

MIAMI-DADE METROPOLITAN PLANNING ORGANIZATION

Pedestrian Improvements at Railroad Crossings



TASK WORK ORDER No. 22
JANUARY 2013

Table of Contents

Executive Summary	ii
1.0 Introduction	1
2.0 Study Advisory Committee	2
3.0 Literature Review	2
4.0 Field Evaluation of Railroad Crossings	9
4.1 Current Railroad Crossing Safety Reviews	9
4.2 Rail Highway Crossing Inventory (RHCI)	9
4.3 Criteria for Grouping RHCI Crossings	10
4.3 Selection of Crossings for Field Evaluation	12
4.4 Field Reviews	15
4.5 Field Evaluation Results	17
5.0 Toolbox	18
5.1 Implementation Strategies	18
5.2 Funding Toolbox	22
5.3 Project Coordination with Land Owners	24
6.0 Implementation	25
6.1 Final Ranking Criteria	25
6.2 Final Ranking Results	28
6.3 Visualizations	29
6.4 Future Program Recommendations	51
7.0 Conclusions	51

List of Appendices

Appendix A: Literature Review
Appendix B: Rail Crossing Inventories (FRA and FDOT)
Appendix C: RHCI as Modified by the Study Team
Appendix D: Grade Crossing Crashes
Appendix E: List of Crossings Selected for Field Evaluation
Appendix F: Field Review Evaluation Sheet Sample
Appendix G: Field Review Evaluation Results
Appendix H: Final Crossings Rankings Results

List of Figures

Figure 1: Combinations of Channelization and Signage	8
Figure 2: Active At-Grade Crossings in Miami-Dade County	11
Figure 3: Accidents at Crossings, 2007-2011	14
Figure 4: Field Evaluation Locations	16
Figure 5: Prioritization of Implementation Strategies	18
Figure 5: Prioritized Crossings	30

List of Tables

Table 1: Pedestrian Behavioral Issues and Possible Solutions	4
Table 2: Programmed Railroad Crossing Improvements from the Transportation Improvement Plans	13
Table 3: Summary of Field Review Findings for Pedestrian Design Elements	17
Table 4: Summary of Field Review Findings for Automobile Design Elements	17
Table 5: Toolbox of Improvement Strategies	20
Table 6: Pedestrian Criteria and Points	26
Table 7: Automobile Criteria and Points	27

Executive Summary

Miami-Dade County has two major railways, the Florida East Coast (FEC) Railway and the CSX Railroad. The CSX Railroad currently provides both freight and passenger service. Currently, operations on the FEC are restricted to freight service. There are studies underway to return passenger service to the FEC, including All Aboard Florida and the South Florida East Coast Corridor (SFECC) Study.

These two railways include 273 crossings within Miami-Dade County. Highway-rail crossings have been maintained by the State of Florida since the early seventies. As a federal mandate, the Florida Department of Transportation's (FDOT) Central Safety Office is required to develop an inventory of all public and private crossings, and establish a methodology to prioritize high crash highway-rail crossings. FDOT conducts annual diagnostic field reviews and makes recommendations for needed improvements. As a result, implementing safety improvement techniques at hazardous locations in the state has led to an 84 percent reduction in train/motor vehicle crashes at highway-rail crossings over the four decade span.

While the state's monitoring process at highway-rail crossings provides a systematic approach to improving highway-rail crossings, the system is geared more towards vehicle-train interactions, rather than non-motorized road users, namely bicyclists and pedestrians. To address this discrepancy in modal safety and with the potential for increased train activity through the addition of passenger service on the FEC, the Miami-Dade Metropolitan Planning Organization (MPO) undertook the study described in this report to assess pedestrian safety conditions at rail crossings in Miami-Dade County. The goal of the study is to establish a methodology for evaluating pedestrian safety deficiencies and identifying improvements that can be implemented in both the near- and long-term. A Study Advisory Committee (SAC) comprised of representatives from the MPO, including the MPO Bicycle/Pedestrian Advisory Committee, FDOT District 6, Miami-Dade Public Works and Waste Management Department, Florida East Coast Rail Railway (FEC), Miami-Dade Transit Agency and the CSX Railroad, was formed and provided guidance throughout the study.

A comprehensive review of relevant literature on pedestrian-rail crossings was conducted for the study and is discussed in section 3.0, beginning on page 2. Federal, state and local standards and guideline documents were consulted, as well as transportation improvement plans impacting rail crossings. Additionally, best practices research was conducted to collect information on proven safety improvements implemented in other regions at pedestrian rail crossings. The literature review provided an overview of the regulatory requirements on rail crossings, as well as the commonly used pedestrian improvement treatments that should be considered for implementation. It should be noted that the research conducted included both passenger and freight rail pedestrian crossings. While the focus of study is on freight rail crossings, existing passenger rail operating on CSX's tracks, and future plans for passenger rail on other freight rail tracks in Miami-Dade call for including research material on all types of pedestrian-rail crossings.

The literature review revealed that solutions for pedestrian safety issues at rail crossings are context sensitive. However, the research does emphasize that the use of detectable warning surfaces or tactile surfaces at crossings is key in enhancing pedestrian safety at rail crossings. In addition, the literature indicates that the use of consistent regulatory and warning signs is considered a best practice approach for pedestrian safety.

The best practices research conducted indicated that safety issues at pedestrian rail crossings are best addressed through a diagnostic field review that identifies deficiencies and makes specific recommendations to the particular crossing site. Education and enforcement are also important in reducing incidents.

The 273 railroad crossings within Miami-Dade County were evaluated to select those crossings that were further reviewed in the field, which is described in section 4.0, beginning on page 9. A listing of 273 active at-grade crossings (public and private) in Miami-Dade County was retrieved from the Florida Department of Transportation's (FDOT) Rail Highway Crossing Inventory (RHCI). Attributes for each crossing were gathered from the most recent Federal Rail Administration's National Highway-Rail Crossing Inventory. The attributes included information on roadway properties and utilization, rail usage, and crossing signalization and warning devices.

A geodatabase is linked to the inventory, allowing geographic analysis of the selected sites. It should be noted, however, that the data obtained from the FDOT RHCI database is over ten years old. FDOT officials indicated there are plans underway to update this information. The locations of the active at-grade crossings extend from the Broward/Dade County line to Homestead, and are densely clustered in areas around Hialeah and Allapattah, where there is significant industrial land use. Of the 273 crossings, 233 are public, 38 are private, and two are strictly pedestrian crossings. Based on data from the FDOT RHCI database, while there are sidewalks at 131 crossings; sidewalks are continuous through only 105 crossings.

To aid in the analysis and selection of crossings for field evaluation, the 273 crossings were categorized into groups using the following criteria: presence or lack of sidewalks at the crossing; type of control at the crossing, i.e. signal, stop sign or none; presence or lack of gate at the crossing; proximity to bus stops and schools; and surrounding land use, i.e. residential, commercial, industrial, recreational. A total of 73 crossings were initially identified from the inventory list for further field evaluation. In selecting these crossings, priority was given to crossings that showed a high probability of attracting pedestrians and that were missing key pedestrian safety features.

Higher priority was given to crossings that were missing more than one safety feature. To further refine the list, an effort was made to select crossings from as many different parts of the county as possible. Although most of the locations selected were located in commercial or residential areas, where higher pedestrian use was expected, several sites selected were located in industrial and open space/recreation areas; to ensure that all of the land use categories were included. Other evaluation factors for selecting the crossings for field evaluation included accident history and programmed improvements.

At the request of the SAC, nine crossings that were part of FDOT District 6's 2012 Diagnostic Field Reviews were included in the study. This brought the total to 82 rail crossings. Field reviews of the 82 crossings were conducted during the fall of 2012. The study team assembled a list of design elements to review. Generally regarded as key factors to improving pedestrian safety at at-grade crossings, the design elements included in the field evaluation were sidewalks, detectable warning surface, crossing surface, pedestrian gates, pedestrian movement control devices, and pedestrian warning devices. Similar elements were added for automobile safety, at the request of the SAC. These elements included automobile gates, pavement markings, signs, and warning devices.

The field evaluation results, which are summarized in section 4.5 on page 16, indicate that pedestrian safety elements are missing from a majority of the crossings reviewed as part of this study. Most crossings are lacking detectable warning surfaces and pedestrian gates. While automobile safety elements are more common, the two least utilized (at the crossings that were reviewed for this study) were gates on both sides of the crossing and overhead warning lights that alert drivers of approaching trains.

A toolbox of strategies was developed as part of this study and is detailed in section 5.0, beginning on page 17. The toolbox can be utilized to identify the most effective strategies for pedestrian safety at railroad crossings. The strategies in the toolbox were prioritized so as to consider the strategy's impact to improving safety first. Site location would be considered next, to represent a wide spectrum of different rail crossing settings and the appropriate strategies that should be applied. Finally, existing infrastructure should be considered, to evaluate the usability of existing facilities to be retrofitted with pedestrian safety improvement strategies.

Specific performance measures were developed and used to prioritize the implementation strategies. To address the issue of safety, two questions were asked: has the location involved a pedestrian incident and is the location a state road without sidewalks. To prioritize site location, proximity to schools and bus stops was considered along with the presence of sidewalks and pedestrian gates. To assess the existing infrastructure, specific features such as sidewalks, crossing surface, crossing angle, sight distance, pedestrian and automotive gates, signs, and warning devices were considered.

It is important to note that each crossing has its own individual set of potential safety issues, thereby warranting a different combination of improvements strategies. Utilizing the toolbox of strategies, however, can help develop and implement a combination of pedestrian safety improvements that best meets the needs of the specific crossing. Strategies included in the toolbox (which are identified in Table 5, beginning on page 19) are pedestrian lighting, flashing light signal, bedstead barriers, fencing, pedestrian gates, z-crossing channelization, "second train coming" sign, swing gates, sidewalk, pavement markings and texturing, and flangeway gaps (the space left for the train wheel that can be a hazard for both pedestrians and bicyclists).

As described in section 5.2, beginning on page 21, there are a number of federal and state funding sources that can potentially be utilized to support pedestrian safety improvements at rail crossings. Federal funding programs under Moving Ahead for Progress in the 21st Century (MAP-21) include Transportation Alternatives, the Surface Transportation Program, the Congestion Mitigation and Air Quality (CMAQ) Improvement Program, and the Highway Safety Improvement Program (HSIP). State-level funding can be allocated through the Highway – Rail Grade Crossing Safety Improvement Program. Additionally, construction and maintenance activities should be coordinated with private rail companies, even though funding for these design phases is also covered by the government agency overseeing the improvement.

The final ranking of the evaluated crossings is detailed in section 6 of this report. The evaluation criteria primarily focused on conditions that related directly to the pedestrian experience, as well as the ability of a pedestrian to safely and appropriately approach and navigate a crossing. Two of the criteria took into account the location of the crossing in relation to schools and bus stops, as this could possibly be an indicator of increased pedestrian use. Other criteria accounted for ADA- and bicycle-related issues, such as flangeway gaps, crossing angle, and whether the crossing was level

with the crossing surface. Further criteria, including vehicle-related criteria, examined physical features and warning devices, such as gates, warning lights, and stop lines.

Criteria weights were created through a two-part analysis process. This included: 1) the likelihood of the criteria item to significantly impact pedestrian safety; and 2) the likelihood that the criteria can reasonably be addressed, given financial limitations and other considerations. The priority of each criterion was then ranked from highest to lowest using professional judgment, and considering the objectives of the project.

The ranking methodology of the reviewed rail crossings utilized a 100 points scale. For train activity, it was determined that the frequency of trains at a particular rail crossing had a significant impact on pedestrian safety, so a maximum of 10 points were assigned for this criterion alone (measured by daily train trips provided by the RHCI). To ensure the maximum utility of the ranking methodology, the remaining 90 points were divided evenly between automobile and pedestrian criteria.

As a result of the rankings, ten crossings were identified for visualizing toolbox improvement strategies. These ten crossings are:

- FEC Crossing No. 272951B at W 18th Street
- FEC Crossing No. 272965J at W 15th Street
- FEC Crossing No. 272950U at W 19th Street
- FEC Crossing No. 273009P at W 20th Street
- FEC Crossing No. 272967X at W 13th Street
- CSX Crossing No. 628325X at Dunad Avenue
- FEC Crossing No. 272606T at NE 151st Street
- CSX Crossing No. 628377P at NW 36th Street
- CSX Crossing No. 628355P at NW 54th Street/Hialeah Drive
- CSX Crossing No. 631097R at SW 137/Tallahassee Road

A profile of each of the ten crossings is also provided in section 6.4 of the report, beginning on page 28. Each crossing profile includes an assessment of missing bike/pedestrian and automobile safety features. Each crossing profile includes two images of the crossing, a “before” and “after” image at the crossing. The “before” picture displays existing conditions at the crossing, while the “after” rendering includes the bike/pedestrian and automobile improvements recommended for each crossing. Each Solution/Improvement includes a timeframe for project implementation and an estimated project cost. It should be noted that cost estimates were only collected for bike/pedestrian improvements.

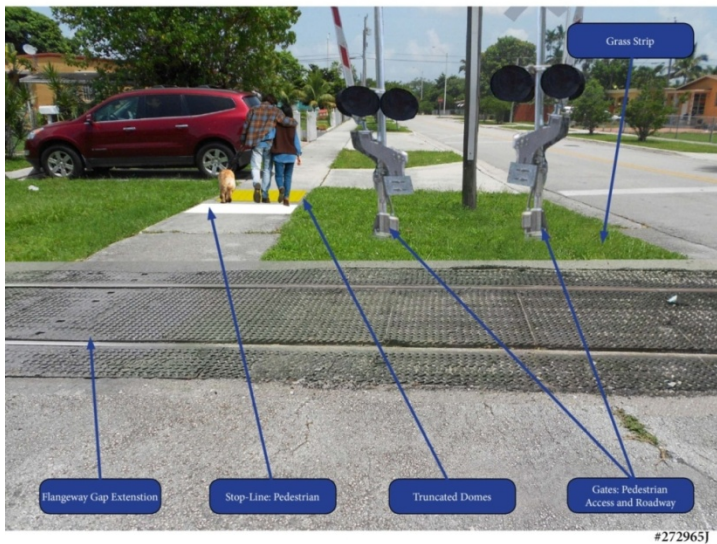
The following is the profile that was developed for FEC Crossing No. 272965J at W 15th Street.

Solution/Improvement	Timeframe	Improvement Cost	Total Cost
Add Stop Line – Pedestrian (4)	1-2 Years	\$5-\$10/linear foot for striping	\$20-\$40
Add truncated dome (4)	1-2 Years	\$300 per panel	\$1,200
Signage at crossing (2)	1-2 Years	\$300-\$350 per sign	\$600-\$700
Flangeway gap (8)	2-5 Years	\$1,600 per pad (8ft x 8ft)	\$12,800
Access Gate - Pedestrian and Automobile (4)	5 or more Years	Approximately \$130,000/ Four quadrant gates	\$130,000
Total Cost = \$144,620-\$144,740			

FEC Crossing No. 272965J Before:



FEC Crossing No. 272965J After:



Future program recommendations are identified in section 6.4 on page 50. There are three main recommendations:

Combine Pedestrian Safety Evaluation Criteria with District Diagnostic Field Reviews

It is recommended that the MPO and FDOT District 6 collaborate to build pedestrian safety improvements into their Diagnostic Field Review process. By institutionalizing processes developed in this study, the MPO, FDOT and railroad agencies can have a data-driven, field-verified process for including pedestrian crossing features in future projects.

Build Recurring Funding into the TIP to Address Pedestrian Crossing Shortcomings

In each crossing profile, project recommendations have been identified for bicycle/pedestrian and automobile improvements at selected crossings. These identified project recommendations have the ability to be included into future funding opportunities. It is recommended that the ranking spreadsheet be updated annually and used to track crossing improvements for both pedestrians/bicyclists and motor vehicles. If a recurring funding source was designated, it would be possible to upgrade several crossings per year.

Refine Selection Matrix Based on Actual Use

The selection matrix that was utilized for this project was created to allow the user to add measures or adjust the criteria weighting for prioritizing projects in the future. This structure allows the user to continue to utilize the matrix structure for future rail crossing evaluations.

It is anticipated that this study can serve as an overarching tool in identifying pedestrian safety issues at rail crossings in Miami-Dade County, as it provides a systematic approach to implementing solutions to these issues.

1.0 Introduction

Miami-Dade County has two major railways, the Florida East Coast (FEC) Railway and the CSX Railroad. The CSX Railroad currently provides both freight and passenger service. Freight service is provided throughout the length of the CSX railway while passenger service operates north of the Airport Expressway/Florida 112. The passenger service offered includes Tri-Rail, a commuter service that operates between Miami and West Palm Beach, and Amtrak, a long-distance service that provides connections throughout the country. Currently, operations on the FEC are restricted to freight service. There are studies underway to return passenger service to the FEC, including All Aboard Florida and the South Florida East Coast Corridor (SFECC) Study. All Aboard Florida, an initiative of Florida East Coast Industries (parent company of the FEC Railway), would provide inter-city service between Miami and Orlando with stops in Miami, Fort Lauderdale, West Palm Beach, and Orlando. The SFECC Study, being conducted by the Florida Department of Transportation (FDOT), would provide more local service between Miami and the Town of Jupiter, with numerous stops in between.

These two railways include 273 crossings within Miami-Dade County. Of these, 233 are public roadways, 38 are private, and two are strictly pedestrian crossings. Highway-rail crossings have been maintained by the State of Florida since the early seventies. As a federal mandate, the Florida Department of Transportation's (FDOT) Central Safety Office is required to develop an inventory of all public and private crossings, and establish a methodology to prioritize high crash highway-rail crossings. Based on the prioritized list, FDOT conducts annual diagnostic field reviews and makes recommendations for needed improvements. As a result, implementing safety improvement techniques at hazardous locations in the state has led to an 84 percent reduction in train/motor vehicle crashes at highway-rail crossings over the four decade span.

While the state's monitoring process at highway-rail crossings provides a systematic approach to improving highway-rail crossings, the system is geared more towards vehicle-train interactions, rather than non-motorized road users, namely bicyclists and pedestrians. To address this discrepancy in modal safety and with the potential for increased train activity through the addition of passenger service on the FEC, the Miami-Dade Metropolitan Planning Organization (MPO) undertook the study described in this report to assess pedestrian safety conditions at rail crossings in Miami-Dade County. The goal of the study is to establish a methodology for evaluating pedestrian safety deficiencies and identifying improvements that can be implemented in both the near- and long-term.

The first steps of the study were to (1) review relevant literature to identify legal requirements and best practices regarding pedestrian safety at rail crossings and (2) identify the location of all active at-grade railroad crossings within the county. The literature review assisted in the identification of strategies that were included in the toolbox for the study. With 273 railroad crossings in the county, the next step of this study was to develop a methodology for identifying those crossings with the greatest potential for pedestrian activity. While the MPO would have preferred to evaluate all 273 crossings for pedestrian safety, this was not feasible within the parameters of the study.

Once a smaller subset of rail crossings was identified, field evaluations to establish the existing conditions were conducted. A database of these measurements was created and used in conjunction with a separate set of criteria to identify the crossings for which recommended safety improvements were developed. Visualizations of each of these crossings were created to show the existing conditions ("before") and how the application of strategies from the toolbox could improve safety conditions ("after"). Costs, implementation time, and level of benefit for each of the improvements

were determined and are provided. Recommendations for continued implementation of the methodology developed by this study are included in the last section of the report.

Throughout the study, the MPO coordinated with FDOT District Six, the Miami-Dade County Public Works and Waste Management Department, Miami-Dade Transit, the Florida East Coast Railway (FEC), and the CSX Railroad. Each of these agencies and companies were invited to participate on the Study Advisory Committee, or SAC. As members of the SAC, they were offered the opportunity to comment on the different evaluation criteria developed and results of the study.

2.0 Study Advisory Committee

As a standard practice on all MPO technical studies, a Study Advisory Committee (SAC) is developed that provides guidance and resources for the study team. As noted above, for this study the SAC included representatives from the MPO, including the MPO Bicycle/Pedestrian Advisory Committee, FDOT District 6, Miami-Dade Public Works and Waste Management Department, Florida East Coast Rail Railway (FEC), Miami-Dade Transit Agency and the CSX Railroad. The first SAC meeting was held on February, 29, 2012, where the study approach and methodology were discussed, and a preliminary plan for the study was formulated. Following the first meeting, communication with the SAC was maintained through a series of teleconferences and email correspondence.

Through continuous communication with the SAC, input was provided on the field evaluation task of the project, as well as on the methodology for crossing ranking and prioritization for future improvements. The SAC's input is reflected throughout this document.

3.0 Literature Review

A comprehensive review of relevant literature on pedestrian-rail crossings was conducted for the study and is included as Appendix A of this report. This section summarizes the literature review, including documents reviewed and findings. Federal, state and local standards and guideline documents were consulted, as well as transportation improvement plans impacting rail crossings. Additionally, best practices research was conducted to collect information on proven safety improvements implemented in other regions at pedestrian rail crossings.

Federal guidance reviewed included:

- the *American Disabilities Act Accessibility Guidelines*,
- the Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices*, 2009,
- the FHWA *Designing Sidewalks and Trails for Access*, 2001, and
- the Federal Railroad Administration (FRA)'s "Train Horn Rule" (49 CFR Part 222).

State-level standards consulted included FDOT's:

- *Florida's Green Book*, May 2010 (Draft),
- *Design Standards Manual*, 2010,
- *Highway-Rail Grade Crossing Safety Action Plan*, August 2011,
- *Design Guidelines for Highway Rail Crossing Profiles in Florida*, May 2006,

- *Florida Bicycle Facilities Planning and Design Handbook*, April 2000,
- *Florida Plans Preparation Manual*, January 2011,
- *Intersection Design Guide*, 2007, and
- *Rail Traffic Evaluation Study- Grade Crossing Evaluation Technical Memorandum*, District 1, November 2009.

Local plans reviewed included Miami-Dade County's:

- *Railroad Right-of-Way Assessment*, MPO, August 1993,
- *Rail Convertibility Study*, MPO, November 2004,
- *Freight Plan*, MPO, March 2009,
- *CSX Corridor Evaluation Study*, MPO, August 2009,
- *FEC Transit Connection Study*, MPO, December 2009, and
- *Trail Design Guidelines and Standards – Ludlam Trail Case Study*, Parks, Recreation and Open Spaces, October 2011.

For the best practices research, the following documents were reviewed:

- FHWA's *Railroad-Highway Grade Crossing Handbook*, August 2007,
- FRA's *Compilation of Pedestrian Safety Devices in Use at Grade Crossings*, January 2008,
- California Public Utilities Commission's *Pedestrian-Rail Crossings in California Report*, May 2008,
- California Public Utilities Commission's *Highway-Rail Grade Crossings Presentation*, May 2008,
- California Metrolink's *Pedestrian Rail Crossings: Lessons Learned Presentation*, October 2007, and
- the Eastern States Grade Crossing Conference, *Pedestrian Safety Best Practices from Recent Western Rail Transit Projects Presentation*, October 2007.

The literature review provided an overview of the regulatory requirements on rail crossings, as well as the commonly used pedestrian improvement treatments that should be considered for implementation. It should be noted that the research conducted included both passenger and freight rail pedestrian crossings. While the focus of study is on freight rail crossings, existing passenger rail operating on CSX's tracks, and future plans for passenger rail on other freight rail tracks in Miami-Dade call for including research material on all types of pedestrian-rail crossings.

Per the reviewed standards and guidelines, rail crossings should be ADA compliant, include adequate pedestrian access routes, have detectable warning surfaces, and manage the issue of flangeway gaps. "Quiet zones", where train horns are not sounded, require coordination and installation of specific warning signs and devices. State-level guidance emphasizes that highway-rail grade crossings should be at right angles, and when that is not feasible, improvements such as lane widening and shoulder paving should be incorporated to minimize safety issues to bicyclists and pedestrians. Local plans address potential safety issues of multi-use trails adjacent to railroad tracks, and specify

minimum setback and dynamic envelope dimensions. Additionally, based on the MUTCD, certain pedestrian safety elements should be incorporated at passenger rail crossings, including automatic gates, flashing light signals, standard cross buck signs, audible devices, and sufficient clearance.

In summary, the literature review revealed that solutions for pedestrian safety issues at rail crossings are context sensitive. However, the research does emphasize that the use of detectable warning surfaces or tactile surfaces at crossings is key in enhancing pedestrian safety at rail crossings. In addition, the literature indicates that the use of consistent regulatory and warning signs is considered a best practice approach for pedestrian safety.

Moreover, the best practices research conducted indicated that safety issues at pedestrian rail crossings are best addressed through a diagnostic field review that identifies deficiencies and makes specific recommendations to the particular crossing site. However, certain standard design treatments, such as ensuring the visibility of traffic control devices, installing appropriate signs and warning signals, and channelization should be incorporated at all pedestrian crossings, to minimize unsafe pedestrian behavior. Education and enforcement are also important in reducing incidents. Finally, research should continue to identify more proven methodologies and treatments to enhancing safety at pedestrian-rail crossings.

Pedestrian safety improvements and warning devices at rail crossings can be categorized as passive or active. Passive devices include fencing, swing gates, pedestrian barriers, pavement marking and texturing, and fixed message signs. Active devices include flashers, audible active control devices, automated pedestrian gates, pedestrian signals and variable message signs.

Table 1 summarizes the common pedestrian-related issues identified in the study, and proposes possible solutions to improving pedestrian safety.

Table 1: Pedestrian Behavioral Issues and Possible Solutions

<i>Pedestrian-related Issue</i>	<i>Possible Solutions</i>
<i>Limited sight distance at pedestrian crossing.</i>	Install pedestrian automatic gates with flashing light signals and bells or alternative audible device.
<i>Pedestrians dart across tracks without looking.</i>	Install warning signs. Install swing gates.
<i>Pedestrians fail to look both ways before crossing tracks.</i>	Channel pedestrians (Z-crossings). Paint directional arrow between tracks where there is double tracking and the direction of travel is fixed.
<i>Pedestrians ignore warning signs.</i>	Provide education and enforcement. Mount signs closer to average eye level for pedestrians. Install active pedestrian warning devices.
<i>Pedestrians stand too close to tracks as train approaches crossings.</i>	Install pedestrian stop bar with tactile warning outside of the dynamic envelope. Provide signs.
<i>Pedestrians and bicyclists routinely cross tracks behind the automatic gate mechanism while it is activated.</i>	Install positive control behind the sidewalk, if present or roadway should include positive control.

Below is a description of the key pedestrian safety improvement strategies that were deduced from the literature review. These strategies were used to create the strategies toolbox detailed in section 5 of this report.

Pedestrian automatic gates are recommended where limited sight distance is noted at pedestrian crossings. It is recommended that the gates be equipped with flashing



light signals and bells or alternative audible devices. In many cases, these gates can be combined with channelized barriers, swing gates, and other devices to promote a desired and safe pedestrian pathway.

The placement of **flashing light signals** provides an additional pedestrian warning mechanism. Flashers should be placed such that they are clearly visible to pedestrians. The *Railroad-Highway Grade Crossing Handbook* states that a flashing light signal assembly system alone may be sufficient for non-gated, un-signalized, pedestrian-only crossings. When crossings without pedestrian gates include vehicular traffic, it is recommended that the flashing light signal assembly be installed at the crossing quadrants that do not have automatic gates. These signal devices should be installed adjacent to the pedestrian crossing, facing away from the tracks. The assembly should also include a standard cross buck sign (where there is more than one track) and an inverted t-shaped sign indicating the number of tracks. Flashers can be used in conjunction with entry/exit swing gates or as a standalone treatment. Flashing signals are also deemed useful at skewed crossings, or at extended crossing distances, such as at multi-track crossings.

There are a number of standard practices that should be followed during the installation of regulatory and warning signs at rail crossings. A key element to enhancing safety for pedestrians is to avoid confusion or conflicts in signs. **Standard signs** should be used for all pedestrian crossings, consistent with guidelines in the MUTCD. Signs should also be provided at pedestrian eye level. **Look both ways signs** are especially useful to increasing pedestrian awareness. Signage visibility is critical, so signing and marking maintenance should be monitored to ensure sign reflectivity and roadway striping is up to standard. Using reflective material that can be seen at night is recommended. Additionally, research has shown that a number of pedestrian incidents at rail crossings occurred when there was an intersection of more than one rail track. **Second train coming signs**, which are internally train-activated, and illuminated matrix sign displays that show pedestrian crossing configurations with one or two trains passing, may be used to alert pedestrians to the direction the train is approaching. This is especially effective at light rail crossings and where pedestrian traffic is heavy. Another strategy for addressing pedestrian safety issues when multiple tracks are involved is to operate the trains such that one vehicle is stopped blocking the pedestrian crossing until the other train passes.

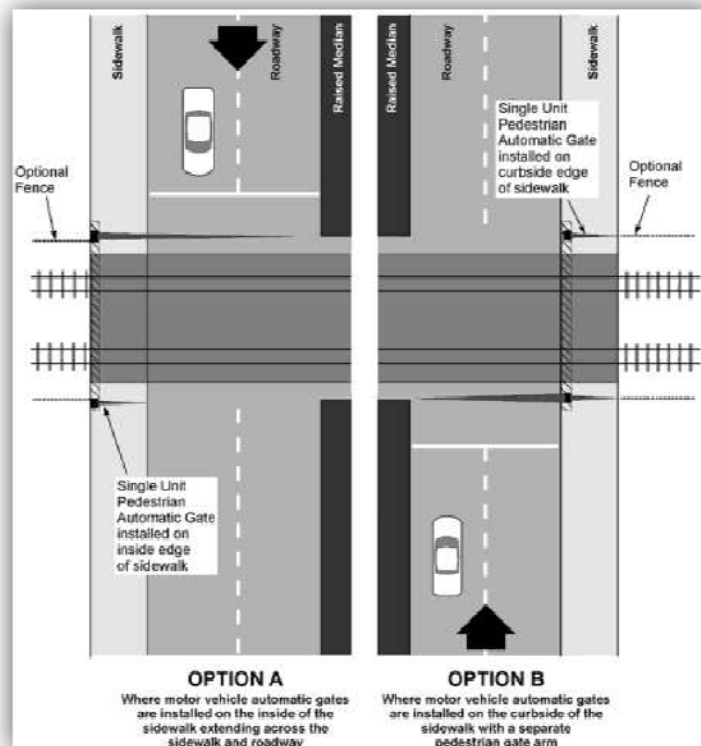


A commonly noted issue with railroad crossings is trespassing and illegal crossing. The literature review indicates that this issue can be addressed through effective design of pedestrian pathways. Creating **pedestrian pathway striping that spans across the track portion of the roadway** provides a good visual for pedestrians, as is the use of **contrasting colors and textures** leading into the rail tracks, and along track pathways, to make users more alert of their surroundings. Using **detectable warning surfaces**, also known as tactile devices and **Stop here signs** is also recommended.



Based on the literature review, there are five main types of barriers, and often the best practices approach is considered to be a combination of these systems as appropriate to the particular rail crossing. **Curbside pedestrian barriers**, which may consist of landscaping, bedstead barriers, fences and/or bollards and chains, are recommended between intersections in shared rights of way.

Pedestrian automatic gates, similar to standard automatic crossing gates but with shorter arms, may also be used to prevent pedestrians from crossing tracks. It is recommended that this type of pedestrian gate be used in areas where there is a medium to high risk of pedestrian-train collisions, and when sight distance is inadequate. Additionally, it is preferred that these gates be provided in all four quadrants of the crossing.



Swing gates, which are sometimes used with flashing lights and bells, alert pedestrians to the tracks that are to be crossed and forces pedestrians to pause before moving forward across the tracks. Swing gates may be used at pedestrian-only crossings, on sidewalks, and near stations where the risk of pedestrians colliding with trains is medium to high. Kick plates are also recommended where swing gates are implemented to assist those in wheelchairs in accessing the doors. It is further recommended that the gates be designed to return to a closed position after pedestrians pass. Swing gates should be supplemented with proper signing mounted on or near the gates. This includes the look both ways signs or flashing light signals.



Bedstead barriers are recommended in tight urban spaces where there is no fenced-in right of way, such as pedestrian grade crossings at street intersections. These barriers are placed in an offset manner that requires pedestrians to move across the tracks to navigate through the barriers. It is recommended that these types of barriers be designed to direct pedestrians towards the approaching train before crossing each track, thereby forcing them to look both ways as they are crossing. The bollard and chain concept may also be used in a similar manner.



Z-crossing channelization controls movement of pedestrians as they approach rail tracks, and is recommended to be used in cases where pedestrians are likely to run across the tracks (e.g. midblock, isolated, pedestrian-only crossings). This type of channelization may be used in conjunction with automatic gates, where there is especially high safety risks associated with a crossing. It should be noted that Z-crossing channelization is not recommended when trains operate in both directions along a single track, since pedestrians may be looking in the wrong direction.

Two experimental pedestrian warning devices were also noted in the literature review: wayside horns and in-road warning lights. These treatments are deemed experimental, since limited studies and implementations currently exist to adequately judge their effectiveness. **Wayside horns**, or stationary horns used at pedestrian rail crossings, are one method of alerting pedestrians, and may be used in lieu of train horns in “Quiet Zone” areas. **In-road warning lights** illuminate pedestrian street crossings, and can provide additional pedestrian wayfinding across rail crossings.

Pedestrian over-crossings and **under-crossings** have been utilized in busier rail corridors, and are particularly noted in areas of high density development and high speed corridors. Overpasses and underpasses involve lengthy implementation schedules, however, and costs are estimated between \$2 and \$8 million for overpasses and \$2 to \$4 million for underpasses. Other safety considerations, such as lighting, should be installed, and ADA accessibility is typically addressed through the provision of elevators and ramps.



Best practices indicate that a combination of these barrier types and control devices should be used to optimize safety and accessibility. Three main combinations were noted and are depicted in Figure 1. These include (1) **gated and channelized**, (2) **swing gates and flashers**, and (3) **channelization with flashers**.

Figure I: Combinations of Channelization and Signage



4.0 Field Evaluation of Railroad Crossings

This section of the report documents the current railroad safety reviews conducted by FDOT, how the 273 railroad crossings within Miami-Dade County were evaluated to select those crossings that were further evaluated in the field, and the results of the field evaluation. Included are descriptions of the Rail Highway Crossing Inventory (RHCI), evaluation criteria, and data collected in the field. The SAC was involved in the evaluation process and their input is described below.

4.1 Current Railroad Crossing Safety Reviews

The annual FDOT inventory and prioritization process of railroad crossings typically starts in March or April. The FDOT Central Office (Central Office) produces a report called the Safety Index Report, where railroad crossings across the state are ranked based on a set of parameters; including train volume, average annual daily traffic, train speed and frequency, vehicle speed limit, number of tracks, crash history, pedestrian counts, existing control devices, and other factors. On a scale of 0 to 8,000, railroad crossings that score 800 or lower are considered potential candidates for Diagnostic Field Reviews.

In addition to this evaluation process, Central Office collects input from municipalities and local jurisdictions on rail crossing issues that originate from citizen or agency complaints. Central Office also receives a preliminary list of recommended sites from railroad agencies, provided by the rail agency's field inspectors. This list is then reviewed by the FDOT Rail Office. Central Office also reviews lists from previous years to verify whether improvements have been programmed for the identified crossings. Unfunded crossings on the list that have been investigated in the last year are recommended for funding. Once Central Office identifies a prioritized list of approximately 40-50 rail crossings through this process, the District Rail Unit conducts preliminary field reviews at these locations; to further refine the list based on field observations and engineering judgment.

