Intersection (Municipality)	Bicycle Crashes (2005-2011)
1	Crandon Boulevard & Harbor Drive/Ocean Lane Drive (Key Biscayne)	14
2	Alton Road & 17th Street (Miami Beach)	10
3	Collins Avenue & 21st Street (Miami Beach)	8
3	Crandon Boulevard & Galen Drive/W McIntire Street (Key Biscayne)	8
5	Miami Gardens Drive & NW 27th Avenue (Miami Gardens)	7
5	Indian Creek Drive/SR A1A & 63rd Street (Miami Beach)	7
5	Lincoln Road & Meridian Avenue (Miami Beach)	7
5	Washington Avenue & 5th Street (Miami Beach)	7
5	Granada Boulevard & US 1 (Coral Gables)	7
5	Miami Gardens Drive & US 1 (Aventura)	7
5	Collins Avenue & 13th Street (Miami Beach)	7

Table 3: Top Juvenile Pedestrian Crash Intersections

Rank	Intersection	Juvenile Pedestrian Crashes (2005-2011)
1	Miami Gardens Drive & NW 27th Avenue (Miami Gardens)	11
2	Caribbean Boulevard & US 1 (Cutler Bay)	7
2	Miami Gardens Drive & NW 37th Avenue (Miami Gardens)	7
4	SW 56th Street at John A. Ferguson High School Entrance (unincorporated)	6
5	NW 27th Avenue & NW 79th Street (unincorporated)	5
5	NE 6th Avenue & NE 149th Street (unincorporated)	5
5	Miami Gardens Drive & NW 47th Avenue (Miami Gardens)	5
5	NW 12th Avenue & NW 103rd Street (unincorporated)	5
9	US 1 & SW 27th Avenue (Miami)	4
9	NW 2nd Avenue & NW 79th Street (Miami)	4
9	NE 12th Avenue & NE 167th Street (North Miami Beach)	4
9	NW 7th Avenue & NW 151st Street (unincorporated)	4
9	NE 6th Avenue & NE 135th Street (North Miami)	4
9	Old Cutler Road & SW 216th Street (Cutler Bay)	4
9	W 24th Avenue & W 60th Street (Hialeah)	4
9	Hammocks Boulevard & SW 104th Street (unincorporated)	4

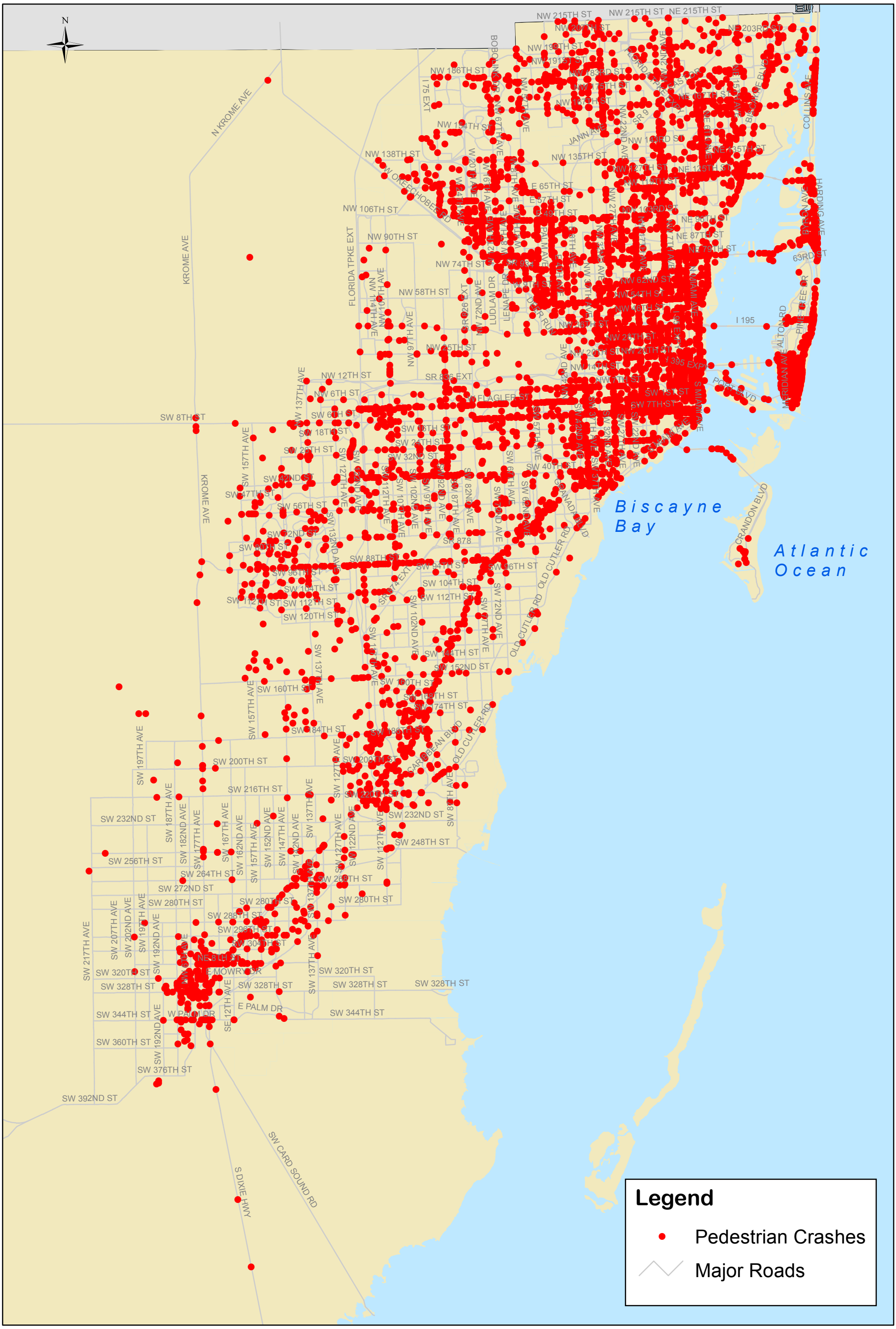
Table 4: Top Elderly Pedestrian Crash Intersections

Rank	Intersection	Elderly Pedestrian Crashes (2005-2011)
1	Alton Road & 17th Street (Miami Beach)	8
2	Normandy Drive & Rue Versailles/Rue Vendome (Miami Beach)	6
2	SW 5th Avenue & SW 8th Street (Miami)	6
4	NW 7th Avenue & NW 95th Street (unincorporated)	5
4	Arthur Godfrey Road/41st Street & Sheridan Avenue (Miami Beach)	5
4	W 16th Avenue & W 49th Street (Hialeah)	5
4	Collins Avenue & 174th Street (Sunny Isles Beach)	5
8	W Flagler Street & W 12th Avenue (Miami)	4
8	Douglas Road/NW 37th Avenue & NW 7th Street (Miami)	4
8	US 1 & NE 36th Street (Miami)	4
8	NE 125th Street & NE 6th Avenue (North Miami)	4
8	US 1 & NE 135th Street (North Miami)	4
8	Kendall Drive/SW 88th Street & SW 107th Avenue (Kendall)	4
8	W 24th Avenue & W 68th Street (Hialeah)	4
8	Collins Avenue & 183rd Street (Sunny Isles Beach)	4

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 30: Pedestrian Crashes 2005-2011

Miami-Dade County



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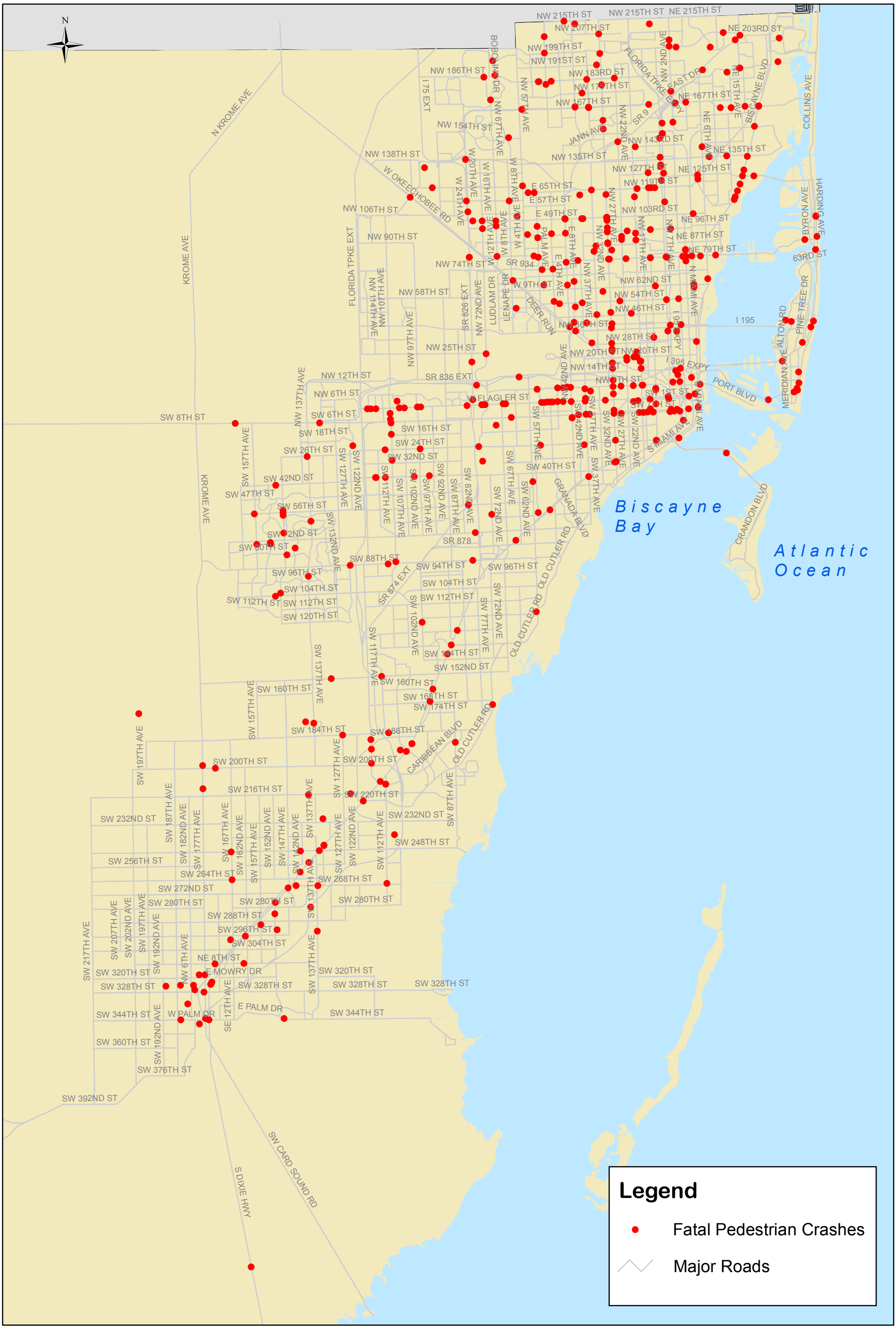
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 31: Fatal Pedestrian Crashes 2005-2011
Miami-Dade County



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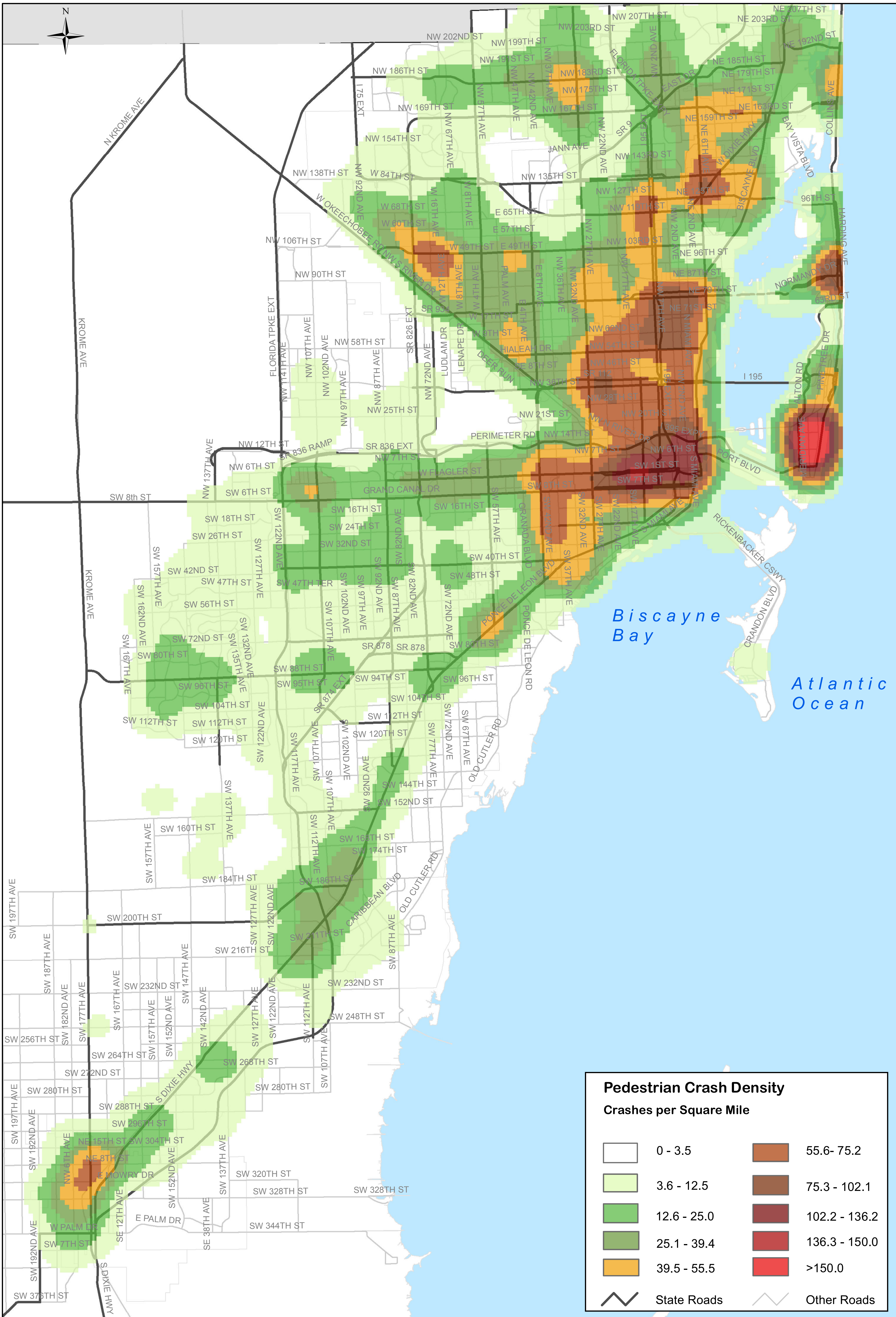
0 2 4 8 Miles

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 32: Pedestrian Crash Density Map 2005-2011

Miami-Dade County

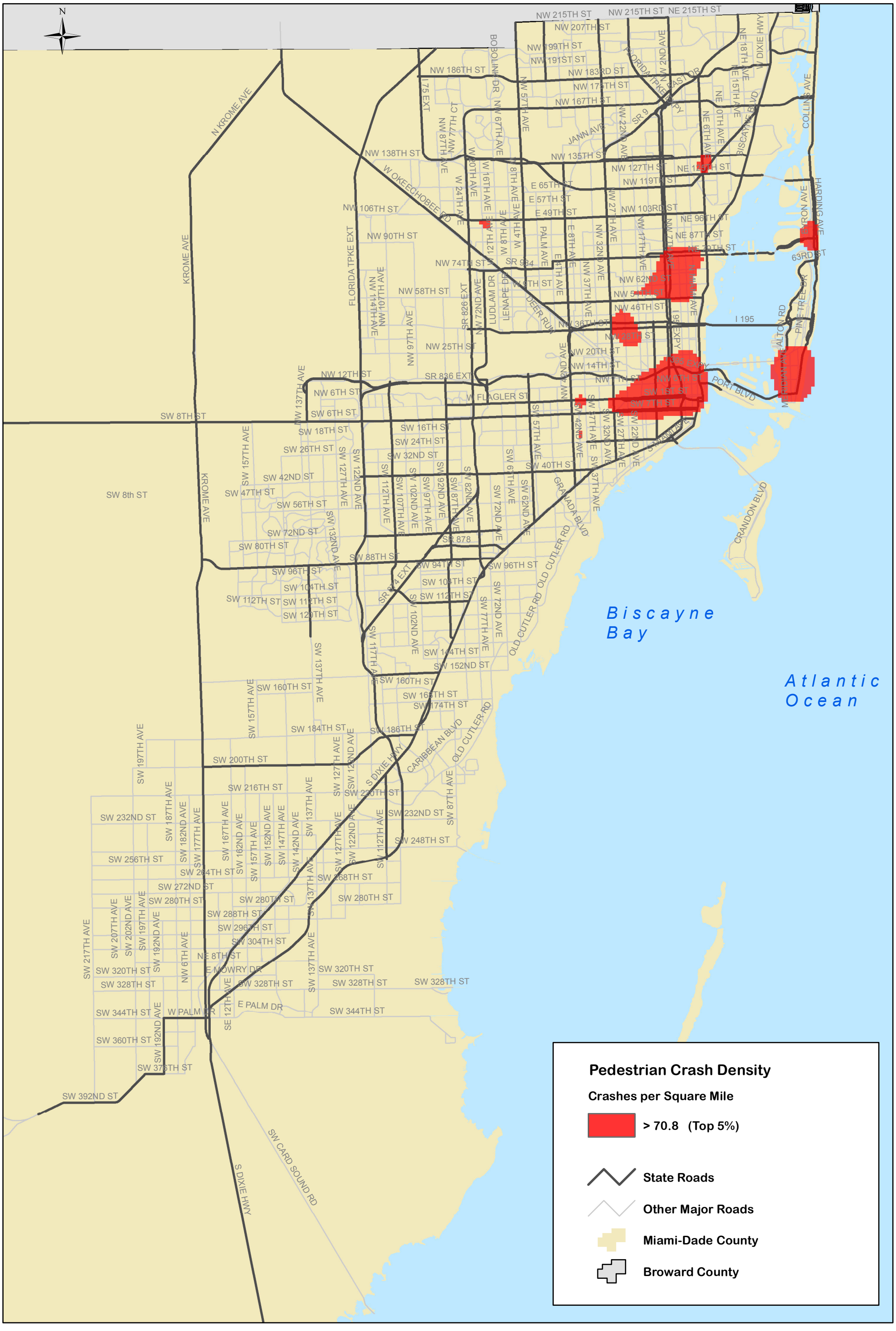


Kimley-Horn and Associates, Inc.

0 2 4 8 Miles

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 33: Pedestrian High-Crash Areas Map 2005-2011
Miami-Dade County



Kimley-Horn and Associates, Inc.

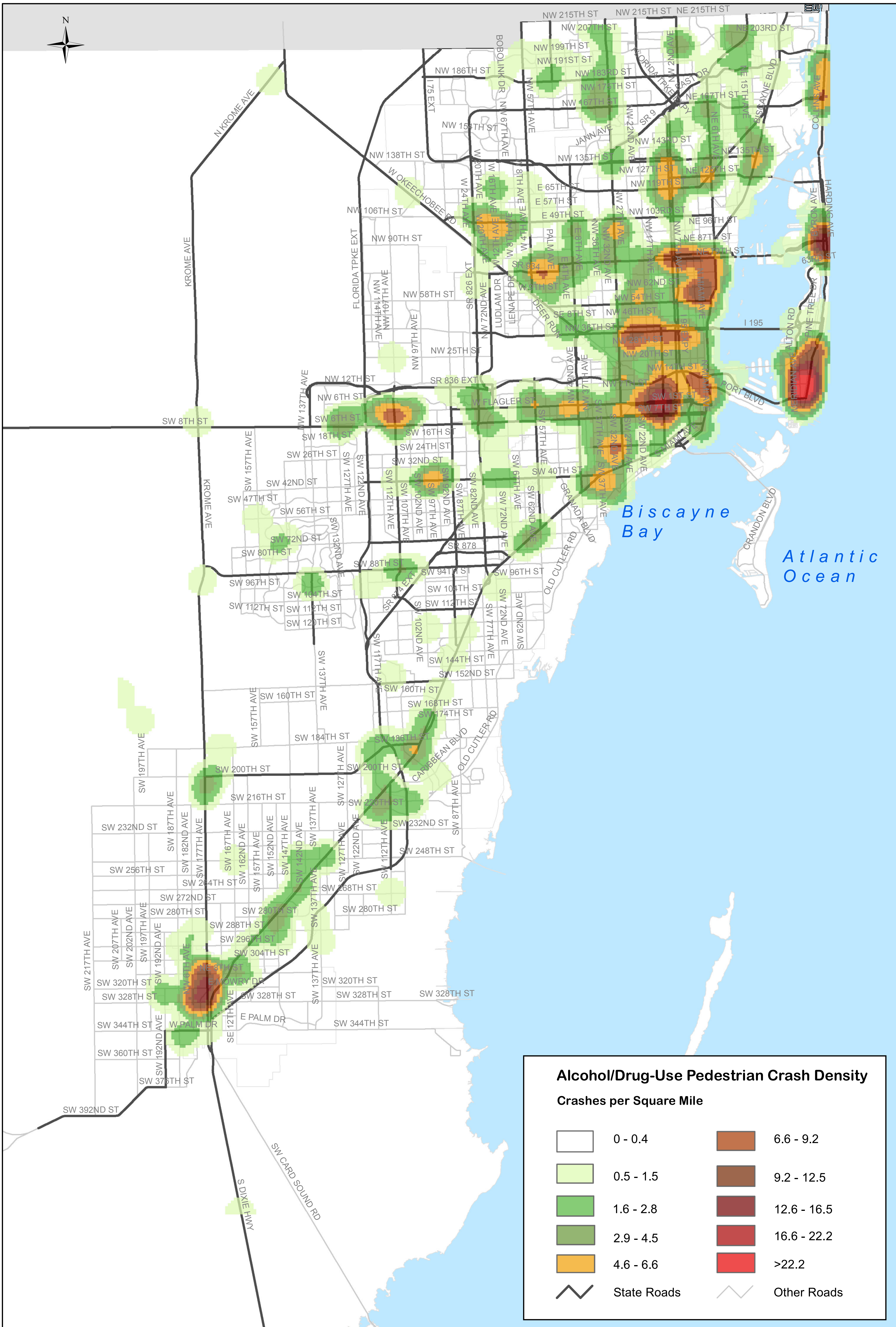
0 2.5 5 10 Miles

MIAMI-DADE MPO Metropolitan Planning Organization

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 34: Alcohol/Drug-Use Related Pedestrian Crash Density Map 2005-2011

Miami-Dade County

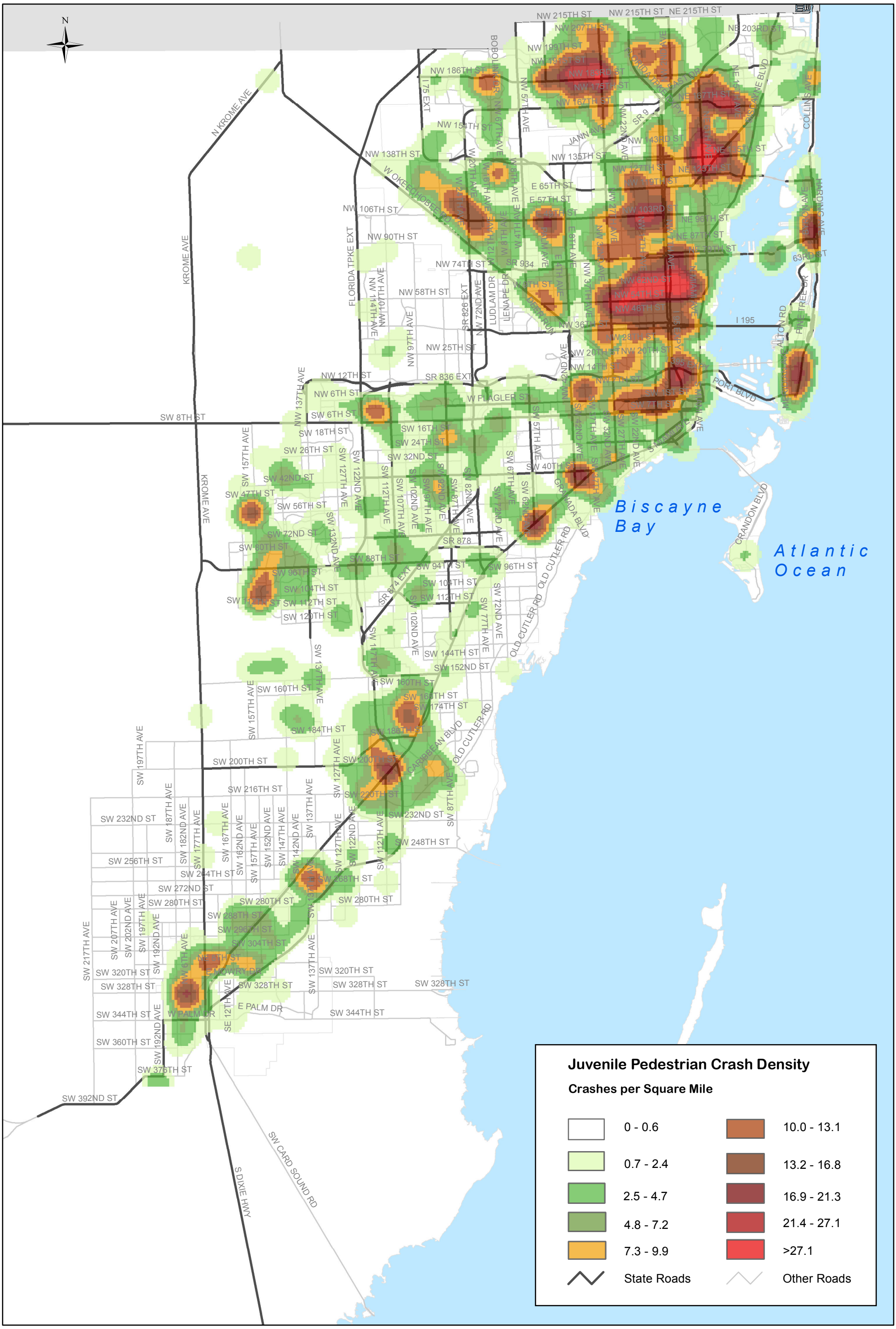


0 2 4 8 Miles

Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 35: Juvenile Pedestrian Crash Density Map 2005-2011
Miami-Dade County



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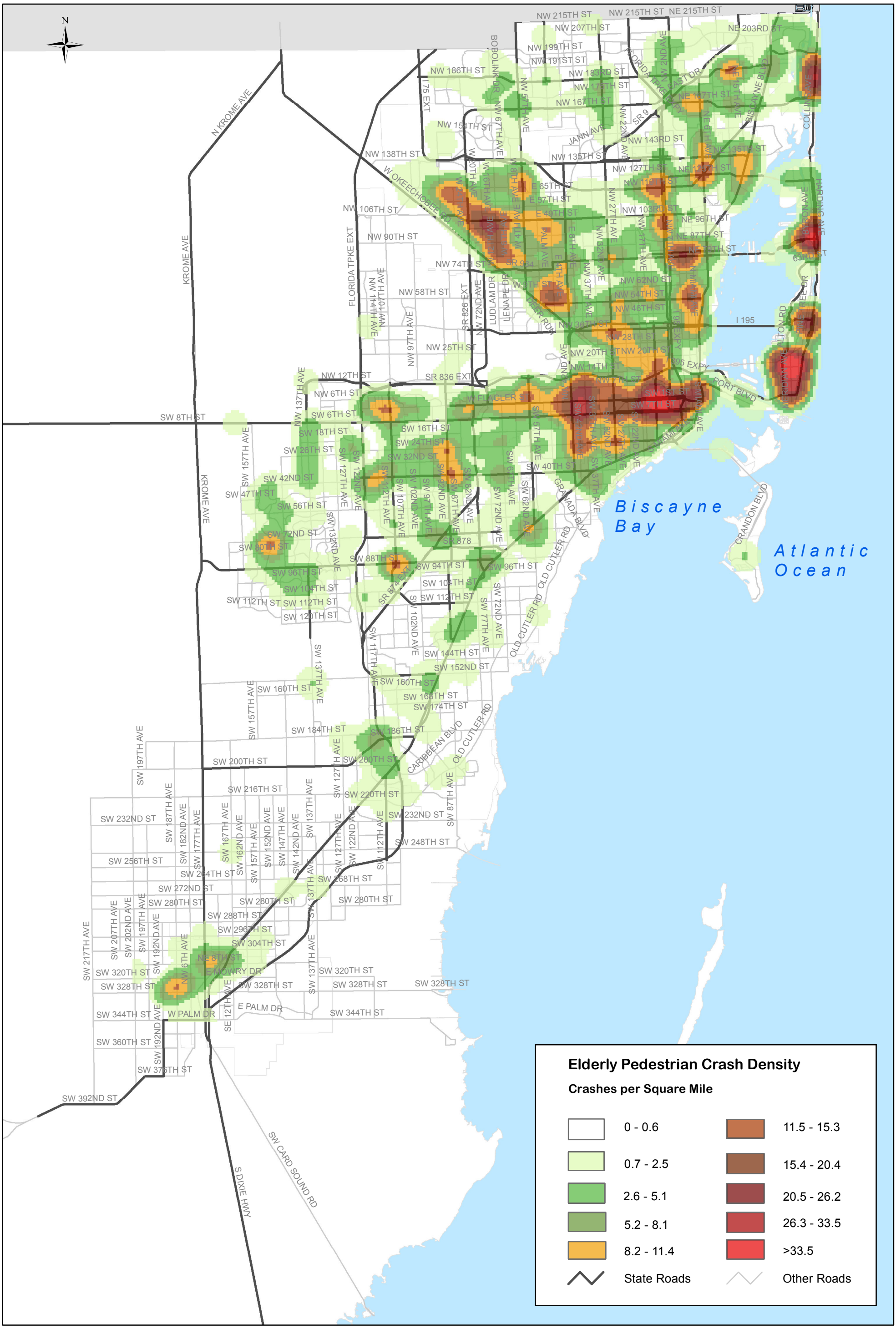
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 36: Elderly Pedestrian Crash Density Map 2005-2011
Miami-Dade County



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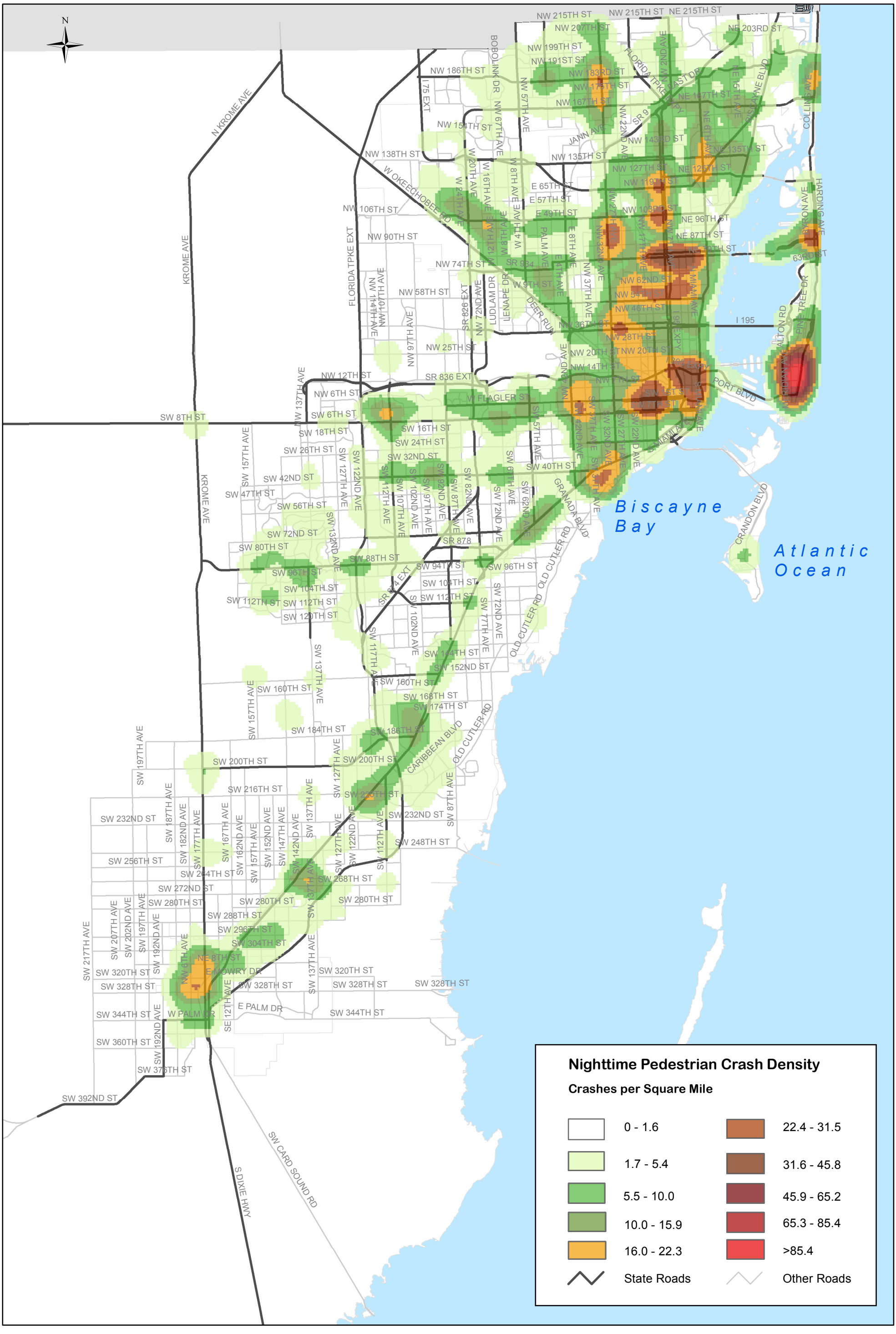
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 37: Nighttime Pedestrian Crash Density Map 2005-2011
Miami-Dade County



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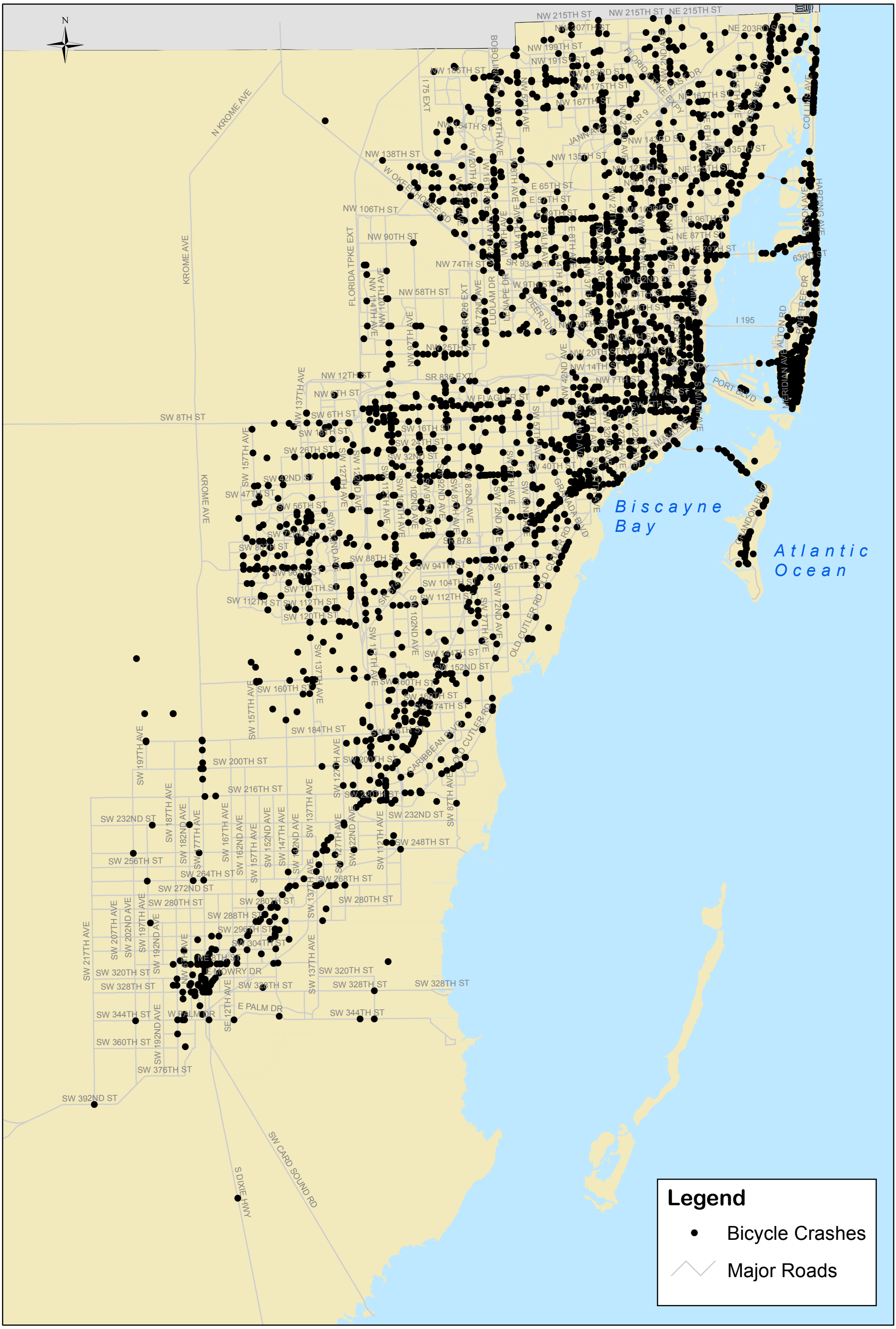
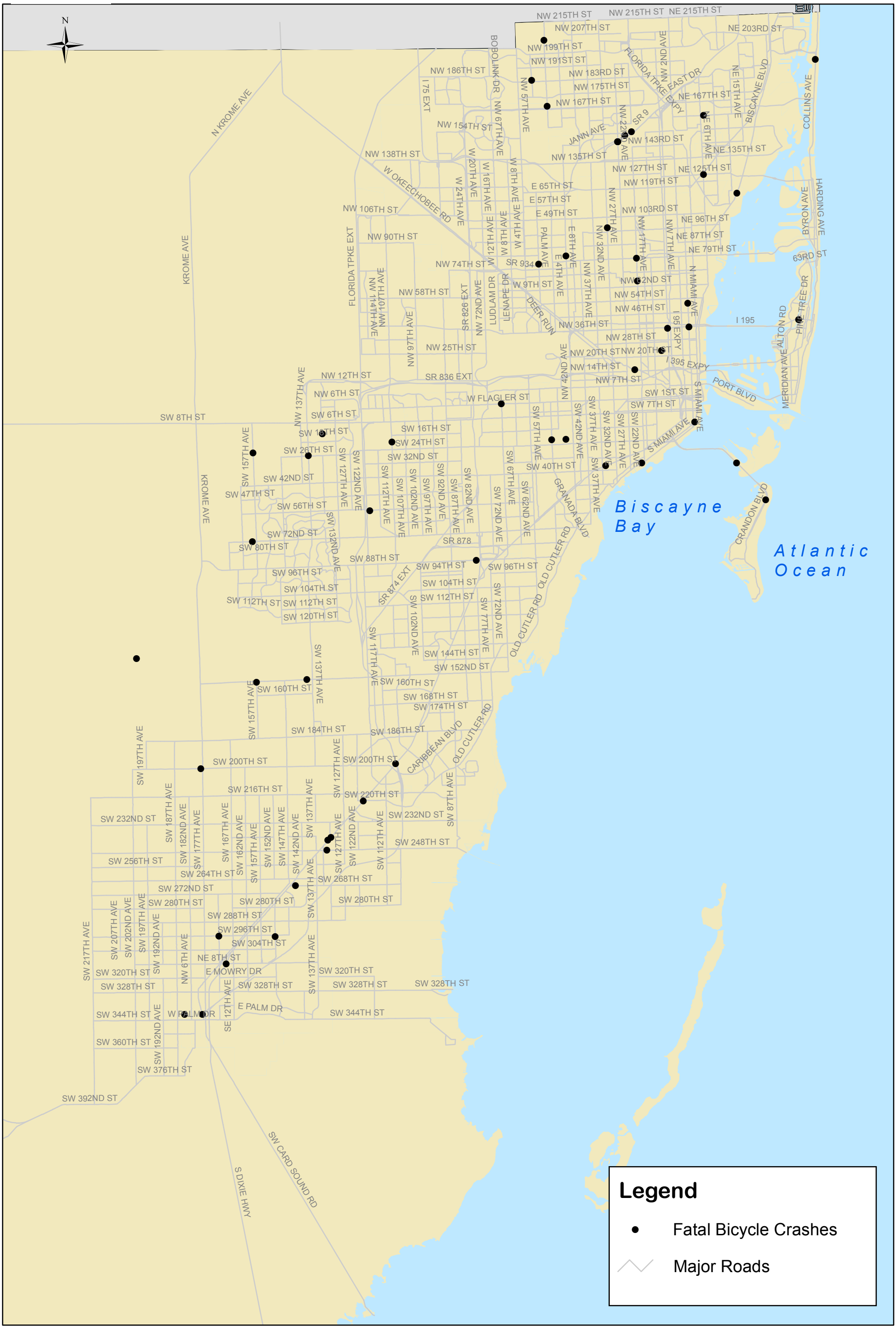
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 38: Bicycle Crashes 2005-2011
Miami-Dade County



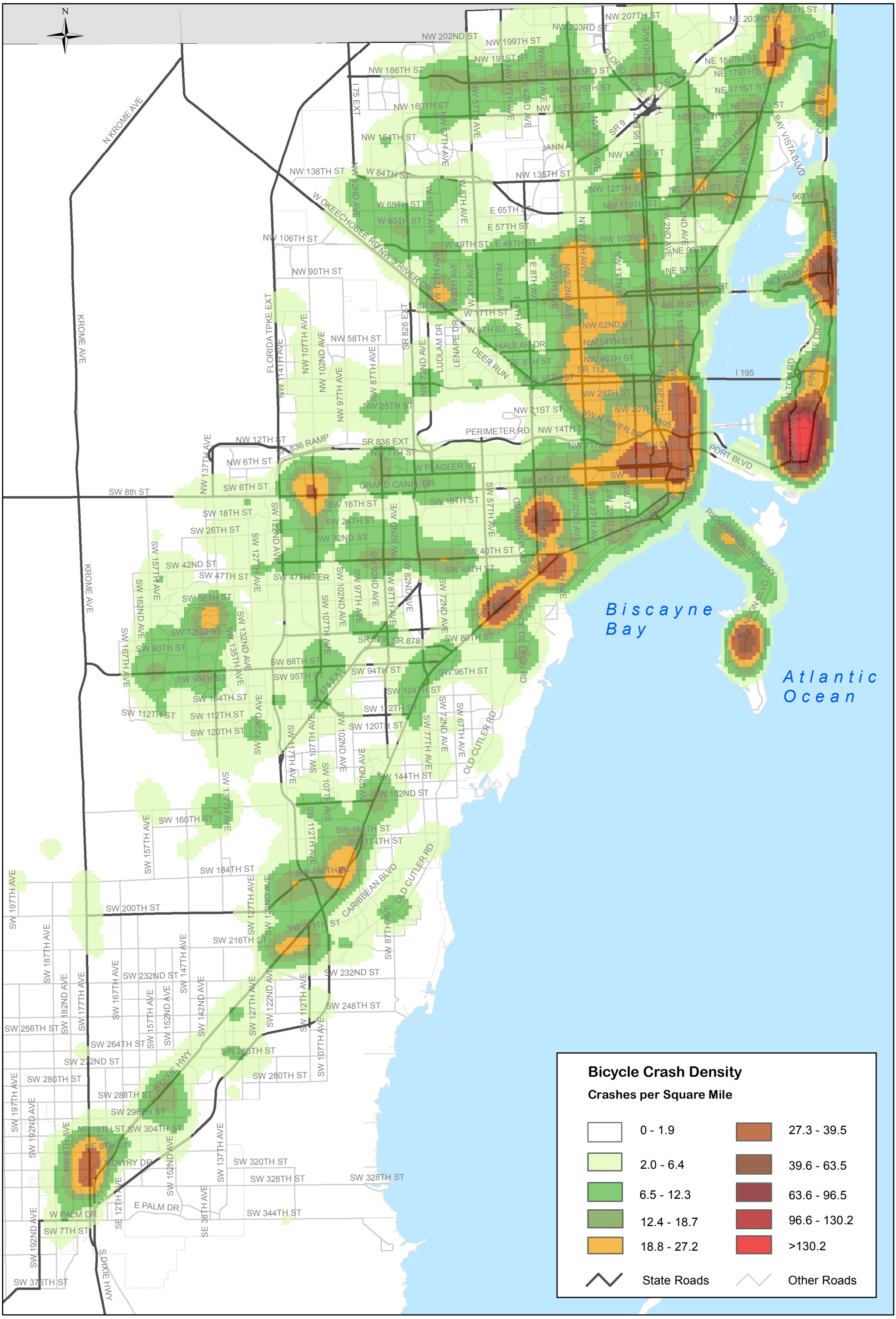
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 39: Fatal Bicycle Crashes 2005-2011
Miami-Dade County



BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 40: Bicycle Crash Density Map 2005-2011
Miami-Dade County



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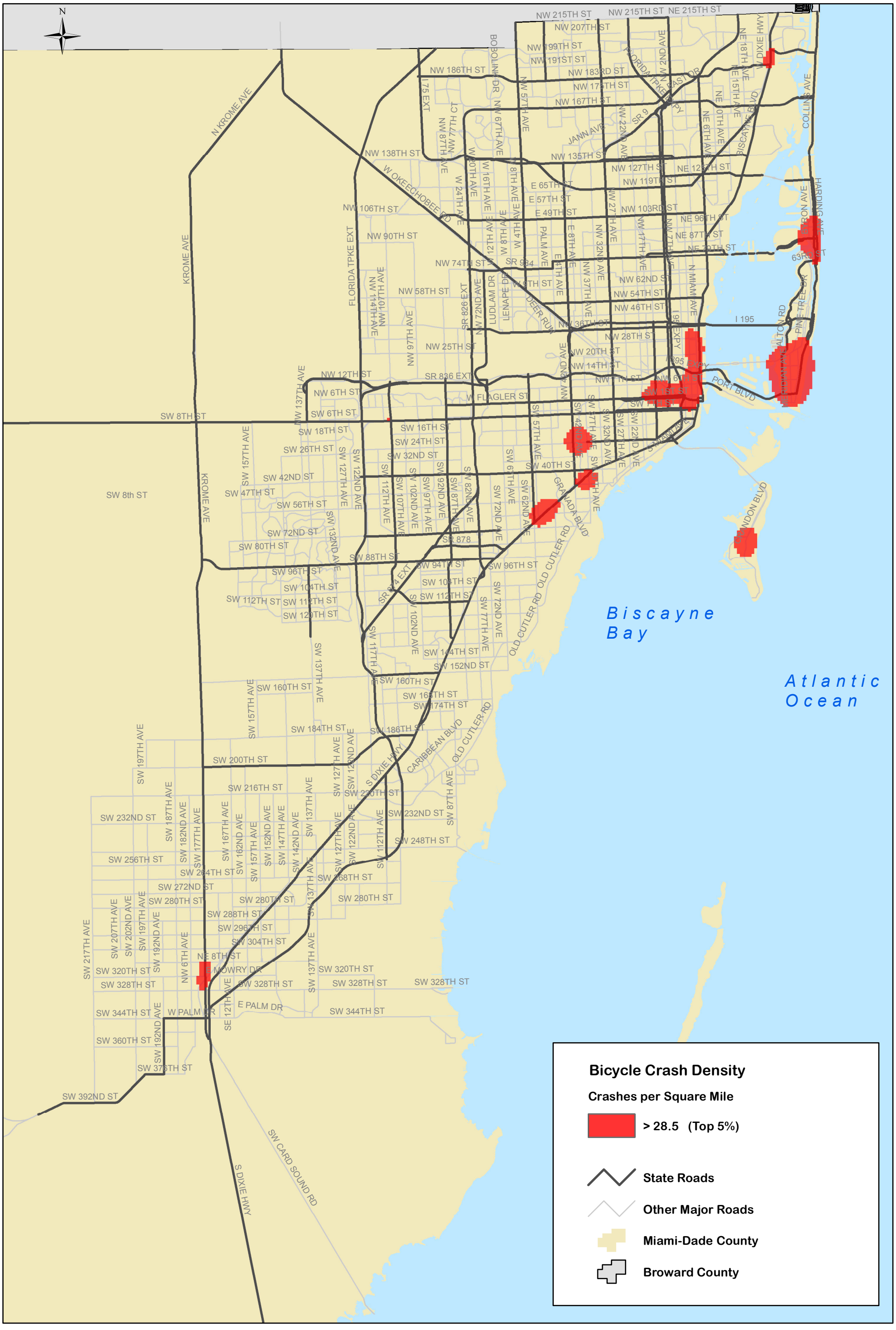
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 41: Bicycle High-Crash Areas Map 2005-2011
Miami-Dade County



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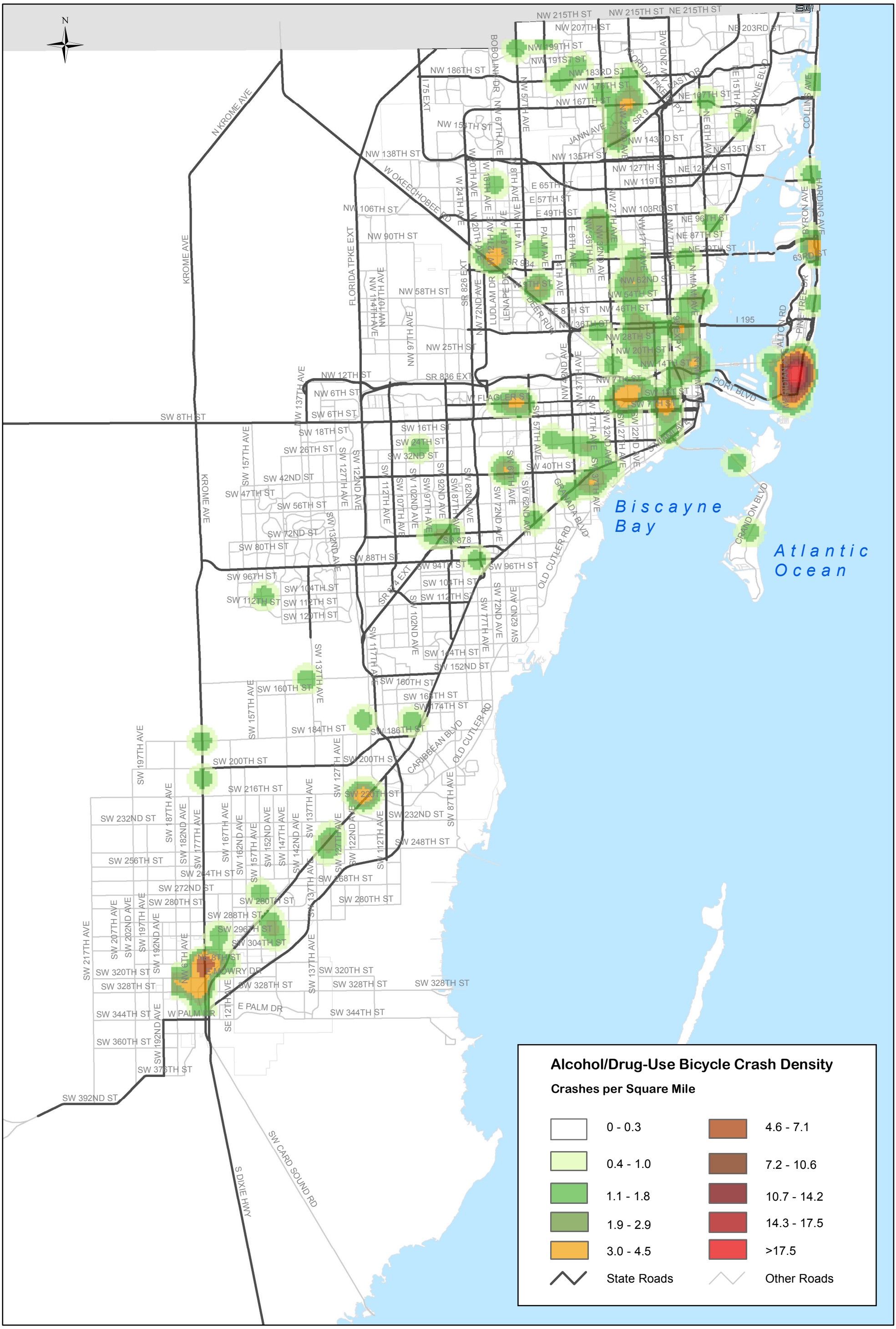
0 2.5 5 10 Miles

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 42: Alcohol/Drug-Use Related Bicycle Crash Density Map 2005-2011
Miami-Dade County



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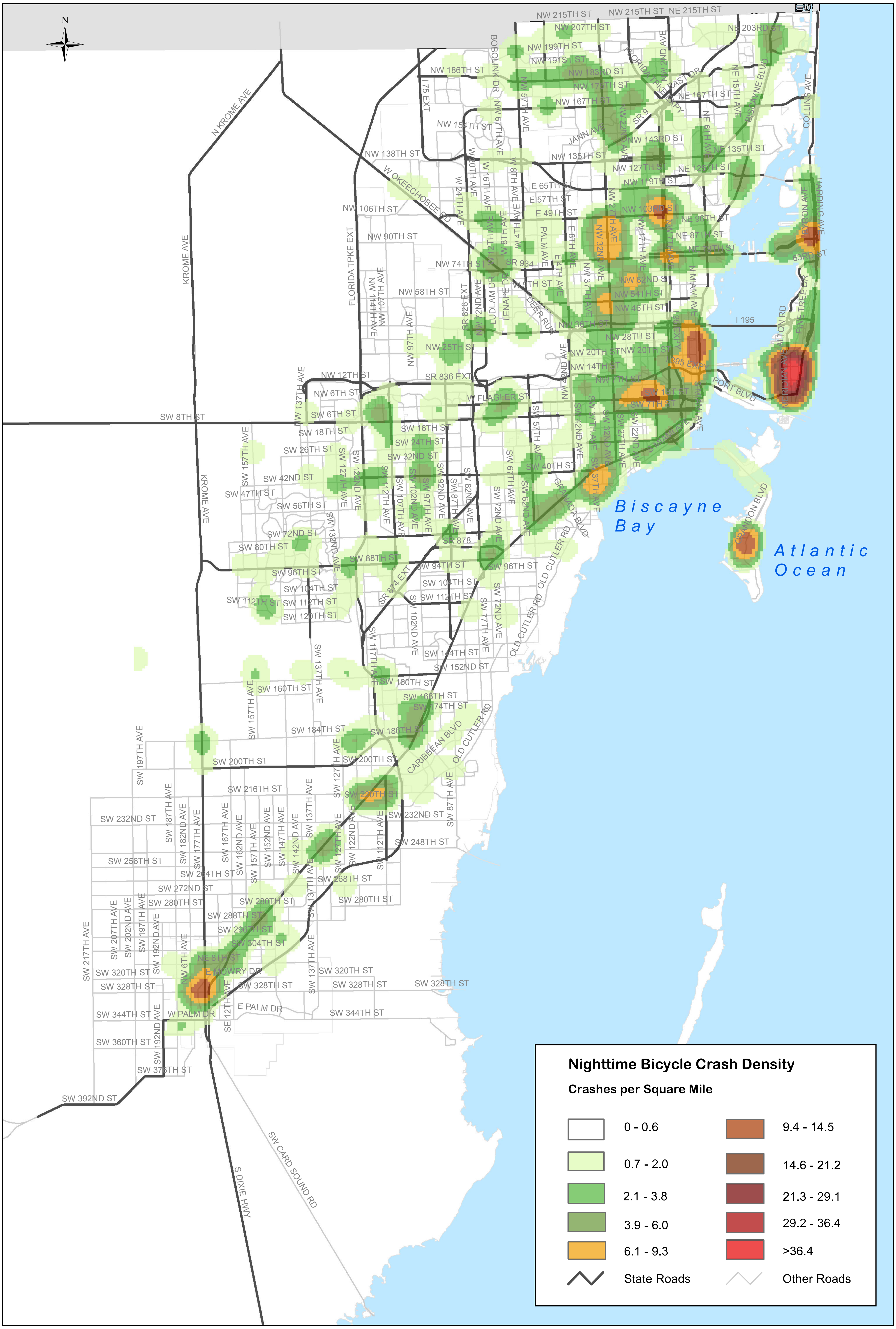
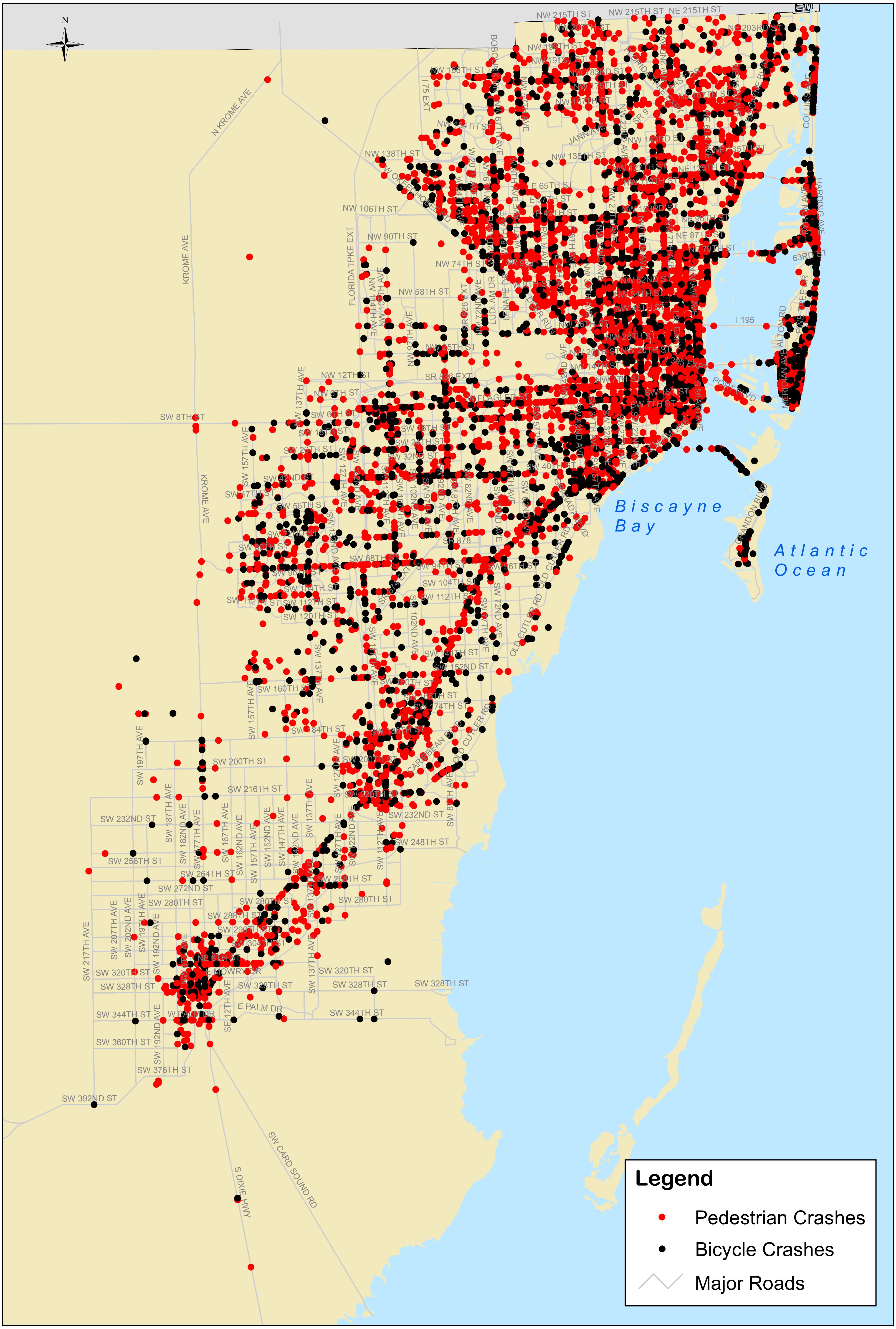
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 43: Nighttime Bicycle Crash Density Map 2005-2011
Miami-Dade County



BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE
Figure 44: Bicycle and Pedestrian Crashes 2005-2011
Miami-Dade County



0 2 4 8 Miles

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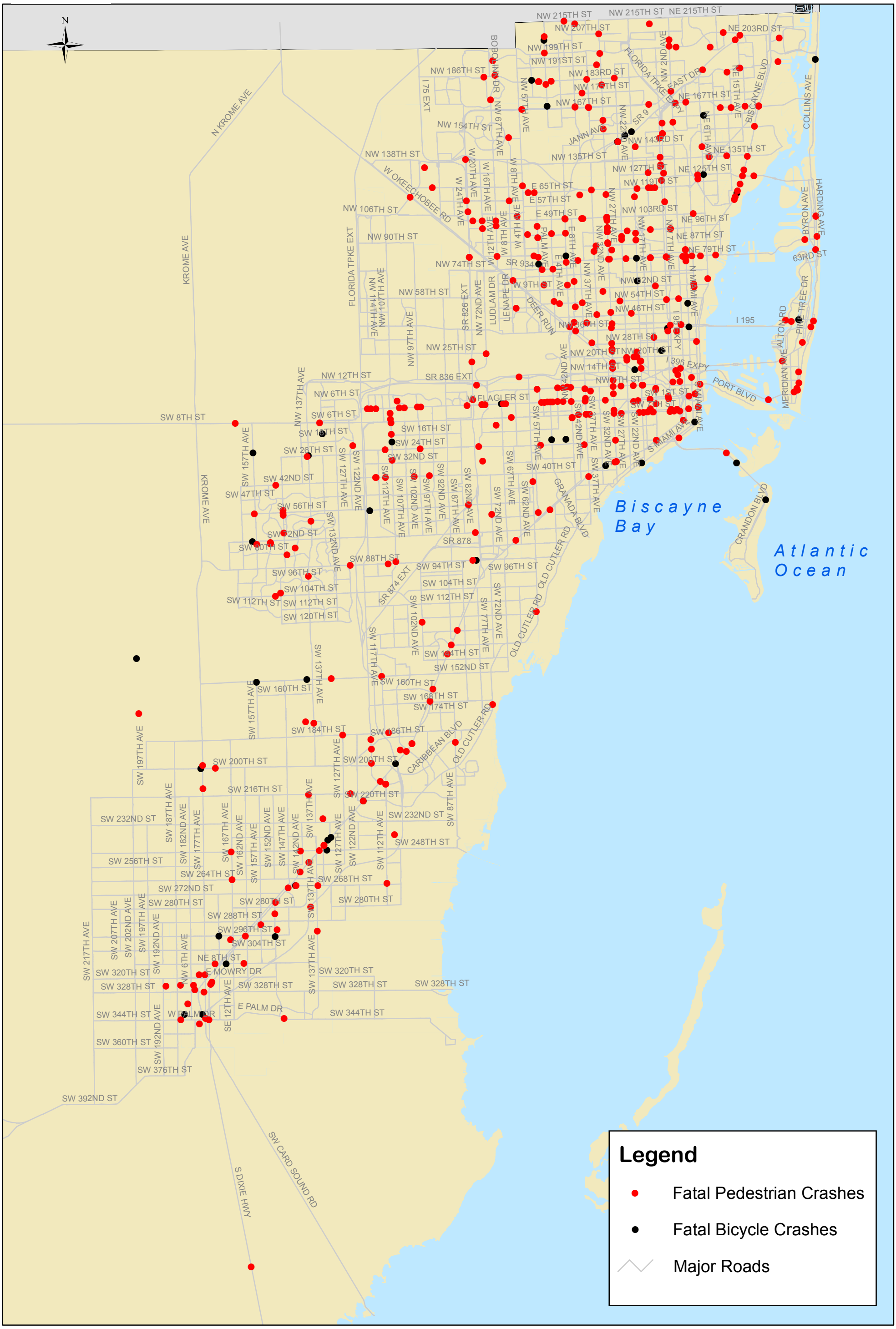
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 45: Fatal Bicycle and Pedestrian Crashes 2005-2011
Miami-Dade County



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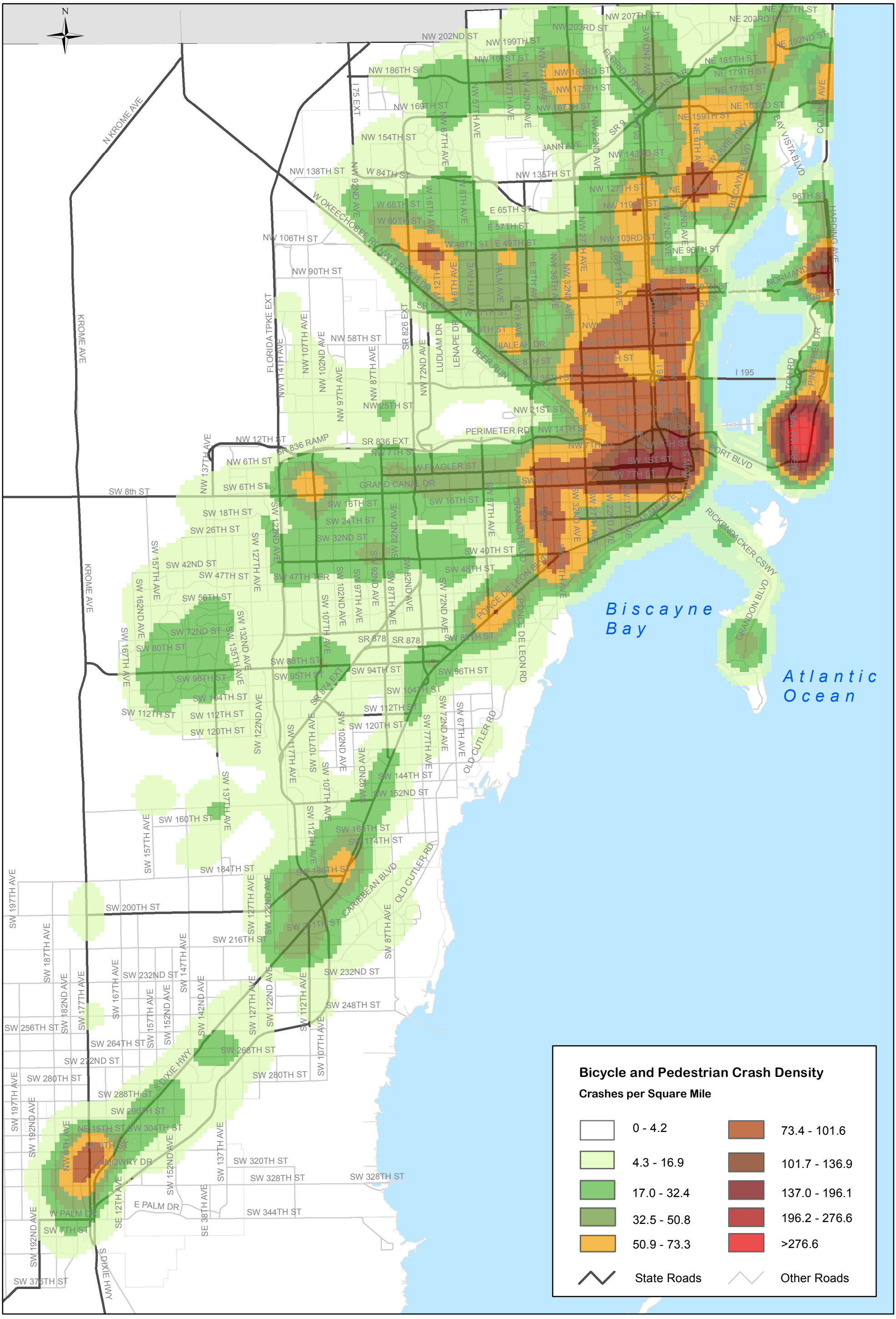
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 46: Bicycle and Pedestrian Crash Density Map 2005-2011
Miami-Dade County



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Crash Typing

In addition to the crash data descriptive statistics and mapping, the FHWA Pedestrian and Bicycle Crash Analysis Tool (PBCAT) was used to analyze a random sample of the crash data reports from the 2010 and 2011 reporting years and help select countermeasures to address the problems identified by the software. Crash typing occurred based on the methodology developed by the National Highway Traffic Safety Administration (NHTSA) to better define the sequence of events and precipitating actions leading to pedestrian crashes.

Each pedestrian and bicyclist crash sampled for this analysis was coded as one of the types below based on the individual characteristics of the crash determine from the police crash report.

Pedestrian

- Dart/Dash
- Multiple Threat/Trapped
- Unique Midblock (Mailbox, Newspaper Box, etc.)
- Through Vehicle at Unsignalized Location (Intersection or Midblock)
- Bus-Related
- Turning Vehicle
- Through Vehicle at Signalized Location
- Walking Along Roadway
- Working/Playing in the Road
- Non-Roadway (Sidewalk, Driveway, Parking Lot, etc.)
- Backing Vehicle
- Crossing Expressway

Bicyclist

- Motorist Failed to Yield – Signalized Intersection
- Motorist Failed to Yield – Non-Signalized Intersection
- Bicyclist Failed to Yield – Signalized Intersection
- Bicyclist Failed to Yield – Non-Signalized Intersection
- Motorist Drove Out – Mid-block
- Bicyclist Rode Out – Mid-block
- Motorist Turned or Merged Left
- Motorist Turned or Merged Right
- Bicyclist Turned or Merged Left
- Bicyclist Turned or Merged Right
- Motorist Overtaking Bicyclist
- Bicyclist Overtaking Motorist
- Non-Motor Vehicle Crashes
- Non-Roadway and Other Causes

Pedestrian Level of Service (PLOS) and Bicycle Level of Service (BLOS)

PLOS and BLOS were calculated according to the methodology established in the 2009 FDOT Quality/Level of Service (QLOS) Handbook. The PLOS Model is based on the following facility characteristics:

- Presence of a sidewalk
- Width of the sidewalk
- Width and type of buffer
- Percent of segment with occupied on-street parking
- Width of outside thru lane
- Width of shoulder or bicycle lane
- Number of motor vehicle thru lanes (per direction)
- Directional volume of motorized vehicles in the peak 15-minute period
- Posted speed limit

In the PLOS Model, pedestrian levels of serve are determined by assessing the above variables in the following equation and then applying the LOS thresholds, shown in Table 5, to the calculated scores.

$$PLOS = -1.2276 ln(W_{ol} + W_l + f_p \times \%OSP + f_b \times W_b + f_{sw} \times W_s) + 0.0091(Vol_{15}/L) + 0.0004SPD^2 + 6.0468$$

The facility characteristics needed to complete the BLOS calculation are listed below:

- Average effective width of the outside thru lane (including bike lane if provided)
- Number of motor vehicle thru lanes (per direction)
- Directional volume of motorized vehicles in the peak 15-minute period
- Posted speed limit
- Percentage of heavy vehicles
- Pavement condition

In the BLOS Model, bicycle levels of service are determined by assessing the above variables in the following equation and then applying the LOS thresholds, shown in Table 5, to the calculated scores.

$$BLOS = 0.507 ln(Vol_{15}/L) + 0.199SP_t(1 + 10.38HV)^2 + 7.066(1/PR_5)^2 - 0.005(W_e)^2 + 0.760$$

Table 5: Pedestrian and Bicycle LOS Categories

LOS	Score
A	≤1.5
B	>1.5 and ≤2.5
C	>2.5 and ≤3.5
D	>3.5 and ≤4.5
E	>4.5 and ≤5.5
F	>5.5

Figure 47: Examples of PLOS and BLOS

Level of Service	Pedestrian	Bicycle
A/B		
C/D		
E/F		

Source: Figure 1-2 Examples of LOS by Mode for Urban Roadways (FDOT, 2009)

In order to provide the most accurate analysis of PLOS and BLOS, a spreadsheet consisting of 3,349 state and county road segments located in Miami-Dade County was utilized. These segments were split into directions, therefore giving the possibility to have a unique Pedestrian Level of Service on both sides of each road. As the spreadsheet was originally created in 2002, updates were needed to make the information valid for 2011. The traffic volume (ADT), directional factor (D), and hourly factor (K_d) were updated based on information from the Florida Department of Transportation and the Miami-Dade Public Works and Waste Management Department. Sidewalk data for the PLOS calculations were updated segment by segment, first by verifying the presence of sidewalks, then measuring the sidewalk width, the buffer width, and the tree spacing in the buffer. The spreadsheet was also revised to correct any segments that were either mislabeled or no longer exist.

Each segment in the spreadsheet received a unique number created so that it could interact with the NAVTEQ street database. The NAVTEQ database is the most comprehensive street database of its kind, and is updated quarterly. Once every segment was given a number, the spreadsheet was joined with the NAVTEQ database to create the maps that provide a visual reference for the levels of service ranging from A to F. Due to varying sidewalk conditions on the different sides of the segments, there are two pedestrian levels of service for each segment showing the PLOS on each side of the segment. The PLOS and BLOS maps for the major roads of Miami-Dade County in its entirety are shown in Appendix D.

Based on the size of Miami-Dade County and the amount of major roads within the county, the PLOS and BLOS results were also mapped separately for 21 focus areas. The focus areas are listed below.