A final prioritized list of 20-30 crossings is then submitted to Central Office, after which these sites are visited by the railroad crossing review team. The review team includes representatives from Central Office, the railroad companies, the District Rail Unit, the District Traffic Operations Unit, and local agencies. This typically occurs during the summer months, particularly July and August. During these field reviews, the team investigates existing conditions and makes recommendations for signal safety improvements. In September of every year, Central Office selects rail crossings from the statewide prioritized list examined by the review team, to make recommendations for federal funding, at their sole discretion. Once these crossings are selected for funding, funds are transferred to each District, where improvements are programmed and constructed in the following three to six months.

This study builds on the FDOT Diagnostic Field Review process, by analyzing existing rail crossing conditions in Miami-Dade County relative to pedestrian and bicyclist infrastructure. The study aims to provide a systematic approach to evaluating critical improvements needed for enhancing safety at rail crossings for non-motorized road users. Thus, this study can be viewed as a continuation of the FDOT rail crossing review process that improves safety conditions at rail crossings from a multi-modal perspective.

4.2 Rail Highway Crossing Inventory (RHCI)

A listing of 273 active at-grade crossings (public and private) in Miami-Dade County was retrieved from the Florida Department of Transportation's (FDOT) Rail Highway Crossing Inventory (RHCI) on

12/28/2011. Attributes for each crossing were gathered from the most recent Federal Rail Administration's National Highway-Rail Crossing Inventory. The attributes included information on roadway properties and utilization, rail usage, and crossing signalization and warning devices. A complete listing of the attributes for the crossing inventory is included in Appendix B.

A geodatabase is linked to the inventory, allowing geographic analysis of the selected sites. It should be noted, however, that the data obtained from the FDOT RHCI database is over ten years old. FDOT officials indicated there are plans underway to update this information. Central Office is currently in the process of evaluating all crossings in the state, and will eventually update the entire inventory database. The steps undertaken to accomplish this effort are summarized below:

- A tablet-based field data collection application is currently being developed. The application will be completed approximately by March 2013, and is a necessary component of field data collection.
- Central Office is also concurrently developing an office-based data collection of characteristics method that can be identified without field work. The office-based data collection effort has been in progress since the fall of 2012 and is expected to be completed in March 2013. During this process, Central Office has been "locking out" counties, or blocking them in the RHCI database from edits while this process takes place. Central Office is planning to carry out this task statewide, and it is estimated that the data portion for District 6 (where Miami-Dade County is located) will be "locked out" in February 2013.
- Once office data collection is complete, Central Office will begin training field data collection teams, starting in approximately April 2013, on the new tablet-based field data collection application.
- Once the training is complete, Central Office will initiate field data collection and develop a schedule for collecting the data.

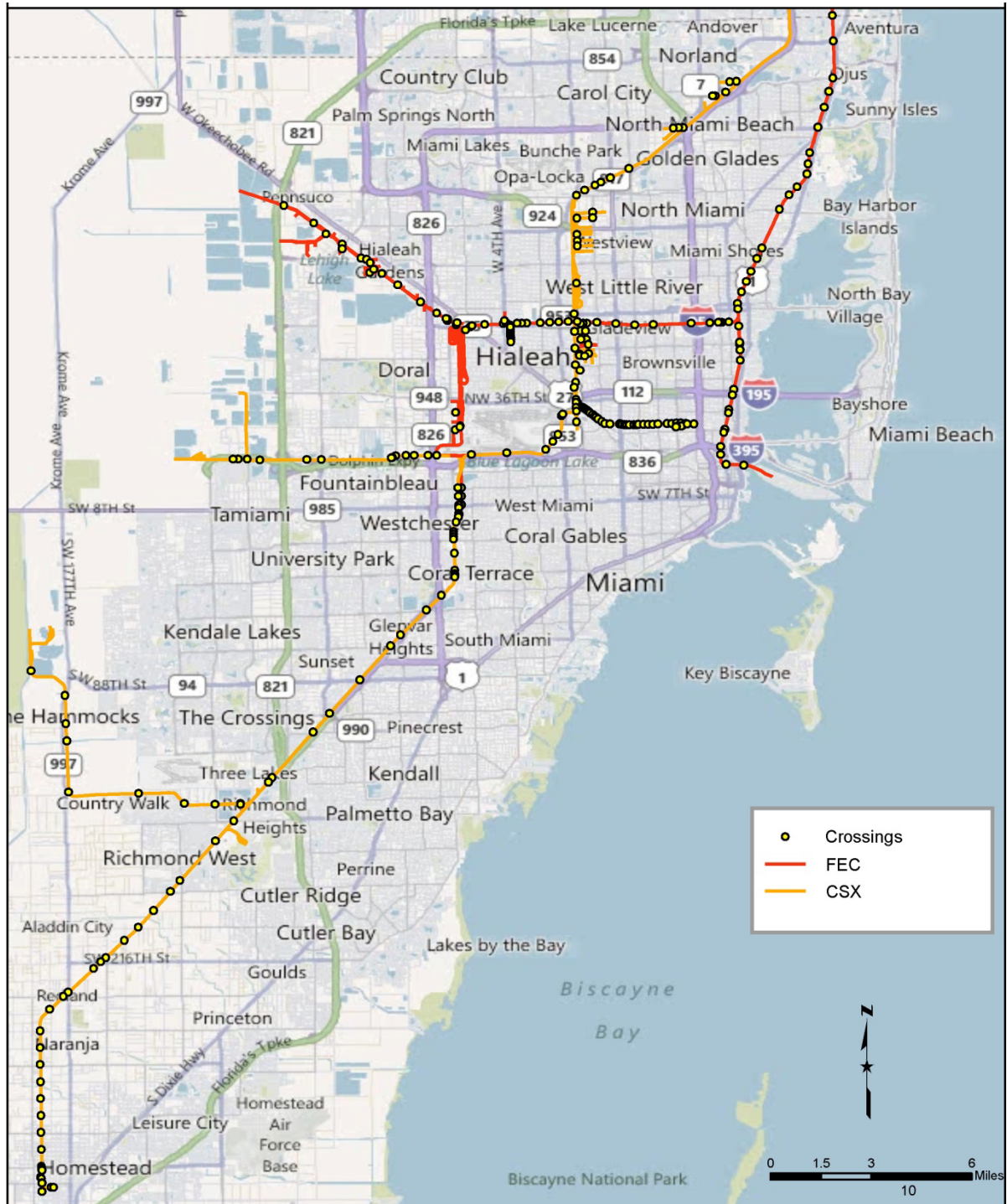
A full inventory of the railroad crossings in Miami-Dade County can be found in Appendix B, and the locations of the crossings are illustrated in Figure 2. The locations of the active at-grade crossings extend from the Broward/Dade County line to Homestead, and are densely clustered in areas around Hialeah and Allapattah, where there is significant industrial land use. Of the 273 crossings, 233 are public, 38 are private, and two are strictly pedestrian crossings. Based on data from the FDOT RHCI database, while there are sidewalks at 131 crossings; sidewalks are continuous through only 105 crossings.

4.3 Criteria for Grouping RHCI Crossings

To aid in the analysis and selection of crossings for field evaluation, the 273 crossings were categorized into groups using the following criteria:

- A. Presence or lack of sidewalks at the crossing
- B. Type of control at the crossing, i.e. signal, stop sign or none
- C. Presence or lack of gate at the crossing
- D. Proximity to bus stops and schools (SAC recommendation)
- E. Surrounding land use, i.e. residential, commercial, industrial, recreational (SAC recommendation)

Figure 2: Active At-Grade Crossings in Miami-Dade County



Source: FDOT Rail Office

Three of these criteria were added to the RHCI information by the study team, including the presence of sidewalks, proximity to bus stops and proximity to schools. The RHCI data on the type of control at the crossings as well as the gates were refined to reflect the specific attributes that were taken into consideration in this study. The modified data for each crossing can be found in Appendix C.

Based on these categories, the following information could be deduced from the inventory:

- There are a total of 90 crossings that do not have gates.
- Out of the crossings with gates, only six do not have flashing signal lights.
- Out of the 39 crossings that are located on state highways; seven do not have sidewalks, and five have no gates.
- Five crossings traverse US routes.
- Out of the total list of crossings, there are 23 crossings where sidewalks are provided but do not have gates.
- There are at least 103 crossings that do not have advance warning signs. 38 crossings did not provide information on warning signs in the inventoried database.
- Fifteen (15) of the at-grade crossings are controlled by stop signs, 29 crossings did not have any type of control, and the remaining crossings include signal control.
- The inventory database showed that the majority of crossings are located in industrial and commercial areas. The breakdown of the crossings by land use is as follows: 103 crossings are located in industrial areas, 64 crossings are located in commercial areas, 42 crossings are located in residential areas, 16 crossings are located in open space, and nine crossings are in institutional areas. There are 38 crossings whose land use is unknown.
- Forty three (43) crossings are located within quarter of a mile from schools and 184 crossings were within a quarter of a mile from bus stops. Fifty crossings were located within quarter of a mile of bicycle lanes and other bicycle facilities.
- Since the inventory database is focused on vehicle-rail related data, limited information on pedestrian traffic related elements was included.

4.3 Selection of Crossings for Field Evaluation

A total of 73 crossings were initially identified from the inventory list for further field evaluation. In selecting these crossings, priority was given to crossings that showed a high probability of attracting pedestrians and that were missing key pedestrian safety features. Priority selection criteria included:

- Locations within ¼ mile of schools
- Locations with ¼ mile from bus stops
- Locations that did not have sidewalks
- Locations that did not have gates

Higher priority was given to crossings that were missing more than one safety feature. To further refine the list, an effort was made to select crossings from as many different parts of the county as possible. Although most of the locations selected were located in commercial or residential areas,

where higher pedestrian use was expected, several sites selected were located in industrial and open space/recreation areas; to ensure that all of the land use categories were included.

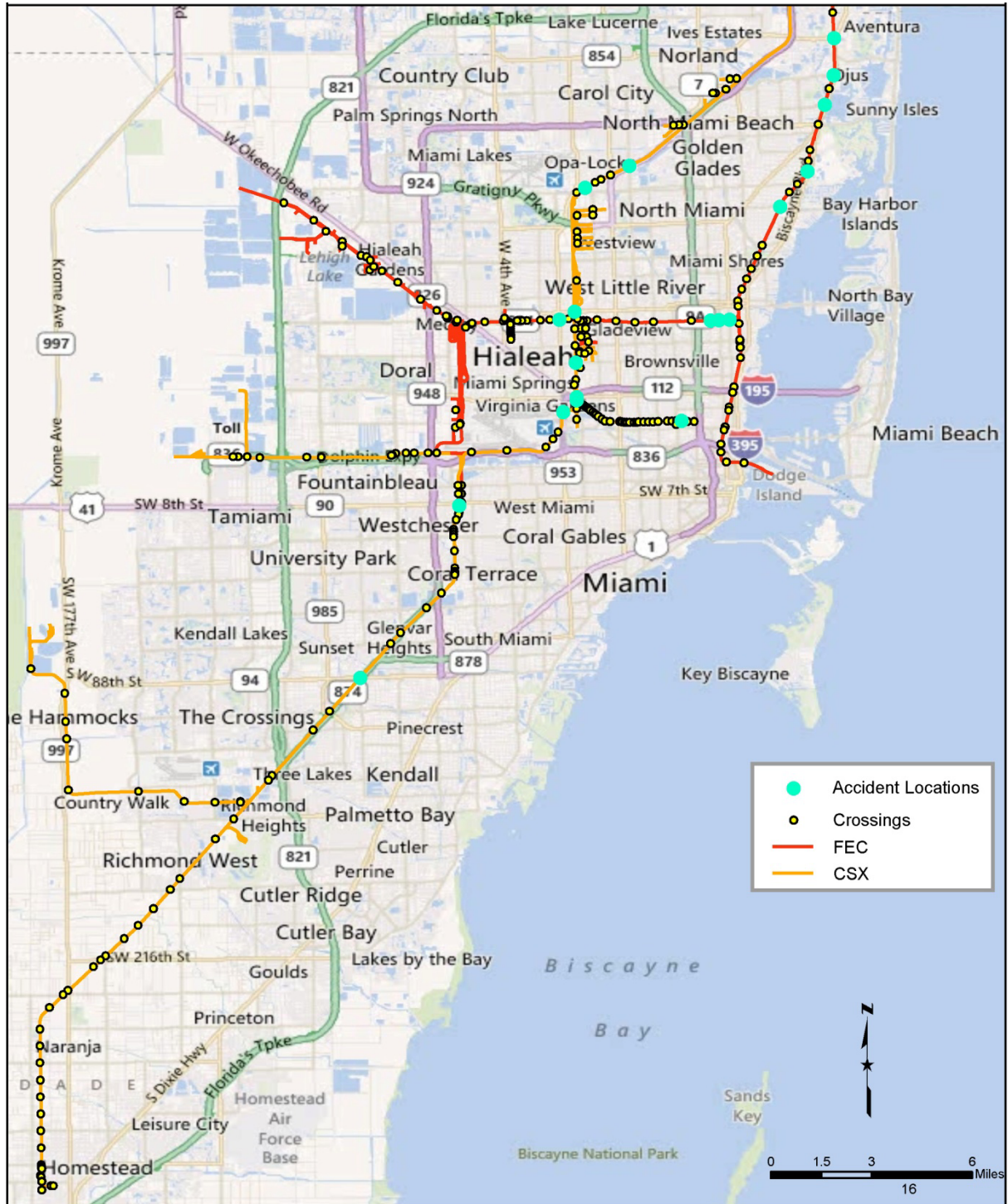
Other evaluation factors for selecting the crossings for field evaluation included accident history and programmed improvements. Information regarding accidents at at-grade crossings within the last five years was collected from the Federal Rail Administration. From 2007 to 2011, 23 accidents occurred at 19 crossings. Only one of the 23 accidents involved a pedestrian, who according to the gathered information, was trespassing within the railroad right-of-way. Figure 3 identifies the accident locations and crossing numbers. Full narrative details for the accidents are found in Appendix D.

Information was also collected for railroad crossings that have been programmed for improvement funds. The purpose for this was to ensure that crossings that may have already been upgraded to address pedestrian safety were not included in the short list for field evaluations. To obtain a list of programmed improvement projects, the project team examined the Miami-Dade Metropolitan Planning Organization's (MPO) Transportation Improvement Plans (TIPs), and contacted FDOT and railroad companies as well. The TIP included information on the types of improvements, costs, and implementation timeframe of the projects at the selected crossings. Based on the TIP, rail safety projects were implemented at 12 crossings in Miami-Dade County, as shown in Table 2.

**Table 2: Programmed Railroad Crossing Improvements
from the Transportation Improvement Plans**

Facility/Project Name	Location	Funding Year	Funding Amount
SR 860/Miami Gardens Dr	At FEC Crossing	2011-2012	\$170,000
SR 826/NE 163 Street	At FEC Crossing	2011-2012	\$67,000
NE 16 Avenue	At FEC Crossing	2011-2012	\$20,000
SR 922/NE 125 Street	At FEC Crossing	2011-2012	\$115,000
NE 107 Street	At FEC Crossing	2011-2012	\$93,000
SR 7/US-441/NW 7 AVE	At FEC Crossing	2011-2012	\$103,000
NW 17 Avenue	At FEC Crossing	2011-2012	\$108,000
SW 152 Street	At CSX Crossing	2011-2012	\$22,000
NW 74TH Street	At FEC Crossing	2010-2011	\$349,000
SR 934/NW 79 Street	At CSX Crossing	2010-2011	\$57,000
Airport Expressway	At CSX Crossing	2010-2011	\$16,000
NW 37TH Avenue	At CSX Crossing	2009-2010	\$283,000

Figure 3: Accidents at Crossings, 2007-2011



Additionally, the FEC has implemented, or is in the process of implementing improvements at the crossings listed below, in conjunction with the Miami Port project. Some of the improvements involve installation of pedestrian gates. Similar information from CSX was not available.

- NE 71st St
- NE 61st St
- NE 59th St
- NE 54th St
- NE 39th St
- NE 36th St
- NE 29th St
- NE 27th St
- NE 20th St
- N Miami Ave/NW 19th St
- NW 14th St
- NW 11th St
- NW 10th St
- NW 8th St
- NW 1st St
- N Miami Ave
- NE 1st Ave
- NE 2nd Ave
- Biscayne Blvd
- Port Blvd/ NE 6th Ave
- NE 62nd St

The initial evaluation process of the study recommended 73 rail crossing sites for field review, which are shown in Figure 4. Sites that were determined to have safety issues that were more auto-oriented were removed from the analysis to maintain the focus of the study on pedestrian safety concerns. At the request of the SAC, the nine crossings that were part of FDOT District 6's 2012 Diagnostic Field Reviews were included in the study. Although these crossings were previously excluded, once it was learned that these crossings had not been evaluated for pedestrian features, the study team decided they should be included in the review and the same data, as described in section 4.4 below, was collected for these crossings. This brought the total to 82 rail crossings. Appendix E provides a list of the crossings that were identified for further evaluation in the field.

4.4 Field Reviews

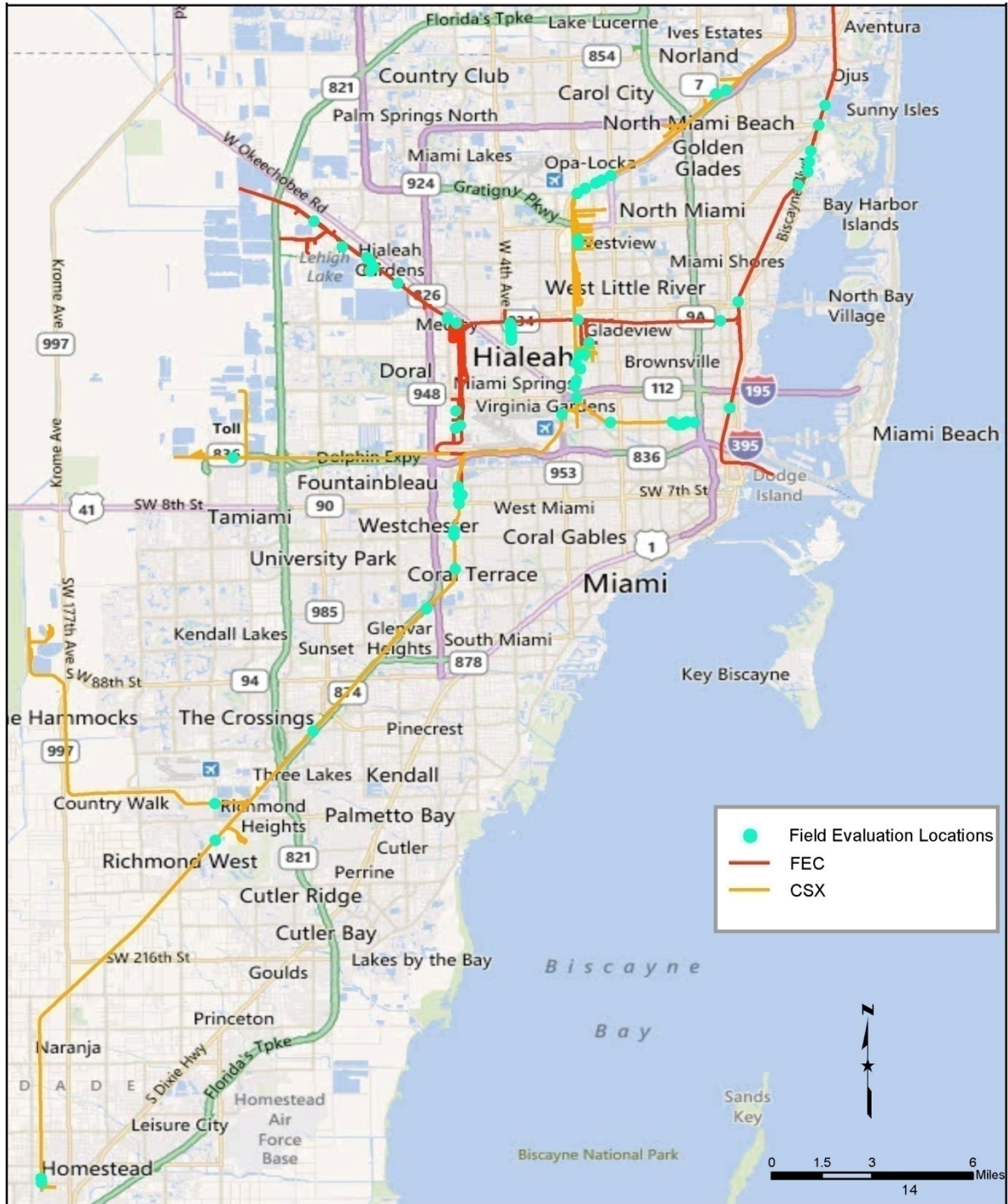
Field reviews of the 82 crossings were conducted during the fall of 2012. Based on the literature review, input from the SAC, and photographic documentation, the study team assembled a list of design elements to review. Generally regarded as key factors to improving pedestrian safety at at-grade crossings, the design elements included in the field evaluation were the sidewalk, detectable warning surface, crossing surface, pedestrian gates, pedestrian movement control devices, and pedestrian warning devices. Several properties of each of these elements were measured in the field, including their presence or absence, measurements, if applicable, and where appropriate, determining their operability.

Due to safety concerns, neither the FEC nor CSX would allow the field review teams to measure the flangeway gaps at the selected crossings. The FEC, however, did provide this information and it was included in the evaluation matrices for those crossings. A sample field evaluation form, which shows all the properties for which data were collected, is included in Appendix F.

Similar elements were added for automobile safety, at the request of the SAC. These elements included automobile gates, pavement markings, signs, and warning devices. Since the request to include this information was received after the field data collection was complete, the evaluation of these elements was based on their presence or absence, as determined through the photographs taken to document the field review.

The complete results of this evaluation are documented in section 6.

Figure 4: Field Evaluation Locations



Source: FDOT Rail Office

4.5 Field Evaluation Results

This section provides a general overview of the findings from the field evaluation regarding the design elements discussed in the previous section. Table 3 summarizes the findings for the pedestrian design elements and table 4 provides a similar summary for the automobile design elements. The complete database of field evaluation results is included in Appendix G.

Table 3: Summary of Field Review Findings for Pedestrian Design Elements

Design Element	Crossings with The Element		Crossings without the Element	
	Number	Percent	Number	Percent
Sidewalk	38	46%	44	54%
Detectable Warning Surface¹	7	9%	72	91%
Pedestrian Gates	16	20%	66	80%
Warning Devices¹				
Bells	38	48%	41	52%
Horn²	44	56%	34	44%
Flashers	38	48%	41	52%
Signs	23	29%	56	71%

¹ The study team was unable to collect information on these elements at three of the crossings during the field review. Two of the affected crossings were under construction and one was located on private property and was inaccessible due to being enclosed by gates. For these elements, the percentage is calculated by the reduced number (79) of crossings and not the total number of crossings (82) reviewed.

²For this crossing, no information was provided regarding the use of a train horn.

As can be seen in Table 3, the majority of the crossings reviewed are lacking in pedestrian design elements, with detectable warning surfaces being the least utilized of the elements. The second least utilized design element is pedestrian gates, with only 16 of the 82 crossings reviewed including this element. It is interesting to note that the one design element that is more commonly utilized is the train horn. These results indicate a need for improved pedestrian safety features for at-grade crossings in Miami-Dade County.

Table 4: Summary of Field Review Findings for Automobile Design Elements

Design Element	Crossings with The Element		Crossings without the Element	
	Number	Percent	Number	Percent
Gates on One Side	50	64%	28	36%
Gates on Two Sides	12	15%	66	85%
Stop Line	44	56%	34	44%
Pavement Messaging	44	56%	34	44%
Signs at Crossing	69	88%	9	12%
Approach Signs	39	51%	37	49%
Side Lights	56	71%	23	29%
Overhead Lights	27	35%	51	65%

With two exceptions, the majority of the crossings evaluated in the field have the identified automobile design elements. The two elements that are less utilized are gates on two sides of the crossing and overhead warning lights. Otherwise, as indicated by Table 4, the at-grade crossings evaluated by this study show higher incidences of automobile safety elements as compared to pedestrian elements in Miami-Dade County.

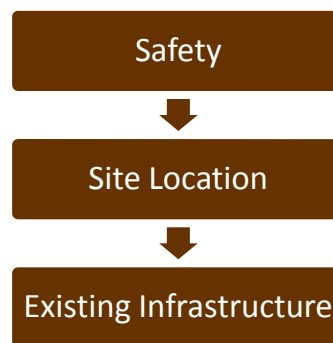
5.0 Toolbox

This section outlines the process employed in the study for identifying, screening, and evaluating safety strategies for pedestrian railroad crossings in Miami-Dade County. The proposed methodology can be applied at both the system-level and site-level. It also provides guidance on selecting strategies, actions, and policies required to plan and implement safety strategies at pedestrian railroad crossings. This section also provides information on funding sources for improving safety at railroad crossings.

5.1 Implementation Strategies

The toolbox can be utilized to identify the most effective strategies for pedestrian safety at railroad crossings. As shown in Figure 5, the strategies in the toolbox were prioritized so as to consider the strategy's impact to improving safety first. Site location would be considered next, to represent a wide spectrum of different rail crossing settings and the appropriate strategies that should be applied. Finally, existing infrastructure should be considered, to evaluate the usability of existing facilities to be retrofitted with pedestrian safety improvement strategies.

Figure 5: Prioritization of Implementation Strategies



The specific performance measures used for the prioritization methodology are outlined below.

Goal Area – Safety

- Has the location involved a pedestrian incident?
- Is the location a state route with no sidewalks?

Goal Area – Site Location

- Is the location within 1/4 mile of a school or bus stop and does have a sidewalk but no gate?
- Is the location within 1/4 mile of a school or bus stop but does not have a sidewalk?

Goal Area – Existing Infrastructure

- Pedestrian
 - Field View Criteria - Physical Conditions' Issues for locations with an existing sidewalk
 - Obstructions in sidewalk?
 - Crossing surface not level with top of rail?

- Flangeway Gap > 2.5 inches?
- Crossing path not clearly delineated?
- Crossing not at 90 degrees?
- Sight distance problems?
- Lack of Pedestrian Gates
- Three or more pedestrian movement control devices missing
- Two or more pedestrian warning devices missing?
- Other - Conditions did not permit field review of location but it is deemed significant based on professional knowledge and/or other data.
- Automobile
 - Physical Conditions Criteria –Issues for crossing locations which impact roadways
 - Lacking gate one on one side
 - Lacking gates on two sides
 - Missing stop line in roadway
 - Missing pavement warning messaging
 - Missing warning signs at crossing
 - Missing approach warning signs
 - Lacking side warning lights
 - Lacking overhead warning lights

The toolbox was compiled based on the literature review, input from the SAC, and the analysis methodology applied. The improvement type, degree of benefit, implementation cost, effort and time, and the implementation criteria that the strategy met is included in the toolbox.

The degree of benefit of an improvement varies for each strategy. Due to the level of coordination with different agencies and/or property owners, there may be financial and time constraints for implementing the improvement within a desired timeframe. The identified costs associated with each improvement were gathered using examples of different improvement types at rail crossings. Each improvement cost was estimated at the planning level, and does not consider right of way or utility connection costs¹. The timeframe associated with each crossing improvement is variable and dependent on existing conditions.

Table 5 illustrates the proposed toolbox, where strategies were listed based on the degree of benefit. It is important to note that each crossing has its own individual set of potential safety issues, thereby warranting a different combination of improvements strategies. Utilizing the toolbox of strategies,

¹ The project team interviewed a CSX representative via phone regarding implementation costs. Costs are very diverse and depend on many different factors. This was later reiterated in discussions with the FDOT Rail office. All railroad crossing improvements are funded by FDOT. Railroad companies pay for maintenance. Example project cost ranges are included in sections four and five of this report.

however, can help develop and implement a combination of pedestrian safety improvements that best meet the needs of the specific crossing.

Table 5: Toolbox of Improvement Strategies



Pedestrian Lighting

Improvement Type: Visual Warning Device

Degree of Benefit: High

Implementation Cost/Effort: Low (\$2,000-\$6,000¹)

Implementation Timeframe: Short-term (1-2 years)

Potential Strategy Measure: Safety/Existing Infrastructure



Flashing light signal

Improvement Type: Primary visual and audible warning device for pedestrians

Degree of Benefit: High

Implementation Cost/Effort: Medium

Implementation Timeframe: Mid-term (2-5 years)

Potential Strategy Measure: Safety/Existing infrastructure



Bedstead Barriers

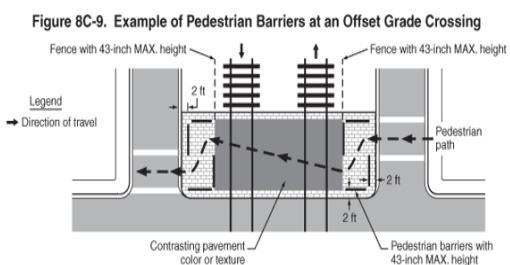
Improvement Type: Physical barrier

Degree of Benefit: High

Implementation Cost/Effort: Medium

Implementation Timeframe: Mid-term (2-5 years)

Potential Strategy Measure: Safety



Fence

Improvement Type: Physical barrier

Degree of Benefit: High

Implementation Cost/Effort: Medium

(Chain Link Fence: 48"=\$15/ft, 72"=\$18/ft)

Implementation Timeframe: Short-term (1-2 years)

Potential Strategy Measure: Safety

¹ Standard Prices for Cost Estimating. City of Rockville (MD) Public Works. December 2010.



Pedestrian Automatic Gates

Improvement Type: Physical barrier

Degree of Benefit: High

Implementation Cost/Effort: High

Implementation Timeframe: Long-term (≥ 5 years)

Potential Strategy Measure: Site Location



Z-Crossing Channelization

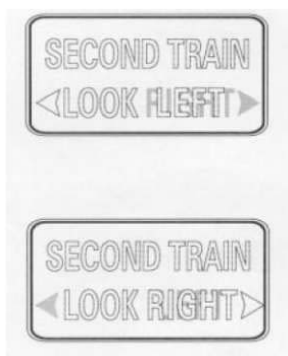
Improvement Type: Physical barrier

Degree of Benefit: High

Implementation Cost/Effort: High

Implementation Timeframe: Mid-term (2-5 years)

Potential Strategy Measure: Existing infrastructure



"Second Train Coming" Sign

Improvement Type: Visual warning device

Degree of Benefit: Medium

Implementation Cost/Effort: Low

Implementation Timeframe: Long-term (≥ 5 years)

Potential Strategy Measure: Site Location



Swing Gates

Improvement Type: Physical barrier

Degree of Benefit: Medium

Implementation Cost/Effort: Medium

Implementation Timeframe: Mid-term (2-5 years)

Potential Strategy Measure: Site Location/Existing Infrastructure



Sidewalk (Improvement and New Construction)

Improvement Type: Connectivity/Pavement

Degree of Benefit: Medium

Implementation Cost/Effort: Medium (approximately \$10-\$15/linear foot for curbing and \$11/linear foot for walkways²)

Implementation Timeframe: Mid-term (2-5 years)

Potential Strategy Measure: Existing Infrastructure



Pavement Markings and Texturing

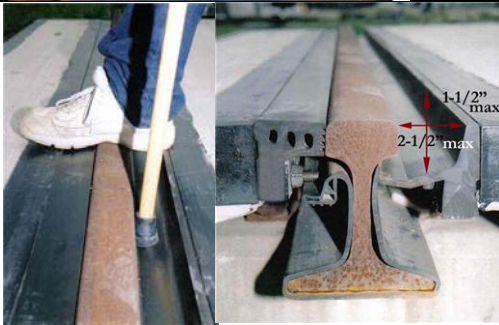
Improvement Type: Pavement

Degree of Benefit: Medium

Implementation Cost/Effort: Low (\$300 per truncated dome panel; \$600 pavement markings³)

Implementation Timeframe: Short-term (1-2 years)

Potential Strategy Measure: Existing Infrastructure



Flangeway Gaps

Improvement Type: Pavement

Degree of Benefit: Medium

Implementation Cost/Effort: Low (\$1,600 per pad (8ft x 8ft)²)

Implementation Timeframe: Mid-term (2-5 years)

Potential Strategy Measure: Safety/Existing Infrastructure

5.2 Funding Toolbox

There are a number of federal and state funding sources that can potentially be utilized to support pedestrian safety improvements at rail crossings. Federal funding programs under Moving Ahead for Progress in the 21st Century (MAP-21) include Transportation Alternatives, the Surface Transportation Program, the Congestion Mitigation and Air Quality (CMAQ) Improvement Program, and the Highway Safety Improvement Program (HSIP). State-level funding can be allocated through the Highway – Rail Grade Crossing Safety Improvement Program. Additionally, construction and maintenance activities should be coordinated with private rail companies, even though funding for these design phases is also covered by the government agency overseeing the improvement.

Federal Funding Programs – MAP 21

The new approach to funding formula distribution for MAP-21 is based on the amount of formula funds each State receives under the previous federal transportation bill – SAFETEA-LU. This new funding formula includes the following process steps:

² City of Dunn Pedestrian Plan – Appendix A: Public Involvement Materials.

³ City of Dunn Pedestrian Plan – Appendix A: Public Involvement Materials.

1. **Step one – authorize lump sum:** A lump sum amount is authorized to core programs – approximately \$38 billion/year.
2. **Step two – calculate each State’s share of the total:** Each State is expected to receive the same total apportionment in FY 2013 as it did in FY 2012. Starting in 2014, funds will be divided proportionally among States based on the share of apportionments each State received for FY 2012, and adjusted, if necessary, to ensure that no State receives less than 95 cents of every dollar it contributed to the Highway Account of the Highway Transportation Fund.
3. **Step three – for each State, divide the total amount up among programs:** Once each State’s total Federal-aid apportionment is calculated, amounts are set aside for Metropolitan Planning and CMAQ based on the relative size of the State’s FY 2009 apportionment of those programs. The remainder is then divided among the rest of the formula programs as follows: National Highway Performance Program (NHPP) (63.7%), Surface Transportation Program (STP) (29.3%), and HSIP (7%). An amount is set aside from HSIP to fund the Rail-Highway Crossings program, and amounts are set aside proportionally from each State’s NHPP, STP, HSIP, CMAQ, and Metropolitan Planning apportionments to fund the State’s Transportation Alternatives (TA) program.

To enhance flexibility, a State may transfer up to 50 percent of any apportionment to another formula program. No transfers of Metropolitan Planning funds or funds sub-allocated to areas based on population (STP and TA) are permitted, however. The following provides a more detailed description of the different federal funding programs that are potentially available for pedestrian safety improvements at rail crossings.

Transportation Alternative (TA) Funds

Under MAP-21 Transportation Enhancements are consolidated under the Transportation Alternatives program. This program provides funding for a range of alternative-related activities including facilities for pedestrians. Based on FDOT guidance, eligible Transportation Alternative projects include providing pedestrian facilities with safe accommodation, either through construction of new facilities or modifications to existing facilities. The facility must comply with the American Association of State Highway Transportation Officials (AASHTO), the Americans with Disabilities Act (ADA) and DOT standards. Costs associated with ADA compliance are eligible only when incidental to the project. While safety and education activities for bicycle and pedestrian have been removed under the new program, the new “safe routes for non-drivers” may allow some of these uses.

Surface Transportation Program (STP) Funds

Under MAP-21, the Surface Transportation Program will continue to provide funding to State and local governments for projects to preserve or improve conditions and performance on any facility for non-motorized transportation, transit capital projects and public bus terminals and facilities.

Congestion Mitigation and Air Quality Improvement Program (CMAQ) Funds

The CMAQ program is continued in MAP-21 to provide a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter (nonattainment areas) and for former nonattainment areas that are now in compliance (maintenance areas).

Funds may be used for transportation projects likely to contribute to the attainment or maintenance of a national ambient air quality standard, with a high level of effectiveness in reducing air pollution, and that are included in the MPO's current transportation plan and transportation improvement program (TIP) or the current state transportation improvement program (STIP) in areas without an MPO.

Highway Safety Improvement Programs (HSIP)

MAP-21 continues the Highway Safety Improvement Program (HSIP) to achieve further reductions in traffic fatalities and serious injuries on all public roads, including non-State-owned public roads on tribal lands. The HSIP requires a data-driven, strategic approach to improving highway safety on all public that focuses on performance. A highway safety improvement project is any strategy, activity or project on a public road that is consistent with the data-driven State Strategic Highway Safety Plan (SHSP) and corrects or improves a hazardous road location or feature or addresses a highway safety problem.

State Funding Programs

Highway – Rail Grade Crossing Safety Improvement Program

The FDOT's Highway-Rail Grade Crossing Safety Improvement Program is a six-step program that the State provides to assist in enhancing highway-rail grade crossings. The program institutes lump sum payments on eligible work, and is limited to a \$100,000 maximum reimbursement. The six steps for this program are:

1. The Diagnostic Field Review Process
2. The Safety Program Funding Process
3. The Safety Program Contracting Process
4. The Construction and Installation Process
5. The Project Payment Process
6. The Program Evaluation

FDOT District 6 currently conducts these reviews, and as an active participant in this study, expressed interest in using the evaluation methodology and toolbox that result to identify pedestrian safety improvements that can be implemented through this process.

5.3 Project Coordination with Land Owners

A pedestrian-rail crossing involves the intersection of public and private transportation entities. The construction or modification of a pedestrian-rail grade crossing within most of the State of Florida's rail system shall be implemented in agreement with the funding agency and the owner of the land or rail right-of-way. Right-of-Entry agreements must define the nature of the work, flagging requirements, and the appropriate safety measures that must be in place during the work. This includes all work within the right-of-way, from initial design through the completion of construction.

Pedestrian pathways at rail crossings are not permitted at at-grade as a standalone facility, but are permitted when located within a public highway easement. These crossings must have appropriate signs and warning systems at these locations. The cost of the pedestrian crossing, signs, and warning systems is funded by the requesting party or government agency, including the initial installation and maintenance.

6.0 Implementation

The study included an analysis of 82 rail crossings that were selected based on the proposed prioritization methodology, input from the SAC, and the FDOT Diagnostic Field Reviews. Following the analysis methodology that ranked the crossings based on the tiered-approach, the top 10 crossing sites were selected for the purpose of illustrating before and after implementation strategies. This section of the report explains the final ranking process, identifies the 10 selected crossings, and provides the results of the before and after visualizations, including estimated costs and time frames for the depicted improvements.

6.1 Final Ranking Criteria

The criteria used to prioritize the crossings was derived from the literature review and input from the SAC, and was weighted to account for significant elements. The evaluation criteria primarily focused on conditions that related directly to the pedestrian experience, as well as the ability of a pedestrian to safely and appropriately approach and navigate a crossing.

Two of the criteria took into account the location of the crossing in relation to schools and bus stops, as this could possibly be an indicator of increased pedestrian use. Other criteria accounted for ADA- and bicycle-related issues, such as flangeway gaps, crossing angle, and whether the crossing was level with the crossing surface. Other criteria, including vehicle-related criteria, examined physical features and warning devices, such as gates, warning lights, and stop lines.

Criteria weights were created through a two-part analysis process. This included: 1) the likelihood of the criteria item to significantly impact pedestrian safety; and 2) the likelihood that the criteria can reasonably be addressed, given financial limitations and other considerations. The priority of each criterion was then ranked from highest to lowest using professional judgment, and considering the objectives of the project.

The ranking methodology of the reviewed rail crossings utilized a 100 points scale. Information on train activity was supplemented to the selected list of 73 rail crossings, because while the RHCI did not include this information for all rail crossings in the inventory, it was determined that the frequency of trains at a particular rail crossing had a significant impact on pedestrian safety. Therefore, a maximum of 10 points were assigned for this criterion alone (measured by daily train trips provided by the RHCI). Train activity information for the 73 rail crossings can be found in Appendix C. To ensure the maximum utility of the ranking methodology, the remaining 90 points were divided evenly between automobile and pedestrian criteria. The SAC was provided an opportunity to review and comment on the weighting and point scale. No comments were received.

The following sections will describe the criteria and points assigned based on the three scoring factors: pedestrian features, automobile features, and level of train activity.

Pedestrian Safety Features Needed

Table 6 lists the measures used in the weighting process for the pedestrian safety criterion. Information from the field evaluation review was used to determine the assigned values. Points were assigned as follows:

- 1) Criteria had to be developed from the field review information collected for this study.
- 2) Criteria deemed to have the most significant potential impact on pedestrians.
- 3) Points were assigned based on a two-part analysis by the assessment team:

- a. What is the likelihood of the criteria item to significantly impact pedestrian safety?
 - b. How likely is it that the criteria can reasonably be addressed, given financial and other considerations?
- 4) From this assessment, the priority or importance of each criterion was ranked from highest to lowest.
 - 5) After considering the objectives of this project, including the addition of automobile and train criteria, the overall point assessment was assigned.
 - a. It was determined that a 100 point scale was most easily understandable.
 - b. Points had to be provided for amount train traffic and this was “taken off the top” – a total of 10 points.
 - c. It was decided that to ensure maximum utility of the ranking spreadsheet for both auto and pedestrian modes, that the remaining 90 points would be split evenly (45 pts each).
 - 6) With the total points determined and the priority of each criterion ranked, the 45 points for pedestrian criteria were assigned, with similar issues generally receiving the same number of points.

Table 6: Pedestrian Criteria and Points

Criteria	Points
Has the location involved a pedestrian incident?	8
Is the location a state route with no sidewalks?	5
Is the location within 1/4 mile of a school or bus stop and does have a sidewalk but no gate?	5
Is the location within 1/4 mile of a school or bus stop but does not have a sidewalk?	5
Obstructions in sidewalk? ¹	3
Crossing surface not level with top of rail? ¹	3
Flangeway Gap > 0.5 inches? ¹	3
Crossing path not clearly delineated? ¹	1
Crossing not at 90 degrees? ¹	1
Sight distance problems? ¹	2
Lack of Pedestrian Gate Control ¹	4
3 or more pedestrian movement control devices missing ^{1*}	3
2 or more pedestrian warning devices missing? ^{1 **}	2
Total:	45

* (Signal, Stop sign, Pavement markings, Swing gates, Automatic gates, All signs/signals visible)

** (Bells, Train horn allowed, Flashers, Warning signs)

¹ - Field View Criteria - Physical Conditions Issues for locations with an existing sidewalk

Automobile Safety Features Needed

The strategy toolbox for developing automobile/railroad crossing safety measures was based upon guidance from the FDOT Design Standards manual for railroad grade crossings. The measures were structured using a two-tiered approach that identified primary and secondary railroad crossing safety measures for roadways. The measures included safety improvement features both at the rail crossing and at the approach to the railroad crossing.

The primary measures identified safety devices that should be regarded as the minimum for safety at rail crossings. The secondary measures complemented the primary measures and further improved safety along rail crossings. Examples of primary measures include access gates at two quadrants, roadway stop lines, warning signs at crossings, and side warning lights. Secondary measures include access gates at four quadrants, pavement messaging, warning signs approaching rail crossings, and overhead warning lights.

The measures weighting process for automobile/railroad crossings are based on a total of 45 points as show in Table 7.

Table 7: Automobile Criteria and Points

Criteria	Points
Are there access gates at two quadrants?	8
Are there access gates at four quadrants?	3
Is the roadway stop line present?	8
Is there pavement messaging present?	4
Are there warning signs at the crossing?	8
Are there warning signs approaching the crossing?	4
Are there side warning lights?	6
Are there overhead warning lights?	4
Total:	45

Level of Train Activity

After comparing the initial prioritization matrix results with photos of the rail crossings, it became apparent that train activity should be assigned significant weighting in the rail crossing selection criteria. In addition to consulting the train frequency data from the RHCI, field reviews were conducted by the study team. The RHCI data was obtained from the Federal Rail Administration's National Highway-Rail Crossing Inventory, and could include outdated information. Data received from CSX and the FEC was compared to the FDOT database. Four levels of weighting were then applied to the remaining crossings. These categories are:

- 0 pts – 0 average daily trains
- 2 pts – 1-3 average daily trains

- 4 pts – 9-10 average daily trains
- 10 pts – 60+ average daily trains

It should be noted that the number of trains was converted into a range, to account for differences in data sources and dates of train counts. In the future, as both passenger and freight rail traffic increase, it is recommended that this factor be carefully tracked so that a higher weighting can be assigned.

6.2 Final Ranking Results

After assigning points and calculating scores for each reviewed crossing, it was apparent that just selecting the crossings with the 10 highest scores would not achieve the objectives established by the SAC. There were several conflicting items that needed to be addressed. These included the addition of the automobile design elements, the desire to include crossings from the FDOT District 6 2012 Diagnostic Field Review, and the level of train activity.

By including the automobile ranking, many of the crossings received higher total point scores due to their lack of automobile design elements. However, since the focus of this study is on pedestrian safety, the effect of this needed to be minimized. The solution was to determine the percentage of the total score that was attributable to the automobile elements. Then, generally speaking, any crossing that received more than 50 percent of its score from the automobile elements was not considered. This helped to ensure that those crossings with greater pedestrian deficiencies were ranked higher.

To ensure that several of the crossings included in the FDOT District 6 2012 Diagnostic Field Review were identified for implementation, three crossings with similar total scores were switched. For example, after adjusting the rankings based on the automobile elements as noted above, one crossing with a total score of 26 that was not included in the FDOT District 6 2012 Diagnostic Field Review was replaced with one of the crossings included in the FDOT District 6 2012 Diagnostic Field Review that also had a total score of 26.

The factor to address the level of train activity was not sufficient enough to overcome the points allocated for pedestrian and automobile elements. Thus, when ranked purely by total points, five of the top ten ranked crossings had no daily train activity. To correct this, crossings with no train activity were excluded from consideration.

Accordingly, the following rail crossings were selected as candidates for visualization in this study.

- FEC Crossing No. 272951B at W 18th Street
- FEC Crossing No. 272965J at W 15th Street
- FEC Crossing No. 272950U at W 19th Street
- FEC Crossing No. 273009P at W 20th Street
- FEC Crossing No. 272967X at W 13th Street
- CSX Crossing No. 628325X at Dunad Avenue
- FEC Crossing No. 272606T at NE 151st Street
- CSX Crossing No. 628377P at NW 36th Street

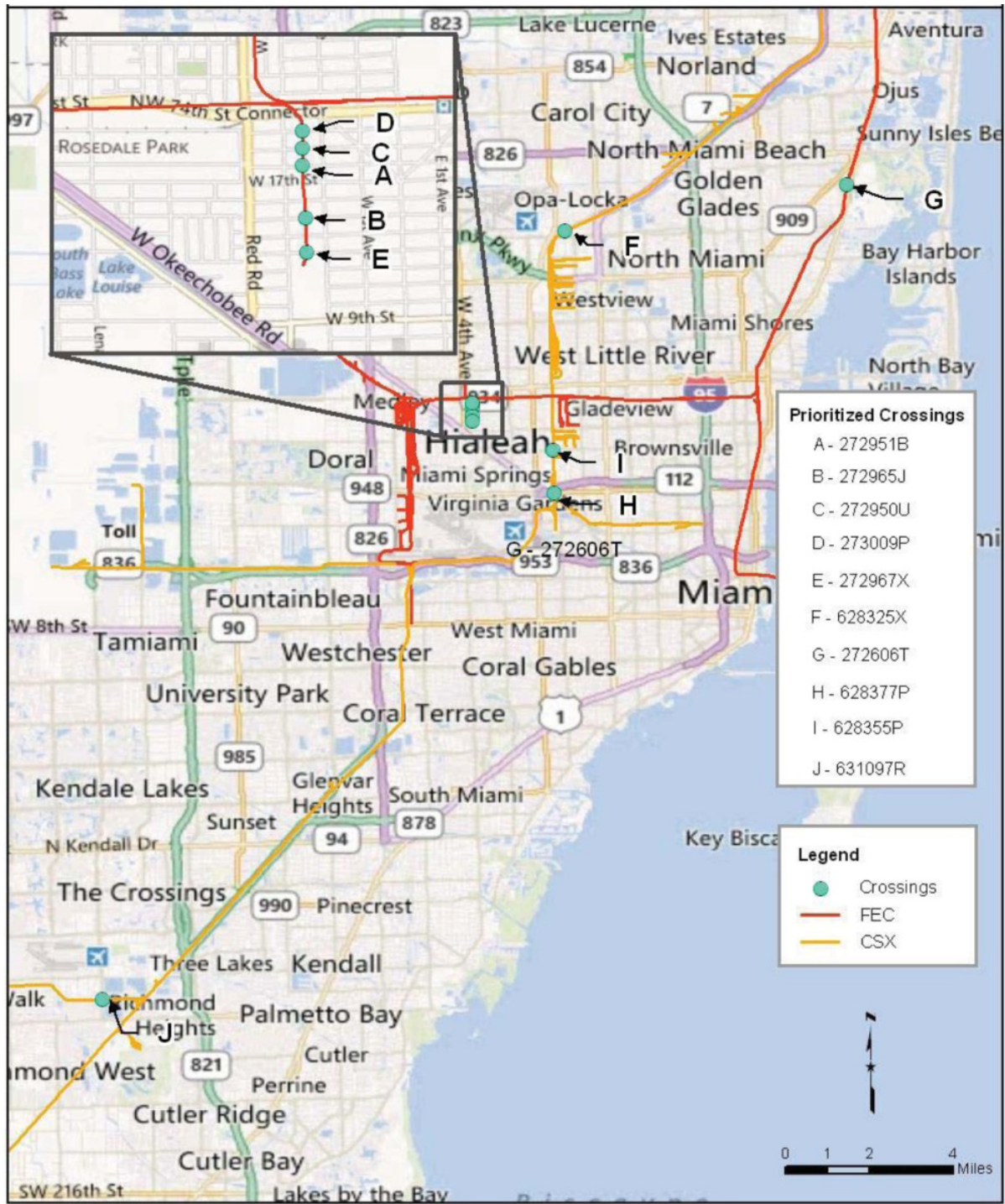
- CSX Crossing No. 628355P at NW 54th Street/Hialeah Drive
- CSX Crossing No. 631097R at SW 137/Tallahassee Road

Figure 5 shows the geographic location of these rail crossings in Miami-Dade County. Appendix H includes the entire final ranking spreadsheet.

6.3 Visualizations

A profile of each of the ten crossings is also provided in this section of the report. Each crossing profile includes an assessment of missing bike/pedestrian and automobile safety features. Each crossing profile includes two images of the crossing, a “before” and “after” image at the crossing. The “before” picture displays existing conditions at the crossing, while the “after” rendering includes the bike/pedestrian and automobile improvements recommended for each crossing. Each Solution/Improvement includes a timeframe for project implementation and an estimated project cost. It should be noted that cost estimates were only collected for bike/pedestrian improvements.

Figure 5: Prioritized Crossings

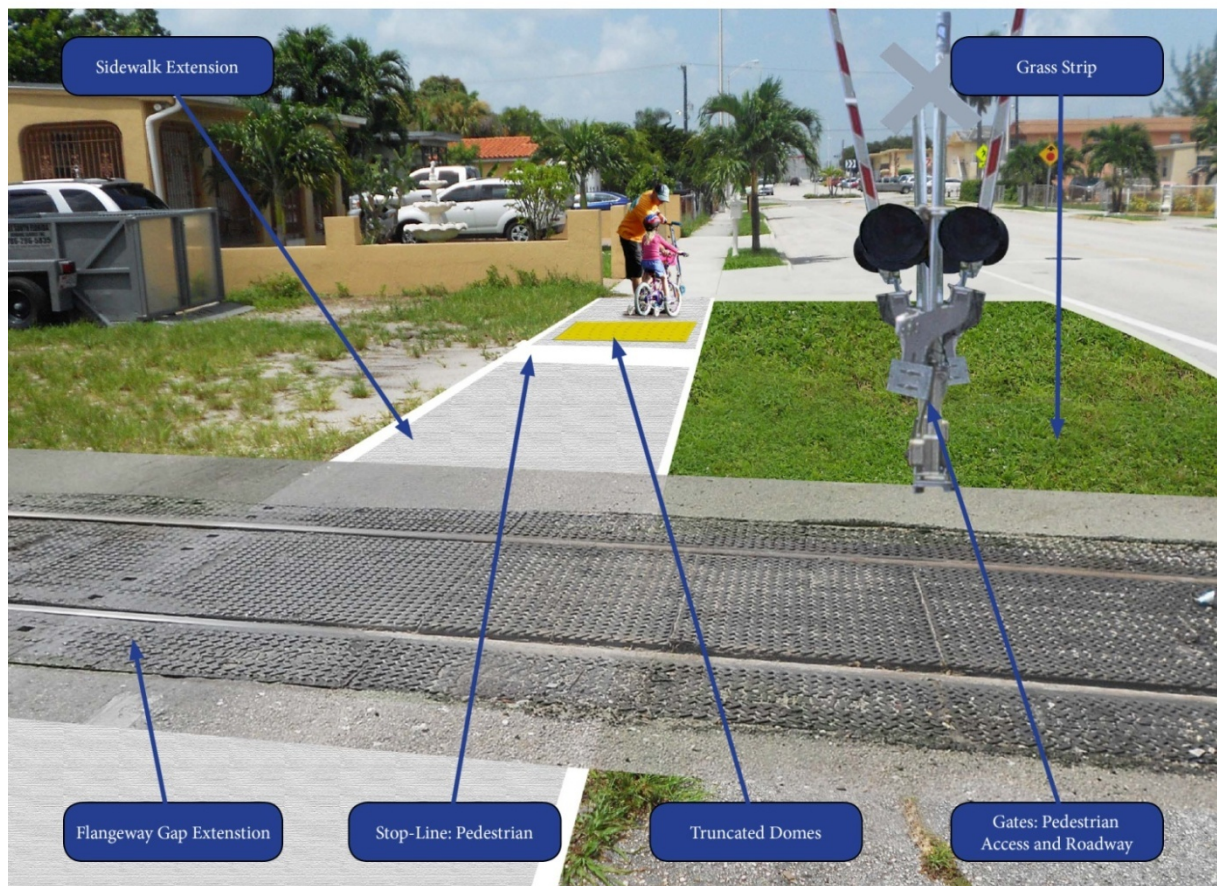


FEC Crossing No. 272951B**Roadway Name:** W 18th Street**Nearest Cross Streets:** W 3rd Avenue and W 2nd Avenue

Solution/Improvement	Implementation Timeframe	Improvement Cost	Total Cost
Sidewalk Extension (50 feet)	1-2 Years	\$10-\$15/linear foot	\$500-\$750
Add Stop Line – Pedestrian (4)	1-2 Years	\$5-\$10/linear foot for striping	\$20-\$40
Add truncated dome (4)	1-2 Years	\$300 per panel	\$1,200
Flangeway gap (8)	2-5 Years	\$1,600 per pad (8ft x 8ft)	\$12,800
Signage at crossing (2)	1-2 Years	\$300-\$350 per sign	\$600-\$700
Access Gate - Pedestrian and Automobile (4)	5 or more Years	Approximately \$130,000/ Four quadrant gates	\$130,000
Total Cost = \$145,120-\$145,490			

FEC Crossing No. 272951B Before:

FEC Crossing No. 272951B After:



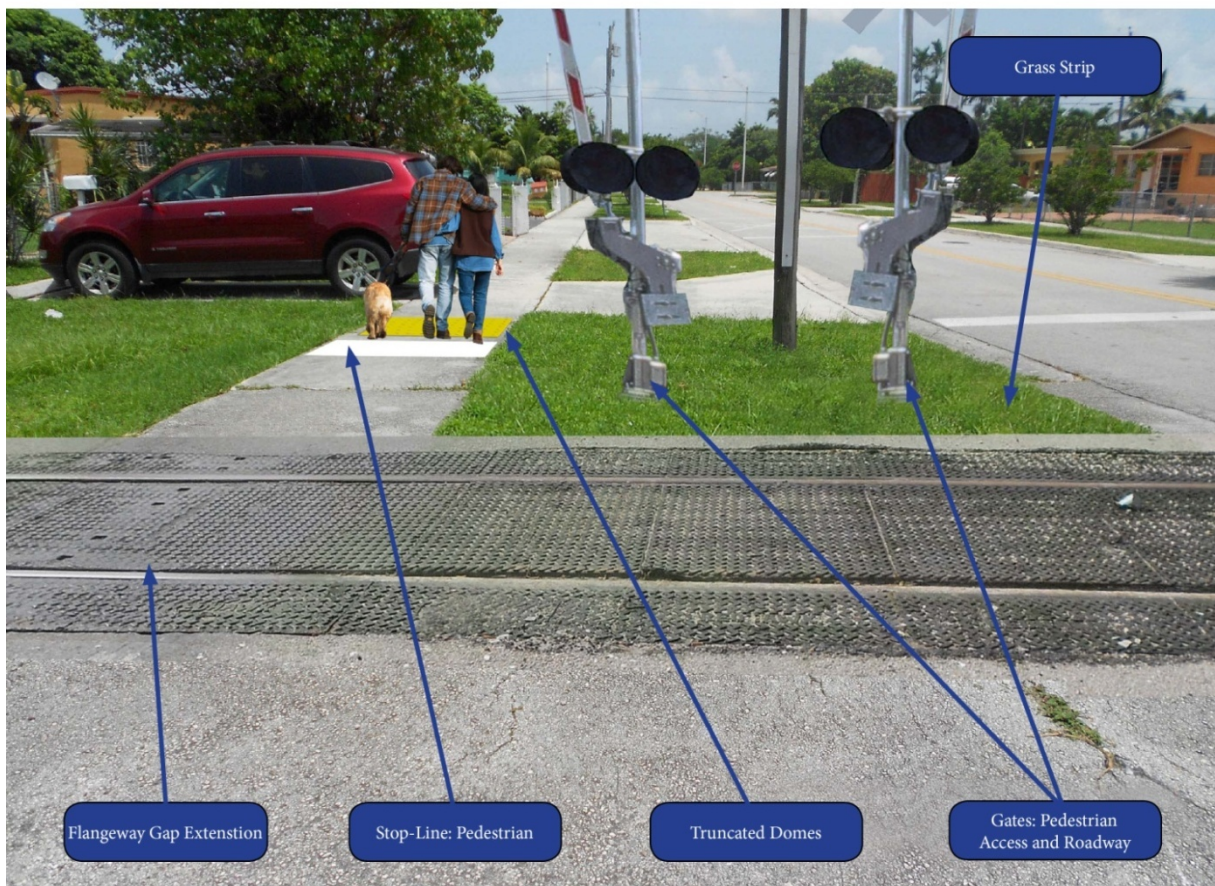
#272951B

FEC Crossing No. 272965J**Roadway Name:** W 15th Street**Nearest Cross Streets:** W 3rd Avenue and W 2nd Avenue

Solution/Improvement	Implementation Timeframe	Improvement Cost	Total Cost
Add Stop Line – Pedestrian (4)	1-2 Years	\$5-\$10/linear foot for striping	\$20-\$40
Add truncated dome (4)	1-2 Years	\$300 per panel	\$1,200
Signage at crossing (2)	1-2 Years	\$300-\$350 per sign	\$600-\$700
Flangeway gap (8)	2-5 Years	\$1,600 per pad (8ft x 8ft)	\$12,800
Access Gate - Pedestrian and Automobile (4)	5 or more Years	Approximately \$130,000/ Four quadrant gates	\$130,000
Total Cost = \$144,620-\$144,740			

FEC Crossing No. 272965J Before:

FEC Crossing No. 272965J After:



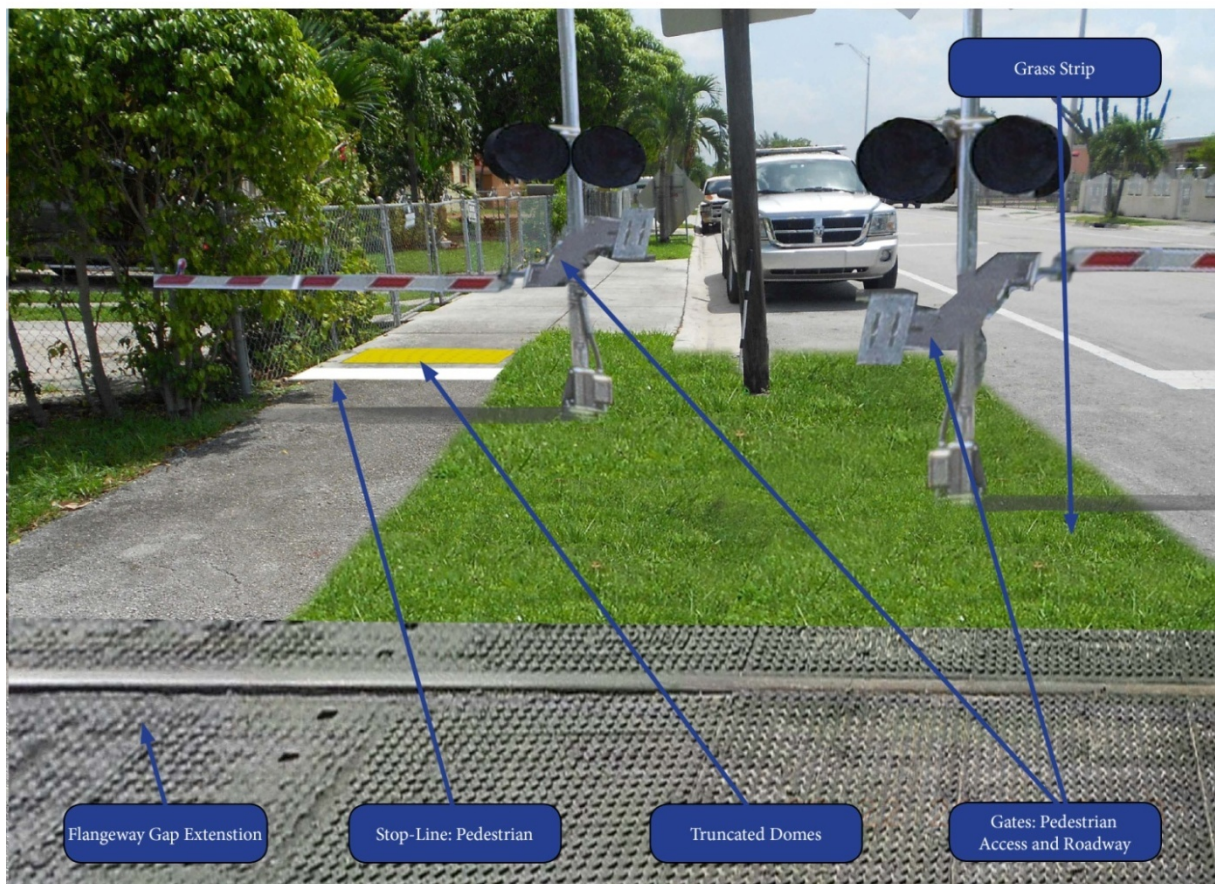
#272965J

FEC Crossing No. 272950U**Roadway Name:** W 19th Street**Nearest Cross Streets:** W 3rd Avenue and W 2nd Avenue

Solution/Improvement	Implementation Timeframe	Improvement Cost	Total Cost
Add Stop Line – Pedestrian (4)	1-2 Years	\$5-\$10/linear foot for striping	\$20-\$40
Add truncated dome (4)	1-2 Years	\$300 per panel	\$1,200
Signage at crossing (2)	1-2 Years	\$300-\$350 per sign	\$600-\$700
Flangeway gap (8)	2-5 Years	\$1,600 per pad (8ft x 8ft)	\$12,800
Access Gate - Pedestrian and Automobile (4)	5 or more Years	Approximately \$130,000/ Four quadrant gates	\$130,000
Total Cost = \$144,620-\$144,740			

FEC Crossing No. 272950U Before:

FEC Crossing No. 272950U After:



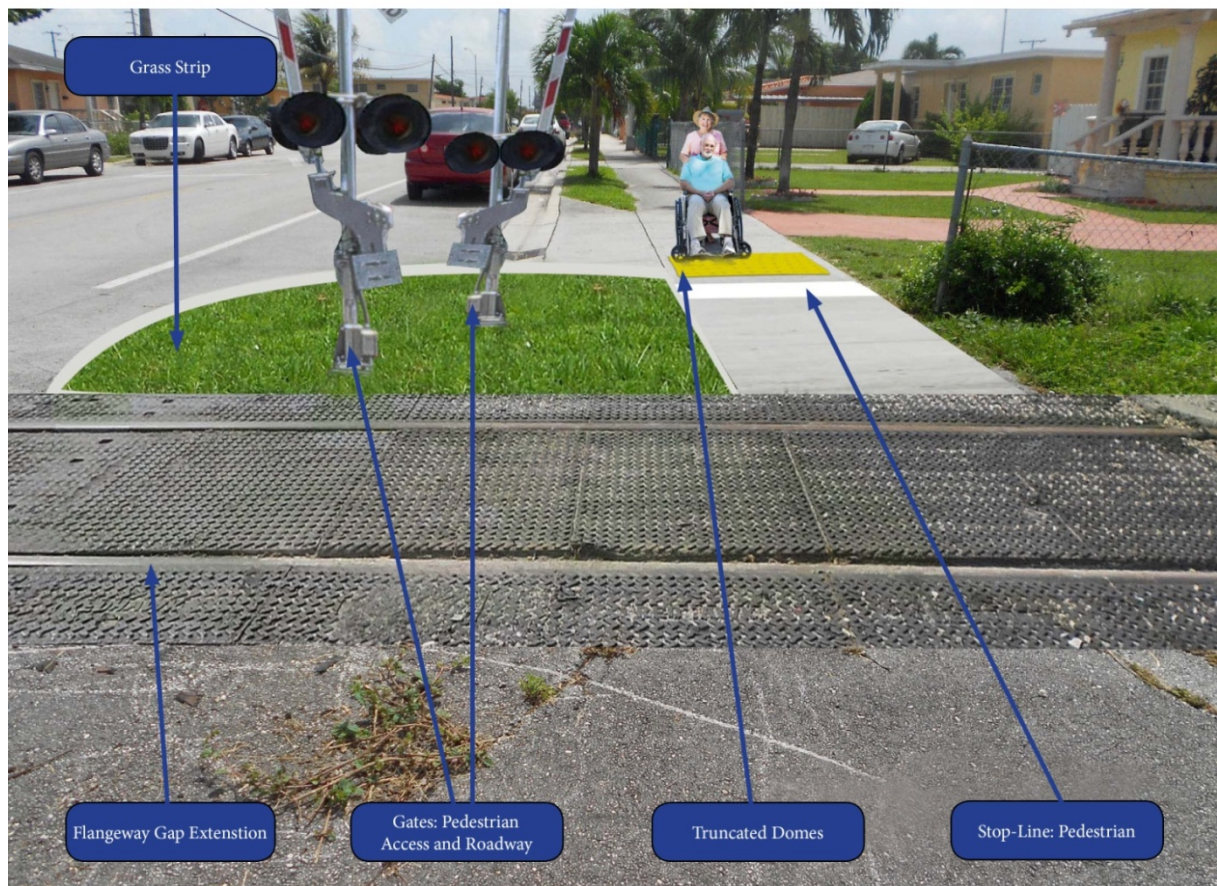
#272950U

FEC Crossing No. 273009P**Roadway Name:** W 20th Street**Nearest Cross Streets:** W 3rd Avenue and W 2nd Avenue

Solution/Improvement	Implementation Timeframe	Improvement Cost	Total Cost
Add Stop Line – Pedestrian (4)	1-2 Years	\$5-\$10/linear foot for striping	\$20-\$40
Add truncated dome (4)	1-2 Years	\$300 per panel	\$1,200
Signage at crossing (2)	1-2 Years	\$300-\$350 per sign	\$600-\$700
Flangeway gap (8)	2-5 Years	\$1,600 per pad (8ft x 8ft)	\$12,800
Access Gate - Pedestrian and Automobile (4)	5 or more Years	Approximately \$130,000/ Four quadrant gates	\$130,000
Total Cost = \$144,620-\$144,740			

FEC Crossing No. 273009P Before:

FEC Crossing No. 273009P After:



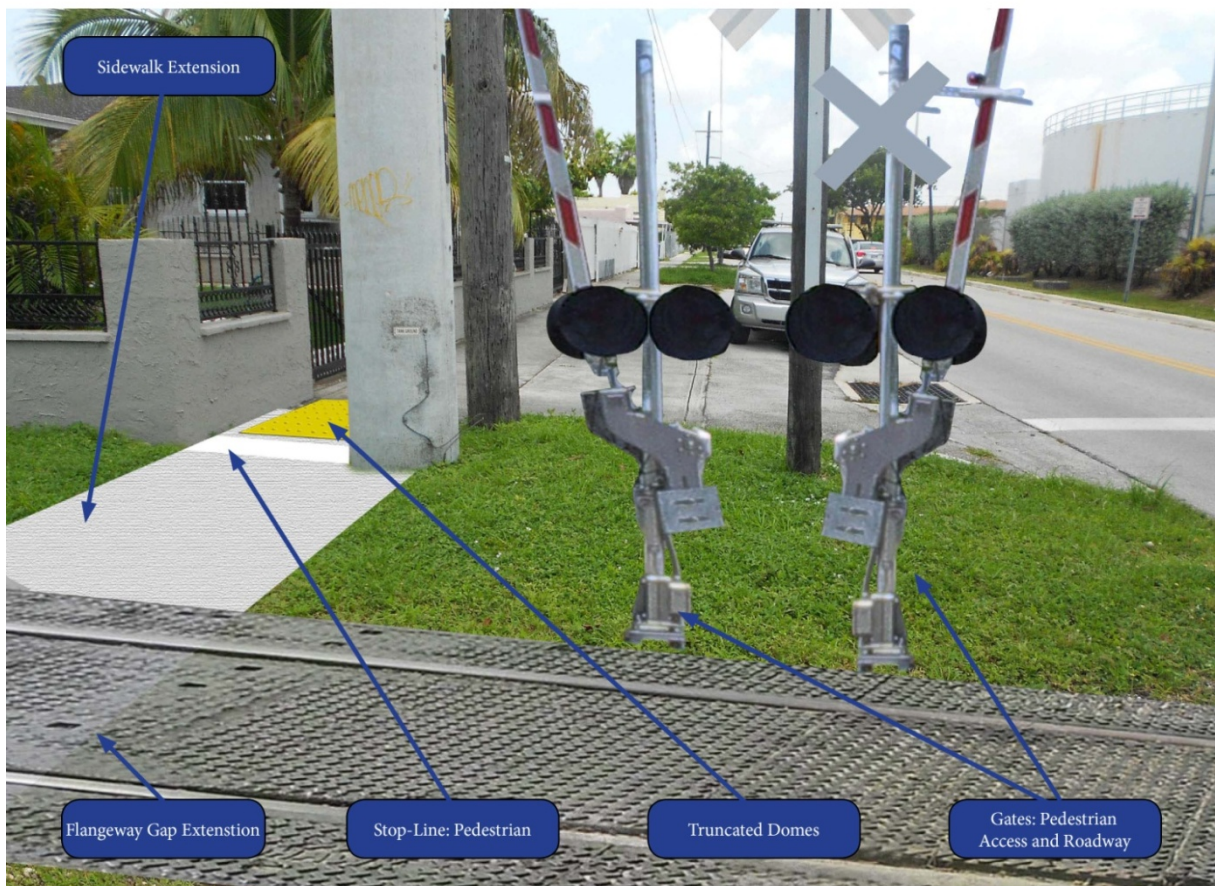
#273009P

FEC Crossing No. 272967X**Roadway Name:** W 13th Street**Nearest Cross Streets:** W 3rd Avenue and W 2nd Avenue