- Brickell
- Coconut Grove
- Coral Gables
- Dadeland
- Downtown
- Florida International University (FIU) Main Campus
- Flagami
- Hialeah Area
- Hialeah Northwest
- Homestead/Florida City
- Hospital/Civic Center

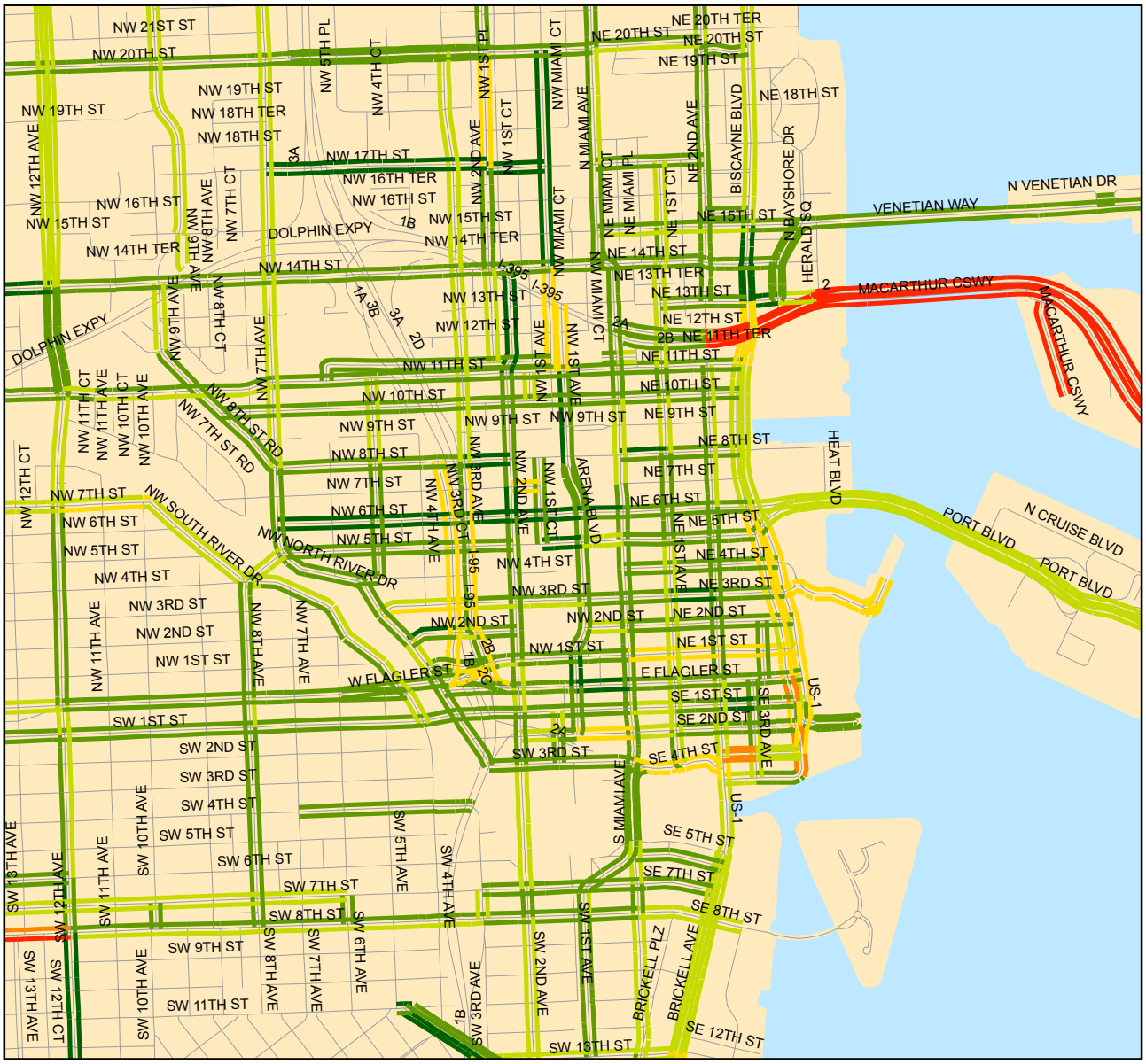
- Key Biscayne
- Little Havana
- Miami Intermodal Center (MIC)
- Miracle Mile
- NE 163rd Street Mall Transit Center
- North Beach
- North Miami
- Omni
- Rickenbacker Causeway
- South Beach
- University of Miami

Figures 48 through 51 depict the PLOS and BLOS of major roads within the Downtown and South Beach focus areas. Individual maps depicting the PLOS and BLOS of the major roads within each of the remaining focus areas are provided in Appendix C.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service

Figure 48: Downtown Pedestrian Level of Service Map

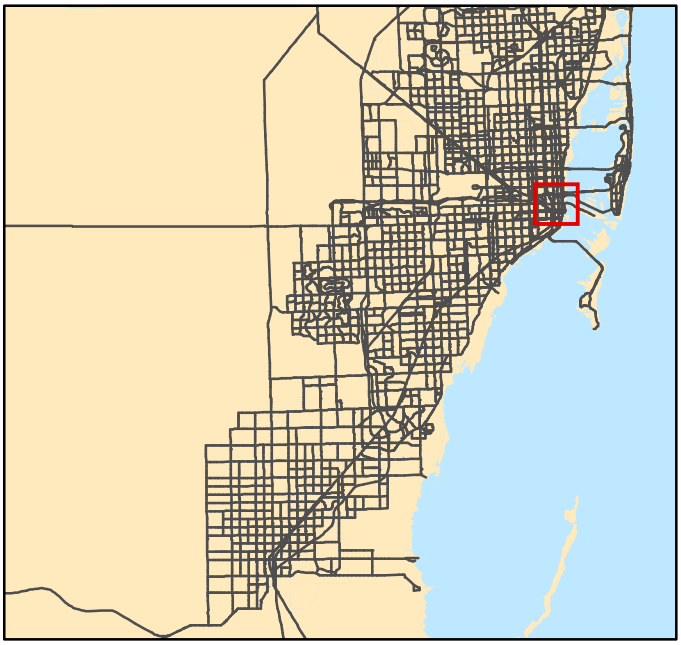


0 0.25 0.5 1 Miles

Pedestrian LOS Score

N

- A
- B
- C
- D
- E
- F
- Other Roads



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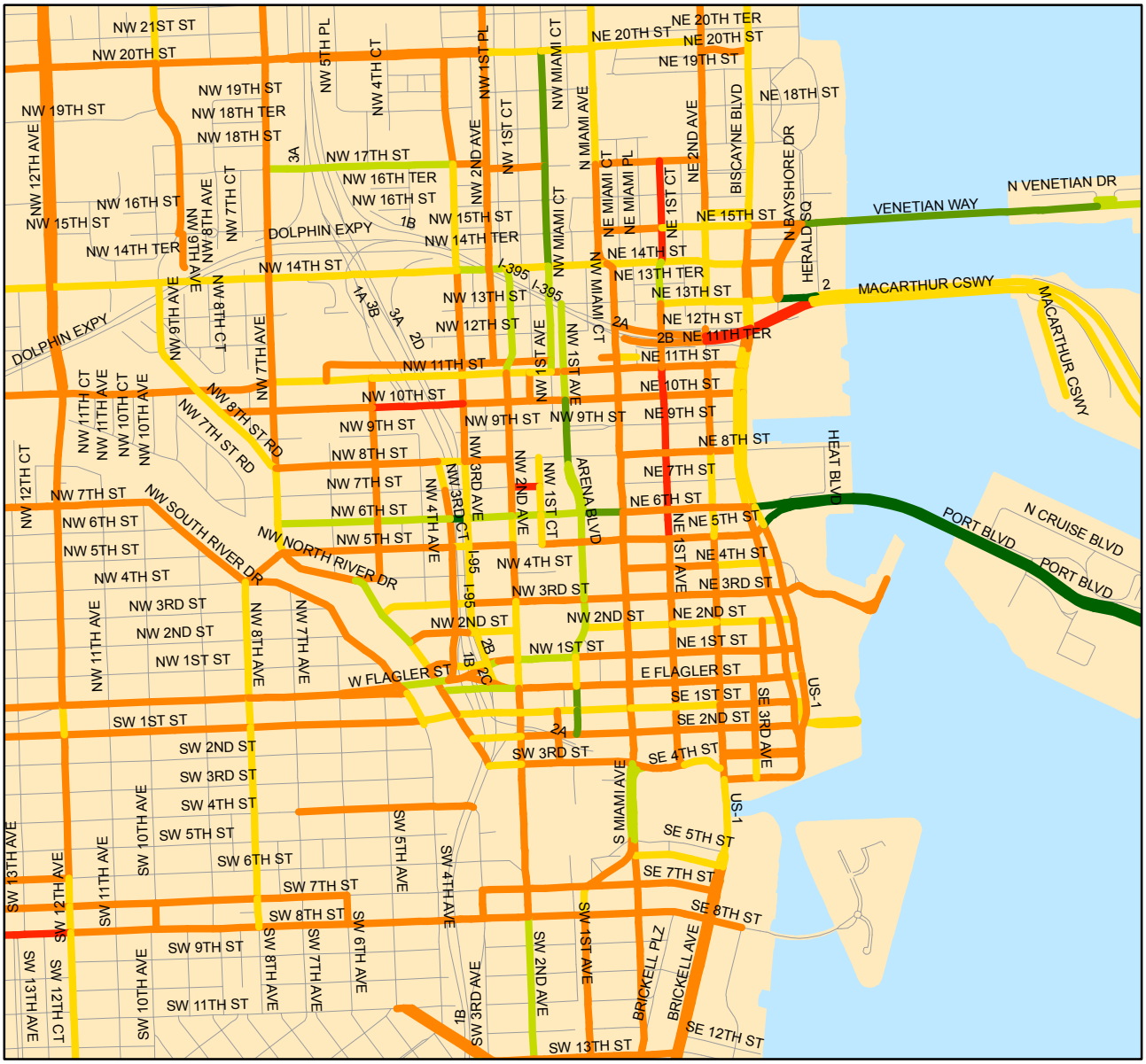
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Bicycle Level of Service

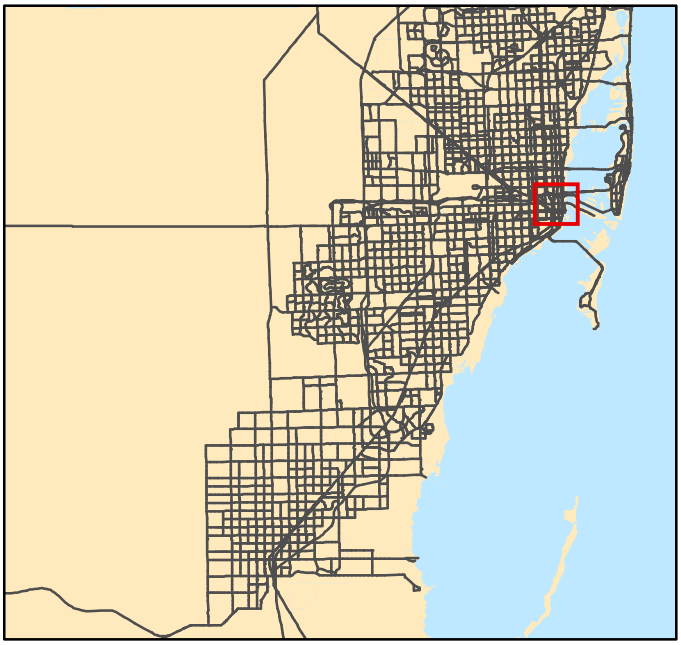
Figure 49: Downtown Bicycle Level of Service Map



0 0.25 0.5 1 Miles

Bicycle LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads



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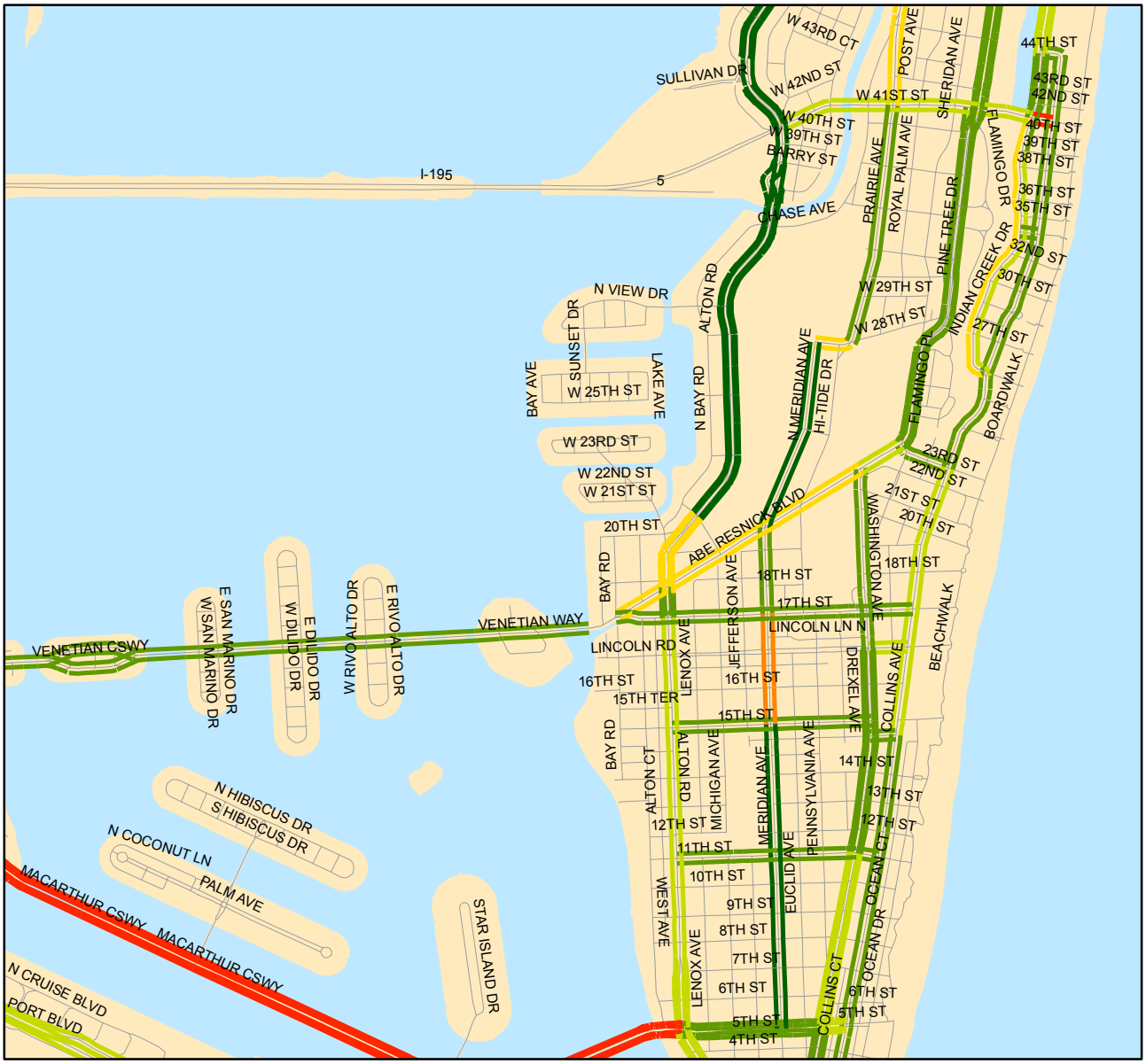
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service

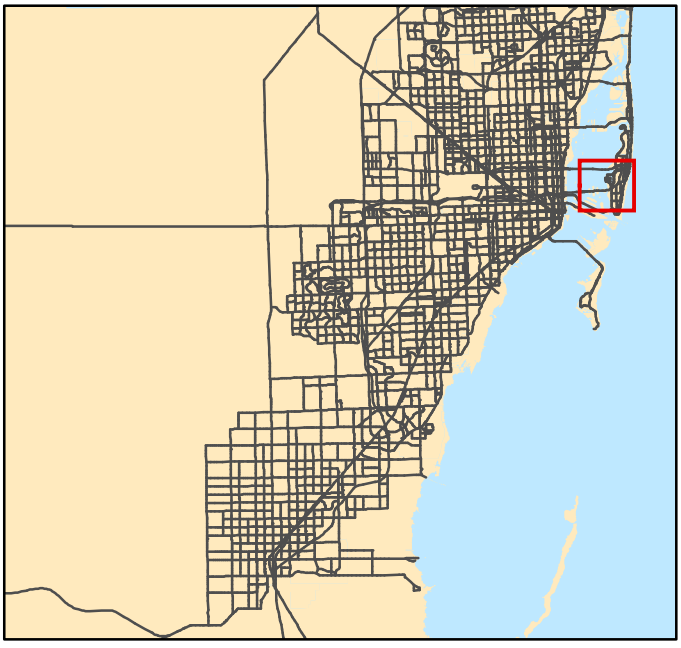
Figure 50: South Beach Pedestrian Level of Service Map



0 0.25 0.5 1 Miles

Pedestrian LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads



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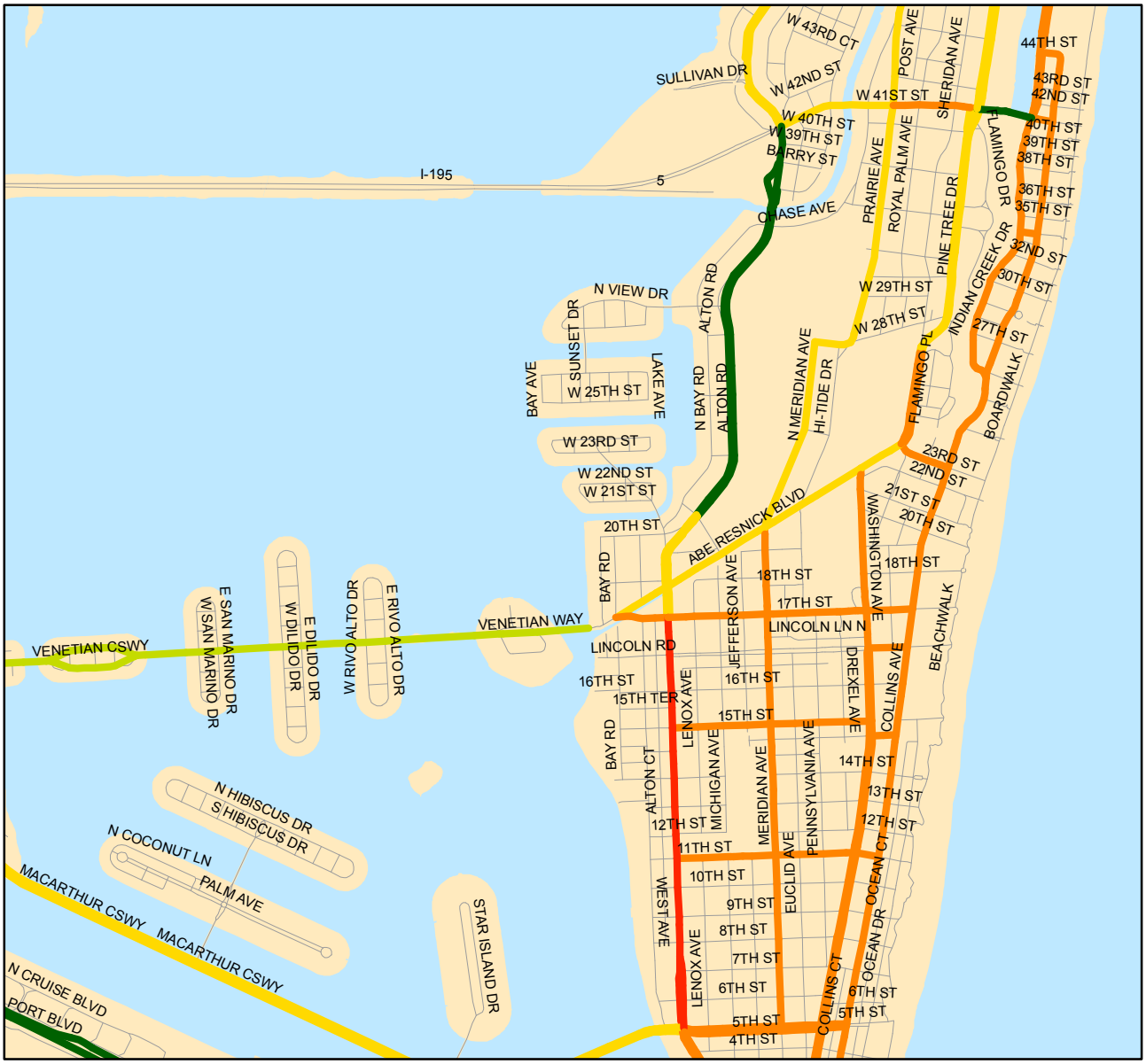
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Bicycle Level of Service

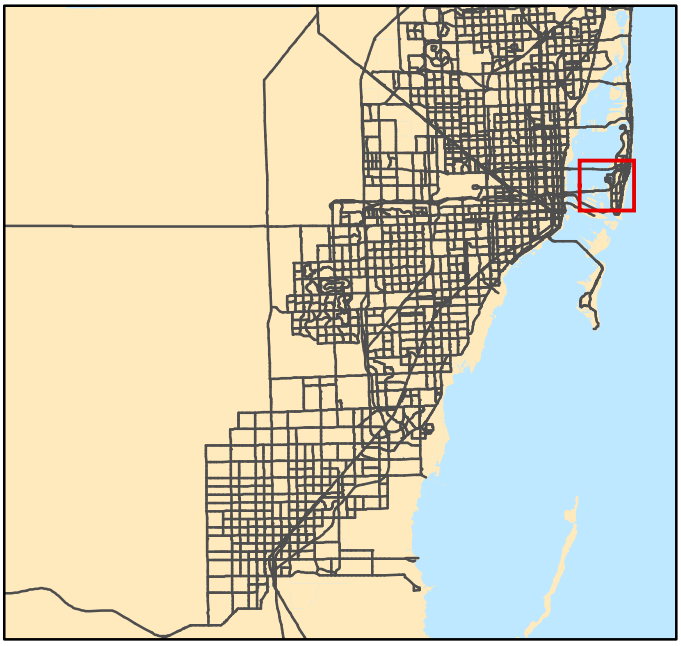
Figure 51: South Beach Bicycle Level of Service Map



0 0.25 0.5 1 Miles

Bicycle LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads



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As shown in Table 6, the majority of the main roadways within Miami-Dade County have a PLOS of B or C. Approximately 3 percent of the major roadway segments within the county have a PLOS of F.

Table 6: Miami-Dade County Pedestrian Level of Service Summary

PLOS Score	Percentage of Major Roads
A	6.1%
B	30.6%
C	31.9%
D	21.7%
E	6.7%
F	3.0%

The results of the BLOS analysis show that about 65 percent of the major roadways within Miami-Dade County have a BLOS of E. Less than 5 percent of the major roadway segments within the county have a BLOS of F. A summary of the BLOS results are presented in Table 7.

Table 7: Miami-Dade County Bicycle Level of Service Summary

BLOS Score	Percentage of Major Roads
A	0.7%
B	1.1%
C	4.7%
D	24.1%
E	64.5%
F	4.9%

RECOMMENDATIONS

Bicycle and pedestrian safety recommendations were developed based on input from the Study Advisory Committee and the prior work tasks of this Plan, including the literature review and data collection and analysis. All improvements have been developed in a manner that will help engineers and policy makers to select countermeasures for specific crash types common in Miami-Dade County. Table 8 presents a summary of the general recommendations for bicycle and pedestrian safety and the types of crashes each recommendation targets.

Table 8: Recommendation Summary

Recommendation	Targeted Crash Types
Pedestrian Focused Improvements	
Pedestrian Crossing Treatments	Right-Hook, Midblock, & Intersection Straight-Through
Pedestrian Throughway Zones	Walking Along Roadway
Pork Chop Islands	Right-Hook Crashes
Leading Pedestrian Interval	Right-Hook Crashes
Prohibited Right Turn on Red (RTOR)	Right-Hook Crashes
WalkSafe Program Expansion	Juvenile Crashes
Pasos Seguros Program Expansion	Elderly Crashes
Enforcement of Yielding to Pedestrians	Intersection Straight-Through and Right-Hook Crashes
Pedestrian Intersection Countermeasures	High Crash Intersections
Bicycle Focused Improvements	
Improving the Environment for Biking	Parallel Path Crashes
Automated Bicycle Rental System	All Crash Types
Bicycle Intersection Countermeasures	High Crash Intersections
BikeSafe Program Expansion	Juvenile Crashes
Education and Enforcement of 3-Foot Law	Parallel Path Crashes
General Improvements	
Low-Speed Design Principles	Right-Hook Crashes
Road Diets / Lane Reductions	Midblock Crashes
Bus Stop Treatments	Midblock Crashes
Lighting	Nighttime Crashes
Public Service Announcement Techniques	All Crash Types
Safe Routes to School Program Expansion	Juvenile Crashes
Server Training Program	Alcohol/Drug-Use Involved Crashes
Taxi Ride Campaign	Alcohol/Drug-Use Involved Crashes
DUI Enforcement Techniques	Alcohol/Drug-Use Involved Crashes
Bicycle/Pedestrian Training Video for Officers	All Crash Types
Speed Feedback Signs	High-Speed Crashes
Progressive Ticketing	High-Speed Crashes
Community Traffic Safety Team	All Crash Types

Pedestrian Crossing Treatments	
Description	Provide crossing treatments such as crosswalks and signage at intersections and midblock crossings.
Targeted Crash Types	Right-Hook, Midblock, and Intersection Crashes

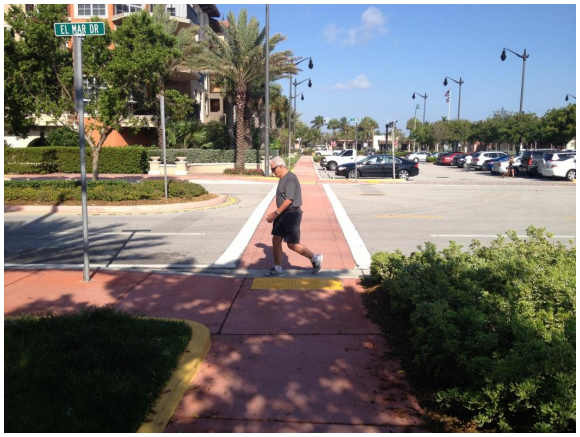
Notes	• At signalized intersections:
	  ○ Marked crosswalks on all four approaches
	  ○ Turning vehicles stop for pedestrian signage
	• At unsignalized intersections < 12,000 AADT:
	  ○ Marked crosswalks
	• At unsignalized intersections > 12,000 AADT:
	  ○ Marked crosswalks
	  ○ State law crosswalk signage
	  ○ Rectangular Rapid Flashing Beacons (RRFB)
	• Install state law signage at crossings in pedestrian high-crash areas (shown in Figure 33) to alert motorists of the state law requiring them to stop for pedestrians within crosswalks
	• In-street pedestrian crossing signs are associated with a 50 percent increase in driver yielding compliance
	• See FDOT Standard Index No. 17346, FDOT PPM Section 8.3.3, 2009 MUTCD Chapter 2B, 2009 Chapter 2C for more information.

Implementation Strategy	Implement as a component of any road improvement project or as a separate project as needed

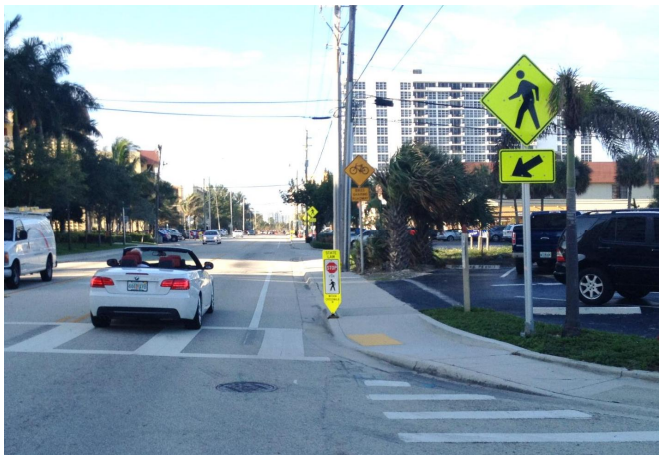
At Signalized Intersections

Pedestrian Crossing Treatments (continued)

At Unsignalized Intersections < 12,000 AADT



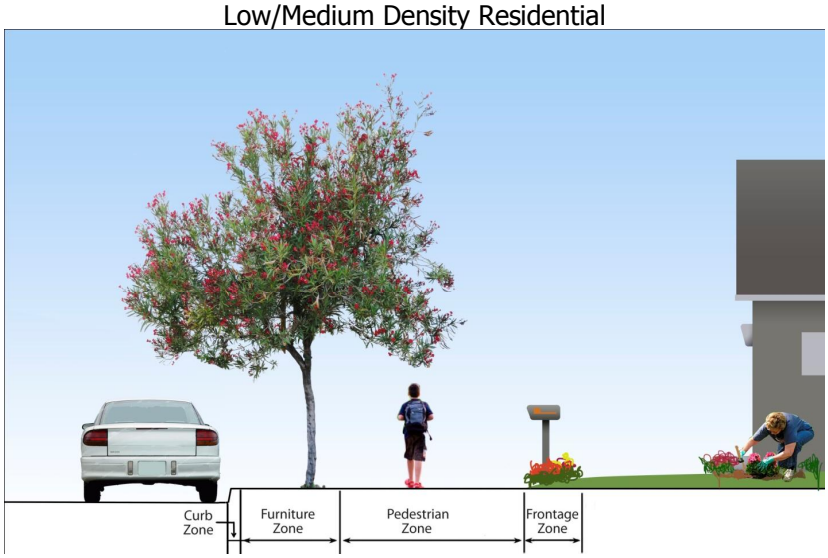
At Unsignalized Intersections > 12,000 AADT



R1-6a

Pedestrian Throughway Zones	
Description	As streets are redeveloped, relocate elements within the right-of-way (including but not limited to signage, lighting, trees, benches, and traffic signal devices) obstructing bicycle and pedestrians paths to establish a clear throughway pedestrian network throughout Miami-Dade County.
Targeted Crash Types	Walking Along Roadway
Notes	• Clear pedestrian travel zones enhance the pedestrian environment and foster community life in residential and commercial districts • A desired minimum pedestrian travel zone width of 6 feet should be provided in areas with active pedestrian activity • For higher pedestrian volume areas, such as business districts and transit stations, additional width should be provided • Trees, planting strips, utilities, traffic signal equipment, benches, water fountains, bicycle parking racks are examples of street furniture • See *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach,* an ITE Recommended Best Practice, and Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highway ("Florida Greenbook") Chapter 19 for more information.
Implementation Strategy	Implement as a component of any road improvement or beautification project

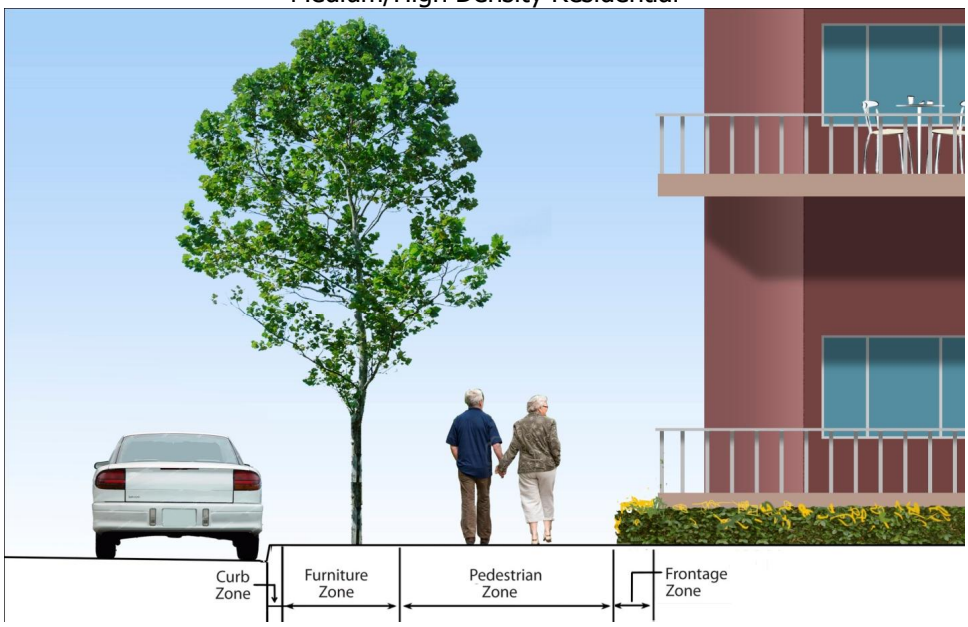
Low/Medium Density Residential



Minimum Dimensions:	6″	4′	5′	18″

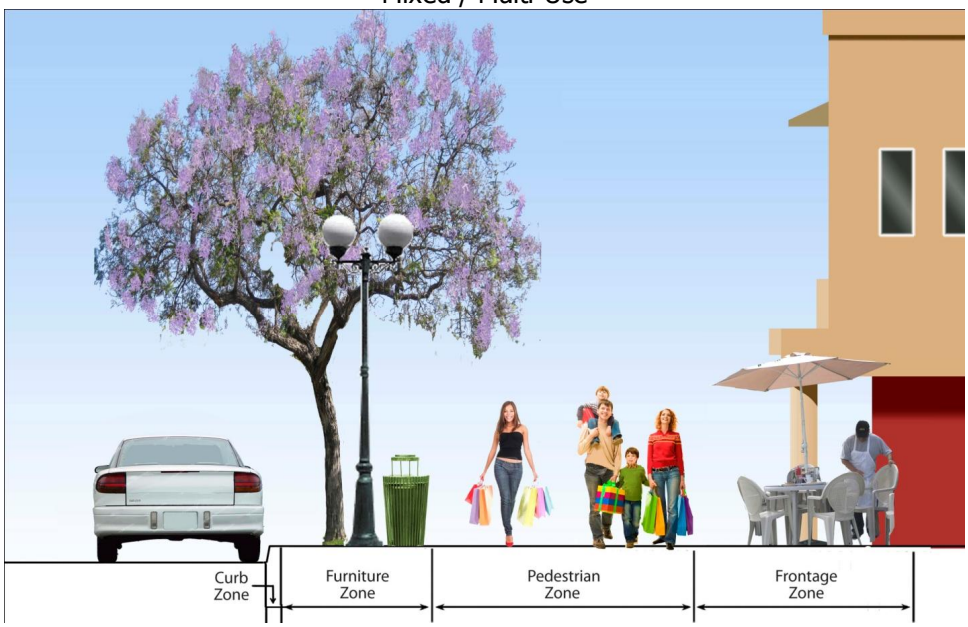
Pedestrian Throughway Zones (continued)

Medium/High Density Residential



Minimum Dimensions:	6″	4′, 6′-8′ at bus stops, and where large trees are desired	6′	18″

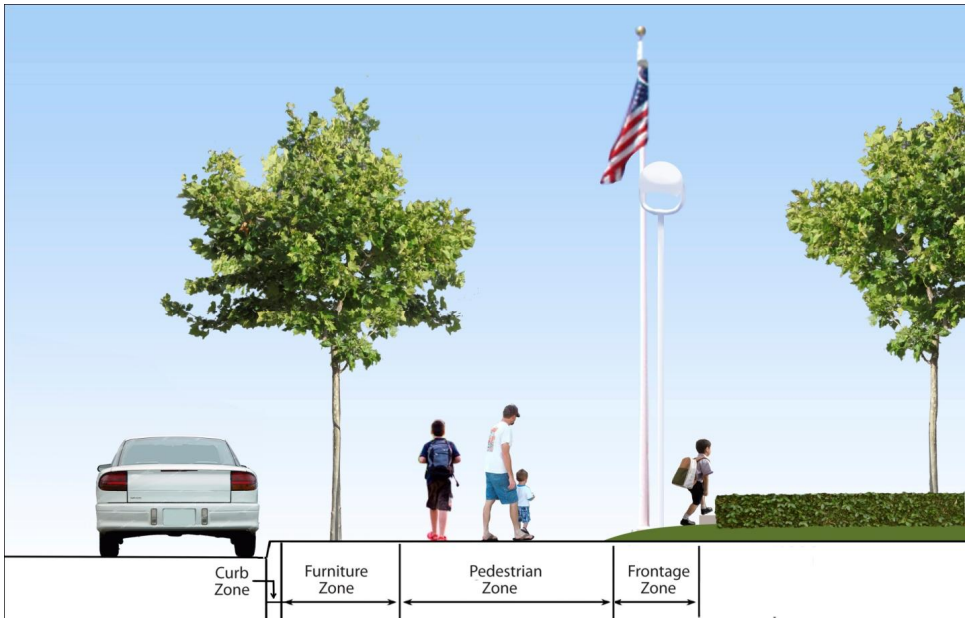
Mixed / Multi-Use



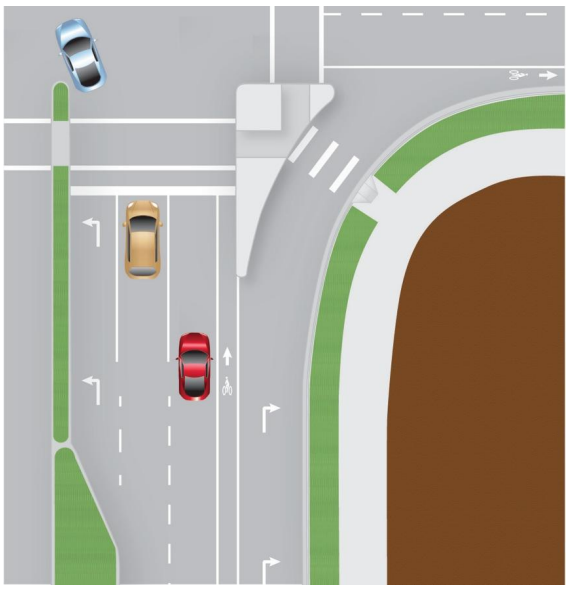
Minimum Dimensions:	6″	4′	6′	18″

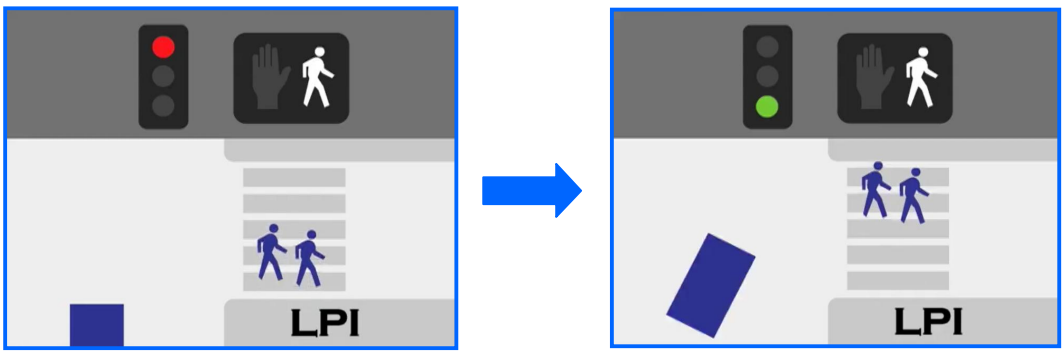
Pedestrian Throughway Zones (continued)

Public Facilities



Minimum Dimensions:	6″	5′, 6′-8′ at bus stops, and where large trees are desired	6′	18″

Pork Chop Islands	
Description	At intersection approaches with exclusive right-turn lanes and high right-turn volumes, a pork chop island can split up the pedestrian crossing into more manageable distances and allows pedestrians and motorists to negotiate one conflict at a time.
Targeted Crash Types	Right-Hook Crashes
Notes	• Provide at least a 60-degree angle between vehicle flows to reduce turning speeds and improve the yielding motorist's visibility of pedestrians and vehicles • Crosswalk across the right-turn lane should be one car length back from where motorists yield to opposing traffic • Generally, these islands should be roughly twice as long as they are wide to maintain proper angles • Can be implemented where turning radii reduction is not feasible • This treatment should only be implemented at signalized approaches with exclusive right-turn lanes and high right-turn volumes • Shown to reduce pedestrian crashes by 29 percent • See *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach,* an ITE Recommended Best Practice for more information.
Implementation Strategy	Implement as a component of any roadway construction or improvement projects
	

Leading Pedestrian Interval	
Description	Leading Pedestrian Interval (LPI) is a traffic signal timing technique that reserves a pedestrian WALK phase for 3 to 5 seconds prior to the concurrent green phase with permissive turns for motor vehicles to allow pedestrians to enter the crosswalk before turning motor vehicles attempt to cross their path.
Targeted Crash Types	Right-Hook Crashes
Notes	• Increases turning motorists' visibility of pedestrians • Allows pedestrians to establish their right-of-way in the crosswalk before turning motor vehicles have a concurrent green indication • Use where heavy turning vehicle volume on permissive green comes into conflict with pedestrians • The LPI is particularly helpful for elder pedestrians who are slower to start into the intersection • Recommended for downtown areas, urban centers, elderly pedestrian areas, and other high-pedestrian activity areas • The *Pedestrian Facilities User Guide* published by FHWA indicates that studies have found that the LPI reduces conflicts for pedestrians by approximately 50 percent • See 2009 MUTCD Chapter 4E and the FHWA *Older Driver and Pedestrian Highway Design Handbook* for more information.
Implementation Strategy	Implement as part of resurfacing and traffic operations projects at signalized intersections where right-hook pedestrian crashes are an identified problem. LPI can also be implemented by Miami-Dade Public Works Signals and Signs Division as standalone projects as a strategy to reduce pedestrian crashes associated with concurrent green phase crashes.
	

Prohibited Right-Turn-On-Red (RTOR)	
Description	Prohibit motorists from turning right during the red interval at certain signalized intersection approaches.
Targeted Crash Types	Right-Hook Crashes

Notes	• Prohibiting vehicle right turns during the red phase can enhance pedestrian safety because although vehicles are required to yield or stop for pedestrians in the crosswalk, motorists do not always look to their right before making a right turn
	• Right-turning vehicles attempting to make turns on red often encroach upon pedestrians in the crosswalk due to line-of-sight restrictions
	• Implementation of a sign is required to prohibit right turn on red at signalized intersection approaches
	• Can be useful where:
	  ○ there are restricted sight lines between motorists and pedestrians
	  ○ there are an unusual number of pedestrian conflicts with turns on red compared to right-turns-on-green
	  ○ a leading pedestrian interval is used
	• Can be implemented during certain time periods or at all times of day

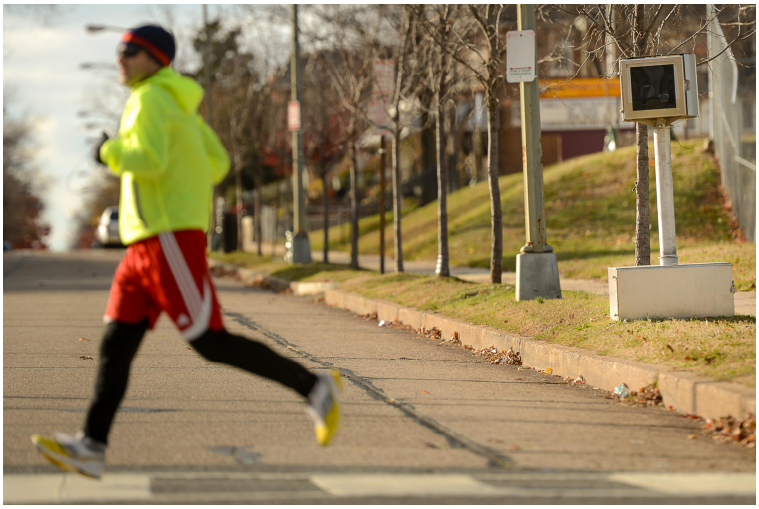
Implementation Strategy	Implement as part of resurfacing and traffic operations projects at signalized intersections where right-hook pedestrian crashes are an identified problem. Prohibited RTOR could be implemented if signage and other treatments, such as LPI, have been tried and produced less than optimal results.
 R10-11  R10-11a  R10-11b	

WalkSafe Program Expansion	
Description	Expand the program locations based on Figure 35: Juvenile Pedestrian Crash Heat Map.
Targeted Crash Types	Juvenile Crashes
Notes	Since its first implementation in 2002, the WalkSafe Program has successfully improved juvenile pedestrian safety throughout Miami-Dade County
Implementation Strategy	Provide the Juvenile Pedestrian Heat Map and list of juvenile pedestrian high crash areas to the WalkSafe Program and coordinate with their staff to implement the current program components in those areas
Implementation Focus Areas	Juvenile pedestrian high crash areas include: • Model City • Little Haiti • Miami Gardens • North Miami

Safe Steps – Pasos Seguros Program Expansion	
Description	Expand the program locations based on Figure 36: Elderly Pedestrian Crash Heat Map.
Targeted Crash Types	Elderly Crashes
Notes	The program is the Alliance for Aging, Inc.'s bilingual project to reduce elder pedestrian crashes in Miami-Dade County through: • Public awareness TV campaign • Educational curriculum provided in areas with high rates of elderly pedestrian crashes
Implementation Strategy	Provide the Elderly Pedestrian Heat Map and list of elderly pedestrian high crash areas to the Alliance for Aging, Inc. and coordinate with their staff to implement the current program components in those areas
Implementation Focus Areas	Elderly pedestrian high crash areas include: • Little Havana • South Beach • North Beach • Flagami • Hialeah • Sunny Isles Beach

Enforcement of Yielding to Pedestrians	
Description	Implement programs or cameras to enforce driver-yielding in the high pedestrian crash areas depicted in Figure 33.
Targeted Crash Types	Intersection Straight-Through and Right-Hook Crashes
Notes	• Programs that combine decoy pedestrians, warnings, informational flyers to give to violators, community feedback, and citations deliver optimum results • One week of an enforcement program can result in increased yielding behavior for a year • Refer to 2004 study of a program in Miami Beach documented in *Effects of a Driver Enforcement Program on Yielding to Pedestrians* by Ron Van Houten and J.E. Louis Malenfant • Cameras that use video analytics and radar to determine if a vehicle is stopped when a pedestrian is in the crosswalk can be installed to enforce pedestrian right of way
Implementation Strategy	Coordinate with local law enforcement agencies in the high pedestrian crash areas highlighted in Figure 33

Signage for Chicago's crosswalk enforcement initiatives notifies drives that they must yield to pedestrians in crosswalk at the enforcement locations



Cameras in Washington D.C. record drivers as pedestrians step into crosswalks. Violations are issued to drivers who fail to stop for pedestrians who have the right of way. A team of officers and employees review the photos/videos from the enforcement cameras before issuing tickets to ensure that the violation notices are valid.

Pedestrian Intersection Countermeasures	
Description	Implement pedestrian-related countermeasures at high crash intersections identified in Tables 1, 3, and 4 based on the pattern and type of crashes that have occurred.
Targeted Crash Types	High Crash Intersections
Notes	The following potential countermeasures have been identified from an initial study of the pattern of crashes at several of the top pedestrian crash intersections: • Install a crosswalk on the north leg of Miami Gardens Drive & NW 27th Avenue • Close the northbound left access into the shopping center south of Miami Gardens Drive & NW 27th Avenue to allow for signalized crosswalk with a 12' median refuge for pedestrians crossing between the commercial areas south of the intersection • Implement No Right Turn on Red for southbound SW 27th Avenue at U.S. 1 • Implement a Leading Pedestrian Interval (LPI) at the intersection of W 16th Avenue and W 49th Street • Provide a 4' raised concrete traffic separator along NW 27th Avenue north and south of the intersection at NW 79th Street • Install a signalized crosswalk across NE 79th Street just east of NE Miami Court between the two bus stops on the north and south sides of NE 79th Street • Implement a Leading Pedestrian Interval (LPI) at the intersection of NW 22nd Avenue and NW 36th Street • Install a signalized crossing across SW 56th Street at the entrance to James A. Ferguson High School • Install a fence and landscaping in the median of US 1 north and south of Caribbean Boulevard to encourage pedestrians to cross at the intersection • Install a crosswalk across Normandy Drive just east of Rue Vendome for pedestrians crossing between the commercial areas on either side of Normandy Drive • Implement a Leading Pedestrian Interval (LPI) at the intersection of Alton Road and 17th Street • Implement a Leading Pedestrian Interval (LPI) and adjust the pedestrian timing to consider a slower walking speed of 2.8 ft/s for elderly pedestrians at the intersection of SW 5th Avenue and SW 8th Street
Implementation Strategy	Implement as part of resurfacing and traffic operations projects and coordinate with municipalities noted for each of the top crash intersections in Tables 1, 3, and 4

Improving the Environment for Biking	
Description	As streets are redesigned, reconstructed, and redeveloped, implement techniques that will improve the level of service for bicycles (BLOS). Improvements can include installing bike lanes to corridors without bicycle facilities, adding buffers between motor vehicle lanes and bike lanes, and adding protected cycle tracks.
Targeted Crash Types	Parallel Path Crashes
Notes	• Providing bike lanes on corridors creates a designated space for bicycles and reduces crash likelihood • Providing buffers between motor vehicle travel lanes and bike lanes allows for greater separation between high-speed vehicles and bicycles. Also recommended for winding/curved streets. • Installing green bike lanes in conflict zones to alert motorists of merging bicycles • Studies have shown that well-designed protected cycle tracks are associated with higher bicyclist usage and lower crash rates when turning movement conflicts at intersections are properly addressed during design. • See 2009 MUTCD Chapter 2G, 2009 MUTCD Chapter 3G, and MUTCD Interim Approval IA-14 for more information.
Implementation Strategy	Implement as a component of any roadway construction or improvement projects, especially corridors that are shown as BLOS E or BLOS F in the maps included in Appendix C.

Green bike lanes reinforce the priority to bicyclists in conflict zones

Buffers allow for greater separation between vehicles and bicycles

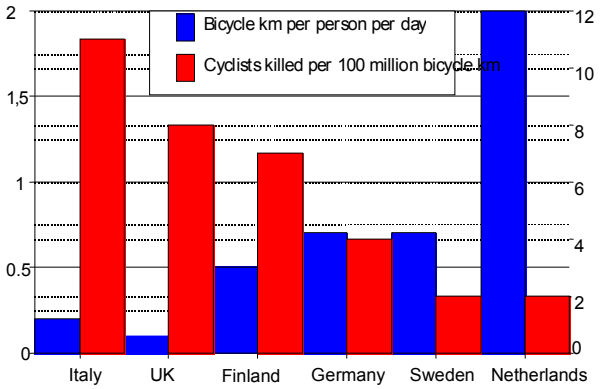
Cycle tracks provide a higher level of protection than conventional bike lanes and are attractive to a wider spectrum of bicyclist comfort levels

Automated Bicycle Rental System	
Description	An automated bicycle rental system provides affordable access to bicycles for trips within a city or county. These types of systems allow a user to take a bike conveniently from their point of origin and return it to the system at a different location.
Targeted Crash Types	All Crash Types

Notes	• Providing affordable access to bicycles can:
	  ○ Reduce the use of automobiles for short trips within the city or county
	  ○ Increase the modal share of bicycles within an area, which enhances "Safety in Numbers"
	• "Safety in Numbers" – Studies have shown that getting more people on bikes leads to increased safety. European countries with high rates of bicycle travel have consistently lower bicyclist fatality rates.

Implementation Strategy	Implement an automated bicycle rental system with a high density of stations consistent with the recommendations in the MPO's Automated Bicycle Rental System and Parking Plan Study. High demand locations include: University of Miami, Coconut Grove, Coral Gables, Brickell, Downtown, and Hospital/Civic Center.

Existing DecoBike station in Miami Beach



European countries with greater bicycle mode shares (Netherlands, Sweden, Germany) have lower cyclist fatality rates than countries with lower bicycle mode shares (Italy, UK, Finland) Source: Dutch crash data analysis presented at ThinkBike Miami Workshop

Bicycle Intersection Countermeasures	
Description	Implement bicycle-related countermeasures at high crash intersections identified in Table 2 based on the pattern and type of crashes that have occurred.
Targeted Crash Types	High Crash Intersections
Notes	The following potential countermeasures have been identified from an initial study of the pattern of crashes at several of the top bicycle crash intersections: • Install signage that alerts motorists to look for bicyclists in response to the high percentage of right turn crashes at the intersection of Crandon Boulevard & Harbor Drive/Ocean Lane Drive. Signage can include the modified R10-15 that includes the bicycle symbol or a text sign that reads "Turning Vehicles Watch for Bicycles" • Place sharrow pavement markings laterally in the through lane along Alton Road to encourage bicycles to take the lane and place the sharrow markings through the intersection at 17th Street • Install bicycle warning signs (W11-1) at the entrances to the block at Collins Avenue and 21st Street • Install signage that alerts motorists to look for bicyclists in response to the high percentage of right turn crashes at the intersection of Crandon Boulevard & Galen Drive/W McIntire Street. Signage can include the modified R10-15 that includes the bicycle symbol or a text sign that reads "Turning Vehicles Watch for Bicycles". Several bicyclists were observed riding on the sidewalk in this area; consider implementing a Leading Pedestrian Interval (LPI) for sidewalk riders. • Implement a Leading Pedestrian Interval (LPI) at the intersection of Miami Gardens Drive and NW 27th Avenue for sidewalk riders, as several bicyclists were observed riding on the sidewalk along these corridors • Install sharrow pavement markings through the intersection at Washington Avenue and 5th Street • Install modified R10-15 signage that includes the bicycle symbol for the northbound approach at Miami Gardens Drive and US 1
Implementation Strategy	Implement as part of resurfacing and traffic operations projects and coordinate with the municipalities noted for each of the top crash intersections in Table 2

BikeSafe Program Expansion	
Description	The large number of injuries in non-motor vehicle crashes for pedalcyclists between the ages of 5 and 14 shown in Figure 7 indicates a need for expanding the existing BikeSafe Program.
Targeted Crash Types	Juvenile Crashes
Notes	The BikeSafe Program began in 2009 with the aim of decreasing the number of children injured as cyclists and increasing physical activity levels of children by encouraging them to bike to and from school throughout Miami-Dade County, with the focus on middle school-aged children. As of August 2013, the BikeSafe Program has been implemented in 15 Miami-Dade County middle schools.
Implementation Strategy	Coordinate with the BikeSafe Program staff to implement the current program components in additional middle schools in Miami-Dade County. To target the younger children in the 5-14 year-old age group, coordinate with the BikeSafe Program staff to expand the program to Miami-Dade elementary schools and make any modifications to the curriculum that may be needed for this younger group of students.

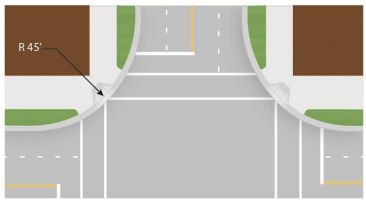
Education and Enforcement of 3-Foot Law	
Description	Educate the public of the state law that requires that motorists give a three-foot clearance when passing cyclists through posters, installation of signage in high-crash areas, and enforcement of the law.
Targeted Crash Types	Straight-Through Crashes
Notes	• For bicycle high-crash areas (shown in Figure 41), install signage that alerts motorists of the state law that requires motorists to give a three-foot clearance when passing cyclists • Educate motorists and bicyclists through the use of posters, advertisements, stickers, etc.
Implementation Strategy	Implement signage as a component of any roadway improvement projects and coordinate with local municipalities and law enforcement agencies in the bicycle high-crash areas to distribute educational materials and enforce the law

FDOT District 4 signage. Recommend installation and evaluation of this sign in a bicycle high-crash area.

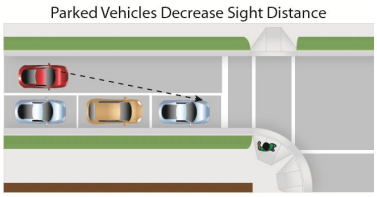
"3 Feet Please" roadside sign (Sunrise, FL) and bumper sticker.

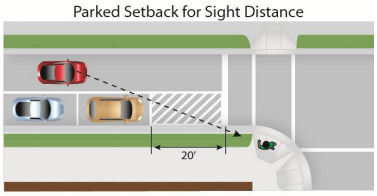
Low-Speed Design Principles	
Description	As streets are redesigned, reconstructed, and redeveloped, use low-speed design principles to achieve lower speeds through techniques such as smaller corner radii, pedestrian bulb-outs, traffic circles that accommodate bicycles and pedestrians, and utilizing traffic calming devices where appropriate. Additionally, perceptual design features such as patterns painted, stamped, or built into the roadway surface encourage motorists to reduce speeds.
Targeted Crash Types	Right-Hook Crashes
Notes	• A general recommendation for most neighborhood streets would be to design for no more than 30 miles per hour; however, each street would need to be evaluated on a case-by-case basis • Roadway safety statistics underscore the need to promote low speeds within high pedestrian areas • The likelihood of a pedestrian surviving a crash with a motor vehicle significantly increases as the vehicular speed at impact decreases • See *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach,* an ITE Recommended Best Practice, and "Florida Greenbook" Chapter 19 for more information.
Implementation Strategy	Implement as a component of any roadway construction or improvement projects

Low-Speed Design Principles Examples

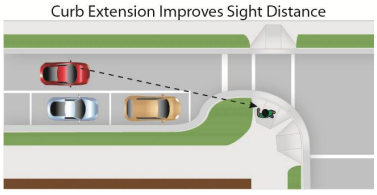


Tighter corner radii slow turning traffic, reduce injury severity, and reduce pedestrian crossing distance (Context sensitive to a road's use and heavy vehicle percentage)





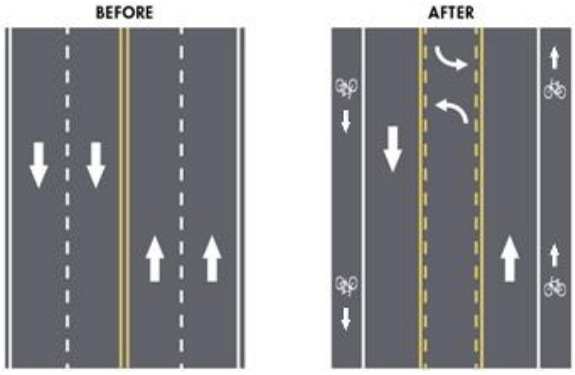
Curb extensions improve sight distance between pedestrians and motorists and increase visibility of pedestrians waiting to cross



Road Diets / Lane Reductions	
Description	Road diets (lane reductions) can improve the safety of a roadway for pedestrians, bicyclists, and motorists through reduction or narrowing of the traveled way.
Targeted Crash Types	Midblock Crashes

Notes	• Road diets most often convert four-lane undivided roadways into three lanes (two through lanes and a center turn lane) with bicycle lanes, sidewalks, and/or on-street parking, although one-way streets can also be reduced in number of lanes
	• Strongly consider for four-lane bi-directional roadways with AADT of 15,000 or less, and for three-lane one-way streets with AADT of 20,000 or less
	• Bi-directional four-lane roadways with AADT of 15,000 to 20,000 can also be good candidates
	• Evaluate the following corridor characteristics before implementation:
	  ○ driveway density
	  ○ transit routes
	  ○ number and design of intersections
	  ○ operational characteristics

Implementation Strategy	Implement as a component of any roadway construction or improvement projects, including resurfacing



Before

After

Bus Stop Treatments	
Description	Provide safety improvements near high-volume bus stops to reduce the frequency and severity of pedestrian and bicycle crashes at and near bus stops.
Targeted Crash Types	Midblock Crashes
Notes	Ensure that the stops have adequate: • Sidewalk connectivity • Roadway crossing treatments • Signage
Implementation Strategy	Implement as a component of any roadway improvement or beautification projects

Lighting	
Description	Providing adequate and uniform lighting along roadways and at crossings is an important factor in reducing the occurrence and potential severity of nighttime crashes. The likelihood of a pedestrian or bicycle crash resulting in a fatality increases drastically during dark (no street light) conditions in comparison to daylight conditions.
Targeted Crash Types	Nighttime Crashes
Notes	Uncontrolled marked crosswalks (mid-block and unsignalized intersection) should be provided with additional illumination producing 1.5 times the normal roadway illumination while maintaining the uniformity ratio within standards
Implementation Strategy	Implement as a component of any roadway improvement or beautification projects
Implementation Focus Areas	Nighttime high crash areas include: • South Beach • North Beach • Downtown/Omni • Little Havana • Little Haiti/Model City

Public Service Announcement Techniques	
Description	Employ specific techniques to create more effective bicycle and pedestrian safety public service announcements (PSAs).
Targeted Crash Types	All Crash Types
Notes	• Highlight the benefits of cycling and walking while educating about safety ○ Focusing exclusively on the dangers of the road can discourage people from cycling and walking • Utilize different messages and forms of media (radio, television, internet, etc.) to target specific population demographics (teenagers, elderly, Hispanic, etc.)

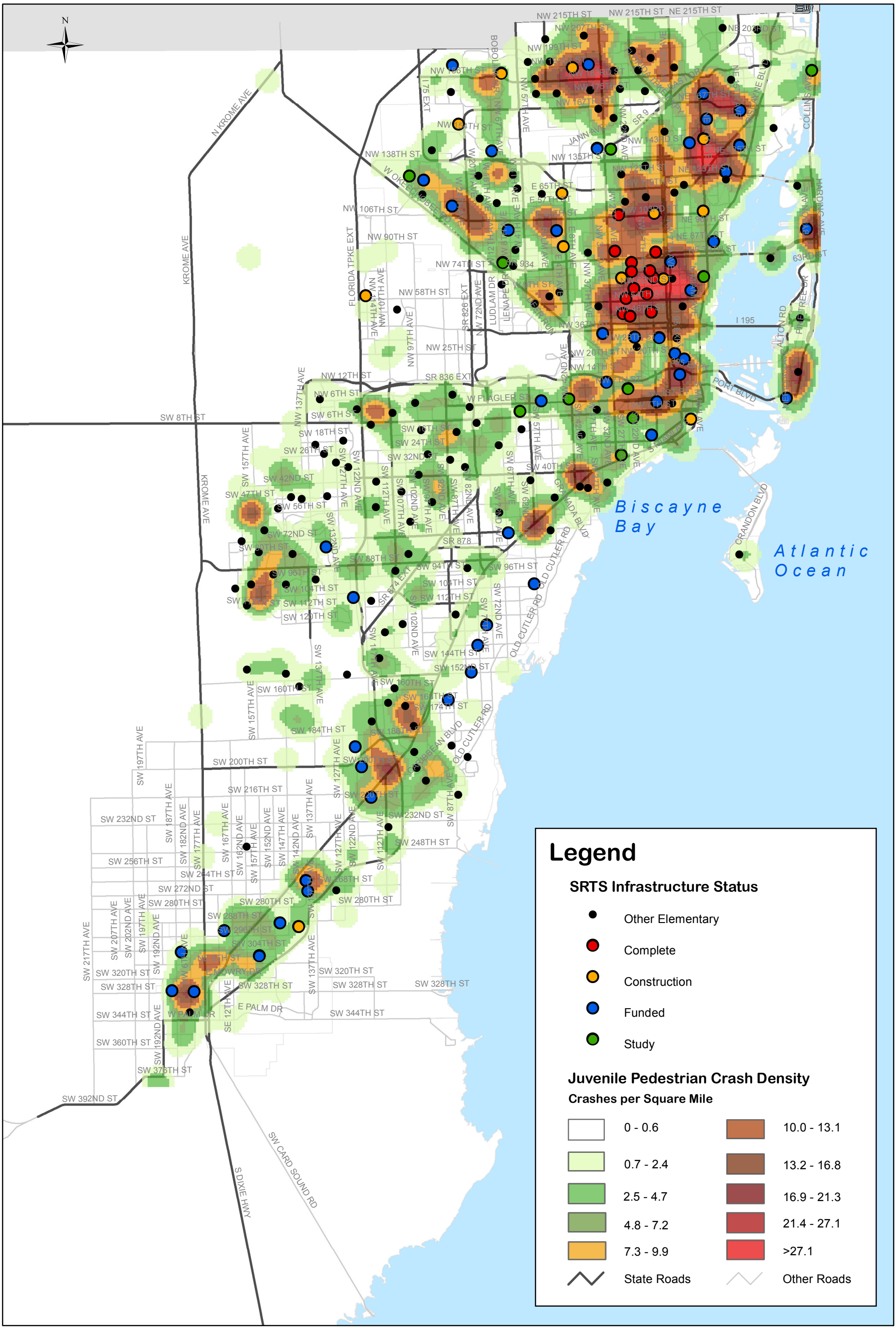
Safe Routes to School Program Expansion	
Description	Continue the existing efforts of the Safe Routes to School (SRTS) program throughout Miami-Dade County.
Targeted Crash Types	Juvenile Crashes

Notes	• SRTS works with parents, schools, community leaders, and governments to create a safe and encouraging environment for children to walk or bicycle to school
	• Efforts include:
	  ○ infrastructure safety improvement projects
	  ○ education programs to encourage bicycling and walking to school
	  ○ projects to reduce motor vehicle traffic around school

Implementation Strategy	Figure 52 depicts the SRTS status (complete, construction, funded, study, or other) for each elementary school in Miami-Dade County and the Juvenile Pedestrian Crash Density. Use this map to help identify future schools to be studied.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Figure 52: SRTS Infrastructure Status with Juvenile Pedestrian Crash Density
Miami-Dade County



Legend

SRTS Infrastructure Status

- Other Elementary
- Complete
- Construction
- Funded
- Study

Juvenile Pedestrian Crash Density

Crashes per Square Mile

0 - 0.6	10.0 - 13.1
0.7 - 2.4	13.2 - 16.8
2.5 - 4.7	16.9 - 21.3
4.8 - 7.2	21.4 - 27.1
7.3 - 9.9	>27.1
State Roads	Other Roads

Kimley-Horn and Associates, Inc.

0 2 4 8 Miles

Server Training Program	
Description	A training program that promotes responsible beverage service to staff at establishments that serve alcohol can reduce alcohol-related crashes.
Targeted Crash Types	Alcohol/Drug-Use Involved Crashes

Notes	• Training programs include instruction on:
	  ○ Alcohol awareness
	  ○ Server responsibilities
	  ○ Checking IDs
	  ○ Intervention
	  ○ Laws and policies
	• There is an existing voluntary program in the state of Florida created by the Florida Responsible Vendors Act
	• A study from the Oregon Transportation Research and Education Consortium found that mandatory programs were much more effective than voluntary programs

Implementation Strategy	Coordinate with management at local restaurants and bars to encourage staff to participate in the available online training programs.

Taxi Ride Campaign	
Description	A campaign to increase awareness of impaired driving and promoting the use of calling a taxi rather than driving under the influence.
Targeted Crash Types	Alcohol/Drug-Use Involved Crashes
Notes	Focus efforts in Entertainment Districts: • Posters in bars, nightclubs, restaurants, and liquor stores • Advertisements on tops of taxis • Billboards and posters on main roadways
Implementation Strategy	Coordinate with local taxi companies, entertainment districts, and law enforcement agencies to display the campaign advertisements

Plano Police Department's Choose Your Ride campaign vehicle marked as half taxi, half police car is parked in areas that serve alcohol to remind people to call a taxi rather than be jailed for drunk driving.

Ventura County Choose Your Ride billboards present the campaign's message in English and Spanish.

DUI Enforcement Techniques	
Description	Implement Driving Under the Influence (DUI) enforcement techniques in the areas with the highest concentrations of alcohol/drug-use related pedestrian and bicycle crashes depicted in Figures 34 and 42.
Targeted Crash Types	Alcohol/Drug-Use Involved Crashes

Notes	• Saturation patrols:
	  ○ involve officers concentrating on all moving violations, especially indications of DUI
	  ○ focused on a limited geographic area
	  ○ difficult for impaired drivers to avoid detection
	• Checkpoints:
	  ○ should be frequent, publicized, and low-staffed
	  ○ effective in deterring impaired driving
	• The use of a streamlined online reporting system can reduce processing time by up to 50 percent and give prosecutors better information to successfully prosecute DUI cases (Texas Municipal Police Association)
	• Approximately 25 percent of the fatal bicycle and pedestrian crashes in Miami-Dade County from 2005 to 2011 were related to alcohol/drug-use
	• Alcohol/drug-use related high crash areas include:
	  ○ South Beach
	  ○ Little Havana
	  ○ North Beach
	  ○ Homestead

Implementation Strategy	Coordinate with local law enforcement agencies in the areas listed above to implement the DUI enforcement techniques

Bicycle/Pedestrian Training Video for Officers	
Description	Introduce a training video on bicycle and pedestrian laws and regulations into local law enforcement agencies' training curriculum.
Targeted Crash Types	All Crash Types

Notes	• Video should include:
	  ○ Bicycle and pedestrian-related laws and regulations
	  ○ Definitions and examples of bicycle and pedestrian facilities
	  ○ Bicyclists' legal rights on roadways
	  ○ Pedestrian and motorist rights and responsibilities in crosswalks
	  ○ Common bicycle and pedestrian-related situations
	• Video should be part of initial training curriculum and also viewed prior to the start of any specific enforcement programs

The San Francisco Police Department has added a bicycle traffic training video to their curriculum *http://www.sfbike.org/?bikelaw_sfpd_video*

Still image from a pedestrian safety training DVD for the Madison Police Department

Speed Feedback Signs	
Description	Speed feedback signs alert motorists of their speeds and can be implemented as part of enforcement or education projects.
Targeted Crash Types	High-Speed Crashes

Notes	• Moveable radar trailers:
	  ○ can be moved around a community easily
	  ○ most effective if moved around on a random schedule
	  ○ can be used in conjunction with ticketing
	  ○ some models can record speed data to compare "before and after" results of the radar trailer
	• Fixed active speed monitors:
	  ○ installed in permanent fixed locations
	  ○ typically installed with speed limit signs
	  ○ can be used in school zones or other special speed limit zones
	• Can be augmented by flashing lights, or messages to drivers such as "Slow Down"

Moveable radar trailer with speed limit sign.

Solar-powered fixed active speed monitor attached to a school speed zone sign.

Progressive Ticketing	
Description	A three-staged process of ticketing for speeding that allows a community to become aware of the harm caused by excessive speeding and gives motorists the opportunity to change such behaviors before ticketing begins.
Targeted Crash Types	High-Speed Crashes
Notes	• Educating – The first stage of progressive ticketing involves educating motorists about the problems of excessive speeding and establish community awareness of the consequences of speeding. • Warning – The motorists within the community are given the opportunity to change their speeding behaviors before ticketing begins during an official warning period. During this time, offending motorists receive written warnings and informational materials. • Ticketing – Once the warning period has ended, violating motorists will be ticketed. • During the warning period, it should be advertised that motorists will be ticketed for severe violations.
Implementation Strategy	Coordinate with local media outlets to advertise the program and local law enforcement agencies to enforce the written warnings and ticketing

Community Traffic Safety Team	
Description	Form a multi-disciplinary Community Traffic Safety Team (CTST) focused on non-motorized traffic safety, comprised of state, county, and local engineers, planners, law enforcement, health, and education staff.
Targeted Crash Types	All Crash Types
Notes	Ideally the group would meet at least quarterly to: • Review crash data • Identify needed infrastructure projects • Identify needed non-infrastructure projects • Share information and resources • Coordinate efforts
Implementation Strategy	The team could stem from the existing Study Advisory Committee for this Plan and invite additional members as needed from areas that are not currently being represented on the committee.

Appendix A

Health-Related Data

Pediatric Pedestrians-Hit-By-Cars (PHBC)
Miami-Dade County - Injuries

Trauma Center Injury Data: PHBC <14 years, 2002-2011

Fiscal Year (10/01-9/30)	JMH/Ryder Trauma Center	Miami Children's Hospital	Liberty City *Included in JMH/RTC	Total
2002-2003	47	51	4	98
2003-2004	30	40	5	70
2004-2005	34	33	7	67
2005-2006	31	33	1	64
2006-2007	26	26	2	52
2007-2008	31	15	3	46
2008-2009	16	20	2	36
2009-2010	20	17		37
2010-2011	16	13		29

*Source: Emergency Room Logs from Jackson Memorial Hospital Ryder Trauma Center and Miami Children's Hospital

WALKSAFE

Since 2002, there has been a 70% decrease in the number of children hit by cars that are being sent to two Level I trauma centers in Miami-Dade County.