Solution/Improvement	Implementation Timeframe	Improvement Cost	Total Cost
Add Stop Line – Pedestrian (4)	1-2 Years	\$5-\$10/linear foot for striping	\$20-\$40
Add truncated dome (4)	1-2 Years	\$300 per panel	\$1,200
Flangeway gap (8)	2-5 Years	\$1,600 per pad (8ft x 8ft)	\$12,800
Access Gate - Pedestrian and Automobile (4)	5 or more Years	Approximately \$130,000/ Four quadrant gates	\$130,000
Total Cost = \$144,020-\$144,040			

FEC Crossing No. 272967X Before:

FEC Crossing No. 272967X After:



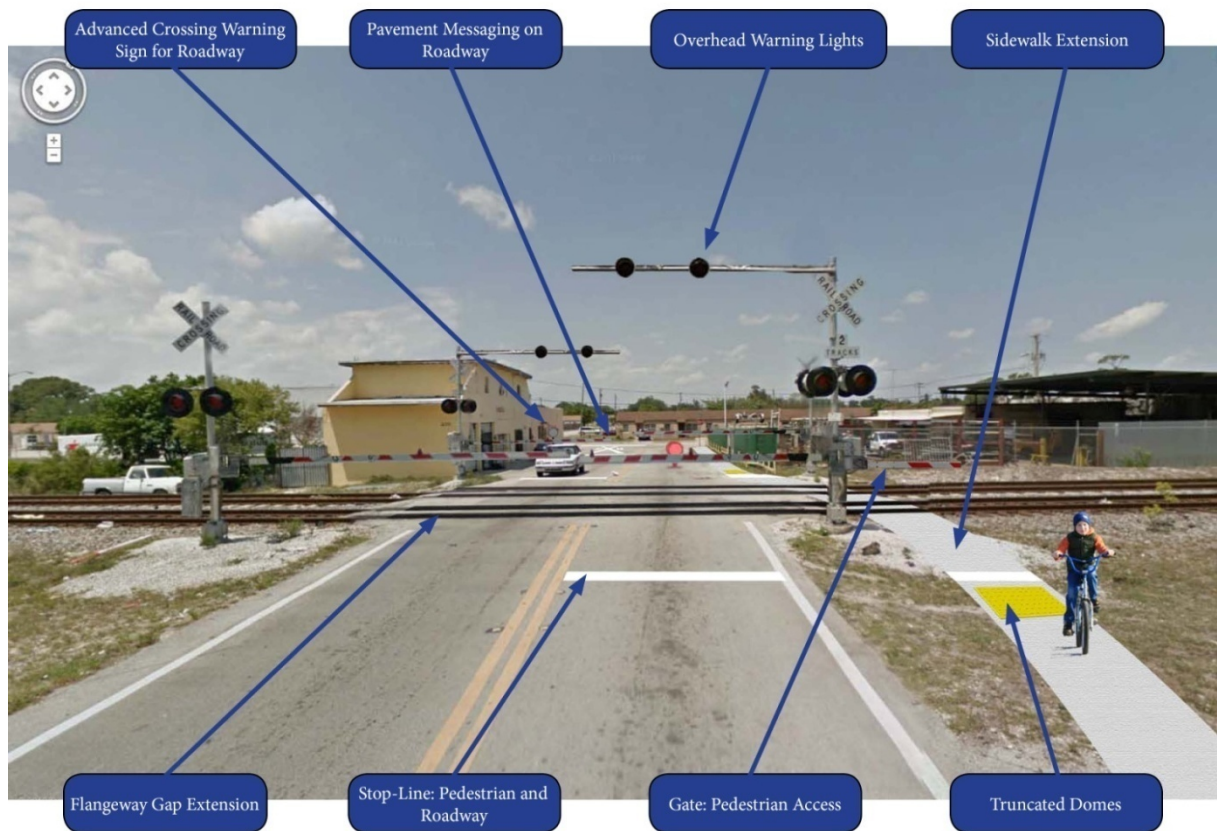
#272967X

CSX Crossing No. 628325X**Roadway Name:** Dunad Avenue**Nearest Cross Streets:** Ali Baba Avenue and Burlington Street

Solution/Improvement	Implementation Timeframe	Improvement Cost	Total Cost
Sidewalk Extension (250-300ft)	1-2 Years	\$10-\$15/linear foot	\$2,500-\$4,500
Add Stop Line – Pedestrian and Roadway (2)	1-2 Years	\$5-\$10/linear foot for striping	\$10-\$20
Add truncated dome (2)	1-2 Years	\$300 per panel	\$600
Add pavement messaging (2)	1-2 Years		
Add approach warning signs (2)	1-2 Years	\$300-\$350 per sign	\$600-\$700
Add overhead warning lights (2)	2-5 Years		
Total Cost = \$3,710-\$5,820			

CSX Crossing No. 628325X Before:

CSX Crossing No. 628325X After:



#628325X

FEC Crossing No. 272606T**Roadway Name:** NE 151st Street**Nearest Cross Streets:** NE 21st Avenue and Biscayne Boulevard

Solution/Improvement	Implementation Timeframe	Improvement Cost	Total Cost
Sidewalk Extension (30ft each side of roadway)	1-2 Years	\$10-\$15/linear foot	\$600-\$900
Add Stop Line – Pedestrian and Roadway (6)	1-2 Years	\$5-\$10/linear foot for striping	\$30-\$60
Add truncated dome (4)	1-2 Years	\$300 per panel	\$1,200
Flangeway gap (8)	2-5 Years	\$1,600 per pad (8ft x 8ft)	\$12,800
Access Gate - Pedestrian and Automobile (2)	5 or more Years	Approximately \$130,000/Four quadrant gates	\$65,000
Total Cost = \$79,630-\$79,960			

FEC Crossing No. 272606T Before:

FEC Crossing No. 272606T After:



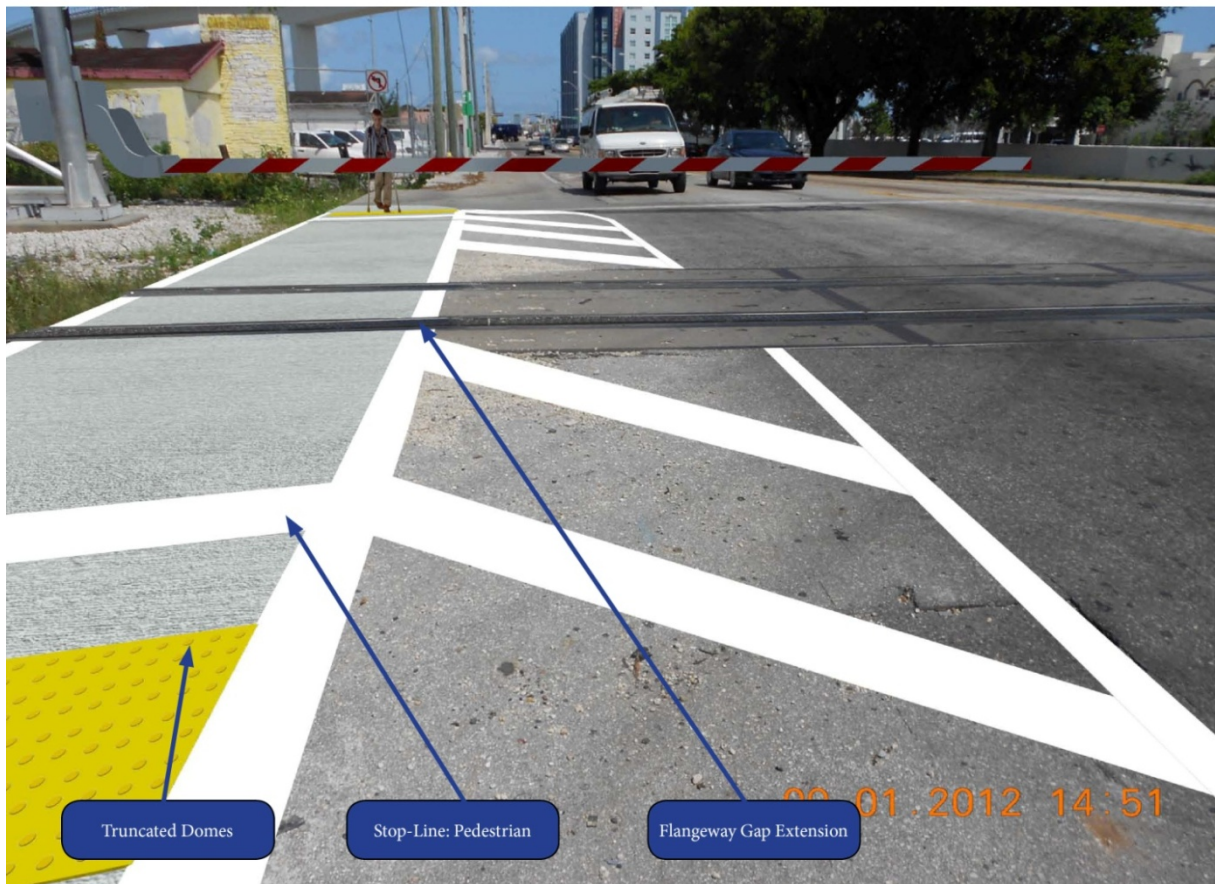
#272606T

CSX Crossing No. 628377P**Roadway Name:** NW 36th Street**Nearest Cross Streets:** NW North River Drive and NW 38th Avenue

Solution/Improvement	Implementation Timeframe	Improvement Cost	Total Cost
Sidewalk Extension	1-2 Years	\$10-\$15/linear foot	\$1,000-\$1,500
Add Stop Line – Pedestrian	1-2 Years	\$5-\$10/linear foot for striping	\$20-\$40
Add truncated dome	1-2 Years	\$300 per panel	\$600
			Total Cost = \$1,620-\$2,140

CSX Crossing No. 628377P Before:

CSX Crossing No. 628377P After:

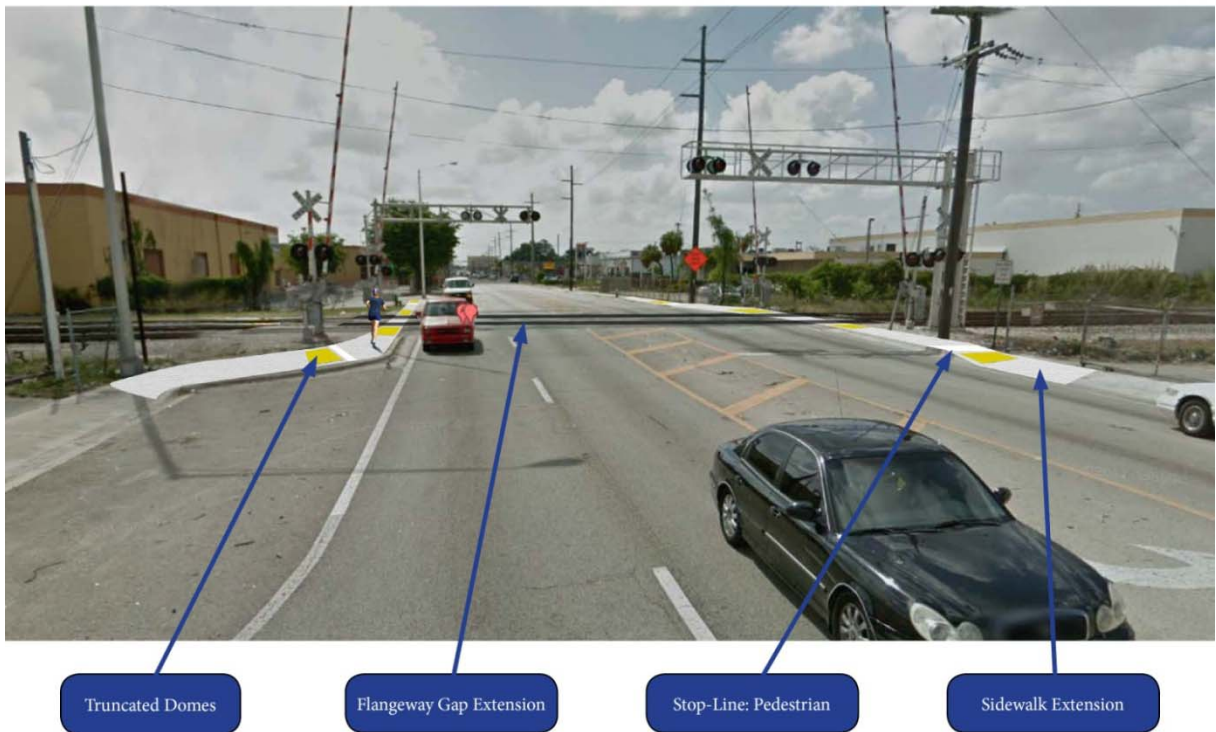


CSX Crossing No. 628355P**Roadway Name:** NW 54th/Hialeah Drive**Nearest Cross Streets:** E 10th Ct and NW 37th Avenue

Solution/Improvement	Implementation Timeframe	Improvement Cost	Total Cost
Sidewalk Extension (100ft both sides of roadway)	1-2 Years	\$10-\$15/linear foot	\$1,000-\$1,500
Add Stop Line – Pedestrian (4)	1-2 Years	\$5-\$10/linear foot for striping	\$20-\$40
Add truncated dome(6)	1-2 Years	\$300 per panel	\$1,800
Total Cost = \$2,820-\$3,340			

CSX Crossing No. 628355P Before:

CSX Crossing No. 628355P After:



#628355P

CSX Crossing No. 631097R**Roadway Name:** SW 137/Tallahassee Road**Nearest Cross Streets:** SW 143rd Street and Country Walk Drive

Solution/Improvement	Implementation Timeframe	Improvement Cost	Total Cost
Sidewalk Extension (50 feet)	1-2 Years	\$10-\$15/linear foot	\$500-\$750
Add Stop Line – Pedestrian (4)	1-2 Years	\$5-\$10/linear foot for striping	\$20-\$40
Add truncated dome (4)	1-2 Years	\$300 per panel	\$1,200
Access Gate - Pedestrian and Automobile (4)	5 or more Years	Approximately \$130,000/ Four quadrant gates	\$130,000
Total Cost = \$131,720-\$131,990			

CSX Crossing No. 631097R Before:

CSX Crossing No. 631097R After:



#631097R

6.4 Future Program Recommendations

Based on the information obtained during the course of this study, the following future program recommendations are suggested.

Combine Pedestrian Safety Evaluation Criteria with District Diagnostic Field Reviews

It is recommended that the MPO and FDOT District 6 collaborate to build pedestrian safety improvements into their Diagnostic Field Review process. By institutionalizing processes developed in this study, the MPO, FDOT and railroad agencies can have a data-driven, field-verified process for including pedestrian crossing features in future projects.

Build Recurring Funding into TIP to Address Pedestrian Crossing Shortcomings

In each crossing profile, project recommendations have been identified for bicycle/pedestrian and automobile improvements at selected crossings. These identified project recommendations have the ability to be included into future funding opportunities. It is recommended that the ranking spreadsheet be updated annually and used to track crossing improvements for both pedestrians/bicyclists and motor vehicles. If a recurring funding source was designated, it would be possible to upgrade several crossings per year.

Refine Selection Matrix Based on Actual Use

The selection matrix that was utilized for this project was created to allow the user to add measures or adjust the criteria weighting for prioritizing projects in the future. This structure allows the user to continue to utilize the matrix structure for future rail crossing evaluations.

In the weighting process utilized in this study, the number of trains was converted to a range in order to account for differences in data sources and dates of the train counts. Had more consistent and up to date data been available, we would have weighted this factor higher. In the future as both passenger and freight rail traffic increase, it is recommended that this factor be tracked carefully and that higher weighting be assigned to it.

7.0 Conclusions

The purpose of this study was to identify a prioritized list of rail crossings that needed pedestrian safety improvements, to propose a toolbox of strategies, funding options, and an implementation plan for installing these improvements. The rail crossings examined were identified using a multi-tiered approach, including the following components:

1. Based on a set of criteria that included lack of pedestrian features and proximity to high pedestrian density areas, a total of 73 rail crossings were identified from the Florida Department of Transportation's rail crossing inventory list.
2. Train activity was a major factor in determining which rail crossings had a higher chance of pedestrian/bicyclist-train conflicts.
3. While most rail crossings identified by FDOT's Diagnostic Review process were not included in this study, nine of these crossings were added to the list for further pedestrian safety evaluation; bringing the total of evaluated rail crossings in this study to 82.
4. Crash data was analyzed to identify high crash pedestrian-rail crossings.
5. Rail crossing improvements programmed in Miami-Dade's Transportation Improvement Plans (TIP) were examined.

6. Improvements proposed or implemented by railway companies were also compiled.
7. The study team conducted field reviews of the selected rail crossings, to further examine existing conditions.

The prioritized list of 82 crossings were evaluated, and based on the literature review and input from the Study Advisory Committee (SAC), a list of recommendations for the appropriate pedestrian safety improvements was developed through the strategies toolbox. To illustrate the recommended improvement strategies and depict how a combination of strategies can be installed, the top ten rail crossings identified by the study team were further analyzed through a 'before' and 'after' assessment.

Federal, state and local funding sources were also identified for the recommended improvement strategies. Additionally, future programming recommendations were presented in the study, to facilitate the feasibility of implementing pedestrian safety improvements at rail crossings. It is anticipated that this study can serve as an overarching tool in identifying pedestrian safety issues at rail crossings in Miami-Dade County, as it provides a systematic approach to implementing solutions to these issues.

Appendix A: Literature Review

Pedestrian Improvements at Rail Crossings Study

Literature Review

Task Purpose

The Miami-Dade Metropolitan Planning Organization (MPO) has undertaken a Pedestrian Improvements at Rail Crossings Study to review and examine conditions of current railroad crossings, assess non-existing crossing and deficiencies of existing ones, and recommend an improvement action plan in compliance with federal and state requirements.

As part of this effort, a literature review has been conducted to identify federal guidelines and regulations for at grade crossings and to provide best practices information on safety and operational devices that may enhance accessibility for pedestrians, bicyclists and persons with disabilities. The following provides detailed information on these elements.

Federal Guidelines and Requirements

Federal guidance reviewed included the *American Disabilities Act Accessibility Guidelines*, the Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices*, the *FHWA Designing Sidewalks and Trails for Access*, and the Federal Railroad Administration (FRA)'s *Train Horn Rule*. Relevant details from these sources are described in the following sub-sections. Other studies done by federal agencies regarding this subject were reviewed as well and are detailed as part of the best practices research in the subsequent section of this report.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) sets accessibility requirements for state and local government facilities, public spaces, as well as areas within public rights-of way such as railroads through ADA Accessibility Guidelines (ADAAG). The most recently proposed ADAAG Guidance, dated July 2011, was reviewed to identify relevant ADA requirements for pedestrian at-grade rail crossings. It should be noted that ADA requirements are inclusive of a number of building elements, and it is therefore not possible to identify all ADA requirements until the desirable design features of a pedestrian at-grade rail crossing are determined. For instance, although not required, channelization through fencing or other barriers is one method for providing enhanced safety at pedestrian rail crossings. If used, additional ADA requirements regarding gating and door widths would need to be reviewed. As such, this review pertains specifically to requirements regarding pedestrian at-grade rail crossings as found in section R302.3 through R302.7, R306, and R308.



Example of a pedestrian rail crossing gated channelization

Pedestrian Access Route Surfaces: The surfaces of pedestrian access routes and the surfaces at accessible elements and spaces that connect to pedestrian access routes must be firm, stable, and slip resistant. Where pedestrian access routes cross rails at grade, the pedestrian access route must be level and flush with the top of the rail at the outer edges of the rails, and the surfaces between the

rails must be aligned with the top of the rail. The following other provisions for pedestrian access route surfaces apply to pedestrian at-grade rail crossings:

- *Continuous Width:* The continuous width of pedestrian access surfaces at rail crossings must be 1.2 m (4.0 ft) minimum, exclusive of the width of the curb. Where sidewalks are wider than 1.2 m (4.0 ft), only a portion of the sidewalk is required to comply with these requirements; however, additional maneuvering space should be provided at turns or changes in direction, transit stops, recesses and alcoves, building entrances, and along curved or angled routes, particularly where the grade exceeds five percent.
- *Passing Spaces:* Where the clear width of pedestrian access routes is less than 1.5 m (5.0 ft), passing spaces shall be provided at intervals of 61 m (200.0 ft) maximum. Passing spaces shall be 1.5 m (5.0 ft) minimum by 1.5 m (5.0 ft) minimum. Passing spaces are permitted to overlap pedestrian access routes.
- *Grade:* The grade of the pedestrian access route is measured parallel to the direction of pedestrian travel and may not exceed five percent.

Detectable Warning Surfaces: Detectable warning surfaces are truncated domes aligned in a square or radial grid pattern in a conspicuous color which alert visually impaired pedestrians to stop and prepare for a rail crossing, train platforms, or other areas where they will interact with passing vehicular traffic. The edge of the detectable warning surface nearest the rail crossing shall be 1.8 m (6.0 ft) minimum and 4.6 m (15.0 ft) maximum from the centerline of the nearest rail as per R305.2.5. Where pedestrian gates are provided, detectable warning surfaces shall be placed on the side of the gates opposite the rail.

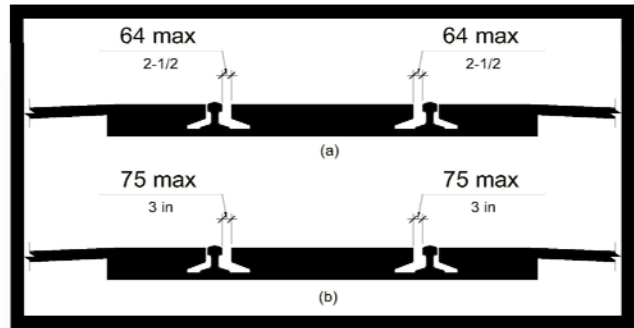
Detectable warning surfaces at grade rail crossings must extend to the full width of the crossing, and meet the following other requirements per R305:



Example of a detectable warning surface

- *Dome Size:* The truncated domes shall have a base diameter of 23 mm (0.9 in) minimum and 36 mm (1.4 in) maximum, a top diameter of 50 percent of the base diameter minimum and 65 percent of the base diameter maximum, and a height of 5 mm (0.2 in).
- *Dome Spacing:* The truncated domes shall have a center-to-center spacing of 41 mm (1.6 in) minimum and 61 mm (2.4 in) maximum, and a base-to-base spacing of 17 mm (0.65 in) minimum, measured between the most adjacent domes.
- *Color:* Detectable warning surfaces shall contrast visually with adjacent gutter, street or highway, or pedestrian access route surface, either light-on-dark or dark-on-light.

Flangeway Gaps: Flangeway gaps are defined as the space between the inner edge of a rail and the crossing surface. Flangeway gaps at pedestrian at-grade rail crossings are 64 mm (2.5 in) maximum on non-freight rail track and 75 mm (3 in) maximum on freight rail track. These dimensions are required to allow safe passage of train wheel flanges along the tracks, but may pose a safety hazard for wheelchairs or bicycle wheels that may become “stuck” in these gaps. The Federal Railroad Association is sponsoring research to develop materials or devices that will fill the flangeway gap under light loads of a wheelchair but will compress or retract when a train wheel flange passes over it. The materials or devices are to be tested under heavy and light train loads for safety, effectiveness, durability, and cost. Given this ongoing research topic, ADA guidance on this issue should continue to be monitored for updates on this topic.



Flangeway Gaps Maximums

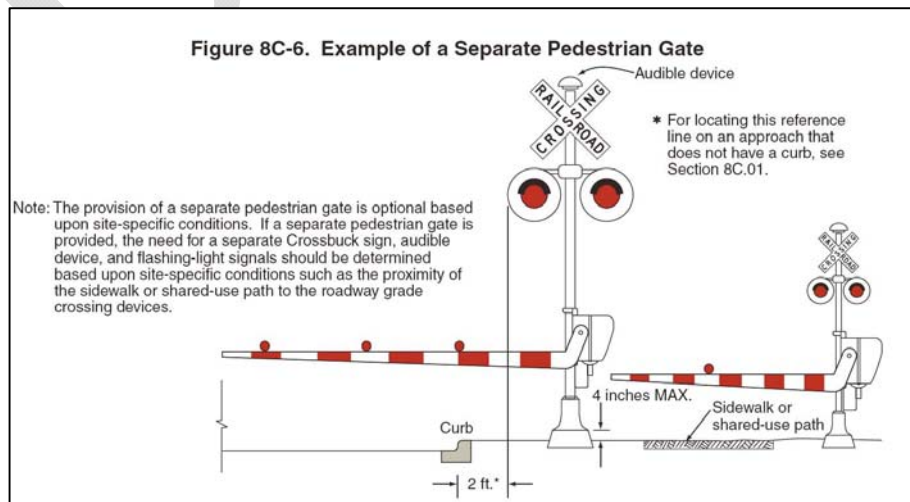
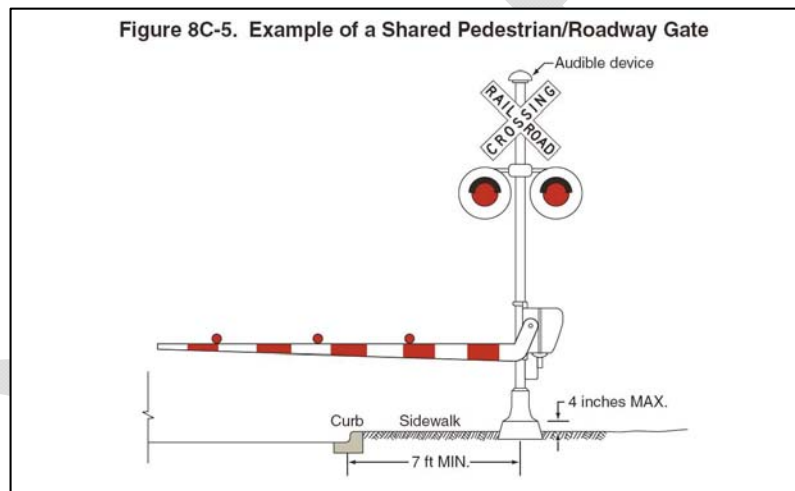
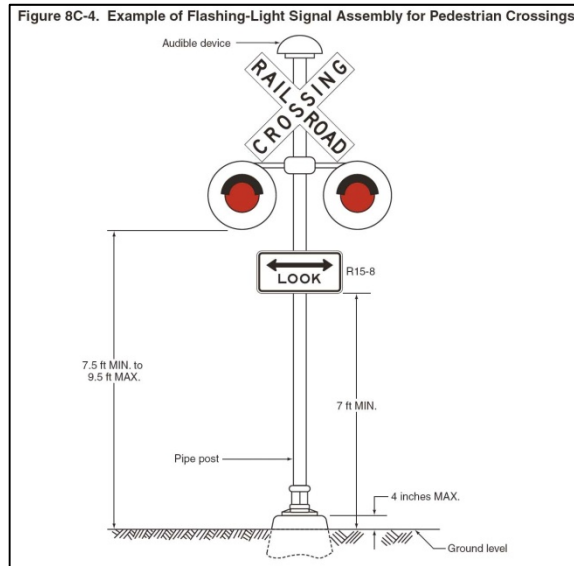
Manual on Uniform Traffic Control Devices

The *Manual on Uniform Traffic Control Devices* (MUTCD) defines the national standards for the installation and maintenance of traffic control devices on all public streets, highways, bikeways, and private roads open to public traffic. The MUTCD is published by the Federal Highway Administration (FHWA) under 23 Code of Federal Regulations (CFR), Part 655, Subpart F. The most recent 2009 edition of the manual, and more specifically relevant sections in Chapter 8 (Traffic Control for Railroad and Light Rail Transit Grade Crossings), was reviewed to identify nationally recognized standards for signage and traffic control at pedestrian railroad crossings,

In general, highway-light rail transit (LRT) grade crossings in semi-exclusive alignments (e.g. rail crossings) should be equipped with a combination of automatic gates and flashing light signals, or flashing light signals only, or traffic control signals, unless an engineering study indicates that use of signage alone would be adequate. Standard cross buck railroad signs and other appropriate signage using reflective materials are to be provided at each highway at each highway-rail grade crossing, and where there is more than one track a supplemental number of tracks plaque is to be provided directly below the cross buck railroad sign. If a pedestrian route is provided at the rail crossing, sufficient clearance from signal supports, posts, and gate mechanisms should be maintained for pedestrian travel. Additional bells or other audible devices are required to be included where there are flashing light assemblies and are suggested for other configurations as well to provide added alertness features for non-motorists. In addition, flashing light signals must be clearly visible to all non-motorists. MUTCD provides optional guidance for green indications to be provided during LRT phases for highway vehicle, pedestrian, and bicycle movements that do not conflict with LRT movements.

MUTCD provisions also provide guidance on LRT grade crossings specifically. Depictions of the various configurations that may be utilized for pedestrian crossings include a flashing light signal assembly, shared pedestrian/roadway gates, or separate pedestrian gates, as shown in the figures below. Guidance on these configurations is described in brief in the bullets that follow.

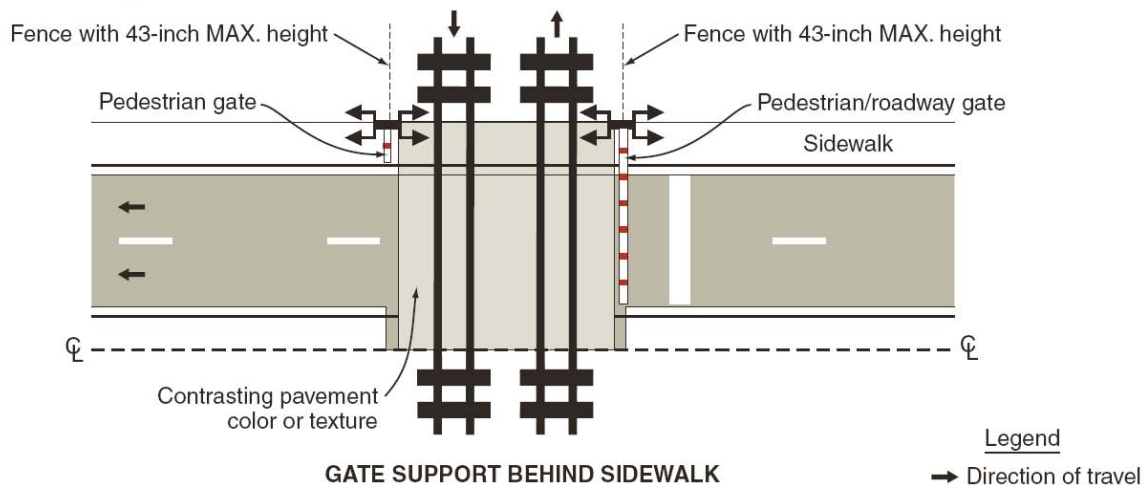
MUTCD Examples of Pedestrian Rail Crossing Configuration Types



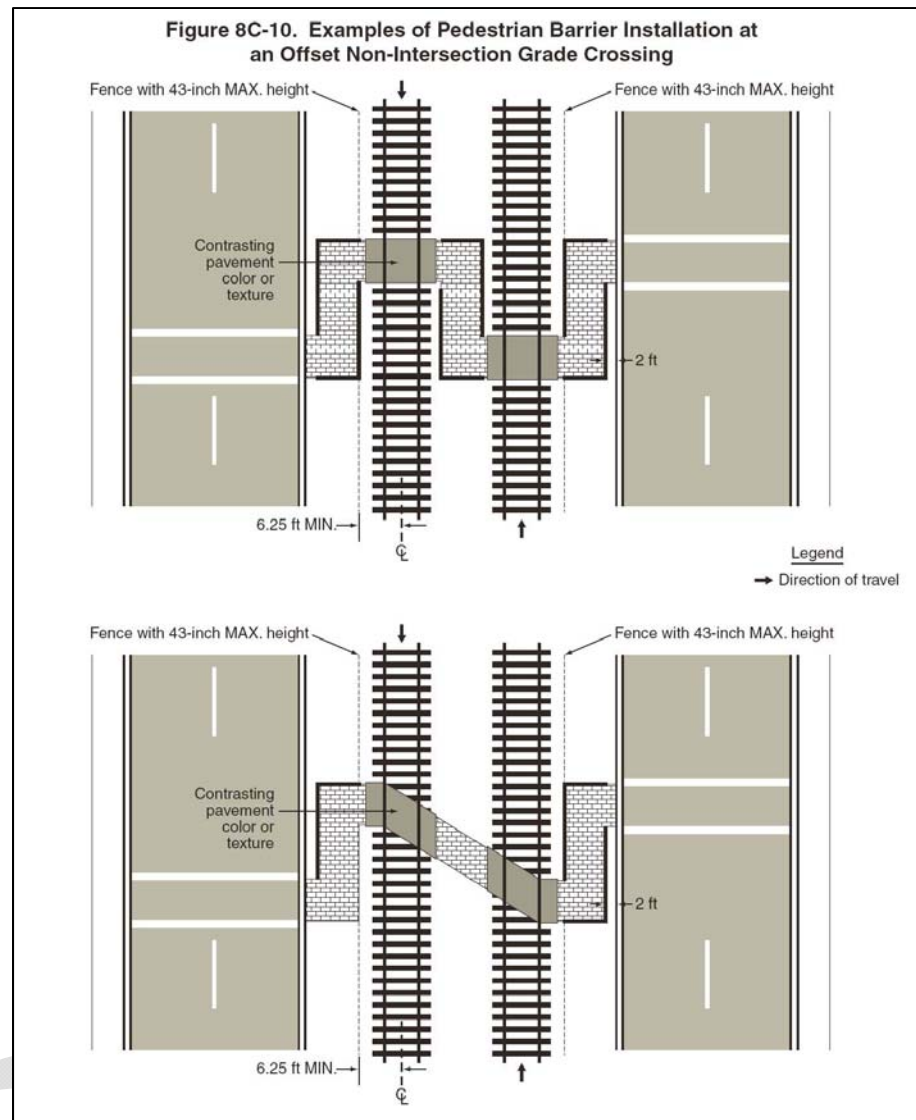
- If a separate set of standard traffic control signal indications (red, yellow, and green circular and arrow indications) is used to control LRT movements, the indications shall be positioned so they are not visible to motorists, pedestrians, and bicyclists.
- Where LRT tracks are immediately adjacent to other tracks or a road, pedestrian signalization should be designed to avoid having pedestrians wait between sets of tracks or between the tracks and the road. If adequate space exists for a pedestrian refuge and is justified based on engineering judgment, additional pedestrian signal heads, signing, and detectors should be installed (see Section 4E.08).
- Flashing-light signals with a cross buck sign and an audible device should be installed at pedestrian and bicycle crossings where an engineering study has determined that the sight distance is not sufficient for pedestrians and bicyclists to complete their crossing prior to the arrival of the LRT traffic at the crossing, or where LRT speeds exceed 35 mph.
- If an engineering study shows that flashing-light signals with a cross buck sign and an audible device would not provide sufficient notice of an approaching LRT traffic, the LOOK sign and/or pedestrian gates should be considered (see Appendix A).