Pedestrian Injuries to Miami-Dade County residents Aged 0-14 Years
Deaths, Hospitalizations and Emergency Dept. Visits

2010		Injuries by Age (years)															0-4 yrs			5-11 yrs			5-13 yrs			0-14 yrs		
		<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14												
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate
Miami-Dade	DC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	166,817	0.6	0	229,257	0.0	0	291,529	0.0	1	489,482	0.2
	HD	0	2	4	5	0	3	2	3	3	1	2	2	3	4	3	37	166,817	22.2	16	229,257	7.0	23	291,529	7.9	37	489,482	7.6
	DC+HD	0	2	4	5	0	3	2	3	3	1	2	2	3	4	4	38	166,817	22.8	16	229,257	7.0	23	291,529	7.9	38	489,482	7.8
	ED	2	3	11	5	4	8	4	4	4	5	5	5	9	20	8	97	166,817	58.1	35	229,257	15.3	64	291,529	22.0	97	489,482	19.8
	TOTAL	2	5	15	10	4	11	6	7	7	6	7	7	12	24	12	36	166,817	21.6	51	229,257	22.2	87	291,529	29.8	135	489,482	27.6

2009		Injuries by Age (years)															0-4 yrs			5-11 yrs			5-13 yrs			0-14 yrs		
		<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14												
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate
Miami-Dade	DC	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	167,812	0.6	1	228,884	0.4	1	291,968	0.3	1	491,322	0.2
	HD	0	0	0	5	3	1	3	1	5	2	1	3	3	4	6	37	167,812	22.0	16	228,884	7.0	23	291,968	7.9	37	491,322	7.5
	DC+HD	0	0	0	5	3	1	3	1	5	2	1	4	3	4	6	38	167,812	22.6	17	228,884	7.4	24	291,968	8.2	38	491,322	7.7
	ED	0	3	5	6	4	6	6	5	5	9	8	8	15	20	14	114	167,812	67.9	47	228,884	20.5	82	291,968	28.1	114	491,322	23.2
	TOTAL	0	3	5	11	7	7	9	6	10	11	9	12	18	24	20	26	167,812	15.5	64	228,884	28.0	106	291,968	36.3	152	491,322	30.9

2008		Injuries by Age (years)															0-4 yrs			5-11 yrs			5-13 yrs			0-14 yrs		
		<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14												
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate
Miami-Dade	DC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168,749	0.0	0	228,423	0.0	0	292,701	0.0	0	493,591	0.0
	HD	1	1	2	2	1	2	1	2	2	2	4	2	5	8	9	44	168,749	26.1	15	228,423	6.6	28	292,701	9.6	44	493,591	8.9
	DC+HD	1	1	2	2	1	2	1	2	2	2	4	2	5	8	9	44	168,749	26.1	15	228,423	6.6	28	292,701	9.6	44	493,591	8.9
	ED	2	4	4	8	3	7	5	8	9	7	7	13	9	20	23	129	168,749	76.4	56	228,423	24.5	85	292,701	29.0	129	493,591	26.1
	TOTAL	3	5	6	10	4	9	6	10	11	9	11	15	14	28	32	28	168,749	16.6	71	228,423	31.1	113	292,701	38.6	173	493,591	35.0

2007		Injuries by Age (years)															0-4 yrs			5-11 yrs			5-13 yrs			0-14 yrs		
		<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14												
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate
Miami-Dade	DC	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	167,060	0.0	1	228,121	0.4	2	293,646	0.7	3	493,468	0.6
	HD	0	3	0	2	4	6	6	4	0	1	2	1	7	4	6	9	167,060	5.4	20	228,121	8.8	31	293,646	10.6	46	493,468	9.3
	DC+HD	0	3	0	2	4	7	6	4	0	1	2	1	8	4	7	9	167,060	5.4	21	228,121	9.2	33	293,646	11.2	49	493,468	9.9
	ED	0	3	5	4	7	8	9	8	7	4	13	9	20	18	14	19	167,060	11.4	58	228,121	25.4	96	293,646	32.7	129	493,468	26.1
	TOTAL	0	6	5	6	11	15	15	12	7	5	15	10	28	22	21	28	167,060	16.8	79	228,121	34.6	129	293,646	43.9	178	493,468	36.1

2006		Injuries by Age (years)															0-4 yrs			5-11 yrs			5-13 yrs			0-14 yrs		
		<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14												
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate
Miami-Dade	DC	0	1	0	0	0	0	0	0	2	0	1	1	0	0	0	1	166,977	0.6	4	225,166	1.8	4	291,137	1.4	5	491,100	1.0
	HD	0	3	1	2	3	2	3	1	1	4	1	6	3	1	9	9	166,977	5.4	18	225,166	8.0	22	291,137	7.6	40	491,100	8.1
	DC+HD	0	4	1	2	3	2	3	1	3	4	2	7	3	1	9	10	166,977	6.0	22	225,166	9.8	26	291,137	8.9	45	491,100	9.2
	ED	3	1	8	4	6	6	10	6	9	11	9	7	12	18	18	22	166,977	13.2	58	225,166	25.8	88	291,137	30.2	128	491,100	26.1
	TOTAL	3	5	9	6	9	8	13	7	12	15	11	14	15	19	27	32	166,977	19.2	80	225,166	35.5	114	291,137	39.2	173	491,100	35.2

2005		Injuries by Age (years)															0-4 yrs			5-11 yrs			5-13 yrs			0-14 yrs		
		<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14												
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate
Miami-Dade	DC	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	1	168,804	0.6	2	222,931	0.9	2	290,120	0.7	4	492,519	0.8
	HD	0	2	1	2	1	5	4	5	2	3	7	5	4	2	8	6	168,804	3.6	31	222,931	13.9	37	290,120	12.8	51	492,519	10.4
	DC+HD	0	2	1	2	2	6	4	5	3	3	7	5	4	2	9	7	168,804	4.1	33	222,931	14.8	39	290,120	13.4	55	492,519	11.2
	ED	2	5	2	6	9	12	5	7	11	12	13	16	19	10	19	24	168,804	14.2	76	222,931	34.1	105	290,120	36.2	148	492,519	30.0
	TOTAL	2	7	3	8	11	18	9	12	14	15	20	21	23	12	28	31	168,804	18.4	109	222,931	48.9	144	290,120	49.6	203	492,519	41.2

2004		Injuries by Age (years)															0-4 yrs			5-11 yrs			5-13 yrs			0-14 yrs		
		<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14												
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate
Miami-Dade	DC	0	0	0	1	0	0	0	0	1	0	0	0	1	0	1	1	163,114	0.6	1	222,208	0.5	2	290,055	0.7	4	487,092	0.8
	HD	0	0	2	2	4	5	2	6	6	1	5	6	4	3	6	8	163,114	4.9	31	222,208	14.0	38	290,055	13.1	52	487,092	10.7
	TOTAL	0	0	2	3	4	5	2	6	7	1	5	6	5	3	7	9	163,114	5.5	32	222,208	14.4	40	290,055	13.8	56	487,092	11.5

2003		Injuries by Age (years)															0-4 yrs			5-11 yrs			5-13 yrs			0-14 yrs		
		<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14												
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate
Miami-Dade	DC	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	156,357	0.0	5	224,441	2.2	5	290,742	1.7	5	480,249	1.0
	HD	0	2	1	1	3	4	8	5	3	4	2	4	7	3	7	7	156,357	4.5	30	224,441	13.4	40	290,742	13.8	54	480,249	11.2
	TOTAL	0	2	1	1	3	4	8	6	4	5	3	5	7	3	7	7	156,357	4.5	35	224,441	15.6	45	290,742	15.5	59	480,249	12.3

2002		Injuries by Age (years)															0-4 yrs			5-11 yrs			5-13 yrs			0-14 yrs		
		<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14												
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate
Miami-Dade	DC	0	1	0	0	1	0	0	1	0	0	0	0	0	1	2	2	152,386	1.3	1	220,838	0.5	2	286,151	0.7	6	471,193	1.3
	HD	0	1	5	0	2	4	7	5	8	4	3	4	4	3	7	8	152,386	5.2	35	220,838	15.8	42	286,151	14.7	57	471,193	12.1
	TOTAL	0	2	5	0	3	4	7	6	8	4	3	4	4	4	9	10	152,386	6.6	36	220,838	16.3	44	286,151	15.4	63	471,193	13.4

2001		Injuries by Age (years)															0-4 yrs			5-11 yrs			5-13 yrs			0-14 yrs		
		<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14												
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate
Miami-Dade	DC	0	2	0	0	0	0	1	0	0	1	0	1	0	0	1	2	153,003	1.3	3	222,002	1.4	3	286,899	1.0	6	472,350	1.3
	HD	0	1	5	2	6	3	4	2	6	9	4	5	4	5	6	14	153,003	9.2	33	222,002	14.9	42	286,899	14.6	62	472,350	13.1
	TOTAL	0	3	5	2	6	3	5	2	6	10	4	6	4	5	7	16	153,003	10.5	36	222,002	16.2	45	286,899	15.7	68	472,350	14.4

2000		Injuries by Age (years)															0-4 yrs			5-11 yrs			5-13 yrs			0-14 yrs		
		<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14												
		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate	N	Pop	Rate
Miami-Dade	DC	0	1	0	1	0	0	1	1	1	0	0	0	0	0	1	2	147,019	1.4	3	222,411	1.3	3	286,954	1.0	6	466,245	1.3
	HD	0	4	3	3	1	5	7	3	4	6	3	9	7	2	3	11	147,019	7.5	37	222,411	16.6	46	286,954	16.0	60	466,245	12.9
	TOTAL	0	5	3	4	1	5	8	4	5	6	3	9	7	2	4	13	147,019	8.8	40	222,411	18.0	49	286,954	17.1	66	466,245	14.2

FDOH Florida Injury Surveillance Data System, http://www.doh.state.fl.us/demo/InjuryPrevention/InjuryData.html

Pedalcyclist Fatalities	<1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total Count	County Age Adj Rate	Florida Age Adj Rate
2007 MV Traffic - Pedalcyclist Fatal	0	0	0	1	0	1	4	2	2	0	0	10	0.4	0.6
2007 Pedalcyclist, Other Fatal	0	0	0	0	0	0	1	0	0	0	0	1	0.0	0.1
2008 MV Traffic - Pedalcyclist Fatal	0	0	0	2	1	1	1	1	1	0	0	7	0.3	0.5
2008 Pedalcyclist, Other Fatal	0	0	0	0	1	0	2	0	0	0	0	3	0.1	0.2
2009 MV Traffic - Pedalcyclist Fatal	0	0	0	2	2	2	2	2	0	0	0	10	0.4	0.5
2009 Pedalcyclist, Other Fatal	0	0	0	0	1	0	3	0	0	0	0	4	0.2	0.1
2010 MV Traffic - Pedalcyclist Fatal	0	0	0	1	2	3	1	1	1	1	0	10	0.4	0.4
2010 Pedalcyclist, Other Fatal	0	0	0	0	0	0	1	2	0	0	0	3	0.1	0.1

Pedalcyclist Injuries	<1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total Count	County Age Adj Rate	Florida Age Adj Rate
2007 MV Traffic - Pedalcyclist Hospitalization	0	0	13	17	4	12	20	13	4	2	1	86	3.5	3.4
2007 Pedalcyclist, Other Hospitalization	0	3	20	18	9	10	29	9	1	2	1	102	4.2	5.8
2007 MV Traffic - Pedalcyclist Emergency Dept	0	1	49	74	46	54	53	23	6	1	1	308	12.8	18.7
2007 Pedalcyclist, Other Emergency Dept	2	111	572	188	135	175	132	60	22	8	2	1407	60.0	106.2
2008 MV Traffic - Pedalcyclist Hospitalization	0	0	11	11	14	13	26	14	11	1	0	101	4.0	3.7
2008 Pedalcyclist, Other Hospitalization	0	3	26	12	7	16	24	17	11	5	1	122	4.9	6.3
2008 MV Traffic - Pedalcyclist Emergency Dept	0	2	38	73	54	81	78	36	13	5	0	380	15.5	21.3
2008 Pedalcyclist, Other Emergency Dept	0	99	539	229	164	173	164	87	25	7	2	1,489	62.6	110.8
2009 MV Traffic - Pedalcyclist Hospitalization	0	1	13	13	6	10	18	11	5	1	0	78	3.1	3.5
2009 Pedalcyclist, Other Hospitalization	0	10	20	15	17	20	31	19	9	2	0	143	5.8	6.9
2009 MV Traffic - Pedalcyclist Emergency Dept	0	0	35	90	51	64	62	34	14	5	1	356	14.6	20.7
2009 Pedalcyclist, Other Emergency Dept	1	100	523	243	195	222	212	102	33	15	4	1,650	69.3	115.9
2010 MV Traffic - Pedalcyclist Hospitalization	0	1	9	17	5	16	14	25	6	2	0	95	3.7	3.5
2010 Pedalcyclist, Other Hospitalization	0	3	23	11	12	15	29	11	10	1	0	115	4.7	6.7
2010 MV Traffic - Pedalcyclist Emergency Dept	0	0	15	68	54	46	31	26	9	2	0	251	10.3	19.4
2010 Pedalcyclist, Other Emergency Dept	1	67	335	144	121	124	120	64	26	8	3	1,013	42.6	99.3

Summary 2007-2010

Mechanism	<1	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total Count
MV Traffic - Pedalcyclist Fatal 2007-2010	0	0	0	6	5	7	8	6	4	1	0	37
Pedalcyclist, Other Fatal 2007-2010	0	0	0	0	2	0	7	2	0	0	0	11
MV Traffic - Pedalcyclist Injury 2007-2010	0	5	183	363	234	296	302	182	68	19	3	1,655
Pedalcyclist, Other Injury 2007-2010	4	396	2,058	860	660	755	741	369	137	48	13	6,041

FDOH Florida Injury Surveillance Data System, http://www.doh.state.fl.us/demo/InjuryPrevention/InjuryData.html

Pedestrian Fatality	<1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total Count	County Age Adj Rate	Florida Age Adj Rate
2007 MV Traffic - Pedestrian Fatal	0	1	2	8	6	5	15	6	13	13	2	71	2.8	2.5
2007 Pedestrian, Other Fatal	0	4	1	0	1	6	4	1	2	2	0	21	0.9	0.5
2008 MV Traffic - Pedestrian Fatal	0	0	0	7	11	11	15	5	8	9	5	71	2.8	2.4
2008 Pedestrian, Other Fatal	0	0	0	0	0	2	1	0	0	1	2	6	0.2	0.3
2009 MV Traffic - Pedestrian Fatal	0	0	1	4	8	9	9	14	14	10	5	74	2.8	2.2
2009 Pedestrian, Other Fatal	0	1	0	0	2	0	1	1	0	1	1	7	0.3	0.3
2010 MV Traffic - Pedestrian Fatal	0	0	1	3	7	8	14	7	13	12	5	70	2.7	2.2
2010 Pedestrian, Other Fatal	0	0	0	0	0	1	2	3	1	2	0	9	0.3	0.3

Pedestrian Injury	<1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total Count	County Age Adj Rate	Florida Age Adj Rate
2007 MV Traffic - Pedestrian Hospitalization	0	9	37	44	36	44	38	43	46	58	12	367	14.6	8.8
2007 Pedestrian, Other Hospitalization	0	2	0	2	2	1	1	3	2	2	1	16	0.6	0.9
2007 MV Traffic - Pedestrian Emergency Dept	0	19	110	218	106	117	115	98	70	34	10	897	36.3	35.7
2007 Pedestrian, Other Emergency Dept	0	5	15	13	6	15	10	7	6	4	0	81	3.3	5.4
2008 MV Traffic - Pedestrian Hospitalization	1	6	37	34	28	43	57	52	40	36	8	342	13.5	8.8
2008 Pedestrian, Other Hospitalization	0	0	2	1	2	2	1	1	2	3	2	16	0.6	0.9
2008 MV Traffic - Pedestrian Emergency Dept	2	19	108	212	112	127	139	105	59	39	11	933	37.6	36.3
2008 Pedestrian, Other Emergency Dept	0	3	17	9	6	5	10	5	4	1	2	62	2.5	5.7
2009 MV Traffic - Pedestrian Hospitalization	0	8	29	38	31	52	48	40	41	16	4	307	12.3	8.3
2009 Pedestrian, Other Hospitalization	0	4	3	4	3	2	6	4	2	1	2	31	1.2	0.9
2009 MV Traffic - Pedestrian Emergency Dept	0	18	96	193	127	129	167	93	53	26	8	910	36.8	35.6
2009 Pedestrian, Other Emergency Dept	0	3	10	12	2	3	12	6	2	2	0	52	2.1	5.2
2010 MV Traffic - Pedestrian Hospitalization	0	11	26	47	38	41	56	54	40	49	17	379	14.7	8.6
2010 Pedestrian, Other Hospitalization	0	1	1	2	3	4	6	2	1	1	0	21	0.8	0.8
2010 MV Traffic - Pedestrian Emergency Dept	1	8	41	115	83	81	76	60	39	21	10	535	21.6	32.1
2010 Pedestrian, Other Emergency Dept	0	2	4	1	2	4	4	2	2	4	0	25	1.0	4.6

Summary 2007-2010

Mechanism	<1	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total Count
MV Traffic - Pedestrian Fatal 2007-2010	0	1	4	22	32	33	53	32	48	44	17	286
Pedestrian, Other Fatal 2007-2010	0	5	1	0	3	9	8	5	3	6	3	43
MV Traffic - Pedestrian Injury 2007-2010	4	98	484	901	561	634	696	545	388	279	80	4,670
Pedestrian, Other Injury 2007-2010	0	20	52	44	26	36	50	30	21	18	7	304

Appendix B

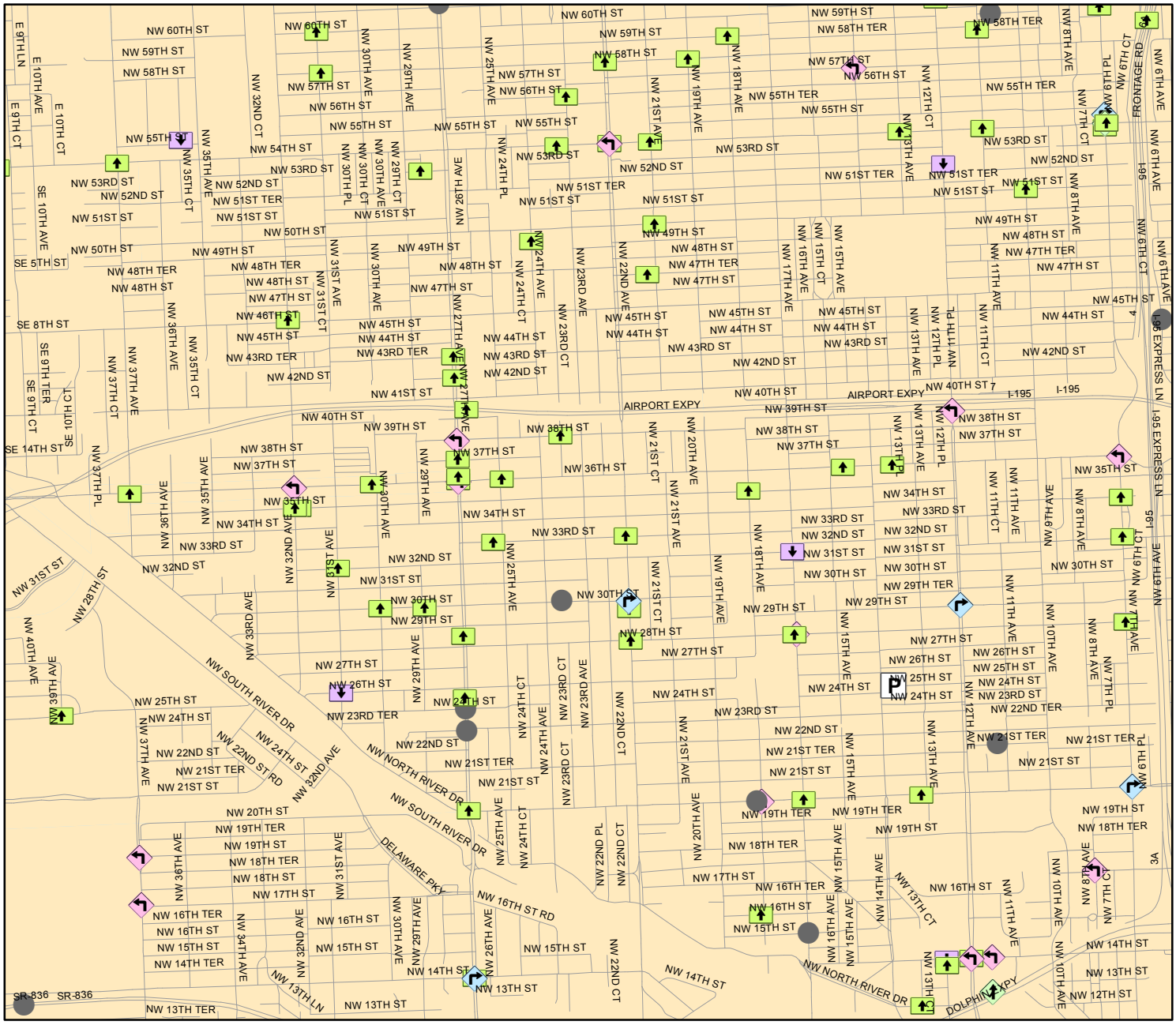
High Crash Area Maps

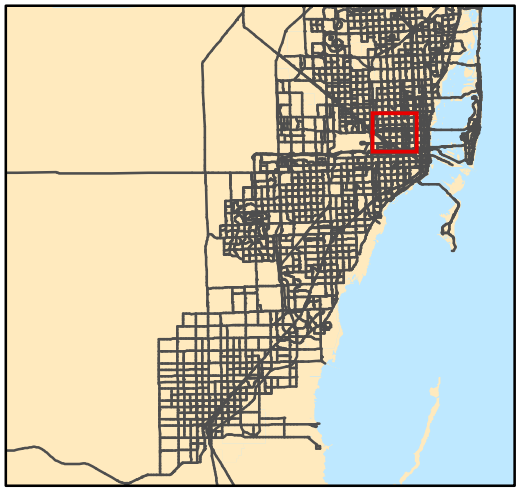
Pedestrian High Crash Area Maps

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Pedestrian Crashes 2010-2011

Allapattah/Brownsville





0 0.25 0.5 1 Miles

N

Legend

Vehicle Movement

- Straight
- Stopped/Slowing
- Turning Left
- Turning Right
- Parked
- Overtaking/Passing
- Entering Traffic Lane
- Backing
- Other
- Making U-Turn
- Changing Lanes

- High Crash Area (Top 5%)
- Major Roads
- Miami-Dade County

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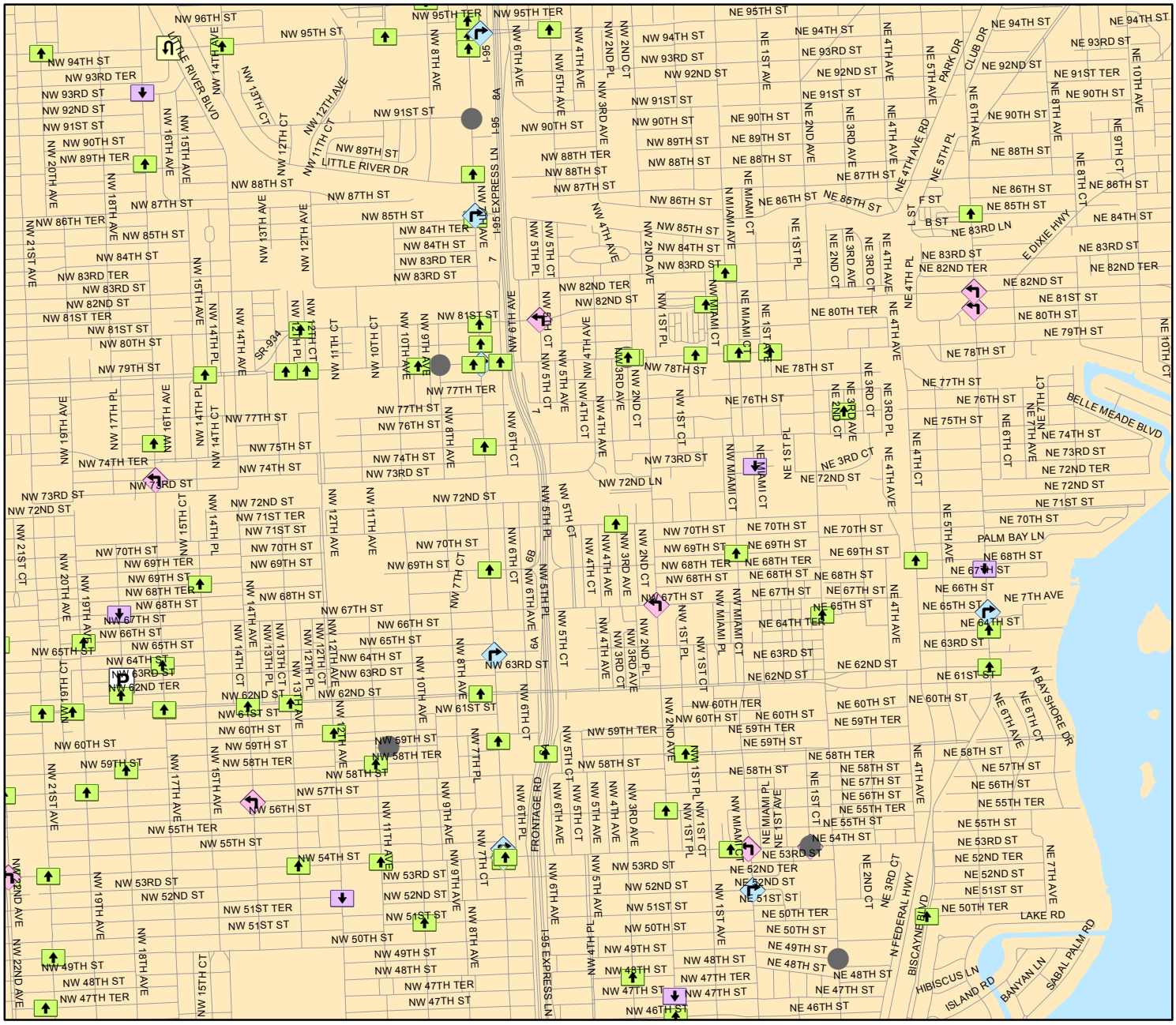
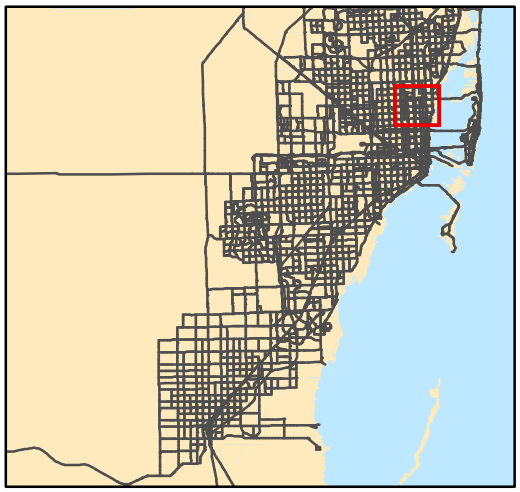
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Pedestrian Crashes 2010-2011

Little Haiti/Model City





0 0.25 0.5 1 Miles

Legend

Vehicle Movement

- Straight
- Stopped/Slowing
- Turning Left
- Turning Right
- Parked
- Overtaking/Passing
- Entering Traffic Lane
- Backing
- Other
- Making U-Turn
- Changing Lanes

- High Crash Area (Top 5%)
- Major Roads
- Miami-Dade County

N

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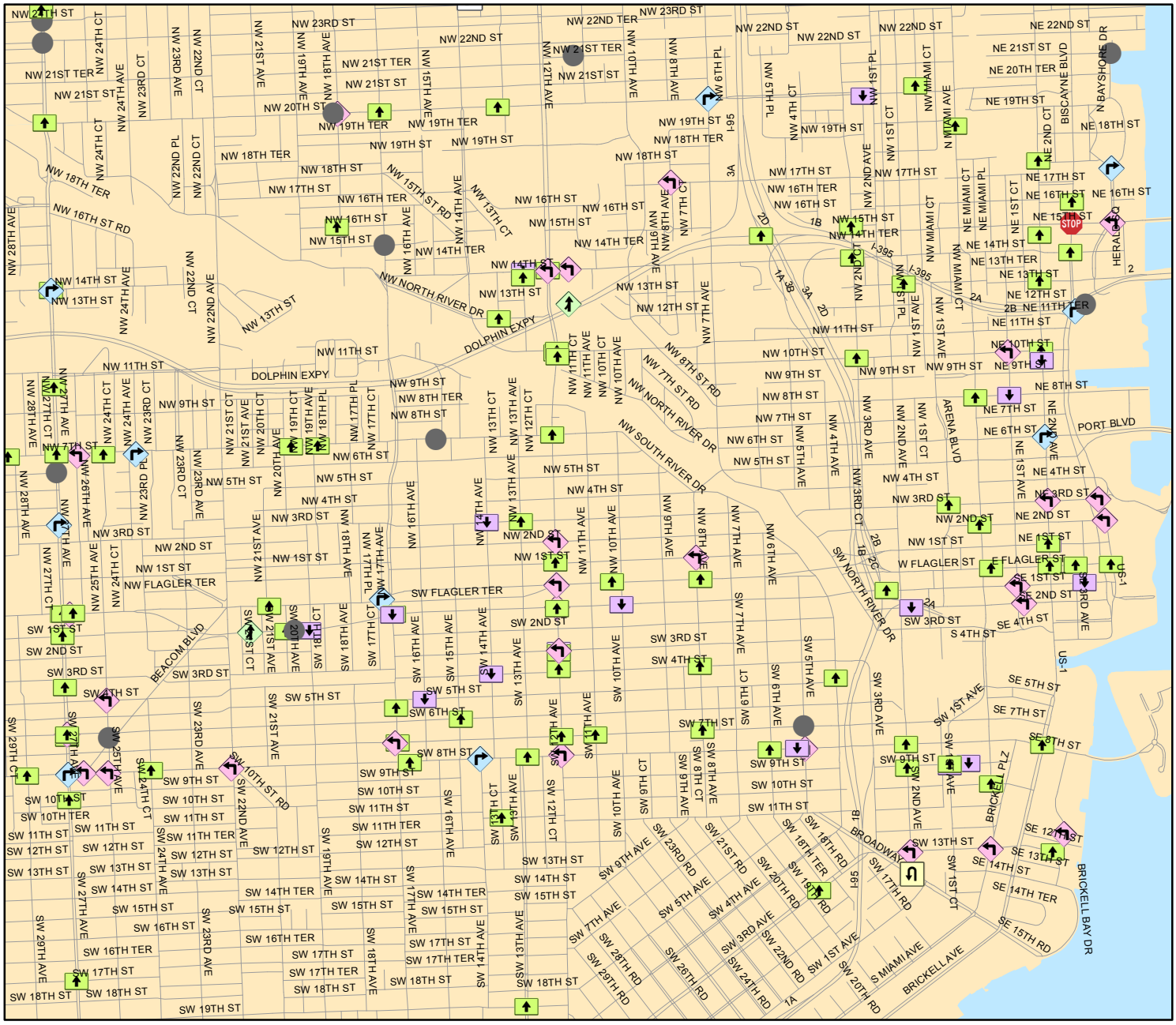
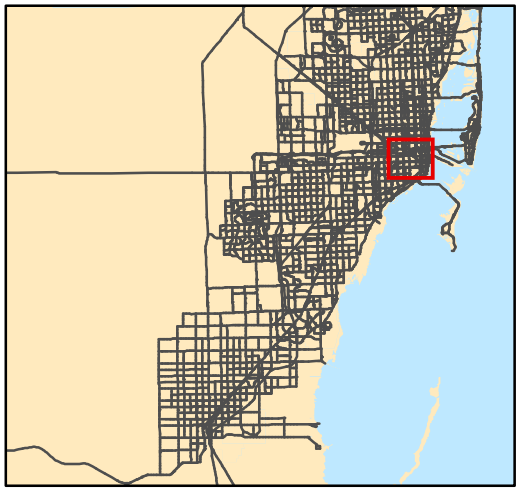
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Pedestrian Crashes 2010-2011

Little Havana/Downtown/Omni/Overtown





0 0.25 0.5 1 Miles

Legend

Vehicle Movement

- Straight
- Stopped/Slowing
- Turning Left
- Turning Right
- Parked
- Overtaking/Passing
- Entering Traffic Lane
- Backing
- Other
- Making U-Turn
- Changing Lanes

- High Crash Area (Top 5%)
- Major Roads
- Miami-Dade County

N

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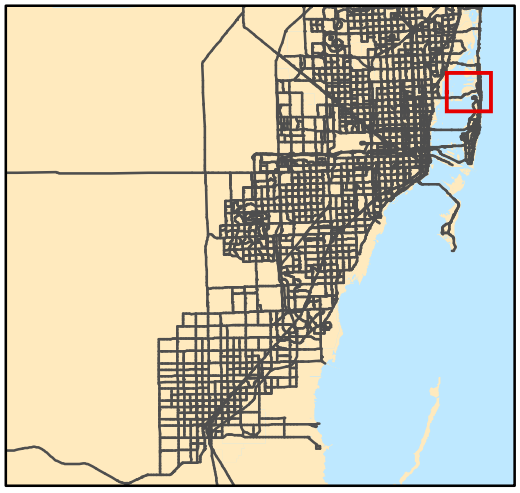
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Pedestrian Crashes 2010-2011

North Beach



0 0.25 0.5 1 Miles

Legend

N

Vehicle Movement

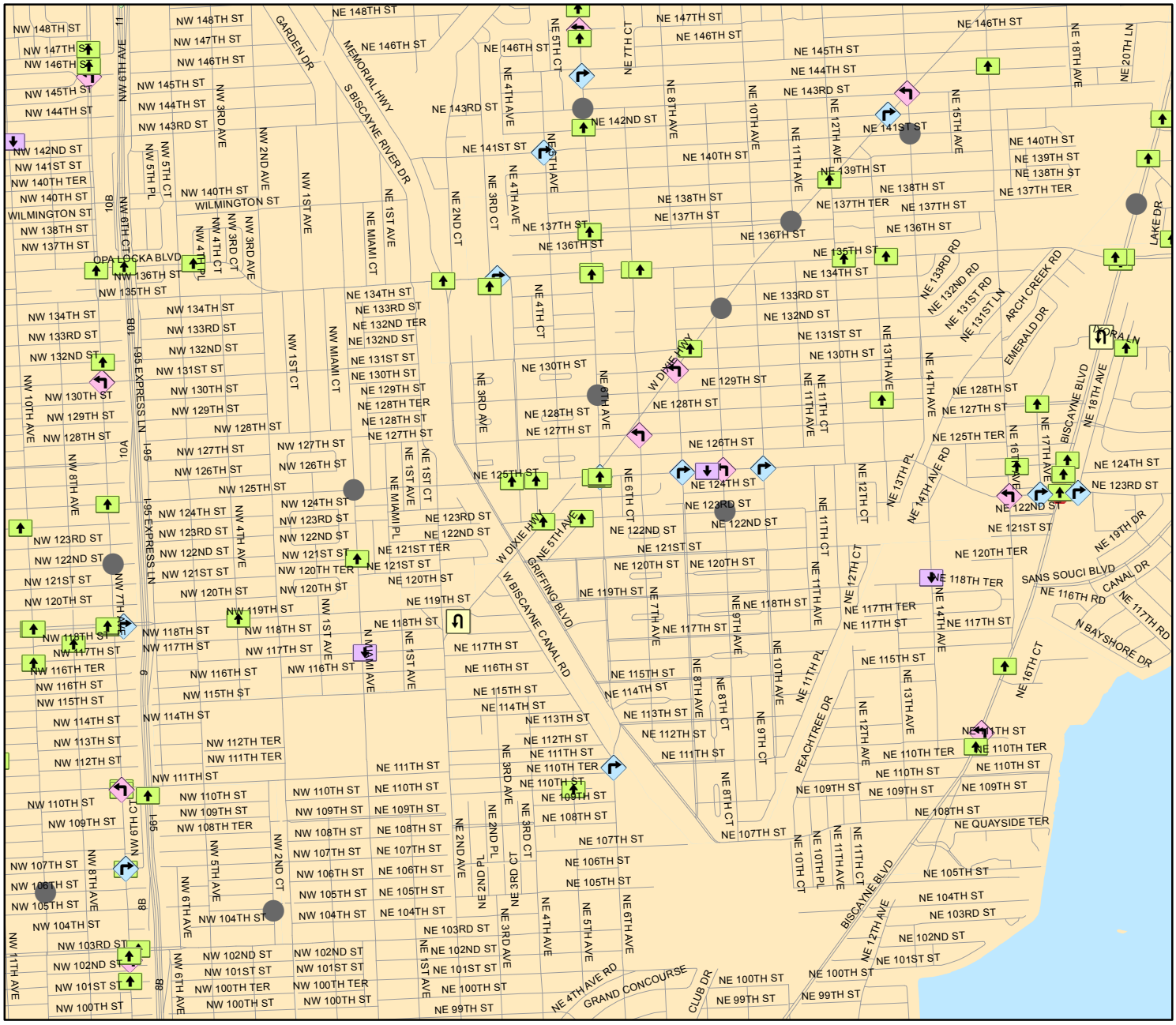
- Straight
- Stopped/Slowing
- Turning Left
- Turning Right
- Parked
- Overtaking/Passing
- Entering Traffic Lane
- Backing
- Other
- Making U-Turn
- Changing Lanes
- High Crash Area (Top 5%)
- Major Roads
- Miami-Dade County

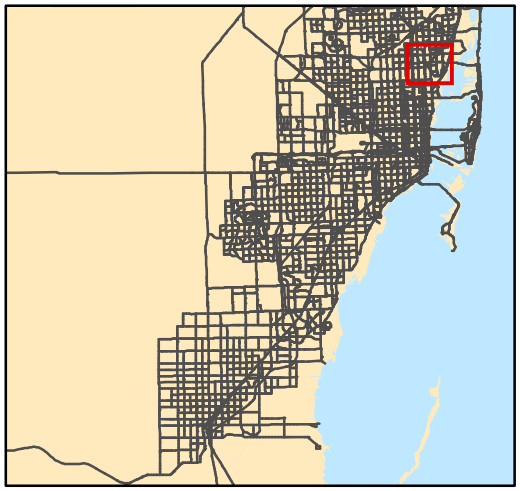
Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Pedestrian Crashes 2010-2011

North Miami





0 0.25 0.5 1 Miles

Legend

Vehicle Movement

- Straight
- Stopped/Slowing
- Turning Left
- Turning Right
- Parked
- Overtaking/Passing
- Entering Traffic Lane
- Backing
- Other
- Making U-Turn
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- Miami-Dade County

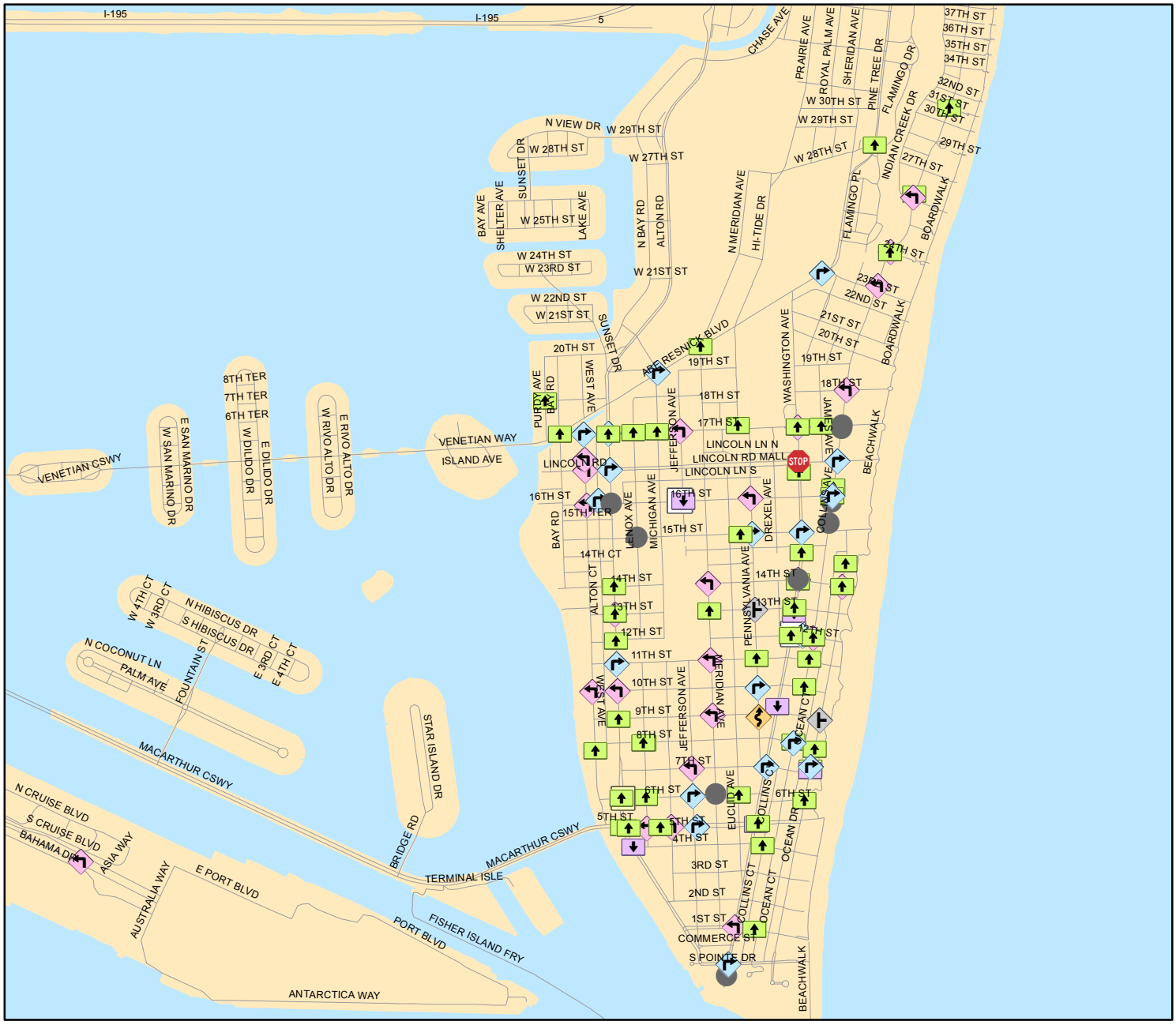
N

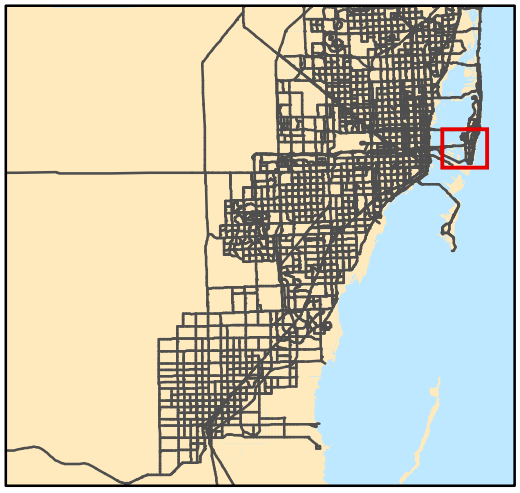
Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Pedestrian Crashes 2010-2011

South Beach





0 0.25 0.5 1 Miles

Legend

N

Vehicle Movement

- Straight
- Stopped/Slowing
- Turning Left
- Turning Right
- Parked
- Overtaking/Passing
- Entering Traffic Lane
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Kimley-Horn and Associates, Inc.

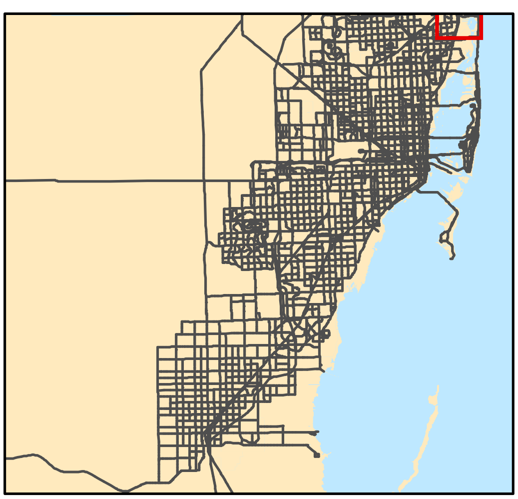
Bicycle High Crash Area Maps

MIAMI-DADE MPO Metropolitan Planning Organization

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Bicycle Crashes 2010-2011

Aventura



0 0.25 0.5 1 Miles

Legend

Vehicle Movement

- Straight
- Stopped/Slowing
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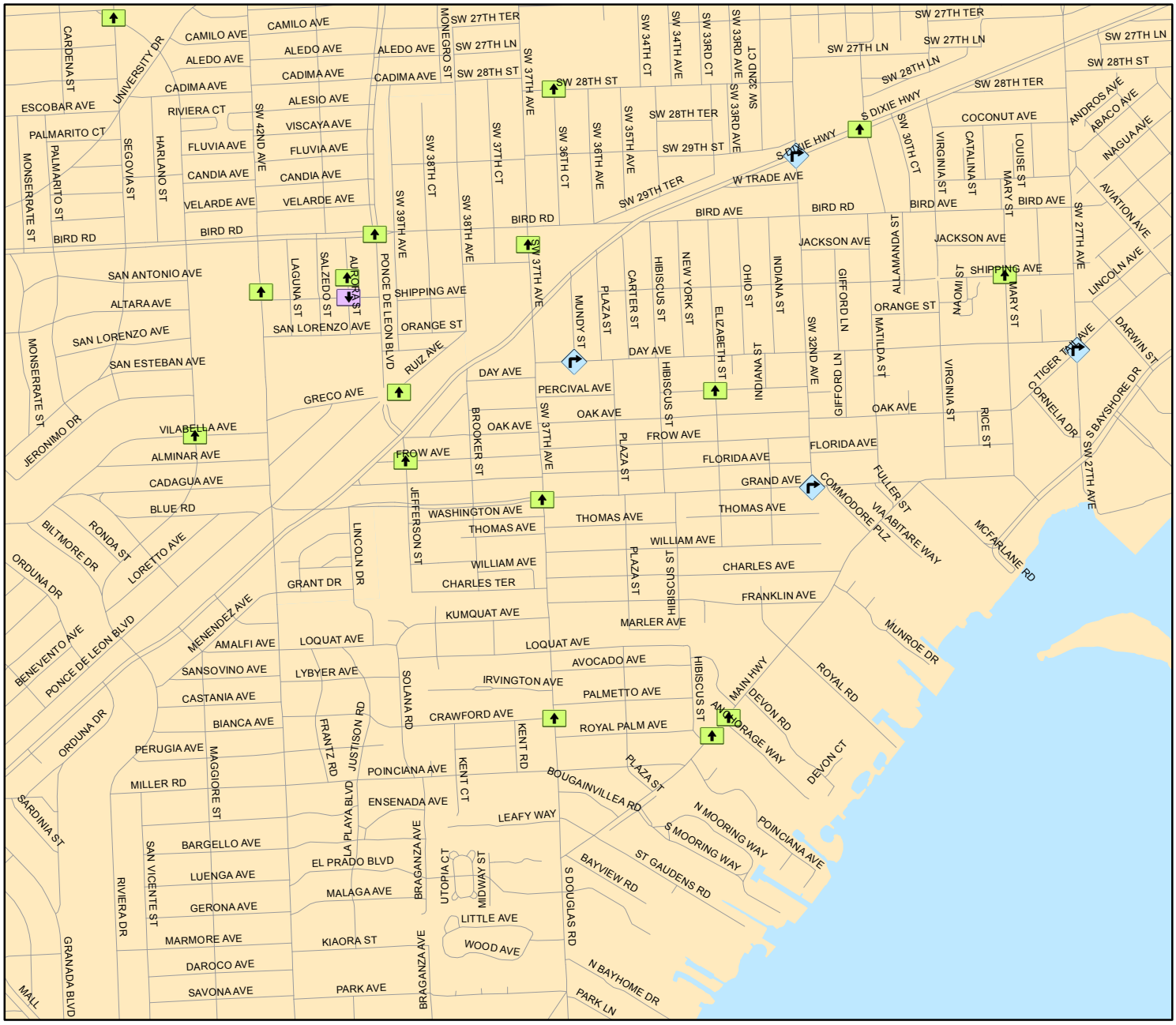
N

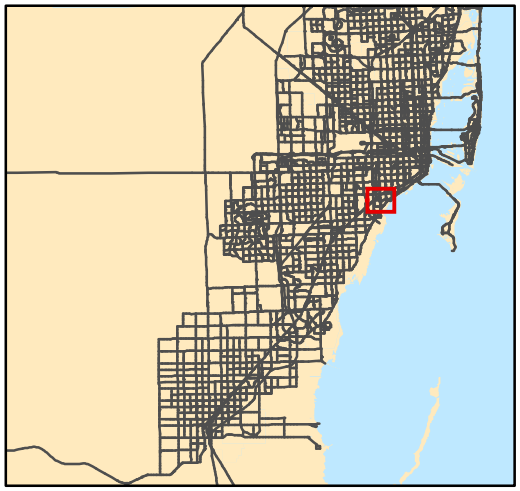
Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Bicycle Crashes 2010-2011

Coconut Grove





0 0.25 0.5 1 Miles

Legend

Vehicle Movement

- Straight
- Stopped/Slowing
- Turning Left
- Turning Right
- Parked
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- Miami-Dade County

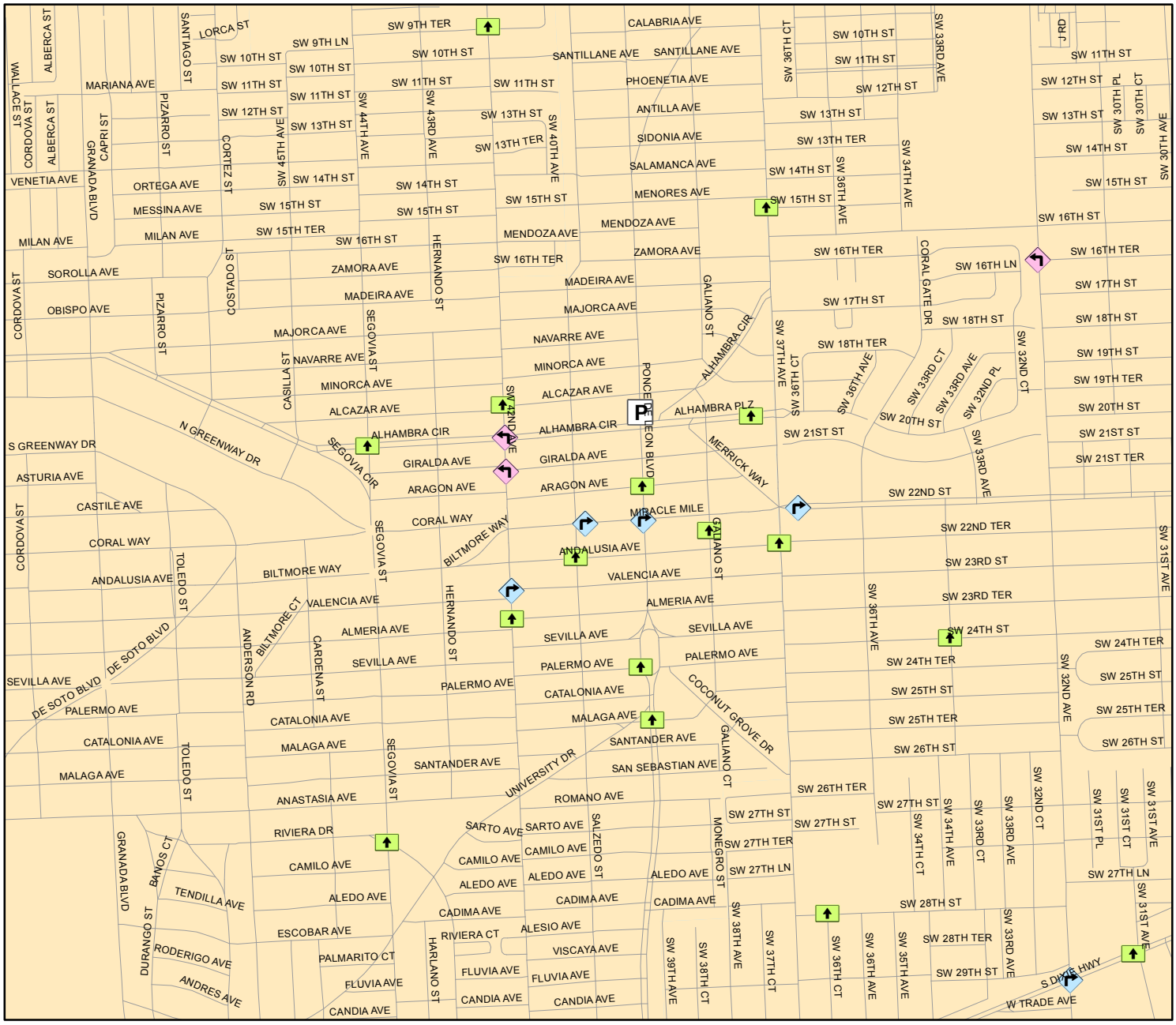
N

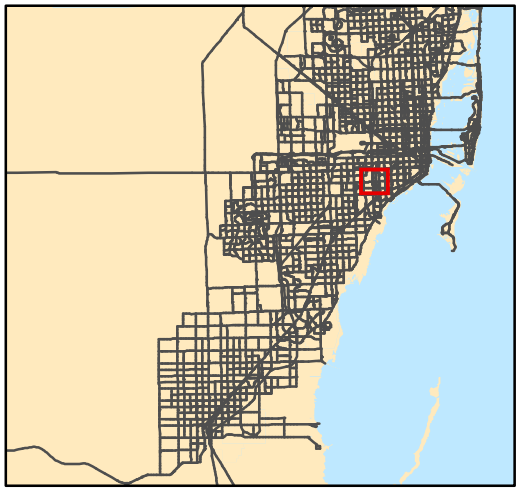
Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Bicycle Crashes 2010-2011

Coral Gables





0 0.25 0.5 1 Miles

Legend

Vehicle Movement

- Straight
- Stopped/Slowing
- Turning Left
- Turning Right
- Parked
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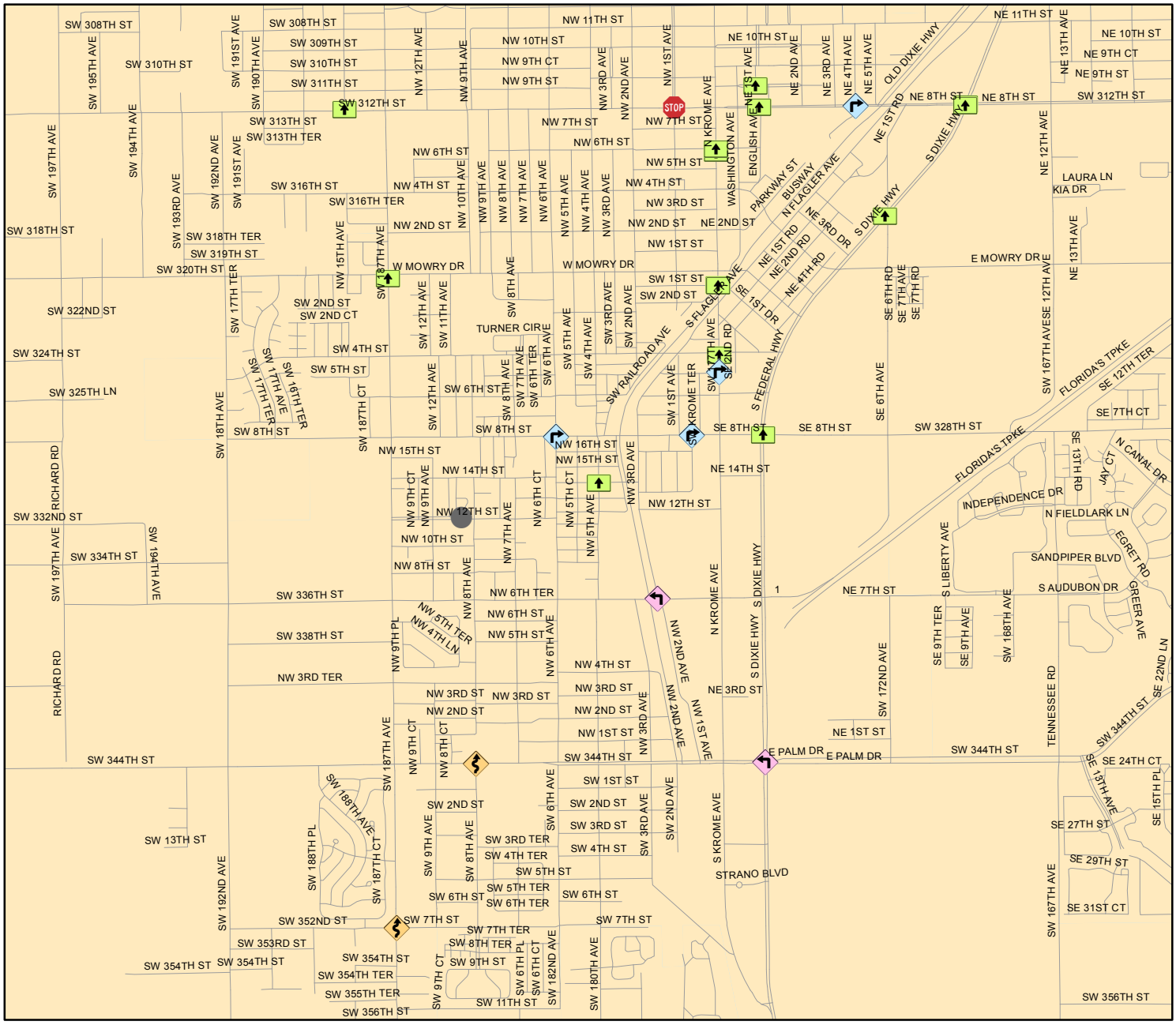
N

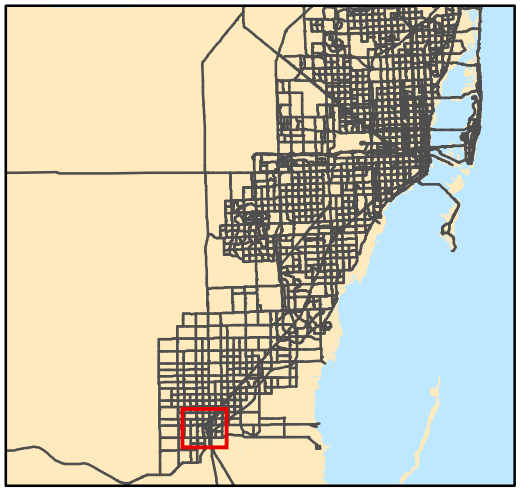
Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Bicycle Crashes 2010-2011

Homestead/Florida City





0 0.25 0.5 1 Miles

Legend

Vehicle Movement

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- Miami-Dade County

N

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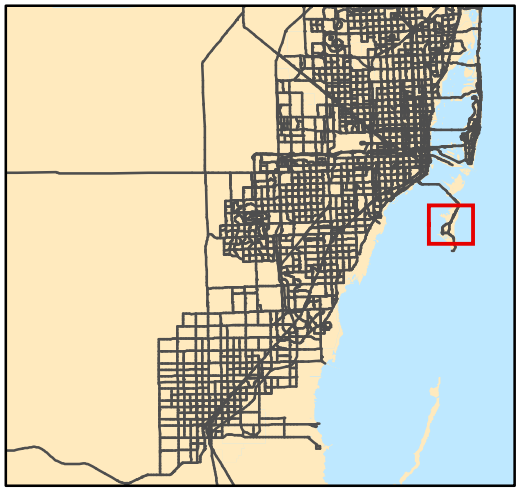
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Bicycle Crashes 2010-2011

Key Biscayne



0 0.25 0.5 1 Miles

Legend

N

Vehicle Movement

- Straight
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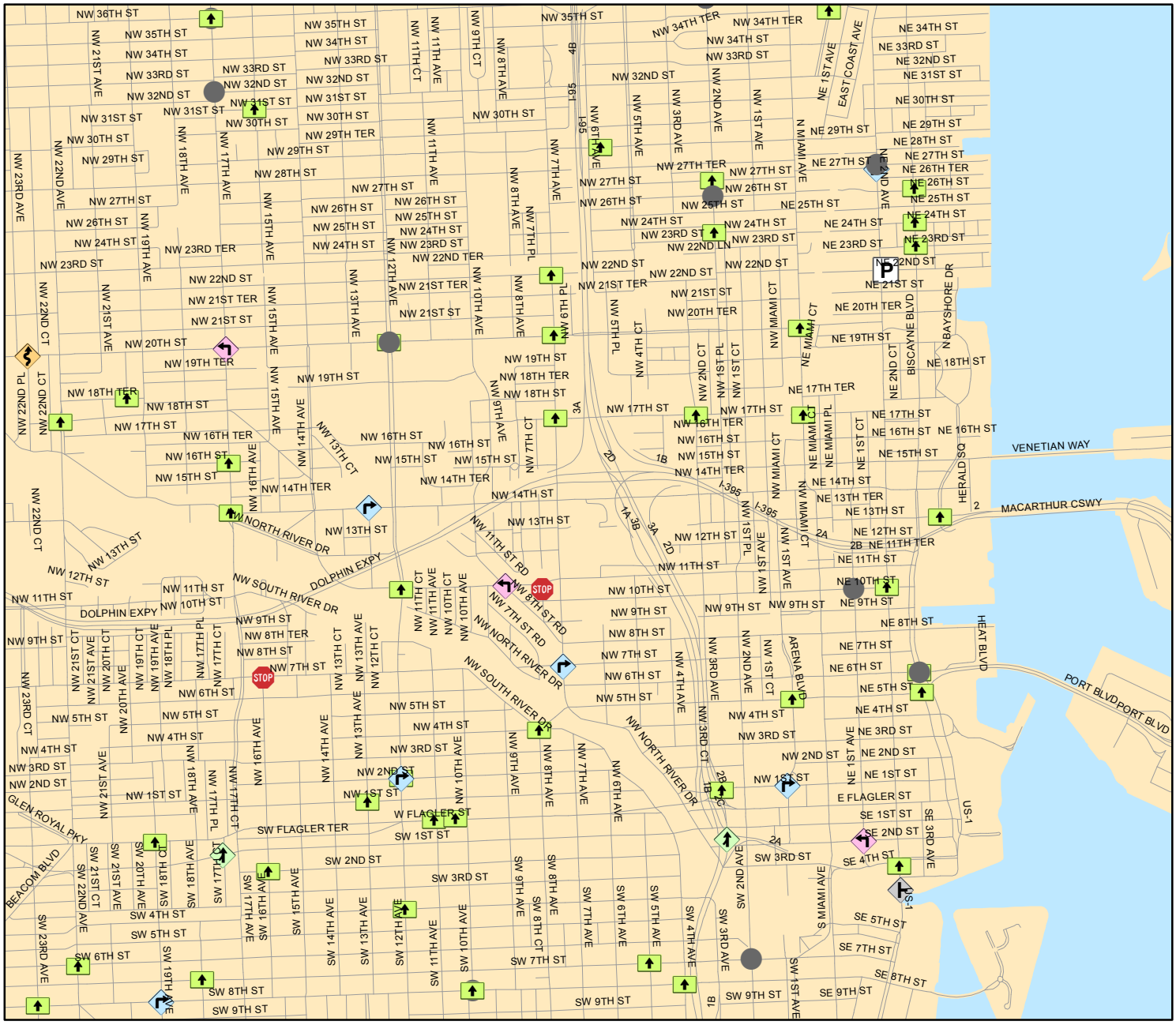
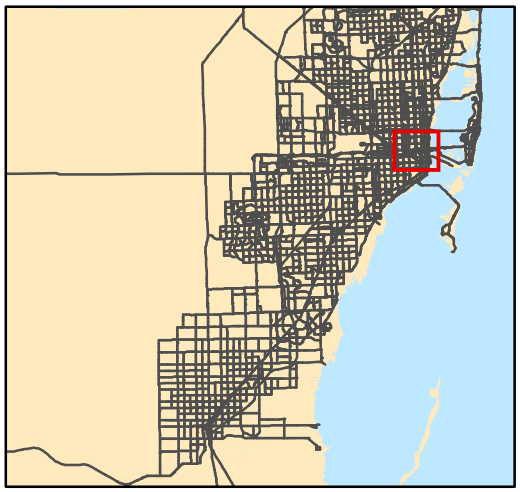
Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Bicycle Crashes 2010-2011

Little Havana/Downtown/Omni





0 0.25 0.5 1 Miles

Legend

Vehicle Movement

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- Turning Left
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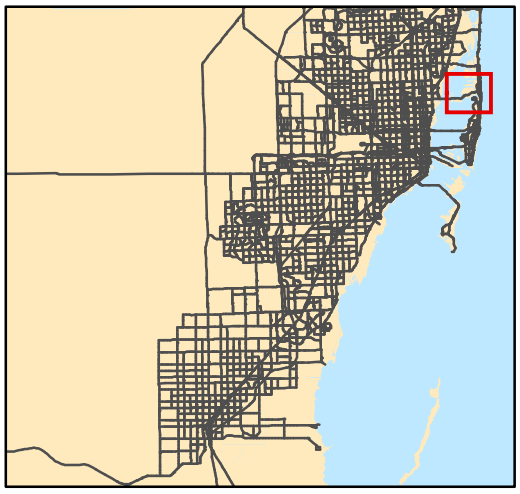
N

Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Bicycle Crashes 2010-2011

North Beach



0 0.25 0.5 1 Miles

Legend

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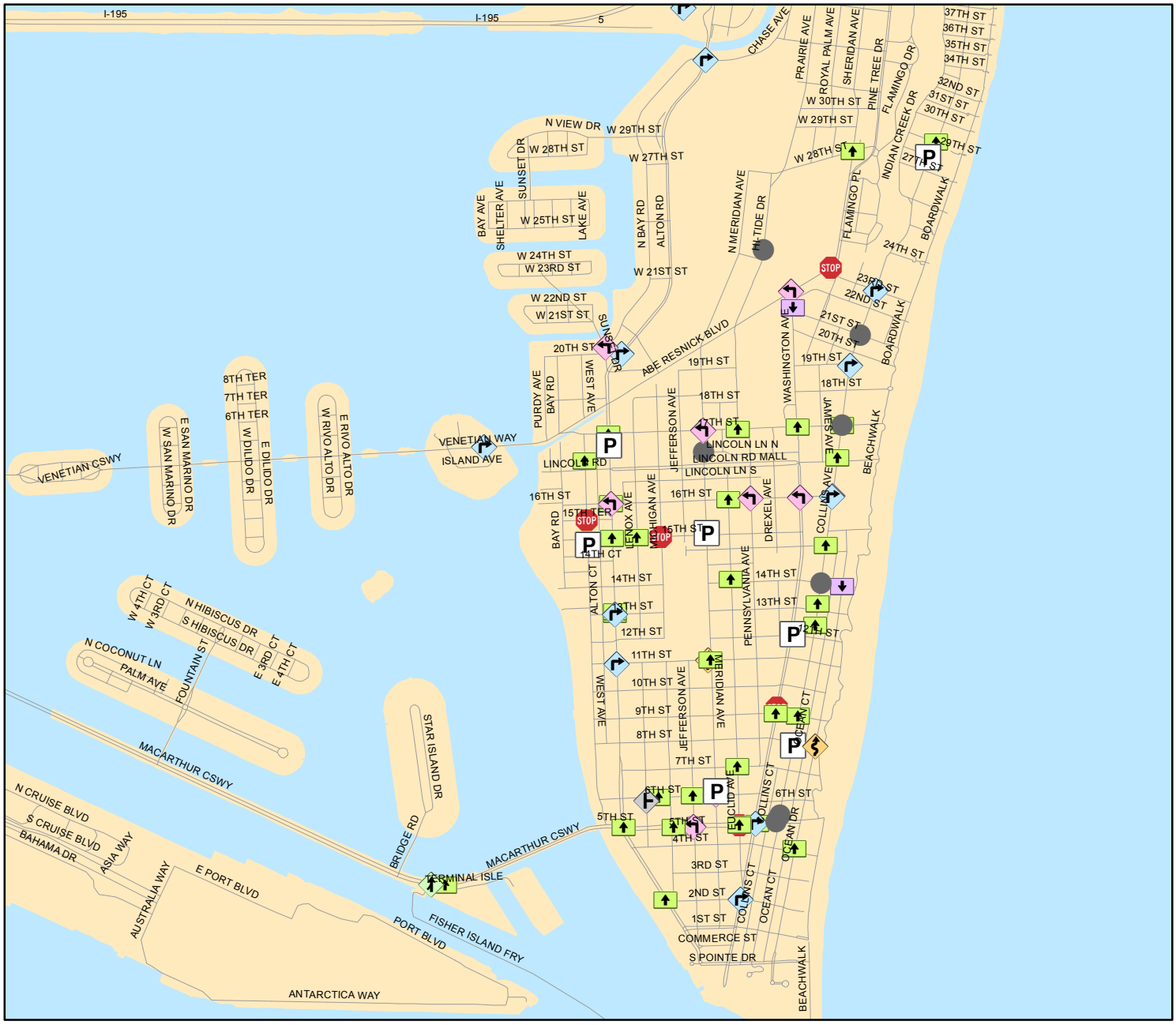
N

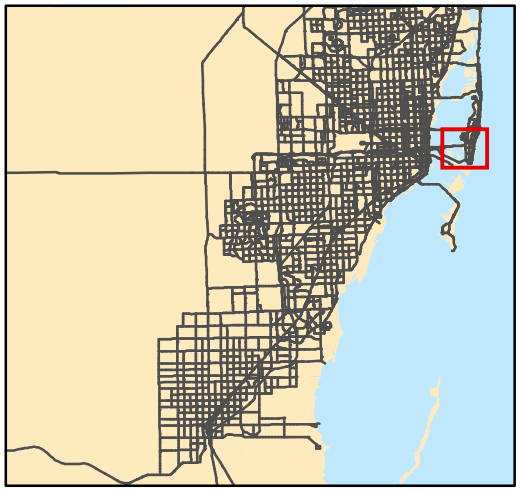
Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Bicycle Crashes 2010-2011

South Beach





0 0.25 0.5 1 Miles

Legend

Vehicle Movement

- Straight
- Stopped/Slowing
- Turning Left
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- Parked
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N

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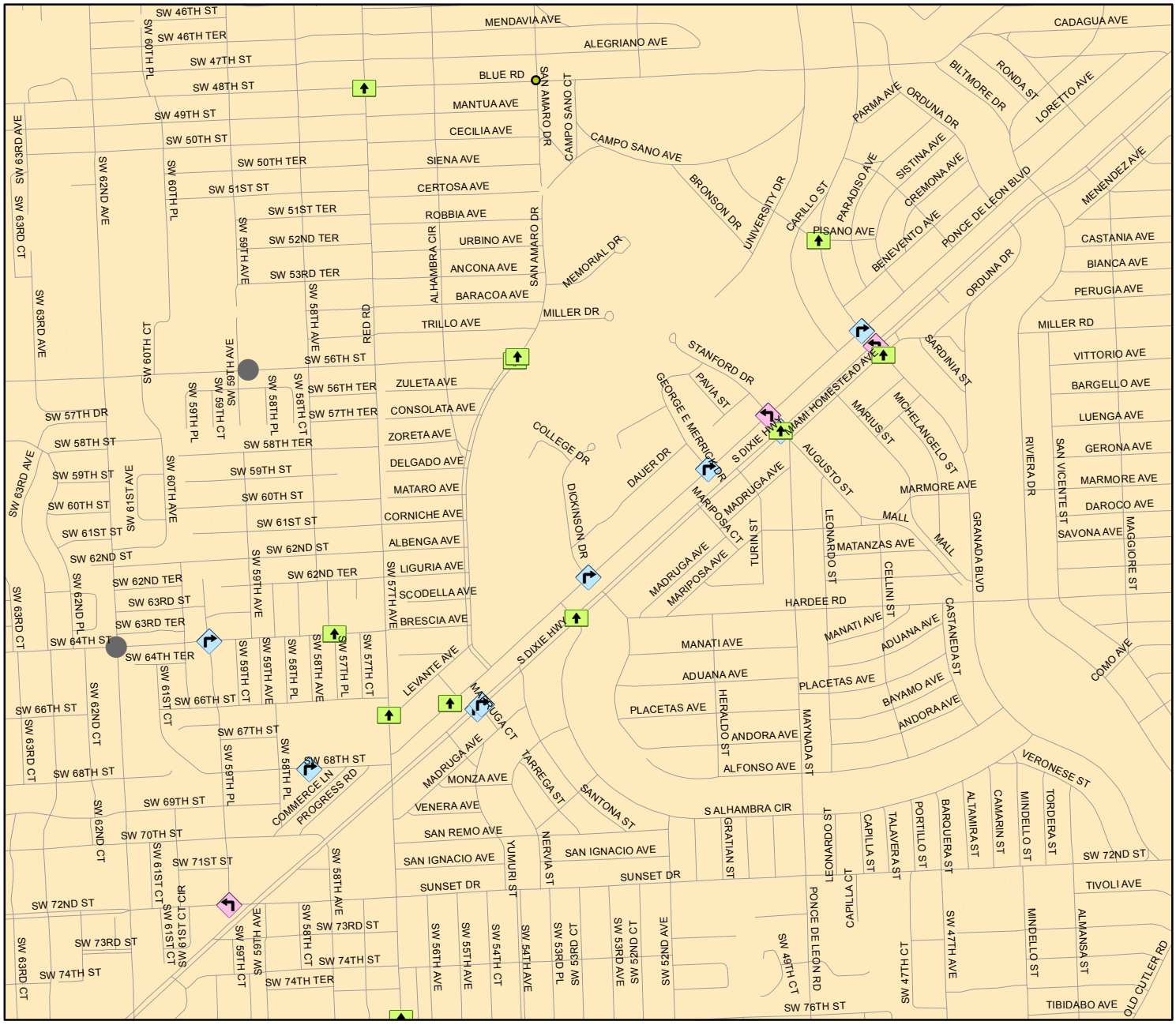
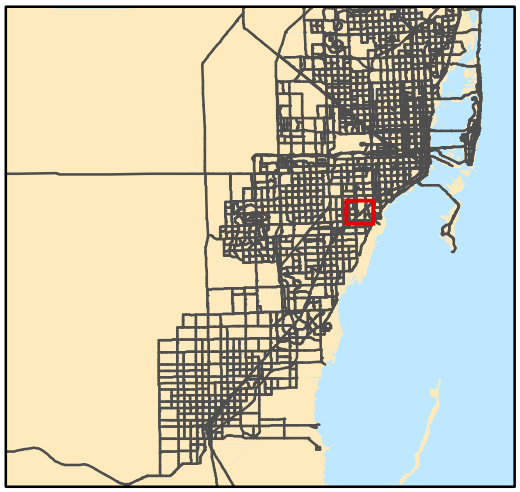
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

High Crash Areas and Corridors - Bicycle Crashes 2010-2011

University of Miami





0 0.25 0.5 1 Miles

Legend

Vehicle Movement

- Straight
- Stopped/Slowing
- Turning Left
- Turning Right
- Parked
- Overtaking/Passing
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- Backing
- Other
- Making U-Turn
- Changing Lanes

- High Crash Area (Top 5%)
- Major Roads
- Miami-Dade County

N

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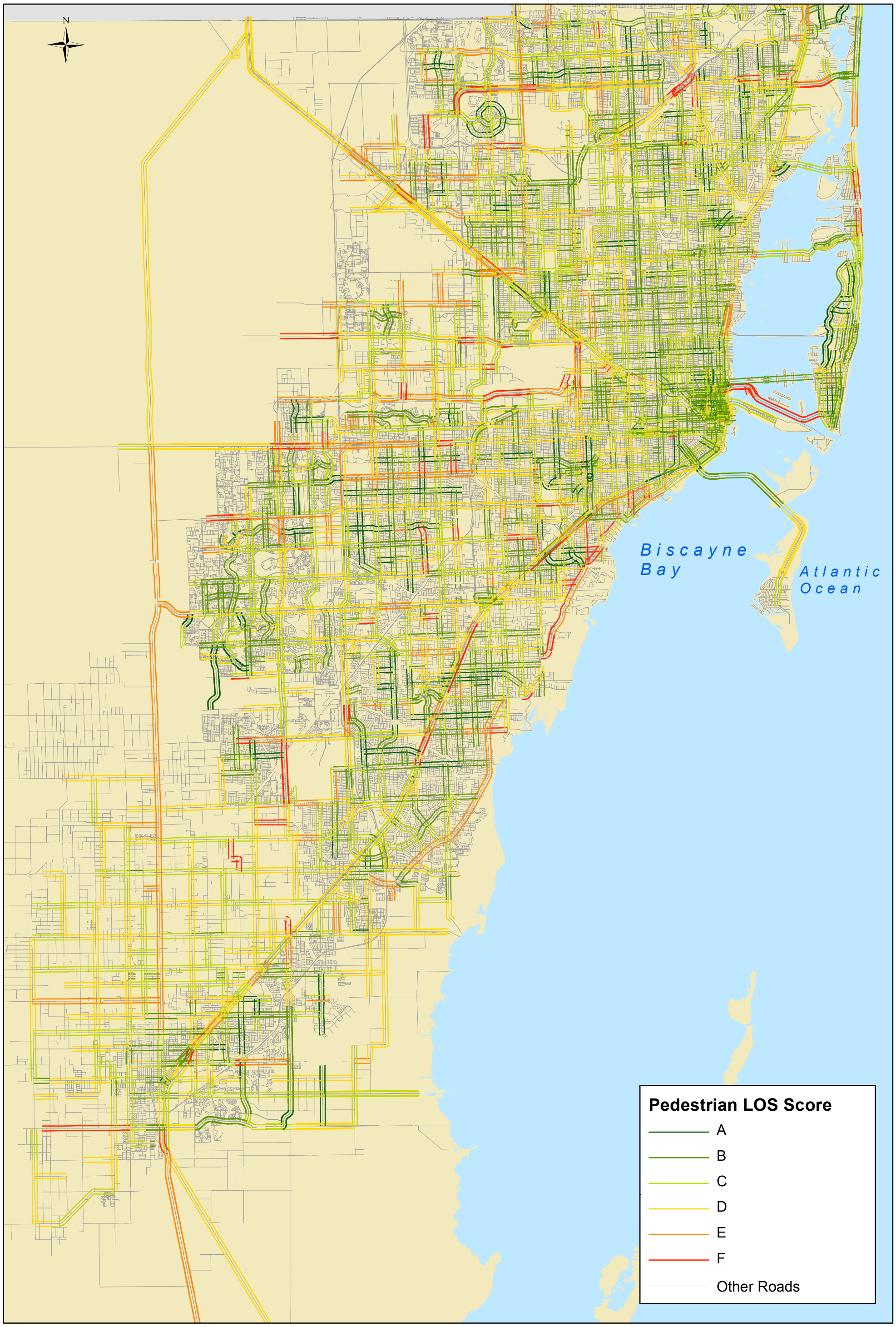
Appendix C

PLOS and BLOS Maps

PLOS Maps

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
Miami-Dade County



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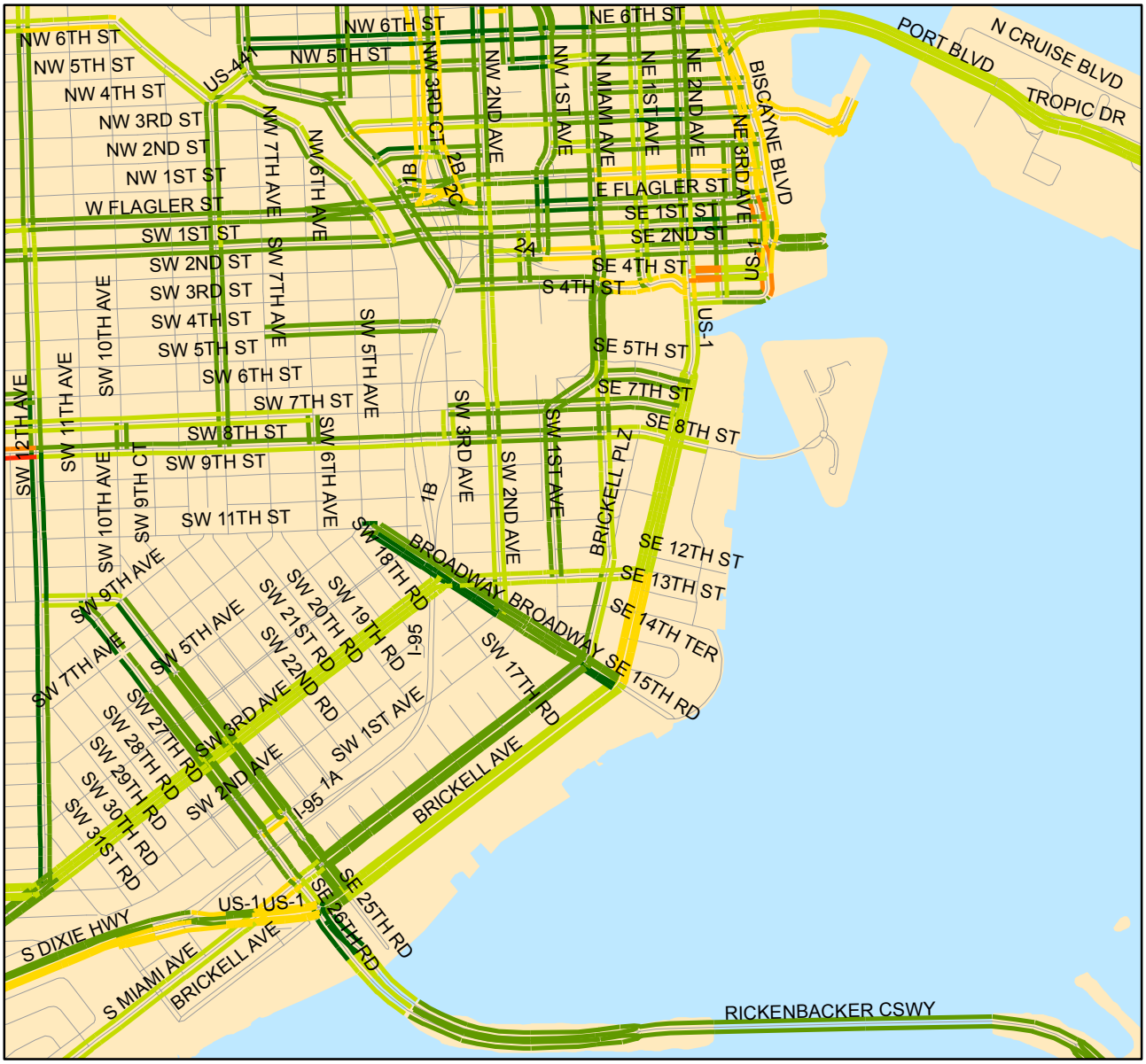
0 2 4 8 Miles

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

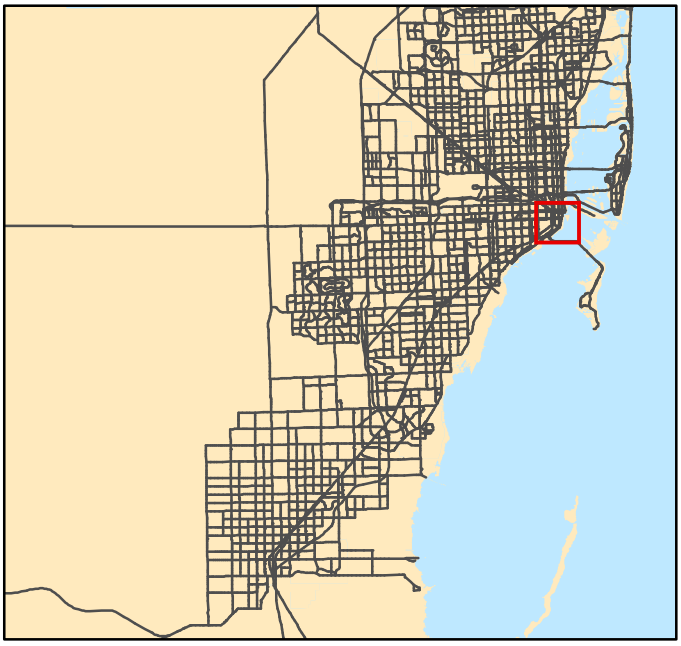
Pedestrian Level of Service
Brickell



0 0.25 0.5 1 Miles

Pedestrian LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads



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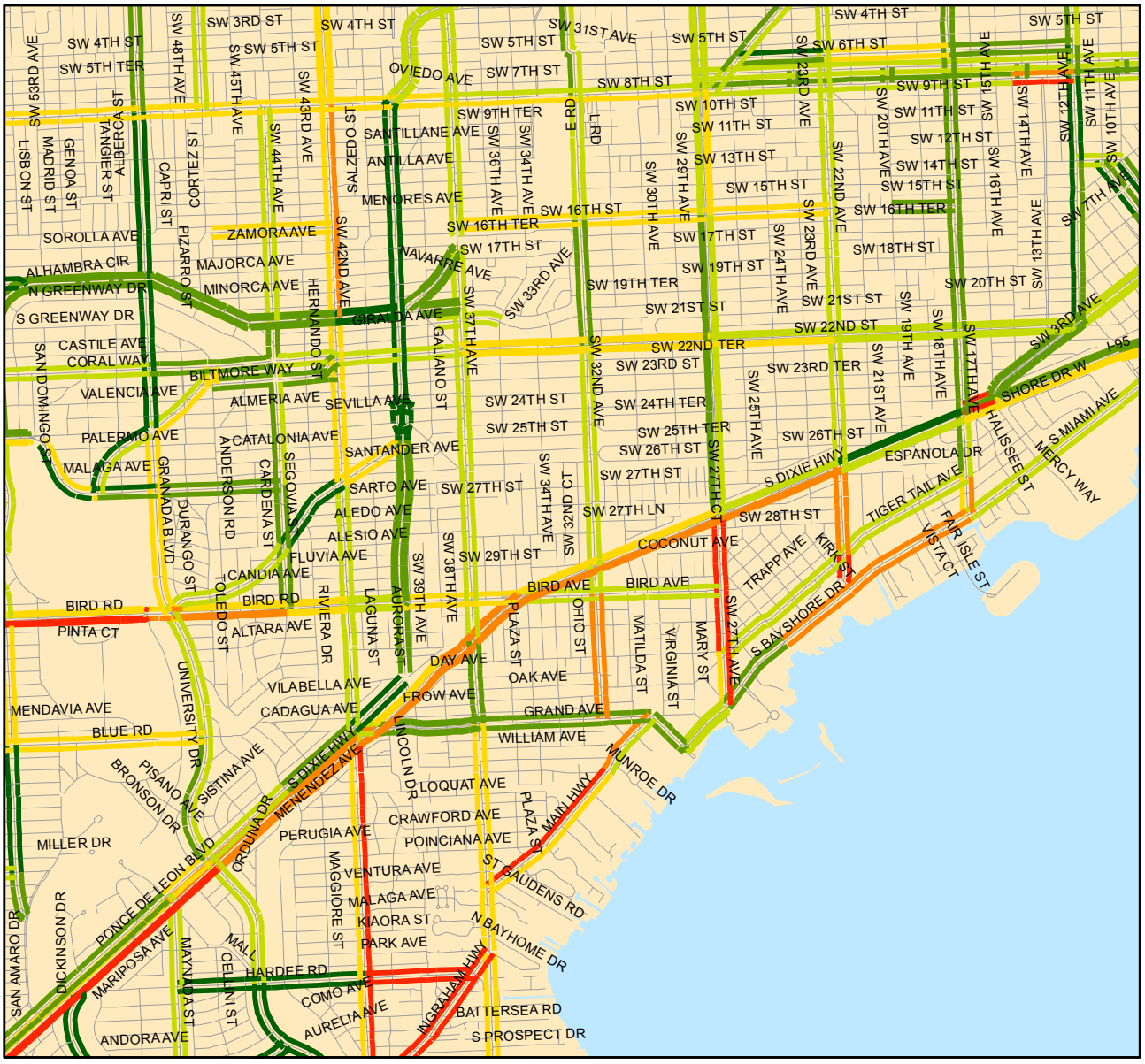
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
Coconut Grove

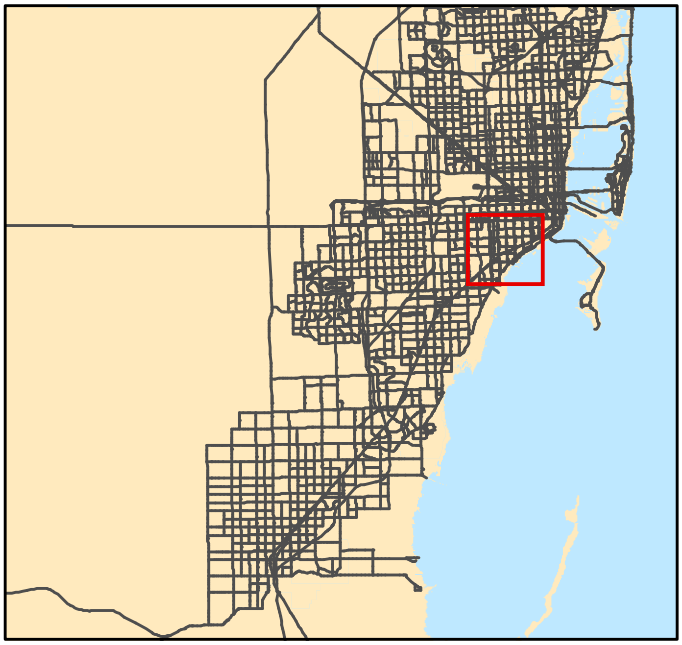


0 0.25 0.5 1 Miles

N

Pedestrian LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads



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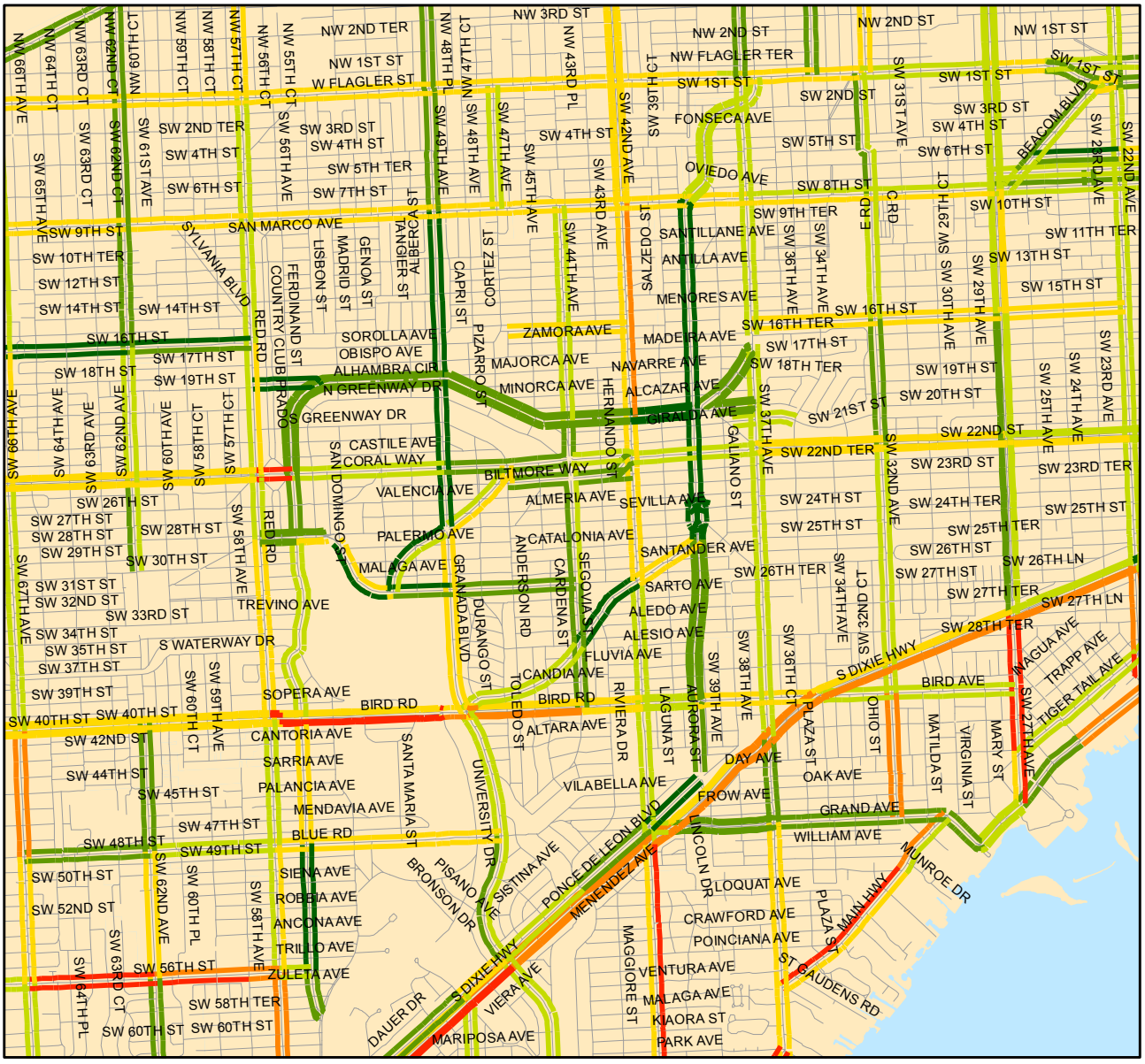
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
Coral Gables

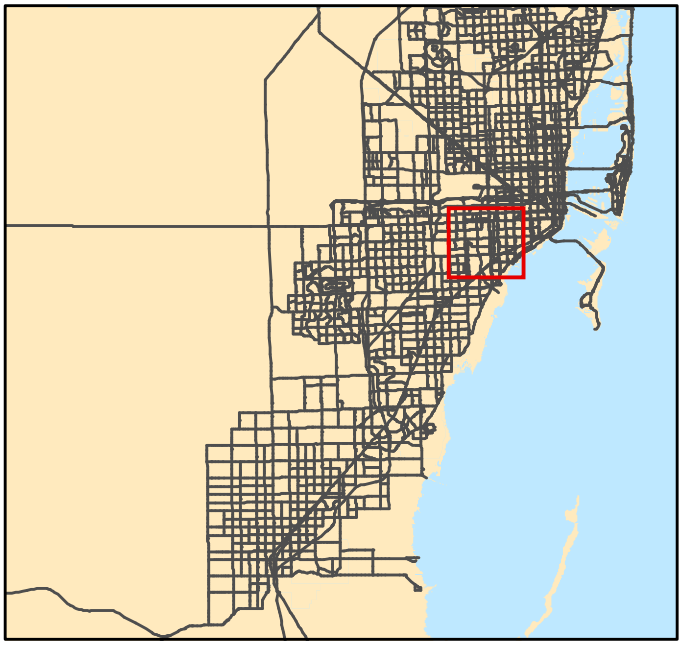


0 0.25 0.5 1 Miles

Pedestrian LOS Score

N

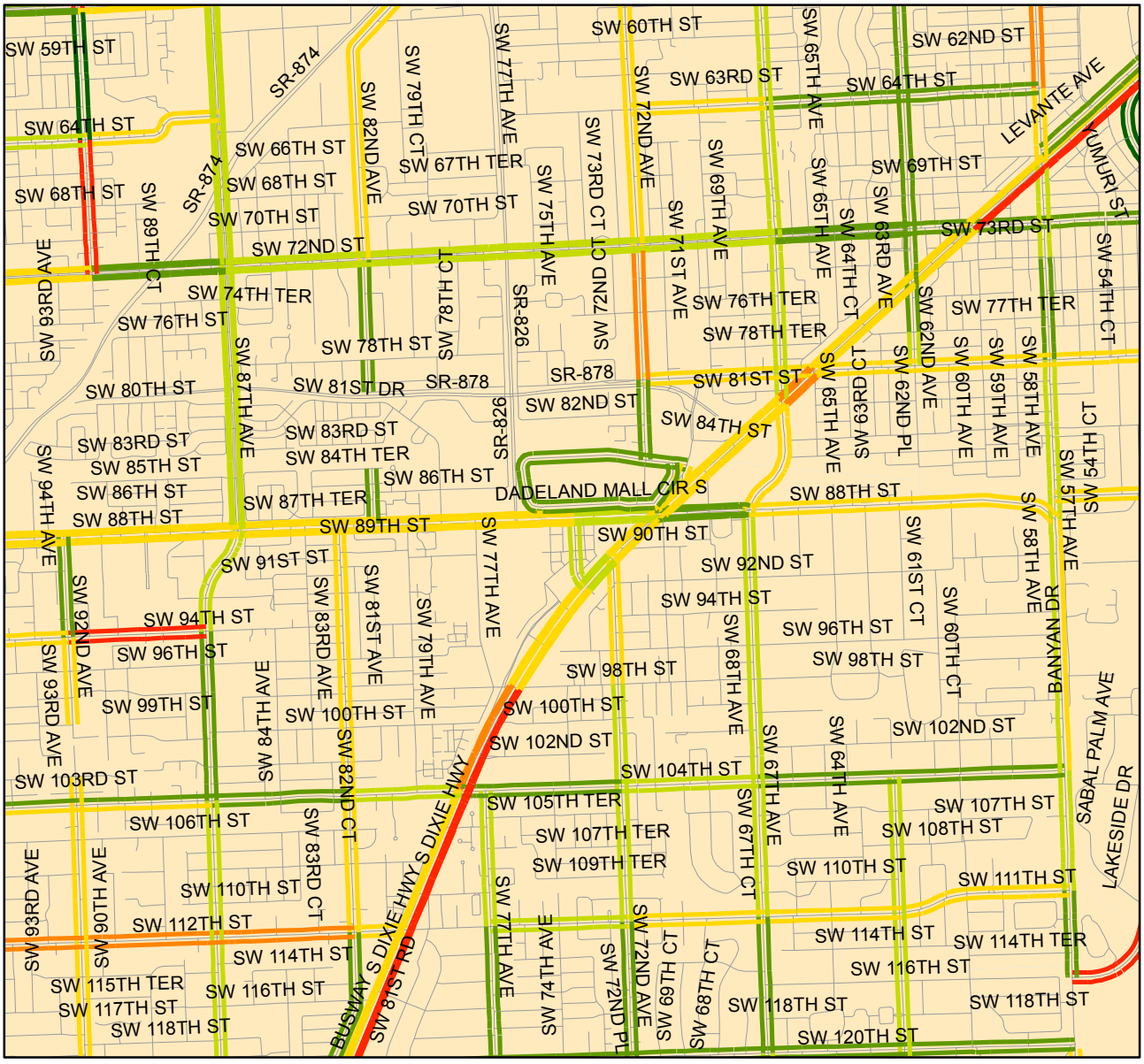
- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

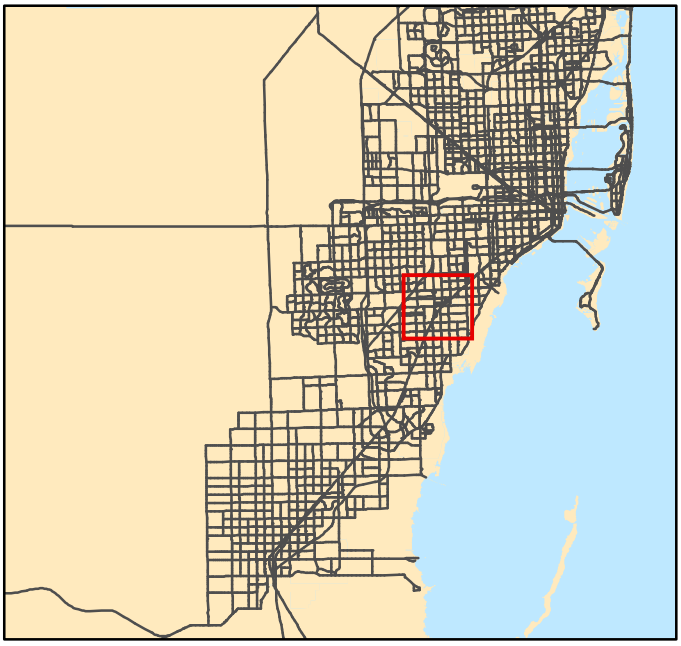
Pedestrian Level of Service
Dadeland



0 0.25 0.5 1 Miles

Pedestrian LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads



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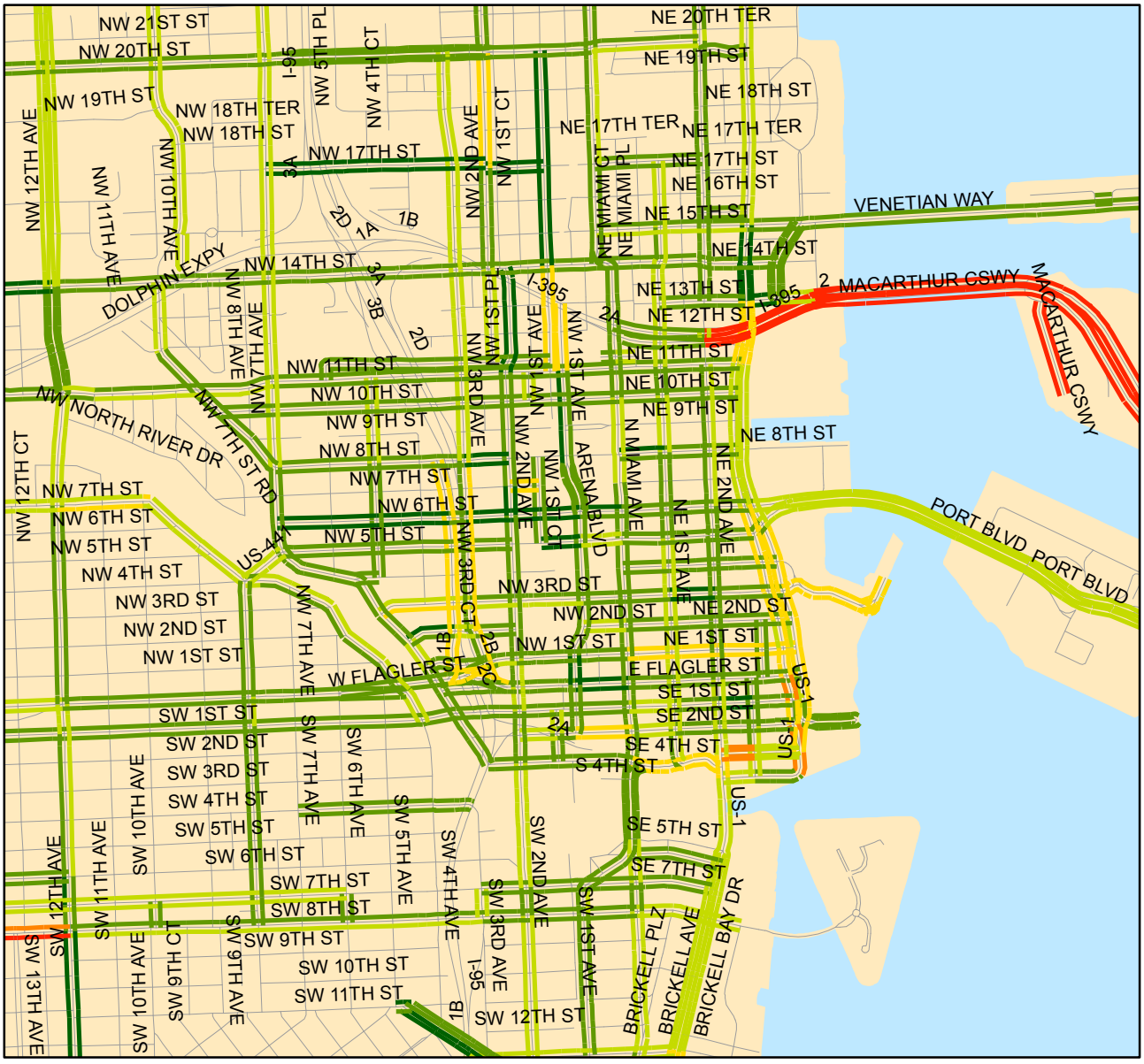
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
Downtown

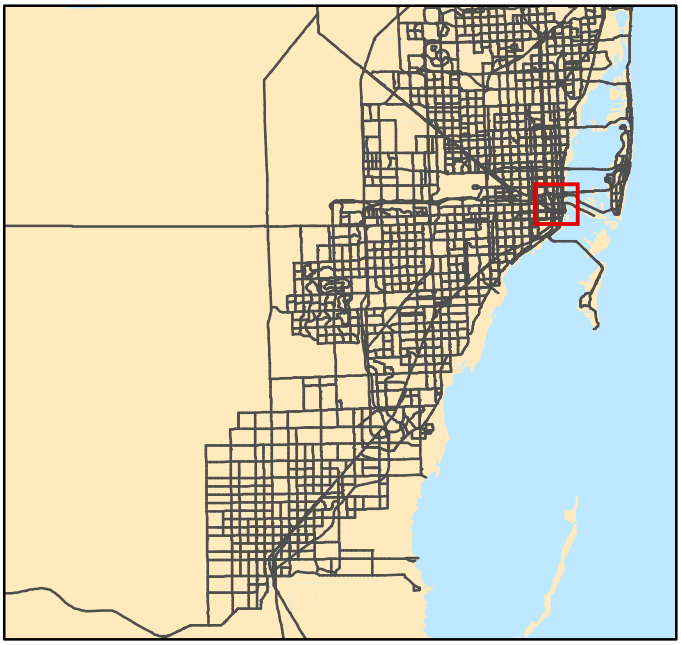


0 0.25 0.5 1 Miles

Pedestrian LOS Score

N

- A
- B
- C
- D
- E
- F
- Other Roads

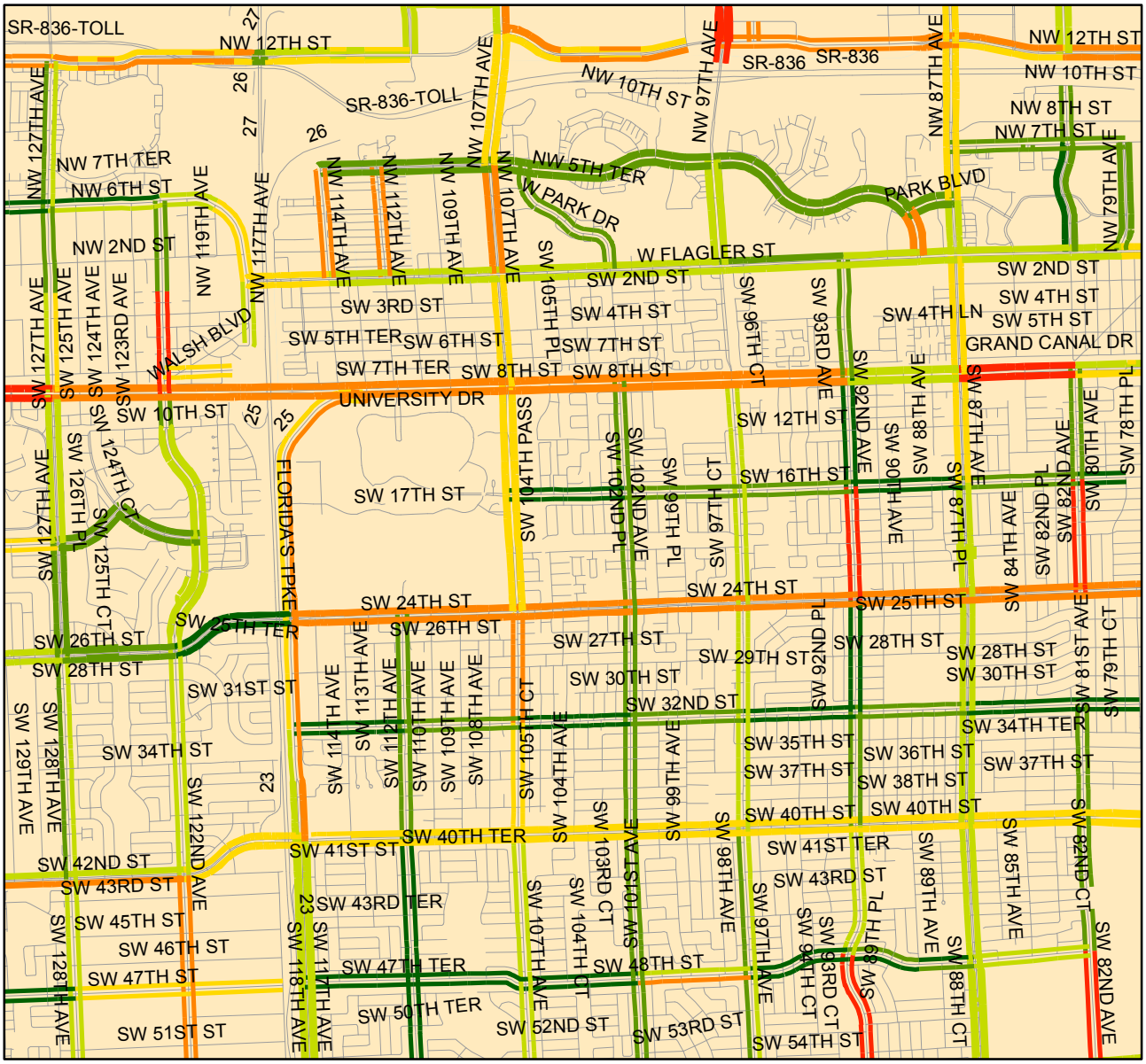


Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service

FIU - Modesto A. Maidique (Main) Campus

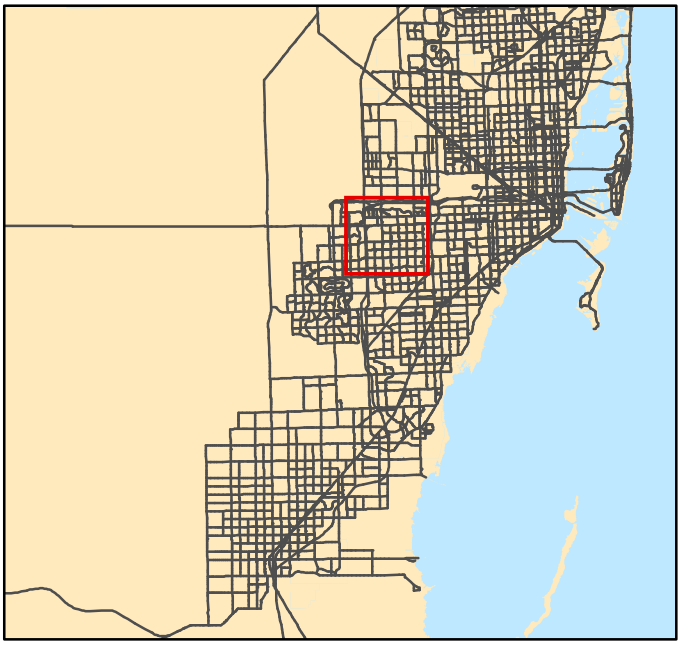


0 0.25 0.5 1 Miles

Pedestrian LOS Score

N

- A
- B
- C
- D
- E
- F
- Other Roads



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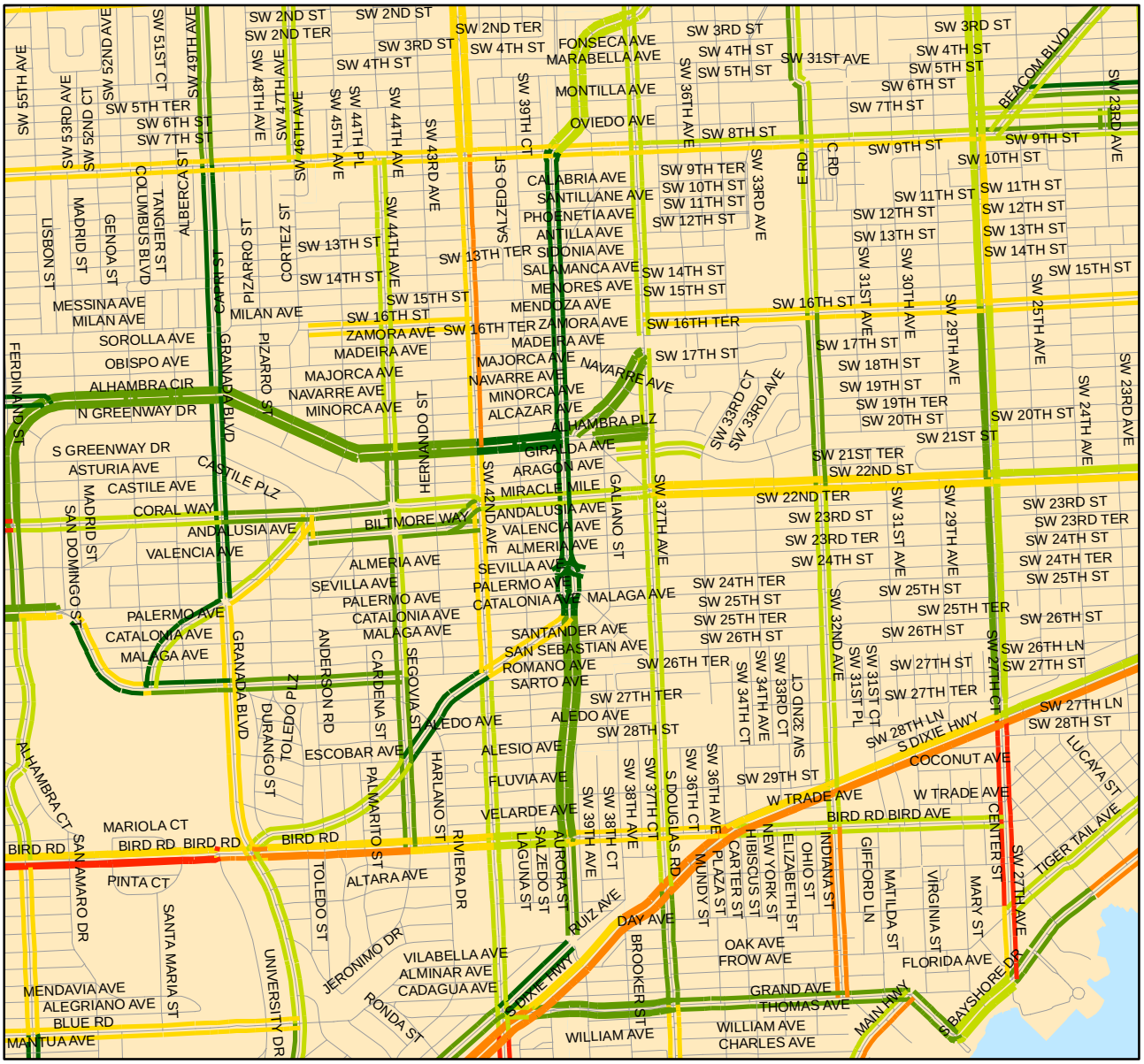
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service

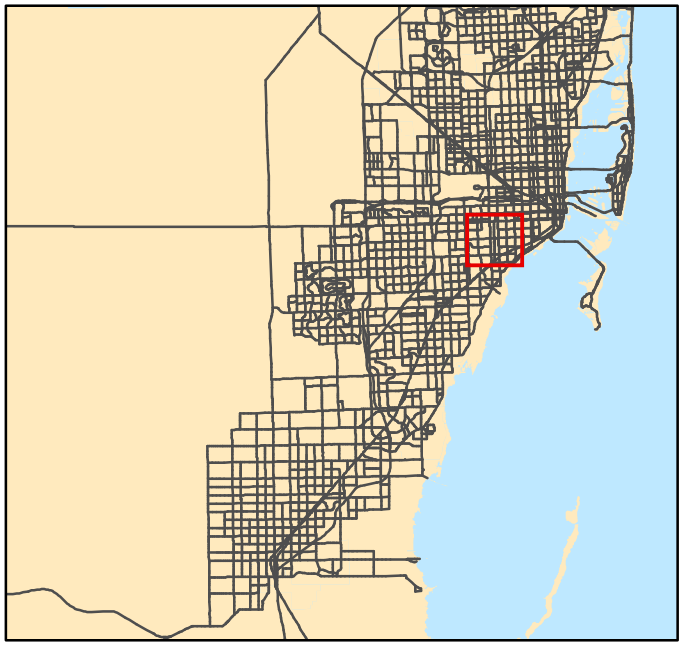
Flagami



0 0.25 0.5 1 Miles

Pedestrian LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads



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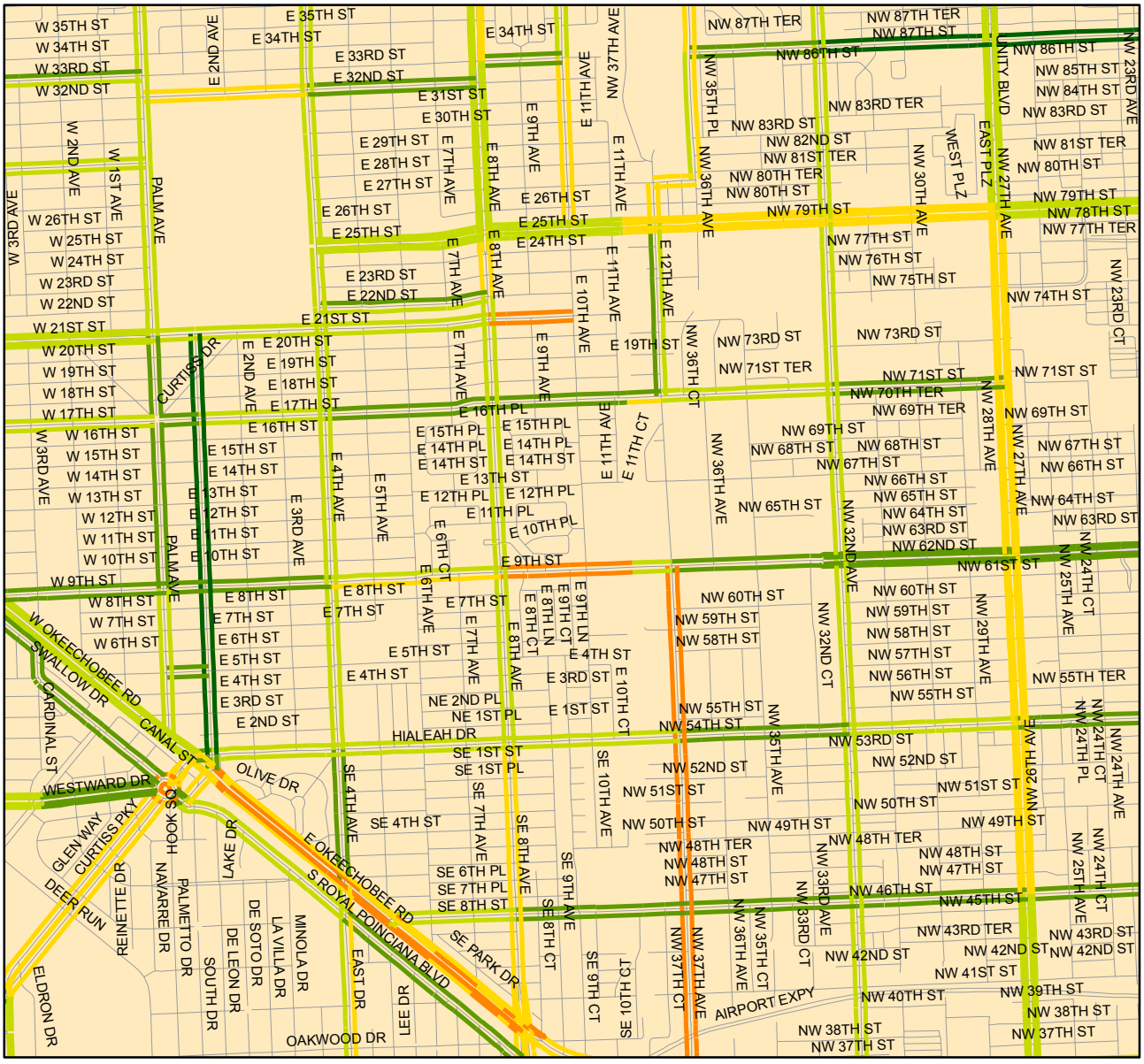
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
Hialeah Area

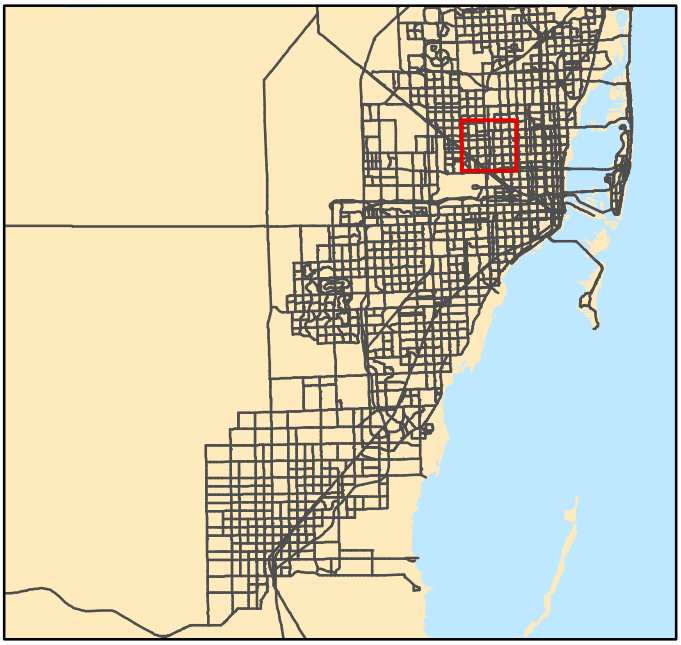


0 0.25 0.5 1 Miles

Pedestrian LOS Score

N

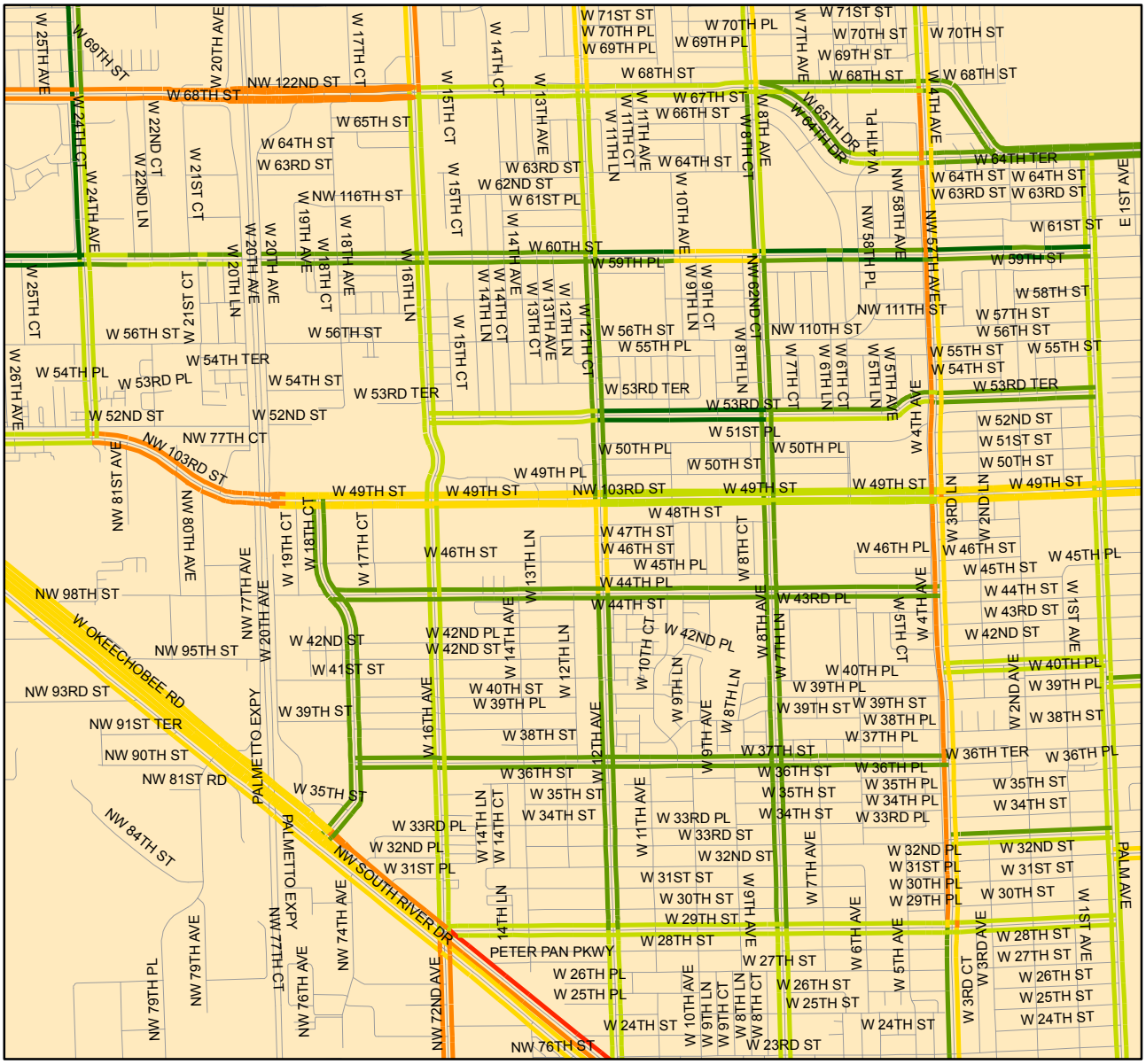
- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
Hialeah Northwest

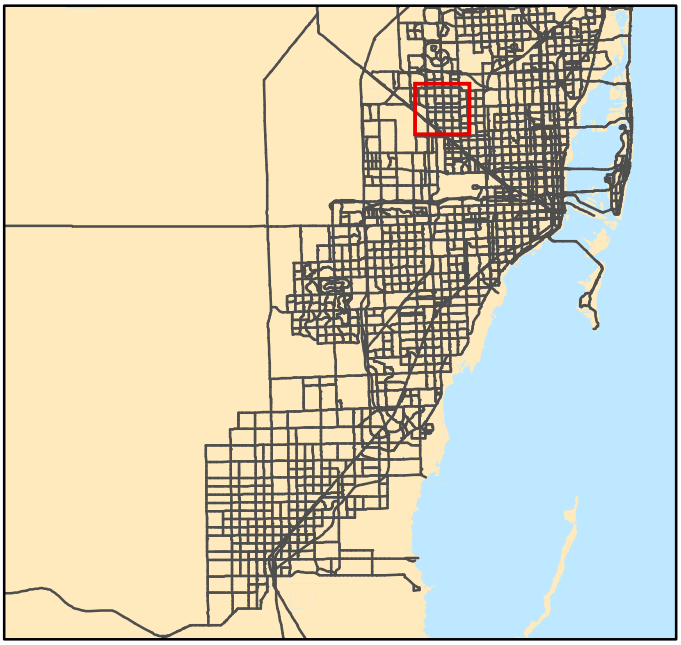


0 0.25 0.5 1 Miles

Pedestrian LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads

N



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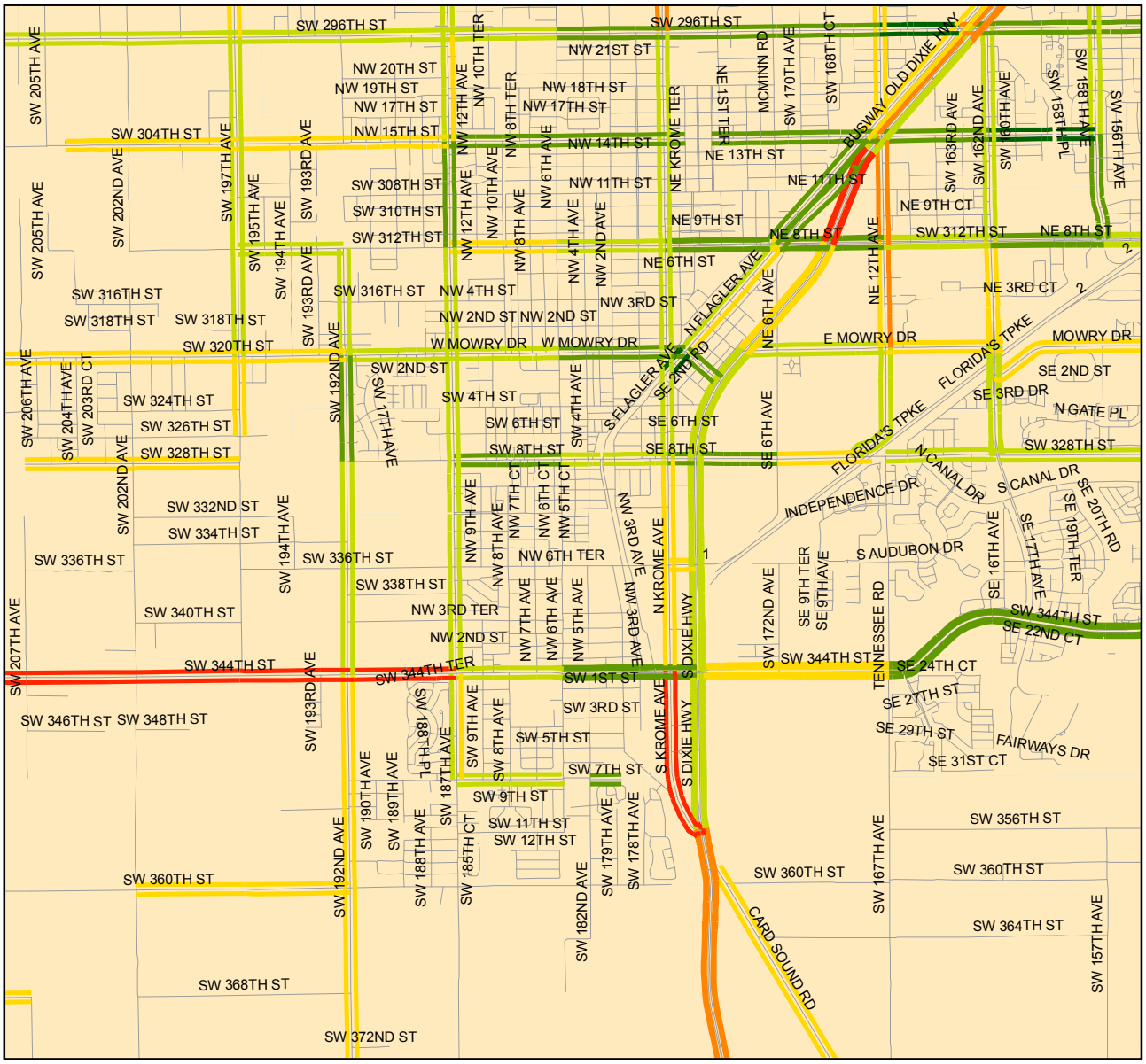
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
Homestead/Florida City



0 0.25 0.5 1 Miles

Pedestrian LOS Score

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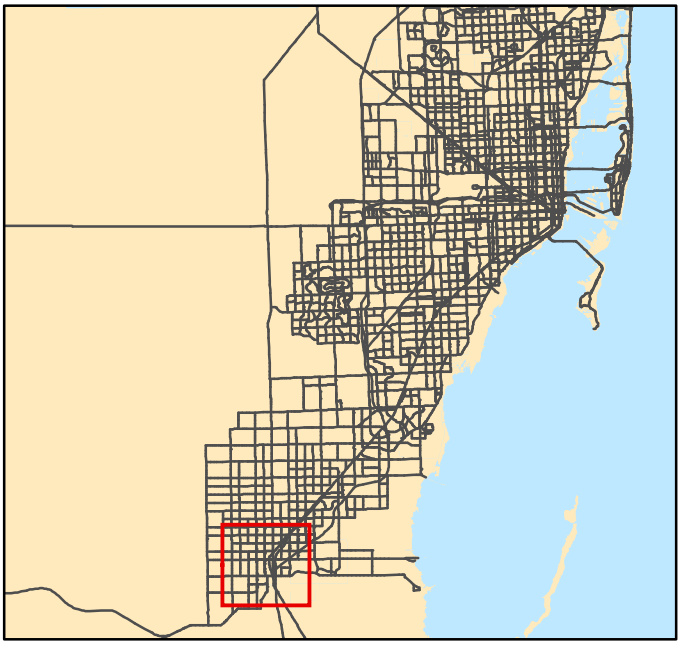
- Other Roads

N



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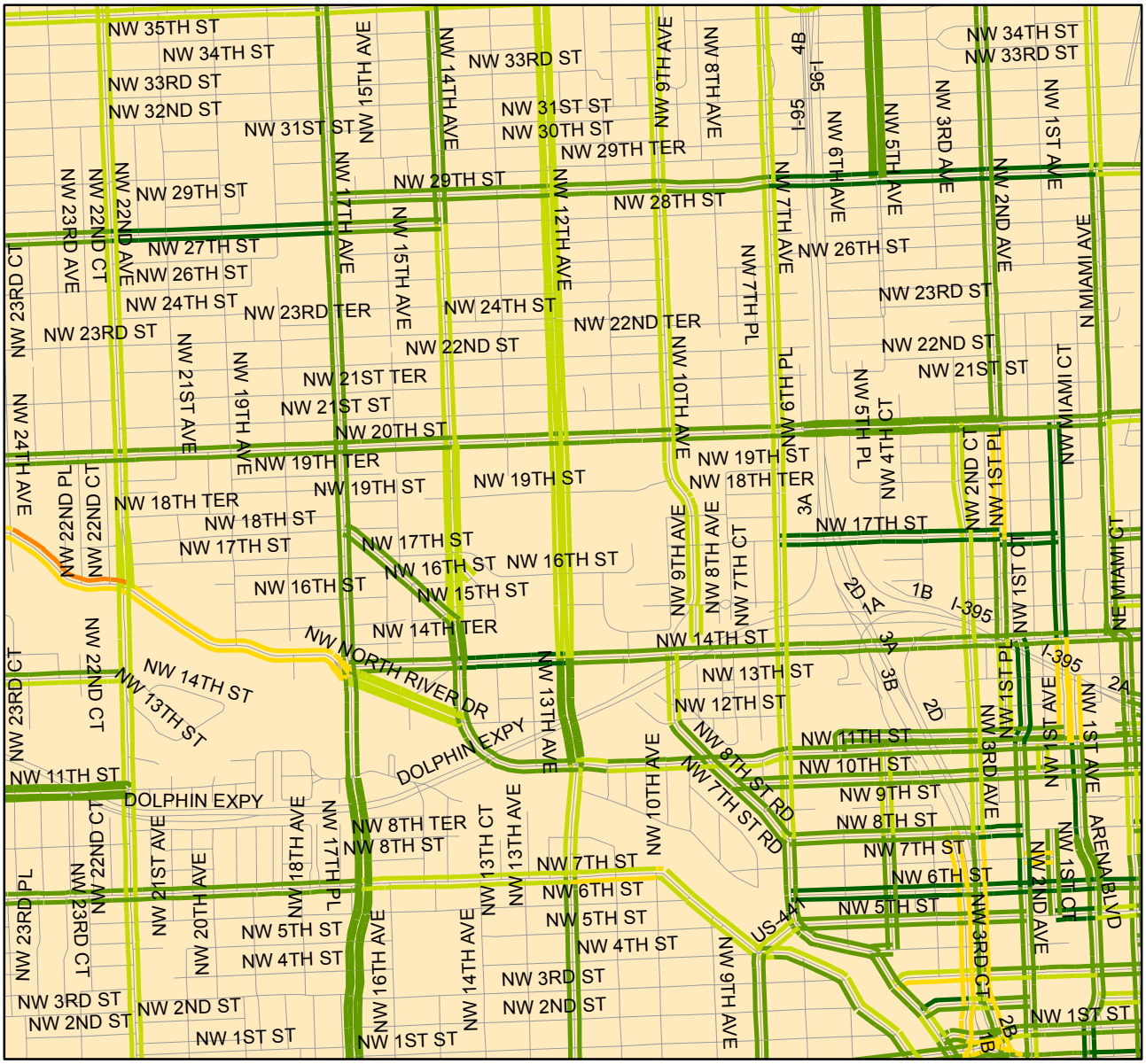
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

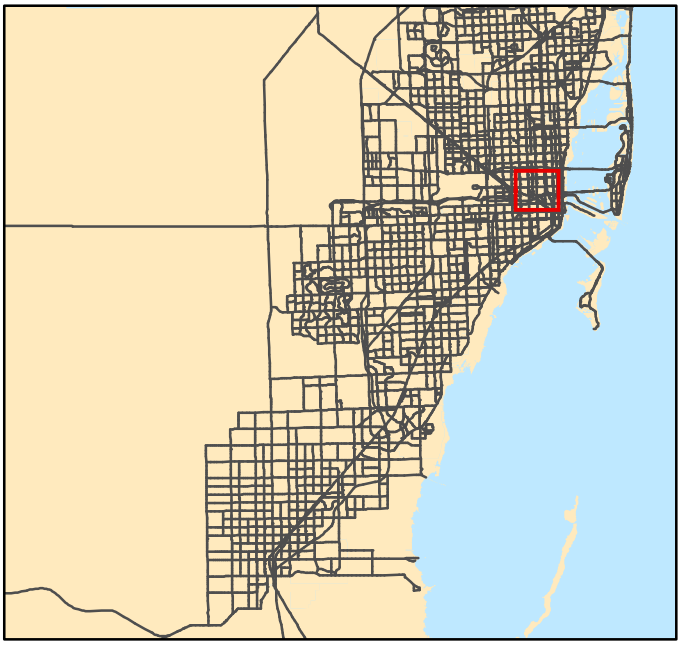
Pedestrian Level of Service
Hospital/Civic Center



0 0.25 0.5 1 Miles

Pedestrian LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

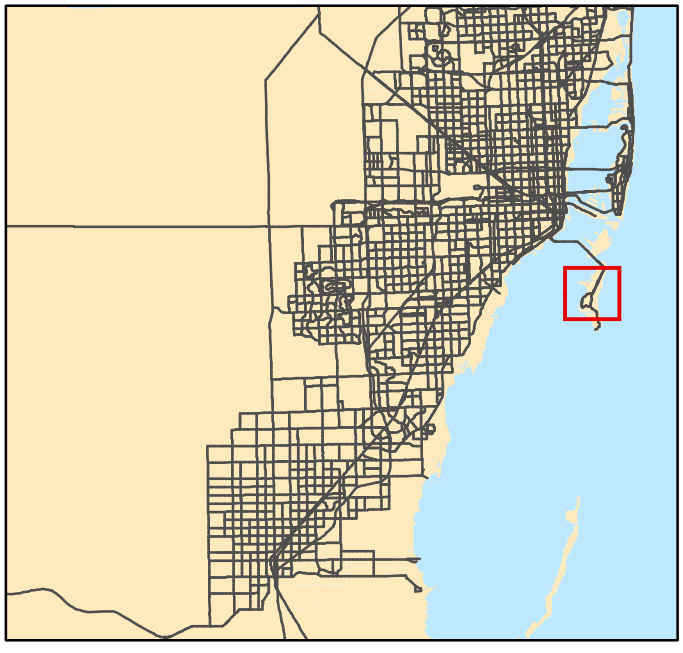
Pedestrian Level of Service

Key Biscayne

0 0.25 0.5 1 Miles

Pedestrian LOS Score

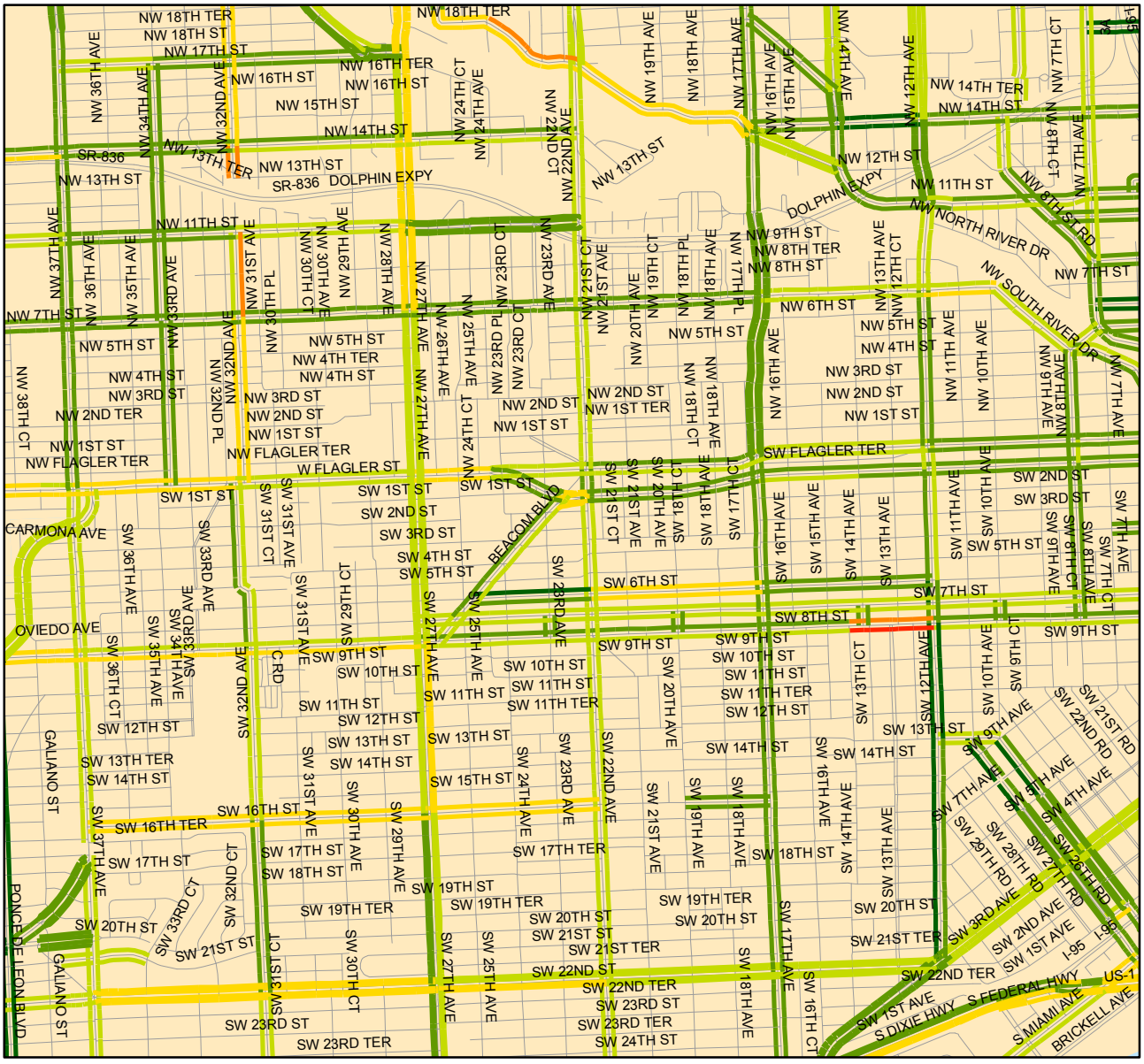
- A
- B
- C
- D
- E
- F
- Other Roads



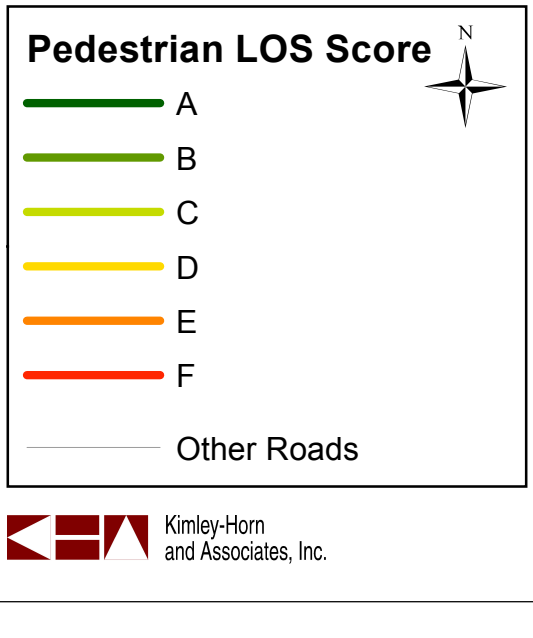
Kimley-Horn and Associates, Inc.

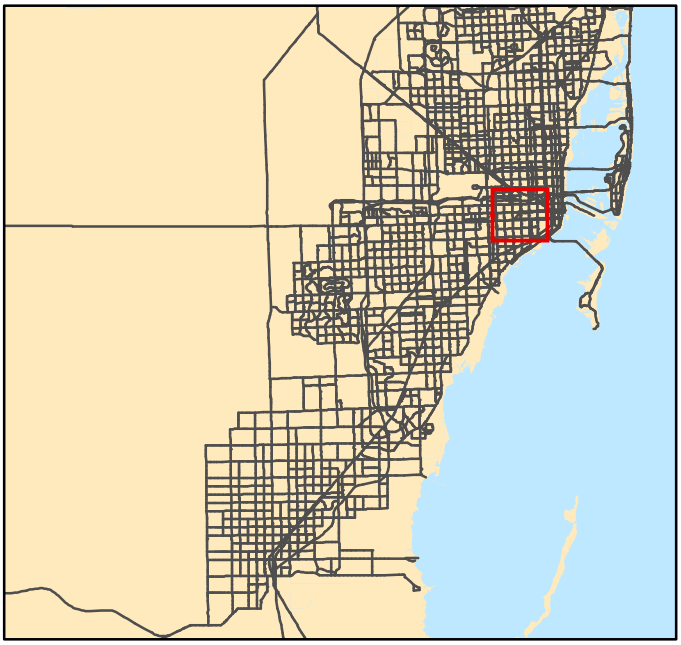
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
Little Havana



0 0.25 0.5 1 Miles

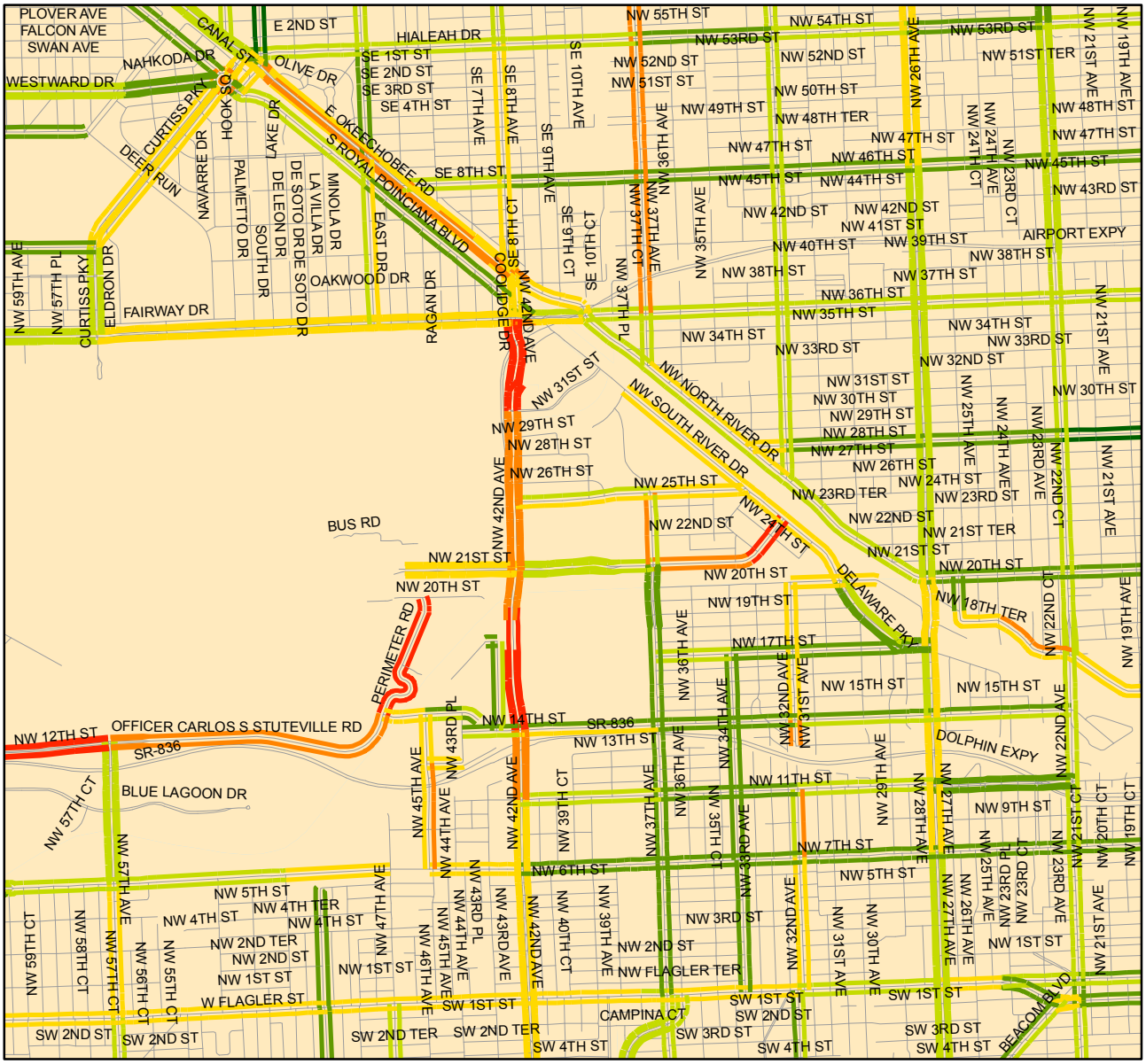




Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
Miami Intermodal Center

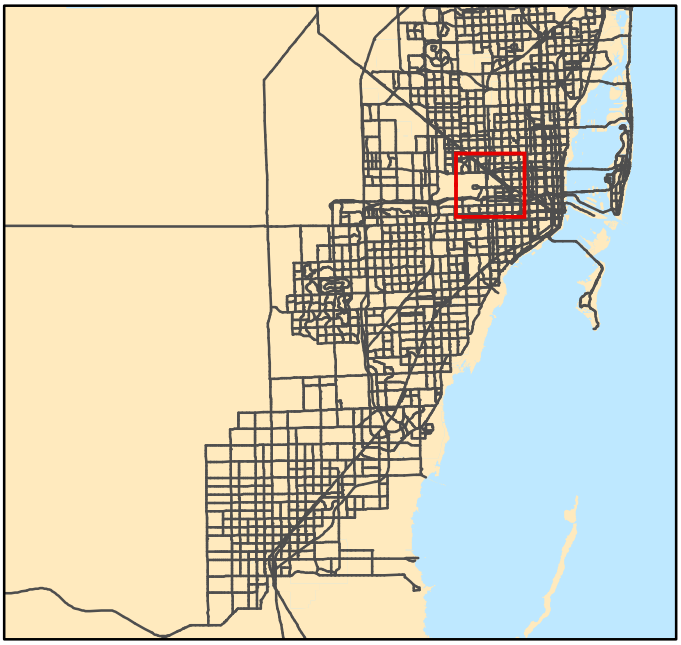


0 0.25 0.5 1 Miles

Pedestrian LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads

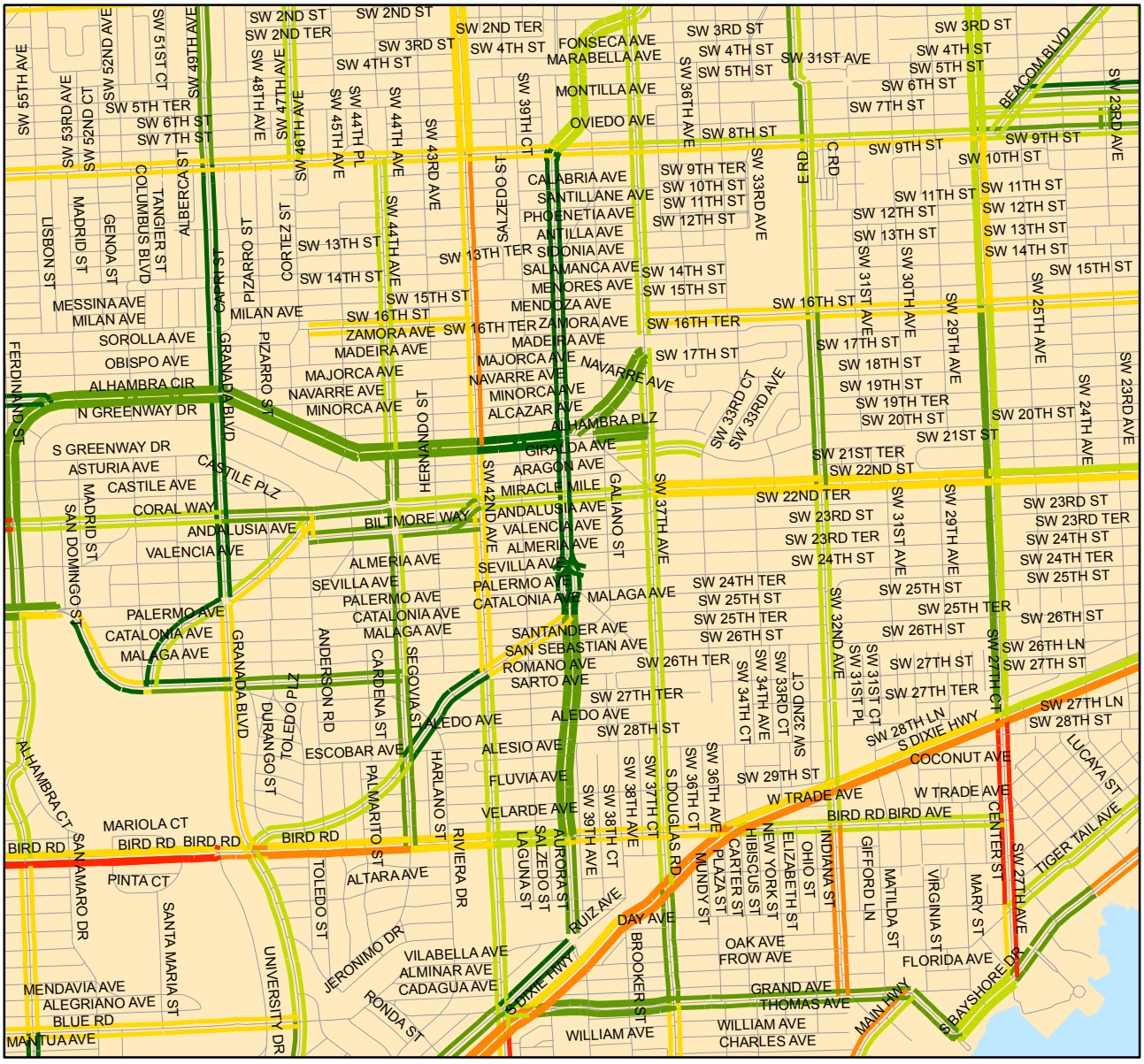
N



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
Miracle Mile

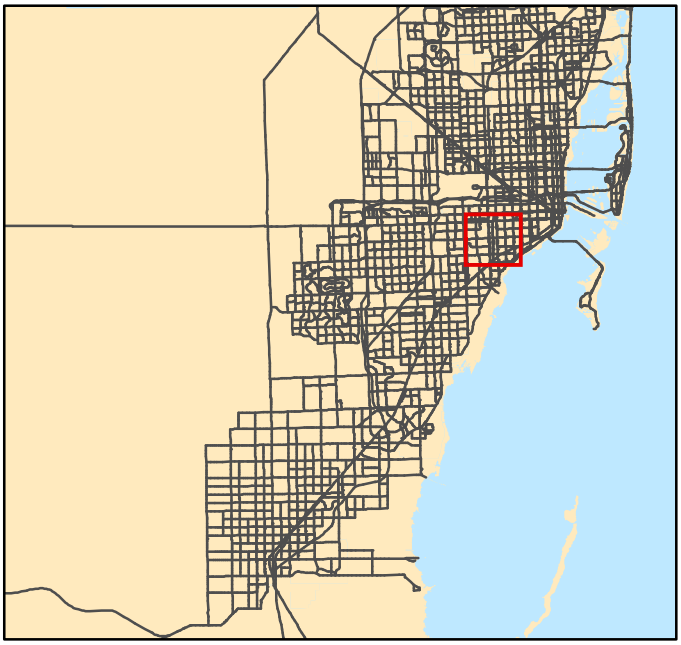


0 0.25 0.5 1 Miles

Pedestrian LOS Score

N

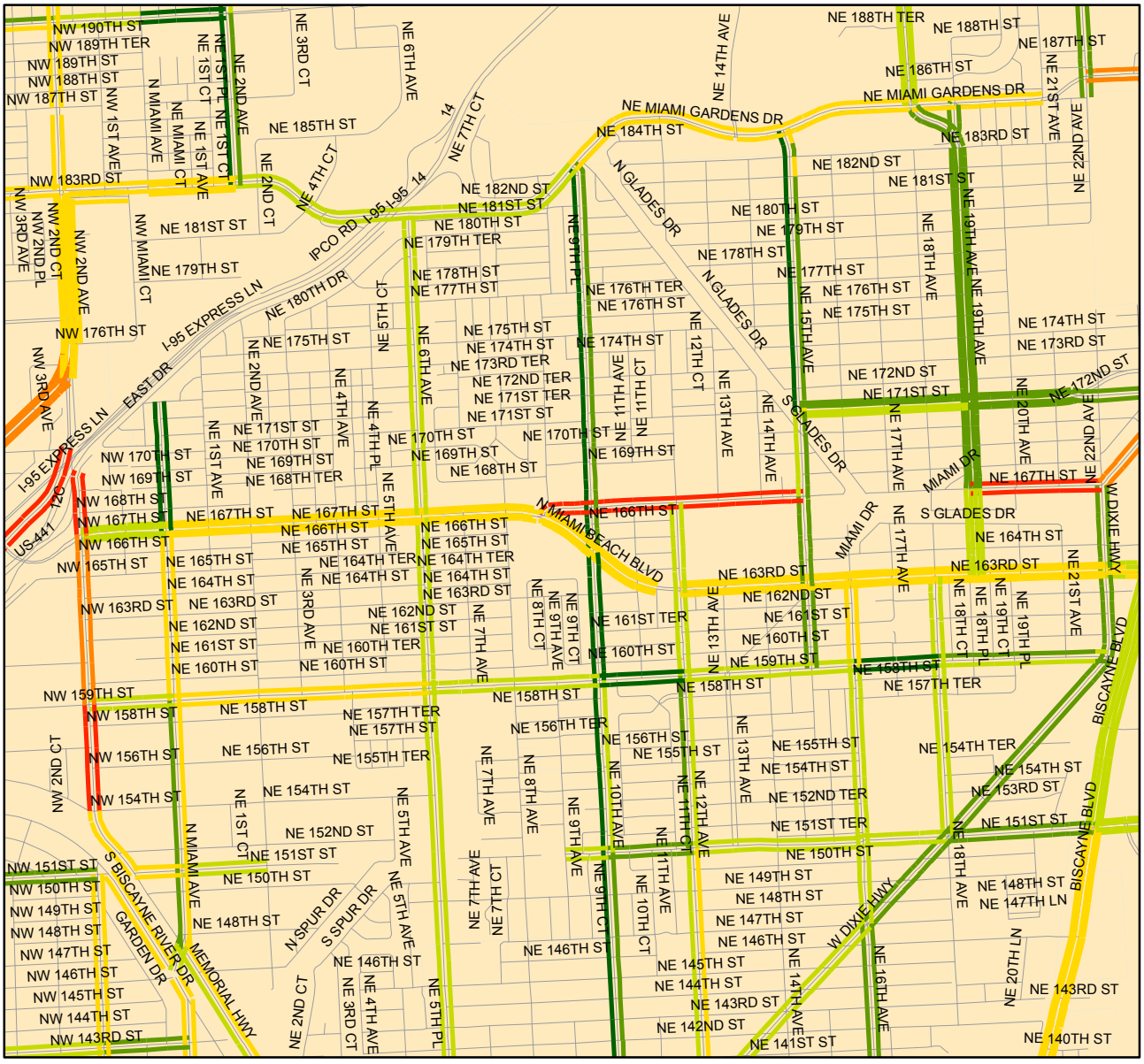
- A
- B
- C
- D
- E
- F
- Other Roads

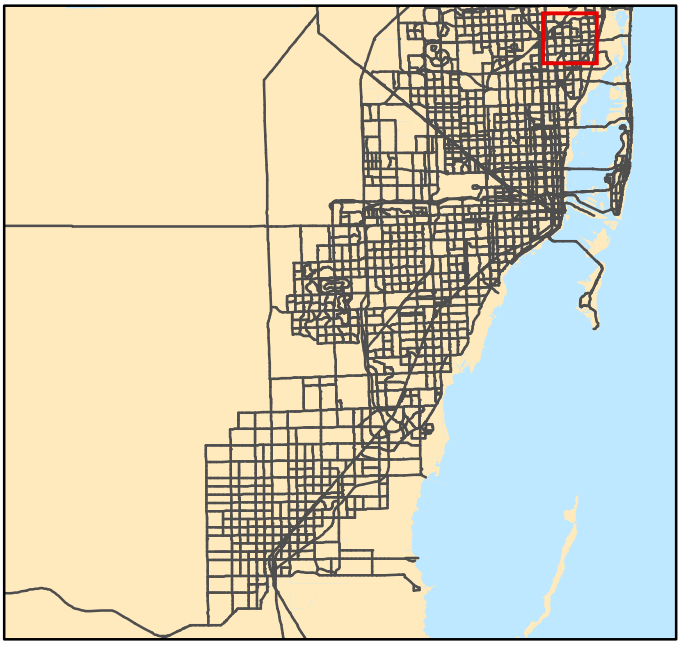


Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
NE 163rd St. Mall Transit Center