MUTCD also provides guidance on gates, should they be used. A pedestrian gate is similar to an automatic gate except the gate arm is shorter, and MUTCD guidance calls for a 43-inch maximum height for pedestrian gates as well as contrasting pavement or texture along the crossing.

Figure 8C-7. Examples of Placement of Pedestrian Gates



Swing gates may be used to alert pedestrians to the LRT tracks that are to be crossed. Swing gates are designed to open away from the tracks, requiring users to pull the gate open to cross, but permitting a quick exit from the track way, and to automatically close. Options for gates or barriers provided for in the MUTCD include the potential for swing gates to be installed across pedestrian/bicycle walkways and pedestrian barriers to be provided at offset crossings to be used as passive devices that force users to face approaching rail traffic before entering the track way. A couple of examples of pedestrian barrier installation options are provided by MUTCD, as shown below.



Designing Sidewalks and Trails for Access Guidance

FHWA's *Designing Sidewalks and Trails for Access* was last published in 2001 and serves as a guidebook focused on designing sidewalks and trails for access. It was created to provide planners, designers, and transportation engineers with a better understanding of how sidewalks and trails should be developed to promote pedestrian access for all users, including people with disabilities. This guidebook and does not constitute a requirement or regulation from the federal government; however, it does provide information regarding accessing pedestrian railroad crossings and was reviewed to identify additional guidance from the federal government on this topic.

The FHWA guidance on railroad crossings is focused on enhancements to pedestrian safety and accessibility. In particular, the guide provides additional information on safety concerns about flangeway gaps and wheelchairs that may become stuck in these gaps. It notes that currently a rubber insert is available to fill the flangeway gap for light rail tracks with trains traveling at low speeds and provide a level surface for pedestrians that deflect downward with the weight of the train for safe

operations of the train on the track. Guidelines on enhancing the safety and addressing the issue of flangeway gaps include:

- Raising the approaches to the track and the area between the tracks to the level of the top of the rail creating flat level areas to cross. When casters on wheelchairs hit changes in level, they rotate and may drop into the flangeway gap.
- Utilizing a surface material that will not buckle, expand, or contract significantly (e.g., textured rubber railroad crossing pads) in all areas adjacent to the tracks so that the surface material will not interfere with railway function or degrade with use.
- Designing crossings so that the pedestrian paths of travel intersect the railroad track at a 90 degree angle, which minimizes problems with the flange-way gap width.
- Widening the crosswalk when a perpendicular crossing cannot be provided so that pedestrians have room to maneuver and position themselves to cross the tracks at a 90 degree angle.
- Installing detectable warnings similar to a transit platform if the railroad crosses the sidewalk.
- Providing railroad crossing information in multiple formats, including signs, flashing lights, and audible sounds. The MUTCD requires railroad crossing signs whenever railroad tracks intersect the street.

Federal Railroad Administration's "Train Horn Rule" (49 CFR Part 222)

Locomotive horns are used as a safety mechanism to alert people to the presence of an oncoming train. For some time, debate has ensued on the safety merits of this procedure versus the potential noise nuisance it poses to certain surrounding community areas. To address these nuisance issues raised at a local level, states enacted rules to allow local train horn bans in certain areas. In the early 1990s, exercising its state right to enact such rules, Florida instituted a state-wide ban on locomotive horns. The passage of this statewide ban coincided with a marked increase in train collisions at particular gated rail crossings. In response to this increased safety issue, the FRA established a rule in 1993 to supersede state law and return to standard train horn practices. In follow up to this action, in 1994 Congress required the FRA to issue federal regulations to guide the use of horns at rail crossings. This legislation was passed in June 2005, and is known as the "Train Horn Rule".

The stated purpose of this legislation is "to provide for safety at public highway-rail grade crossings by requiring locomotive horn use at public highway-rail grade crossings" and to set up rules for "quiet zones" where this rule might be waived in areas meeting specific standards. The legislation provides the requirements for the timing, alert pattern, and maximum loudness (in decibels) for train horns at public rail crossings.

"Quiet zones" are defined in the legislation as a segment of a rail line situated within one or a number of consecutive public highway-rail crossings where a waiver has been granted to prohibit locomotive horns from sounding. Quiet zones may be established for an entire 24-hour period or only for the overnight period of 10pm to 7am. In order to qualify as a new quiet zone, the areas must meet the following requirements:

- The quiet zone must be at least ½-mile in length and consist of at least one public highway-rail grade crossing.

- Every public grade crossing must be equipped with, at minimum, the standard or conventional flashing light and gate automatic warning system
- Local governments must working in cooperation with the railroad owner and the appropriate state transportation authority to form a diagnostic team to assess the risk of collision at each grade crossing where a request is made to silence horns. This determination will identify where and what type of additional safety improvements are needed to effectively reduce the associated risk, and must take into account local conditions such as highway traffic volumes, train traffic volumes, crash statistics, and physical characteristics of the rail crossing. This part of the rule will also define risks and improvements at pedestrian crossings.

The legislation provides numerous examples of acceptable improvements that may be considered in reducing the risk to safety from these quiet zones, including measures like:

- Installing medians on one or both sides of a rail crossing track to prevent motorists from driving around a lowered gate
- Establishing a four-quadrant gate system to block all lanes of highway traffic
- Converting a two-way street into a one-way street
- Permanently closing the rail crossing to highway traffic
- Using wayside horns posted at the crossing directed at highway traffic only

The legislation does not require horn sounding at all pedestrian grade crossings, but does provide requirements that the interaction of train horn sounds and audible warning devices at pedestrian crossings to be coordinated. Further, the legislation provides public authorities with the flexibility of installing warning signs to advise pedestrians that horns are not sounded in specific locations and/or at specific times. It notes that advance warning signs must be installed on each approach to the pedestrian grade crossing within all quiet zones.

Best Practices Review

Although no best practices research specific to design and engineering features at pedestrian grade crossings could be found, a number of resources were reviewed to provide the most comprehensive identification of practices utilized to enhance safety and accessibility. Resources reviewed for this best practices research included the following sources:

- FHWA's *Railroad-Highway Grade Crossing Handbook*, August 2007
- FRA's *Compilation of Pedestrian Safety Devices in Use at Grade Crossings*, January 2008
- California Public Utilities Commission's *Pedestrian-Rail Crossings in California Report*, May 2008
- California Public Utilities Commission's *Highway-Rail Grade Crossings Presentation*, May 2008
- California Metrolink's *Pedestrian Rail Crossings: Lessons Learned Presentation*, October 2007
- Eastern States Grade Crossing Conference, *Pedestrian Safety Best Practices from Recent Western Rail Transit Projects Presentation*, October 2007

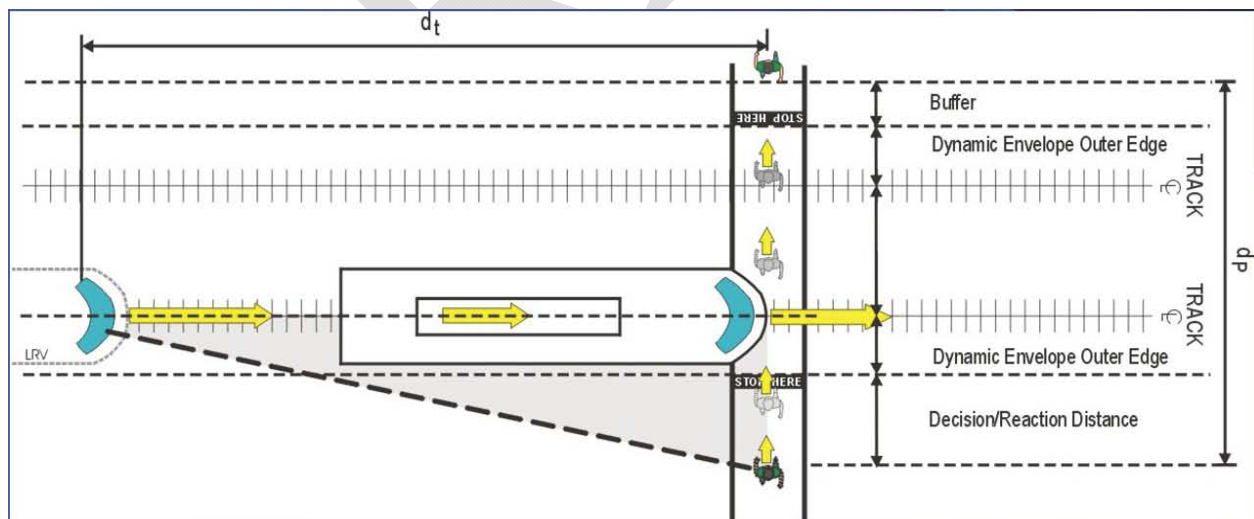
Sub-sections of this best practices review are broken down based on topic area in order to consolidate the issues and design/operations opportunities identified from these multiple sources into useful information on best practices.

In general, several sources take special note that all pedestrian rail crossings are unique and need diagnostic reviews to identify the most effective roadway geometry, traffic control devices, and other elements that may be needed to improve safety and accessibility. What should be noted in these diagnostic reviews and in determining effective engineering solutions are some standard known information on typical pedestrian behaviors at crossings: (1) pedestrians will take the most direct route possible and therefore are apt to create their own paths or trespass in absence of good design (2) pedestrians tend to look down instead of up (3) pedestrians are often distracted or inattentive when crossing and audible warnings are particularly useful to pedestrian safety, and (4) when children are using railroad crossings, education is needed on proper crossings. In addition, most of the reports reviewed noted the importance of public education and law enforcement as an effective tool to address pedestrian safety in a comprehensive manner.

Although specific solutions will depend upon the specifics of the rail crossing under evaluation and no one solution will be advisable at all rail crossings, some options and best practices on specific treatments have been noted in the literature review and are detailed in the following list for ease of use to Miami-Dade MPO in determining optimal solutions for pedestrian rail crossing.

1. Addressing Line of Sight Issues

Ensuring the visibility of traffic control devices is key to effective pedestrian safety and any noted vegetation, clutter, parking, or traffic parallel to the track that could be impeding visibility should be noted and addressed. Minimum line of sight speed and distances are provided in the federal reporting *Guidance on 23 U.S.C. § 130 Annual Reporting Requirements for Railway-Highway Crossings*, and are shown graphically in the figure below.



Line of Sight at Rail Crossings

Pedestrian automatic gates are recommended where limited sight distances are noted at pedestrian crossings. It is recommended that these automatic gates be equipped with flashing light signals and bells or some alternative audible device. In many cases, these gates can be combined with channelized barriers, swing gates, and other devices to promote a desired and safe pedestrian pathway.



Pedestrian Automatic Gate

2. Use of Flashing Light Signals

The placement of flashers can provide additional pedestrian warning and placement of these flashers should be such that pedestrians can see them. As the *Railroad-Highway Grade Crossing Handbook* notes, a **flashing light signal assembly** system alone may be appropriate for non-gated, unsignalized, pedestrian-only crossings. When crossings are combined with motor vehicle gated crossings without pedestrian gates, it is recommended that the flashing light signal assembly be used in the two quadrants without vehicle automatic gates. These signal devices should be installed adjacent to the pedestrian crossing facing out from the tracks, and the assembly should include a standard cross buck sign and (where there is more than one track) and inverted t-shaped sign indicating the number of tracks. It is also noted that flashers can be used in conjunction with entry/exit swing gates or stand alone. These signals are deemed good treatments for off-quadrants at skewed crossings or where distances are greater, such as at multi-track crossings.

3. Signage Best Practices

A number of best practices with regard to signage were noted in the literature review. First, a key to enhancing safety for pedestrians is to avoid confusion or conflicts in signage. **Standard signage** should be used for all pedestrian crossings, consistent with standard signs identified in the MUTCD, and should be provided at eye level for pedestrians. **Look both ways signage** is especially useful to make pedestrians more aware of surroundings. Secondly, the visibility of signage is key and all signs and markings should be continually maintained. Using reflective materials that can be seen at night is recommended. Thirdly, research has noted that a number of pedestrian incidents at rail crossings coincide with more than one track. **Second train coming signs**, train-activated internally illuminated matrix signs displays that show pedestrian crossing configurations with one or two trains passing, may be used to alert pedestrians to the direction from which one or more trains are approaching the crossing. This is especially effective for light rail and where pedestrian traffic is heavy. Another strategy for addressing pedestrian safety issues when multiple tracks are involved is to operate the trains such that one vehicle is stopped blocking the pedestrian crossing until the other passes.



Look Both Ways Signage

4. Pedestrian Pathways



Note contrasting colors and span of the pedestrian pathway

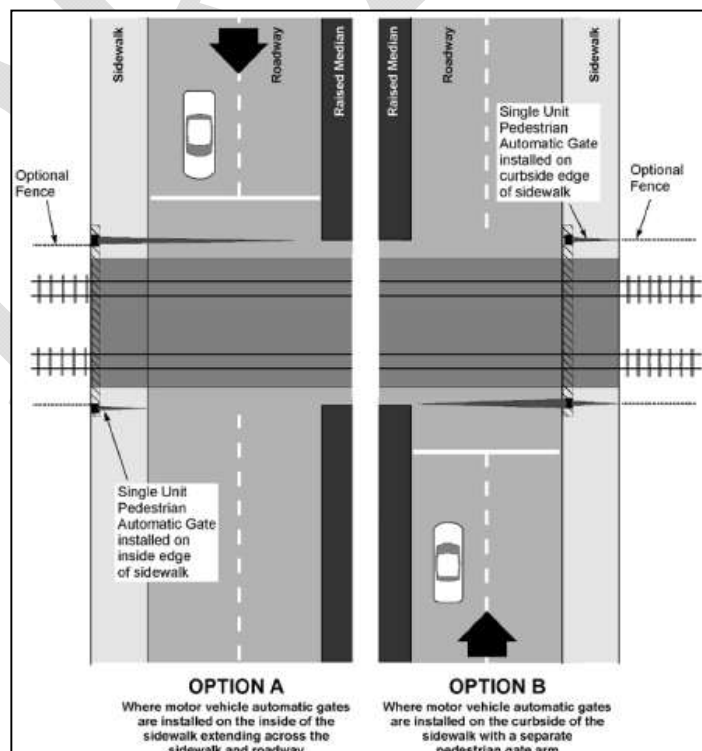
A commonly noted issue with railroad crossings is trespassing and illegal crossings. The review of literature indicates that this issue can be addressed through effective design of pedestrian pathways. Creating **pedestrian pathway striping that spans across the track portion of roadway** is good visual cue for pedestrians, as is the use of **contrasting colors and textures** leading into tracks and along the track pathways to make users more alert to their surroundings. Using **detectable warning surfaces**, also known as tactile devices, is also recommended to provide additional cues to pedestrians. **Stop here signage** is also recommended.



5. Pedestrian Barrier Systems

There are five main types of barrier that are provided in the literature reviewed, and often the best practices are considered to be combinations of these systems as appropriate to the rail crossing context. **Curbside pedestrian barriers**, which may consist of landscaping, bedstead barriers, fences and/or bollards and chains, are recommended between intersections in shared rights of way.

Pedestrian automatic gates, similar to standard automatic crossing gates but with shorter arms, may also be used to prevent pedestrians from crossing LRT tracks. It is recommended that this type of gate be used in areas where pedestrian risk of collision with a train is medium to high and when sight distance is inadequate (as noted in #1 above). It is preferred that these gates be provided in all four quadrants, as shown in the figure below.



Swing gates, which are sometimes used with flashing lights and bells, alert pedestrians to the tracks that are to be crossed and forces pedestrians to pause before moving forward across the tracks. Swing



gates may be used at pedestrian-only crossings, on sidewalks, and near stations where the risk of pedestrians colliding with trains is medium to high. **Kick plates** are also recommended where swing gates are implemented to assist those in wheelchairs in accessing the doors. It is further recommended that the gates be designed to return to a closed position after pedestrians pass. Swing gates should be supplemented with proposer signing mounted on or near the gates. This signage includes the look both ways signage or flashing light signals.

Bedstead barriers are recommended in tight urban spaces where there is no fenced in right of way, such as pedestrian grade crossings at street intersections. These barricades are placed in an offset manner that requires pedestrians move across the tracks to navigate through the barriers. It is recommended that these types of barriers be designed to turn pedestrians toward the approaching train before crossing each track, thereby forcing them to look both ways as they are crossing. The bollard and chain concept may also be used similarly.

Z-crossing channelization crossing controls movement of pedestrians as they approach rail tracks, and is recommended to be used in cases where pedestrians are likely to run unimpeded across the tracks (e.g. midblock, isolated, pedestrian-only crossings). This type of channelization may be used in conjunction with automatic gates where there are especially high safety risks associated with a crossing. It should be noted that this z-crossing is not recommended when trains operate in both directions along a single track since pedestrians may be looking in the wrong direction.



Many best practices findings found a combination of these barrier types and control devices used to optimize safety and accessibility. Three main combinations were noted and are provided as example concepts in the next page. These include (1) **gated and channelized**, (2) **swing gates and flashers**, and (3) **channelization with flashers**.

Combinations of Channelization and Signage



6. Other Experimental Pedestrian Warning Devices

Two experimental pedestrian warning devices were also noted in the literature review: wayside horns and in-road warning lights. These are deemed experimental since limited studies and implementations exist at the current time to adequately judge their efficacy. *Wayside horns*, or stationary horns used at pedestrian rail crossings, are one method of altering pedestrians and may be used in lieu of train horns in quiet zone areas. *In-road warning lights* work similar to illuminated pedestrian street crossings and can provide additional pedestrian wayfinding across a rail crossing.

7. More Expensive Solutions

Pedestrian over-crossings and *under-crossings* have been utilized in busier rail corridors, and are particularly noted in areas of high density development and high speed corridors. There is a long lead time for development of these options and costs are estimated between \$2 and \$8 million for overpasses and \$2 to \$4 million for underpasses. Other safety considerations, such as lighting, must be met and ADA accessibility issues are typically addressed through the provision of elevators and ramps.



Conclusions

Both the review of federal requirements and guidelines and best practices research reveal that solutions for pedestrians at rail crossings are context sensitive. This review provides an overview of the requirements and options for best practices that may be considered for implementation. Reviews of specific risk factors and safety issues at specific locations must continue to be practiced to identify the solutions that work best for the situation. That being said, there does appear to be consistency between ADA requirements and best practices research findings on the use of detectable warning surfaces, or tactile surfaces at crossings. In addition, the literature indicates that use of consistent signage may be considered a best practice for pedestrian safety and that standard signage is identified by the MUTCD.

Finally, flangeway gaps continue to be a safety issue that is not adequately addressed through the maximum gap requirements in the ADAAG. Federal recommended guidelines to address these flangeway gaps, including the suggestion to use surface materials that do not buckle, expand or contract significantly (such as textured rubber railroad crossing pads) may be further considered and implemented depending upon cost and other site specific factors.

Appendix B: Rail Crossing Inventories (FRA and FDOT)

RHCI Crossing Inventory Attributes and Description

Attribute	Definition
CROSSING	Highway-rail Crossing Identification Number.
RAILROAD	Railroad Code.
TYPE	Numeric code specifying the type category of the highway-rail crossing. 1=Public, 2=Private, 3=Pedestrian.
STREET	Name of street or road at crossing.
STATE_ROAD	Name of state road (if applicable).
US_ROUTE	Name of US route (if applicable).
LAT	Latitude.
LONG	Longitude.
SDWLK_PRSN	Sidewalks on the approach. Y=Yes, N=No, X=Unknown.
SDWLK_THRU	Sidewalks through the approach. Y=Yes, N=No, X=Unknown.
DAYTHRU	Normal number of daily through train movements over this crossing b/w 6 AM and 6 PM.
DAYSWT	Normal number of daily local, industrial, or switch engine through train movements over this crossing b/w 6 AM and 6 PM.
NGHTTHRU	Normal number of daily through train movements over this crossing b/w 6 PM and 6 AM.
NGHTSWT	Normal number of daily local, industrial, or switch engine through train movements over this crossing b/w 6 PM and 6 AM.
MAXTTSPD	Maximum timetable speed at the highway-rail crossing (in miles per hour).
MINSPD	Minimum typical speed of trains at the highway-rail crossing.
MAXSPD	Maximum typical speed of trains at the highway-rail crossing.
MAINTRK	Number of main tracks at the highway-rail crossing.
OTHRTRK	Number of tracks other than main tracks at the highway-rail crossing.
XBUCK	Total number of cross-bucks.
STOPSTD	Number of standard stop signs at the highway-rail crossing.
GATERW	Number of gates w/ red and white reflectorized arms at the highway-rail crossing.
GATEOTH	Number of gates other than red and white reflectorized arms at the highway-rail crossing.
FLASHOV	Number of cantilevered flashing lights over traffic lanes of the roadway approaching the highway-rail crossing.
FLASHNOV	Number of cantilevered flashing lights not over traffic lanes of the roadway approaching the highway-rail crossing.
FLASHMAS	Number of mast mounted flashing lights at the highway-rail crossing.
FLASHOTH	Number of flashing lights at the highway-rail crossing not conforming to the MUTCD published by FHWA.
HWYSGNL	Number of highway traffic signals at the highway-rail crossing. Applies only to train activated red-amber-green signals that control street traffic over the crossing.
WIGWAGS	Number of wigwags at the highway-rail crossing.
BELLS	Number of bells at the highway-rail crossing.
NOSIGNS	Indicates whether any signs or signals are present at the highway-rail crossing. 0=At

Attribute	Definition
	least one sign or signal, 1=No signs or signals.
DEVELTYP	Indicates the predominant type of development in the vicinity of the crossing. 1=Open space, 2=Residential, 3=Commercial, 4=Industrial, 5=Institutional.
PAVEMRK	Indicates the presence of highway pavement markings at the highway-rail crossing. 1=Stop lines, 2=Railroad crossing symbol, 3=No markings, 4=Stop lines and railroad crossing symbols.
ADVWARN	Indicates whether advance warning signs are present on any of the highway approaches to the highway-rail crossing. 1=Yes, 2=No.
TRAFICLN	Number of traffic lanes crossing the tracks. Only through lanes are counted.
WHISTBAN	Indicates whether or not a whistle ban is in effect for the crossing. 0=No, 1=24 hour, 2=Partial, 9=Unknown.

RHCI Inventory for Miami-Dade County

CROSSING	RAILROAD	TYPE	STREET	STATE_ROAD	US_ROUTE	CITY	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	NUM_TRAINS
272595H	FEC	Public	NE 215th ST			Miami	25.974429	-80.147845	N	N	20
272596P	FEC	Public	NE 203th ST			Miami	25.963596	-80.147479	Y	Y	34
272598D	FEC	Public	MIAMI GARDENS DR	SR 860		Ojus	25.947475	-80.147559	Y	Y	22
272602R	FEC	Public	NE 179th ST			Miami	25.941597	-80.149383	N	N	20
272603X	FEC	Public	NE 172nd ST			North Miami Beach	25.934765	-80.151527	N	N	20
272604E	FEC	Public	NE 163rd ST	SR 826		North Miami Beach	25.926145	-80.154238	Y	Y	24
272606T	FEC	Public	NE 151th ST			North Miami Beach	25.915039	-80.157715	Y	Y	20
272607A	FEC	Public	NE 146th ST			North Miami	25.910449	-80.158387	N	N	20
272609N	FEC	Public	NE 141st ST			North Miami	25.906085	-80.158983	N	N	24
272610H	FEC	Public	NE 135th ST	SR 916		North Miami	25.900348	-80.163123	Y	Y	20
272611P	FEC	Public	NE 16th AVE			North Miami	25.896839	-80.166601	N	N	20
272612W	FEC	Public	NE 125th/NE 123rd	SR 922		North Miami	25.890764	-80.170648	Y	Y	20
272613D	FEC	Public	NE 107th ST			North Miami	25.873933	-80.178448	Y	N	20
272616Y	FEC	Private	MIAMI SHORES CLUB			Miami Shores	25.869379	-80.180553	N	N	0
272617F	FEC	Public	NE 96th ST			Miami Shores	25.863848	-80.183103	Y	Y	20
272618M	FEC	Public	NE 6th AVE	SR 915		Miami Shores	25.859508	-80.185104	Y	Y	22
272619U	FEC	Public	NE 87th ST			El Portal	25.855154	-80.187111	Y	N	20
272620N	FEC	Public	NE 82nd ST	SR 934		Miami	25.850009	-80.188886	Y	Y	20
272621V	FEC	Public	NE 79th ST	SR 934		Miami	25.847698	-80.188769	Y	Y	20
272622C	FEC	Public	NE 71st ST			Miami	25.840239	-80.188350	N	N	4
272624R	FEC	Public	NE 61st ST			Miami	25.832560	-80.187937	Y	Y	4
272625X	FEC	Public	NE 59th ST			Miami	25.829911	-80.187793	N	X	4
272627L	FEC	Public	NE 54th ST	SR 944		Miami	25.825500	-80.187627	Y	Y	4
272631B	FEC	Public	NE 39th ST			Miami	25.812820	-80.190493	Y	Y	4
272633P	FEC	Public	NE 36th ST	SR 25	US 27	Miami	25.810595	-80.191015	N	X	4
272634W	FEC	Public	NE 29th ST			Miami	25.804054	-80.192484	Y	N	4
272635D	FEC	Public	NE 27th ST			Miami	25.802630	-80.192813	Y	Y	4
272636K	FEC	Public	NE 20th ST			Miami	25.795625	-80.194448	Y	N	4
272637S	FEC	Public	N MIAMI AVE/NW 19			Miami	25.794243	-80.194831	Y	Y	4
272640A	FEC	Public	NW 14th ST			Miami	25.788210	-80.196195	Y	Y	4
272644C	FEC	Public	NW 11th ST			Miami	25.784671	-80.196196	N	N	4
272651M	FEC	Public	N MIAMI AVE			Miami	25.780423	-80.193816	Y	Y	4
272706X	FEC	Public	NE 2nd AVE			Miami	25.841900	-80.192567	Y	Y	22
272707E	FEC	Public	NE MIAMI CT			Miami	25.841799	-80.195652	Y	N	22
272708L	FEC	Public	N MIAMI AVE			Miami	25.841770	-80.196580	Y	Y	22
272709T	FEC	Public	NW MIAMI CT			Miami	25.841751	-80.197169	Y	Y	22
272710M	FEC	Public	NW 2nd AVE			Miami	25.841636	-80.200760	Y	Y	22
272712B	FEC	Public	NW 7th AVE	SR 7	US 441	Miami	25.841379	-80.208901	Y	Y	22
272713H	FEC	Public	NW 17th AVE			Miami	25.840874	-80.225293	Y	Y	22
272714P	FEC	Public	NW 22nd AVE			Miami	25.840740	-80.233372	Y	Y	22
272717K	FEC	Public	NW 27th AVE	SR 9		Miami	25.841272	-80.241579	Y	Y	22
272722G	FEC	Public	NW 32nd AVE			Miami	25.841803	-80.249766	Y	Y	22
272723N	FEC	Public	NW 74th ST			Miami	25.841421	-80.254059	N	N	4
272724V	FEC	Public	NW 74th ST			Miami	25.841390	-80.255589	N	N	4
272725C	FEC	Public	NW 74th ST			Miami	25.841342	-80.256707	N	N	4
272727R	FEC	Public	NW 71st ST			Miami	25.838152	-80.256848	N	N	4
272728X	FEC	Public	NW 71st ST			Miami	25.838223	-80.254522	N	N	4
272730Y	FEC	Public	NW 67th ST			Miami	25.834507	-80.254290	N	N	4
272731F	FEC	Public	NW 67th ST			Miami	25.834469	-80.256628	N	N	4
272733U	FEC	Public	NW 35th AVE			Miami	25.832324	-80.253398	N	N	4
272734B	FEC	Public	NW 37th AVE			Hialeah	25.842205	-80.257971	N	N	22
272735H	FEC	Public	E 10th AVE			Hialeah	25.842081	-80.262006	Y	Y	45
272736P	FEC	Public	E 8th AVE	SR 953		Hialeah	25.841949	-80.266019	Y	Y	22
272737W	FEC	Public	E 6th AVE			Hialeah	25.841821	-80.270020	Y	Y	22
272738D	FEC	Public	E 4th Av/Flamingo	SR 934		Hialeah	25.841692	-80.274043	Y	Y	22
272741L	FEC	Private	HIALEAH RACETRACK			Hialeah	25.841499	-80.280066	N	N	0
272742T	FEC	Public	PALM AVE			Hialeah	25.841435	-80.282077	Y	Y	22
272743A	FEC	Public	W 1st AVE			Hialeah	25.841374	-80.284058	N	N	22
272744G	FEC	Public	RED RD	SR 823		Hialeah	25.841188	-80.290032	Y	Y	22
272745N	FEC	Public	W 22nd Street			Hialeah	25.841709	-80.288929	N	N	4
272746V	FEC	Public	W 23rd Street			Hialeah	25.842596	-80.289463	N	N	4
272748J	FEC	Public	W 8th AVE			Hialeah	25.840925	-80.298070	Y	Y	22
272753F	FEC	Public	NW SO RIVER DR			Miami Springs	25.839757	-80.304393	Y	Y	22
272755U	FEC	Public	NW 74th Street			Medley	25.840715	-80.310492	Y	N	16
272756B	FEC	Public	NW 72/Milan Dairy			Medley	25.842526	-80.314204	Y	Y	16
272757H	FEC	Public	NW 72/Milan Dairy			Medley	25.843185	-80.314221	N	N	16
272758P	FEC	Public	NW 77th ST			Medley	25.843475	-80.314728	N	N	20

RHCI Inventory for Miami-Dade County

CROSSING	MINSPD	NUM_TRK	XBUCK	STOPSTD	GATES	FLASH	BELLS	SIGNS	PAVEMRK	ADVWARN	WHISTBAN	BUS	BICYCLE	SCHOOL	DEV_TYPE
272595H	25	2 Y	N		Y	Y	Y	Y	3	Y	0	N	N	N	Commercial
272596P	50	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	Y	Industrial
272598D	40	2 Y	N		Y	Y	Y	Y	2	Y	0	Y	Y	Y	Commercial
272602R	45	1 Y	N		Y	Y	Y	Y	3	Y	0	Y	Y	N	Commercial
272603X	45	1 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	Y	Commercial
272604E	45	1 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	N	Commercial
272606T	50	3 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	N	Industrial
272607A	50	3 Y	N		Y	Y	Y	Y	2	Y	0	Y	Y	N	Industrial
272609N	45	1 Y	N		Y	Y	Y	Y	3	N	0	Y	Y	N	Industrial
272610H	50	1 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	N	Commercial
272611P	50	1 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Residential
272612W	50	1 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	Y	Commercial
272613D	50	2 Y	N		Y	Y	Y	Y	4	Y	0	N	N	N	Residential
272616Y	0	0 N	N		N	N	N	N			0	N	N	N	
272617F	50	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	Y	Commercial
272618M	30	2 Y	N		Y	Y	Y	Y	2	Y	0	Y	N	N	Commercial
272619U	50	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
272620N	50	3 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Residential
272621V	25	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
272622C	15	9 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
272624R	15	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	Y	Commercial
272625X	15	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	Y	Residential
272627L	15	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	N	Commercial
272631B	15	3 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	Y	Commercial
272633P	15	2 Y	N		Y	Y	Y	Y	2	Y	0	Y	Y	Y	Commercial
272634W	15	5 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
272635D	15	9 Y	Y		Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
272636K	15	12 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	Y	Commercial
272637S	15	5 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	Y	Commercial
272640A	5	5 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	Y	Commercial
272644C	10	11 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	Y	Industrial
272651M	5	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
272706X	15	2 Y	N		Y	Y	Y	Y	2	Y	0	Y	Y	N	Industrial
272707E	15	5 Y	N		Y	Y	Y	Y	3	N	0	Y	N	Y	Industrial
272708L	15	3 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	Y	Commercial
272709T	15	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	Y	Industrial
272710M	15	2 Y	N		Y	Y	Y	Y	3	Y	0	Y	N	Y	Commercial
272712B	15	2 Y	N		Y	Y	Y	Y	1	N	0	Y	N	N	Commercial
272713H	15	3 Y	N		Y	Y	Y	Y	3	Y	0	Y	Y	Y	Residential
272714P	15	3 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Residential
272717K	15	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
272722G	15	6 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
272723N	1	5 Y	N		Y	Y	Y	Y	4	N	0	N	N	N	Industrial
272724V	1	5 Y	N		Y	Y	Y	Y	4	Y	0	N	N	N	Industrial
272725C	1	2 Y	N		Y	Y	Y	Y	3	N	0	N	N	N	Industrial
272727R	1	3 Y	N		Y	Y	Y	Y	4	Y	0	N	N	N	Industrial
272728X	1	4 Y	N		Y	Y	Y	Y	4	N	0	N	N	N	Industrial
272730Y	1	4 Y	N		Y	Y	Y	Y	3	N	0	N	N	N	Industrial
272731F	1	4 Y	N		Y	Y	Y	Y	3	N	0	N	N	N	Industrial
272733U	1	5 N	N		N	N	N	N	3	N	0	Y	N	N	Industrial
272734B	10	4 Y	N		Y	Y	Y	Y	3	Y	0	Y	N	N	Industrial
272735H	15	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Residential
272736P	15	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	Y	Residential
272737W	20	2 Y	N		Y	Y	Y	Y	2	N	0	Y	N	N	Residential
272738D	20	2 Y	N		Y	Y	Y	Y	1	Y	0	Y	N	Y	Commercial
272741L	0	0 N	N		N	N	N	N			0	Y	N	N	
272742T	20	3 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
272743A	20	6 Y	N		Y	Y	Y	Y	2	Y	0	Y	N	N	Industrial
272744G	20	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
272745N	5	2 Y	N		Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
272746V	5	3 Y	N		Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
272748J	20	5 Y	N		Y	Y	Y	Y	2	Y	0	Y	N	Y	Industrial
272753F	10	1 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	Y	Residential
272755U	5	2 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
272756B	5	2 Y	N		Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
272757H	5	2 Y	N		Y	Y	Y	Y	1	N	0	Y	N	N	Industrial
272758P	10	1 N	N		Y	Y	Y	Y	3	N	0	Y	N	N	Industrial