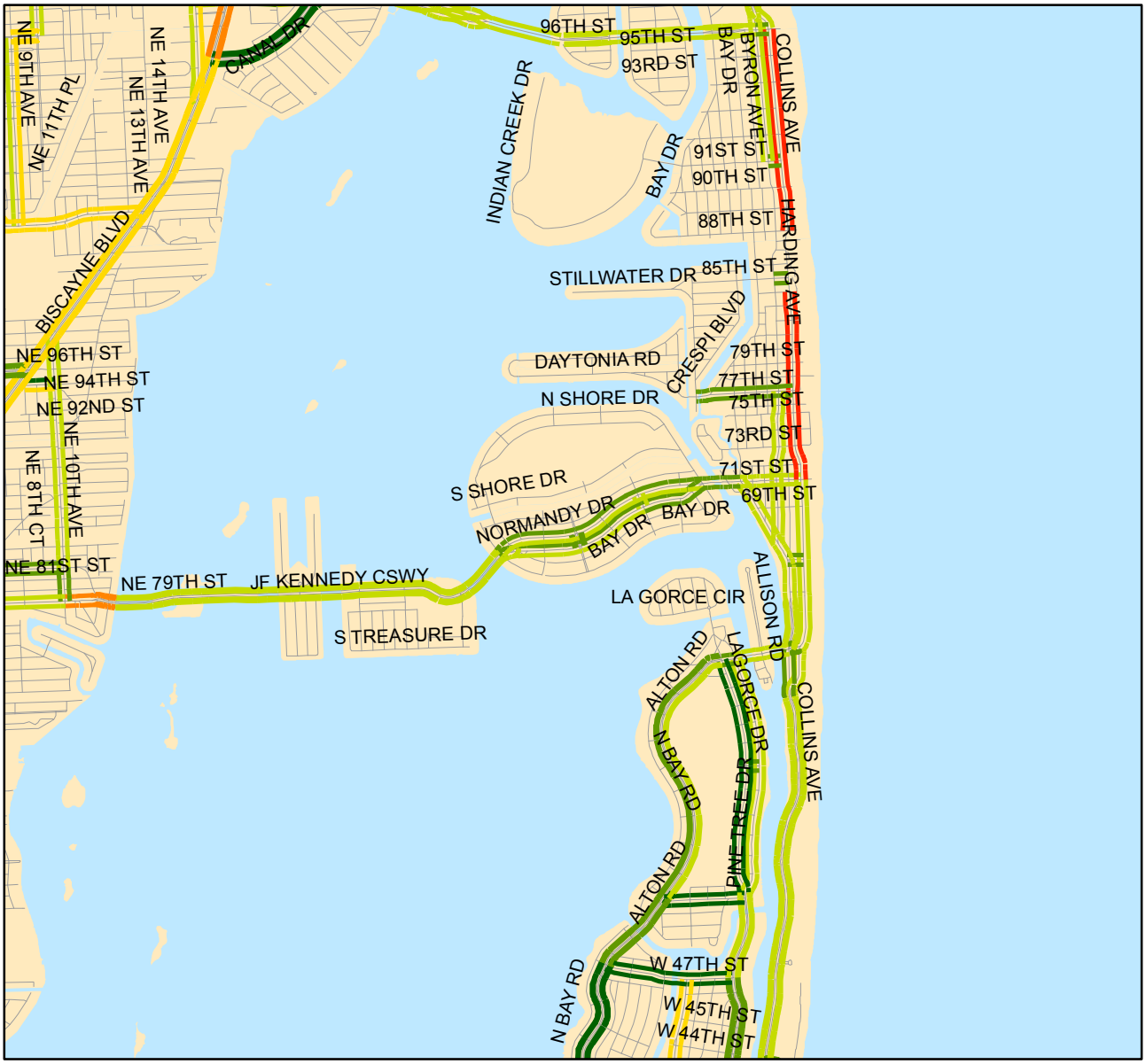




Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
North Beach



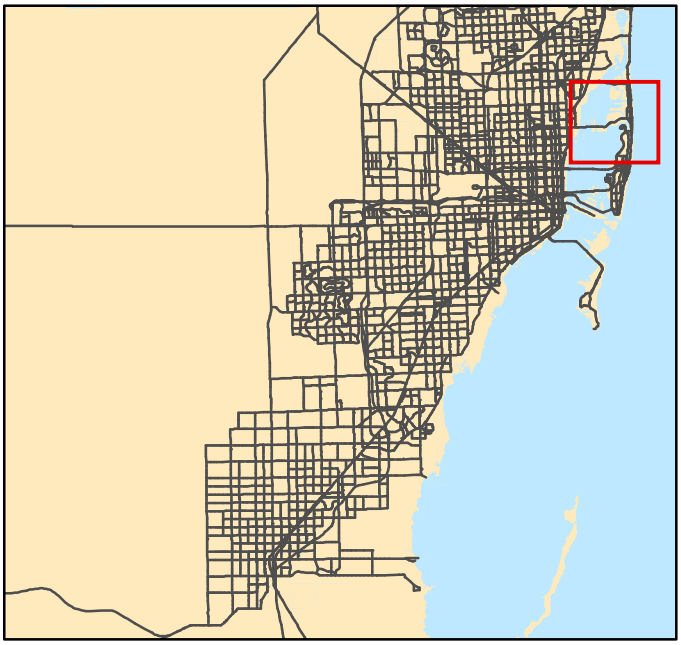
0 0.25 0.5 1 Miles

Pedestrian LOS Score

N

- A
- B
- C
- D
- E
- F

Other Roads

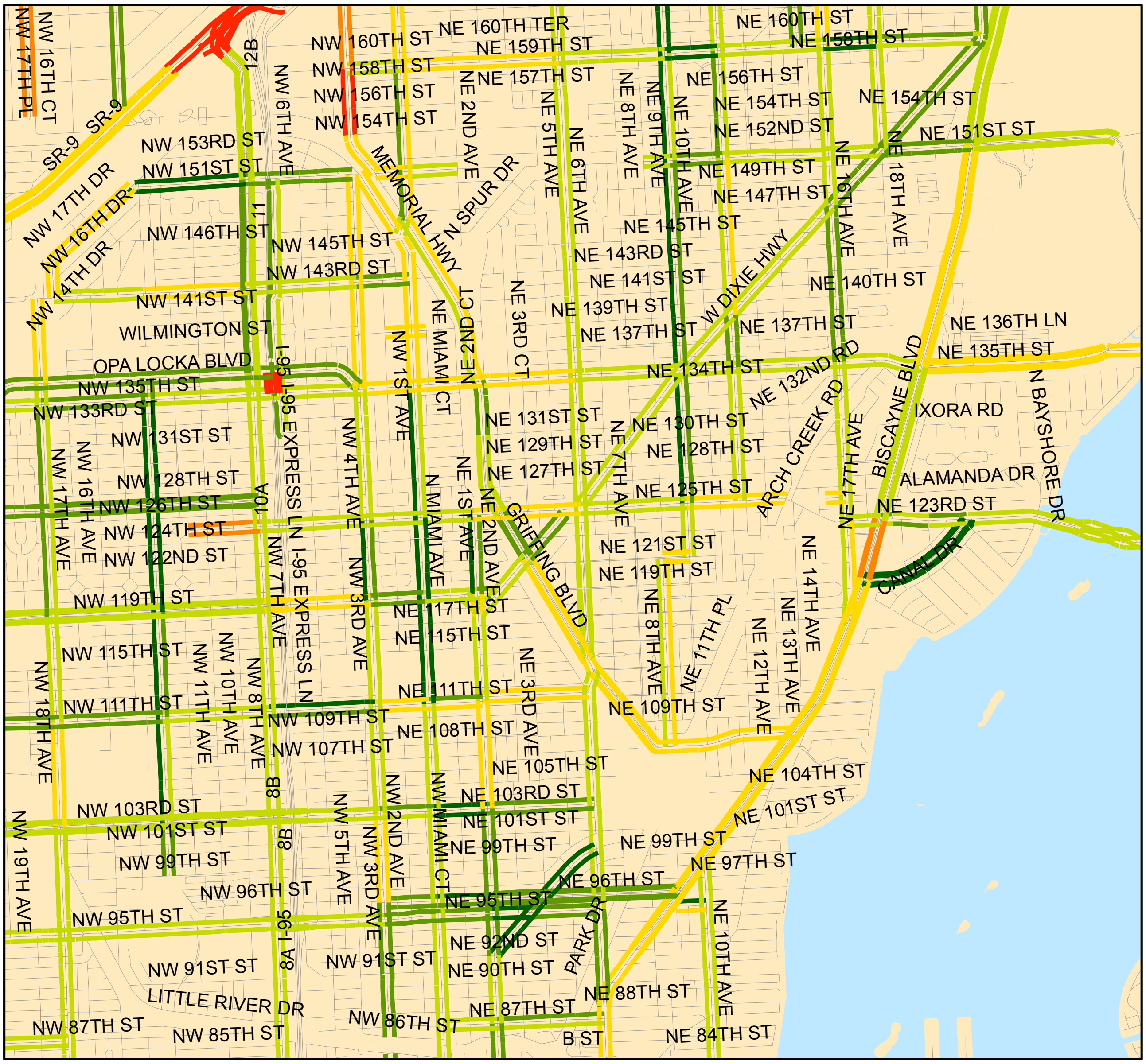


Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service

North Miami

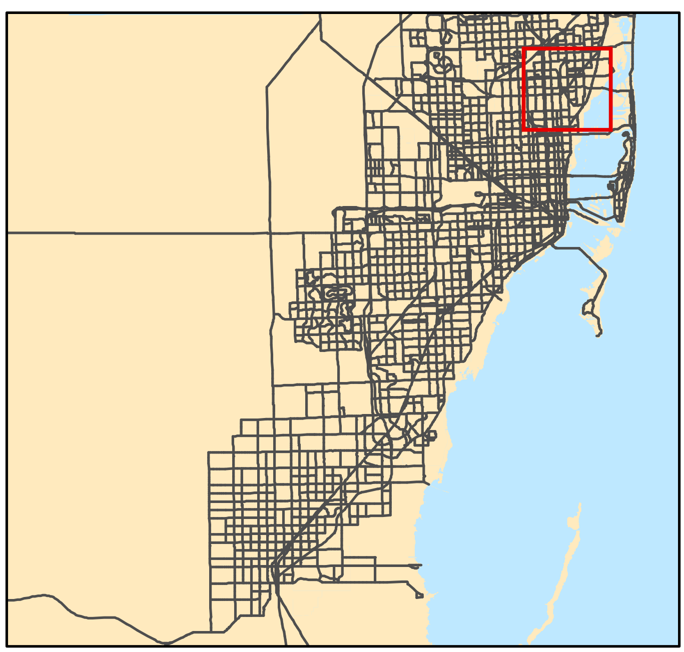


0 0.25 0.5 1 Miles

Pedestrian LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads

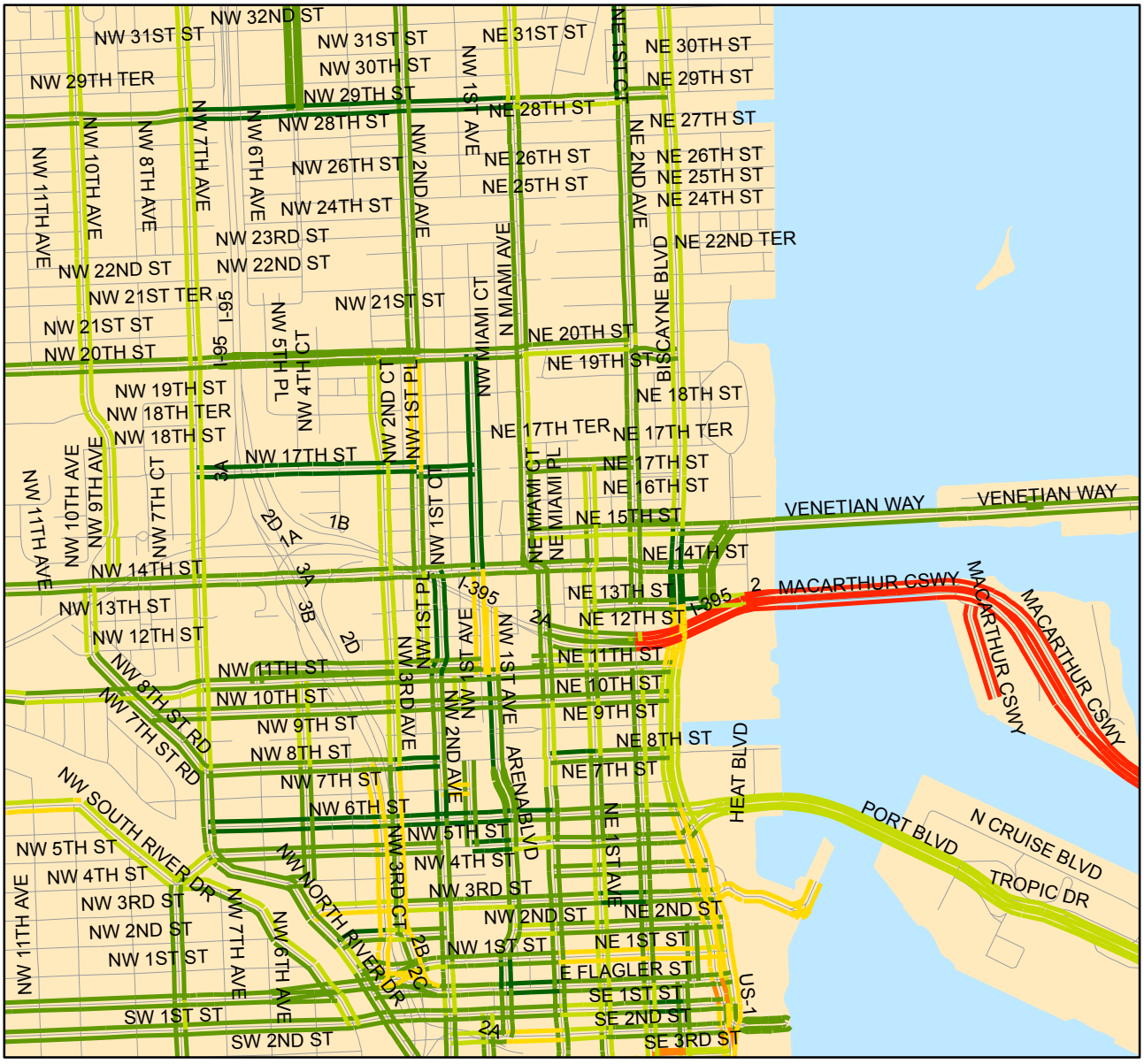
N



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

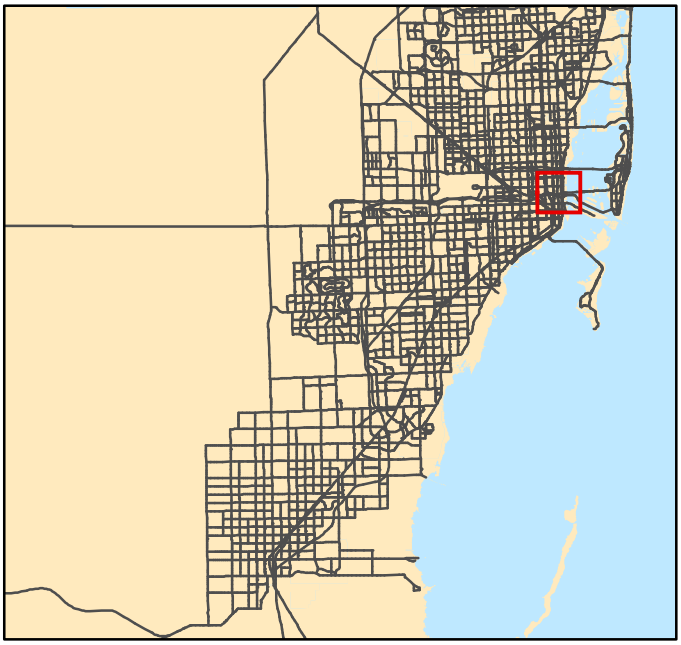
Pedestrian Level of Service
Omni



0 0.25 0.5 1 Miles

Pedestrian LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

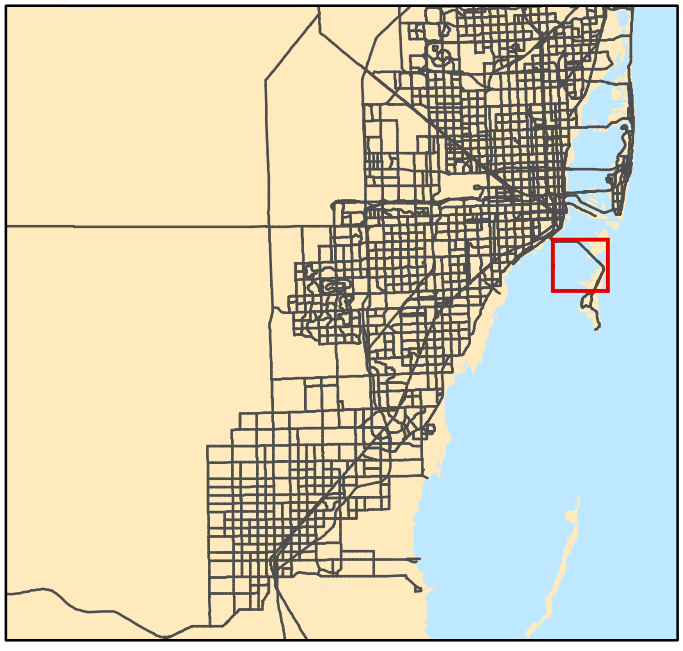
Pedestrian Level of Service
Rickenbacker Causeway

0 0.25 0.5 1 Miles

Pedestrian LOS Score

- A
- B
- C
- D
- E
- F

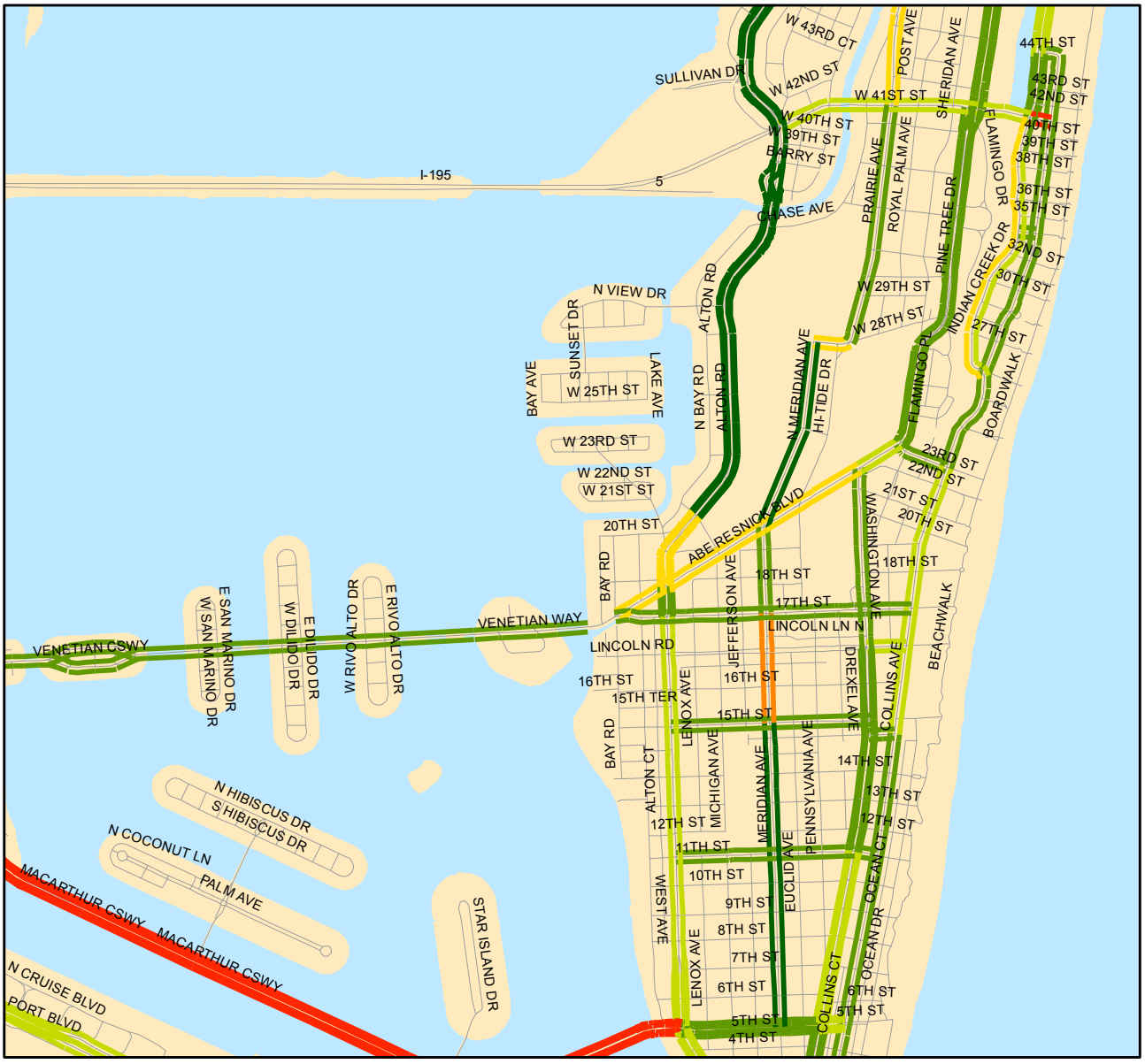
Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
South Beach

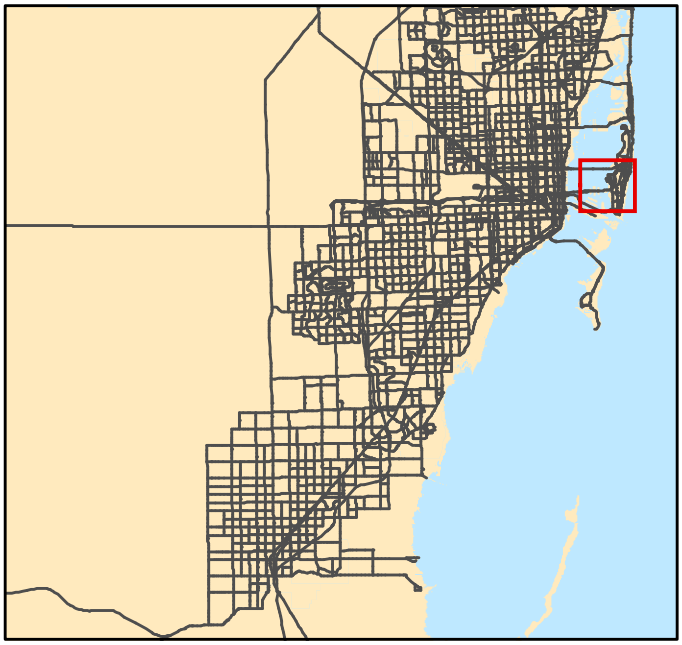


0 0.25 0.5 1 Miles

Pedestrian LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads

N



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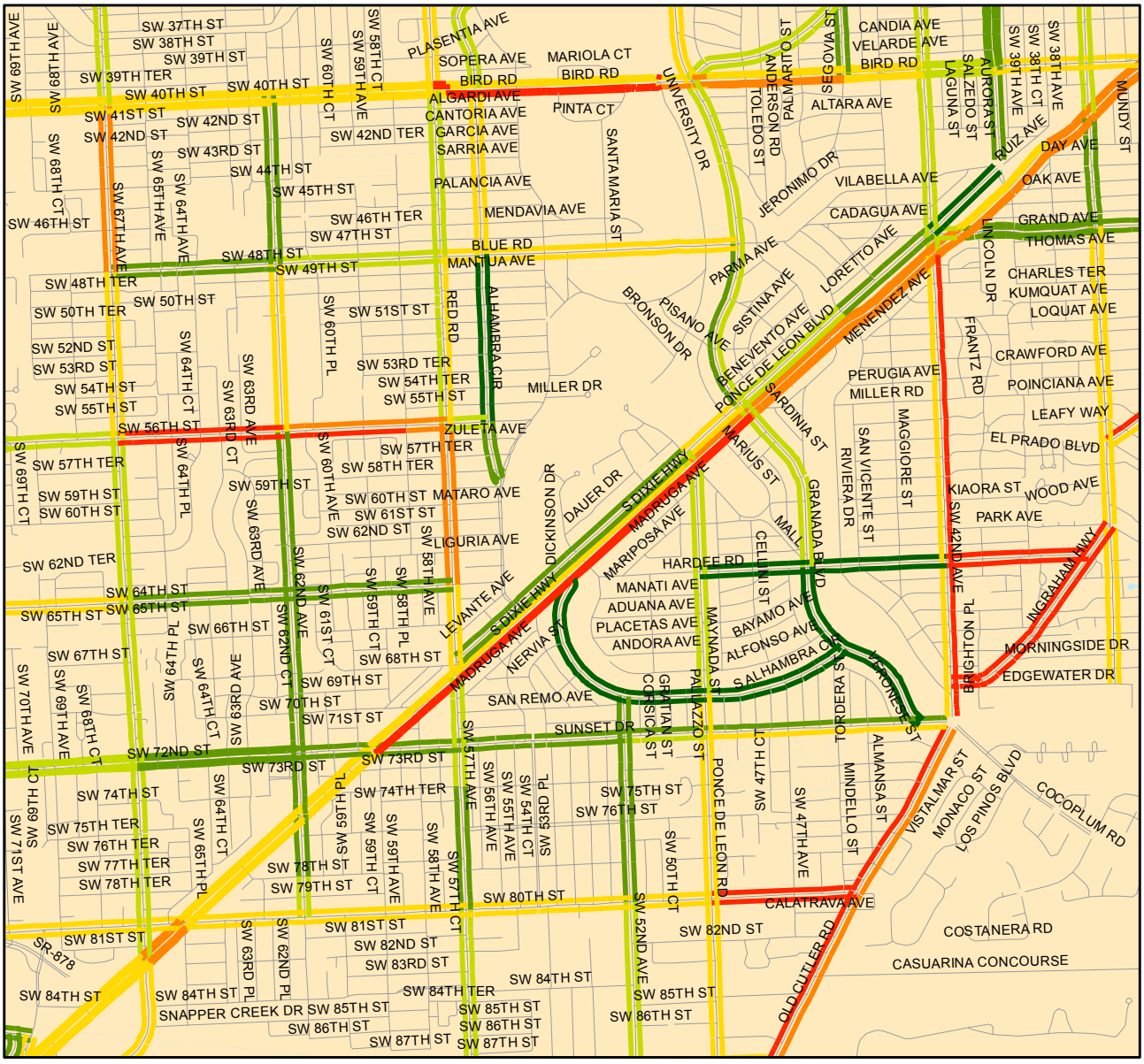
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Pedestrian Level of Service
University of Miami

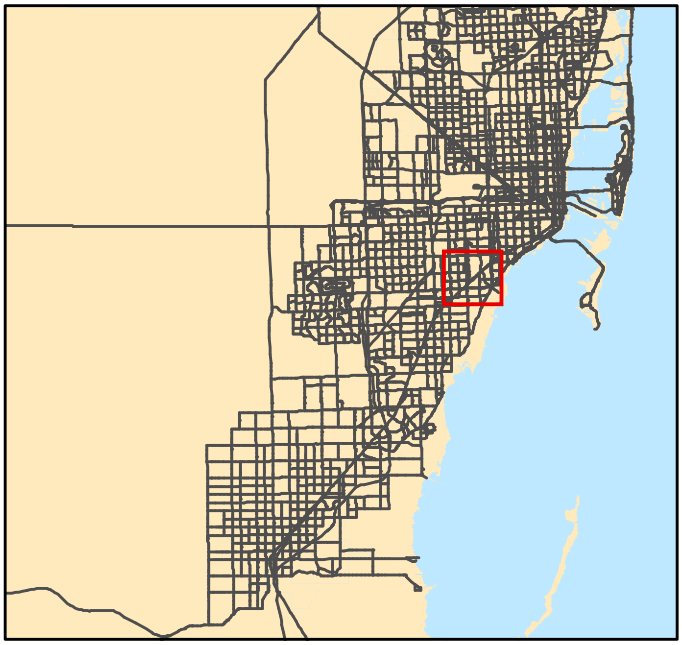


0 0.25 0.5 1 Miles

Pedestrian LOS Score

N

- A
- B
- C
- D
- E
- F
- Other Roads

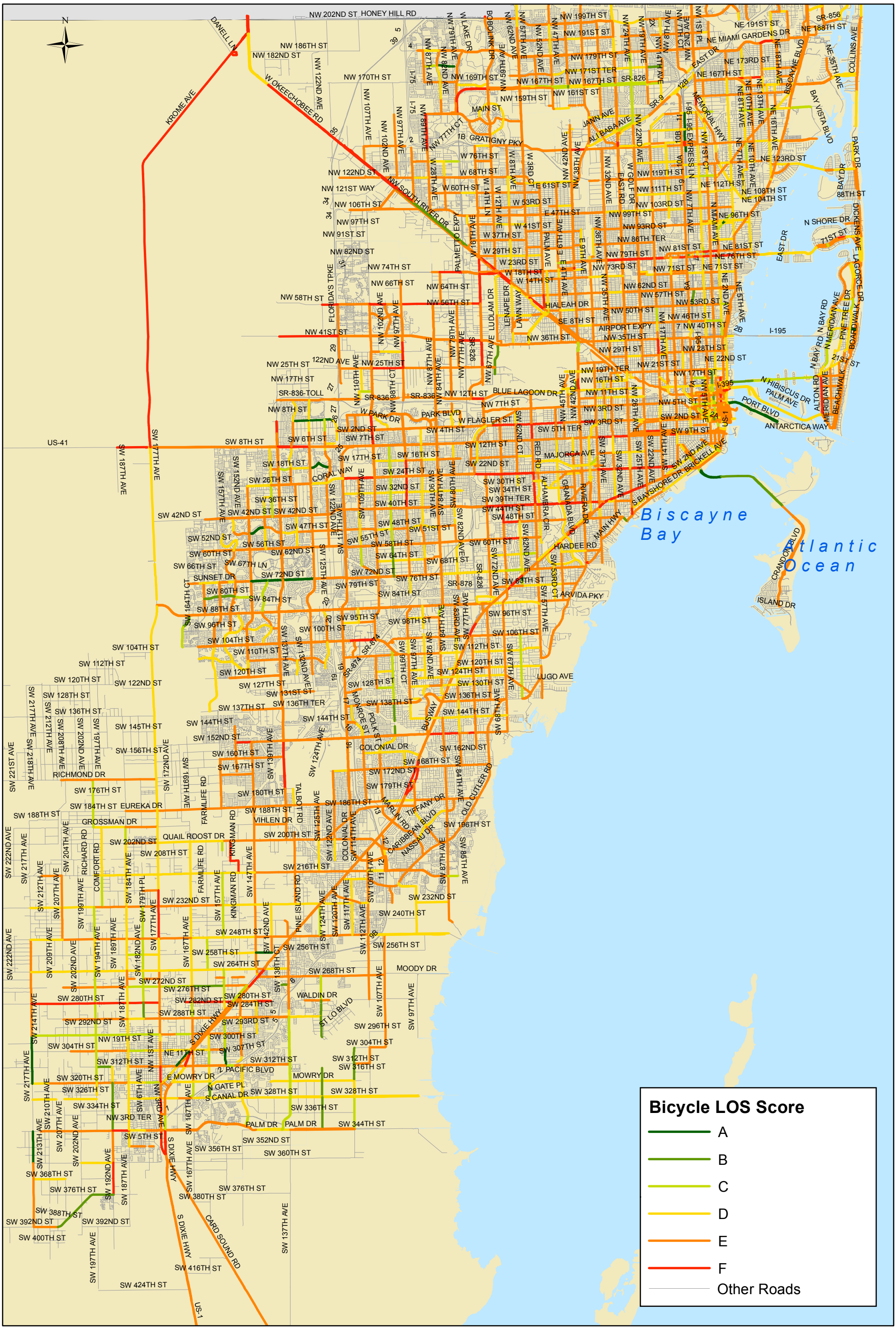


Kimley-Horn and Associates, Inc.

BLOS Maps

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Bicycle Level of Service
Miami-Dade County

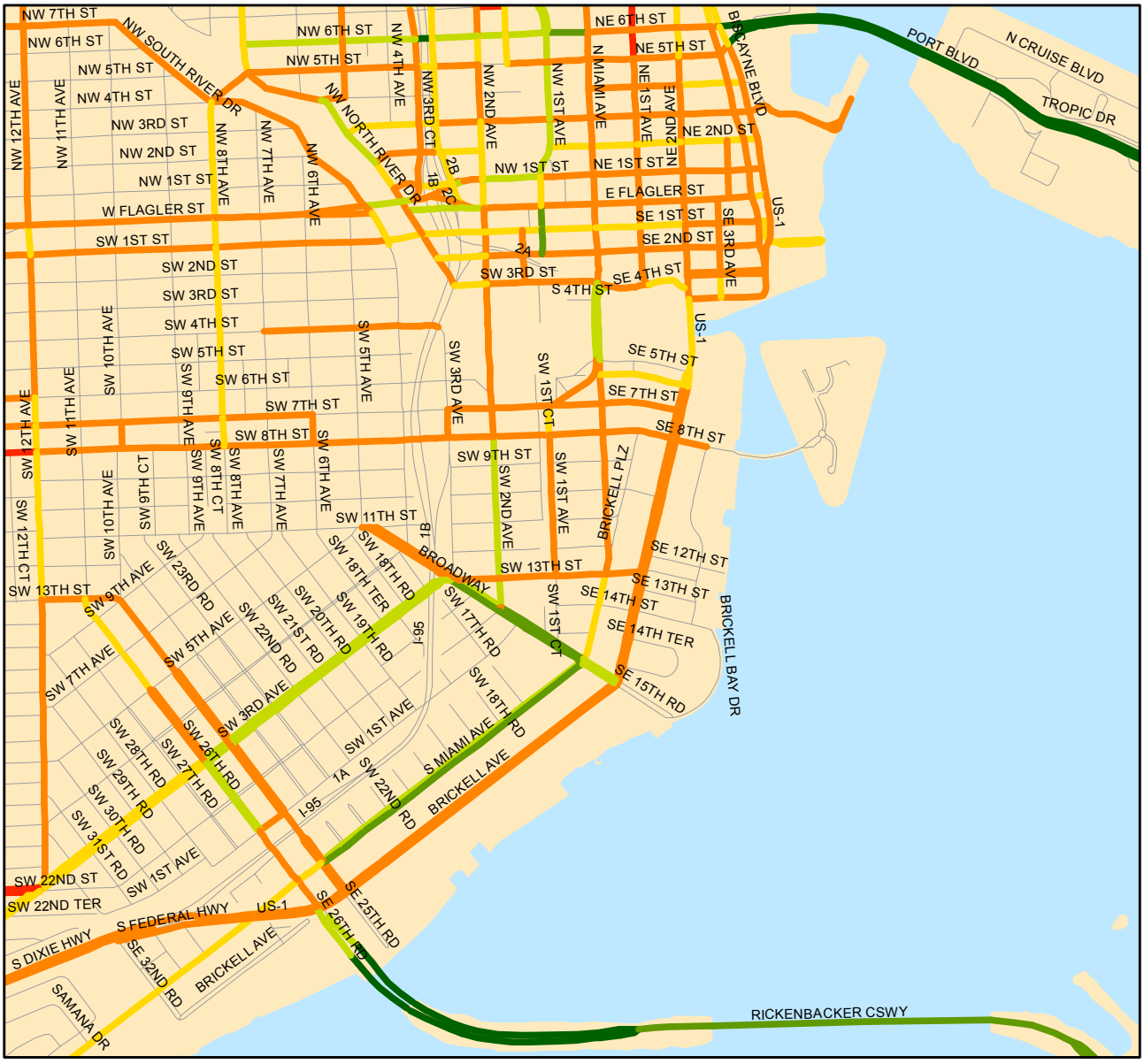


Kimley-Horn and Associates, Inc.

0 2 4 8 Miles

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Bicycle Level of Service
Brickell

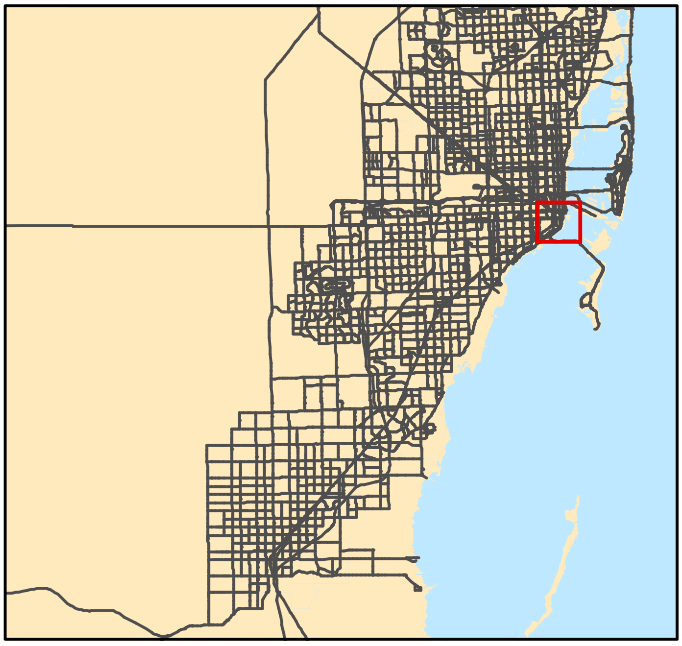


0 0.25 0.5 1 Miles

Bicycle LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads

N



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

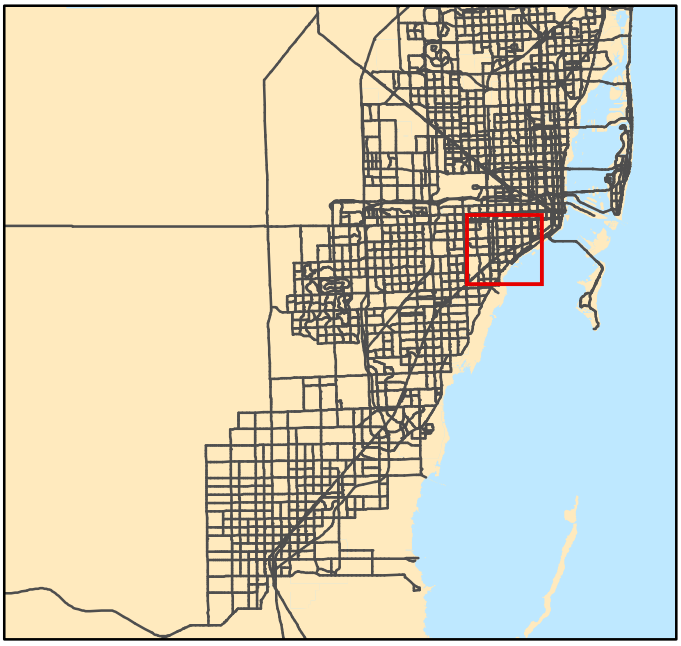
Bicycle Level of Service
Coconut Grove

0 0.25 0.5 1 Miles

Bicycle LOS Score

N

- A
- B
- C
- D
- E
- F
- Other Roads



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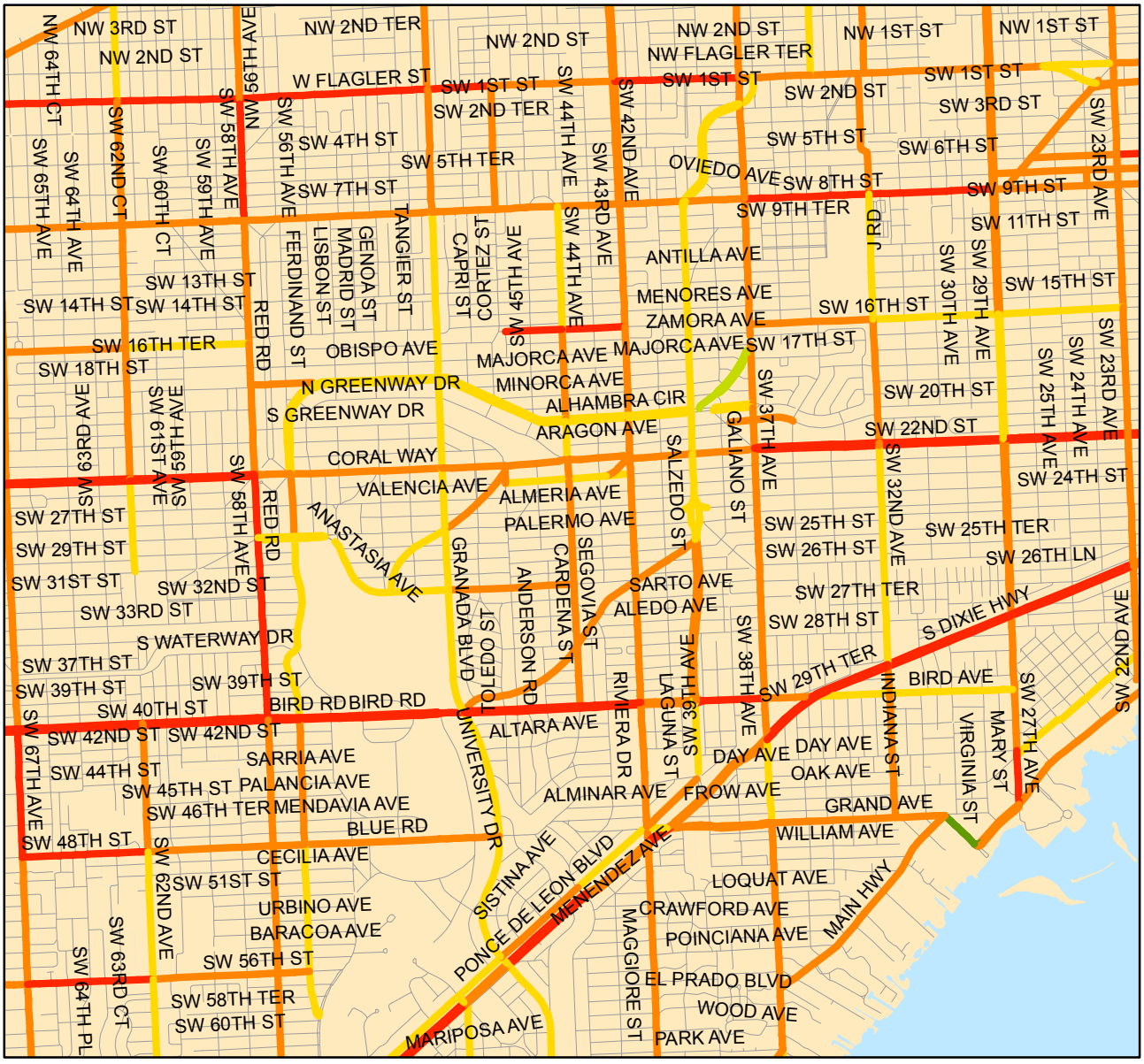
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

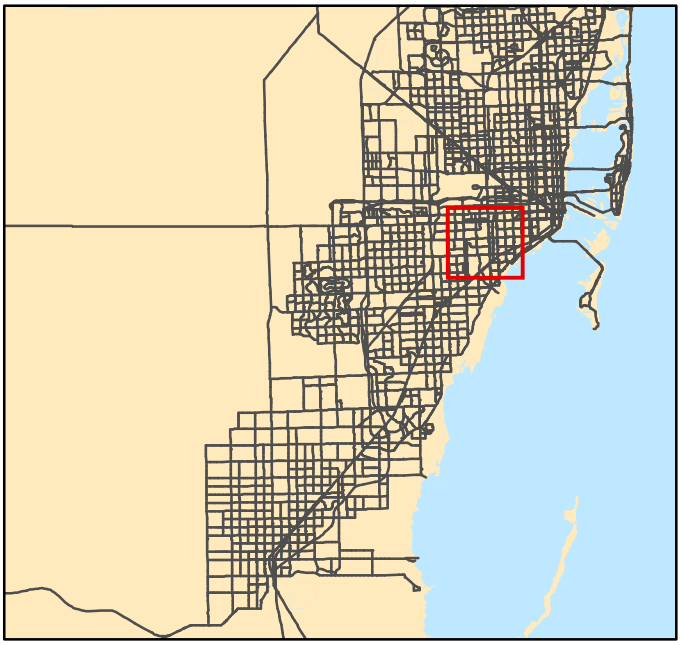
Bicycle Level of Service
Coral Gables



0 0.25 0.5 1 Miles

Bicycle LOS Score

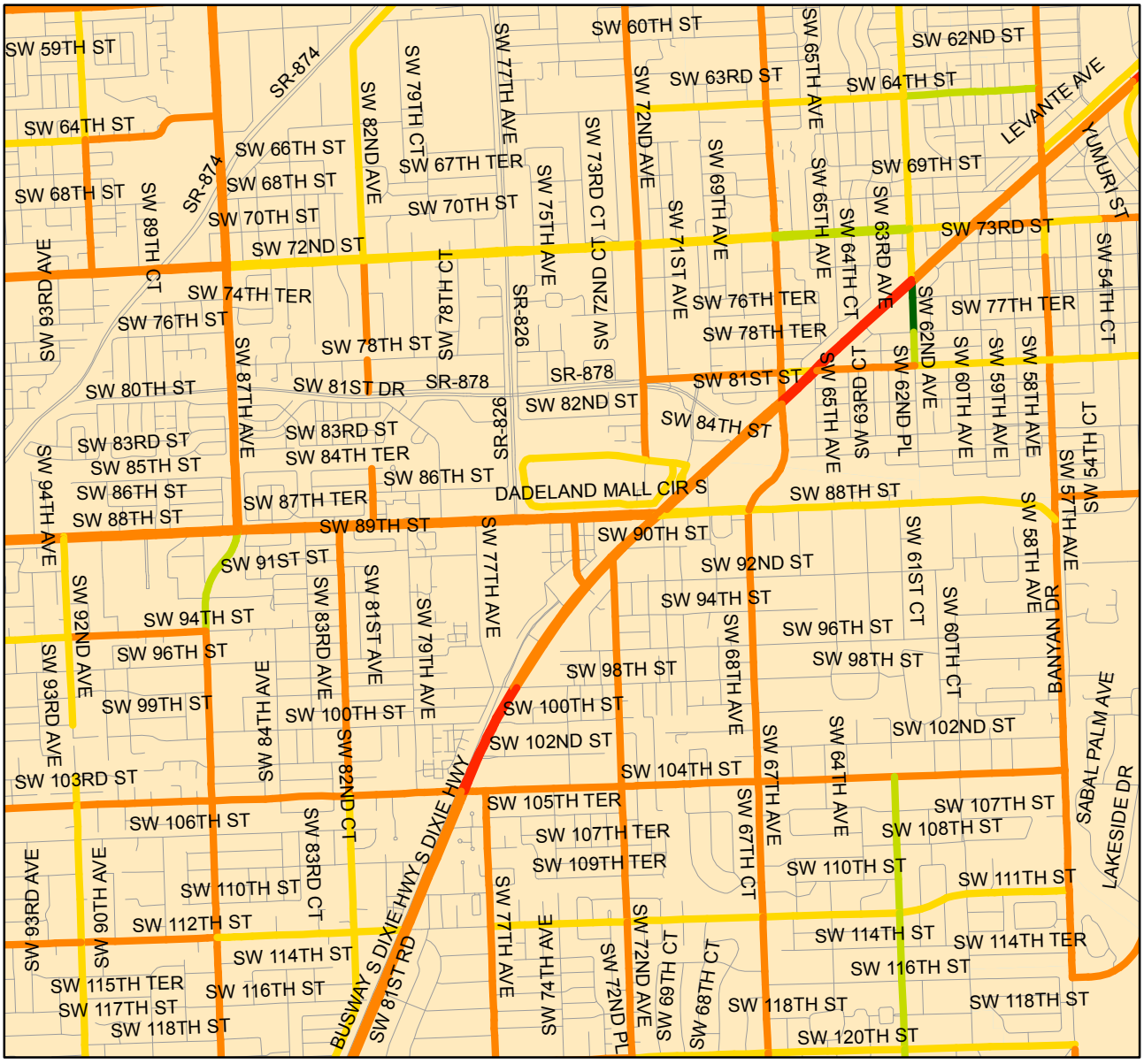
- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Bicycle Level of Service
Dadeland

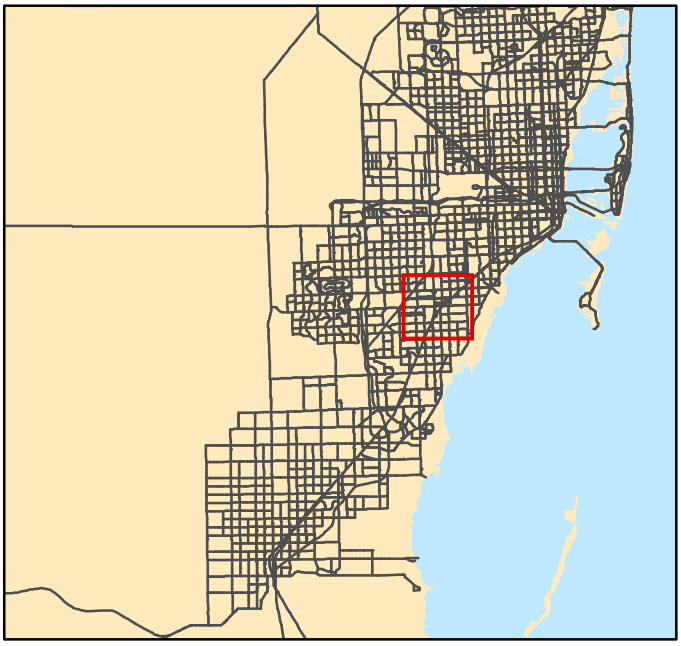


0 0.25 0.5 1 Miles

Bicycle LOS Score

N

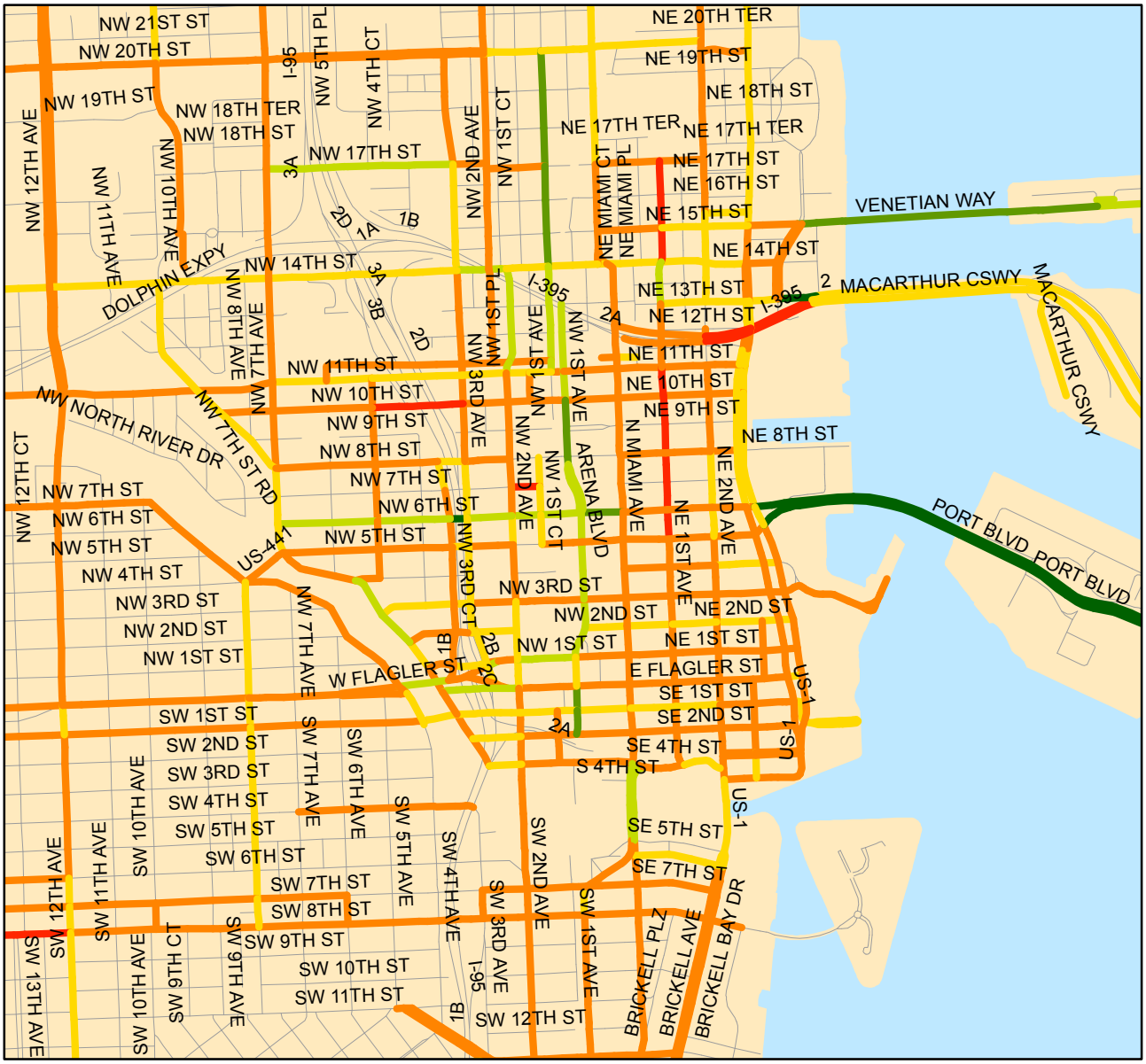
- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

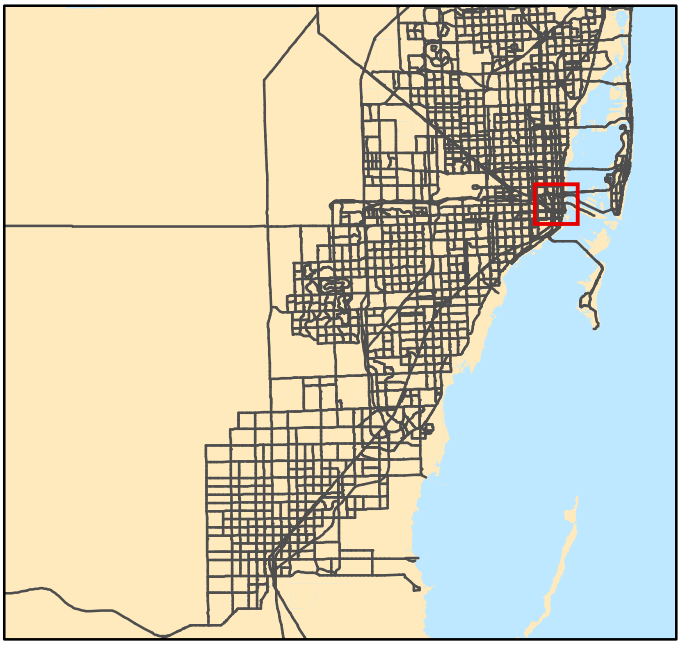
Bicycle Level of Service
Downtown



0 0.25 0.5 1 Miles

Bicycle LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads

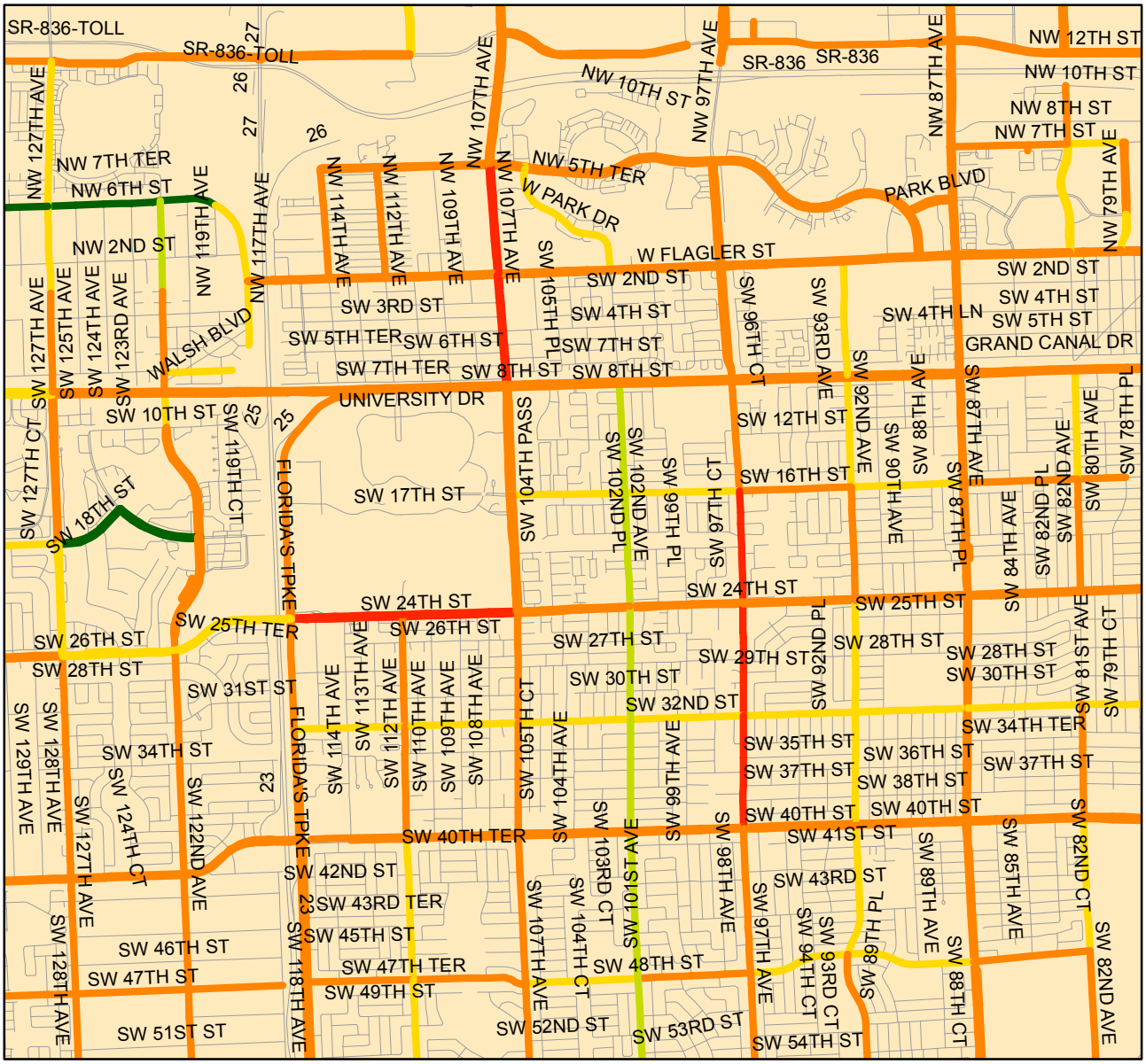


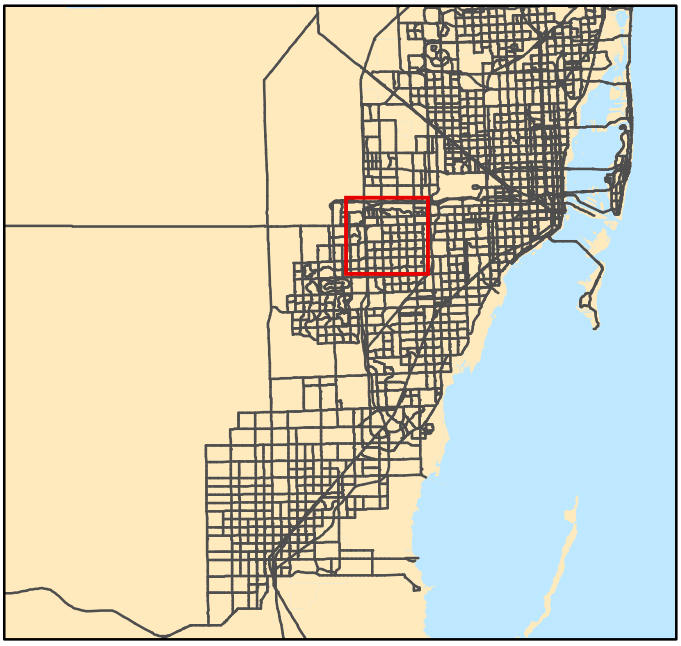
Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Bicycle Level of Service

FIU - Modesto A. Maidique (Main) Campus



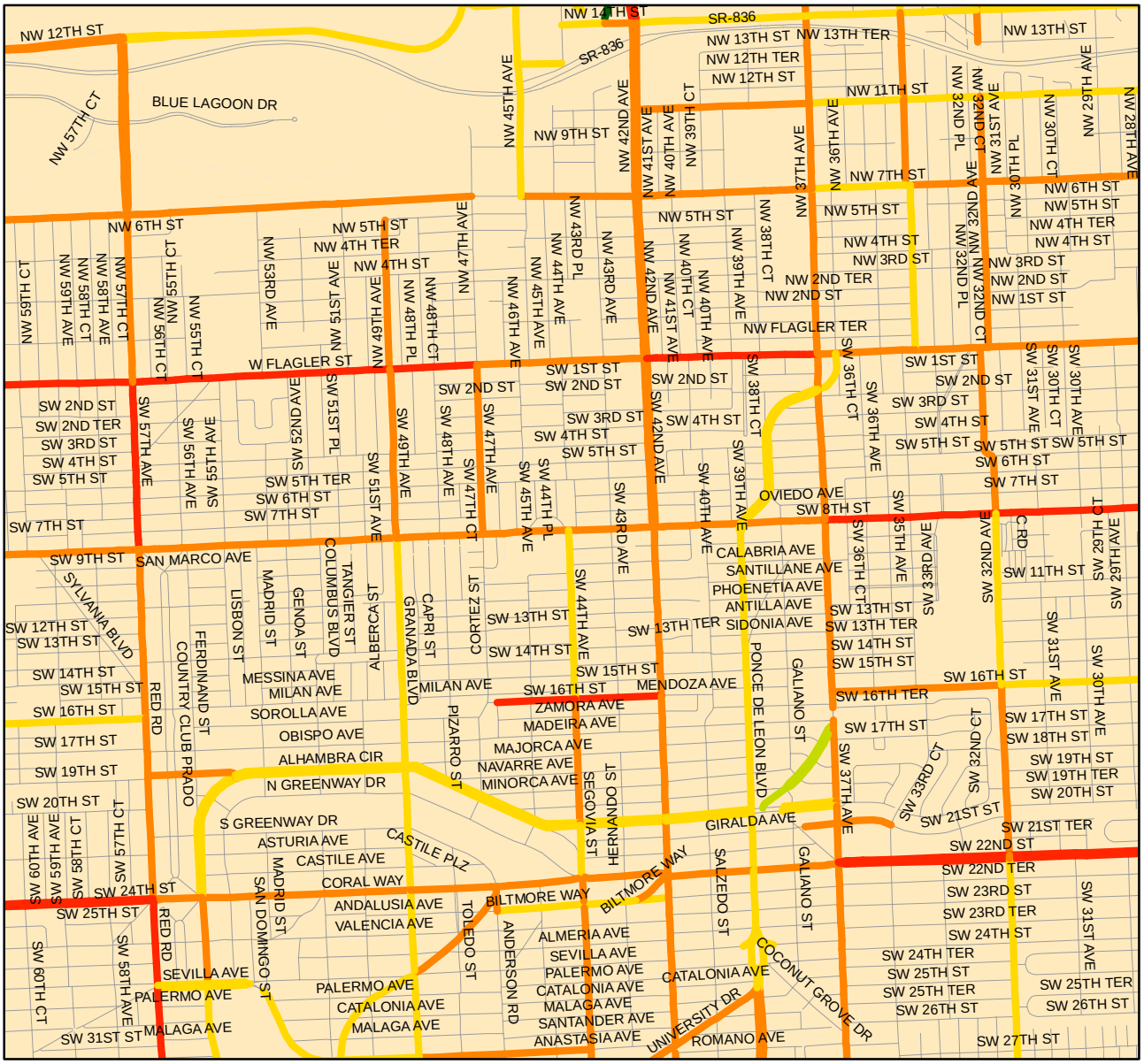


Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Bicycle Level of Service

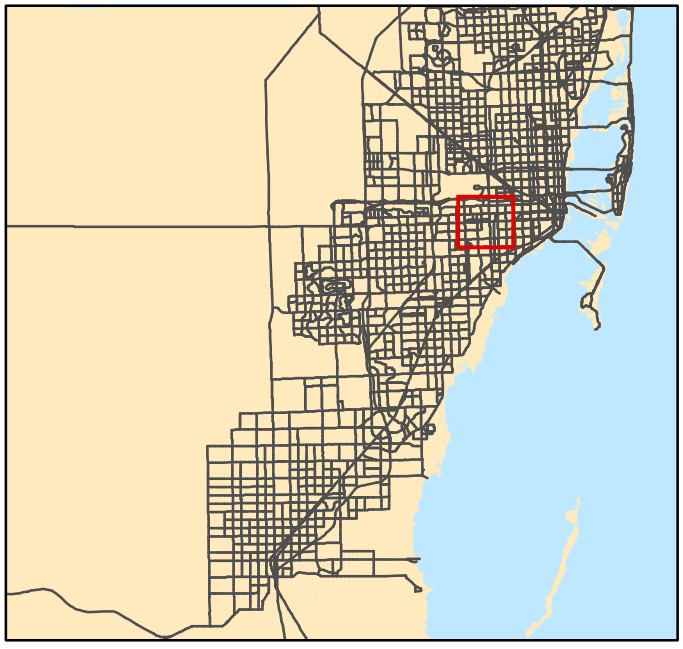
Flagami



0 0.25 0.5 1 Miles

Bicycle LOS Score

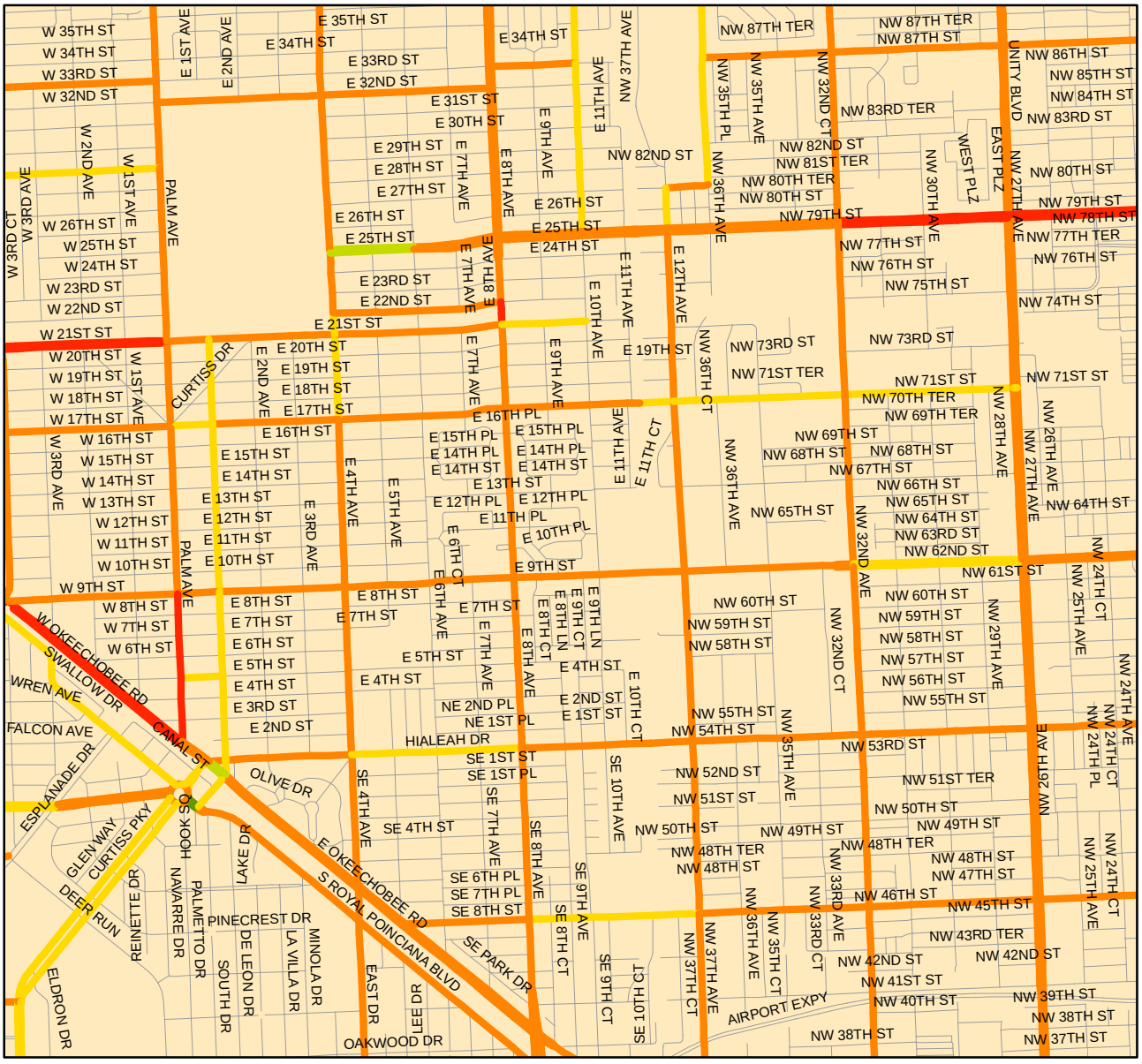
- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

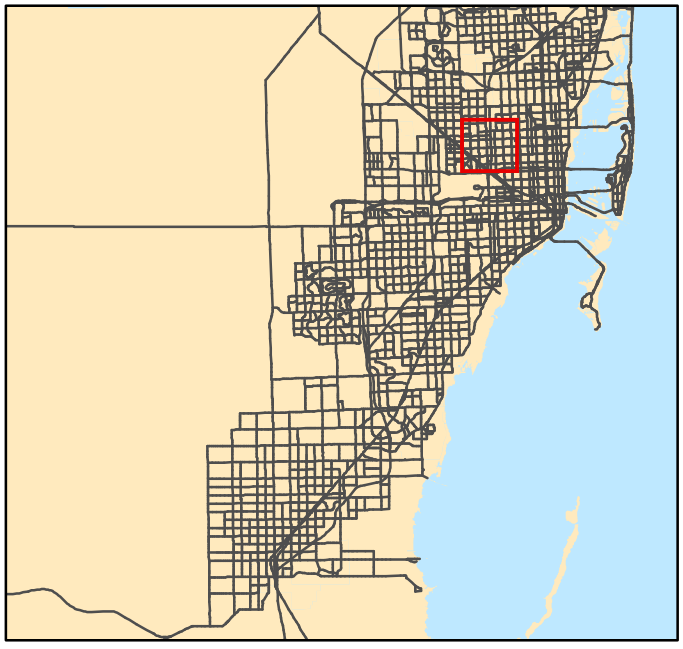
Bicycle Level of Service
Hialeah Area



0 0.25 0.5 1 Miles

Bicycle LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads



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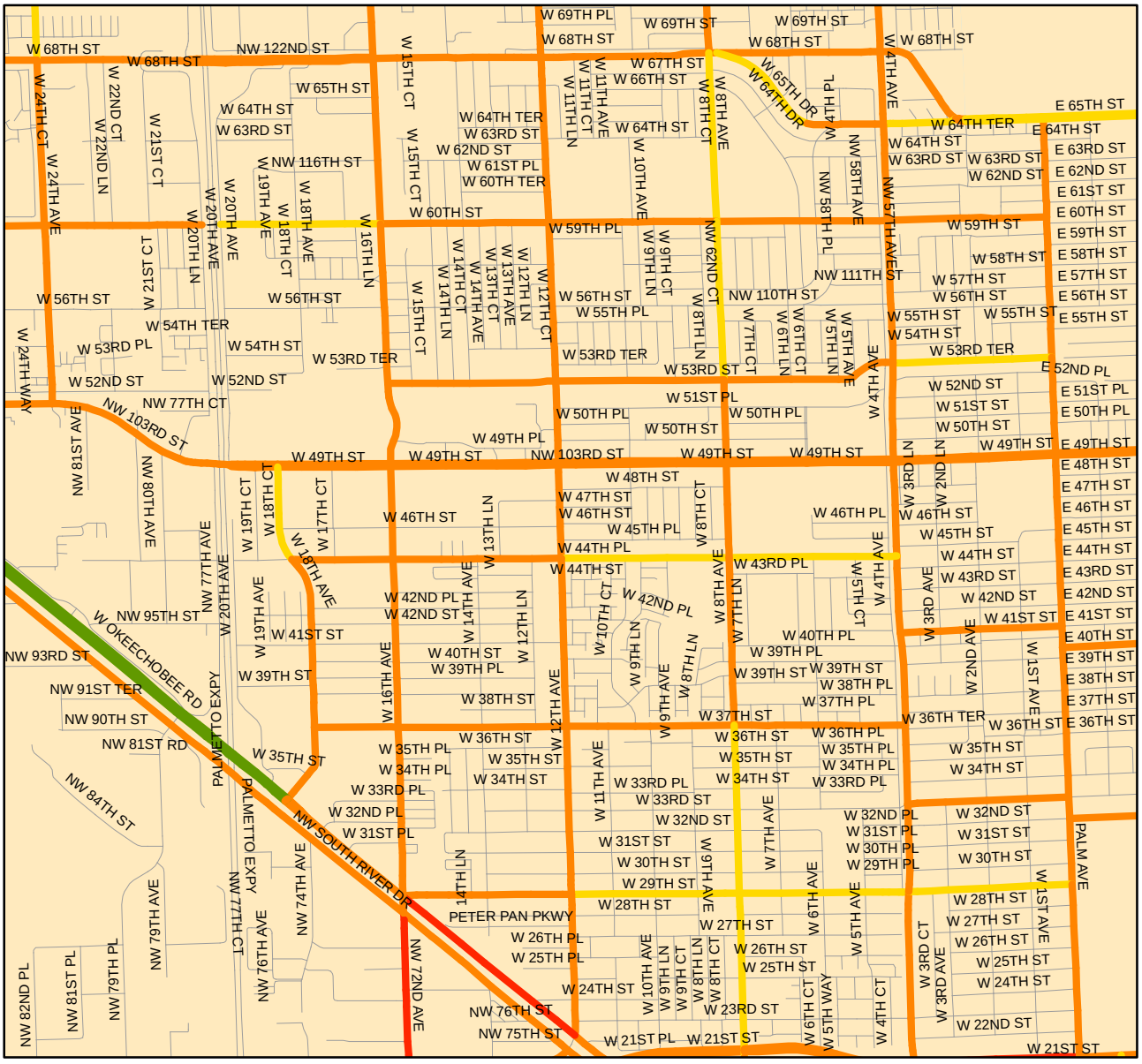
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