RHCI Inventory for Miami-Dade County

CROSSING	RAILROAD	TYPE	STREET	STATE_ROAD	US_ROUTE	CITY	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	NUM_TRAINS
272759W	FEC	Public	NW 74th AVE			Medley	25.845797	-80.318797 N		N	16
272760R	FEC	Public	NW 69th AVE			Medley	25.841621	-80.310143 N		N	2
272762E	FEC	Public	NW 93rd ST			Medley	25.857961	-80.335766 N		N	16
272763L	FEC	Public	NW 89th AVE			Medley	25.862978	-80.342540 N		N	16
272764T	FEC	Public	NW 91st Court			Medley	25.864709	-80.346112 N		N	0
272765A	FEC	Private	NW 91st Court			Medley	25.864668	-80.346187 N		N	0
272766G	FEC	Private	NW 105th Circle			Medley	25.869023	-80.349324 N		N	0
272767N	FEC	Public	NW 106th Street			Medley	25.869682	-80.351599 N		N	16
272769C	FEC	Private	PRIVATE			Medley	25.879990	-80.366661 N		N	0
272776M	FEC	Public	NW 25th ST			Miami	25.797012	-80.308588 Y		Y	6
272778B	FEC	Public	NW 70 AVE			Miami	25.795434	-80.310744 N		N	6
272787A	FEC	Private	NW 68th AVE			Miami	25.796771	-80.308845 N		N	2
272791P	FEC	Public	W FLAGLER ST	SR 968		Miami	25.770326	-80.308177 Y		Y	6
272792W	FEC	Public	SW 4th ST			Miami	25.766654	-80.308094 N		X	6
272793D	FEC	Public	SW 8th ST	SR 90	US 41	Miami	25.762972	-80.308010 Y		Y	6
272927A	FEC	Public	NW 70th AVE			Miami	25.802910	-80.310708 N		N	6
272931P	FEC	Public	NW 105th Circle			Miami	25.869043	-80.349179 N		N	16
272948T	FEC	Private	TOFC			Medley	25.838598	-80.306363 N		N	0
272950U	FEC	Public	W 19th Street			Hialeah	25.838836	-80.286997 Y		Y	2
272951B	FEC	Public	W 18th Street			Hialeah	25.837939	-80.287002 Y		Y	2
272952H	FEC	Public	W 17th Street			Hialeah	25.837019	-80.286997 Y		Y	2
272954W	FEC	Public	W 16th Street			Hialeah	25.836111	-80.286907 Y		Y	2
272965J	FEC	Public	W 15th Street			Hialeah	25.835205	-80.286869 Y		Y	2
272966R	FEC	Public	W 14th Street			Hialeah	25.834314	-80.286826 Y		Y	2
272967X	FEC	Public	W 13th Street			Hialeah	25.833391	-80.286810 Y		Y	1
272969L	FEC	Public	N.W. 100th Road			Medley	25.873589	-80.359671 N		X	0
272971M	FEC	Public	NW 79th AVE			Medley	25.850632	-80.325872 Y		Y	0
272972U	FEC	Public	N.W. 100th Street			Medley	25.863313	-80.347801 N		X	0
272973B	FEC	Public	NW 101st Street			Medley	25.864695	-80.346153 N		N	0
273008H	FEC	Public	W 21st Street	SR 934		Hialeah	25.840668	-80.287272 Y		Y	2
273009P	FEC	Public	W 20th Street			Hialeah	25.839732	-80.287025 Y		Y	2
273010J	FEC	Public	NE 62nd ST			Miami	25.833220	-80.187972 Y		Y	0
273012X	FEC	Public	NW 105th CIR			Miami	25.867661	-80.347537 N		N	6
273014L	FEC	Private	NW 116th/Beacon S			Miami	25.875688	-80.359676 N		N	4
273139L	FEC	Pedestrian				Miami	25.780065	-80.186148 Y		Y	0
273261D	FEC	Public	NW 122 St./107 Av			Medley	25.884667	-80.371887 N		N	5
273262K	FEC	Public	NW 138th Ave			Medley	25.892294	-80.384858 N		X	5
273266M	FEC	Pedestrian	Okeechobee Ped			Medley	25.840312	-80.303483 N		N	0
621464U	CSX	Public	NW 84th Avenue			Miami	25.784299	-80.332171 Y		N	0
621501U	CSX	Public	SR 112	SR 112		Miami	25.801456	-80.264891 N		X	0
621531L	CSX	Public	NW 32nd Avenue			Hialeah	25.889399	-80.251474 Y		Y	0
621532T	CSX	Public	NW 32nd AVE			Hialeah	25.887179	-80.251497 Y		Y	0
621535N	CSX	Public	NW 36th AVE			Hialeah	25.879896	-80.258150 N		X	0
627898C	CSX	Public	CSX DRIVE			Hialeah	25.858728	-80.258452 X		X	15
627901H	CSX	Public	SW 39th ST			South Miami	25.734611	-80.311086 N		X	0
628293U	CSX	Public	NE 6th AVE			Miami Beach	25.945987	-80.189340 N		X	4
628294B	CSX	Public	NE 4th CT			North Miami Beach	25.945851	-80.192284 N		X	24
628296P	CSX	Public	NE 181st ST			Miami Beach	25.941372	-80.194036 N		X	4
628303X	CSX	Public	NE 1nd CT			Miami Beach	25.939736	-80.198589 N		X	4
628308G	CSX	Public	NW 7th AVE (OPAS)			North Miami Beach	25.926083	-80.212445 N		X	4
628309N	CSX	Public	NW 8th AVE			North Miami Beach	25.925992	-80.214434 Y		Y	4
628310H	CSX	Public	NW 10th AVE			North Miami Beach	25.925907	-80.216495 Y		N	4
628320N	CSX	Public	NW 22nd AVE			Carol City	25.908347	-80.235946 Y		Y	48
628321V	CSX	Public	NW 27th AVE	SR 817		Carol City	25.904419	-80.243881 Y		Y	48
628322C	CSX	Public	CODADAD AVE			Carol City	25.902470	-80.247811 Y		Y	48
628323J	CSX	Public	OPA-LOCKA BLVD			Carol City	25.901187	-80.250419 Y		Y	48
628325X	CSX	Public	DUNAD AVE			Carol City	25.898928	-80.254948 N		X	48
628334W	CSX	Public	NW 135th ST	SR 916		Carol City	25.896708	-80.258360 Y		Y	48
628335D	CSX	Public	NW 36th AVE			Carol City	25.886948	-80.258313 N		X	4
628336K	CSX	Public	NW 36th AVE			Carol City	25.877172	-80.258135 N		X	4
628337S	CSX	Public	NW 36th AVE			Carol City	25.874943	-80.258100 N		X	4
628339F	CSX	Public	NW 79th/E 25th S	SR 934		Hialeah	25.845448	-80.259582 Y		Y	45
628340A	CSX	Public	NW 71st/E 17th St			Hialeah	25.838070	-80.259413 N		X	44
628343V	CSX	Public	NW 62nd ST			Hialeah	25.830713	-80.259214 N		X	0
628347X	CSX	Public	NW 37th AVE			Hialeah	25.828144	-80.257257 N		X	4
628348E	CSX	Public	NW 35th AVE			Hialeah	25.828264	-80.253179 N		X	4
628350F	CSX	Public	NW 37th AVE			Hialeah	25.827484	-80.257231 N		X	4

RHCI Inventory for Miami-Dade County

CROSSING	MINSPD	NUM_TRK	XBUCK	STOPSTD	GATES	FLASH	BELLS	SIGNS	PAVEMRK	ADVWARN	WHISTBAN	BUS	BICYCLE	SCHOOL	DEV_TYPE
272759W	5	2 Y	N		Y	Y	Y	Y	4	Y	0	N	N	N	Industrial
272760R	5	2 Y	N		N	N	N	Y	1	N	0	Y	N	N	Industrial
272762E	5	2 Y	Y		Y	Y	Y	Y	3	N	0	N	N	N	Industrial
272763L	5	2 Y	N		Y	Y	Y	Y	3	N	0	N	N	N	Industrial
272764T	0	0 N	N		N	N	N				0	N	N	N	
272765A	0	0 N	N		N	N	N				0	N	N	N	
272766G	0	0 N	N		N	N	N				0	Y	N	N	
272767N	5	2 Y	N		Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
272769C	0	0 N	N		N	N	N				0	N	N	N	
272776M	5	3 Y	N		Y	Y	Y	Y	3	N	0	N	N	N	Industrial
272778B	5	5 Y	N		Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
272787A	5	1 Y	N		N	N	N	Y	3	N	0	N	N	N	Industrial
272791P	10	1 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	Y	Residential
272792W	5	3 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	Y	Industrial
272793D	5	1 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
272927A	5	2 Y	N		Y	Y	Y	Y	3	N	9	Y	N	N	Institutional
272931P	5	2 Y	N		Y	Y	Y	Y	3	N	9	Y	Y	N	Industrial
272948T	5	1 Y	N		Y	Y	Y	Y	3	N	9	N	Y	N	Industrial
272950U	5	1 Y	N		N	N	N	Y	3	Y	9	Y	N	N	Residential
272951B	5	1 Y	N		N	N	N	Y	4	Y	9	Y	N	N	Residential
272952H	5	1 Y	N		N	N	N	Y	4	N	9	Y	N	N	Residential
272954W	5	1 Y	N		N	N	N	Y	3	Y	9	N	N	N	Residential
272965J	1	1 Y	N		N	N	N	Y	4	Y	9	N	N	N	Residential
272966R	5	1 Y	N		N	N	N	Y	4	Y	9	N	N	N	Residential
272967X	5	2 Y	N		N	N	N	Y	4	N	9	N	N	N	Residential
272969L	0	0 N	N		N	N	N				0	N	N	N	Industrial
272971M	5	1 Y	N		Y	Y	Y	Y	3	N	9	N	N	N	Industrial
272972U	0	0 N	N		N	N	N				0	N	N	N	Industrial
272973B	0	0 N	N		N	N	N				9	N	N	N	
273008H	5	1 Y	N		N	N	N	Y	4	Y	9	Y	N	N	Residential
273009P	5	1 Y	N		N	N	N	Y	4	Y	9	Y	N	N	Residential
273010J	5	1 Y	N		Y	Y	Y	Y	4	N	9	Y	Y	Y	Commercial
273012X	10	1 Y	N		Y	Y	Y	Y	3	N	9	Y	N	N	Industrial
273014L	1	1 Y	N		Y	Y	Y	Y	4	Y	9	N	N	N	Industrial
273139L	0	0 N	N		N	N	N	N			0	Y	Y	N	
273261D	1	4 N	Y		Y	Y	Y	Y	4	N	0	N	N	N	Industrial
273262K	1	1 N	N		Y	Y	Y	Y	4	Y	0	N	N	N	Industrial
273266M	0	0 N	N		N	N	N				0	Y	Y	Y	Industrial
621464U	5	2 N	N		Y	Y	Y	Y	4	Y	0	N	N	N	Commercial
621501U	15	1 N	N		Y	N	Y	Y	4	Y	0	Y	N	Y	Institutional
621531L	5	1 Y	N		Y	Y	Y	Y	4	N	0	Y	N	N	Commercial
621532T	0	0 N	N		N	N	N				0	Y	N	N	
621535N	5	2 N	N		N	N	N	Y	3	N	0	N	N	N	Industrial
627898C	5	1 N	N		Y	N	N	Y	3	N	0	N	N	N	Open Space
627901H	20	1 N	N		Y	N	Y	Y	4	N	0	Y	N	N	Residential
628293U	5	1 Y	N		N	N	N	Y	4	Y	0	N	Y	N	Industrial
628294B	5	1 N	N		N	N	N	Y	3	N	0	N	N	N	Industrial
628296P	5	1 Y	N		N	N	N	Y	3	N	0	Y	N	N	Industrial
628303X	5	3 N	N		N	N	N	Y	3	N	0	Y	N	N	Industrial
628308G	5	3 N	N		N	N	N	N	3	N	0	N	N	N	Industrial
628309N	5	2 Y	N		N	N	N	Y	3	Y	0	N	N	N	Industrial
628310H	5	1 Y	N		N	N	N	Y	3	N	0	N	N	N	Industrial
628320N	74	1 N	N		Y	Y	Y	Y	4	Y	0	Y	Y	N	Commercial
628321V	40	1 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	Y	Commercial
628322C	40	1 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	Y	Institutional
628323J	40	1 Y	N		Y	Y	Y	Y	4	Y	0	Y	Y	N	Commercial
628325X	40	2 N	N		Y	Y	Y	Y	4	N	0	Y	Y	Y	Institutional
628334W	40	2 N	N		Y	Y	Y	Y	4	Y	0	Y	Y	N	Commercial
628335D	5	3 N	N		Y	Y	Y	Y	3	N	0	N	N	N	Industrial
628336K	5	3 Y	N		N	N	N	Y	3	N	0	N	N	N	Industrial
628337S	5	2 Y	N		N	N	N	Y	3	N	0	N	N	N	Industrial
628339F	35	1 Y	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
628340A	40	5 Y	N		Y	Y	Y	Y	3	Y	0	N	N	N	Industrial
628343V	5	2 N	N		Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
628347X	5	2 N	N		Y	Y	Y	Y	3	Y	0	Y	N	N	Industrial
628348E	5	3 N	N		Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
628350F	5	5 N	N		Y	Y	Y	Y	3	N	0	Y	N	N	Industrial

RHCI Inventory for Miami-Dade County

CROSSING	RAILROAD	TYPE	STREET	STATE_ROAD	US_ROUTE	CITY	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	NUM_TRAINS
628352U	CSX	Public	NW 58th ST			Hialeah	25.827174	-80.255049 N		X	4
628355P	CSX	Public	NW 54th/Hialeah D	SR 944		Hialeah	25.823359	-80.259017 Y		Y	18
628359S	CSX	Public	NW 37th AVE			Hialeah	25.821123	-80.256930 N		X	1
628360L	CSX	Public	NW 46th/SE 8th			Hialeah	25.815950	-80.258823 N		X	48
628366C	CSX	Public	Dunan Brick			Hialeah	25.813714	-80.259443 N		N	4
628377P	CSX	Public	NW 36th ST	SR 25	US 27	Hialeah	25.808551	-80.258628 Y		Y	36
628378W	CSX	Public	NW N RIVER DR			Miami	25.807274	-80.258589 Y		Y	38
628379D	CSX	Public	NW N RIVER DR			Miami	25.806856	-80.257952 N		N	2
628381E	CSX	Private	Private			Miami	25.804990	-80.255610 N		N	0
628382L	CSX	Public	NW 32nd Street			Miami	25.804682	-80.255209 N		N	0
628383T	CSX	Private	PVT			Miami	25.804082	-80.254408 N		N	0
628384A	CSX	Private	PVT			Miami	25.803550	-80.253720 N		N	0
628385G	CSX	Private	Private			Miami	25.803035	-80.253027 N		N	0
628386N	CSX	Private	Private			Miami	25.802678	-80.252545 N		N	2
628387V	CSX	Private	Private			Miami	25.801920	-80.251526 N		X	2
628389J	CSX	Private	Private			Miami	25.801185	-80.250544 N		N	0
628390D	CSX	Private	Private			Miami	25.800803	-80.250031 N		X	0
628391K	CSX	Private	Private			Miami	25.800093	-80.249080 N		X	0
628392S	CSX	Private	Private			Miami	25.798975	-80.247581 N		X	3
628403C	CSX	Public	NW N RIVER DR			Miami	25.798115	-80.246211 Y		N	22
628404J	CSX	Public	NW 30th AVE			Miami	25.797906	-80.244001 N		X	22
628406X	CSX	Public	NW 27th AVE	SR 9		Miami	25.798005	-80.239906 Y		Y	22
628407E	CSX	Public	NW 23rd ST			Miami	25.797985	-80.239537 Y		Y	22
628408L	CSX	Public	NW 26th AVE			Miami	25.797834	-80.238853 Y		Y	22
628409T	CSX	Public	NW 25th AVE			Miami	25.797536	-80.237770 Y		Y	22
628410M	CSX	Public	NW 24th CT			Miami	25.797541	-80.236734 Y		Y	22
628411U	CSX	Public	NW 24th AVE			Miami	25.797572	-80.235748 Y		Y	22
628412B	CSX	Public	NW 23rd AVE			Miami	25.797638	-80.233685 Y		Y	22
628413H	CSX	Public	NW 22nd CT			Miami	25.797667	-80.232666 Y		Y	22
628414P	CSX	Public	NW 22nd AVE			Miami	25.797692	-80.231612 Y		Y	22
628417K	CSX	Public	NW 21st AVE			Miami	25.797745	-80.229530 Y		Y	22
628418S	CSX	Public	NW 19th AVE			Miami	25.797827	-80.227523 Y		Y	22
628419Y	CSX	Public	NW 18th AVE			Miami	25.797832	-80.225455 Y		Y	22
628424V	CSX	Public	NW 17th AVE			Miami	25.797915	-80.223398 Y		Y	22
628425C	CSX	Public	NW 14th AVE			Miami	25.798123	-80.219345 Y		Y	22
628426J	CSX	Public	NW 13th AVE			Miami	25.798191	-80.217323 Y		Y	22
628427R	CSX	Public	NW 12th AVE	SR 933		Miami	25.798263	-80.215291 Y		Y	22
628428X	CSX	Public	NW 11th AVE			Miami	25.798276	-80.213227 N		X	22
628429E	CSX	Public	NW 10th AVE			Miami	25.797914	-80.211180 Y		Y	22
628430Y	CSX	Public	NW 10th AVE			Miami	25.798070	-80.211177 Y		Y	6
628431F	CSX	Public	NW 22nd ST			Miami	25.797870	-80.211440 N		X	2
628432M	CSX	Public	NW 11th AVE			Miami	25.796986	-80.213195 Y		N	24
628436P	CSX	Public	NW 21st TER			Miami	25.797201	-80.212748 N		X	2
628437W	CSX	Public	NW 11th AVE			Miami	25.796987	-80.213192 Y		N	2
628438D	CSX	Public	NW 12th AVE	SR 933		Miami	25.796836	-80.215267 Y		Y	2
628439K	CSX	Private	PVT (FARMERS MKT)			Miami	25.796762	-80.215515 N		X	0
628440E	CSX	Public	NW 22 ST			Miami	25.798001	-80.207692 Y		N	22
628475F	CSX	Public	NW N RIVER DR			Miami	25.807269	-80.258589 Y		N	18
628476M	CSX	Public	NW S RIVER DR			Miami	25.805126	-80.258550 N		X	21
628477U	CSX	Public	NW 28th Street			Miami	25.803368	-80.258505 N		N	2
628478B	CSX	Public	NW 25th ST			Miami	25.798881	-80.258340 N		X	39
628502A	CSX	Public	LeJeune Road	SR 953		Miami	25.802141	-80.264444 N		X	4
628505V	CSX	Private	NW 14th Street			Miami	25.786944	-80.271651 N		N	0
628507J	CSX	Public	NW 57th/N Red Rd.	SR 959		Miami	25.785456	-80.288558 N		X	6
628509X	CSX	Public	Hotel Access			Miami	25.784589	-80.303909 N		X	6
628536U	CSX	Public	Milan Dairy Road	SR 969		Miami	25.784294	-80.318848 Y		Y	0
628538H	CSX	Public	NW 78 Avenue			Miami	25.784299	-80.322650 N		N	0
628543E	CSX	Public	NW 107th AVE	SR 985		Sweetwater	25.782404	-80.368709 Y		Y	0
631051C	CSX	Public	NW 12th Street			Hialeah	25.782401	-80.395260 Y		Y	4
631053R	CSX	Private	NW 129 Avenue			Hialeah	25.782665	-80.404702 N		N	0
631054X	CSX	Public	NW 130th Avenue			Hialeah	25.782662	-80.406819 N		N	0
631055E	CSX	Public	W Flagler Street	SR 968		Miami	25.770272	-80.309695 Y		Y	5
631056L	CSX	Public	SW 4th Street			Miami	25.766607	-80.309539 Y		N	5
631057T	CSX	Public	SW 8th Street	SR 90	US 41	Miami	25.762912	-80.309381 Y		Y	5
631058A	CSX	Public	SW 9th Street			West Miami	25.761748	-80.309355 N		X	5
631059G	CSX	Public	SW 12th Street			West Miami	25.759287	-80.309301 N		X	5
631060B	CSX	Public	SW 13th Street			West Miami	25.758561	-80.309351 N		X	5

RHCI Inventory for Miami-Dade County

CROSSING	MINSPD	NUM_TRK	XBUCK	STOPSTD	GATES	FLASH	BELLS	SIGNS	PAVEMRK	ADVWARN	WHISTBAN	BUS	BICYCLE	SCHOOL	DEV_TYPE
628352U	5	3 Y	N	N	N	N	N	Y	3	N	0	Y	N	N	Industrial
628355P	40	4 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
628359S	5	1 N	N	Y	Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
628360L	40	3 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
628366C	5	1 N	N	N	N	N	N	N	3	N	0	Y	N	N	Industrial
628377P	40	2 N	Y	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
628378W	40	2 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
628379D	5	1 Y	N	N	N	N	N	Y	2	N	0	Y	N	N	Commercial
628381E	0	0 N	N	N	N	N	N				0	N	N	N	
628382L	0	0 N	N	N	N	N	N				0	N	N	N	
628383T	0	0 N	N	N	N	N	N				0	N	N	N	
628384A	0	0 N	N	N	N	N	N				0	N	N	N	
628385G	0	0 N	N	N	N	N	N				0	N	N	N	
628386N	5	3 Y	N	N	N	N	N	Y	3	Y	0	N	N	N	Commercial
628387V	5	1 Y	N	N	N	N	N	Y	3	N	0	Y	N	N	Industrial
628389J	15	0 N	N	N	N	N	N				0	Y	N	N	
628390D	0	0 N	N	N	N	N	N	N			0	Y	N	N	
628391K	0	0 N	N	N	N	N	N	N			0	Y	N	N	
628392S	40	2 N	N	N	N	N	N	N			0	Y	N	N	
628403C	5	2 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
628404J	5	3 N	N	Y	Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
628406X	5	2 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
628407E	5	2 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
628408L	5	2 N	N	Y	Y	Y	Y	Y	3	N	0	Y	N	N	Commercial
628409T	5	3 N	N	Y	Y	Y	Y	Y	3	N	0	Y	N	N	Commercial
628410M	5	2 N	N	Y	Y	Y	Y	Y	4	N	0	Y	N	N	Commercial
628411U	5	2 N	N	Y	Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
628412B	5	4 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
628413H	5	4 N	N	Y	Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
628414P	5	3 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
628417K	5	2 N	N	Y	Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
628418S	5	2 N	N	Y	Y	Y	Y	Y	3	N	0	Y	N	Y	Industrial
628419Y	5	2 N	N	Y	Y	N	Y	Y	3	N	0	Y	N	Y	Industrial
628424V	5	2 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	Y	Commercial
628425C	5	3 N	N	Y	Y	Y	Y	Y	4	N	0	Y	N	N	Industrial
628426J	5	4 N	Y	Y	Y	Y	Y	Y	3	N	0	Y	N	N	Commercial
628427R	5	2 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
628428X	5	3 N	N	Y	Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
628429E	5	5 N	N	Y	Y	Y	Y	Y	3	N	0	Y	N	N	Industrial
628430Y	5	2 N	N	N	Y	N	Y	Y	3	Y	0	Y	N	N	Institutional
628431F	5	2 N	N	N	N	N	N	N	3	N	0	Y	N	N	Institutional
628432M	1	1 Y	N	N	N	N	N	Y	3	N	0	Y	N	N	Industrial
628436P	5	1 Y	N	N	N	N	N	Y	3	N	0	Y	N	N	Industrial
628437W	5	3 Y	N	N	N	N	N	Y	3	N	0	Y	N	N	Industrial
628438D	5	2 N	N	N	N	N	N	N	2	N	0	Y	N	N	Industrial
628439K	1	1 N	N	N	N	N	N	N			0	Y	N	N	
628440E	5	1 N	N	N	N	N	N	Y	3	N	0	Y	N	Y	Industrial
628475F	5	2 N	N	Y	Y	N	Y	Y	3	Y	0	Y	N	N	Institutional
628476M	40	3 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
628477U	5	1 Y	N	N	N	N	N	Y	3	N	0	N	N	N	Industrial
628478B	15	2 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
628502A	15	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	Y	Industrial
628505V	0	0 N	N	N	N	N	N				0	N	N	N	
628507J	20	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
628509X	5	2 N	N	Y	Y	Y	Y	Y	2	N	0	Y	N	N	Open Space
628536U	5	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
628538H	5	3 N	N	Y	Y	Y	Y	Y	4	N	0	Y	N	N	Commercial
628543E	5	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	Y	N	Commercial
631051C	5	1 Y	N	Y	Y	Y	Y	Y	4	Y	0	N	Y	N	Residential
631053R	5	0 N	N	N	N	N	N	N			0	N	Y	N	
631054X	5	0 N	N	N	N	N	N	N			0	N	Y	N	
631055E	20	1 Y	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	Y	Institutional
631056L	20	1 Y	N	Y	Y	Y	Y	Y	4	N	0	Y	N	Y	Industrial
631057T	20	1 Y	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
631058A	20	1 Y	N	N	N	N	N	Y	4	Y	0	Y	N	N	Industrial
631059G	20	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Industrial
631060B	20	1 Y	N	N	N	N	N	Y	4	N	0	N	N	N	Industrial

RHCI Inventory for Miami-Dade County

CROSSING	RAILROAD	TYPE	STREET	STATE_ROAD	US_ROUTE	CITY	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	NUM_TRAINS
631061H	CSX	Public	SW 13th Terrace			West Miami	25.757823	-80.309521 N		X	5
631062P	CSX	Public	SW 16th Street			West Miami	25.755625	-80.310520 N		X	5
631063W	CSX	Public	SW 21st Street			West Miami	25.751301	-80.311633 Y		N	5
631064D	CSX	Public	SW 22th Street			West Miami	25.750324	-80.311617 N		X	5
631065K	CSX	Public	SW 23rd Street			West Miami	25.749215	-80.311606 Y		N	5
631066S	CSX	Public	SW 24th St/Coral			West Miami	25.748091	-80.311493 Y		Y	5
631069M	CSX	Public	N Waterway Drive			West Miami	25.742082	-80.311239 Y		Y	5
631070G	CSX	Public	SW 40th/Bird Rd.	SR 976		South Miami	25.733168	-80.311080 Y		Y	5
631071N	CSX	Public	SW 41st Street			South Miami	25.732401	-80.311077 Y		N	5
631072V	CSX	Public	SW 42nd Street			South Miami	25.731676	-80.311056 Y		N	5
631074J	CSX	Public	SW 75th Avenue			South Miami	25.723865	-80.316760 N		X	5
631077E	CSX	Public	SW 56th/Mill Dr.			South Miami	25.717460	-80.323365 Y		Y	2
631078L	CSX	Public	SW 87th Avenue	SR 973		South Miami	25.706779	-80.334394 Y		Y	2
631079T	CSX	Public	SW 72nd/Sunset	SR 986		South Miami	25.702100	-80.338877 Y		Y	2
631081U	CSX	Public	SW 88 St/Kendall	SR 94		Miami	25.687431	-80.352038 Y		Y	2
631084P	CSX	Public	SW 112th Avenue			South Miami	25.664740	-80.372353 Y		Y	2
631091A	CSX	Private	Florida Power			Miami	25.645147	-80.389905 N		N	0
631092G	CSX	Private	Florida Power			Miami	25.643225	-80.391616 N		N	0
631097R	CSX	Public	SW 137/Tallahassee			South Miami	25.633557	-80.414732 Y		N	0
631100W	CSX	Private	SW 157th/Newton R			Miami	25.638265	-80.447577 Y		Y	0
631105F	CSX	Public	SW 136th/Howard D			South Miami	25.638824	-80.478005 N		N	0
631106M	CSX	Private	SW 112th Street			South Miami	25.660933	-80.478800 N		N	0
631107U	CSX	Public	SW 104th Street			South Miami	25.668499	-80.479106 N		N	0
631108B	CSX	Public	SW 177th/Krome Av	SR 997		South Miami	25.680623	-80.479548 N		N	0
631121P	CSX	Public	SW 152nd/Coral Re			South Miami	25.626487	-80.406598 Y		N	0
631122W	CSX	Public	SW 137th/Lingren			South Miami	25.617659	-80.414499 Y		N	0
631126Y	CSX	Public	SW 147th/Naranja			South Miami	25.600562	-80.429793 N		N	0
631127F	CSX	Public	SW 184th/Eureka D			South Miami	25.595808	-80.434029 N		N	0
631128M	CSX	Private	Sw 192/Vihlen/Gro			South Miami	25.587632	-80.441327 N		N	0
631130N	CSX	Public	SW 200 St/Quail R	SR 994		Homestead AFB	25.580381	-80.447830 N		N	0
631131V	CSX	Public	SW 162nd Avenue			Homestead AFB	25.574749	-80.453887 N		N	0
631133J	CSX	Public	SW 167th Avenue			Homestead AFB	25.567335	-80.461898 N		N	0
631134R	CSX	Public	SW 216th Street			Homestead AFB	25.565466	-80.463922 N		N	0
631137L	CSX	Public	SW 177th/Krome Av	SR 997		Homestead	25.552331	-80.478106 N		N	0
631138T	CSX	Public	SW 232nd/Silver P			Homestead	25.550471	-80.480123 N		N	0
631139A	CSX	Public	SW 182nd/Roberts			Homestead	25.544880	-80.486161 N		N	0
631140U	CSX	Public	SW 248th/Coconut			Homestead	25.535685	-80.490280 N		N	0
631141B	CSX	Public	SW 256th Street			Homestead	25.528349	-80.490191 N		N	0
631142H	CSX	Public	SW 264th Street			Homestead	25.521045	-80.490108 N		N	0
631143P	CSX	Public	SW 272nd/Epmore D			Homestead	25.513663	-80.490012 N		N	0
631144W	CSX	Public	SW 280th Street			Homestead	25.506286	-80.489930 N		N	0
631145D	CSX	Public	SW 288th/Biscayne			Homestead	25.498971	-80.489849 N		N	0
631147S	CSX	Public	SW 296th Street			Homestead	25.491736	-80.489756 N		N	0
631148Y	CSX	Public	SW 304th/Kings/NW			Homestead	25.484385	-80.489664 Y		Y	2
631149F	CSX	Public	SW 312nd/NW 8th			Homestead	25.477075	-80.489580 Y		Y	0
631150A	CSX	Private	Private			Homestead	25.476644	-80.489576 Y		N	0
631151G	CSX	Private	Private			Homestead	25.476275	-80.489572 Y		N	0
631152N	CSX	Private	Private			Homestead	25.475992	-80.489569 N		N	0
631153V	CSX	Private	Private			Homestead	25.475391	-80.489544 N		N	0
631155J	CSX	Private	Private			Homestead	25.472331	-80.490069 N		N	0
631156R	CSX	Public	NW 10th Avenue			Homestead	25.471765	-80.489579 Y		N	2
631157X	CSX	Public	NW 10th Avenue			Homestead	25.469851	-80.489551 Y		N	2
631158E	CSX	Public	SW 320th St/Mowry			Homestead	25.469757	-80.489474 Y		N	0
631160F	CSX	Private	SW 6th Avenue			Homestead	25.467942	-80.485467 Y		Y	4
631161M	CSX	Public	SW 5th Avenue			Homestead	25.467944	-80.484438 N		N	4
631169S	CSX	Public	SW 4th/SW 324th			Homestead	25.466096	-80.489393 Y		Y	0
631208F	CSX	Public	NW 87th Avenue			Miami	25.784177	-80.336646 Y		Y	0
631218L	CSX	Private	SW 220th Street			Florida City	25.562586	-80.467036 N		N	0
639869B	CSX	Public	132nd Ct/SW Carbe			Homestead	25.633883	-80.403516 N		N	0
639870V	CSX	Public	132nd Ct/SW Carbe			Homestead	25.633500	-80.403679 N		N	0
641457N	CSX	Public	NW 12th ST			Miami	25.783440	-80.338100 Y		Y	4
643808S	CSX	Public	NW 111th AVE			Carol City	25.782406	-80.375099 Y		Y	2
915143C	CSX	Public	NW 20th/Commissar			Miami	25.793349	-80.266344 N		N	0
915144J	CSX	Private	Fuel Tank Road			Miami	25.790276	-80.268671 N		N	0
915147E	CSX	Public	NW 82nd Avenue			Hialeah	25.784304	-80.328633 N		N	0
926166P	CSX	Public	SW 143 Terrace			South Miami	25.633866	-80.428061 Y		Y	0
926173A	CSX	Public	NW 127th Avenue			Hialeah	25.782617	-80.400749 Y		Y	0

RHCI Inventory for Miami-Dade County

CROSSING	MINSPD	NUM_TRK	XBUCK	STOPSTD	GATES	FLASH	BELLS	SIGNS	PAVEMRK	ADVWARN	WHISTBAN	BUS	BICYCLE	SCHOOL	DEV_TYPE
631061H	20	1 Y	N	N	N	N	N	Y	4	Y	0	N	N	N	Commercial
631062P	20	1 Y	N	Y	Y	Y	Y	Y	4	N	0	N	N	N	Residential
631063W	20	1 Y	Y	Y	Y	Y	Y	Y	1	Y	0	Y	N	N	Residential
631064D	20	1 N	Y	N	N	N	N	Y	1	N	0	Y	N	N	Residential
631065K	20	1 Y	Y	N	N	N	N	Y	1	N	0	Y	N	N	Residential
631066S	20	2 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
631069M	20	1 Y	N	Y	Y	Y	Y	Y	4	N	0	N	N	N	Industrial
631070G	20	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Open Space
631071N	20	1 N	Y	Y	Y	Y	Y	Y	2	N	0	Y	N	N	Industrial
631072V	20	1 N	Y	Y	Y	Y	Y	Y	2	Y	0	Y	N	N	Industrial
631074J	20	1 N	N	Y	Y	Y	Y	Y	4	Y	0	N	N	N	Industrial
631077E	20	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	Y	Y	Institutional
631078L	20	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Residential
631079T	20	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	Y	N	Residential
631081U	20	1 Y	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Commercial
631084P	20	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	Y	Residential
631091A	5	0 N	N	N	N	N	N	N			0	N	N	N	
631092G	20	1 N	N	N	N	N	N	N			0	N	N	N	
631097R	20	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Residential
631100W	15	0 N	N	N	N	N	N				0	N	N	N	
631105F	5	1 Y	N	N	N	N	N	Y	3	N	0	N	Y	N	Open Space
631106M	20	1 N	N	N	N	N	N	N			0	N	Y	N	
631107U	1	1 Y	N	N	N	N	N	Y	3	N	0	N	Y	N	Open Space
631108B	20	1 N	N	Y	Y	Y	Y	Y	4	Y	0	N	Y	N	Open Space
631121P	5	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Residential
631122W	5	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	Y	N	Residential
631126Y	5	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Residential
631127F	5	1 N	N	Y	Y	Y	Y	Y	4	N	0	N	N	N	Residential
631128M	5	1 N	N	N	N	N	N	N			0	N	N	N	
631130N	5	1 N	N	Y	Y	Y	Y	Y	4	Y	0	N	N	N	Open Space
631131V	5	1 Y	N	N	N	N	N	Y	4	N	0	N	N	N	Open Space
631133J	5	1 Y	Y	N	N	N	N	Y	4	N	0	N	N	N	Open Space
631134R	5	1 N	N	Y	Y	Y	Y	Y	4	N	0	N	N	N	Open Space
631137L	5	1 N	N	Y	Y	Y	Y	Y	4	Y	0	N	Y	N	Commercial
631138T	5	1 N	N	Y	Y	Y	Y	Y	4	N	0	N	Y	N	Open Space
631139A	5	1 Y	N	N	N	N	N	Y	3	N	0	N	N	N	Open Space
631140U	5	1 N	N	Y	Y	Y	Y	Y	3	N	0	N	N	N	Open Space
631141B	5	1 N	N	Y	Y	Y	Y	Y	4	N	0	N	N	N	Industrial
631142H	5	1 Y	N	Y	Y	Y	Y	Y	3	N	0	N	N	N	Residential
631143P	5	1 N	N	Y	Y	Y	Y	Y	4	Y	0	N	N	N	Commercial
631144W	5	1 N	N	Y	Y	Y	Y	Y	4	N	0	N	N	N	Residential
631145D	5	1 Y	N	Y	Y	Y	Y	Y	4	Y	0	N	N	Y	Commercial
631147S	5	1 N	Y	Y	Y	Y	Y	Y	4	Y	0	N	N	N	Residential
631148Y	5	1 N	Y	Y	Y	Y	Y	Y	4	Y	0	N	N	Y	Residential
631149F	5	1 N	Y	Y	Y	Y	Y	Y	4	Y	0	Y	N	N	Residential
631150A	5	0 N	N	N	N	N	N	N			0	Y	N	N	
631151G	5	0 N	N	N	N	N	N	N			0	Y	N	N	
631152N	5	0 N	N	N	N	N	N	N			0	Y	N	N	
631153V	5	0 N	N	N	N	N	N	N			0	Y	N	N	
631155J	5	1 N	N	N	N	N	N	N			0	Y	N	N	
631156R	5	1 N	N	N	Y	N	N	Y	3	N	0	Y	N	N	Industrial
631157X	5	2 Y	N	N	N	N	N	Y	3	N	0	Y	N	N	Industrial
631158E	5	2 N	N	Y	Y	Y	Y	Y	4	N	0	Y	N	N	Industrial
631160F	10	1 Y	N	N	N	N	N	Y	1	Y	0	Y	N	N	Commercial
631161M	5	1 Y	Y	N	N	N	N	Y	1	N	0	Y	N	N	Commercial
631169S	5	1 N	N	Y	Y	Y	Y	Y	3	N	0	Y	N	N	Residential
631208F	5	1 N	N	Y	Y	Y	Y	Y	4	N	0	Y	Y	N	Commercial
631218L	5	0 N	N	N	N	N	N	N			0	N	N	N	
639869B	20	1 N	N	Y	N	Y	Y	Y	3	N	0	N	N	N	Open Space
639870V	1	1 N	N	Y	N	Y	Y	Y	3	N	0	N	N	N	Open Space
641457N	5	1 Y	N	Y	Y	Y	Y	Y	4	Y	9	Y	Y	N	Commercial
643808S	5	1 N	N	Y	Y	Y	Y	Y	4	Y	0	Y	Y	N	Commercial
915143C	15	1 N	N	Y	Y	Y	Y	Y			0	Y	N	N	Industrial
915144J	20	0 N	N	N	N	N	N	N			0	Y	N	N	
915147E	5	1 N	N	Y	Y	Y	Y	Y	3	N	0	N	N	N	Commercial
926166P	20	1 N	N	Y	N	Y	Y	Y	4	N	0	N	N	Y	Residential
926173A	5	1 N	N	Y	Y	Y	Y	Y	3		0	N	Y	N	Residential

RHCI Inventory for Miami-Dade County

CROSSING	RAILROAD	TYPE	STREET	STATE_ROAD	US_ROUTE	CITY	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	NUM_TRAINS
926204W	CSX	Private	Private			Homestead	25.691181	-80.494259	N	N	0
927731U	CSX	Private	Killian Pkwy Temp			South Miami	25.672801	-80.365142	N	N	0
936071J	CSX	Public	NW 12th Street			Miami	25.783270	-80.338380	Y	Y	0
937438F	CSX	Private	Mia. Plant. YARD			Miami Beach	25.939688	-80.199621	N	N	0
937439M	CSX	Private	Allapattah			Miami	25.797977	-80.210656	N	N	0

Appendix C: RHCI As Modified by Study Team

Identified Crossings

A total of 273 active at-grade crossings (public and private) in Miami-Dade County was retrieved from the Florida Department of Transportation (FDOT) Rail Highway Crossing Inventory (RHC) on 12/28/11. Attributes for each crossing were gathered from the most current National Highway-Rail Crossing Inventory from the Federal Rail Administration (FRA)

Crossing Inventory Attributes Retrieved from the FDOT Rail Highway Crossing Inventory (RHCI)																											
CROSSING	RAILROAD	TYPE	STREET	STATE_ROAD	US_ROUTE	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	DAYTHRU	MINSPD	MAINTRK	PAVEMRK	WHISTBAN	DEVELTYP	NOSIGNS	ADVWARN	XBUCK	STOPSTD	GATERW/GATEOTH	FLASHOV/ FLASHNOV/ FLASHMAS/ FLASHOTH	BELLS					
Highway-rail Crossing Identification Number	Railroad Code	Numeric code specifying the type category of the highway-rail crossing. 1=Public, 2=Private, 3=Pedestrian	Name of street or road at crossing	Name of state road (if applicable)	Name of US route (if applicable)	Latitude	Longitude	Sidewalks on the approach. Y=Yes, N=No, X=Unknown	Sidewalks through the approach. Y=Yes, N=No, X=Unknown	Normal number of daily through train movements over this crossing b/w 6 AM and 6 PM	Minimum typical speed of trains at the highway-rail crossing	Number of main tracks at the highway-rail crossing	Indicates the presence of highway pavement markings at the highway-rail crossing. 1=Stop lines, 2=Railroad crossing symbol, 3=No markings, 4=Stop lines and railroad crossing symbols	Indicates whether or not a whistle ban is in effect for the crossing. 0=No, 1=24 hour, 2=Partial, 9=Unknown	Indicates the predominant type of development in the vicinity of the crossing. 1=Open space, 2=Residential, 3=Commercial, 4=Industrial, 5=Institutional	Indicates whether any signs or signals are present at the highway-rail crossing. 0=At least one sign or signal, 1=No signs or signals	Indicates whether advance warning signs are present on any of the highway approaches to the highway-rail crossing. 1=Yes, 2=No	Total number of cross-bucks	Number of standard stop signs at the highway-rail crossing	Number of gates w/ red and white reflectorized arms at the highway-rail crossing/ Number of gates other than red and white reflectorized arms at the highway-rail crossing	Number of cantilevered flashing lights over traffic lanes of the roadway approaching the highway-rail crossing/ Number of cantilevered flashing lights not over traffic lanes of the roadway approaching the highway-rail crossing/ Number of mast mounted flashing lights at the highway-rail crossing/ Number of flashing lights at the highway-rail crossing not conforming to the MUTCD published by FHWA	Number of bells at the highway-rail crossing					
Crossing Inventory Attributes Derived/Modified from the FDOT Rail Highway Crossing Inventory (RHCI)																											
CROSSING	RAILROAD	TYPE	STREET_NAM	STATE_ROAD	US_ROUTE	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	DAYTHRU	MINSPD	MAINTRK	PAVEMRK	WHISTBAN	DEV_TYPE	NOSIGNS	ADVWARN	XBUCK_1	STOPSTD_1	GATES	FLASH	BELLS_1	CITY	BUS	BICYCLE	SCHOOL	Trains per day
Crossing ID	Railroad Agency	Rail Crossing Type	Street Name at Rail Crossing	State Road	US Route	Latitude	Longitude	Are sidewalks present at the approaches to the crossing? (Y/N)	Are sidewalks present through the crossing? (Y/N)	Number of daily trains (6:00 AM - 6:00 PM)	Minimum train speed at crossing	Number of main tracks at crossing	What type of pavement markings are at the crossing?	Is there a whistle ban at the crossings?	What is the predominant land use type at the crossing?	Are there any signs or signals at the crossing?	Are there any advance warning signs at the crossing approaches? (Y/N)	Is there a Cross-Buck sign at the crossing? (Y/N)	Is there a stop sign at the crossing? (Y/N)	Are there gates at the crossing? (Y/N)	Are there flashing lights at the crossing? (Y/N)	Are there bells at the crossing? (Y/N)	City	Is there a Bus Stop within 1/4 mile of the Rail Crossing? (Y/N)	Is there a Bicycle Route within 1/4 mile of the Rail Crossing? (Y/N)	Is there a School within 1/4 mile of the Rail Crossing? (Y/N)	Train Activity (trains/day) (Retrieved from FEC & CSX Oct/Nov 2012) *
628355P	CSX	Public	NW 54th/Hialeah D	SR 944		25.823359	-80.259017	Y	Y	18	40	4	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	N	N	N	Y	Y	Hialeah	Y	N	N	76
628360L	CSX	Public	NW 46th/SE 8th			25.815950	-80.258823	N	Unknown	48	40	3	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	N	N	Y	Y	Y	Hialeah	Y	N	N	76
628377P	CSX	Public	NW 36th ST	SR 25	US 27	25.808551	-80.258628	Y	Y	36	40	2	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	N	Y	Y	Y	Y	Hialeah	Y	N	N	76
628321V	CSX	Public	NW 27th AVE	SR 817		25.904419	-80.243881	Y	Y	48	40	1	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	Carol City	Y	Y	Y	60
628322C	CSX	Public	CODADAD AVE			25.902470	-80.247811	Y	Y	48	40	1	Stop Lines & Railroad Crossing Symbols	No	Institutional	Y	Y	Y	N	Y	Y	Y	Carol City	Y	Y	Y	60
628323J	CSX	Public	OPA-LOCKA BLVD			25.901187	-80.250419	Y	Y	48	40	1	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	Carol City	Y	Y	N	60
628325X	CSX	Public	DUNAD AVE			25.898928	-80.254948	N	Unknown	48	40	2	Stop Lines & Railroad Crossing Symbols	No	Institutional	Y	N	N	N	Y	Y	Y	Carol City	Y	Y	Y	60
628334W	CSX	Public	NW 135th ST	SR 916		25.896708	-80.258360	Y	Y	48	40	2	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	N	N	Y	Y	Y	Carol City	Y	Y	N	60
272755U	FEC	Public	NW 74th Street			25.840715	-80.310492	Y	N	16	5	2	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	Y	N	Y	Y	Y	Medley	Y	N	N	10
272756B	FEC	Public	NW 72/Milan Dairy			25.842526	-80.314204	Y	Y	16	5	2	No Markings	No	Industrial	Y	N	Y	N	Y	Y	Y	Medley	Y	N	N	10
272757H	FEC	Public	NW 72/Milan Dairy			25.843185	-80.314221	N	N	16	5	2	Stop Lines	No	Industrial	Y	N	Y	N	Y	Y	Y	Medley	Y	N	N	10
272762E	FEC	Public	NW 93rd ST			25.857961	-80.335766	N	N	16	5	2	No Markings	No	Industrial	Y	N	Y	Y	N	Y	Y	Medley	N	N	N	10
272931P	FEC	Public	NW 105th Circle			25.869043	-80.349179	N	N	16	5	2	No Markings	Unknown	Industrial	Y	N	Y	N	N	Y	Y	Miami	Y	Y	N	10
273012X	FEC	Public	NW 105th CIR			25.867661	-80.347537	N	N	6	10	1	No Markings	Unknown	Industrial	Y	N	Y	N	Y	Y	Y	Miami	Y	N	N	10
272969L	FEC	Public	N.W. 100th Road			25.873589	-80.359671	N	Unknown	0	0	0		No	Industrial			N	N	N	N	Y	Medley	N	N	N	10
273261D	FEC	Public	NW 122 St./107 Av			25.884667	-80.371887	N	N	5	1	4	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	N	N	Y	N	N	Y	Medley	N	N	N	10
272603X	FEC	Public	NE 172nd ST			25.934765	-80.151527	N	N	20	45	1	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	North Miami Beach	Y	Y	Y	9
272604E	FEC	Public	NE 163rd ST	SR 826		25.926145	-80.154238	Y	Y	24	45	1	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	North Miami Beach	Y	Y	N	9
272606T	FEC	Public	NE 151st ST			25.915039	-80.157715	Y	Y	20	50	3	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	Y	N	Y	Y	Y	North Miami Beach	Y	Y	N	9
272607A	FEC	Public	NE 146th ST			25.910449	-80.158387	N	Y	20	50	3	Railroad Crossing symbol	No	Industrial	Y	Y	Y	N	Y	Y	Y	North Miami	Y	Y	N	9
272609N	FEC	Public	NE 141st ST			25.906085	-80.158983	N	N	24	45	1	No Markings	No	Industrial	Y	N	Y	N	Y	Y	Y	North Miami	Y	Y	N	9
272610H	FEC	Public	NE 135th ST	SR 916		25.900348	-80.163123	Y	Y	20	50	1	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	North Miami	Y	Y	N	9
272620N	FEC	Public	NE 82nd ST	SR 934		25.850009	-80.188886	Y	Y	20	50	3	Stop Lines & Railroad Crossing Symbols	No	Residential	Y	Y	Y	N	Y	Y	Y	Miami	Y	N	N	9
272634W	FEC	Public	NE 29th ST			25.804054	-80.192484	Y	N	4	15	5	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	Miami	Y	N	N	9
272708L	FEC	Public	N MIAMI AVE			25.841770	-80.196580	Y	Y	22	15	3	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	Miami	Y	N	Y	9
272734B	FEC	Public	NW 37th AVE			25.842205	-80.257971	N	N	22	10	4	No Markings	No	Industrial	Y	Y	Y	N	Y	Y	Y	Hialeah	Y	N	N	9
272733U	FEC	Public	NW 35th AVE			25.832324	-80.253398	N	N	4	1	5	No Markings	No	Industrial	N	N	N	N	N	N	N	Miami	Y	N	N	3
272787A	FEC	Private	NW 68th AVE			25.796771	-80.308845	N	N	2	5	1	No Markings	No	Industrial	Y	N	Y	N	N	N	N	Miami	N	N	N	2
272950U	FEC	Public	W 19th Street			25.838836	-80.286997	Y	Y	2	5	1	No Markings	Unknown	Residential	Y	Y	Y	N	N	N	N	Hialeah	Y	N	N	2
272951B	FEC	Public	W 18th Street			25.837939	-80.287002	Y	Y	2	5	1	Stop Lines & Railroad Crossing Symbols	Unknown	Residential	Y	Y	Y	N	N	N	N	Hialeah	Y	N	N	2
272952H	FEC	Public	W 17th Street			25.837019	-80.286997	Y	Y	2	5	1	Stop Lines & Railroad Crossing Symbols	Unknown	Residential	Y	N	Y	N	N	N	N	Hialeah	Y	N	N	2
272954W	FEC	Public	W 16th Street			25.836111	-80.286907	Y	Y	2	5	1	No Markings	Unknown	Residential	Y	Y	Y	N	N	N	N	Hialeah	N	N	N	2
272965J	FEC	Public	W 15th Street			25.835205	-80.286869	Y	Y	2	1	1	Stop Lines & Railroad Crossing Symbols	Unknown	Residential	Y	Y	Y	N	N	N	N	Hialeah	N	N	N	2
272966R	FEC	Public	W 14th Street			25.834314	-80.286826	Y	Y	2	5	1	Stop Lines & Railroad Crossing Symbols	Unknown	Residential	Y	Y	Y	N	N	N	N	Hialeah	N	N	N	2
272967X	FEC	Public	W 13th Street			25.833391	-80.286810	Y	Y	1	5																

Crossing Inventory Attributes Retrieved from the FDOT Rail Highway Crossing Inventory (RHCI)																												
CROSSING	RAILROAD	TYPE	STREET	STATE_ROAD	US_ROUTE	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	DAYTHRU	MINSPD	MAINTRK	PAVEMRK	WHISTBAN	DEVELTYP	NOSIGNS	ADVWARN	XBUCK	STOPSTD	GATERW/GATEOTH	FLASHOV/ FLASHNOV/ FLASHMAS/ FLASHOTH	BELLS						
Highway-rail Crossing Identification Number	Railroad Code	Numeric code specifying the type category of the highway-rail crossing. 1=Public, 2=Private, 3=Pedestrian	Name of street or road at crossing	Name of state road (if applicable)	Name of US route (if applicable)	Latitude	Longitude	Sidewalks on the approach. Y=Yes, N=No, X=Unknown	Sidewalks through the approach. Y=Yes, N=No, X=Unknown	Normal number of daily through train movements over this crossing b/w 6 AM and 6 PM	Minimum typical speed of trains at the highway-rail crossing	Number of main tracks at the highway-rail crossing	Indicates the presence of highway pavement markings at the highway-rail crossing. 1=Stop lines, 2=Railroad crossing symbol, 3=No markings, 4=Stop lines and railroad crossing symbols	Indicates whether or not a whistle ban is in effect for the crossing. 0=No, 1=24 hour, 2=Partial, 9=Unknown	Indicates the predominant type of development in the vicinity of the crossing. 1=Open space, 2=Residential, 3=Commercial, 4=Industrial, 5=Institutional	Indicates whether any signs or signals are present at the highway-rail crossing. 0=At least one sign or signal, 1=No signs or signals	Indicates whether advance warning signs are present on any of the highway approaches to the highway-rail crossing. 1=Yes, 2=No	Total number of cross-bucks	Number of standard stop signs at the highway-rail crossing	Number of gates w/ red and white reflectorized arms at the highway-rail crossing/ Number of gates other than red and white reflectorized arms at the highway-rail crossing	Number of cantilevered flashing lights over traffic lanes of the roadway approaching the highway-rail crossing/ Number of cantilevered flashing lights not over traffic lanes of the roadway approaching the highway-rail crossing/ Number of mast mounted flashing lights at the highway-rail crossing/ Number of flashing lights at the highway-rail crossing not conforming to the MUTCD published by FHWA	Number of bells at the highway-rail crossing						
Crossing Inventory Attributes Derived/Modified from the FDOT Rail Highway Crossing Inventory (RHCI)																												
CROSSING	RAILROAD	TYPE	STREET_NAM	STATE_ROAD	US_ROUTE	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	DAYTHRU	MINSPD	MAINTRK	PAVEMRK	WHISTBAN	DEV_TYPE	NOSIGNS	ADVWARN	XBUCK_1	STOPSTD_1	GATES	FLASH	BELLS_1	CITY	BUS	BICYCLE	SCHOOL	Trains per day	
Crossing ID	Railroad Agency	Rail Crossing Type	Street Name at Rail Crossing	State Road	US Route	Latitude	Longitude	Are sidewalks present at the approaches to the crossing? (Y/N)	Are sidewalks present through the crossing? (Y/N)	Number of daily trains (6:00 AM - 6:00 PM)	Minimum train speed at crossing	Number of main tracks at crossing	What type of pavement markings are at the crossing?	Is there a whistle ban at the crossings?	What is the predominant land use type at the crossing?	Are there any signs or signals at the crossing?	Are there any advance warning signs at the crossing approaches? (Y/N)	Is there a Cross-Buck sign at the crossing? (Y/N)	Is there a stop sign at the crossing? (Y/N)	Are there gates at the crossing? (Y/N)	Are there flashing lights at the crossing? (Y/N)	Are there bells at the crossing? (Y/N)	City	Is there a Bus Stop within 1/4 mile of the Rail Crossing? (Y/N)	Is there a Bicycle Route within 1/4 mile of the Rail Crossing? (Y/N)	Is there a School within 1/4 mile of the Rail Crossing? (Y/N)	Train Activity (trains/day) (Retrieved from FEC & CSX Oct/Nov 2012) *	
272624R	FEC	Public	NE 61st ST			25.832560	-80.187937	Y	Y	4	15	2	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	Miami	Y	Y	Y	Y	
272625X	FEC	Public	NE 59th ST			25.829911	-80.187793	N	Unknown	4	15	2	Stop Lines & Railroad Crossing Symbols	No	Residential	Y	Y	Y	N	Y	Y	Y	Miami	Y	Y	Y	Y	
272627L	FEC	Public	NE 54th ST	SR 944		25.825500	-80.187627	Y	Y	4	15	2	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	Miami	Y	Y	Y	N	
272631B	FEC	Public	NE 39th ST			25.812820	-80.190493	Y	Y	4	15	3	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	Miami	Y	Y	Y	Y	
272633P	FEC	Public	NE 36th ST	SR 25	US 27	25.810595	-80.191015	N	Unknown	4	15	2	Railroad Crossing symbol	No	Commercial	Y	Y	Y	N	Y	Y	Y	Miami	Y	Y	Y	Y	
272635D	FEC	Public	NE 27th ST			25.802630	-80.192813	Y	Y	4	15	9	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	Y	N	Y	Y	Miami	Y	N	N	N	
272636K	FEC	Public	NE 20th ST			25.795625	-80.194448	Y	N	4	15	12	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	Miami	Y	Y	Y	Y	
272637S	FEC	Public	N MIAMI AVE/NW 19			25.794243	-80.194831	Y	Y	4	15	5	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	Miami	Y	Y	Y	Y	
272640A	FEC	Public	NW 14th ST			25.788210	-80.196195	Y	Y	4	5	5	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	N	Y	Y	Miami	Y	Y	Y	Y	
272644C	FEC	Public	NW 11th ST			25.784671	-80.196196	N	N	4	10	11	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	Y	N	N	Y	Y	Miami	Y	Y	Y	Y	
272651M	FEC	Public	N MIAMI AVE			25.780423	-80.193816	Y	Y	4	5	2	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	Y	Y	Y	Miami	Y	N	N	Y	
272706X	FEC	Public	NE 2nd AVE			25.841900	-80.192567	Y	Y	22	15	2	Railroad Crossing symbol	No	Industrial	Y	Y	Y	N	Y	Y	Y	Miami	Y	Y	Y	N	
272707E	FEC	Public	NE MIAMI CT			25.841799	-80.195652	Y	N	22	15	5	No Markings	No	Industrial	Y	N	Y	N	Y	Y	Y	Miami	Y	N	Y	Y	
272709T	FEC	Public	NW MIAMI CT			25.841751	-80.197169	Y	Y	22	15	2	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	Y	N	Y	Y	Y	Miami	Y	N	Y	Y	
272710M	FEC	Public	NW 2nd AVE			25.841636	-80.200760	Y	Y	22	15	2	No Markings	No	Commercial	Y	Y	Y	N	Y	Y	Y	Miami	Y	N	Y	Y	
272712B	FEC	Public	NW 7th AVE	SR 7	US 441	25.841379	-80.208901	Y	Y	22	15	2	Stop Lines	No	Commercial	Y	N	Y	N	Y	Y	Y	Miami	Y	N	N	N	
272713H	FEC	Public	NW 17th AVE			25.840874	-80.225293	Y	Y	22	15	3	No Markings	No	Residential	Y	Y	Y	N	Y	Y	Y	Miami	Y	Y	Y	Y	
272714P	FEC	Public	NW 22nd AVE			25.840740	-80.233372	Y	Y	22	15	3	Stop Lines & Railroad Crossing Symbols	No	Residential	Y	Y	Y	N	Y	Y	Y	Miami	Y	N	N	N	
272717K	FEC	Public	NW 27th AVE	SR 9		25.841272	-80.241579	Y	Y	22	15	2	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	Y	N	Y	Y	Y	Miami	Y	N	N	N	
272722G	FEC	Public	NW 32nd AVE			25.841803	-80.249766	Y	Y	22	15	6	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	Y	N	Y	Y	Y	Miami	Y	N	N	N	
272723N	FEC	Public	NW 74th ST			25.841421	-80.254059	N	N	4	1	5	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	N	Y	N	Y	Y	Y	Miami	N	N	N	N	
272724V	FEC	Public	NW 74th ST			25.841390	-80.255589	N	N	4	1	5	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	Y	N	Y	Y	Y	Miami	N	N	N	N	
272725C	FEC	Public	NW 74th ST			25.841342	-80.256707	N	N	4	1	2	No Markings	No	Industrial	Y	Y	Y	N	N	Y	Y	Miami	N	N	N	N	
272727R	FEC	Public	NW 71st ST			25.838152	-80.256848	N	N	4	1	3	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	Y	N	Y	Y	Y	Miami	N	N	N	N	
272728X	FEC	Public	NW 71st ST			25.838223	-80.254522	N	N	4	1	4	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	N	Y	N	Y	Y	Y	Miami	N	N	N	N	
272730Y	FEC	Public	NW 67th ST			25.834507	-80.254290	N	N	4	1	4	No Markings	No	Industrial	Y	N	Y	N	Y	Y	Y	Miami	N	N	N	N	
272731F	FEC	Public	NW 67th ST			25.834469	-80.256628	N	N	4	1	4	No Markings	No	Industrial	Y	N	Y	N	Y	Y	Y	Miami	N	N	N	N	
272735H	FEC	Public	E 10th AVE			25.842081	-80.262006	Y	Y	45	15	2	Stop Lines & Railroad Crossing Symbols	No	Residential	Y	Y	Y	N	Y	Y	Y	Hialeah	Y	N	N	Y	
272736P	FEC	Public	E 8th AVE	SR 953		25.841949	-80.266019	Y	Y	22	15	2	Stop Lines & Railroad Crossing Symbols	No	Residential	Y	Y	Y	N	Y	Y	Y	Hialeah	Y	N	Y	Y	
272737W	FEC	Public	E 6th AVE			25.841821	-80.270020	Y	Y	22	20	2	Railroad Crossing symbol	No	Residential	Y	N	Y	N	Y	Y	Y	Hialeah	Y	N	N	N	
272738D	FEC	Public	E 4th Av/Flamingo	SR 934		25.841692	-80.274043	Y	Y	22	20	2	Stop Lines	No	Commercial	Y	Y	Y	N	Y	Y	Y	Hialeah	Y	N	N	Y	
272741L	FEC	Private	HIA																									

Crossing Inventory Attributes Retrieved from the FDOT Rail Highway Crossing Inventory (RHCI)																												
CROSSING	RAILROAD	TYPE	STREET	STATE_ROAD	US_ROUTE	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	DAYTHRU	MINSPD	MAINTRK	PAVEMRK	WHISTBAN	DEVELTYP	NOSIGNS	ADVWARN	XBUCK	STOPSTD	GATERW/GATEOTH	FLASHOV/ FLASHNOV/ FLASHMAS/ FLASHOTH	BELLS						
Highway-rail Crossing Identification Number	Railroad Code	Numeric code specifying the type category of the highway-rail crossing. 1=Public, 2=Private, 3=Pedestrian	Name of street or road at crossing	Name of state road (if applicable)	Name of US route (if applicable)	Latitude	Longitude	Sidewalks on the approach. Y=Yes, N=No, X=Unknown	Sidewalks through the approach. Y=Yes, N=No, X=Unknown	Normal number of daily through train movements over this crossing b/w 6 AM and 6 PM	Minimum typical speed of trains at the highway-rail crossing	Number of main tracks at the highway-rail crossing	Indicates the presence of highway pavement markings at the highway-rail crossing. 1=Stop lines, 2=Roadroad crossing symbol, 3=No markings, 4=Stop lines and railroad crossing symbols	Indicates whether or not a whistle ban is in effect for the crossing. 0=No, 1=24 hour, 2=Partial, 9=Unknown	Indicates the predominant type of development in the vicinity of the crossing. 1=Open space, 2=Residential, 3=Commercial, 4=Industrial, 5=Institutional	Indicates whether any signs or signals are present at the highway-rail crossing. 0=At least one sign or signal, 1=No signs or signals	Indicates whether advance warning signs are present on any of the highway approaches to the highway-rail crossing. 1=Yes, 2=No	Total number of cross-bucks	Number of standard stop signs at the highway-rail crossing	Number of gates w/ red and white reflectorized arms at the highway-rail crossing/ Number of gates other than red and white reflectorized arms at the highway-rail crossing	Number of cantilevered flashing lights over traffic lanes of the roadway approaching the highway-rail crossing/ Number of cantilevered flashing lights not over traffic lanes of the roadway approaching the highway-rail crossing/ Number of mast mounted flashing lights at the highway-rail crossing/ Number of flashing lights at the highway-rail crossing not conforming to the MUTCD published by FHWA	Number of bells at the highway-rail crossing						
Crossing Inventory Attributes Derived/Modified from the FDOT Rail Highway Crossing Inventory (RHCI)																												
CROSSING	RAILROAD	TYPE	STREET_NAM	STATE_ROAD	US_ROUTE	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	DAYTHRU	MINSPD	MAINTRK	PAVEMRK	WHISTBAN	DEV_TYPE	NOSIGNS	ADVWARN	XBUCK_1	STOPSTD_1	GATES	FLASH	BELLS_1	CITY	BUS	BICYCLE	SCHOOL	Trains per day	
Crossing ID	Railroad Agency	Rail Crossing Type	Street Name at Rail Crossing	State Road	US Route	Latitude	Longitude	Are sidewalks present at the approaches to the crossing? (Y/N)	Are sidewalks present through the crossing? (Y/N)	Number of daily trains (6:00 AM - 6:00 PM)	Minimum train speed at crossing	Number of main tracks at crossing	What type of pavement markings are at the crossing?	Is there a whistle ban at the crossings?	What is the predominant land use type at the crossing?	Are there any signs or signals at the crossing?	Are there any advance warning signs at the crossing approaches? (Y/N)	Is there a Cross-Buck sign at the crossing? (Y/N)	Is there a stop sign at the crossing? (Y/N)	Are there gates at the crossing? (Y/N)	Are there flashing lights at the crossing? (Y/N)	Are there bells at the crossing? (Y/N)	City	Is there a Bus Stop within 1/4 mile of the Rail Crossing? (Y/N)	Is there a Bicycle Route within 1/4 mile of the Rail Crossing? (Y/N)	Is there a School within 1/4 mile of the Rail Crossing? (Y/N)	Train Activity (trains/day) (Retrieved from FEC & CSX Oct/Nov 2012) *	
628379D	CSX	Public	NW N RIVER DR			25.806856	-80.257952	N	N	2	5	1	Railroad Crossing symbol	No	Commercial	Y	N	Y	N	N	N	N	Miami	Y	N	N	N	
628381E	CSX	Private	Private			25.804990	-80.255610	N	N	0	0	0		No				N	N	N	N	N	Miami	N	N	N	N	
628382L	CSX	Public	NW 32nd Street			25.804682	-80.255209	N	N	0	0	0		No				N	N	N	N	N	Miami	N	N	N	N	
628383T	CSX	Private	PVT			25.804082	-80.254408	N	N	0	0	0		No				N	N	N	N	N	Miami	N	N	N	N	
628384A	CSX	Private	PVT			25.803550	-80.253720	N	N	0	0	0		No				N	N	N	N	N	Miami	N	N	N	N	
628385G	CSX	Private	Private			25.803035	-80.253027	N	N	0	0	0		No				N	N	N	N	N	Miami	N	N	N	N	
628386N	CSX	Private	Private			25.802678	-80.252545	N	N	2	5	3	No Markings	No	Commercial	Y	Y	Y	N	N	N	N	Miami	N	N	N	N	
628387V	CSX	Private	Private			25.801920	-80.251526	N	Unknown	2	5	1	No Markings	No	Industrial	Y	N	Y	N	N	N	N	Miami	Y	N	N	N	
628389J	CSX	Private	Private			25.801185	-80.250544	N	N	0	15	0		No				N	N	N	N	N	Miami	Y	N	N	N	
628390D	CSX	Private	Private			25.800803	-80.250031	N	Unknown	0	0	0		No		N		N	N	N	N	N	Miami	Y	N	N	N	
628391K	CSX	Private	Private			25.800093	-80.249080	N	Unknown	0	0	0		No		N		N	N	N	N	N	Miami	Y	N	N	N	
628392S	CSX	Private	Private			25.798975	-80.247581	N	Unknown	3	40	2		No		N		N	N	N	N	N	Miami	Y	N	N	N	
628403C	CSX	Public	NW N RIVER DR			25.798115	-80.246211	Y	N	22	5	2	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	N	N	Y	Y	Y	Miami	Y	N	N	N	
628406X	CSX	Public	NW 27th AVE	SR 9		25.798005	-80.239906	Y	Y	22	5	2	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	N	N	Y	Y	Y	Miami	Y	N	N	N	
628407E	CSX	Public	NW 23rd ST			25.797985	-80.239537	Y	Y	22	5	2	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	N	N	Y	Y	Y	Miami	Y	N	N	N	
628408L	CSX	Public	NW 26th AVE			25.797834	-80.238853	Y	Y	22	5	2	No Markings	No	Commercial	Y	N	N	N	Y	Y	Y	Miami	Y	N	N	N	
628409T	CSX	Public	NW 25th AVE			25.797536	-80.237770	Y	Y	22	5	3	No Markings	No	Commercial	Y	N	N	N	N	Y	Y	Miami	Y	N	N	N	
628410M	CSX	Public	NW 24th CT			25.797541	-80.236734	Y	Y	22	5	2	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	N	N	N	Y	Y	Y	Miami	Y	N	N	N	
628411U	CSX	Public	NW 24th AVE			25.797572	-80.235748	Y	Y	22	5	2	No Markings	No	Industrial	Y	N	N	N	Y	Y	Y	Miami	Y	N	N	N	
628412B	CSX	Public	NW 23rd AVE			25.797638	-80.233685	Y	Y	22	5	4	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	N	N	N	Y	Y	Miami	Y	N	N	N	
628413H	CSX	Public	NW 22nd CT			25.797667	-80.232666	Y	Y	22	5	4	No Markings	No	Industrial	Y	N	N	N	Y	Y	Y	Miami	Y	N	N	N	
628414P	CSX	Public	NW 22nd AVE			25.797692	-80.231612	Y	Y	22	5	3	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	N	N	Y	Y	Y	Miami	Y	N	N	N	
628417K	CSX	Public	NW 21st AVE			25.797745	-80.229530	Y	Y	22	5	2	No Markings	No	Industrial	Y	N	N	N	N	Y	Y	Miami	Y	N	N	N	
628418S	CSX	Public	NW 19th AVE			25.797827	-80.227523	Y	Y	22	5	2	No Markings	No	Industrial	Y	N	N	N	Y	Y	Y	Miami	Y	N	N	Y	
628419Y	CSX	Public	NW 18th AVE			25.797832	-80.225455	Y	Y	22	5	2	No Markings	No	Industrial	Y	N	N	N	Y	Y	N	Miami	Y	N	N	Y	
628424V	CSX	Public	NW 17th AVE			25.797915	-80.223398	Y	Y	22	5	2	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	N	N	Y	Y	Y	Miami	Y	N	N	Y	
628425C	CSX	Public	NW 14th AVE			25.798123	-80.219345	Y	Y	22	5	3	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	N	N	N	N	Y	Y	Miami	Y	N	N	N	
628427R	CSX	Public	NW 12th AVE	SR 933		25.798263	-80.215291	Y	Y	22	5	2	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	N	N	Y	Y	Y	Miami	Y	N	N	N	
628428X	CSX	Public	NW 11th AVE			25.798276	-80.213227	N	Unknown	22	5	3	No Markings	No	Industrial	Y	N	N	N	Y	Y	Y	Miami	Y	N	N	N	
628429E	CSX	Public	NW 10th AVE			25.797914	-80.211180	Y	Y	22	5	5	No Markings	No	Industrial	Y	N	N	N	N	Y	Y	Miami	Y	N	N	N	
628430Y	CSX	Public	NW 10th AVE			25.798070	-80.211177	Y	Y	6	5	2	No Markings	No	Institutional	Y	Y	N	N	N	Y	N	Miami	Y	N	N	N	
628431F	CSX	Public	NW 22nd ST			25.797870	-80.211440	N	Unknown	2	5	2	No Markings	No	Institutional	N	N	N	N	N	N	N	Miami	Y	N	N	N	
628432M	CSX	Public	NW 11th AVE			25.796986	-80.213195	Y	N	24	1	1	No Markings	No	Industrial	Y	N	Y	N									