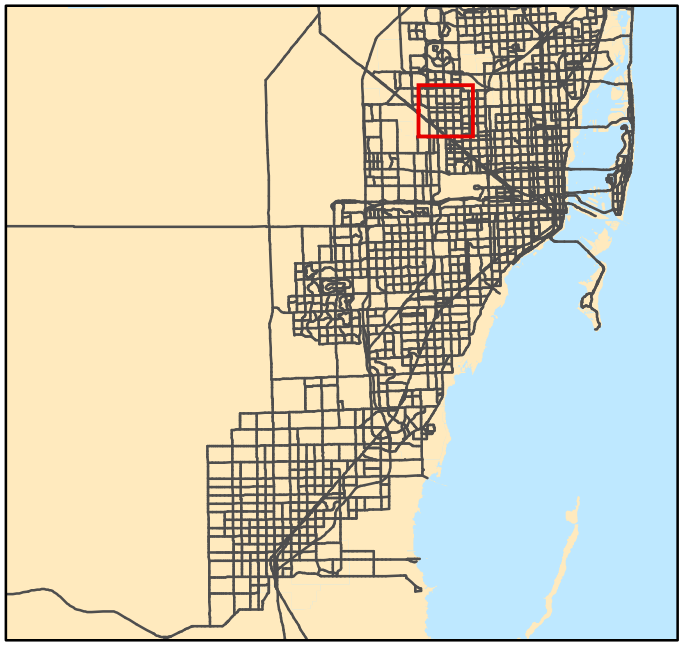
Bicycle Level of Service
Hialeah Northwest



0 0.25 0.5 1 Miles

Bicycle LOS Score

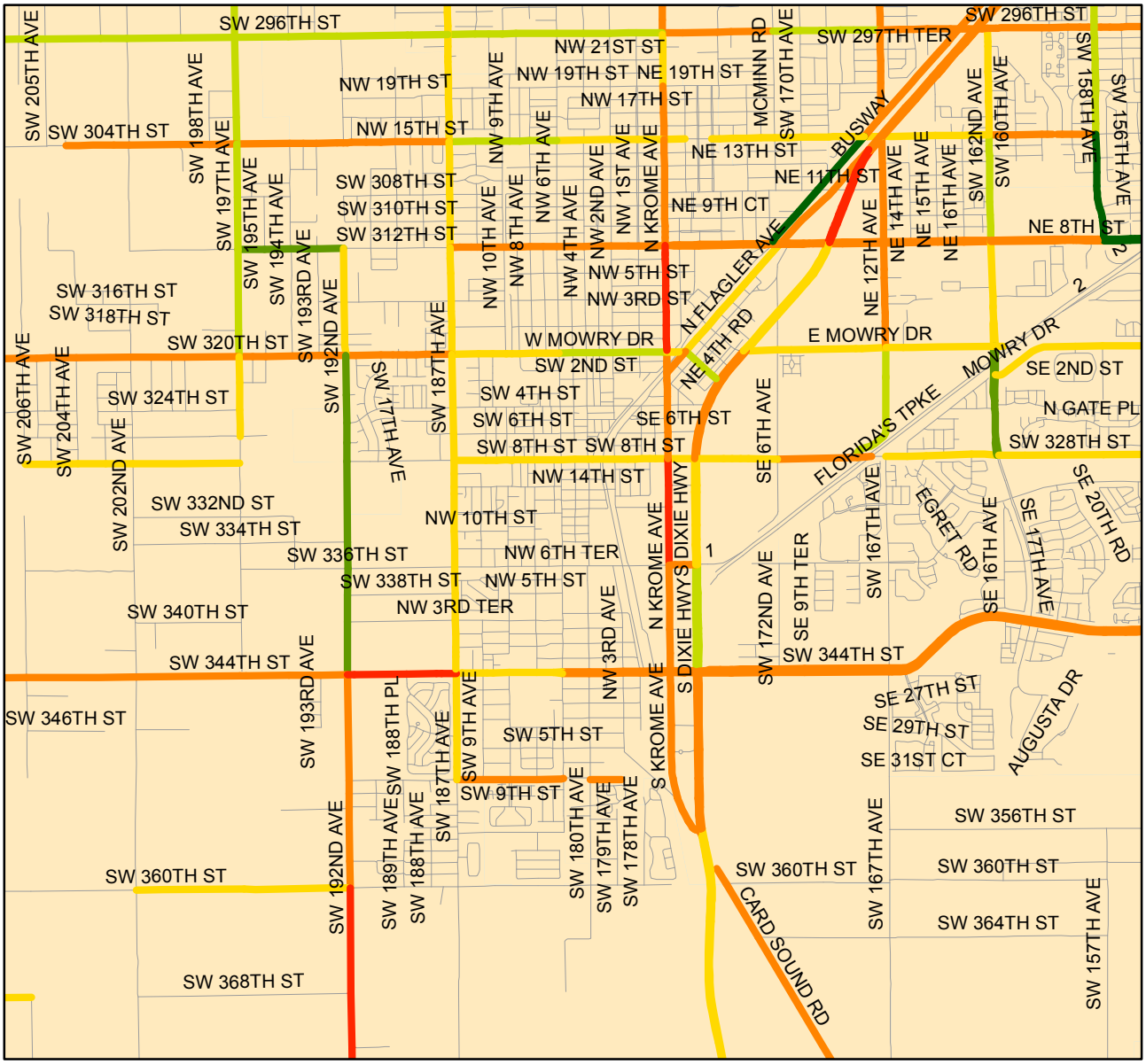
- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Bicycle Level of Service
Homestead/Florida City

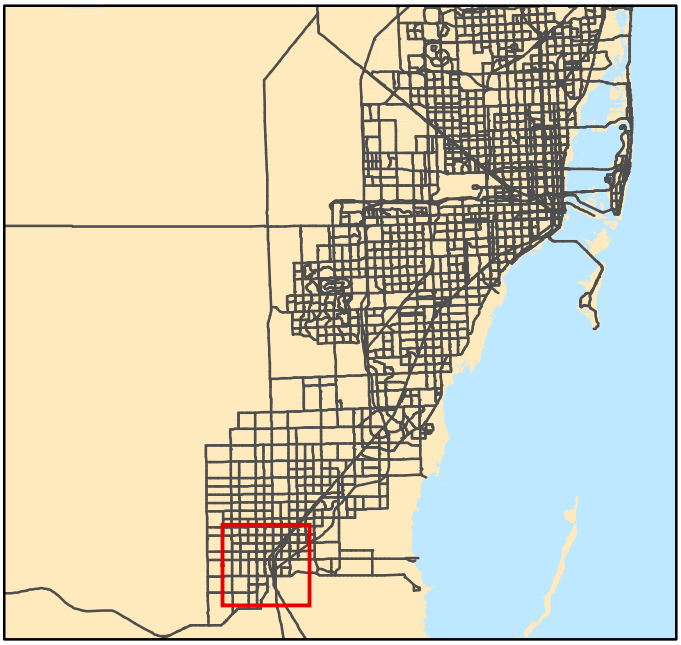


0 0.25 0.5 1 Miles

Bicycle LOS Score

N

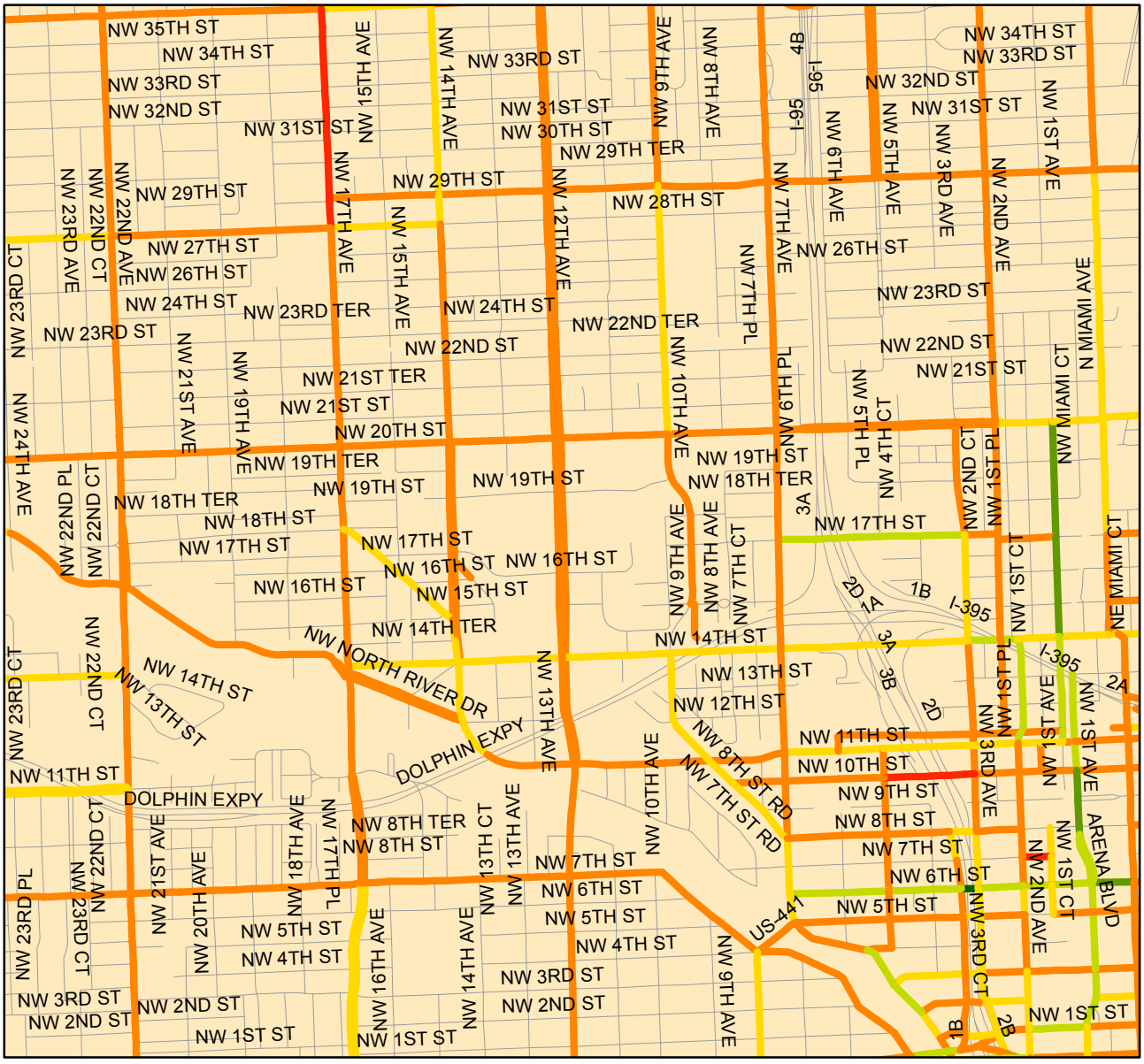
- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Bicycle Level of Service
Hospital/Civic Center

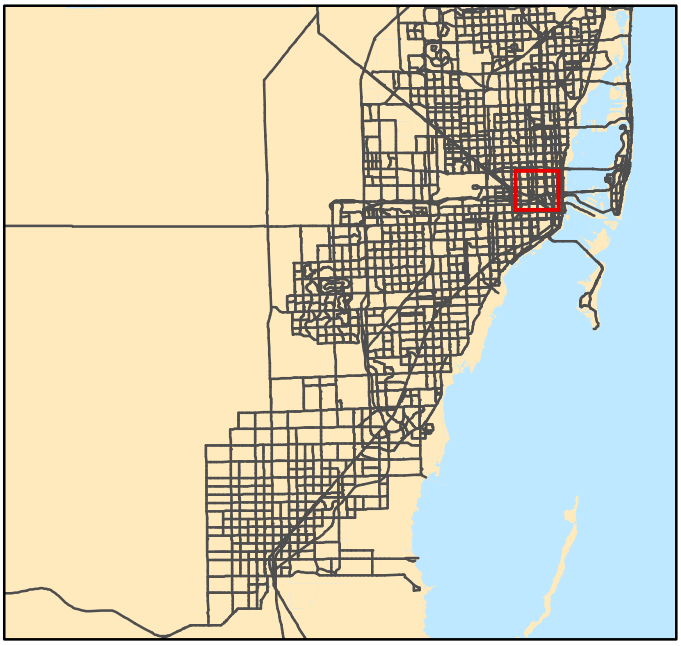


0 0.25 0.5 1 Miles

Bicycle LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads

N



Kimley-Horn and Associates, Inc.

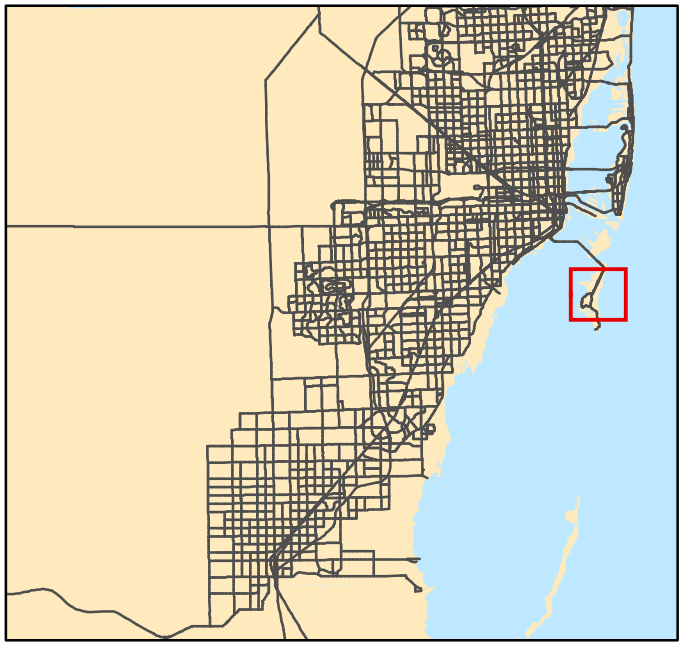
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Bicycle Level of Service
Key Biscayne

0 0.25 0.5 1 Miles

Bicycle LOS Score

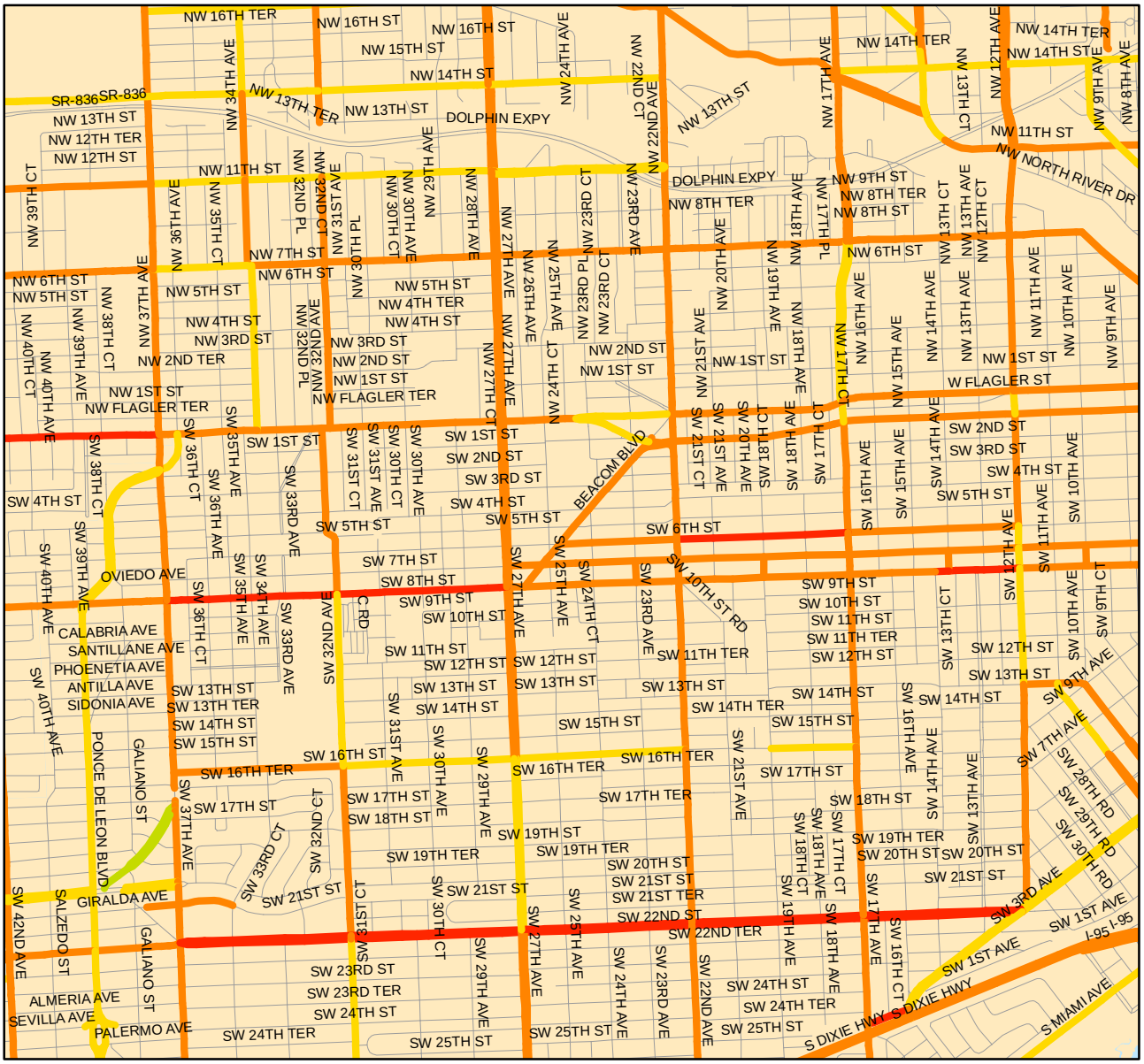
- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

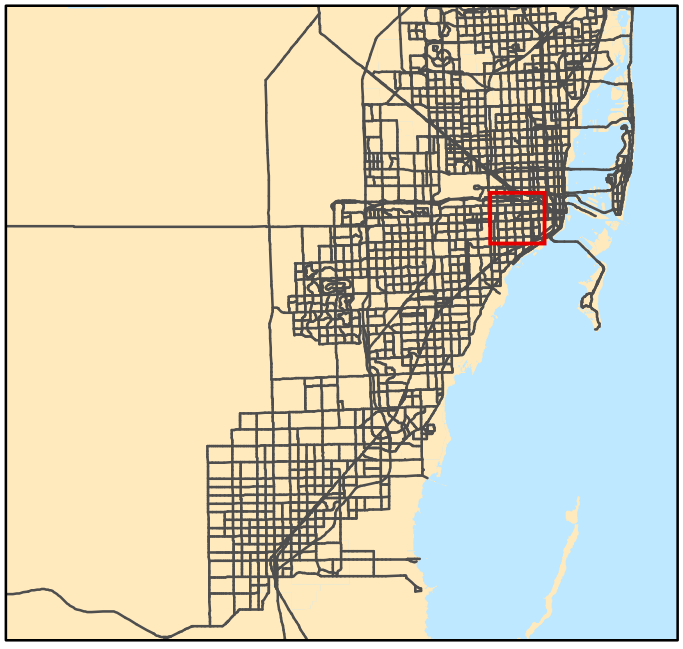
Bicycle Level of Service
Little Havana



0 0.25 0.5 1 Miles

Bicycle LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

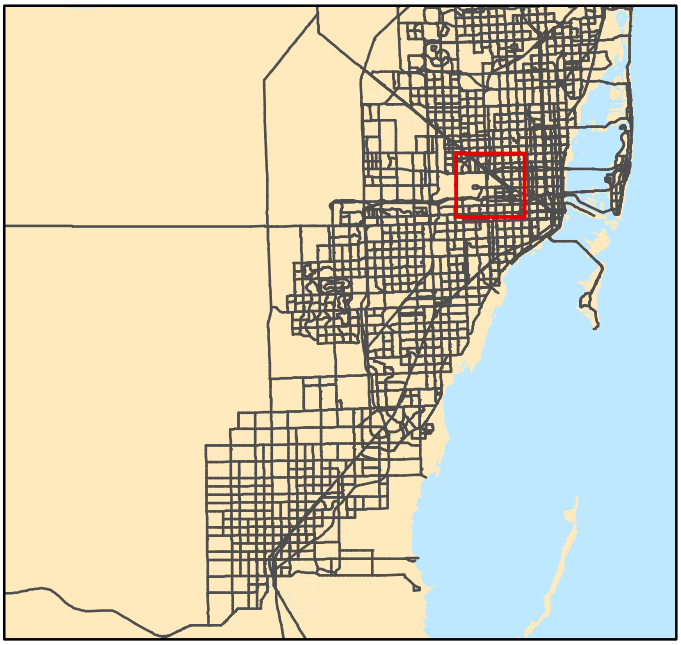
Bicycle Level of Service
Miami Intermodal Center

0 0.25 0.5 1 Miles

Bicycle LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads

N

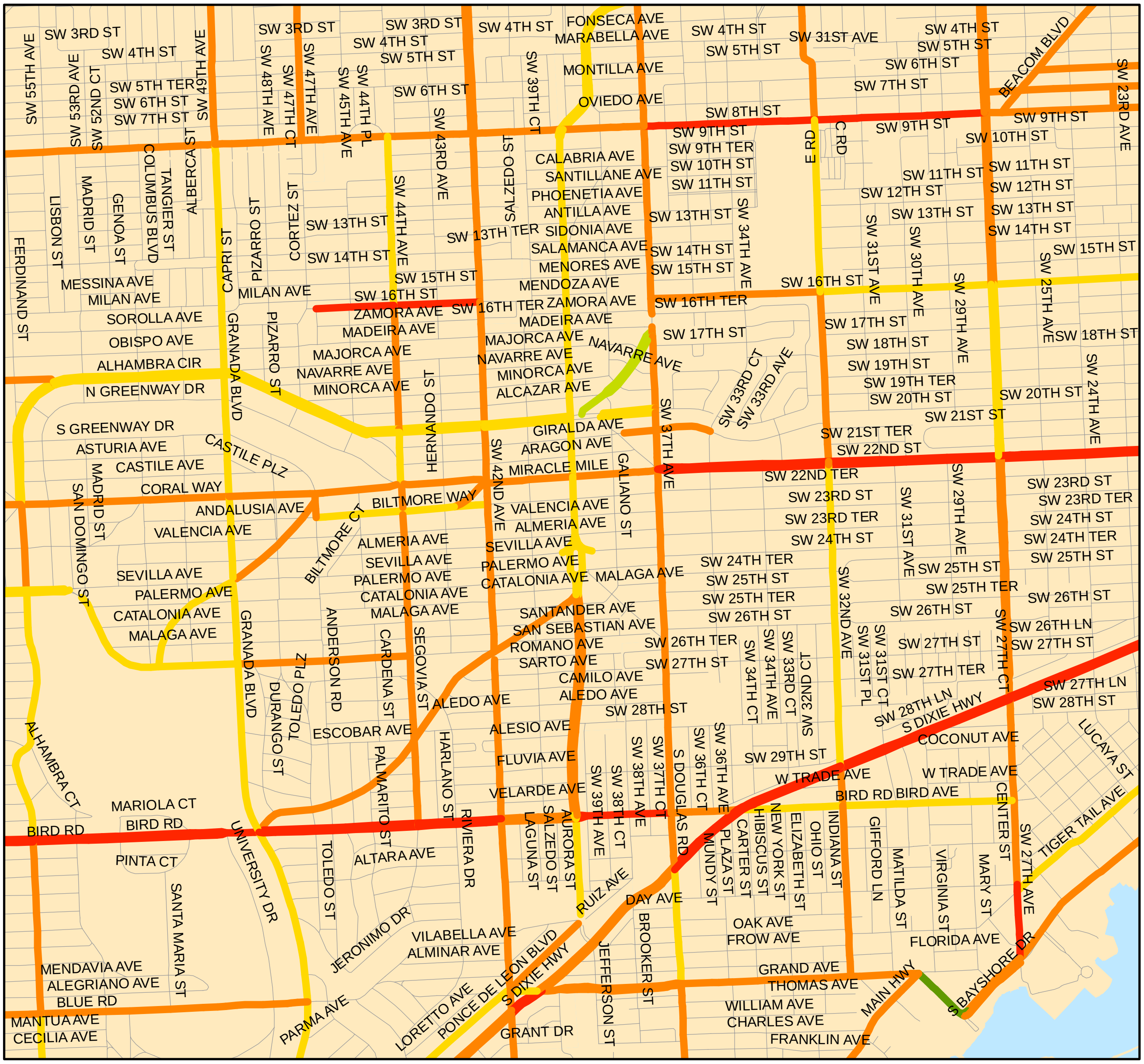


Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

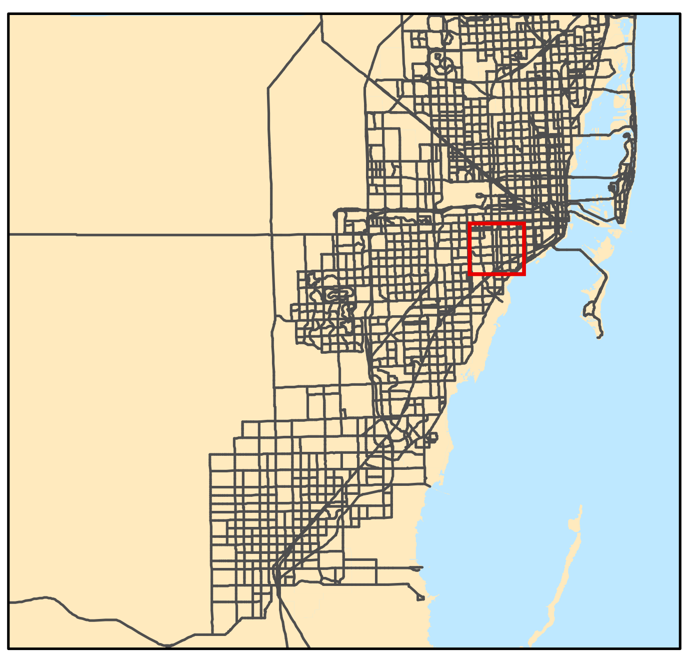
Bicycle Level of Service

Miracle Mile



Bicycle LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads

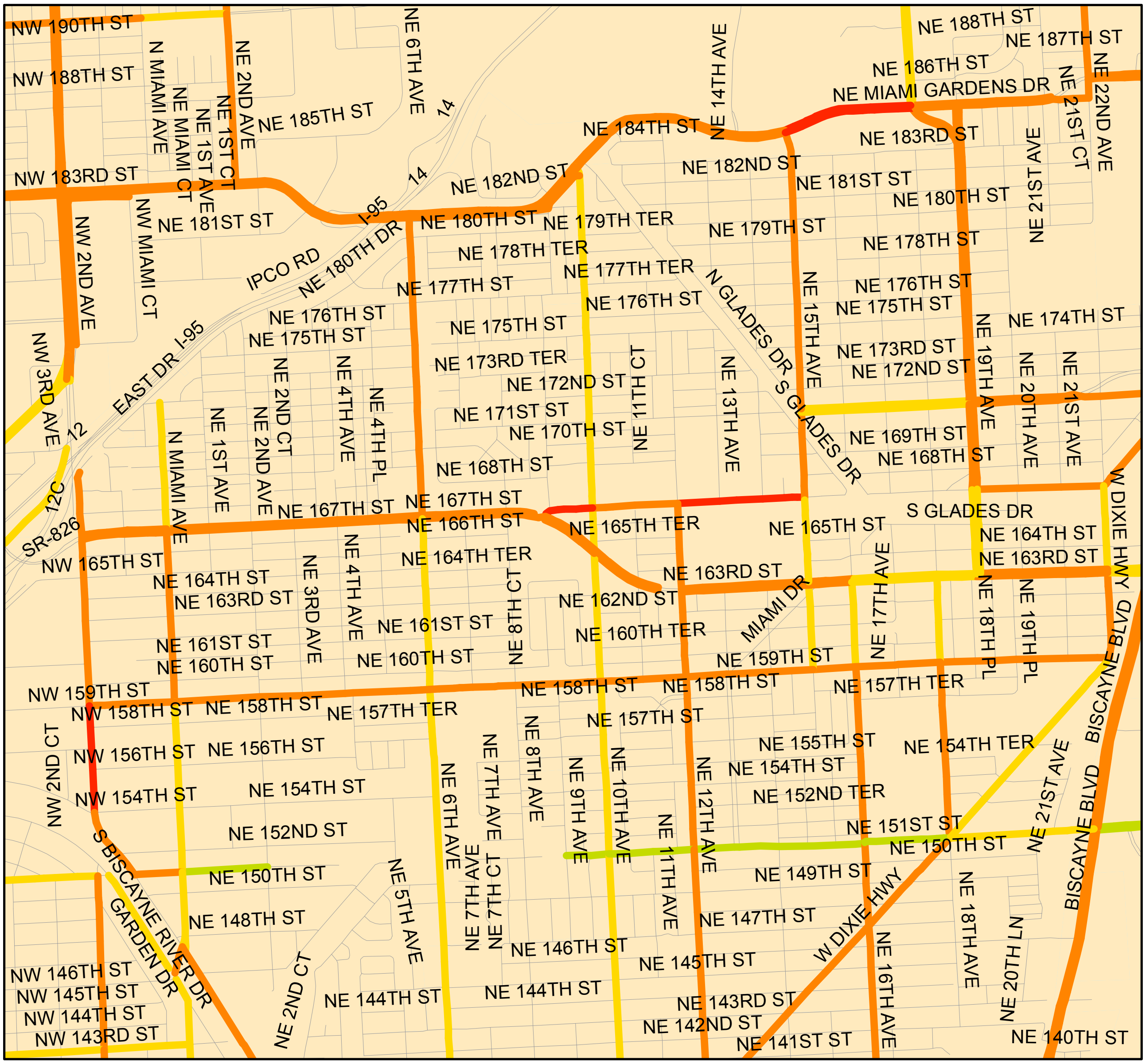


Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

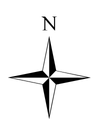
Bicycle Level of Service

NE 163rd St. Mall Transit Center

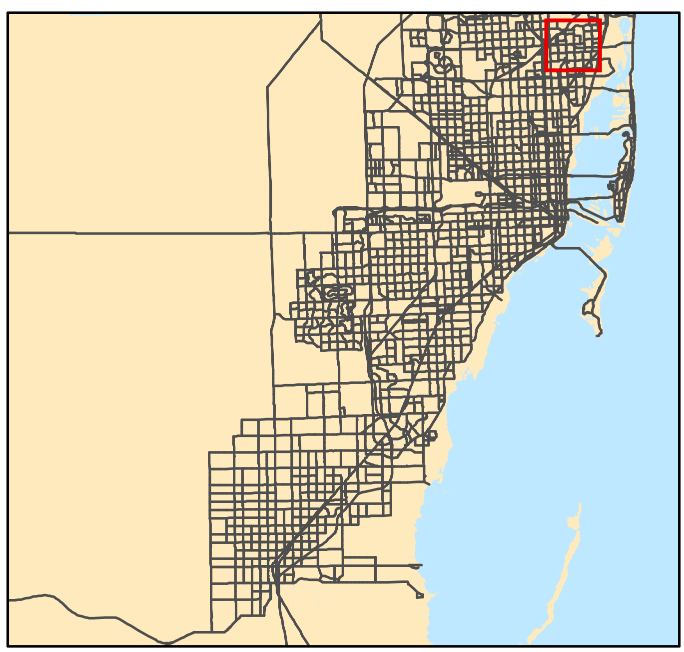


0 0.25 0.5 1 Miles

Bicycle LOS Score



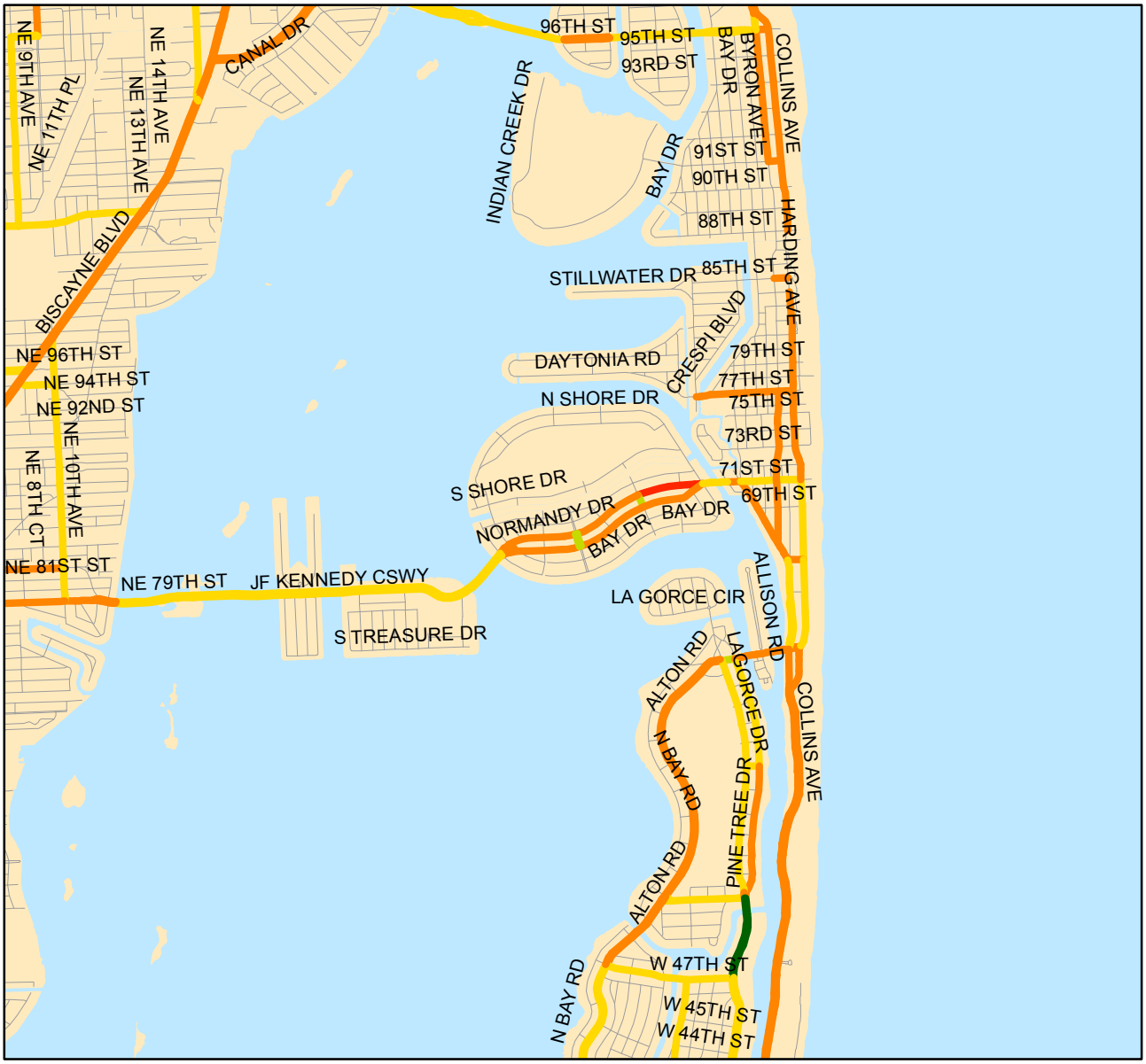
- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

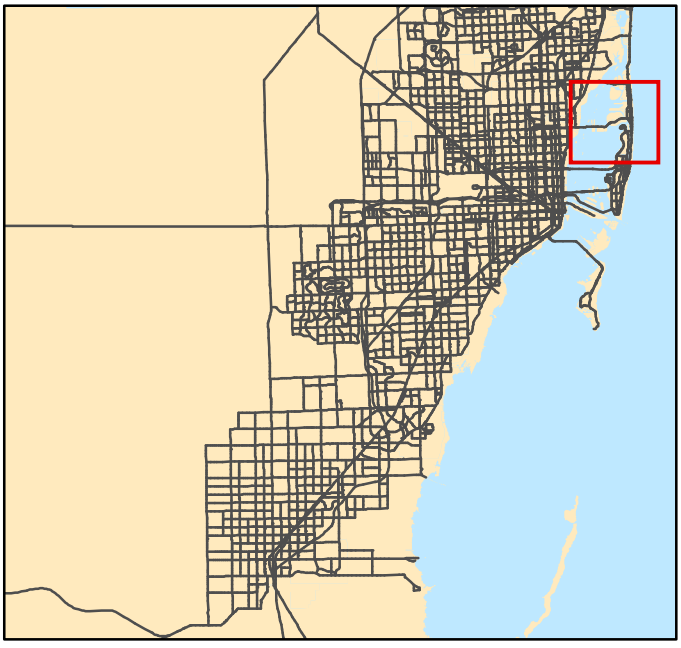
Bicycle Level of Service
North Beach



0 0.25 0.5 1 Miles

Bicycle LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads



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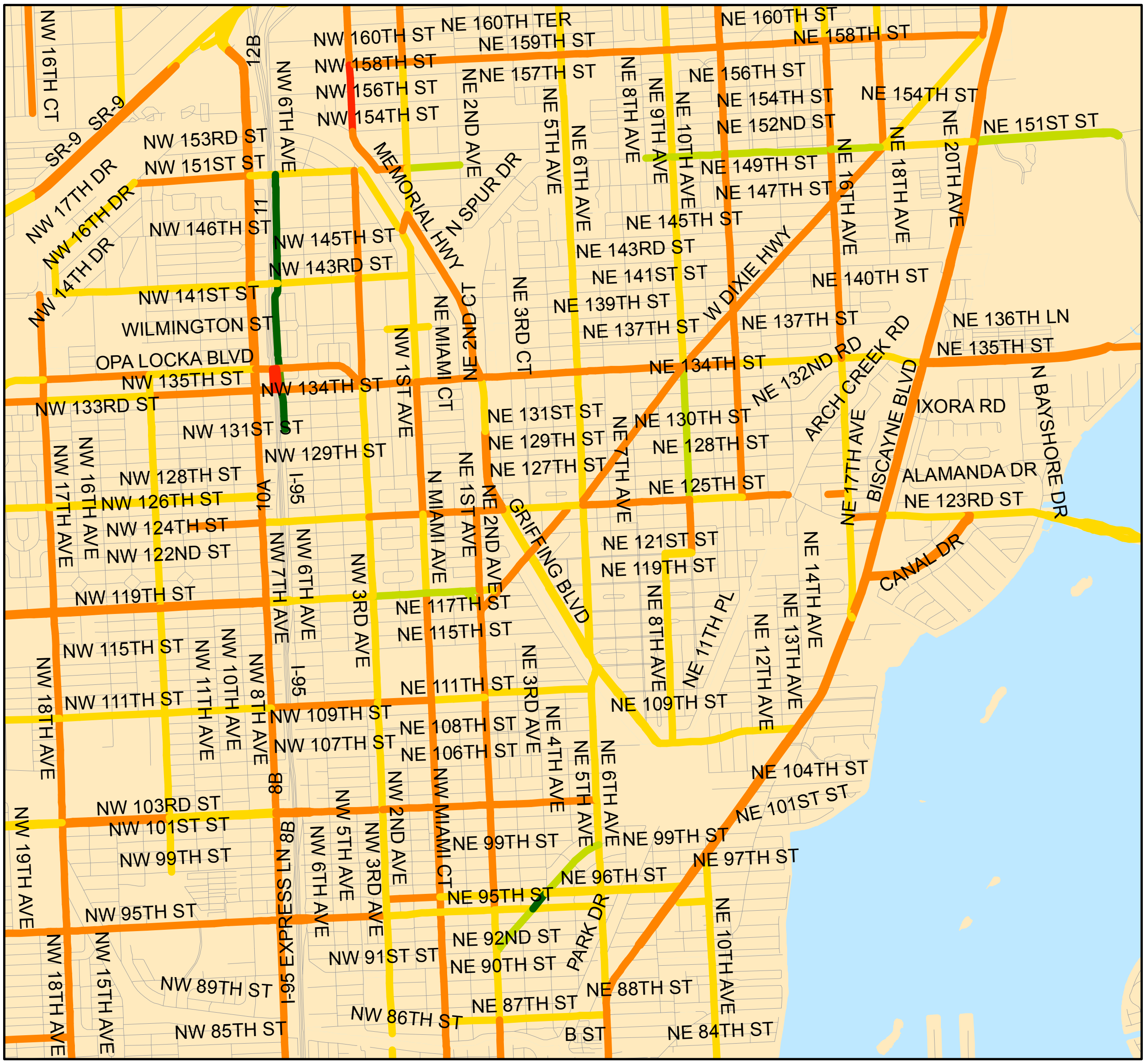
BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Bicycle Level of Service

North Miami

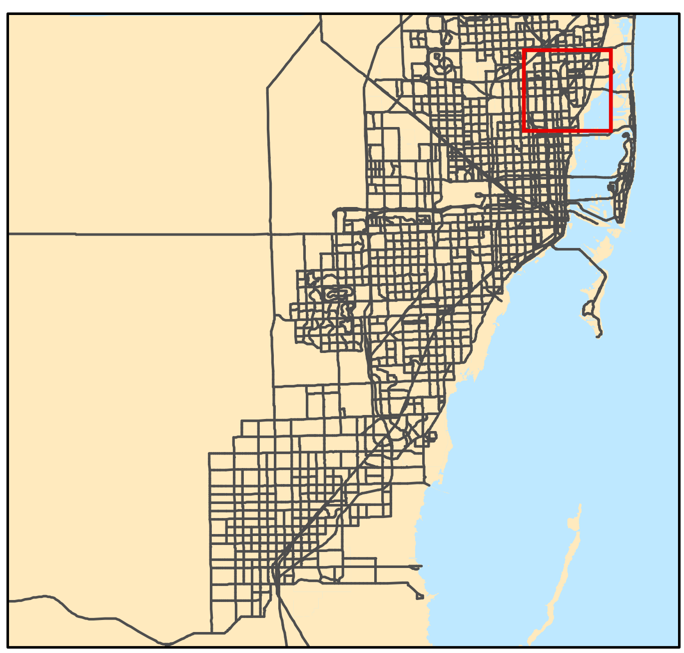


0 0.25 0.5 1 Miles

Bicycle LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads

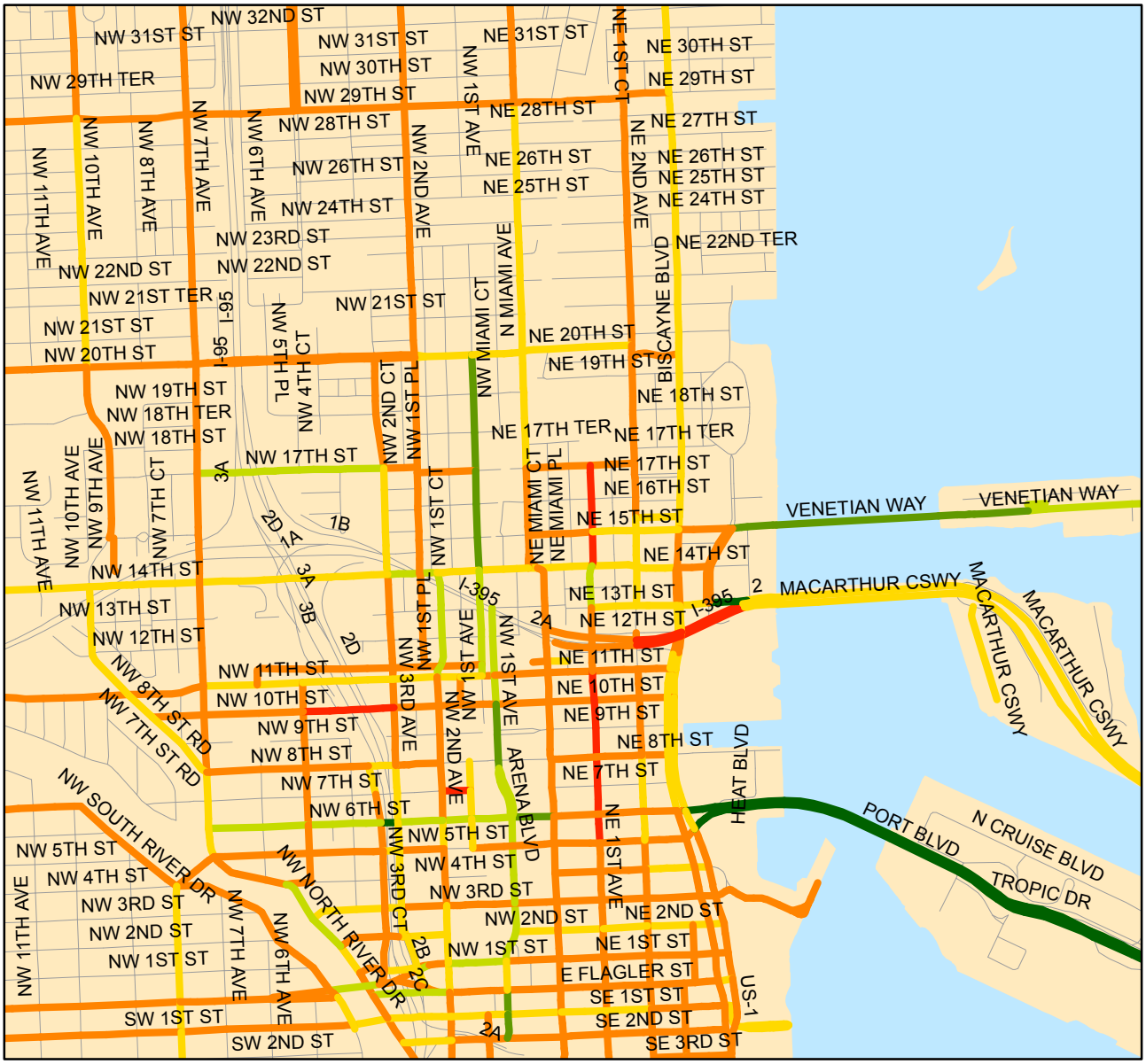
N



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

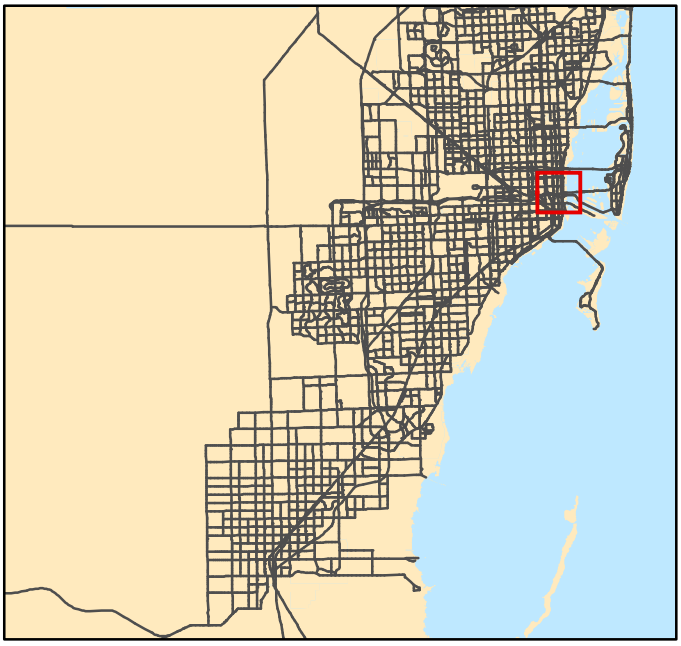
Bicycle Level of Service
Omni



0 0.25 0.5 1 Miles

Bicycle LOS Score

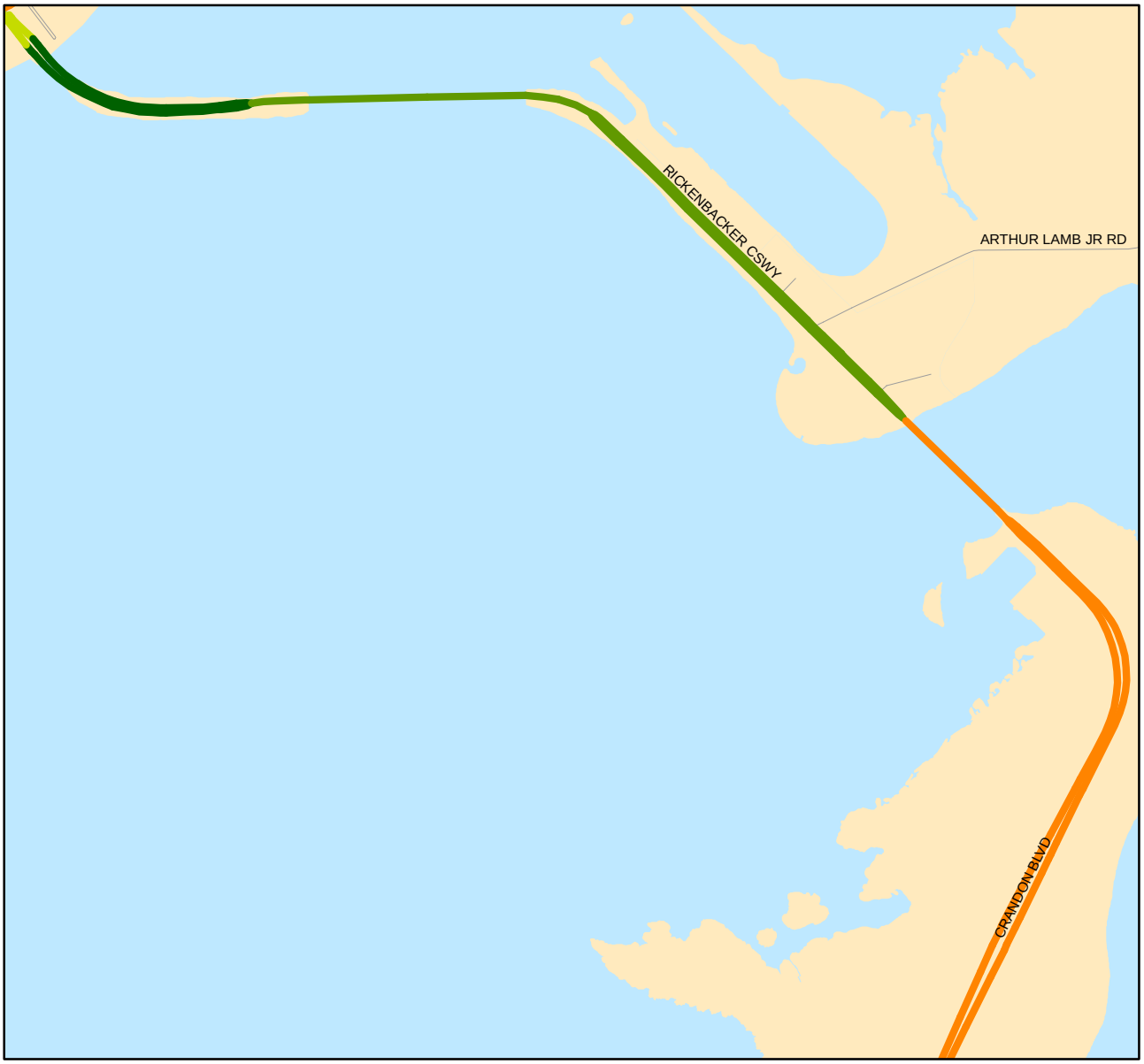
- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

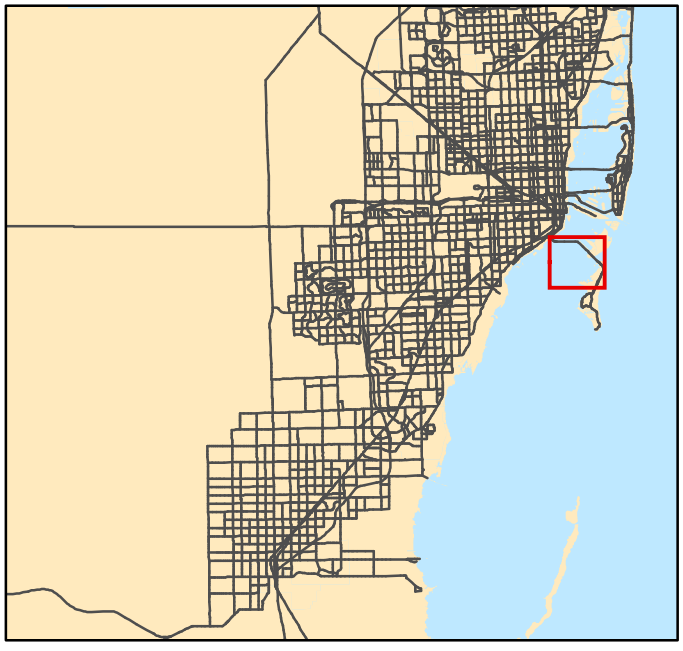
Bicycle Level of Service
Rickenbacker Causeway



0 0.25 0.5 1 Miles

Bicycle LOS Score

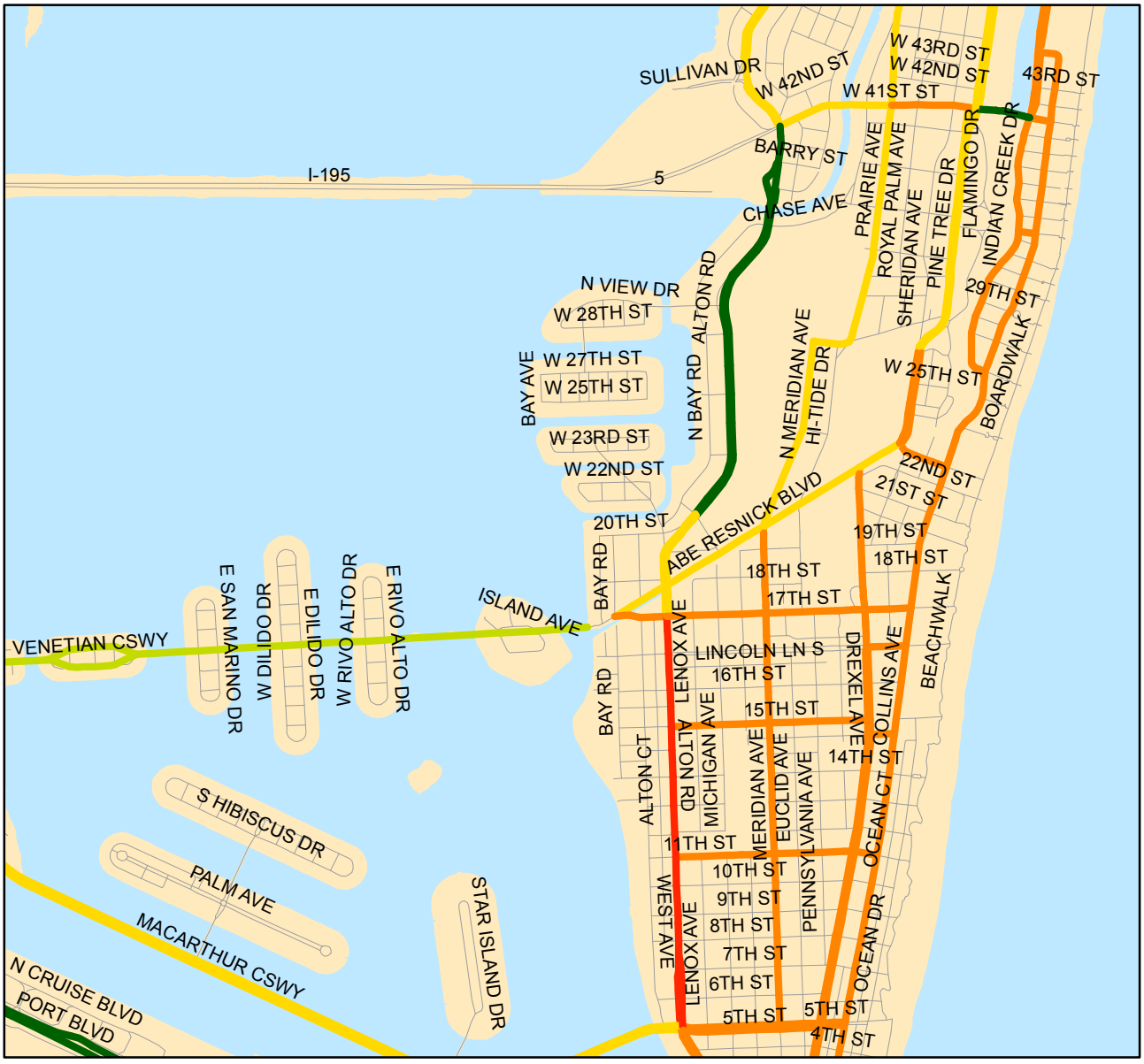
- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

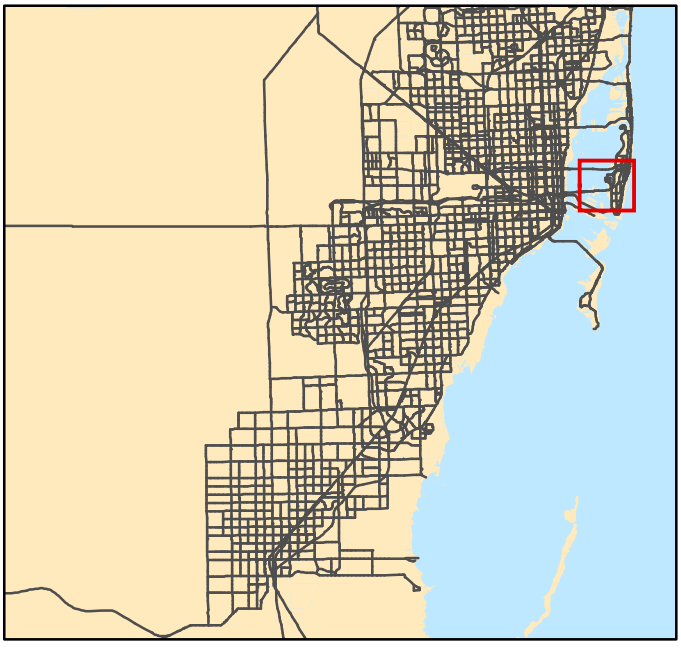
Bicycle Level of Service
South Beach



0 0.25 0.5 1 Miles

Bicycle LOS Score

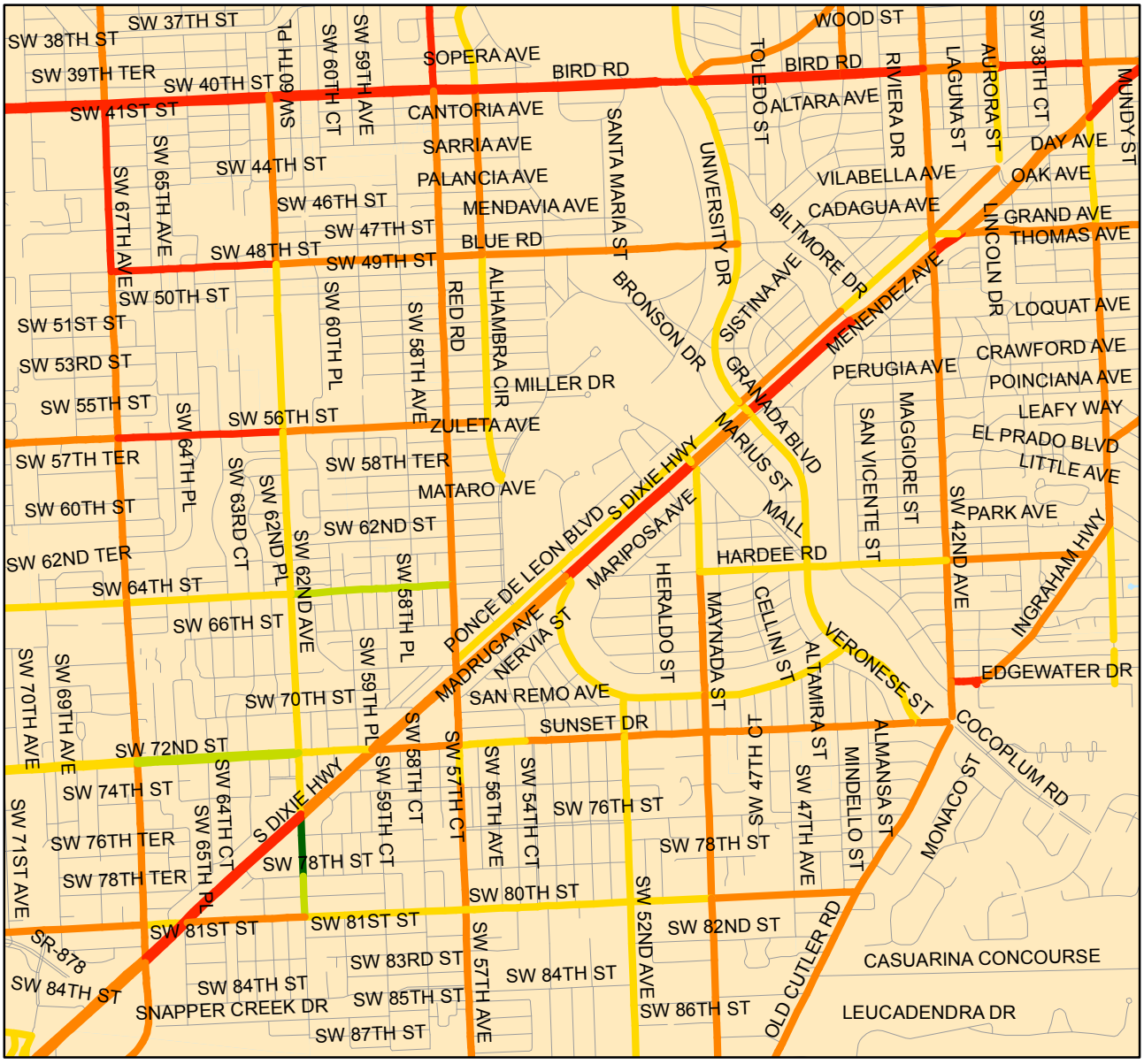
- A
- B
- C
- D
- E
- F
- Other Roads



Kimley-Horn and Associates, Inc.

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE

Bicycle Level of Service
University of Miami

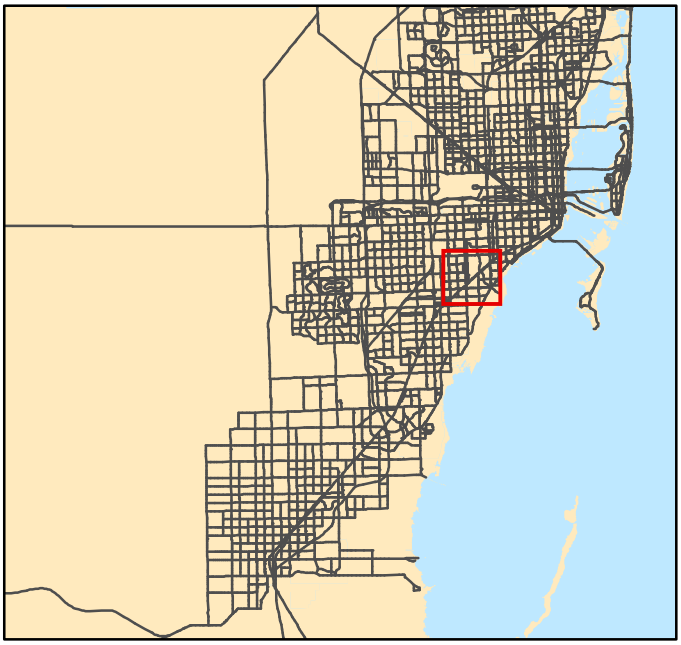


0 0.25 0.5 1 Miles

Bicycle LOS Score

- A
- B
- C
- D
- E
- F
- Other Roads

N



Kimley-Horn and Associates, Inc.

Appendix D

Final Study Advisory Committee Meeting Presentation

BICYCLE/PEDESTRIAN Safety Plan Update

Study Advisory Committee
Meeting 3
February 4, 2014

MIAMI-DADE MPO
Metropolitan Planning Organization

Kimley-Horn and Associates, Inc.

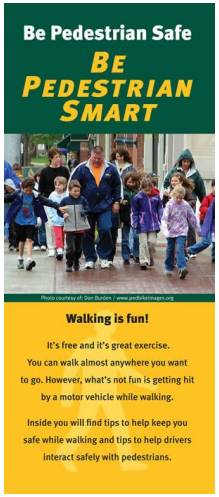
Overall Goal

- **Reduce** bicyclist and pedestrian fatalities in Miami-Dade County

Study Objectives

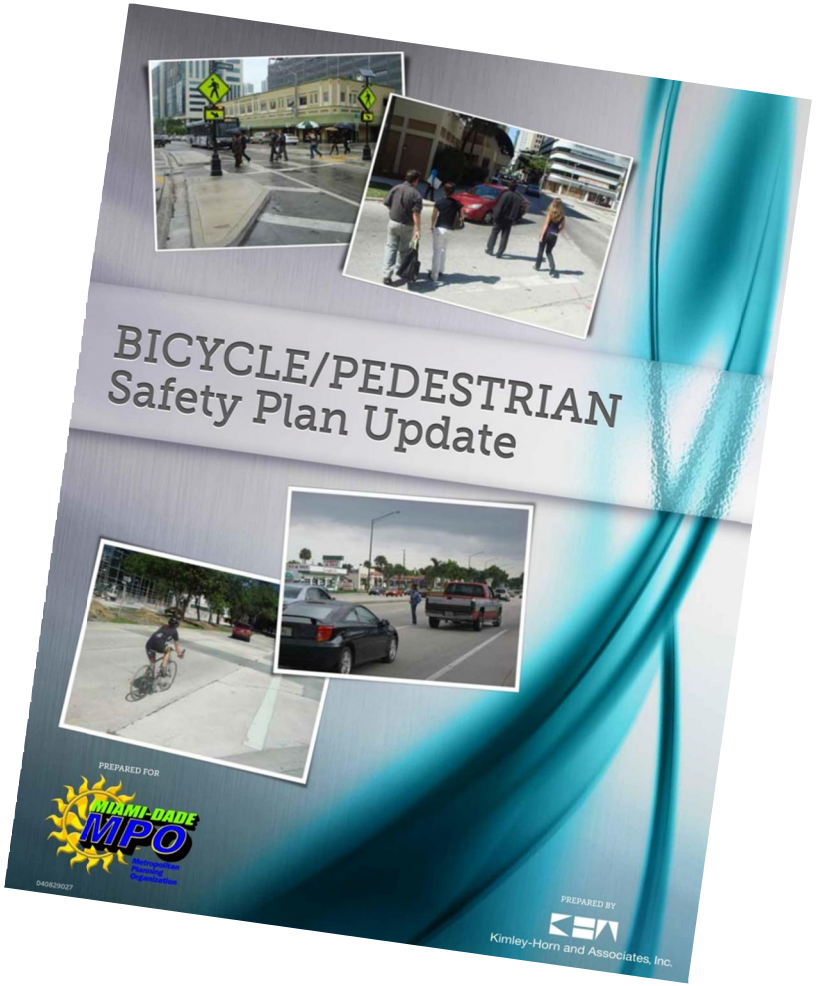
- Update the **data analysis** in the prior safety program plan
- Evaluate and **recommend safety countermeasures** to address specific crash types

R1-6a



Study Update

- **Draft final report** completed and posted on the Kimley-Horn ShareFile site for your review



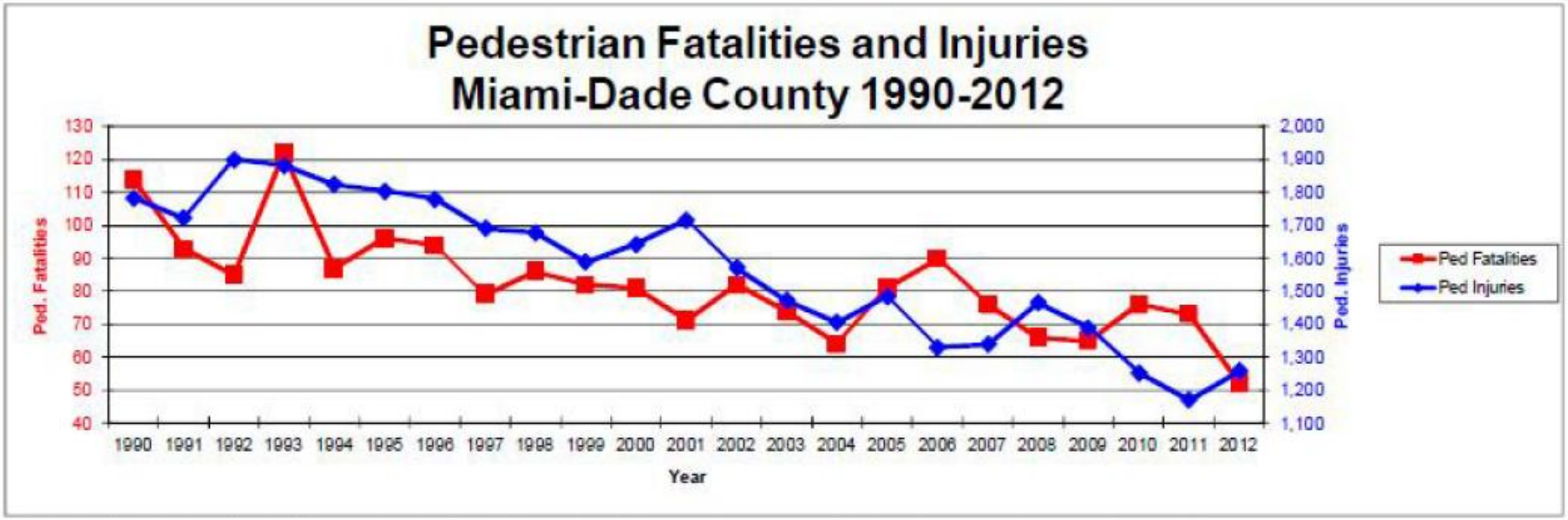
Report Overview

- Introduction
- Study Objective
- Literature Review (Background Research)
- Data Analysis
- Recommendations
- Appendix

Background Research

Pedestrian Injuries and Fatalities
Miami-Dade County

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Ped Fatalities	114	93	85	122	87	96	94	79	86	82	81	71	82	74	64	81	90	76	66	65	76	73	52
Ped Injuries	1,785	1,723	1,901	1,883	1,825	1,806	1,781	1,690	1,678	1,588	1,643	1,717	1,571	1,473	1,405	1,484	1,329	1,338	1,466	1,390	1,252	1,170	1,257

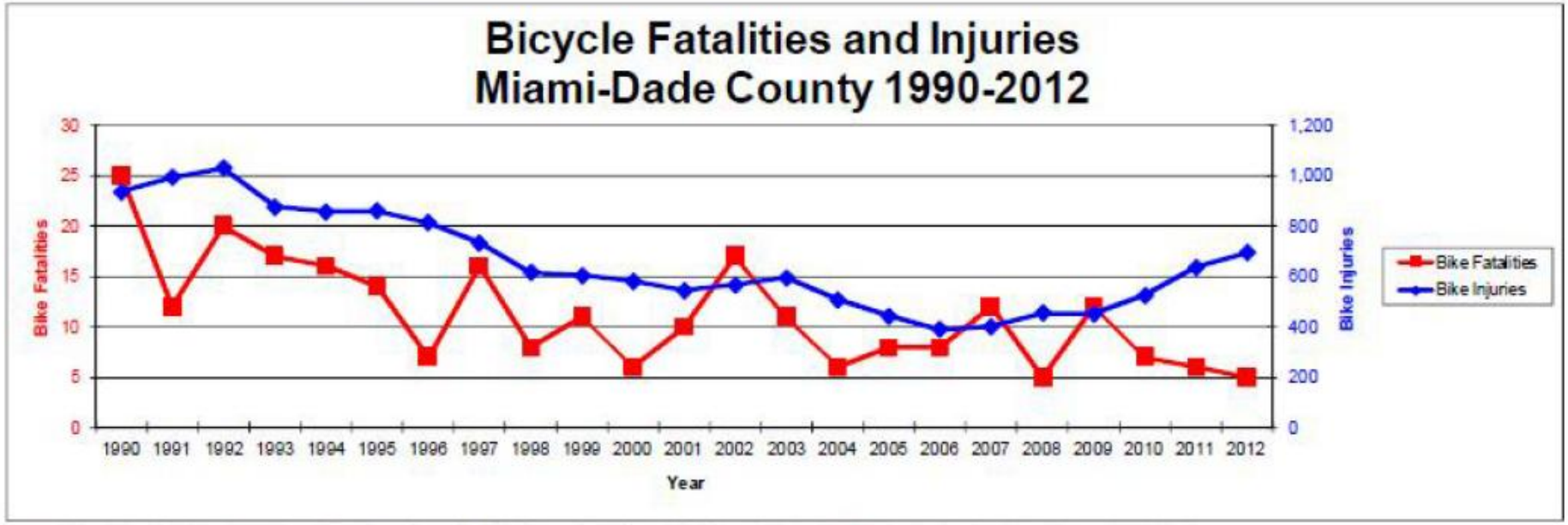


Prepared by Miami-Dade MPO from the Department of Highway Safety and Motor Vehicles' "Traffic Crash Statistics Report 2012."

Background Research

Bicyclist Injuries and Fatalities
Miami-Dade County

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Bike Fatalities	25	12	20	17	16	14	7	16	8	11	6	10	17	11	6	8	8	12	5	12	7	6	5
Bike Injuries	935	993	1,030	875	857	859	813	733	616	605	582	543	566	596	508	444	391	403	454	452	525	635	693

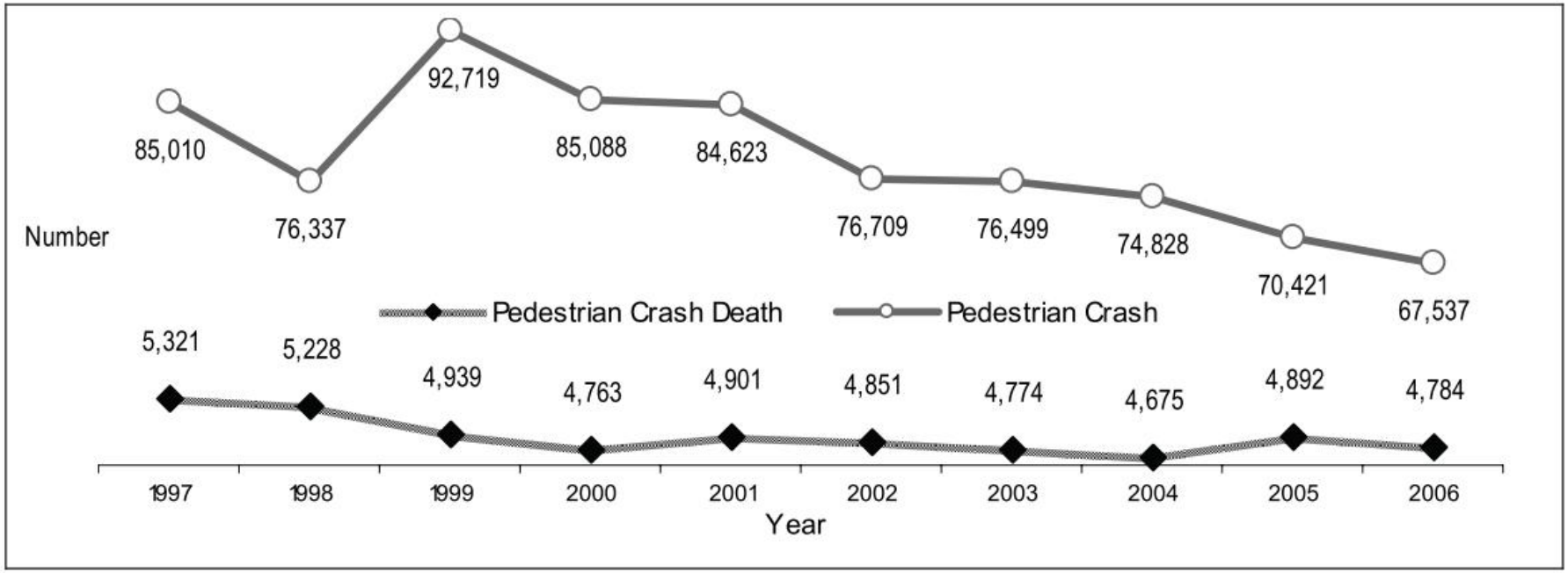


Prepared by Miami-Dade MPO from the Department of Highway Safety and Motor Vehicles' "Traffic Crash Statistics Report 2012."

Background Research

- Miami-Dade data generally consistent with national trends

Figure 1-2: Pedestrian Fatalities and Police-Reported Pedestrian Crashes by Year

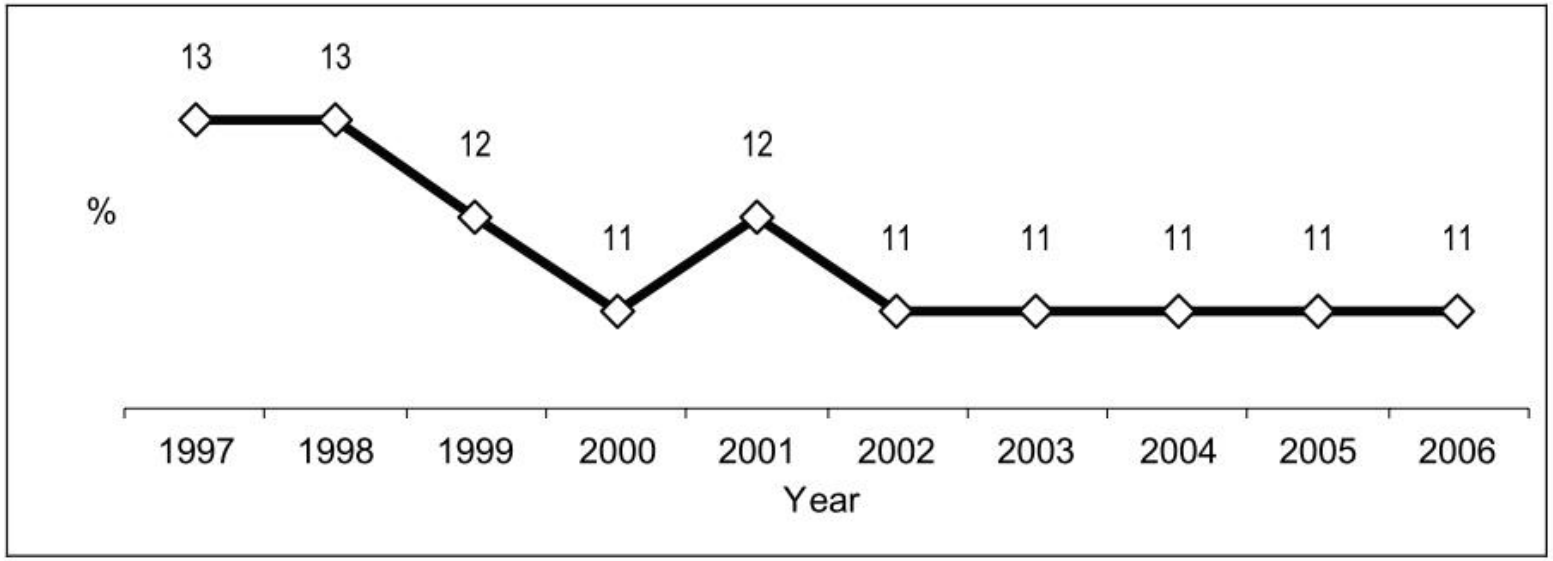


Source: FARS 1997-2005 (Final), 2006 (ARF) and GES, 1997-2006

Background Research

- Percentage of pedestrian fatalities within all traffic fatalities is declining

Figure 1-3: Percentage of Pedestrian Fatalities by Year

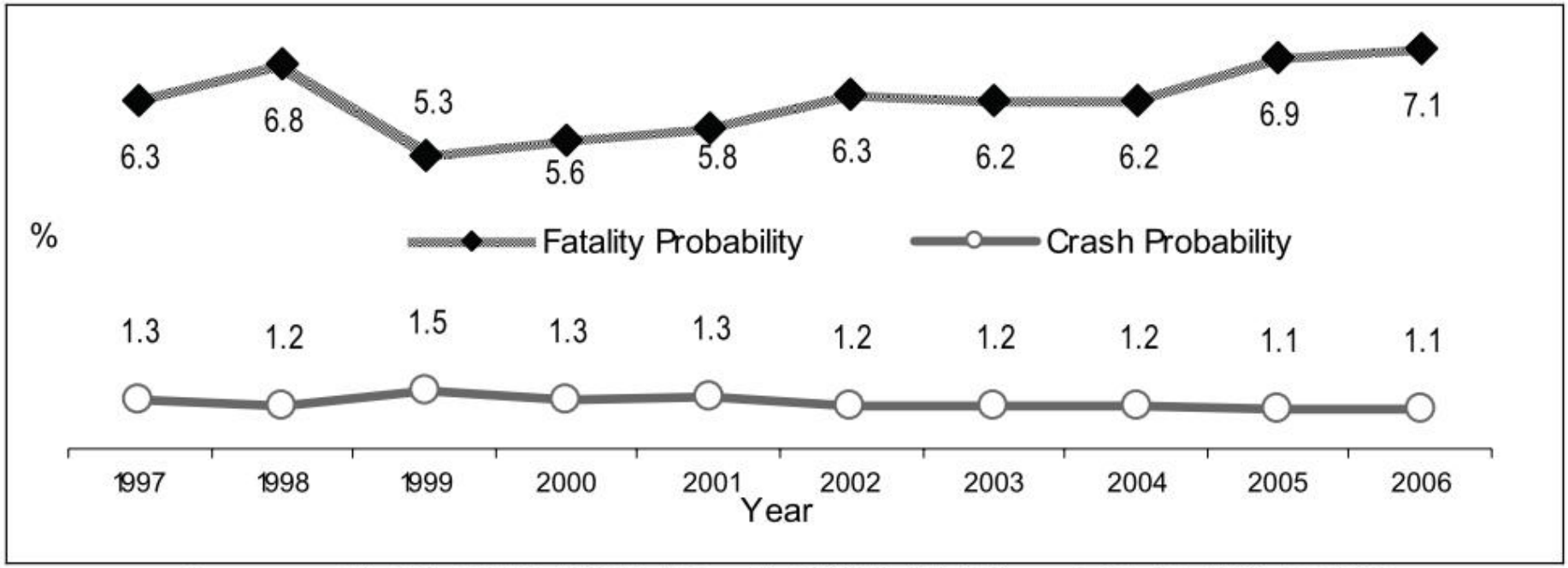


Source: FARS 1997-2005 (Final), 2006 (ARF)

Background Research

- Probability of a pedestrian crash being fatal is increasing

Figure 1-5: Pedestrian Fatality Probability and Crash Probability by Year

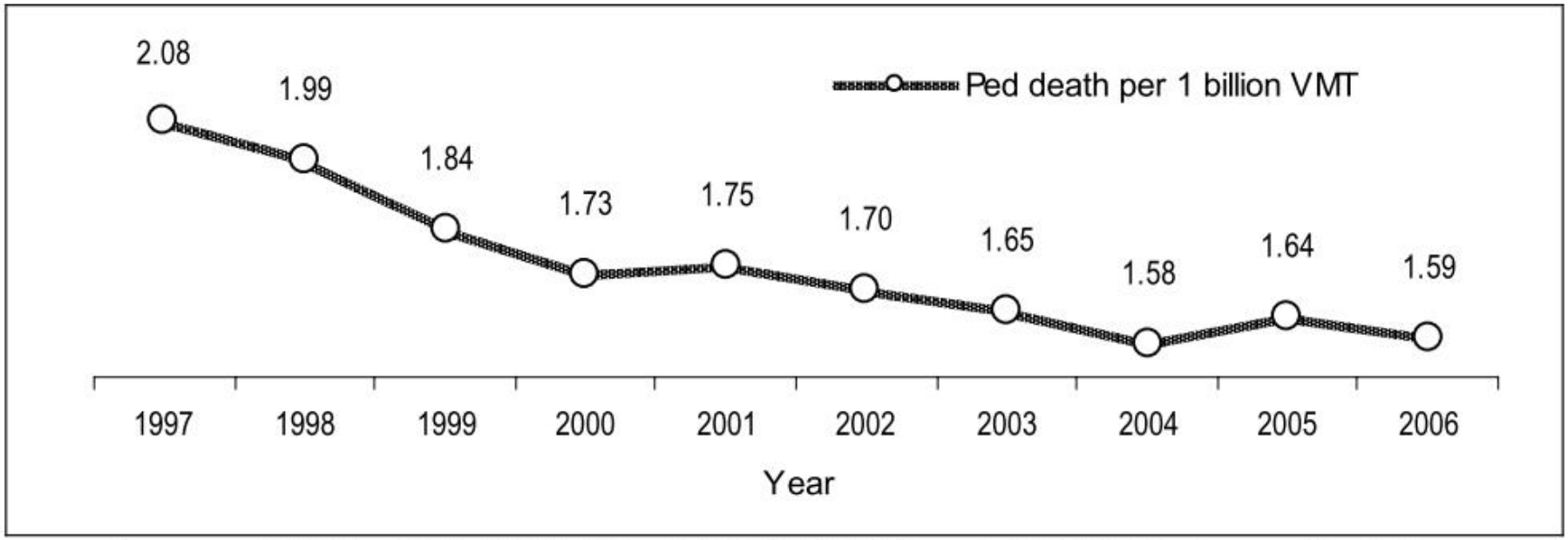


Source: FARS 1997-2005 (Final), 2006 (ARF) and GES 1997-2006

Background Research

- Pedestrian fatalities per vehicle mile traveled (VMT) is decreasing

Figure 1-6: Pedestrian Fatality Rate per One Billion VMT by Year

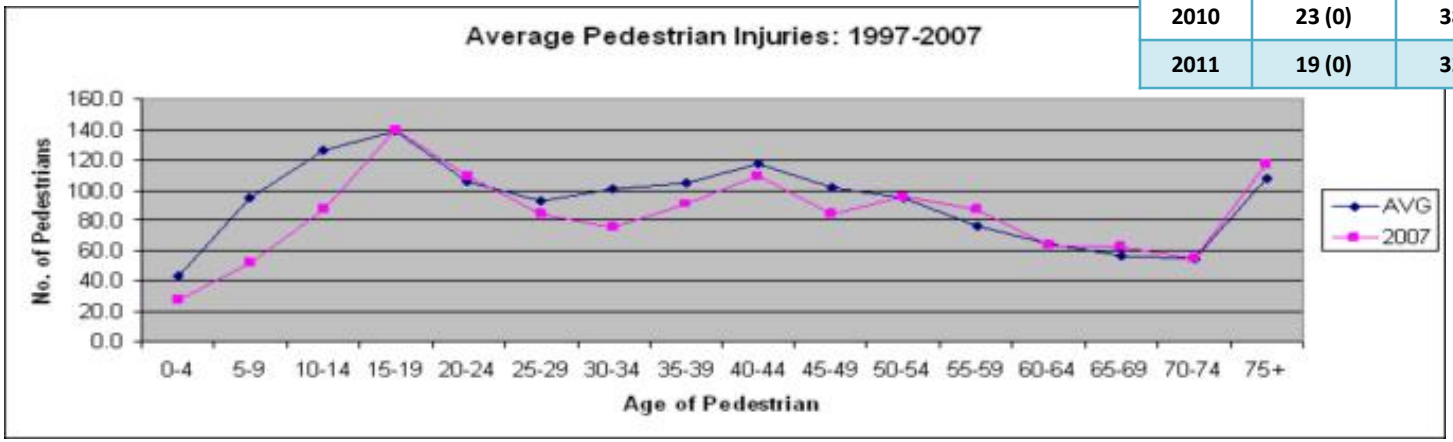


Source: FARS 1997-2005 (Final, 2006 (ARF) and FHWA Highway Statistics

Background Research

- WALKSAFE
  - University of Miami (UHealth)
  - Health-data from Trauma Centers
  - Education-based approach
  - Reduced children pedestrian hit-by-car by **65 percent**

Year	0-4 years old Injuries (Fatalities)	5-9 years old Injuries (Fatalities)	10-14 years old Injuries (Fatalities)	Total Injuries (Fatalities)
2001	50 (1)	93 (1)	150 (0)	293 (2)
2002	52 (1)	104 (1)	116 (1)	272 (3)
2003	36 (0)	101 (3)	120 (1)	257 (4)
2004	27 (1)	63 (1)	130 (2)	220 (4)
2005	34 (2)	73 (1)	105 (0)	212 (3)
2006	29 (0)	55 (1)	90 (1)	174 (2)
2007	27 (1)	52 (1)	87 (2)	166 (4)
2008	25 (0)	43 (1)	103 (0)	171 (1)
2009	19 (1)	39 (0)	83 (2)	141 (3)
2010	23 (0)	38 (0)	77 (1)	138 (1)
2011	19 (0)	32 (0)	53 (2)	104 (2)



Background Research

- Miami-Dade Alliance for Aging
  - Bi-lingual Project to Reduce Elder Pedestrian Crashes
    - Safe Steps - Pasos Seguros
  - Two Primary Strategies
    - A television public awareness campaign for elder pedestrian safety
    - An education component to teach elders how to walk safely
  - Objectives are to change pedestrian behavior, as well as make drivers more aware

afa
Alliance for Aging, Inc.
Answers on Aging.

Background Research

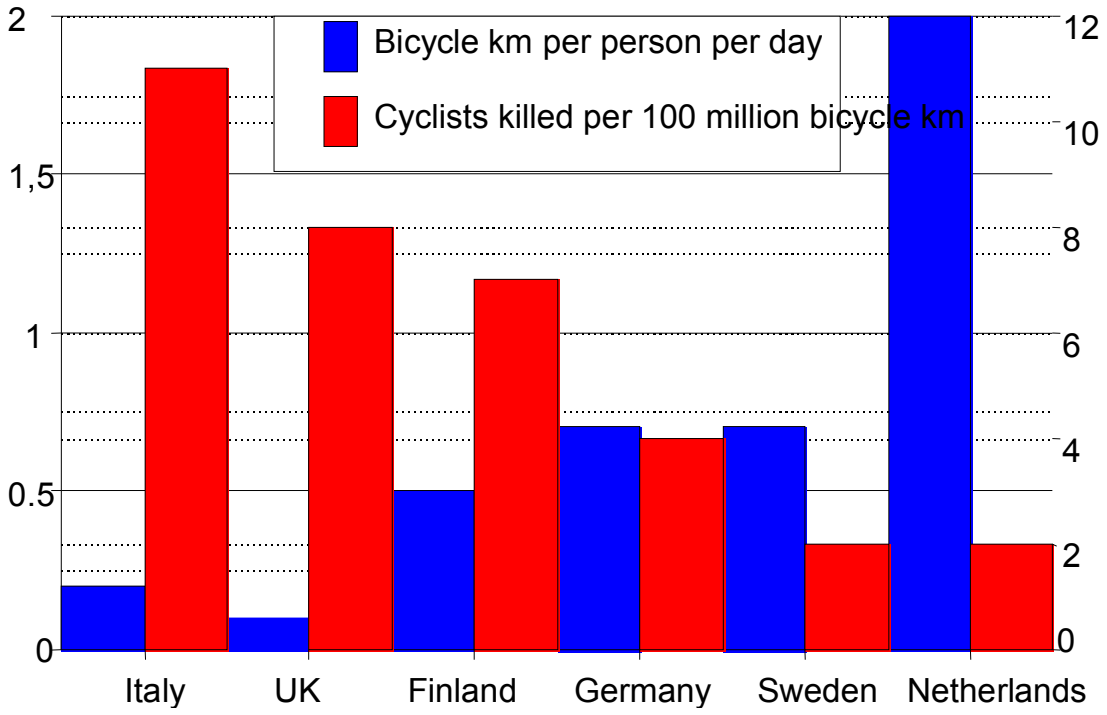
- Miami-Dade Pedestrian Safety Demonstration Project
  - Before-and-After Study
  - Most countermeasures were Educational
    - One Enforcement, One Engineering
  - Reduced Countywide Crash Rates 8 -13 percent
  - Children and non-elderly adults showed the greatest decrease in crashes

Background Research

- Pedestrian Safety Engineering and ITS-Based Countermeasures (FHWA)
  - Miami one of 3 Cities Selected for Study
  - Impacts of countermeasures assessed through self-evaluations and field research
  - MOEs
  - Countermeasures

Background Research

- Safety in Numbers
  - European countries with greater bicycle mode shares have significantly lower cyclist fatality rates



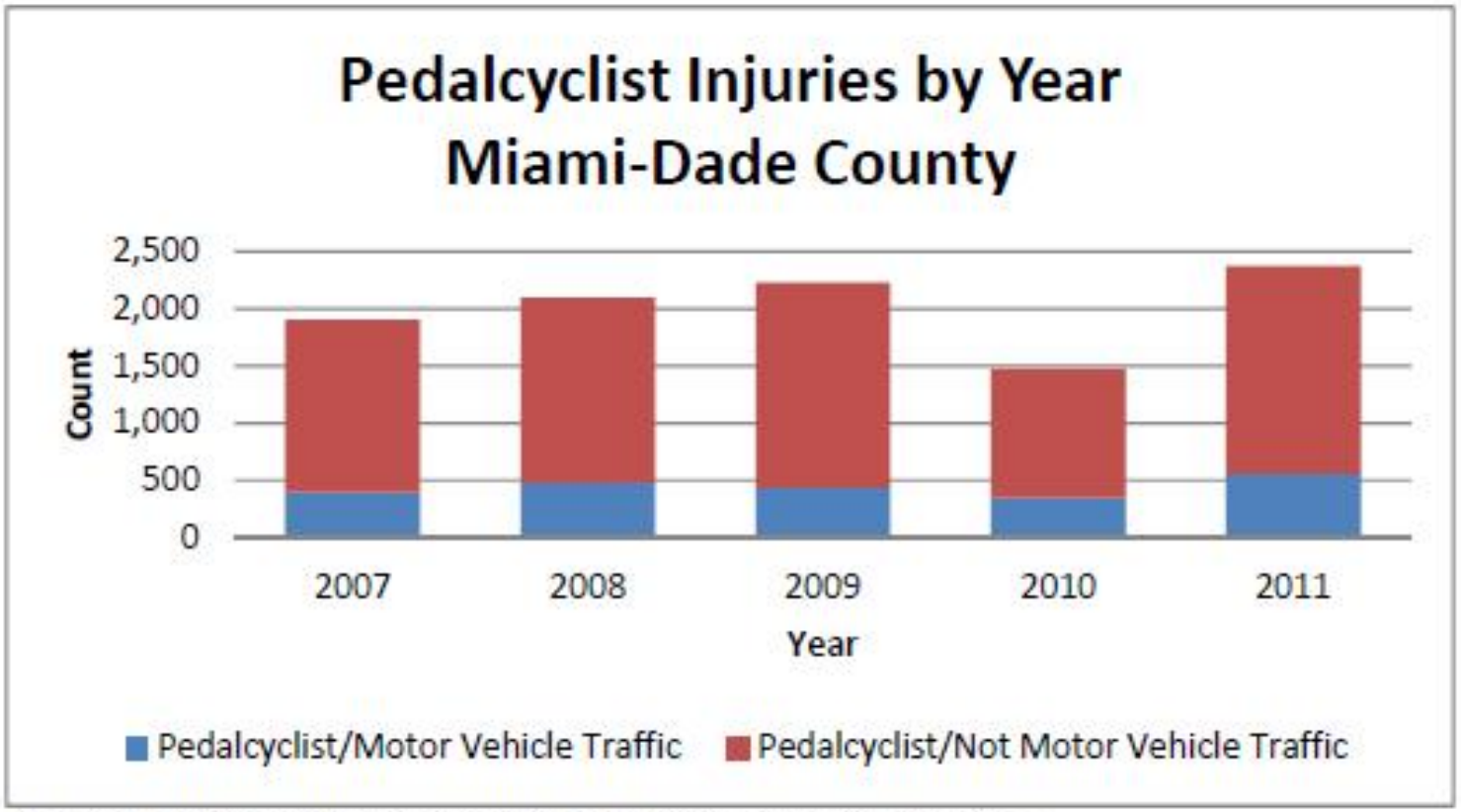
Data Analysis

- Two Main Analysis Tracks
  - Crash Data Analysis
    - Department of Health/Trauma Center Data
    - Department of Highway Safety and Motor Vehicles (DHSMV) Crash Reports
  - Level of Service
    - Pedestrian Level of Service (PLOS)
    - Bicycle Level of Service (BLOS)

Department of Health Data

- Department of Health's (DOH) Florida Injury Surveillance Data System (2007-2011)
  - Pedalcyclist (Bicycle) and Pedestrian data for:
    - Fatalities
    - Hospitalizations
    - Emergency Department Admissions
  - Categorizes incidents as resulting from either a motor vehicle traffic accident or a non-motor vehicle accident

Department of Health Data

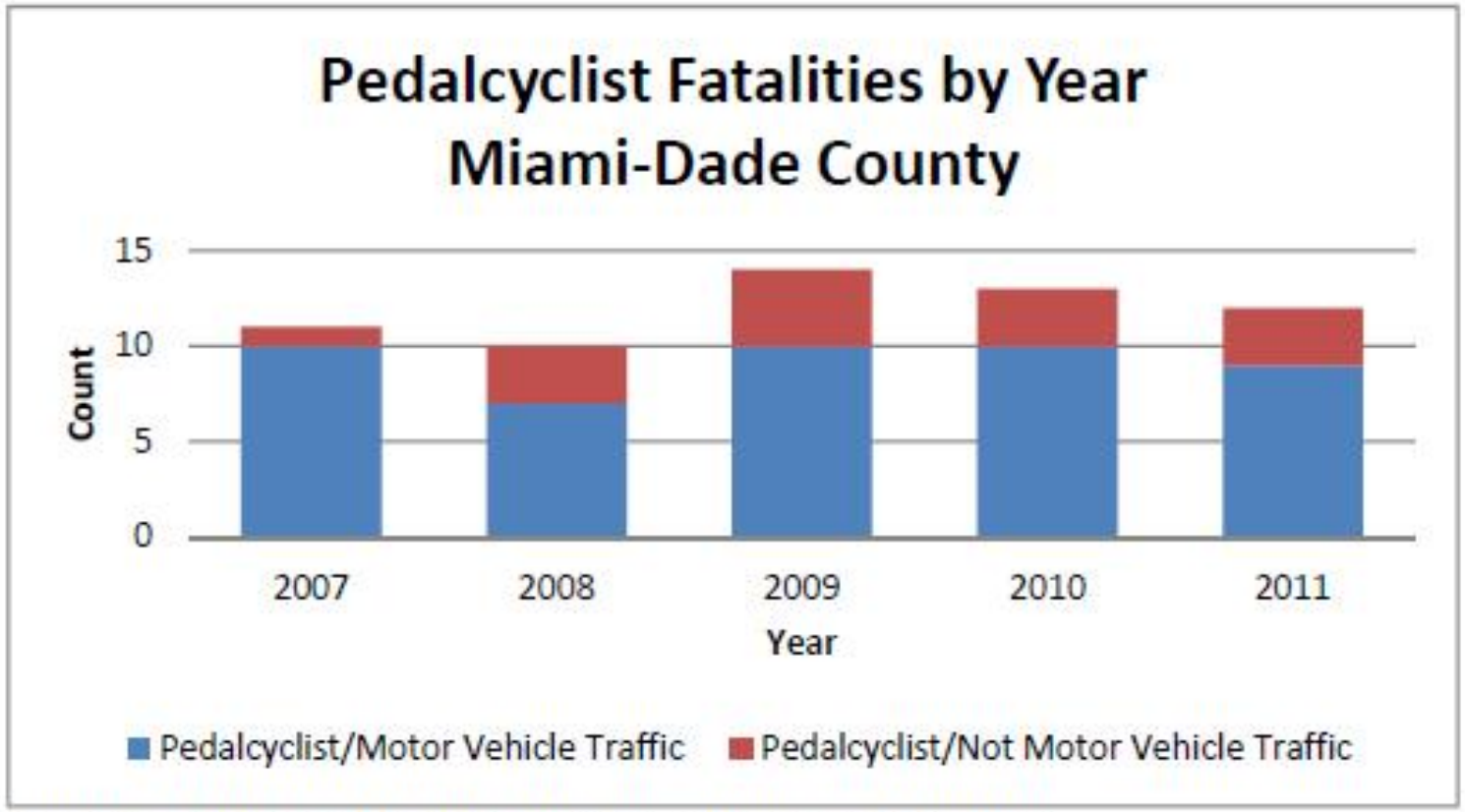


Source: Florida DOH Florida Injury Surveillance Data System

Observations:

- The majority of pedalcyclist injuries did not involve a motor vehicle

Department of Health Data

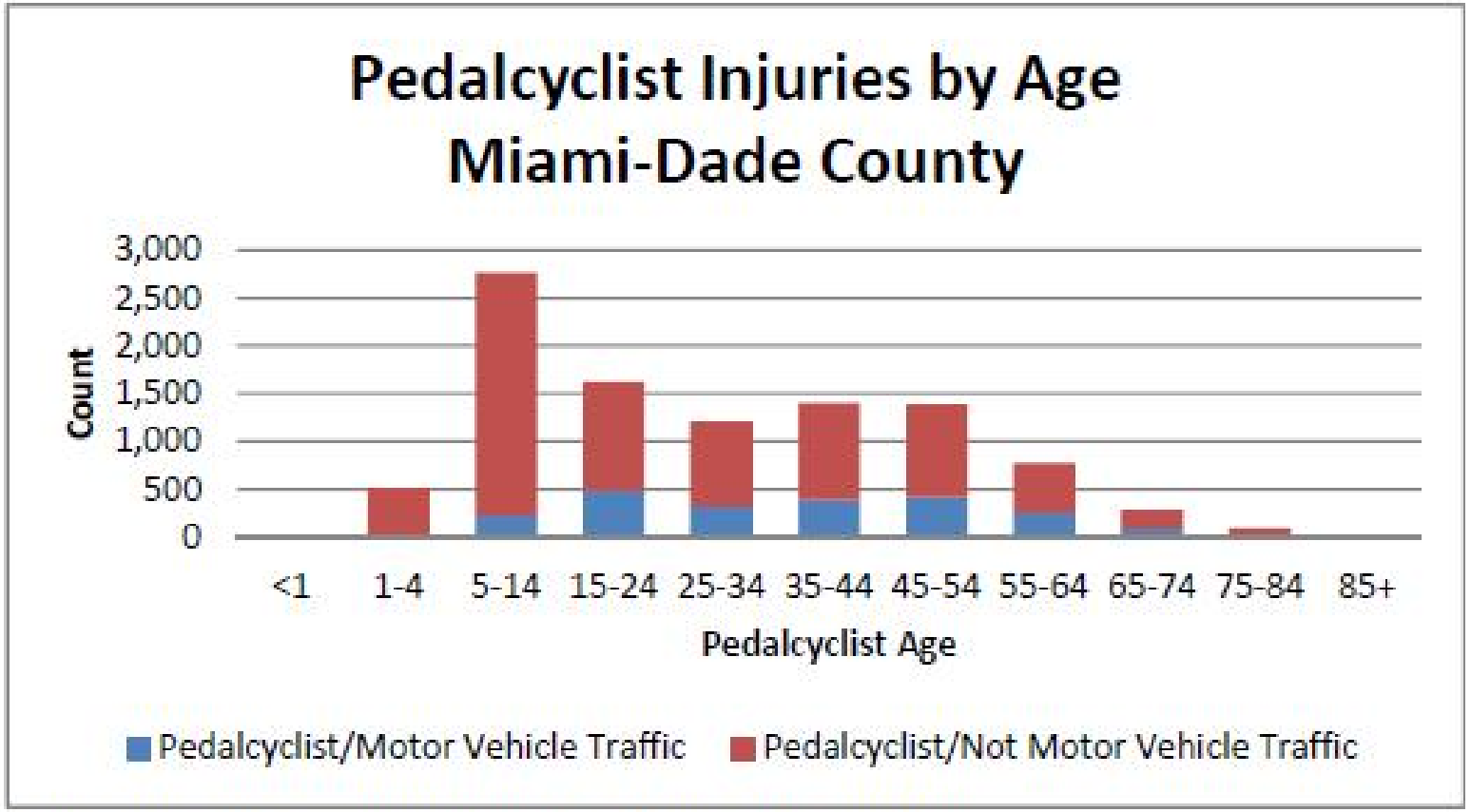


Source: Florida DOH Florida Injury Surveillance Data System

Observations:

- The majority of pedalcyclist fatalities involved a motor vehicle

Department of Health Data

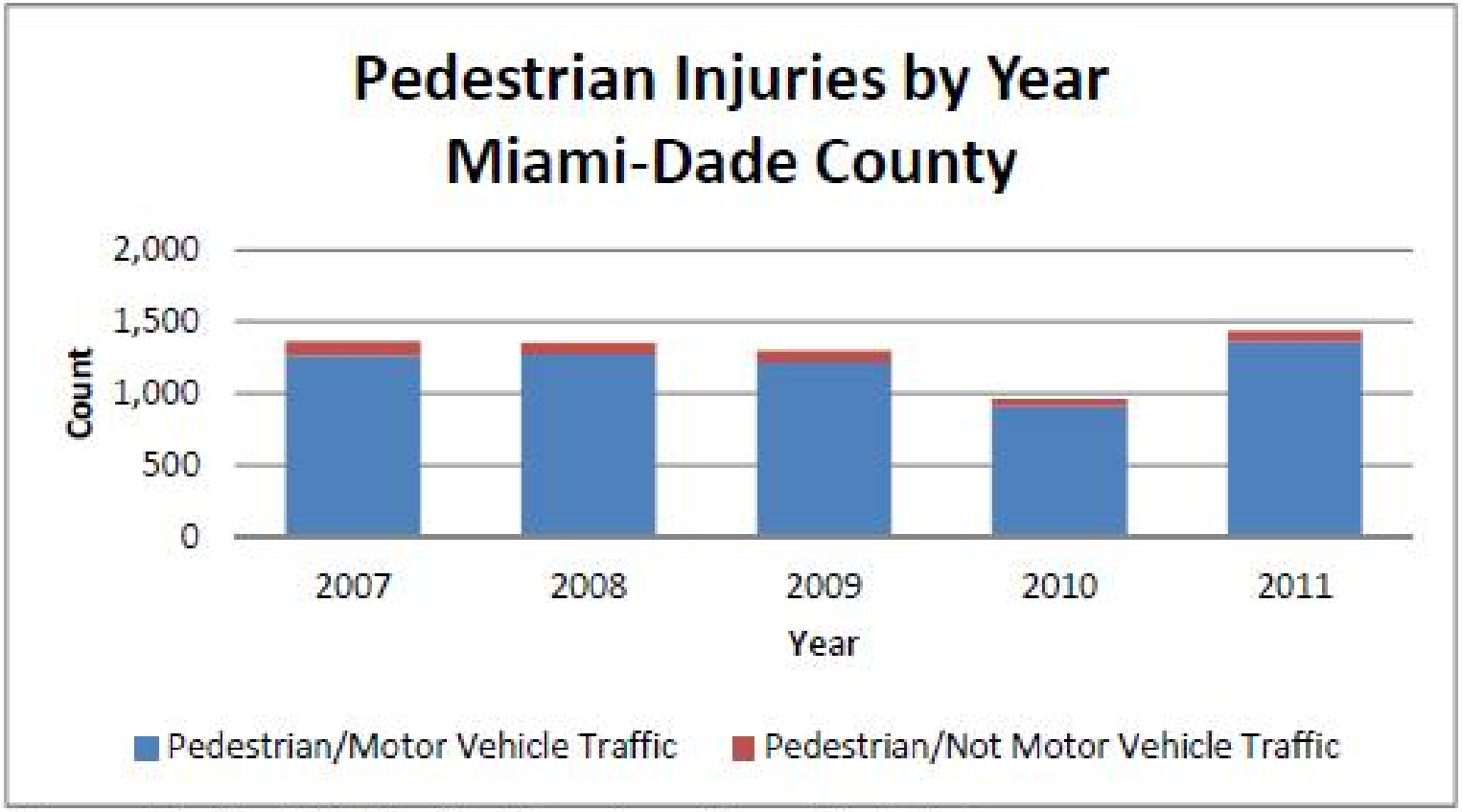


Source: FDOH, Florida Injury Surveillance Data System

Observations:

- The trend of pedalcyclist injuries in non motor vehicle-involved crashes is even more pronounced in juveniles

Department of Health Data

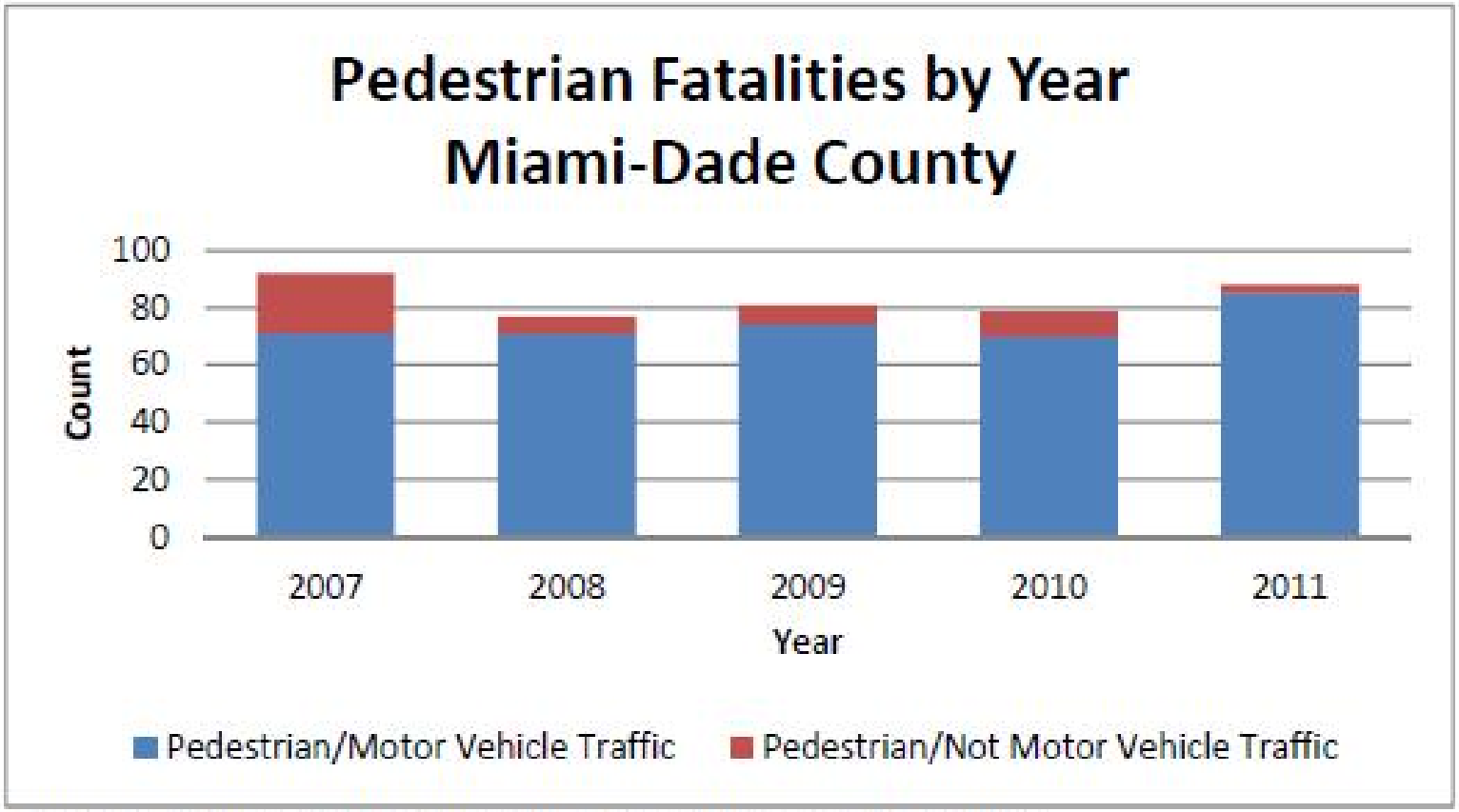


Source: Florida DOH Florida Injury Surveillance Data System

Observations:

- The majority of pedestrian injuries involved a motor vehicle

Department of Health Data



Source: Florida DOH Florida Injury Surveillance Data System

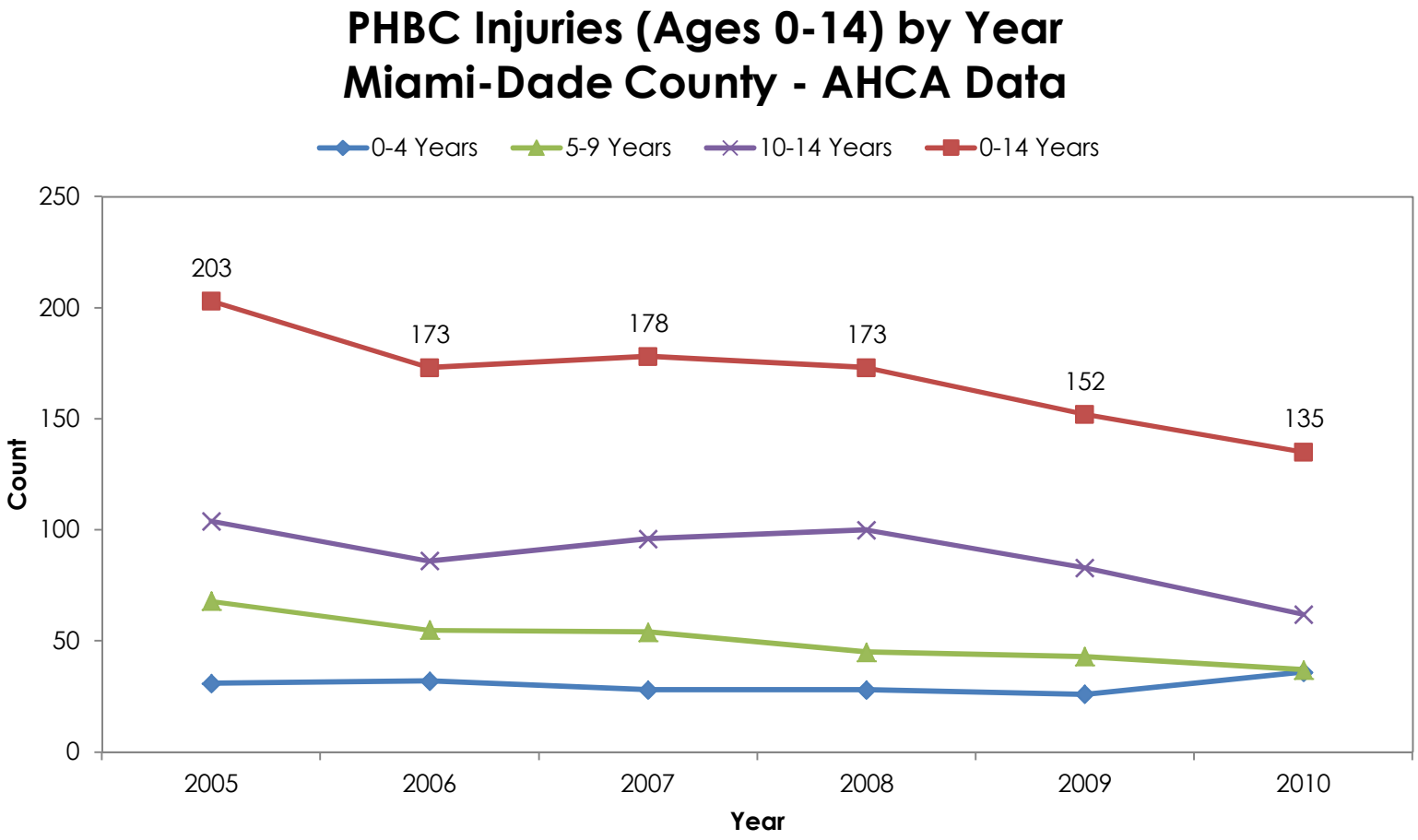
Observations:

- The majority of pedestrian fatalities involved a motor vehicle

Pediatric Pedestrians Hit By Car (PHBC) Data

- Agency for Health Care Administration (AHCA) pediatric PHBC injury data from 2005 to 2010
- Pediatric PHBC data from emergency room logs at Jackson Memorial Hospital, Ryder Trauma Center, and Miami Children's Hospital from 2002-2011

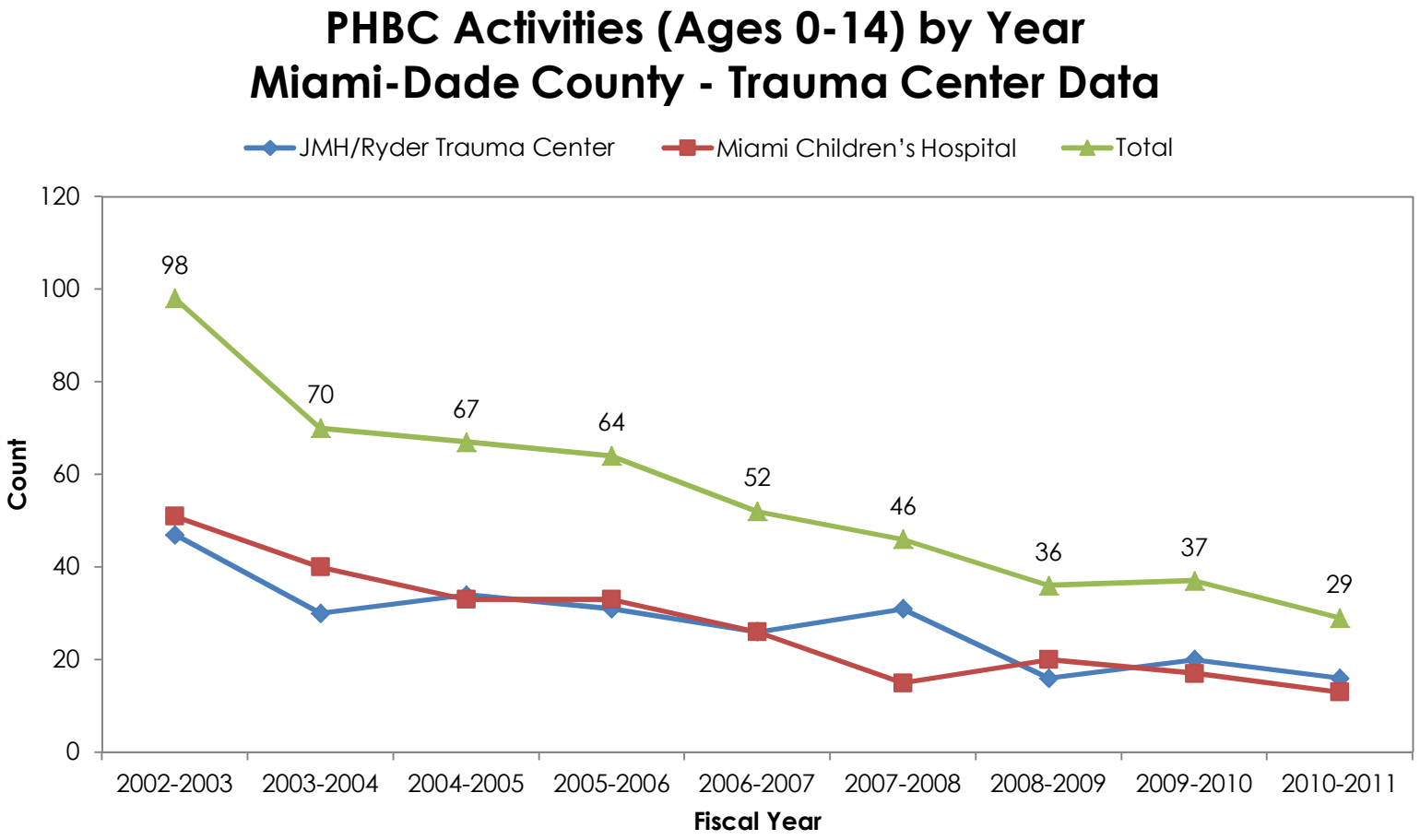
Pediatric PHBC Data



Observations:

- Decreasing trend in the number of pediatric PHBC injuries

Pediatric PHBC Data



Observations:

- Pediatric PHBC being sent to these Level I trauma centers decreased by 70 percent since 2002

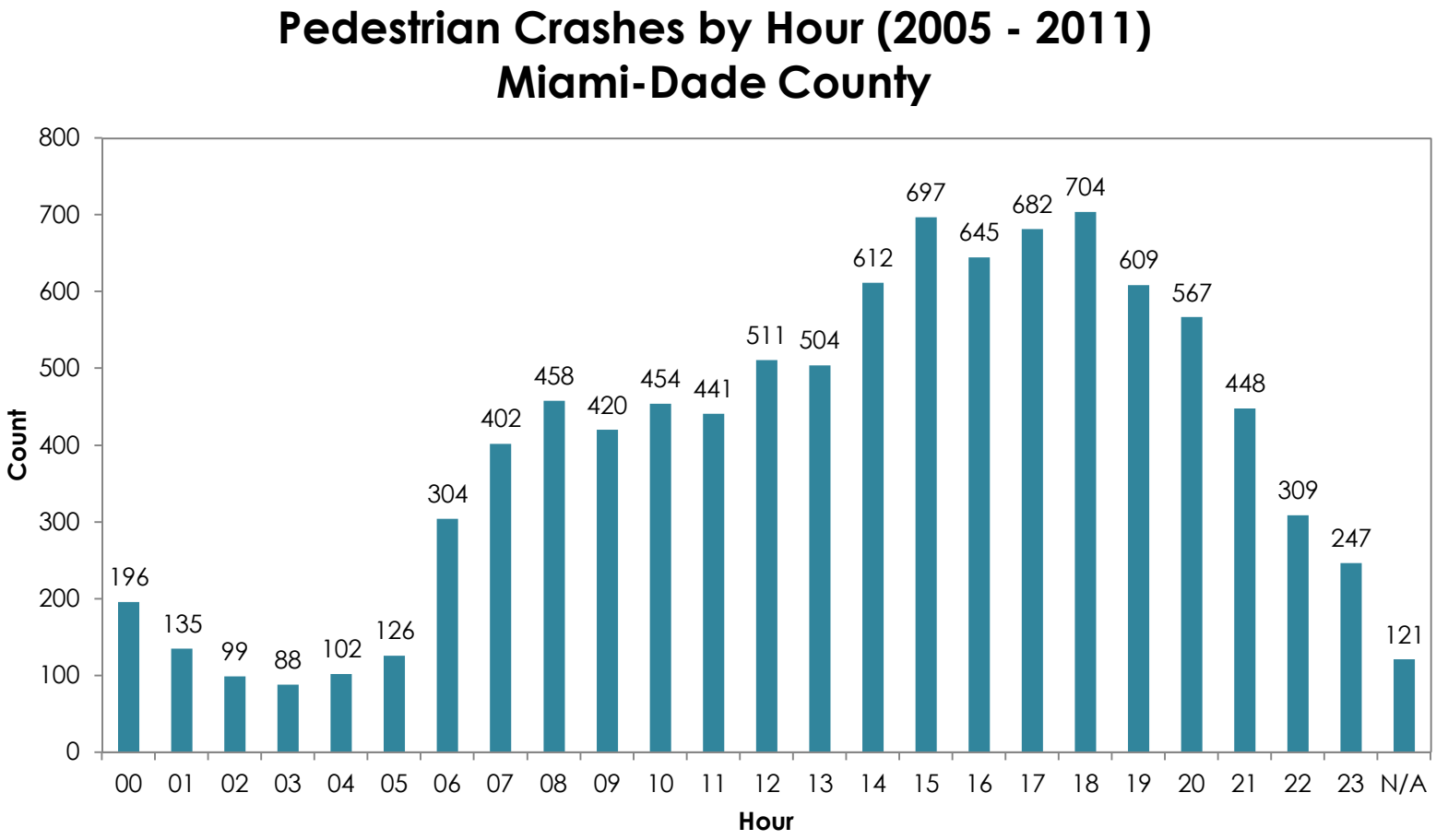
DHSMV Data

- Seven Years of Crash Data (2005 – 2011)
  - Pedestrians
    - Average of **1412** crashes per year
    - Average of **70** fatalities per year

DHSMV Data

- Seven Years of Crash Data (2005 – 2011)
  - Bicyclists
    - Average of **538** crashes per year
    - Average of **8** fatalities per year

Crash Data

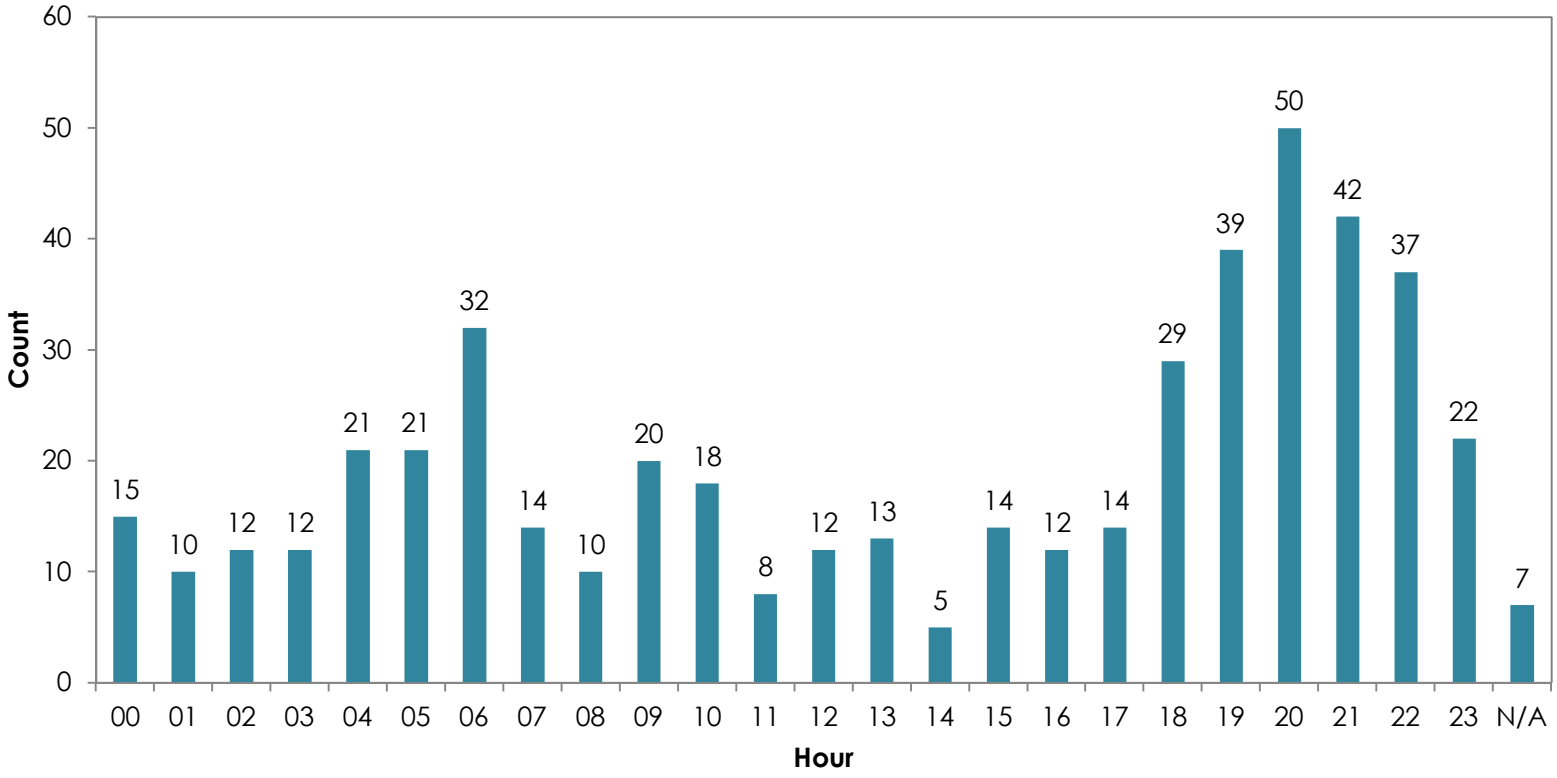


Observations:

- 40 percent of crashes occurred between 2:00 PM and 7:59 PM

Crash Data

Pedestrian Fatalities by Hour (2005 - 2011)
Miami-Dade County

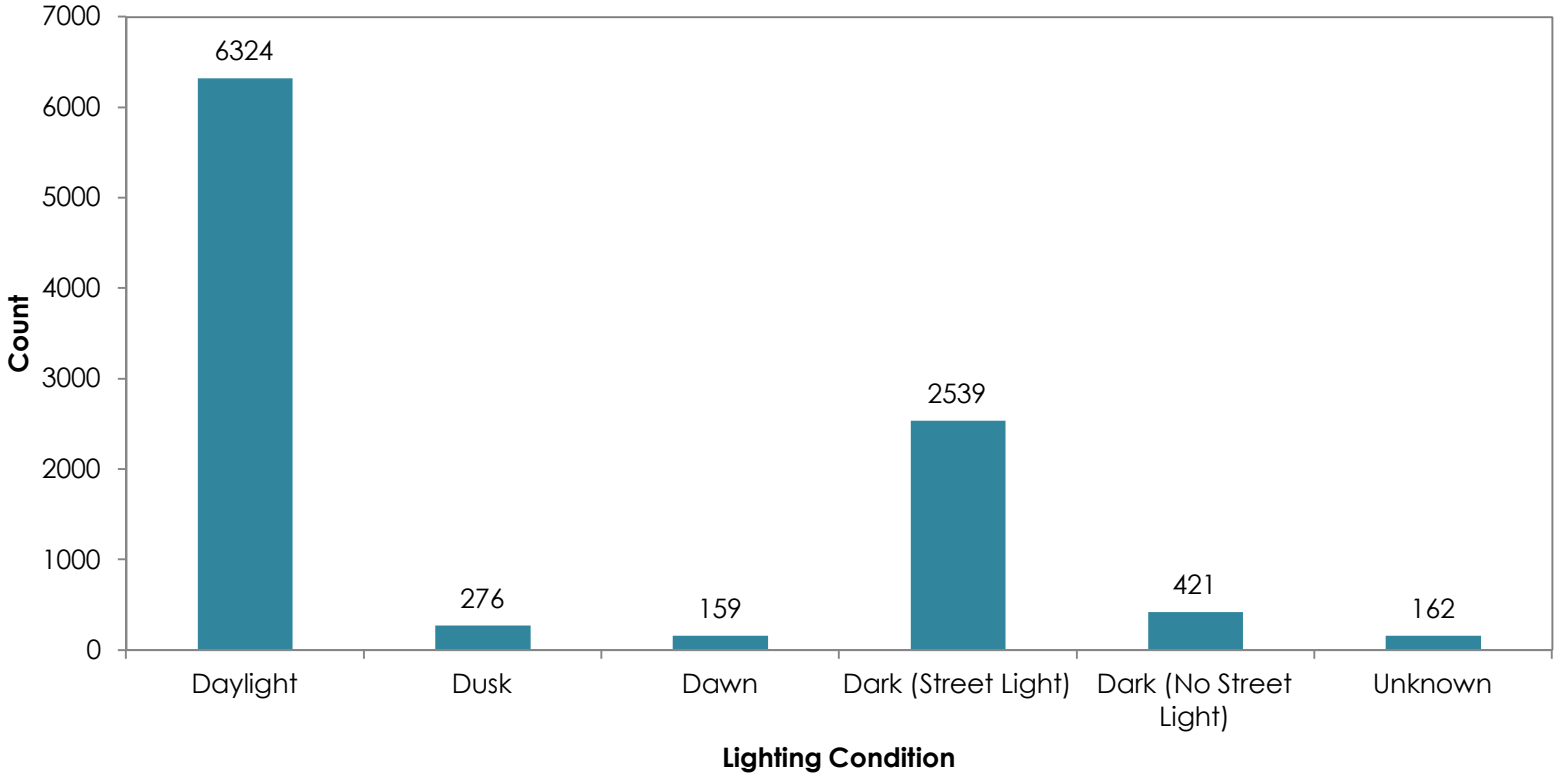


Observations:

- 40 percent of fatal crashes occurred between 6:00 PM and 10:59 PM

Crash Data

Pedestrian Crashes by Lighting Condition (2005 - 2011)
Miami-Dade County

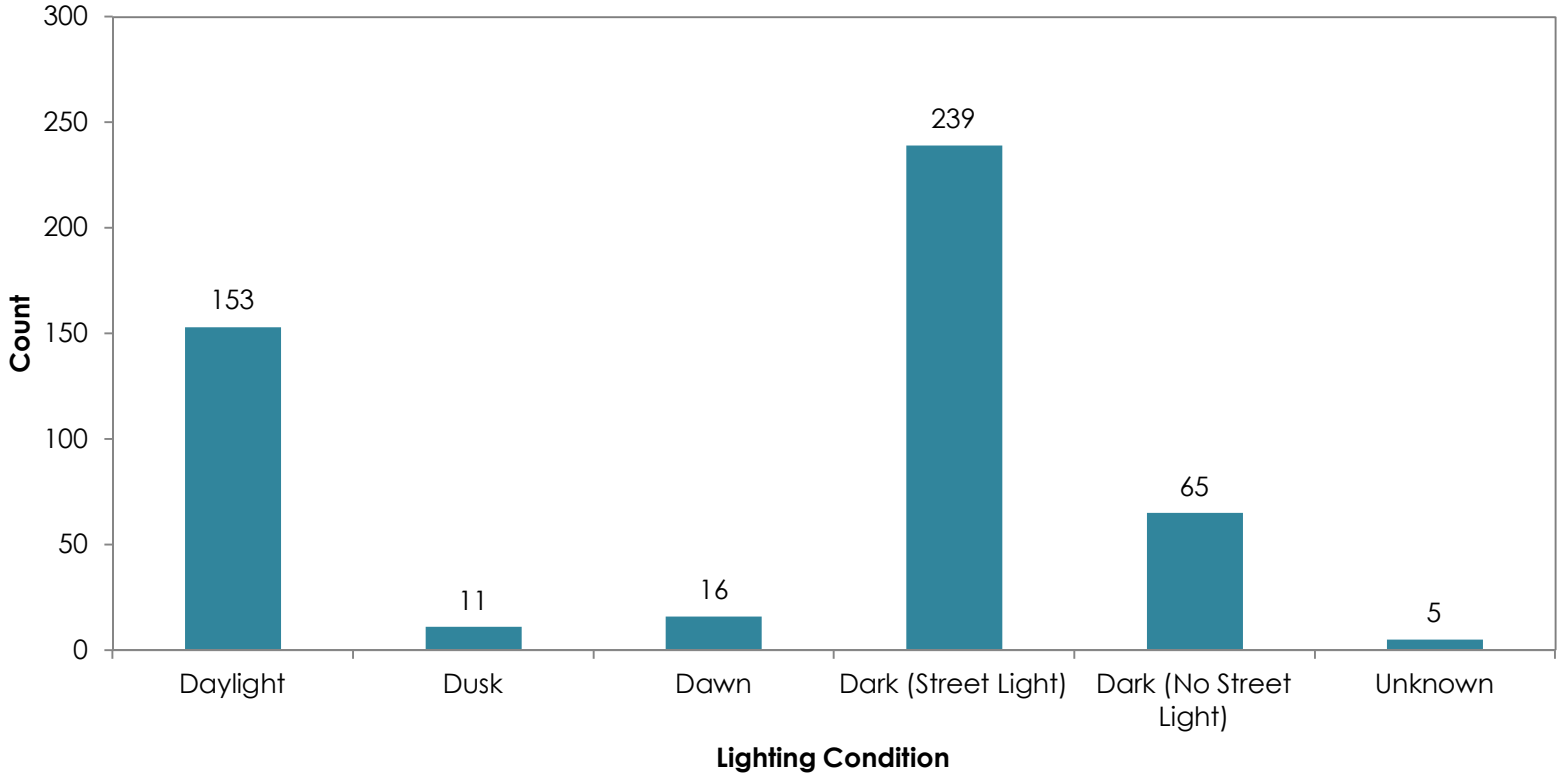


Observations:

- 64 percent of crashes occurred during daylight
- 26 percent of crashes occurred during dark (with street light) conditions
- 4 percent of crashes occurred during dark (with no street light) conditions

Crash Data

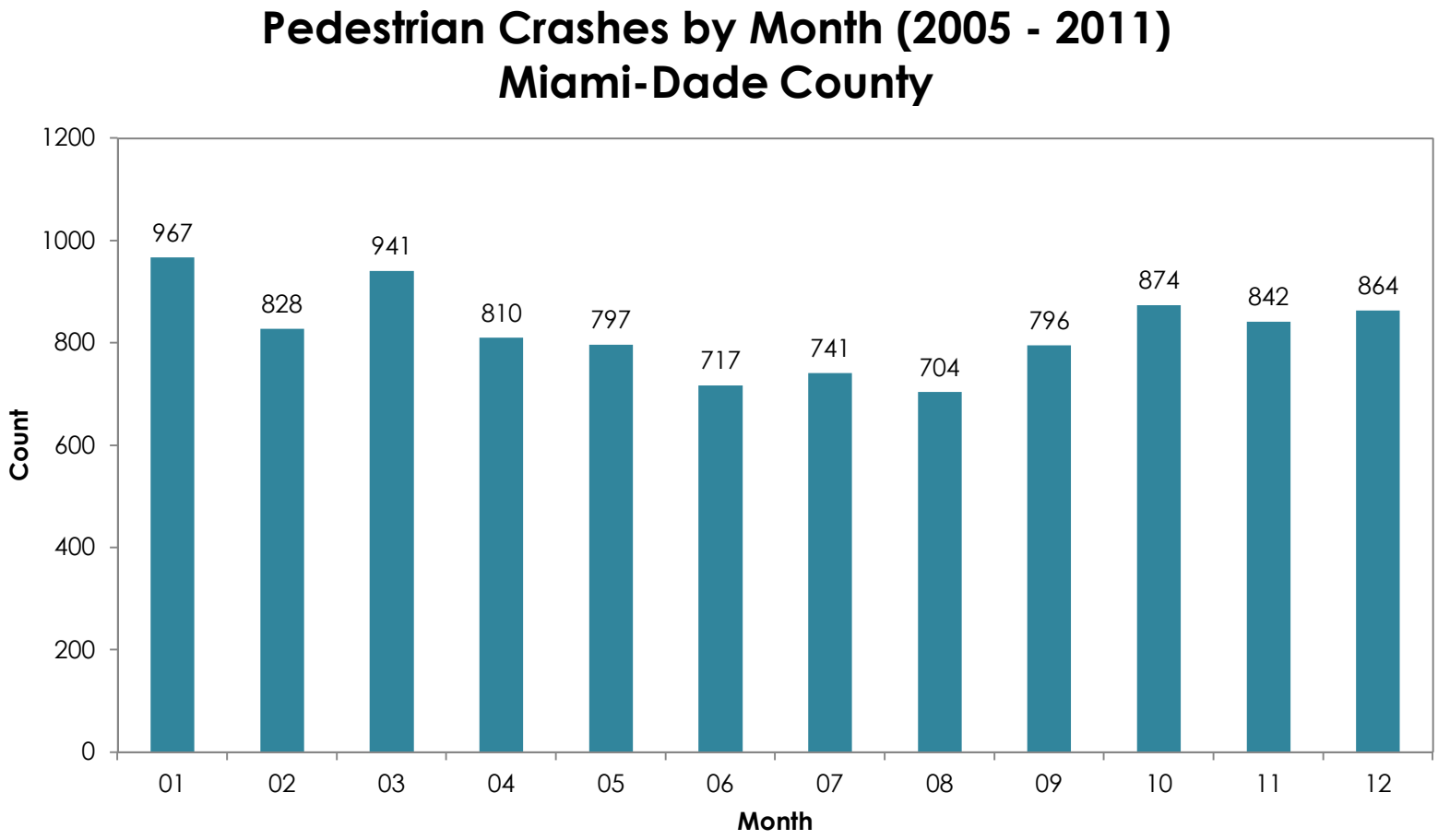
Pedestrian Fatalities by Lighting Condition (2005 - 2011)
Miami-Dade County



Observations:

- 31 percent of fatal crashes occurred during daylight
- 49 percent of fatal crashes occurred during dark (with street light) conditions
- 13 percent of fatal crashes occurred during dark (with no street light) conditions

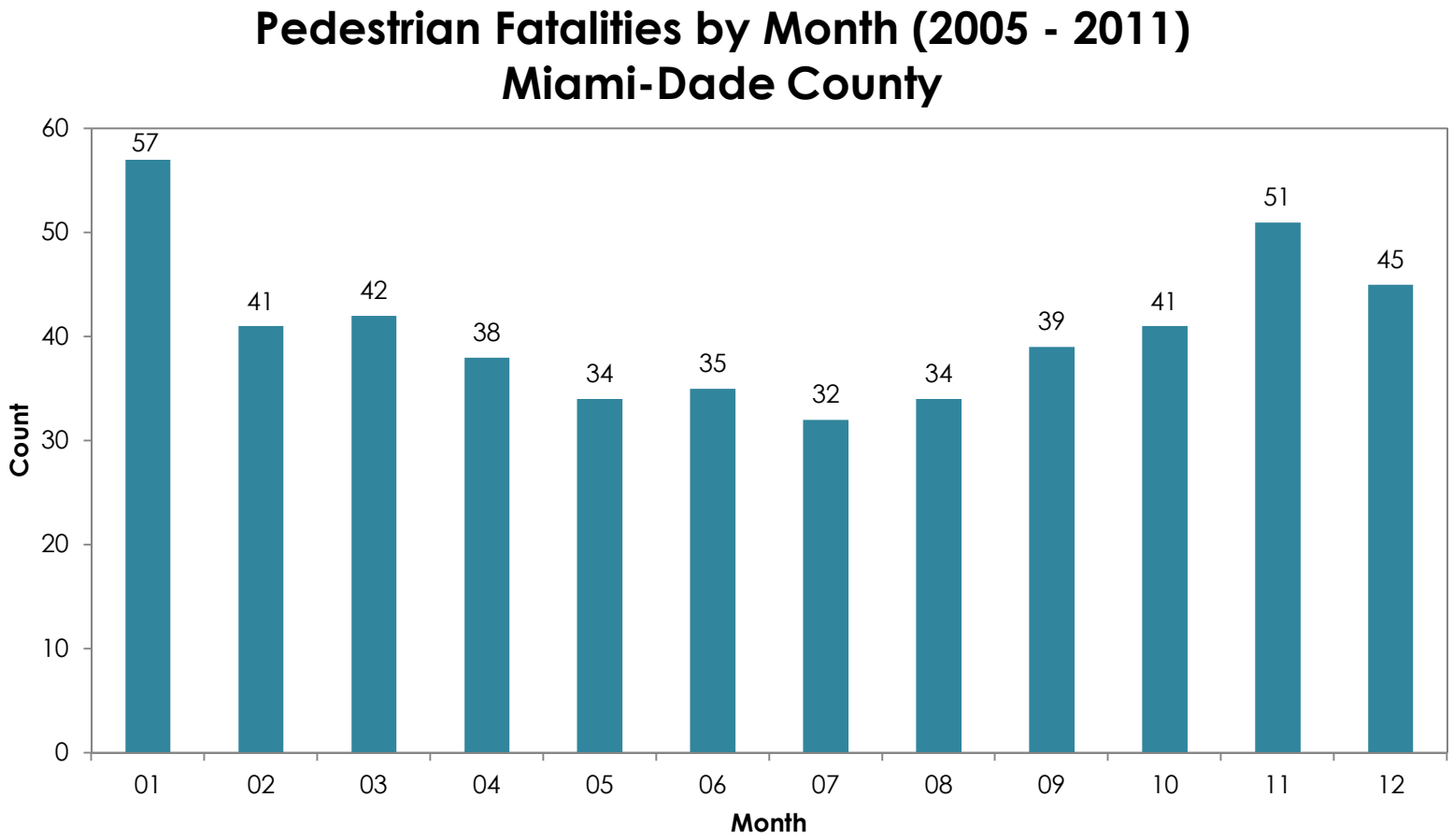
Crash Data



Observations:

- The highest number of crashes occurred in the month of January

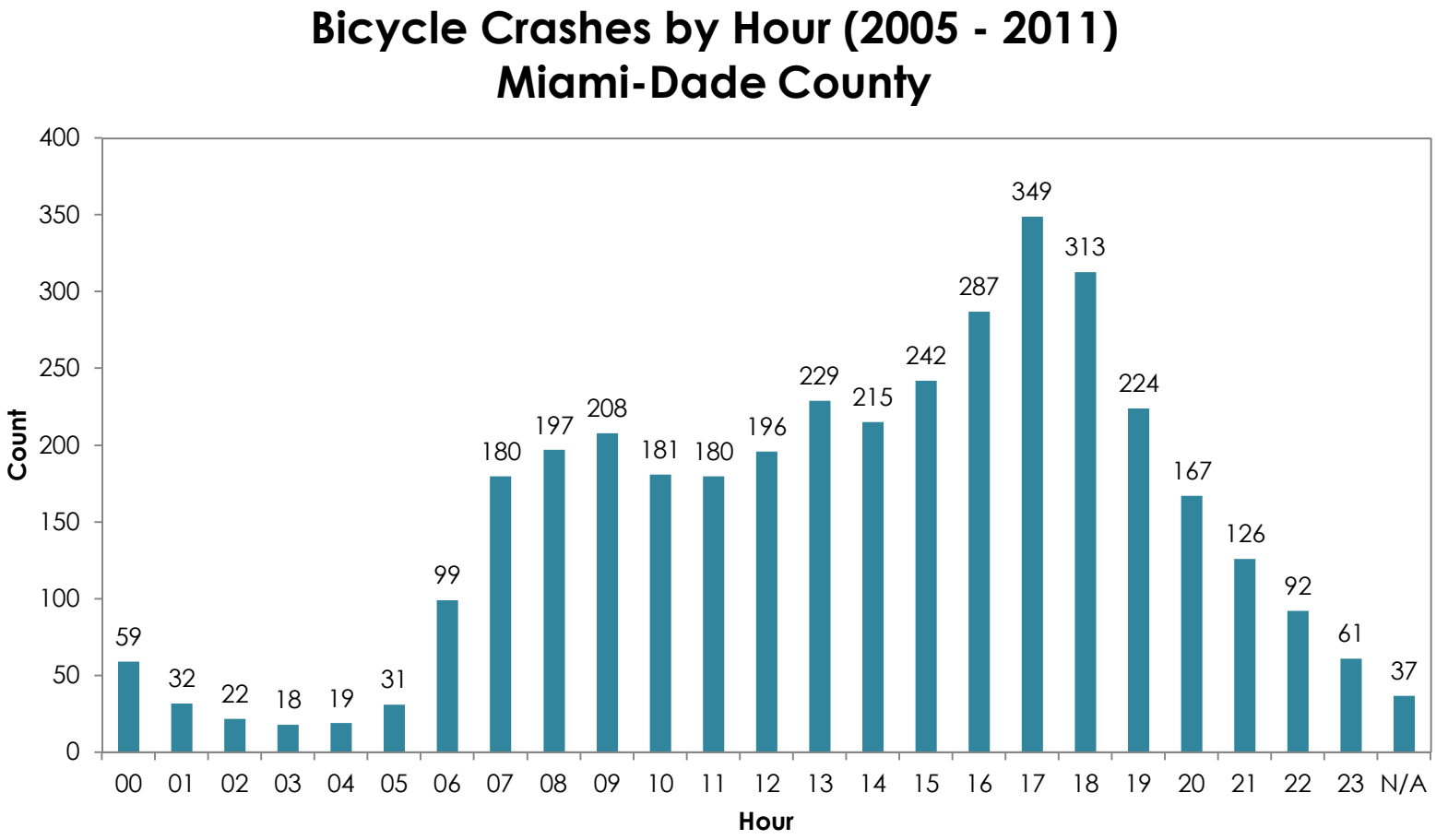
Crash Data



Observations:

- The highest number of fatal crashes occurred in the month of January. The summer months (with more hours of daylight) experience fewer fatalities.

Crash Data

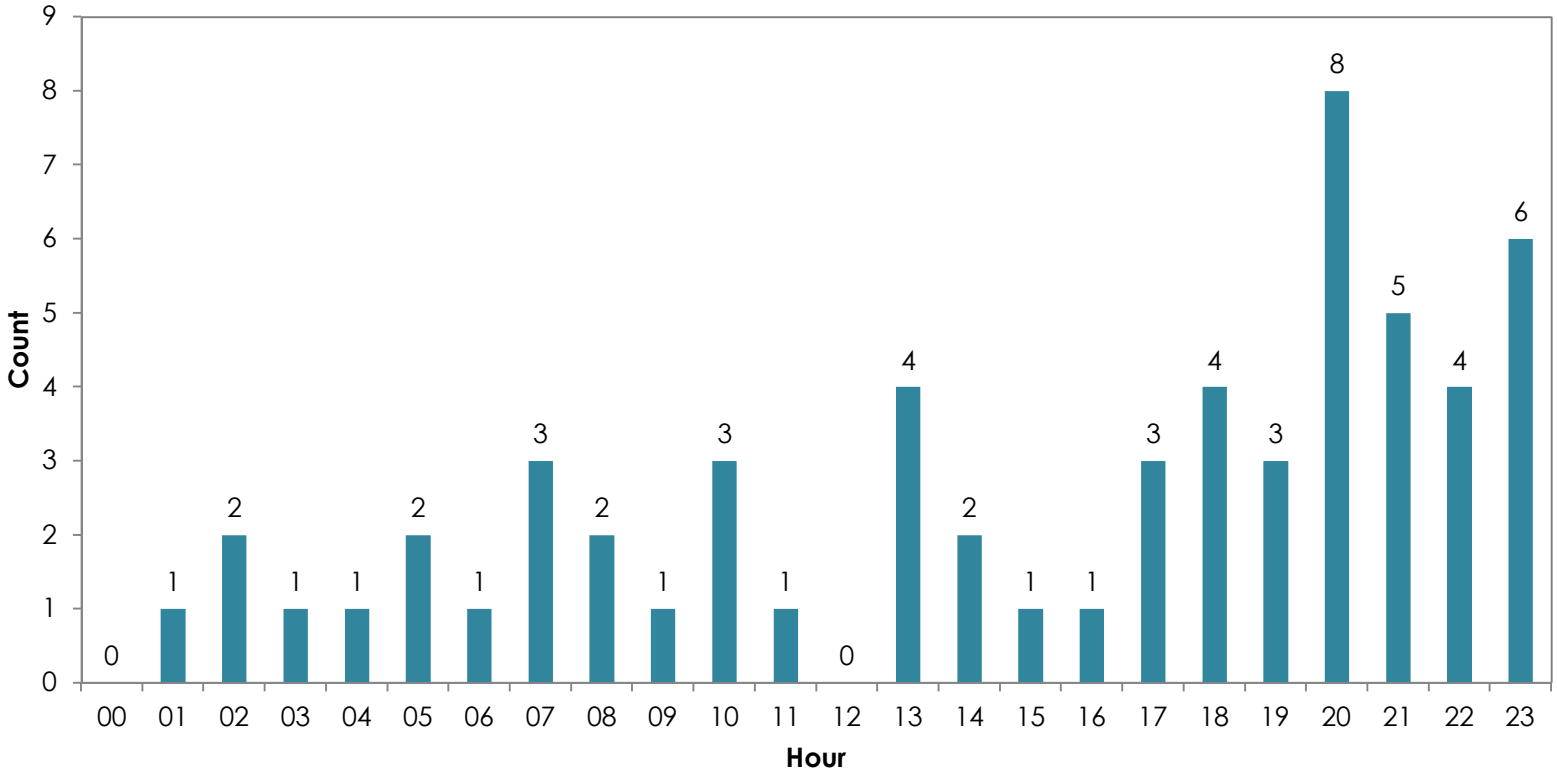


Observations:

- 38 percent of crashes occurred between 3:00 PM and 7:59 PM

Crash Data

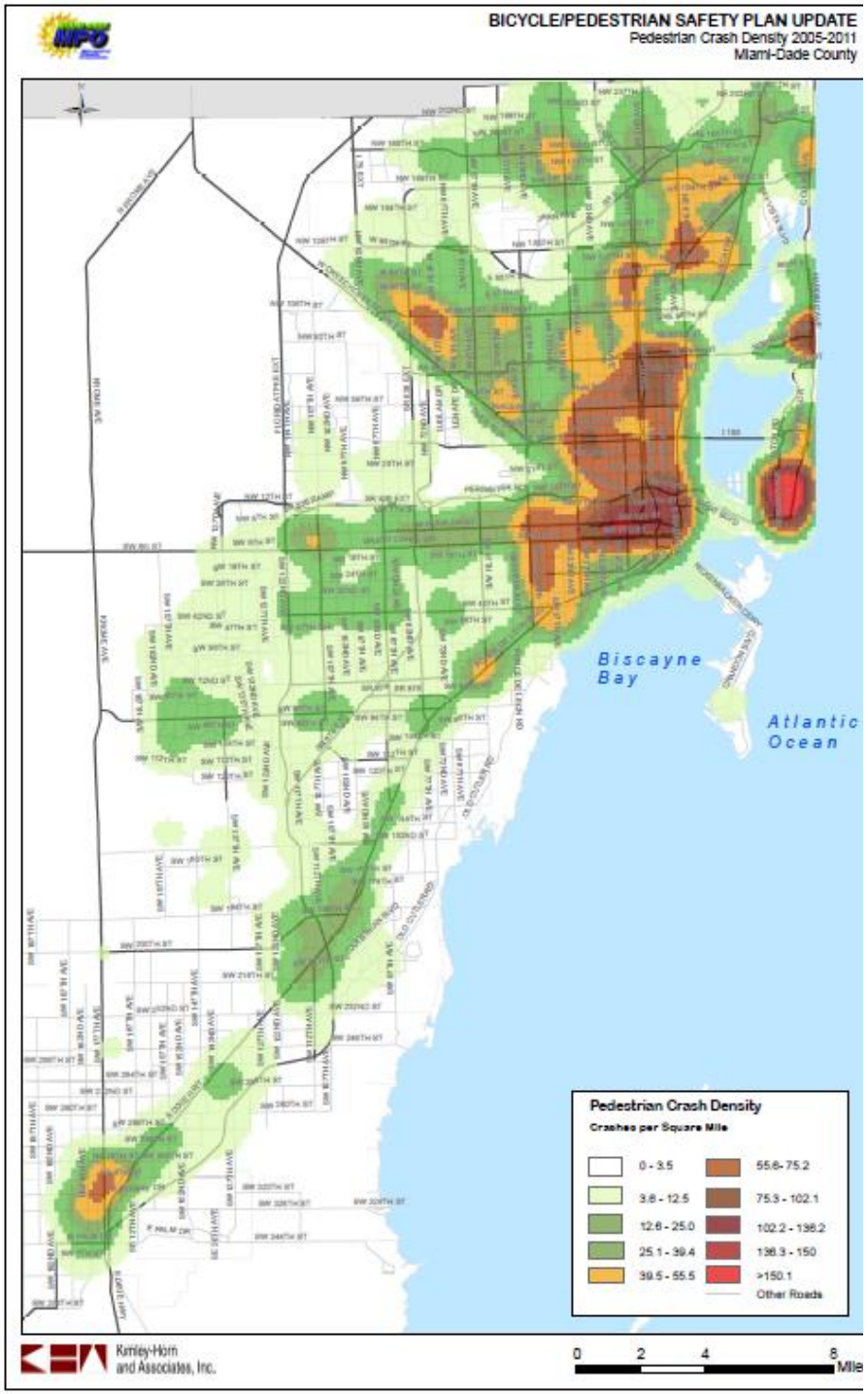
Bicycle Fatalities by Hour (2005 - 2011)
Miami-Dade County



Observations:

- 39 percent of fatal crashes occurred between 8:00 PM and 11:59 PM

Pedestrian Crash Heat Map

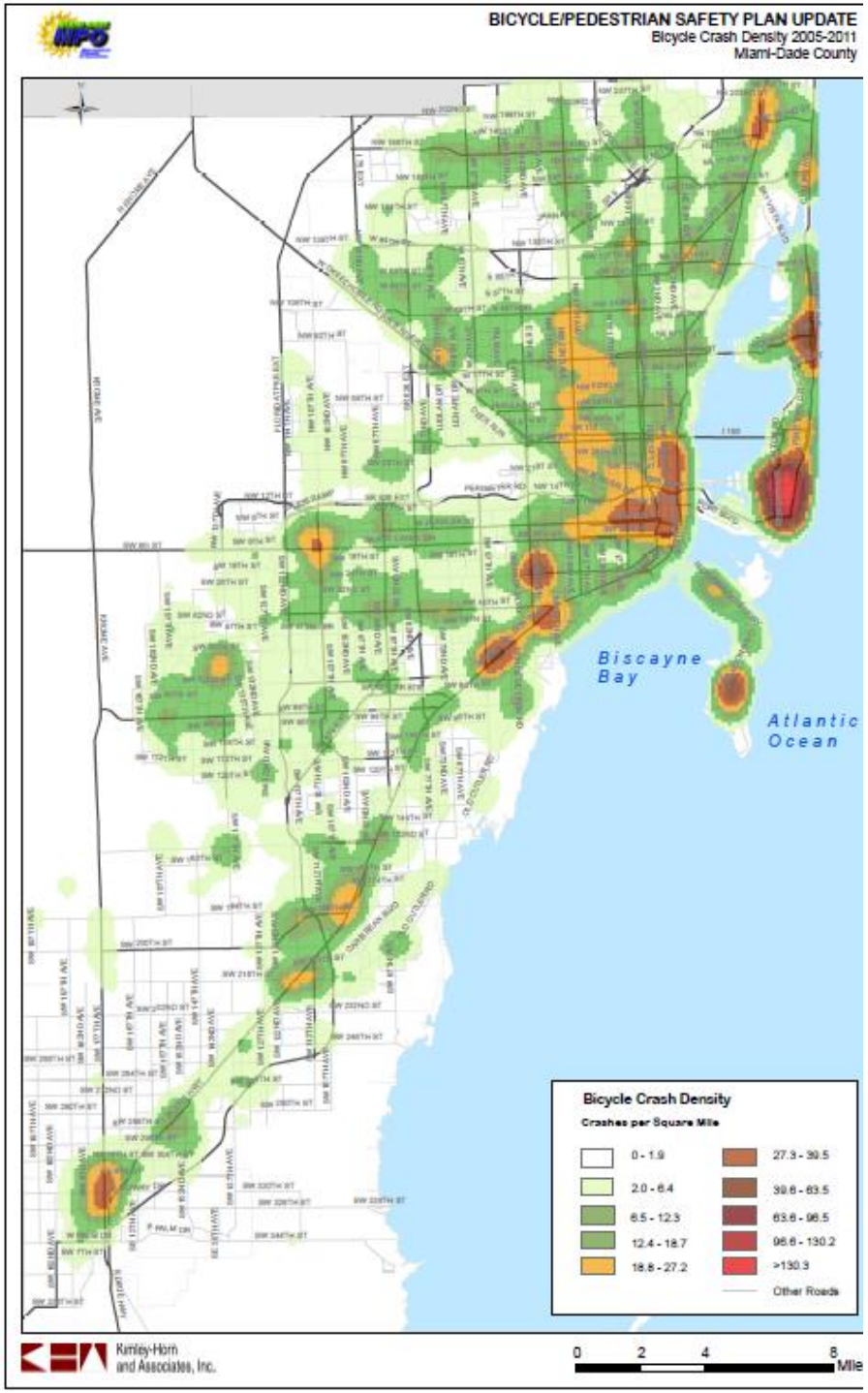


Crash Data

Table 1: Top Pedestrian Crash Intersections

Rank	Intersection (Municipality)	Pedestrian Crashes (2005-2011)
1	Miami Gardens Drive & NW 27th Avenue (Miami Gardens)	23
2	US 1 & SW 27th Avenue (Miami)	21
3	W 16th Avenue & W 49th Street (Hialeah)	19
4	NE 125th Street & NE 6th Avenue (North Miami)	18
5	NW 27th Avenue & NW 79th Street (unincorporated)	17
6	N Miami Avenue & N 79th Street (Miami)	16
7	NW 22nd Avenue & NW 36th Street (Miami)	15
7	Collins Avenue & Lincoln Road (Miami Beach)	15
7	Collins Avenue & 174th Street (Sunny Isles Beach)	15
7	Collins Avenue & 178th Street (Sunny Isles Beach)	15

Bicycle Crash Heat Map

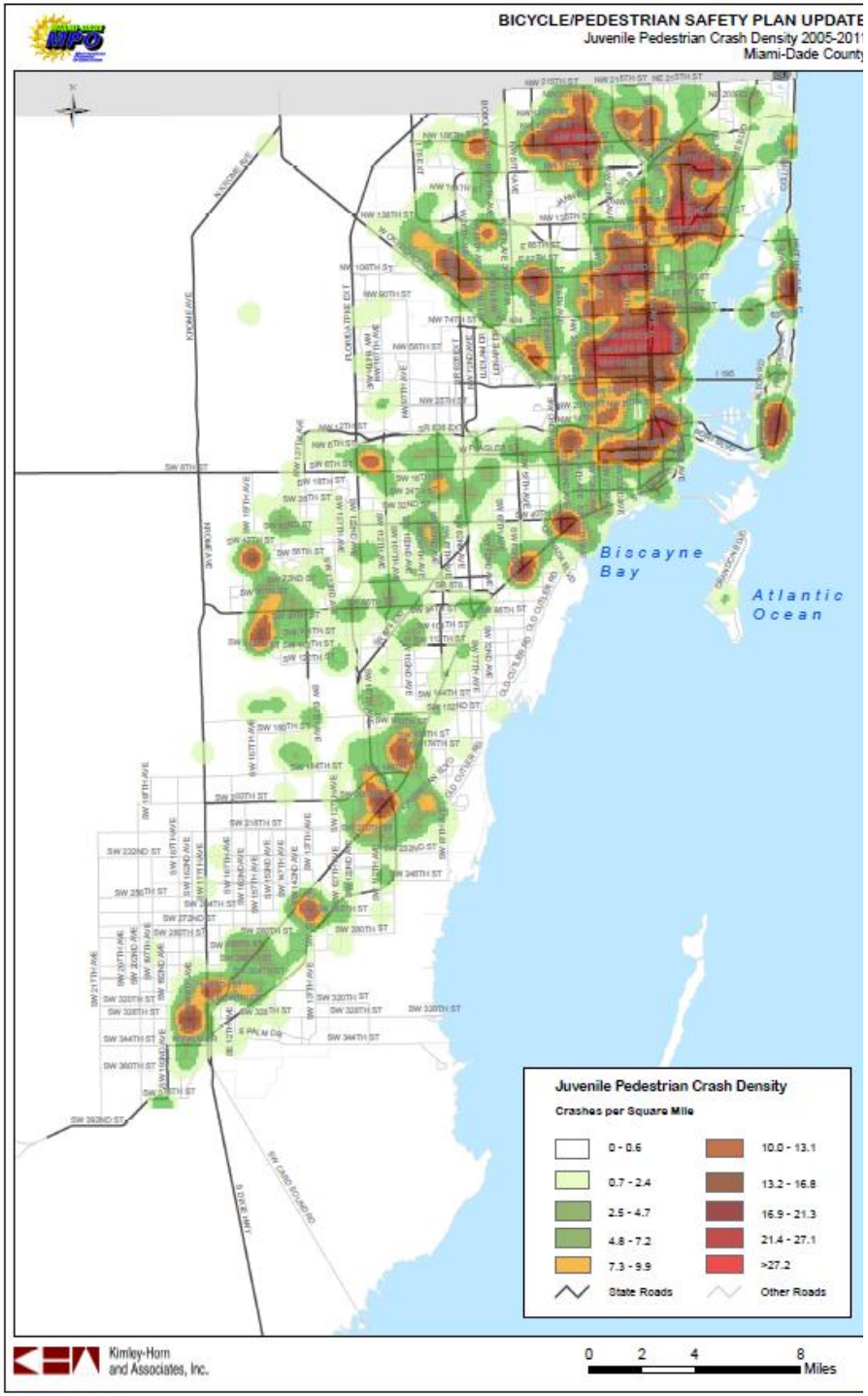


Crash Data

Table 2: Top Bicycle Crash Intersections

Rank	Intersection (Municipality)	Bicycle Crashes (2005-2011)
1	Crandon Boulevard & Harbor Drive/Ocean Lane Drive (Key Biscayne)	14
2	Alton Road & 17th Street (Miami Beach)	10
3	Collins Avenue & 21st Street (Miami Beach)	8
3	Crandon Boulevard & Galen Drive/W McIntire Street (Key Biscayne)	8
5	Miami Gardens Drive & NW 27th Avenue (Miami Gardens)	7
5	Indian Creek Drive/SR A1A & 63rd Street (Miami Beach)	7
5	Lincoln Road & Meridian Avenue (Miami Beach)	7
5	Washington Avenue & 5th Street (Miami Beach)	7
5	Granada Boulevard & US 1 (Coral Gables)	7
5	Miami Gardens Drive & US 1 (Aventura)	7
5	Collins Avenue & 13th Street (Miami Beach)	7

Juvenile Pedestrian Crash Heat Map

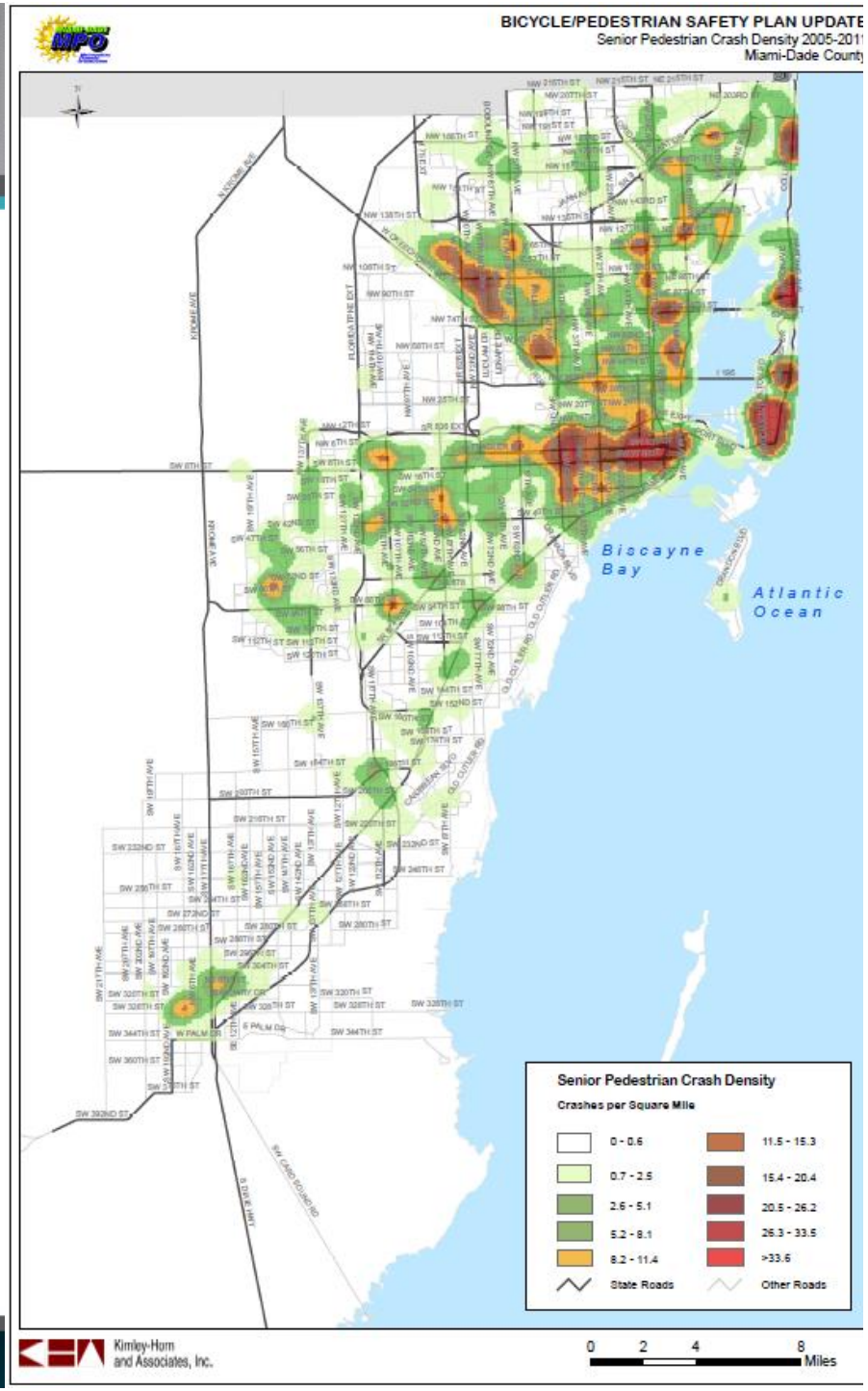


Crash Data

Table 3: Top Juvenile Pedestrian Crash Intersections

Rank	Intersection	Juvenile Pedestrian Crashes (2005-2011)
1	Miami Gardens Drive & NW 27th Avenue (Miami Gardens)	11
2	Caribbean Boulevard & US 1 (Cutler Bay)	7
2	Miami Gardens Drive & NW 37th Avenue (Miami Gardens)	7
4	SW 56th Street at John A. Ferguson High School Entrance (unincorporated)	6
5	NW 27th Avenue & NW 79th Street (unincorporated)	5
5	NE 6th Avenue & NE 149th Street (unincorporated)	5
5	Miami Gardens Drive & NW 47th Avenue (Miami Gardens)	5
5	NW 12th Avenue & NW 103rd Street (unincorporated)	5
9	US 1 & SW 27th Avenue (Miami)	4
9	NW 2nd Avenue & NW 79th Street (Miami)	4
9	NE 12th Avenue & NE 167th Street (North Miami Beach)	4
9	NW 7th Avenue & NW 151st Street (unincorporated)	4
9	NE 6th Avenue & NE 135th Street (North Miami)	4
9	Old Cutler Road & SW 216th Street (Cutler Bay)	4
9	W 24th Avenue & W 60th Street (Hialeah)	4
9	Hammocks Boulevard & SW 104th Street (unincorporated)	4

Elderly Pedestrian Crash Heat Map

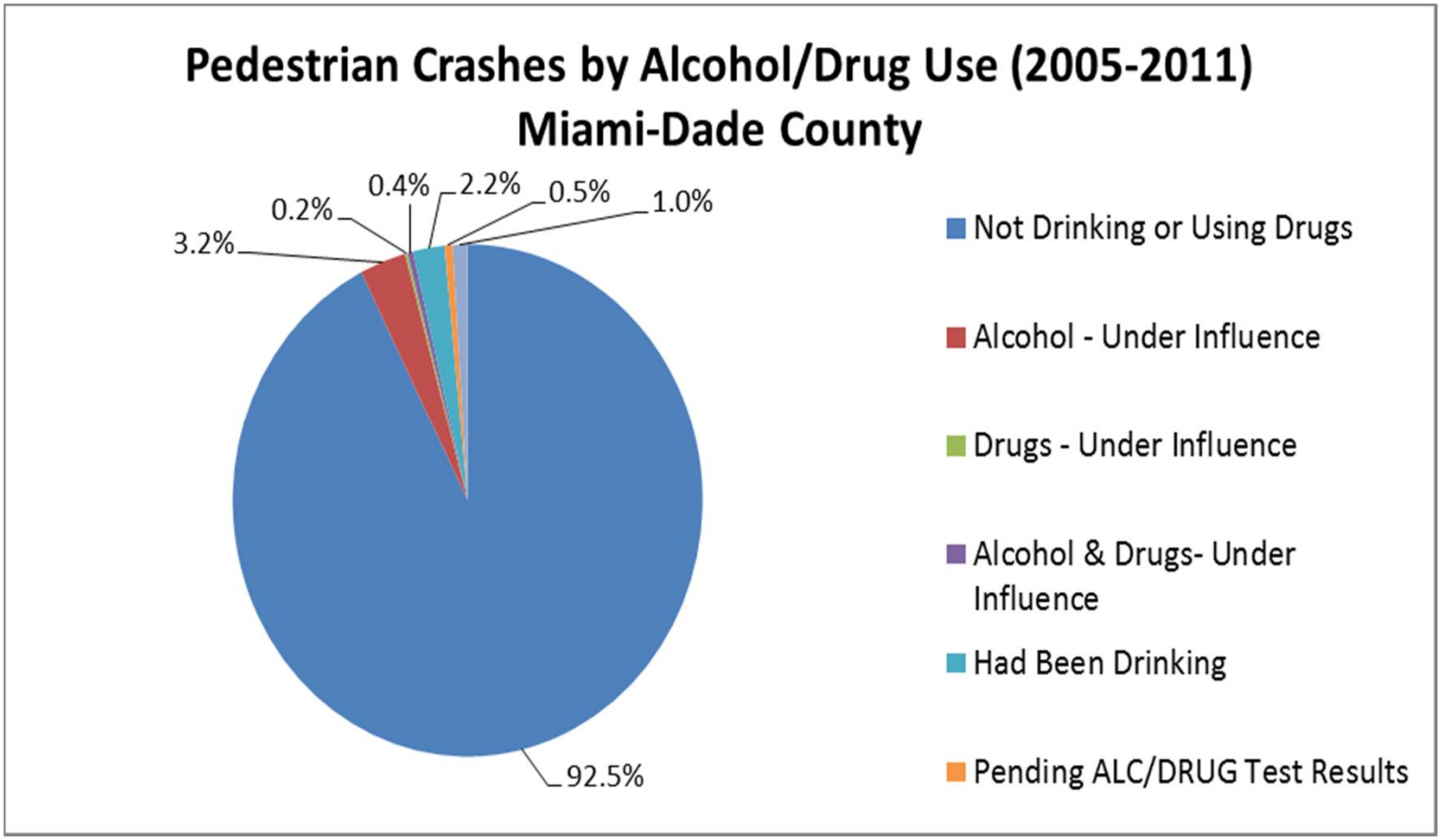


Crash Data

Table 4: Top Elderly Pedestrian Crash Intersections

Rank	Intersection	Elderly Pedestrian Crashes (2005-2011)
1	Alton Road & 17th Street (Miami Beach)	8
2	Normandy Drive & Rue Versailles/Rue Vendome (Miami Beach)	6
2	SW 5th Avenue & SW 8th Street (Miami)	6
4	NW 7th Avenue & NW 95th Street (unincorporated)	5
4	Arthur Godfrey Road/41st Street & Sheridan Avenue (Miami Beach)	5
4	W 16th Avenue & W 49th Street (Hialeah)	5
4	Collins Avenue & 174th Street (Sunny Isles Beach)	5
8	W Flagler Street & W 12th Avenue (Miami)	4
8	Douglas Road/NW 37th Avenue & NW 7th Street (Miami)	4
8	US 1 & NE 36th Street (Miami)	4
8	NE 125th Street & NE 6th Avenue (North Miami)	4
8	US 1 & NE 135th Street (North Miami)	4
8	Kendall Drive/SW 88th Street & SW 107th Avenue (Kendall)	4
8	W 24th Avenue & W 68th Street (Hialeah)	4
8	Collins Avenue & 183rd Street (Sunny Isles Beach)	4

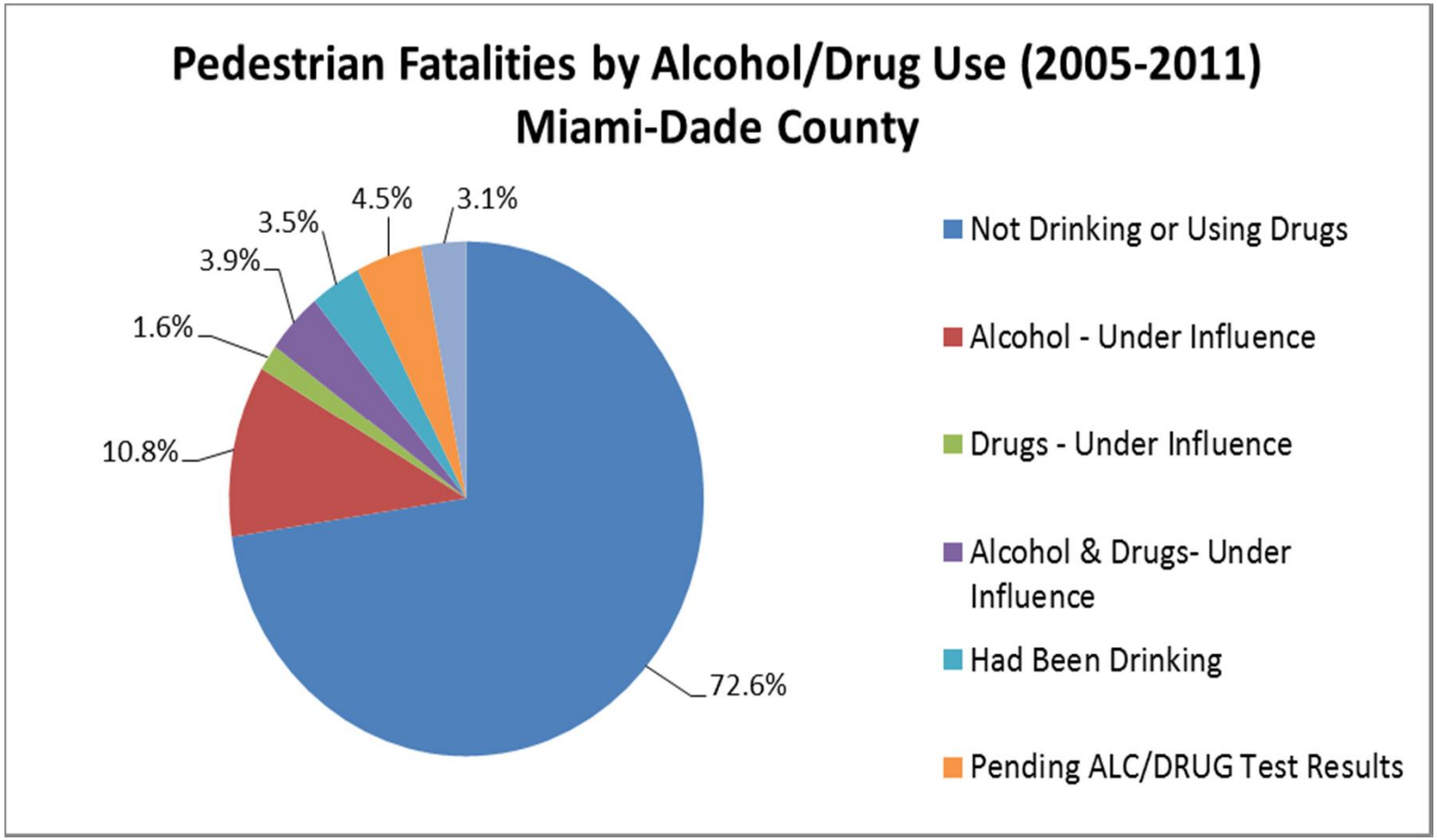
Crash Data



Observations:

- Majority of pedestrian crashes from 2005 – 2011 did not involve alcohol or drugs

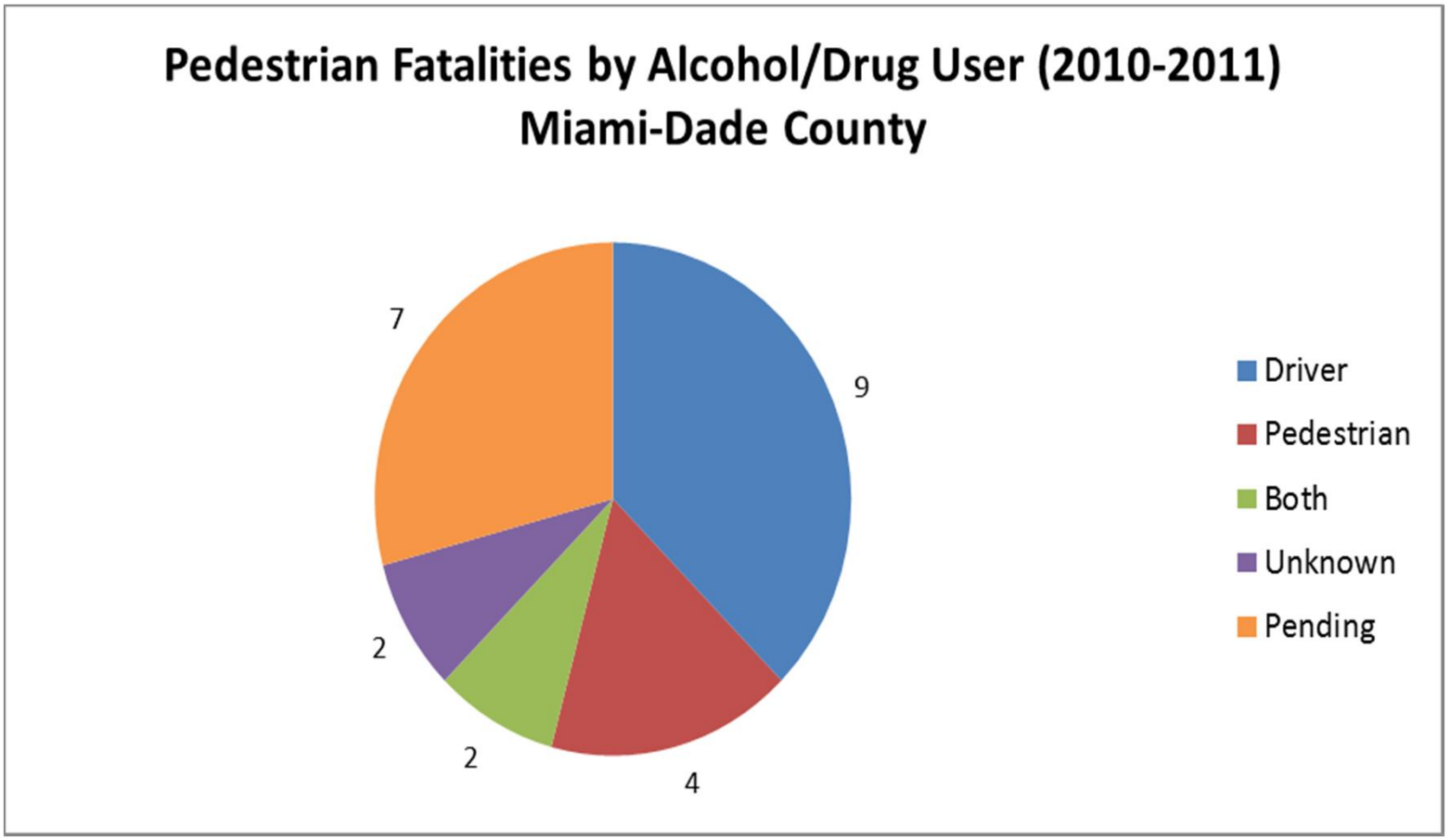
Crash Data



Observations:

- Probability of alcohol or drug use increases significantly in fatal pedestrian crashes when compared to all pedestrian crashes

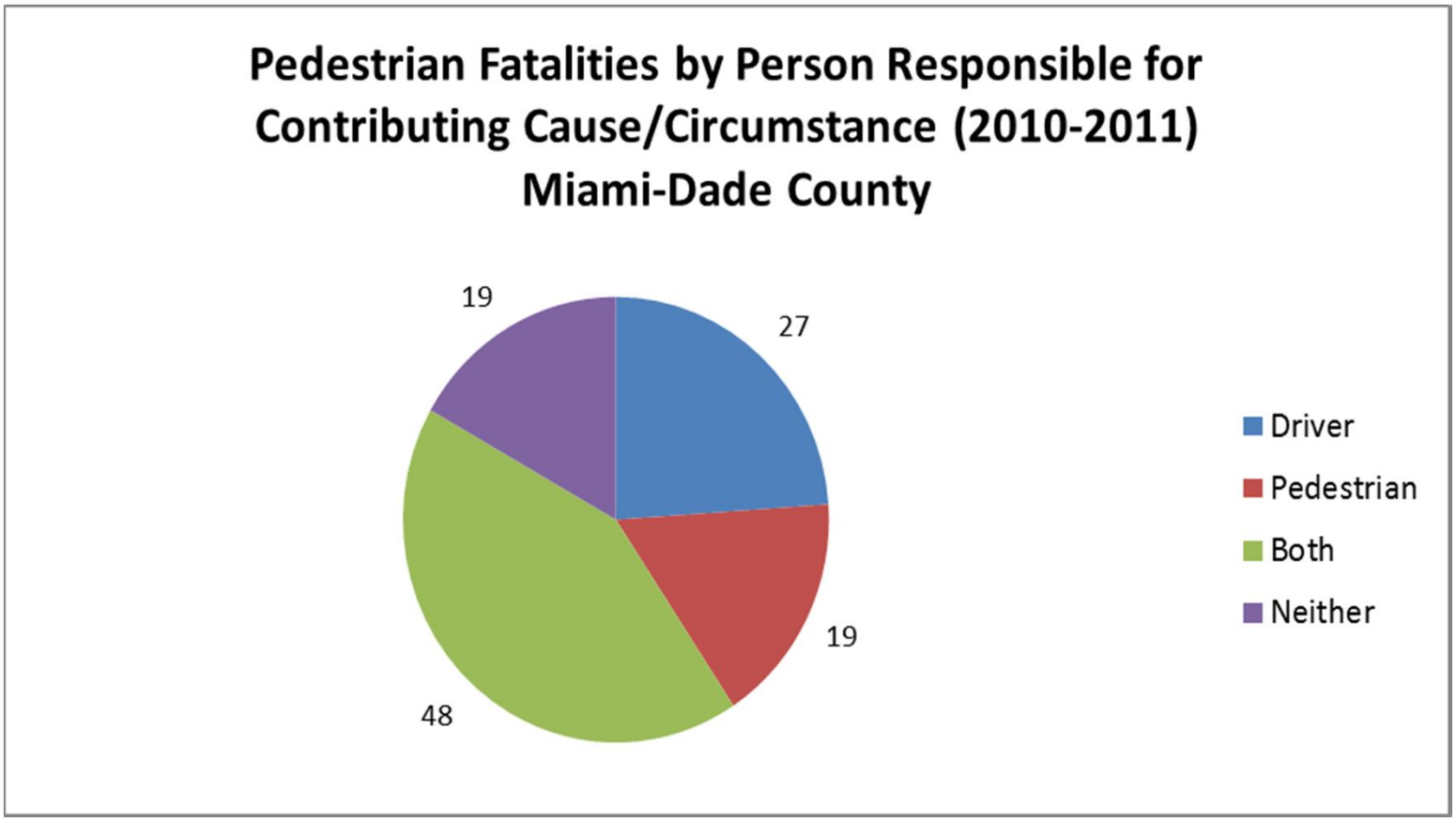
Crash Data



Observations:

- The driver was more likely than the pedestrian to be the party using alcohol or drugs, although many records were marked "pending"

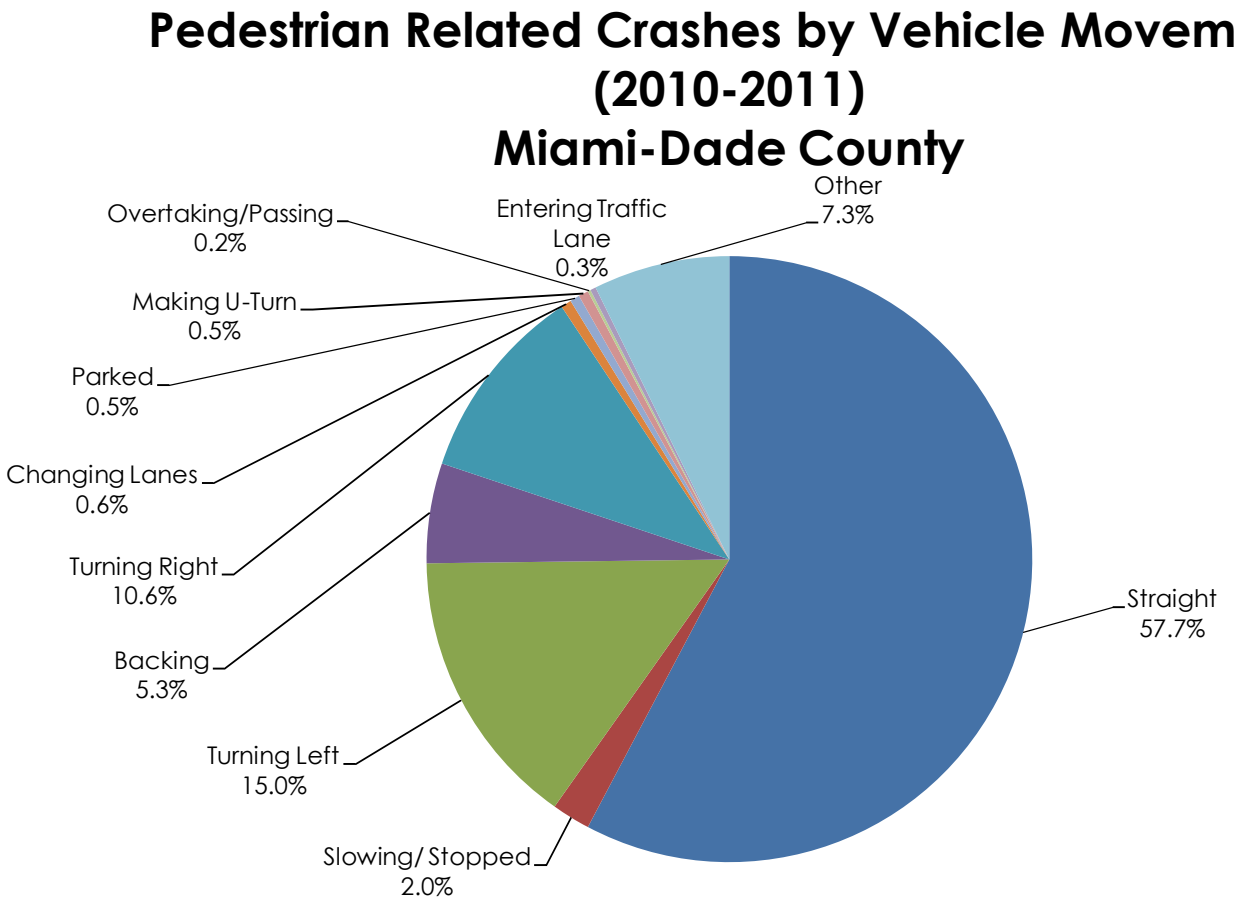
Crash Data



Observations:

- The driver was 50 percent more likely to be the person responsible for fatal crash contributing cause(s) when only one party was identified, although over one-third of fatal crash reports assign responsibility to both parties for contributing causes

Crash Data

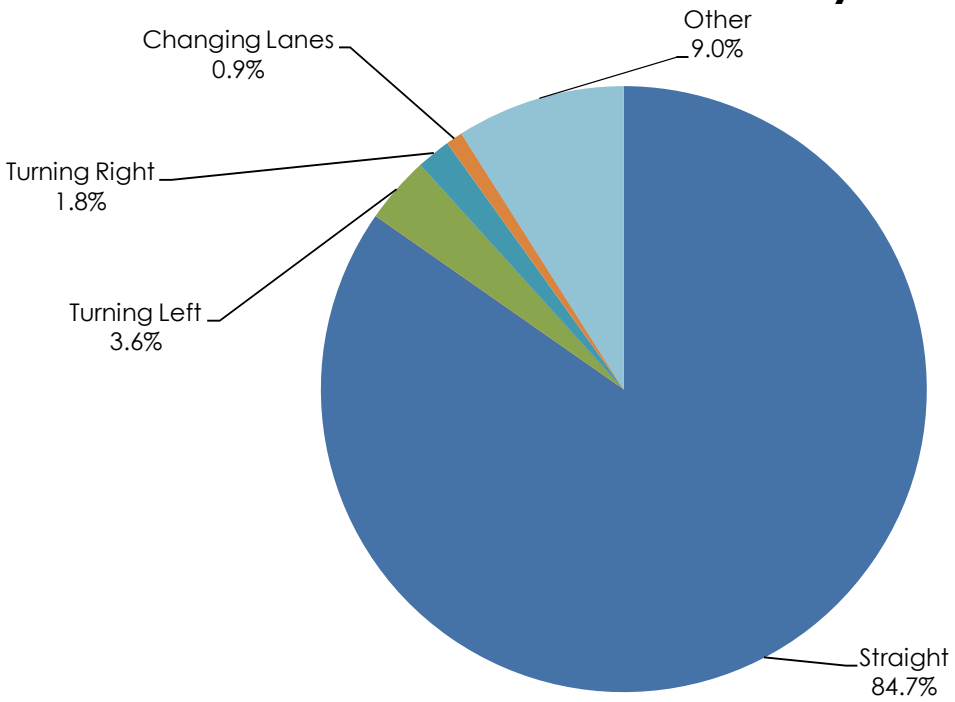


Observations:

- Vehicles turning left are the most common type of pedestrian related crashes after vehicles traveling straight

Crash Data

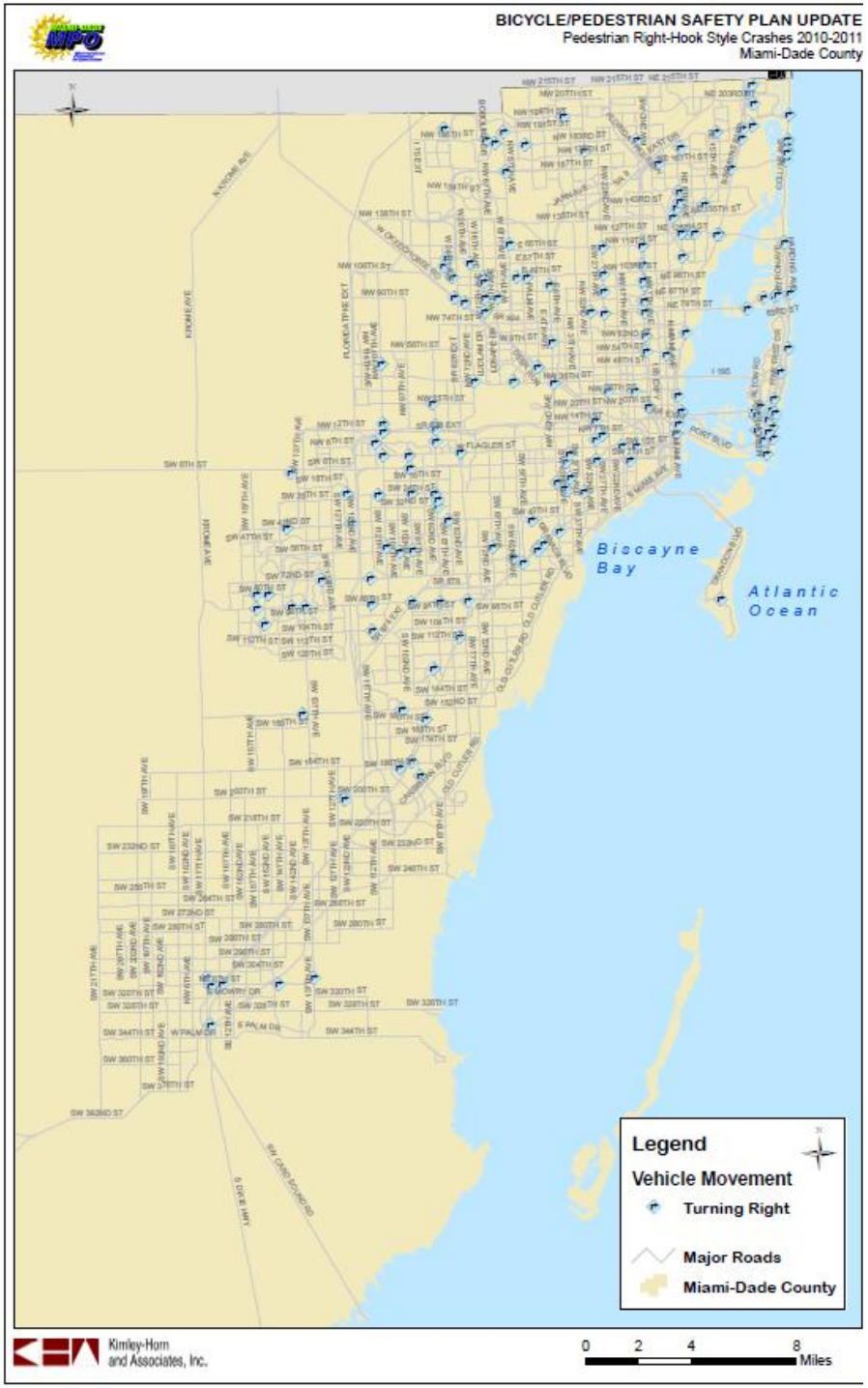
Pedestrian Related Fatalities by Vehicle Movement (2010-2011)
Miami-Dade County



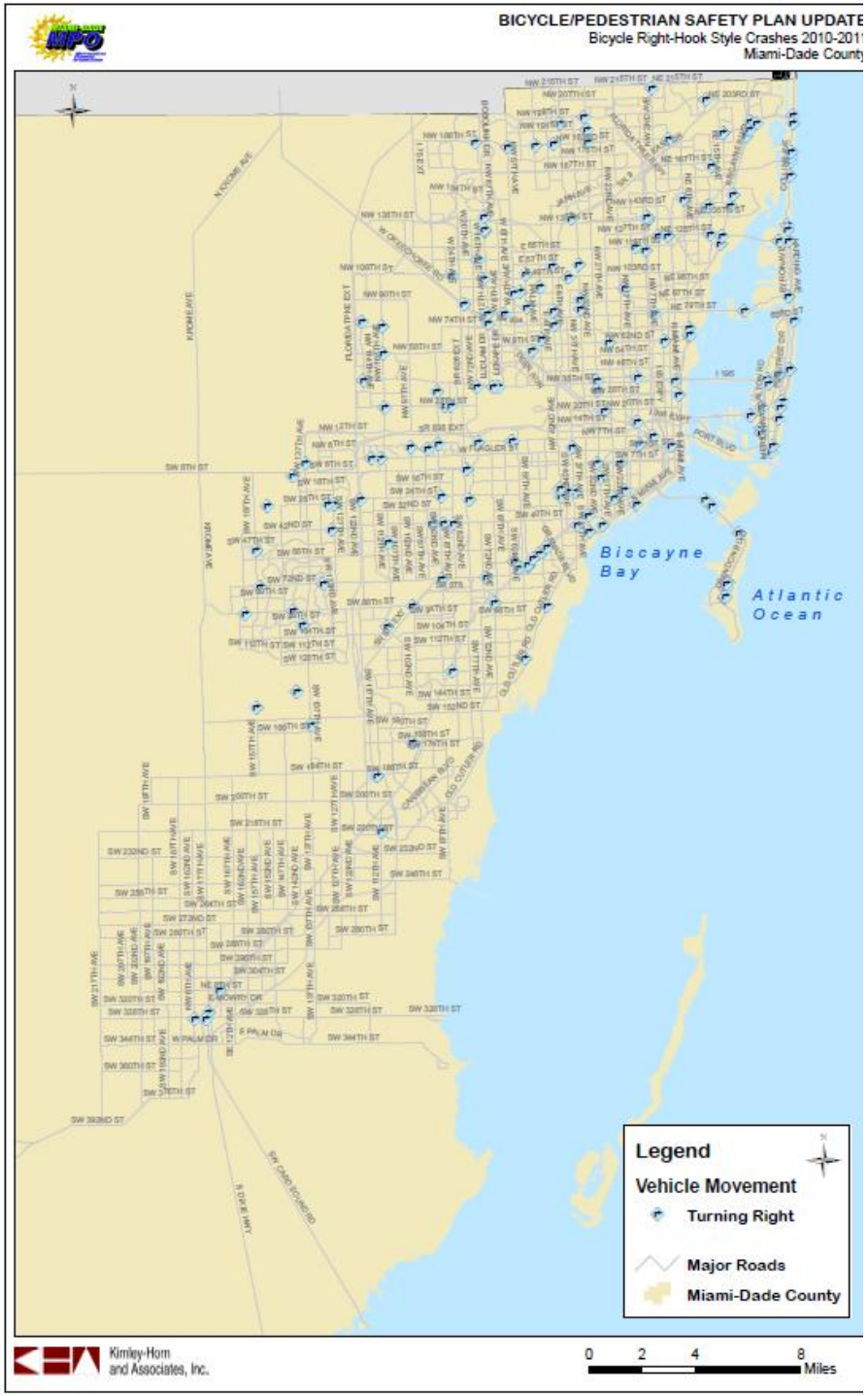
Observations:

- Majority of vehicles in fatal pedestrian crashes from 2010 – 2011 were traveling straight ahead

Right Hook Pedestrian Crash Map



Right Hook Bicycle Crash Map



High-Crash Area Maps – Examples

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE
High Crash Areas and Corridors - Pedestrian Crashes 2010-2011
South Beach

BICYCLE/PEDESTRIAN SAFETY PLAN UPDATE
High Crash Areas and Corridors - Bicycle Crashes 2010-2011
South Beach

Level of Service Categories

Table 1: Bicycle and Pedestrian LOS Categories

LOS	Score
A	≤1.5
B	>1.5 and ≤2.5
C	>2.5 and ≤3.5
D	>3.5 and ≤4.5
E	>4.5 and ≤5.5
F	>5.5

Level of Service	Bicycle	Pedestrian
A/B		
C/D		
E/F		

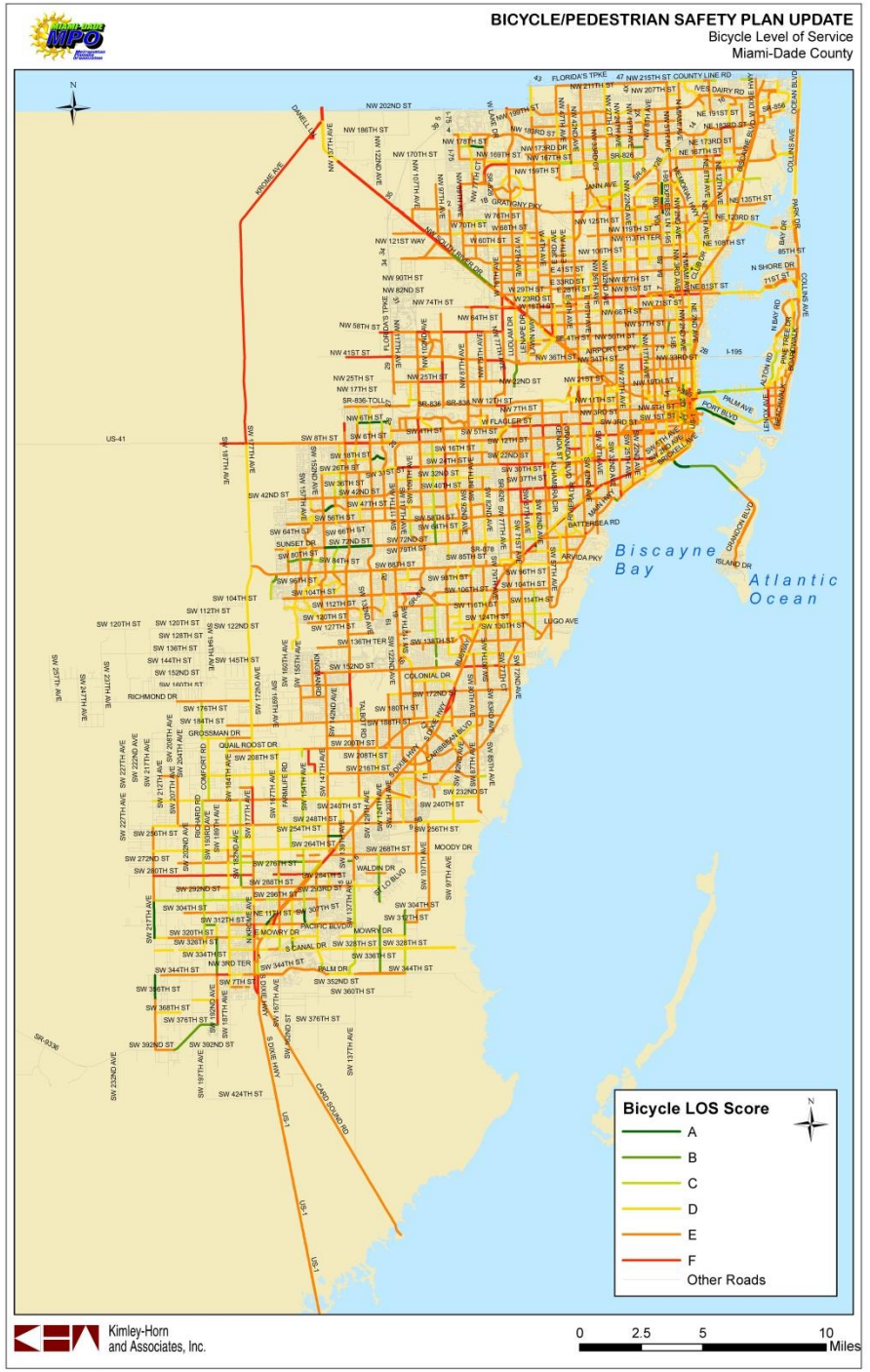
Source: Figure 1-2 Examples of LOS by Mode for Urban Roadways (FDOT, 2009)

BICYCLE/PEDESTRIAN Safety Plan Update

Bicycle Level of Service (BLOS)

Table 2: Miami-Dade County Bicycle Level of Service Summary

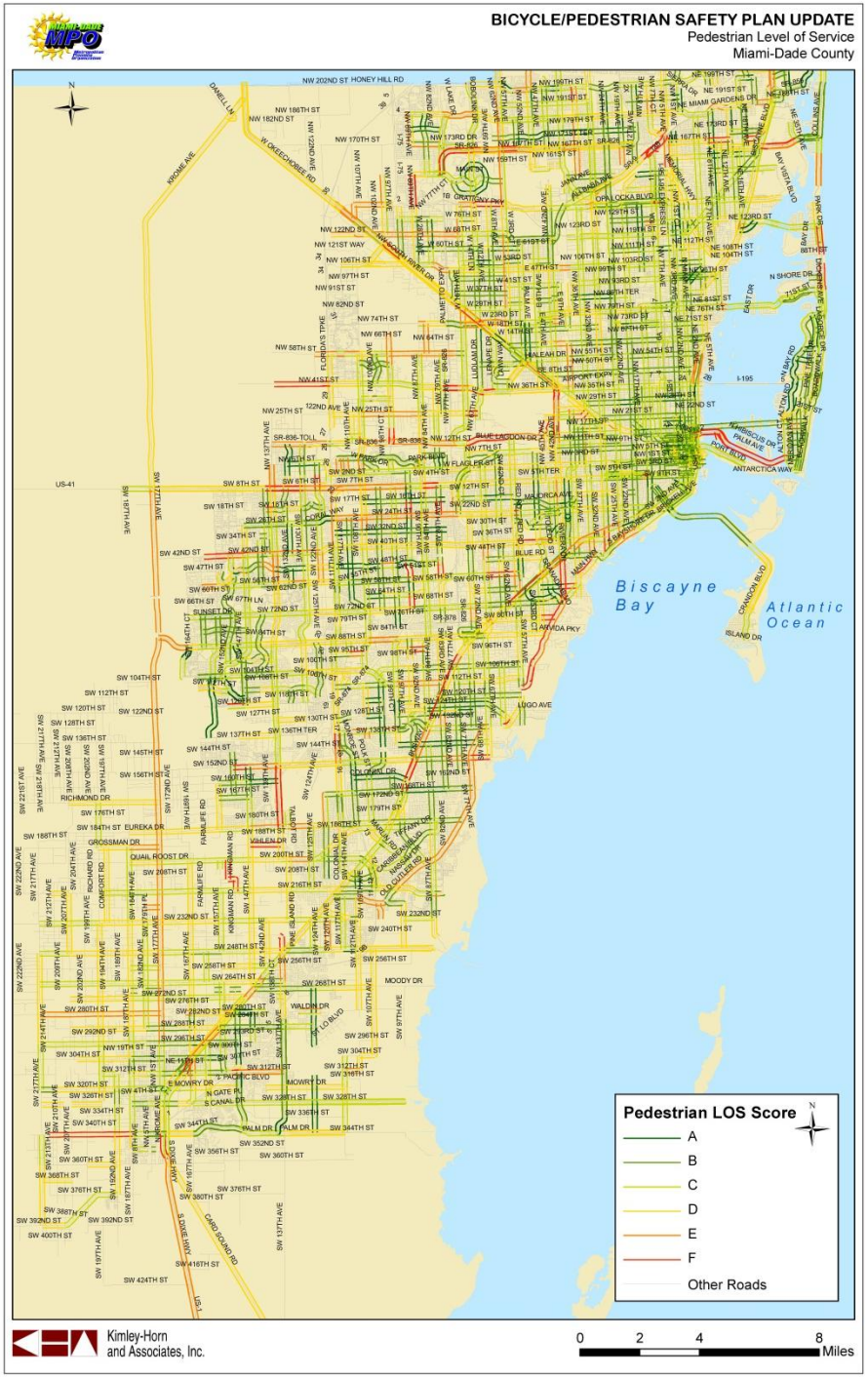
BLOS Score	Percentage of Major Roads
A	0.7%
B	1.1%
C	4.7%
D	24.1%
E	64.5%
F	4.9%



Pedestrian Level of Service (BLOS)

Table 3: Miami-Dade County Pedestrian Level of Service Summary

PLOS Score	Percentage of Major Roads
A	6.1%
B	30.6%
C	31.9%
D	21.7%
E	6.7%
F	3.0%



22 Focus Area Maps

- Brickell
- Coconut Grove
- Coral Gables
- Dadeland
- Downtown
- FIU
- Flagami
- Hialeah
- Hialeah NW / Hialeah Gardens
- Homestead / Florida City
- Hospital / Civic Center
- Key Biscayne
- Little Havana
- Miami Intermodal Center area
- Miracle Mile
- NE 163rd Street Transit Center area
- North Beach
- North Miami
- Omni
- Rickenbacker Causeway
- South Beach
- University of Miami

Recommendations

- A set of recommendations and countermeasures were developed focused on reducing specific crash types identified in the data analysis
  - Pedestrian-Focused Recommendations
  - Bicycle-Focused Recommendations
  - General Recommendations
- Includes prior input from Study Advisory Committee

Summary Table

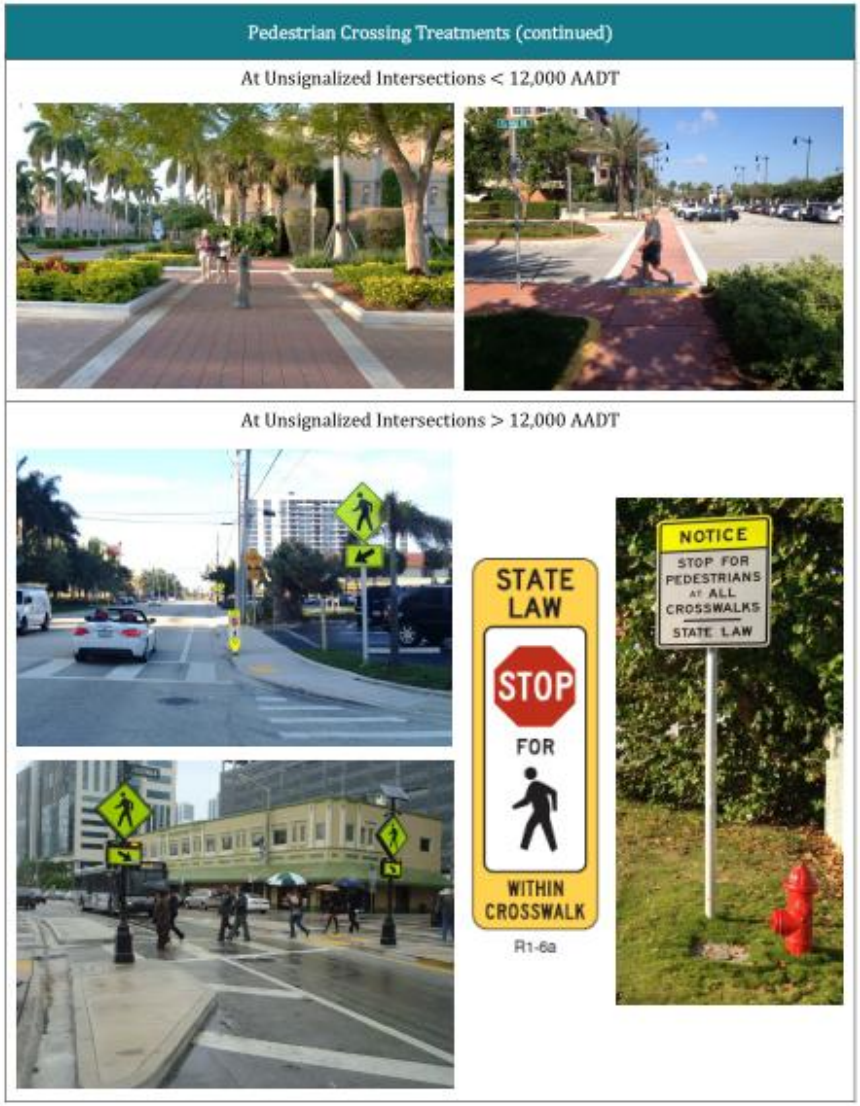
- Please see the draft report for a full description of the recommendations

Table 8: Recommendation Summary

Recommendation	Targeted Crash Types
Pedestrian Focused Improvements	
Pedestrian Crossing Treatments	Right-Hook, Midblock, and Intersection Straight-Through Crashes
Pedestrian Throughway Zones	Walking Along Roadway
Pork Chop Islands	Right-Hook Crashes
Leading Pedestrian Interval	Right-Hook Crashes
Prohibited RTOR	Right-Hook Crashes
WalkSafe Program Expansion	Juvenile Crashes
Pasos Seguros Program Expansion	Elderly Crashes
Enforcement of Yielding to Pedestrians	Intersection Straight-Through and Right-Hook Crashes
Pedestrian Intersection Countermeasures	High Crash Intersections
Bicycle Focused Improvements	
Improving the Environment for Biking	Parallel Path Crashes
Automated Bicycle Rental System	All Crash Types
Education and Enforcement of 3-Foot Law	Parallel Path Crashes
Bicycle Intersection Countermeasures	High Crash Intersections
BikeSafe Program Expansion	Juvenile Crashes
General Improvements	
Low-Speed Design Principles	Right-Hook Crashes
Road Diets / Lane Reductions	Midblock Crashes
Bus Stop Treatments	Midblock Crashes
Lighting	Nighttime Crashes
Public Service Announcement Techniques	All Crash Types
Safe Routes to School Program Expansion	Juvenile Crashes
Server Training Program	Alcohol/Drug-Use Involved Crashes
Taxi Ride Campaign	Alcohol/Drug-Use Involved Crashes
DUI Enforcement Techniques	Alcohol/Drug-Use Involved Crashes
Bicycle/Pedestrian Training Video for Officers	All Crash Types
Speed Feedback Signs	High-Speed Crashes
Progressive Ticketing	High-Speed Crashes

More and Safer Crosswalks

- Increased frequency of crosswalks, with proven safety countermeasures



Pedestrian Refuges

- Pork Chop Islands at Exclusive Right-Turn Lanes
- Median Refuges for Crossings

Pork Chop Islands	
Description	At intersection approaches with exclusive right-turn lanes and high right-turn volumes, a pork chop island can split up the pedestrian crossing into more manageable distances and allows pedestrians and motorists to negotiate one conflict at a time.
Targeted Crash Types	Right-Hook Crashes
Notes	• Provide at least a 60-degree angle between vehicle flows to reduce turning speeds and improve the yielding motorist's visibility of pedestrians and vehicles • Crosswalk across the right-turn lane should be one car length back from where motorists yield to opposing traffic • Generally, these islands should be roughly twice as long as they are wide • Can be implemented where radii reduction is not feasible • This treatment should only be implemented at signalized approaches with exclusive right-turn lanes and high right-turn volumes
Implementation Strategy	Implement as a component of any roadway construction or improvement projects

Signalized Intersection Treatments

- Leading Pedestrian Interval (LPI)
- Prohibited Right-Turn-On-Red

Leading Pedestrian Interval	
Description	Leading Pedestrian Interval (LPI) reserves a pedestrian WALK phase for 2 to 5 seconds prior to the concurrent green phase for motor vehicles to allow pedestrians to enter the crosswalk before turning motor vehicles attempt to cross their path
Targeted Crash Types	Right-Hook Crashes
Notes	• Increases turning motorists' visibility of pedestrians • Recommended for Downtown and other high-pedestrian activity areas
Implementation Strategy	Implement as part of resurfacing and traffic operations projects at signalized intersections where right-hook pedestrian crashes are an identified problem. LPI can also be implemented by Miami-Dade Public Works Signals and Signs Division as standalone projects as a strategy to reduce pedestrian crashes associated with concurrent green phase crashes.

Prohibited Right-Turn-On-Red (RTOR)	
Description	Prohibit motorists from turning right during the red interval at certain intersection approaches
Targeted Crash Types	Right-Hook Crashes

Notes	• Can be useful where:
	  ○ there are restricted sight lines between motorists and pedestrians
	  ○ there are an unusual number of pedestrian conflicts with turns on red compared to right-turns-on-green
	  ○ a leading pedestrian interval is used
	• Can be implemented during certain time periods or at all times of day

Implementation Strategy	Implement as part of resurfacing and traffic operations projects at signalized intersections where right-hook pedestrian crashes are an identified problem. Prohibited RTOR could be implemented if signage and other treatments, such as LPI, have been tried and produced less than optimal results.

High Crash Intersections – Pedestrian Countermeasures

- Specific recommended countermeasures at pedestrian high crash intersections

Pedestrian Intersection Countermeasures	
Description	Implement pedestrian-related countermeasures at high crash intersections identified in Tables 1, 3, and 4 based on the pattern and type of crashes that have occurred
Targeted Crash Types	High Crash Intersections
Notes	The following potential countermeasures have been identified from an initial study of the pattern of crashes at several of the top pedestrian crash intersections: • Install a crosswalk on the north leg of Miami Gardens Drive & NW 27th Avenue • Close the northbound left access into the shopping center south of Miami Gardens Drive & NW 27th Avenue to allow for signalized crosswalk with a 12' median refuge for pedestrians crossing between the commercial areas south of the intersection • Implement a Leading Pedestrian Interval (LPI) at the intersection of W 16th Avenue and W 49th Street • Provide a 4' raised concrete traffic separator along NW 27th Avenue north and south of the intersection at NW 79th Street • Install a signalized crosswalk across NE 79th Street just east of NE Miami Court between the two bus stops on the north and south sides of NE 79th Street • Implement a Leading Pedestrian Interval (LPI) at the intersection of NW 22nd Avenue and NW 36th Street • Install a signalized crossing across SW 56th Street at the entrance to James A. Ferguson High School • Install a fence and landscaping in the median of US 1 north and south of Caribbean Boulevard to encourage pedestrians to cross at the intersection • Install a crosswalk across Normandy Drive just east of Rue Vendome for pedestrians crossing between the commercial areas on either side of Normandy Drive • Implement a Leading Pedestrian Interval (LPI) at the intersection of Alton Road and 17th Street • Implement a Leading Pedestrian Interval (LPI) and adjust the pedestrian timing to consider a slower walking speed of 2.8 ft/s for elderly pedestrians at the intersection of SW 5th Avenue and SW 8th Street

Improve Bicycle Conditions

- Provide bike lanes as a minimum design
- Buffered bike lanes on higher speed roadways
- Cycle tracks to attract a wider range of bicyclists

Improving the Environment for Biking	
Description	As streets are redesigned, reconstructed, and redeveloped, implement techniques that will improve the level of service for bicycles (BLOS). Improvements can include installing bike lanes to corridors without bicycle facilities, adding buffers between motor vehicle lanes and bike lanes, and adding protected cycle tracks.
Targeted Crash Types	Parallel Path Crashes
Notes	• Providing bike lanes on corridors creates a designated space for bicycles and reduces crash likelihood • Providing buffers between motor vehicle travel lanes and bike lanes allows for greater separation between vehicles and bicycles • Studies have shown that well-designed protected cycle tracks are associated with higher bicyclist usage and lower crash rates when turning movement conflicts at intersections are properly addressed during design.
Implementation Strategy	Implement as a component of any roadway construction or improvement projects, especially corridors that are shown as BLOS E or BLOS F in the maps included in Appendix C.

Buffers allow for greater separation between high-speed vehicles and bicycles traveling in bike lanes.

Cycle tracks provide a higher level of protection than conventional bike lanes and are attractive to a wider spectrum of bicyclist comfort levels

3-Foot Separation Law

- Improve education and enforcement of the 3-Foot Separation Law

Education and Enforcement of 3-Foot Law	
Description	Educate the public of the state law that requires that motorists give a three-foot clearance when passing cyclists through posters, installation of signage in high-crash areas, and enforcement of the law
Targeted Crash Types	Straight-Through Crashes
Notes	• For bicycle high-crash areas (shown in Figure 41), install signage that alerts motorists of the state law that requires motorists to give a three-foot clearance when passing cyclists • Educate motorists and bicyclists through the use of posters, advertisements, stickers, etc.
Implementation Strategy	Implement signage as a component of any roadway improvement projects and coordinate with local municipalities and law enforcement agencies in the bicycle high-crash areas to distribute educational materials and enforce the law

FDOT District 4 experimental signage. Recommend installation and evaluation of this sign in a bicycle high-crash area.

This "3 Feet Please" sticker could be developed into a sign.

BIKESAFE Program Expansion

- Expand to additional middle schools
- Consider expanding to elementary schools to target identified injury patterns

BikeSafe Program Expansion	
Description	The large number of injuries in non-motor vehicle crashes for pedalcyclists between the ages of 5 and 14 shown in Figure 7 indicates a need for expanding the existing BikeSafe Program.
Targeted Crash Types	Juvenile Crashes
Notes	The BikeSafe Program began in 2009 with the aim of decreasing the number of children injured as cyclists and increasing physical activity levels of children by encouraging them to bike to and from school throughout Miami-Dade County, with the focus on middle school-aged children. As of August 2013, the BikeSafe Program has been implemented in 15 Miami-Dade County middle schools.
Implementation Strategy	Coordinate with the BikeSafe Program staff to implement the current program components in additional middle schools in Miami-Dade County. To target the younger children in the 5-14 year-old age group, coordinate with the BikeSafe Program staff to expand the program to Miami-Dade elementary schools and make any modifications to the curriculum that may be needed for this younger group of students.

High Crash Intersections – Bicycle Countermeasures

- Specific recommended countermeasures at bicyclist high crash intersections

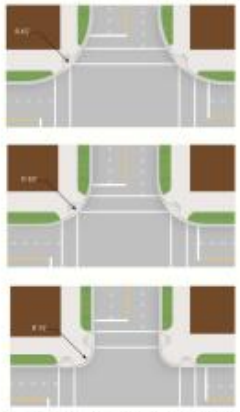
Bicycle Intersection Countermeasures	
Description	Implement bicycle-related countermeasures at high crash intersections identified in Table 2 based on the pattern and type of crashes that have occurred
Targeted Crash Types	High Crash Intersections
Notes	The following potential countermeasures have been identified from an initial study of the pattern of crashes at several of the top bicycle crash intersections: • Install signage that alerts motorists to look for bicyclists in response to the high percentage of right turn crashes at the intersection of Crandon Boulevard & Harbor Drive/Ocean Lane Drive. Signage can include the modified R10-15 that includes the bicycle symbol or a text sign that reads "Turning Vehicles Watch for Bicycles" • Place sharrow pavement markings laterally in the through lane along Alton Road to encourage bicycles to take the lane and place the sharrow markings through the intersection at 17th Street • Install bicycle warning signs (W11-1) at the entrances to the block at Collins Avenue and 21st Street • Install signage that alerts motorists to look for bicyclists in response to the high percentage of right turn crashes at the intersection of Crandon Boulevard & Galen Drive/W McIntire Street. Signage can include the modified R10-15 that includes the bicycle symbol or a text sign that reads "Turning Vehicles Watch for Bicycles". Several bicyclists were observed riding on the sidewalk in this area; consider implementing a Leading Pedestrian Interval (LPI) for sidewalk riders. • Implement a Leading Pedestrian Interval (LPI) at the intersection of Miami Gardens Drive and NW 27th Avenue for sidewalk riders, as several bicyclists were observed riding on the sidewalk along these corridors • Install sharrow pavement markings through the intersection at Washington Avenue and 5th Street • Install modified R10-15 signage that includes the bicycle symbol for the northbound approach at Miami Gardens Drive and US 1

Low Speed Design Principles

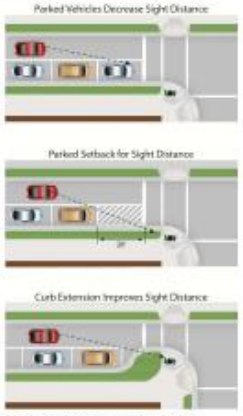
- Smaller corner radii
- Pedestrian bulb-outs
- Traffic calming

Low-Speed Design Principles	
Description	As streets are redesigned, reconstructed, and redeveloped, use low-speed design principles to achieve lower speeds through techniques such as smaller corner radii, pedestrian bulb-outs, traffic circles that accommodate bicycles and pedestrians, and utilizing traffic calming devices where appropriate. Additionally, perceptual design features such as patterns painted, stamped, or built into the roadway surface encourage motorists to reduce speeds.
Targeted Crash Types	Right-Hook Crashes
Notes	• A general recommendation for most neighborhood streets would be to design for no more than 30 miles per hour; however, each street would need to be evaluated on a case-by-case basis • Roadway safety statistics underscore the need to promote low speeds within high pedestrian areas • The likelihood of a pedestrian surviving a crash with a motor vehicle significantly increases as the vehicular speed at impact decreases
Implementation Strategy	Implement as a component of any roadway construction or improvement projects

Low-Speed Design Principle Examples



Tighter corner radii slow turning traffic and reduce pedestrian crossing distance



Curb extensions improve sight distance between pedestrians and motorists

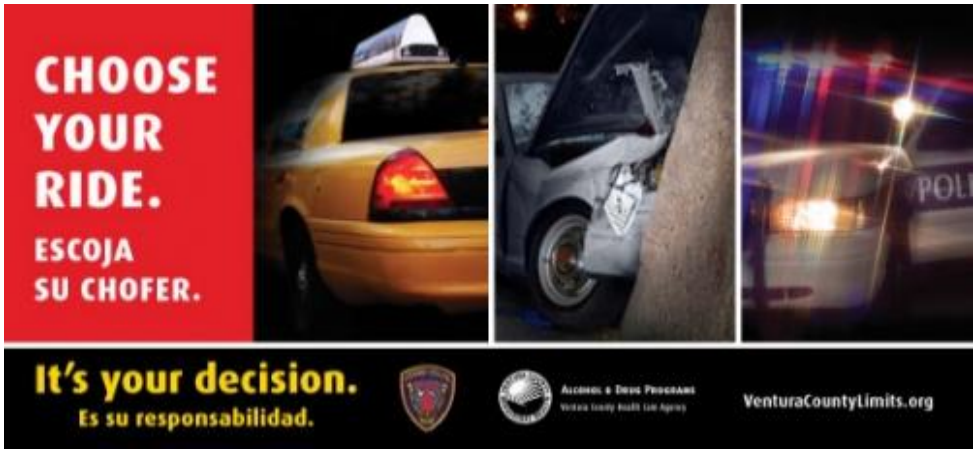
Target Impaired Driving

- Server Training Program
- Taxi Ride Home Campaign
- DUI Enforcement Techniques

Server Training Program	
Description	A training program that promotes responsible beverage service to staff at establishments that serve alcohol can reduce alcohol-related crashes.
Targeted Crash Types	Alcohol/Drug-Use Involved Crashes

Notes	• Training programs include instruction on:
	  ○ Alcohol awareness
	  ○ Server responsibilities
	  ○ Checking IDs
	  ○ Intervention
	  ○ Laws and policies
	• There is an existing voluntary program in the state of Florida created by the Florida Responsible Vendors Act
	• A study from the Oregon Research Institute found that mandatory programs were much more effective than voluntary programs

Implementation Strategy	Coordinate with management at local restaurants and bars to encourage staff to participate in the available online training programs.



Next Steps

- Review draft report for comments/suggestions
- Please submit any written comments you may have by Friday, February 21
- Finalize Report

- Thank you for your help and input!!!