Crossing Inventory Attributes Retrieved from the FDOT Rail Highway Crossing Inventory (RHCI)																												
CROSSING	RAILROAD	TYPE	STREET	STATE_ROAD	US_ROUTE	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	DAYTHRU	MINSPD	MAINTRK	PAVEMRK	WHISTBAN	DEVELTYP	NOSIGNS	ADVWARN	XBUCK	STOPSTD	GATERW/GATEOTH	FLASHOV/ FLASHNOV/ FLASHMAS/ FLASHOTH	BELLS						
Highway-rail Crossing Identification Number	Railroad Code	Numeric code specifying the type category of the highway-rail crossing. 1=Public, 2=Private, 3=Pedestrian	Name of street or road at crossing	Name of state road (if applicable)	Name of US route (if applicable)	Latitude	Longitude	Sidewalks on the approach. Y=Yes, N=No, X=Unknown	Sidewalks through the approach. Y=Yes, N=No, X=Unknown	Normal number of daily through train movements over this crossing b/w 6 AM and 6 PM	Minimum typical speed of trains at the highway-rail crossing	Number of main tracks at the highway-rail crossing	Indicates the presence of highway pavement markings at the highway-rail crossing. 1=Stop lines, 2=Railroad crossing symbol, 3=No markings, 4=Stop lines and railroad crossing symbols	Indicates whether or not a whistle ban is in effect for the crossing. 0=No, 1=24 hour, 2=Partial, 9=Unknown	Indicates the predominant type of development in the vicinity of the crossing. 1=Open space, 2=Residential, 3=Commercial, 4=Industrial, 5=Institutional	Indicates whether any signs or signals are present at the highway-rail crossing. 0=At least one sign or signal, 1=No signs or signals	Indicates whether advance warning signs are present on any of the highway approaches to the highway-rail crossing. 1=Yes, 2=No	Total number of cross-bucks	Number of standard stop signs at the highway-rail crossing	Number of gates w/ red and white reflectorized arms at the highway-rail crossing/ Number of gates other than red and white reflectorized arms at the highway-rail crossing	Number of cantilevered flashing lights over traffic lanes of the roadway approaching the highway-rail crossing/ Number of cantilevered flashing lights not over traffic lanes of the roadway approaching the highway-rail crossing/ Number of mast mounted flashing lights at the highway-rail crossing/ Number of flashing lights at the highway-rail crossing not conforming to the MUTCD published by FWHA	Number of bells at the highway-rail crossing						
Crossing Inventory Attributes Derived/Modified from the FDOT Rail Highway Crossing Inventory (RHCI)																												
CROSSING	RAILROAD	TYPE	STREET_NAM	STATE_ROAD	US_ROUTE	LAT	LONG	SDWLK_PRSN	SDWLK_THRU	DAYTHRU	MINSPD	MAINTRK	PAVEMRK	WHISTBAN	DEV_TYPE	NOSIGNS	ADVWARN	XBUCK_1	STOPSTD_1	GATES	FLASH	BELLS_1	CITY	BUS	BICYCLE	SCHOOL	Trains per day	
Crossing ID	Railroad Agency	Rail Crossing Type	Street Name at Rail Crossing	State Road	US Route	Latitude	Longitude	Are sidewalks present at the approaches to the crossing? (Y/N)	Are sidewalks present through the crossing? (Y/N)	Number of daily trains (6:00 AM - 6:00 PM)	Minimum train speed at crossing	Number of main tracks at crossing	What type of pavement markings are at the crossing?	Is there a whistle ban at the crossings?	What is the predominant land use type at the crossing?	Are there any signs or signals at the crossing?	Are there any advance warning signs at the crossing approaches? (Y/N)	Is there a Cross-Buck sign at the crossing? (Y/N)	Is there a stop sign at the crossing? (Y/N)	Are there gates at the crossing? (Y/N)	Are there flashing lights at the crossing? (Y/N)	Are there bells at the crossing? (Y/N)	City	Is there a Bus Stop within 1/4 mile of the Rail Crossing? (Y/N)	Is there a Bicycle Route within 1/4 mile of the Rail Crossing? (Y/N)	Is there a School within 1/4 mile of the Rail Crossing? (Y/N)	Train Activity (trains/day) (Retrieved from FEC & CSX Oct/Nov 2012) *	
631131V	CSX	Public	SW 162nd Avenue			25.574749	-80.453887	N	N	0	5	1	Stop Lines & Railroad Crossing Symbols	No	Open Space	Y	N	Y	N	N	N	N	Homestead AFB	N	N	N	N	
631133J	CSX	Public	SW 167th Avenue			25.567335	-80.461898	N	N	0	5	1	Stop Lines & Railroad Crossing Symbols	No	Open Space	Y	N	Y	Y	N	N	N	Homestead AFB	N	N	N	N	
631134R	CSX	Public	SW 216th Street			25.565466	-80.463922	N	N	0	5	1	Stop Lines & Railroad Crossing Symbols	No	Open Space	Y	N	N	N	N	Y	Y	Homestead AFB	N	N	N	N	
631137L	CSX	Public	SW 177th/Krome Av	SR 997		25.552331	-80.478106	N	N	0	5	1	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	N	N	Y	Y	Y	Homestead	N	Y	N	N	
631138T	CSX	Public	SW 232nd/Silver P			25.550471	-80.480123	N	N	0	5	1	Stop Lines & Railroad Crossing Symbols	No	Open Space	Y	N	N	N	N	Y	Y	Homestead	N	Y	N	N	
631139A	CSX	Public	SW 182nd/Roberts			25.544880	-80.486161	N	N	0	5	1	No Markings	No	Open Space	Y	N	Y	N	N	N	N	Homestead	N	N	N	N	
631140U	CSX	Public	SW 248th/Coconut			25.535685	-80.490280	N	N	0	5	1	No Markings	No	Open Space	Y	N	N	N	N	Y	Y	Homestead	N	N	N	N	
631141B	CSX	Public	SW 256th Street			25.528349	-80.490191	N	N	0	5	1	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	N	N	N	N	Y	Y	Homestead	N	N	N	N	
631142H	CSX	Public	SW 264th Street			25.521045	-80.490108	N	N	0	5	1	No Markings	No	Residential	Y	N	Y	N	N	Y	Y	Homestead	N	N	N	N	
631143P	CSX	Public	SW 272nd/Epmore D			25.513663	-80.490012	N	N	0	5	1	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	N	N	Y	Y	Y	Homestead	N	N	N	N	
631144W	CSX	Public	SW 280th Street			25.506286	-80.489930	N	N	0	5	1	Stop Lines & Railroad Crossing Symbols	No	Residential	Y	N	N	N	Y	Y	Y	Homestead	N	N	N	N	
631145D	CSX	Public	SW 288th/Biscayne			25.498971	-80.489849	N	N	0	5	1	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	Y	N	N	Y	Y	Homestead	N	N	N	Y	
631147S	CSX	Public	SW 296th Street			25.491736	-80.489756	N	N	0	5	1	Stop Lines & Railroad Crossing Symbols	No	Residential	Y	Y	N	Y	N	Y	Y	Homestead	N	N	N	N	
631148Y	CSX	Public	SW 304th/Kings/NW			25.484385	-80.489664	Y	Y	2	5	1	Stop Lines & Railroad Crossing Symbols	No	Residential	Y	Y	N	Y	N	Y	Y	Homestead	N	N	N	Y	
631149F	CSX	Public	SW 312nd/NW 8th			25.477075	-80.489580	Y	Y	0	5	1	Stop Lines & Railroad Crossing Symbols	No	Residential	Y	Y	N	Y	N	Y	Y	Homestead	Y	N	N	N	
631150A	CSX	Private	Private			25.476644	-80.489576	Y	N	0	5	0		No		N		N	N	N	N	N	Homestead	Y	N	N	N	
631151G	CSX	Private	Private			25.476275	-80.489572	Y	N	0	5	0		No		N		N	N	N	N	N	Homestead	Y	N	N	N	
631152N	CSX	Private	Private			25.475992	-80.489569	N	N	0	5	0		No		N		N	N	N	N	N	Homestead	Y	N	N	N	
631153V	CSX	Private	Private			25.475391	-80.489544	N	N	0	5	0		No		N		N	N	N	N	N	Homestead	Y	N	N	N	
631155J	CSX	Private	Private			25.472331	-80.490069	N	N	0	5	1		No		N		N	N	N	N	N	Homestead	Y	N	N	N	
631156R	CSX	Public	NW 10th Avenue			25.471765	-80.489579	Y	N	2	5	1	No Markings	No	Industrial	Y	N	N	N	N	Y	N	Homestead	Y	N	N	N	
631157X	CSX	Public	NW 10th Avenue			25.469851	-80.489551	Y	N	2	5	2	No Markings	No	Industrial	Y	N	Y	N	N	N	N	Homestead	Y	N	N	N	
631158E	CSX	Public	SW 320th St/Mowry			25.469757	-80.489474	Y	N	0	5	2	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	N	N	N	N	Y	Y	Homestead	Y	N	N	N	
631160F	CSX	Private	SW 6th Avenue			25.467942	-80.485467	Y	Y	4	10	1	Stop Lines	No	Commercial	Y	Y	Y	N	N	N	N	Homestead	Y	N	N	N	
631161M	CSX	Public	SW 5th Avenue			25.467944	-80.484438	N	N	4	5	1	Stop Lines	No	Commercial	Y	N	Y	Y	N	N	N	Homestead	Y	N	N	N	
631169S	CSX	Public	SW 4th/SW 324th			25.466096	-80.489393	Y	Y	0	5	1	No Markings	No	Residential	Y	N	N	N	N	Y	Y	Homestead	Y	N	N	N	
631208F	CSX	Public	NW 87th Avenue			25.784177	-80.336646	Y	Y	0	5	1	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	N	N	N	N	Y	Y	Miami	Y	Y	N	N	
631218L	CSX	Private	SW 220th Street			25.562586	-80.467036	N	N	0	5	0		No		N		N	N	N	N	N	Florida City	N	N	N	N	
639869B	CSX	Public	132nd Ct/SW Carbe			25.633883	-80.403516	N	N	0	20	1	No Markings	No	Open Space	Y	N	N	N	N	Y	Y	Homestead	N	N	N	N	
639870V	CSX	Public	132nd Ct/SW Carbe			25.633500	-80.403679	N	N	0	1	1	No Markings	No	Open Space	Y	N	N	N	N	N	Y	Homestead	N	N	N	N	
641457N	CSX	Public	NW 12th ST			25.783440	-80.338100	Y	Y	4	5	1	Stop Lines & Railroad Crossing Symbols	Unknown	Commercial	Y	Y	Y	N	Y	Y	Y	Miami	Y	Y	N	N	
643808S	CSX	Public	NW 111th AVE			25.782406	-80.375099	Y	Y	2	5	1	Stop Lines & Railroad Crossing Symbols	No	Commercial	Y	Y	N	N	Y	Y	Y	Carol City	Y	Y	N	N	
915143C	CSX	Public	NW 20th/Commissar			25.793349	-80.266344	N	N	0	15	1		No	Industrial	Y		N	N	N	Y	Y	Miami	Y	N	N	N	
915144J	CSX	Private	Fuel Tank Road			25.790276	-80.268671	N	N	0	20	0		No		N		N	N	N	N	N	Miami	Y	N	N	N	
915147E	CSX	Public	NW 82nd Avenue			25.784304	-80.328633	N	N	0	5	1	No Markings	No	Commercial	Y	N	N	N	Y	Y	Y	Hialeah	N	N	N	N	
926204W	CSX	Private	Private			25.691181	-80.494259	N	N	0	20	0		No		N		N	N	N	N	N	Homestead	N	N	N	N	
273139L	FEC	Pedestrian				25.780065	-80.186148	Y	Y	0	0	0		No		N		N	N	N	N	N	Miami	Y	Y	N	N	
273262K	FEC	Public	NW 138th Ave			25.892294	-80.384858	N	Unknown	5	1	1	Stop Lines & Railroad Crossing Symbols	No	Industrial	Y	Y	N	N	N	Y	Y	Medley	N	N	N	N	
273266M	FEC	Pedestrian	Okeechobee Ped			25.840312	-80.303483	N	N	0	0	0		No	Industrial			N	N	N	N	N	Medley	Y	Y	Y	Y	
926166P	CSX	Public	SW 143 Terrace			25.633866	-80.428061	Y	Y	0	20	1	Stop Lines & Railroad Crossing Symbols	No	Residential	Y	N	N	N	N	Y	Y	South Miami	N	N	N	Y	
926173A	CSX	Public	NW 127th Avenue			25.782617	-80.400749	Y	Y	0	5	1	No Markings	No	Residential	Y		N	N	Y	Y	Y	Hialeah	N	Y	N	N	
927731U	CSX	Private	Killian Pkwy Temp			25.672801	-80.365142	N	N	0	20	0		No		N		N	N	N	N	N	South Miami	Y	N	Y	Y	
936071J	CSX	Public	NW 12th Street			25.783270	-80.338380	Y	Y	0	5	1	No Markings	No	Commercial	Y	N	Y	N	Y	Y	Y	Miami	Y	Y	N	N	
937438F	CSX	Private	Mia. Plant. YARD			25.939688	-80.199621	N	N	0	0	0		No		N		N	N	N	N	N	Miami Beach	Y	N	N	N	
937439M	CSX	Private	Allapattah			25.797977	-80.210656	N	N	0	0	0		No		N		N	N	N	N	N	Miami	Y	N	N	N	

* Since train activity was not provided for all rail crossings, this variable was collected for the 73 rail crossings that were identified through the initial evaluation and prioritization criteria.

Appendix D: Grade Crossing Crashes

Grade Crossing Accidents 2007-2011

Incident Number	Railroad	Crossing ID	Highway	City	Year	Month
X11030907	FEC	272603X	N. E. 172ND STREET	NORTH MIAMI BEACH	07	03
X10030607	FEC	272706X	N. E. 2ND AVENUE	MIAMI	07	03
X16042007	FEC	272709T	N. W. MIAMI COURT	MIAMI	07	04
000028889	CSX	628502A	LEJUNE RD (SR 953)	MIAMI	07	02
000034015	CSX	631081U	SW 88 ST/KENDALL DR	MIAMI	07	07
X30101007	FEC	272612W	N. E. 125TH STREET	NORTH MIAMI	07	10
X02011307	FEC	272612W	N. E. 125TH STREET	NORTH MIAMI	07	01
X36111507	FEC	272596P	N. E. 203RD STREET	NORTH MIAMI	07	11
000028911	CSX	628428X	NW 11TH AVE.	MIAMI	07	02
000053445	CSX	628320N	NW 22ND A	OPA LOCKA	08	10
X05082710	FEC	272598D	MIAMI GARDENS DRIVE	NORTH MIAMI BEACH	10	08
000085612	CSX	631058A	SW 9TH ST	WEST MIAMI	11	02
X01032210	FEC	272609N	N. E. 141TH STREET	NORTH MIAMI	10	03
000073764	CSX	628378W	NWN RIVER	MIAMI	10	03
101910	CSX	628339F	NW 79TH STREET	HIALEAH	10	10
X28092707	FEC	272710M	N. W. 2ND AVENUE	MIAMI	07	09
X13122610	FEC	272736P	EAST 8TH AVENUE	HIALEAH	10	12
000077423	CSX	628355P	NW 54TH ST.	HIALEAH	10	06
000034899	CSX	628325X	DUNAD AVENUE	OPA LOCKA	07	08
011507	CSX	628320N	NW 22ND AV	OPA LOCKA	07	01
061907	CSX	628378W	NW NORTH RIVER DRIVE	HIALEAH	07	06
033007	CSX	628378W	NW NORTH RIVER DRIVE	HIALEAH	07	03
060509	SFRV	628377P	NW 36TH ST	HIALEAH	09	06

Grade Crossing Accidents 2007-2011

Incident Number	Day	Time-Hour	Time-Min	AM/PM	Highway User	Position	Visibility
X11030907	09	11	22	PM	Auto	Stopped on crossing	Dark
X10030607	06	12	55	AM	Auto	Stopped on crossing	Dark
X16042007	20	12	10	AM	Auto	Stopped on crossing	Dark
000028889	08	12	45	AM	Auto	Moving over crossing	Dark
000034015	17	4	10	AM	Auto	Moving over crossing	Dark
X30101007	10	5	39	AM	Auto	Moving over crossing	Dark
X02011307	13	11	9	PM	Other	Moving over crossing	Dark
X36111507	15	2	11	AM	Auto	Stopped on crossing	Dark
000028911	08	5	35	AM	Van	Moving over crossing	Dark
000053445	30	11	45	AM	Truck-trailer	Stalled on crossing	Day
X05082710	27	2	37	PM	Auto	Stopped on crossing	Day
000085612	16	4	10	PM	Truck	Stopped on crossing	Day
X01032210	22	5	55	PM	Truck_	Stopped on crossing	Day
000073764	08	8	30	AM	Truck-trailer	Stopped on crossing	Day
101910	19	10	38	AM	Other	Stopped on crossing	Day
X28092707	27	7	8	AM	Auto	Moving over crossing	Day
X13122610	26	3	30	PM	Auto	Moving over crossing	Day
000077423	30	1	50	PM	Auto	Moving over crossing	Day
000034899	07	12	50	AM	Pedestrian	Stopped on crossing	Dark
011507	15	6	48	PM	Auto	Trapped	Dark
061907	19	5	14	PM	Truck	Stopped on crossing	Day
033007	30	5	31	PM	Truck	Stopped on crossing	Day
060509	05	3	25	PM	Truck	Stopped on crossing	Day

Grade Crossing Accidents 2007-2011

Incident Number	Weather	Type of T Lights	Warning Device***	Public	Whistle Ban
X11030907	Clear	Main Yes	010206	Y	NO
X10030607	Clear	Main Yes	010206	Y	NO
X16042007	Clear	Main Yes	010206	Y	NO
000028889	Clear	Main Yes	020611	Y	NO
000034015	Clear	Main Yes	010203060711	Y	NO
X30101007	Clear	Main Yes	010206	Y	NO
X02011307	Clear	Main Yes	010206	Y	NO
X36111507	Rain	Main Yes	010206	Y	NO
000028911	Clear	Siding Yes	010306	Y	NO
000053445	Clear	Main No	0102030611	Y	NO
X05082710	Clear	Main No	010206	Y	NO
000085612	Clear	Main No	0711	Y	NO
X01032210	Clear	Main No	010206	Y	NO
000073764	Clear	Main No	01020611	Y	NO
101910	Clear	Main No	01030607	Y	NO
X28092707	Clear	Main No	010306	Y	NO
X13122610	Clear	Main No	010206	Y	NO
000077423	Clear	Main No	010206	Y	NO
000034899	Clear	Main No	0103060711	Y	NO
011507	Cloudy	Main No	010203050607	Y	NO
061907	Clear	Main Unknown	01030607	Y	NO
033007	Cloudy	Main Unknown	01030607	Y	NO
060509	Cloudy	Main Unknown	0103050607	Y	NO

***Type of warning device at crossing
(series of 2 digit codes)

- 01=gates
- 02=cantilever fls
- 03=standard fls
- 04=wig wags
- 05=highway traffic signals
- 06=audible
- 07=cross bucks
- 08=stop signs
- 09=watchman
- 10=flagged by crew
- 11=other
- 12=none

Grade Crossing Accidents 2007-2011

Incident Number	Number Killed	Number Injured
X11030907	0	0
X10030607	0	0
X16042007	0	0
000028889	1	3
000034015	0	0
X30101007	0	1
X02011307	0	0
X36111507	0	0
000028911	0	2
000053445	0	0
X05082710	0	0
000085612	0	1
X01032210	0	0
000073764	0	0
101910	0	0
X28092707	0	2
X13122610	0	0
000077423	0	1
000034899	1	0
011507	0	0
061907	0	0
033007	0	0
060509	0	0

Grade Crossing Accidents 2007-2011

Incident Number	Narrative
X11030907	AS DRIVER ENTERED THE NE 172ND STREET INTERSECTION, SHE TURNED LEFT, TRAVELING EAST IN THE WEST TRAFFIC LANES. AS DRIVER PROCEEDED EAST INTO ONCOMING TRAFFIC, AN UNKNOWN VEHICLE TRAVELING WEST, APPROACHED HER HEAD ON. AS A RESULT, DRIVER SWERVED TO THE RIGHT TO AVOID A HEAD ON COLLISION AND DROVE TRACK. VEHICLE BECAME IMMOBILE AT THAT TIME AND DRIVER FAILED TO NOTIFY POLICE. DURING THIS TIME,
X10030607	DRIVER WAS TRAVELING NORTHBOUND AND DROVE INTO THE SIGNAL STANCHION POLE LOCATED ON THE NORTHEAST SIDE OF THE TRACKS. VEHICLE WAS WEDGED INTO THE SIGNAL STANCHION POLE WITH THE REAR OF THE VEHICLE FOULING THE MAINLINE TRACK. DRIVER WAS NOT INJURED AND EXITED HER VEHICLE. WITNESSES ATTEMPTED TO FRTRAIN WAS APPROACHING THE CROSSING. CREW STATED THEY OBSERVED A VEHICLE THAT HAD CRASHED INTO THE S
X16042007	MIAMI POLICE OFFICER PARKED HIS VEHICLE ON THE TRACKS AND FAILED TO ACTIVATE THE EMERGENCY LIGHTS AS HE WAS ATTEMPTING TO APPREHEND A SUSPECT. TRAIN WAS UNABLE TO STOP PRIOR TO IMPACT. NO INJURIES WERE SUSTAINED.
000028889	Y22007 HIT AUTO THAT FAILED TO STOP AT CROSSING. WITNESS STATED DRIVER RAN RED LIGHT, CONTINUED PAST FLASHING LIGHTS & BELLS AT TRACKS AND ENTERED PATH OF TRAIN. FATALITY TO DRIVER AND INJURIES TO PASSENGERS. PROTECTION ALSO AT CROSSING: ADVANCED WARNING AND PAVEMENT MARKINGS.
000034015	071917 TRAVELING OVER CROSSING WHEN VEHICLE DROVE THROUGH WARNING GATES AND INTO THE SIDE OF ENGINECSXT 6365. DRIVER GIVEN FIRST AID AT SCENE/NO INJURIES. DRIVER CITED. PROTECTION ALSO AT CROSSING: ADVANCE WARNING SIGNS AND PAVEMENT MARKINGS (STOP LINES & RR XING SYMBOLS).///
X30101007	AS THE TRAIN WAS CROSSING THE N. E. 125TH STREET CROSSING, A VEHICLE DROVE WESTBOUND AROUND THE LOWERED GATES AND INTO THE PATH OF THE TRAIN. ENGINEER ADVISED HE WAS SOUNDING THE HORN AS THE TRAIN ENTERED THE CROSSING AND NEVER SAW THE VEHICLE APPROACH AND WAS MADE AWARE ONCE IMPACT HAD TAKEN PLACE
X02011307	ACCORDING TO WITNESS, DRIVER WAS DRIVING ON THE WRONG SIDE OF THE ROADWAY, WESTBOUND, IN THE EASTBOUND LANE AND PASSED SEVERAL VEHICLES THAT WERE STOPPED AT THE CROSSING. WITHOUT STOPPING, DRIVER DROVER AROUND THE GATE AND RAN INTO THE SIDE OF THE SOUTHBOUND TRAIN AND THEN BACKED UP AND CAME TO A S WITNESS STATED ALL OF THE ACTIVE CROSSING WARNING DEVICES WERE OPERATING AT THE TIME OF THE IMPACT
X36111507	DRIVER STATES HE LOST CONTROL OF HIS VEHICLE AND DROVE ONTO THE TRACKS FACING WESTBOUND FOULING THENORTHBOUND TRACK WITH HIS VEHICLE. CREW STATED THEY OBSERVED A VEHICLE STUCK ON THE TRACKS AS THEYAPPROACHED THE CROSSING. TRAIN WAS IMMEDIATELY PLACED INTO EMERGENCY BUT WAS UNABLE TO STOP PRIOR T
000028911	Y32207 HAD STOPPED AND DETACHED LOCO TO RUN AROUND THEIR TRAIN, LEAVING A RAILCAR IN THE CROSSING. THE RAILROAD CROSSING ARMS WERE DOWN AND TRAFFIC WAS STOPPED. DRIVER OF PENSKE TRUCK REAR-ENDED A STOPPED VAN PUSHING IT INTO THE RAILCAR. DRIVER OF TRUCK FLED SCENE ON FOOT.///
000053445	AS K99530 HEADED SOUTHBOUND TO MIAMI YARD IT STRUCK AN UNOCCUPIED TRUCK THAT HAD BROKEN DOWN ON CROSSING. NO INJURIES. OTHER PROTECTION AT CROSSING: ADVANCE WARNING. DRIVER WAS CITED FOR STOPPING/PARKING ON RAILROAD CROSSING.
X05082710	INVESTIGATION REVEALED A 2008 TOYOTA CAMRY WAS EASTBOUND ON MIAMI GARDENS DRIVE AND ATTEMPTED TO STOP FOR THE LOWERING SIGNAL GATES. AS SHE WAS COMING TO A STOP, HER VEHICLE WAS REAR ENDED BY ANOTHER VEHICLE AND WAS PUSHED ONTO THE TRACKS AND IT STALLED. DRIVER TRIED TO RESTART IT TO NO AVAIL. DR
000085612	072116 HIT WRECKER AT A XING. THE VEHICLE WAS FOULING THE RAILROAD TRACKS. DAMAGES TO LEAD ENGINE 2617. INJURY TO THE TRUCK DRIVER. PROTECTION ALSO AT THE XING INCLUDE: ADVANCE WARNING AND PAVEMENT MARKINGS (STOPLINES AND RRXING SYM).
X01032210	TRAIN 222-22 REPORTED STRIKING AN UNOCCUPIED TRACTOR/TRAILER COMBINATION THAT WAS STUCK ON THE TRACKS AT THE NE 141 STREET CROSSING. THE TRAILER WAS A CAR CARRIER AND HAD SIX VEHICLES LOADED ON IT.ACCORDING TO THE DRIVER OF THE TRUCK, HE HAD JUST FINISHED LOADING THREE VEHICLES ONTO HIS CAR CARRI AND GOT STUCK ATTEMPTING TO CROSS THE ELEVATED CROSSING. HE EXITED THE VEHICLE AND MOVED TO SAFETY
000073764	DRIVER LEAVING THE FPT FACILITY FAILED TO STOP BEFORE FOULING THE TRACK. RESULTING IN THE Y32207 STRIKING THE TRUCK CAUSING DAMAGE TO ENGINE AND TRUCK. PROTECTION ALSO AT THE CROSSING INCLUDES: ADVANCE WARNING AND PAVEMENT MARKINGS (RRX SYMBOLS AND STOPLINES). NO INJURIES.
101910	OPERATOR OF 2008 GMC COMMERCIAL REFRIGERATED DELIVERY TRUCK DROVE THROUGH THE CROSSING GATE AND STOPPED WITH THE REAR OF THE VEHICLE FOULING THE TRACK AND WAS SUBSEQUENTLY STRUCK BY THE NORTHBOUND TRAIN. NO INJURIES SUSTAINED. TRAIN SUSTAINED MULTIPLE POINTS OF DAMAGE.
X28092707	AS THE TRAIN APPROACHED THE CROSSING, A VEHICLE CAME FROM THE NORTH AND DROVE AROUND A VEHICLE THATWAS STOPPED AT THE CROSSING AND THE LOWERED CROSSING GATES INTO THE PATH OF THE TRAIN. TRAIN WAS UNABLE TO STOP PRIOR TO IMPACT. DRIVER WAS NOT INJURED BUT TWO PASSENGERS IN VEHICLE WERE TRANSPORTED
X13122610	ELDERLY DRIVER WAS TRAVELING NORTHBOUND ON EAST 8TH AVENUE APPROACHING THE FEC TRACKS AND FAILED TOSTOP AS THE GATES WERE GOING DOWN. THE VEHICLE THEN ENTERED THE CROSSING AND WAS STRUCK AND THEN SPUN AROUND AND HIT A FENCE. NO INJURIES WERE SUSTAINED.
000077423	OPERATING UNDER RULE 707, OTE TAMPER AND HIGHWAY USER COLLIDED AT 54TH ST. CROSSING. DRIVER WAS INJURED. VEHICLE SPEED UNKNOWN.

Appendix E: List of Crossings Selected for Field Evaluation

List of Crossings Selected for Field Evaluation

Crossing	Rail road	Type	Street	State/US Road	Side Walks Present	Within ¼ mile of school or bus stop	Gate Yes/ No	City
621501U	CSX	Public	SR 112	SR 112	No	Yes	Yes	Miami
627901H	CSX	Public	SW 39th St		No	Yes	Yes	South Miami
628296P	CSX	Public	NE 181st St		No	Yes	No	Miami Beach
628303X	CSX	Public	NE 1nd Ct		No	Yes	No	Miami Beach
628321V	CSX	Public	NW 27th Ave	SR 817	Yes	Yes	Yes	Carol City
628322C	CSX	Public	Codadad Ave		Yes	Yes	Yes	Carol City
628323J	CSX	Public	Opa-Locka Blvd		Yes	Yes	Yes	Carol City
628325X	CSX	Public	Dunad Ave		No	Yes	Yes	Carol City
628334W	CSX	Public	NW 135th St	SR 916	Yes	Yes	Yes	Carol City
628336K	CSX	Public	NW 36th Ave		No	No	No	Carol City
628337S	CSX	Public	NW 36th Ave		No	No	No	Carol City
628350F	CSX	Public	NW 37th Ave		No	Yes	Yes	Hialeah
628352U	CSX	Public	NW 58th St		No	Yes	No	Hialeah
628355P	CSX	Public	NW 54th/Hialeah D	SR 944	Yes	Yes	Ys	Hialeah
628359S	CSX	Public	NW 37th Ave		No	Yes	Yes	Hialeah
628360L	CSX	Public	NW 46th/SE 8th		No	Yes	Yes	Hialeah
628366C	CSX	Public	Dunan Brick		No	Yes	No	Hialeah
628377P	CSX	Public	NW 36th St	SR 25/US 27	Yes	Yes	Yes	Hialeah
628404J	CSX	Public	NW 30th Ave		No	Yes	Yes	Miami
628426J	CSX	Public	NW 13th Ave		Yes	Yes	Yes	Miami
628430Y	CSX	Public	NW 10th Ave		Yes	Yes	No	Miami
628431F	CSX	Public	NW 22nd St		No	Yes	No	Miami
628432M	CSX	Public	NW 11th Ave		Yes	Yes	No	Miami
628437W	CSX	Public	NW 11th Ave		Yes	Yes	No	Miami
628438D	CSX	Public	NW 12th Ave	SR 933	Yes	Yes	No	Miami
628440E	CSX	Public	NW 22 St		Yes	Yes	No	Miami
631054X	CSX	Public	NW 130th Ave		No	No	No	Hialeah
631055E	CSX	Public	W Flagler St	SR 968	Yes	Yes	Yes	Miami
631056L	CSX	Public	SW 4th St		Yes	Yes	Yes	Miami
631057T	CSX	Public	SW 8th St	SR 90/US 41		Yes	Yes	Miami
631063W	CSX	Public	SW 21st St		Yes	Yes	Yes	West Miami
631064D	CSX	Public	SW 22th St		No	Yes	No	West Miami
631065K	CSX	Public	SW 23rd St		Yes	Yes	No	West Miami
631077E	CSX	Public	SW 56th/Mill Dr		Yes	Yes	Yes	South Miami
631084P	CSX	Public	SW 112th Ave		Yes	Yes	Yes	South Miami
631097R	CSX	Public	SW 137/Tallahassee		Yes	Yes	Yes	South Miami
631122W	CSX	Public	SW 137th/Lingren		Yes	Yes	Yes	South Miami
631156R	CSX	Public	NW 10th Ave		Yes	Yes	No	Homestead
631157X	CSX	Public	NW 10th Ave		Yes	Yes	No	Homestead
272603X	FEC	Public	NE 172nd St		No	Yes	Yes	North Miami Beach

Crossing	Rail road	Type	Street	State/US Road	Side Walks Present	Within ¼ mile of school or bus stop	Gate Yes/ No	City
272604E	FEC	Public	NE 163rd St	SR 826	Yes	Yes	Yes	North Miami Beach
272606T	FEC	Public	NE 151th St		Yes	Yes	Yes	North Miami Beach
272607A	FEC	Public	NE 146th St		No	Yes	Yes	North Miami
272609N	FEC	Public	NE 141st St		No	Yes	Yes	North Miami
272610H	FEC	Public	NE 135th St	SR 916	Yes	Yes	Yes	North Miami
272620N	FEC	Public	NE 82nd St	SR 934	Yes	Yes	Yes	Miami
272634W	FEC	Public	NE 29th St		Yes	Yes	Yes	Miami
272708L	FEC	Public	N Miami Ave		Yes	Yes	Yes	Miami
272733U	FEC	Public	NW 35th Ave		No	Yes	No	Miami
272734B	FEC	Public	NW 37th Ave		No	Yes	Yes	Hialeah
272755U	FEC	Public	NW 74th St		Yes	Yes	Yes	Medley
272756B	FEC	Public	NW 72/Milan Dairy		Yes	Yes	Yes	Medley
272757H	FEC	Public	NW 72/Milan Dairy		No	Yes	Yes	Medley
272762E	FEC	Public	NW 93rd St		No	No	Yes	Medley
272778B	FEC	Public	NW 70 Ave		No	Yes	Yes	Miami
272787A	FEC	Private	NW 68th Ave		No	No	No	Miami
272792W	FEC	Public	SW 4th St		No	Yes	Yes	Miami
272927A	FEC	Public	NW 70th Ave		No	Yes	Yes	Miami
272931P	FEC	Public	NW 105th Cir		No	Yes	Yes	Miami
272950U	FEC	Public	W 19th St		Yes	Yes	No	Hialeah
272951B	FEC	Public	W 18th St		Yes	Yes	No	Hialeah
272952H	FEC	Public	W 17th St		Yes	Yes	No	Hialeah
272954W	FEC	Public	W 16th St		Yes	No	No	Hialeah
272965J	FEC	Public	W 15th St		Yes	No	No	Hialeah
272966R	FEC	Public	W 14th St		Yes	No	No	Hialeah
272967X	FEC	Public	W 13th St		Yes	No	No	Hialeah
272969L	FEC	Public	NW 100th Rd		No	No	No	Medley
272972U	FEC	Public	NW 100th St		No	No	No	Medley
272973B	FEC	Public	NW 101st St		No	No	No	Medley
273008H	FEC	Public	W 21st St	SR 934	Yes	Yes	No	Hialeah
273009P	FEC	Public	W 20th St		Yes	Yes	No	Hialeah
273012X	FEC	Public	NW 105th Cir		No	Yes	Yes	Miami
273261D	FEC	Public	NW 122 St/107 Ave		No	No	Yes	Medley

Appendix F: Field Review Evaluation Sheet Sample

Railroad ID: 628377P		Railroad Crossings Field Checklist	
Street Name: NW 365th		Railroad Company: CSX	
City: Hialeah		Direction of Street: E-W	
Observer: Marco Incer		County: Miami Dade	
		Date: 09/01/12	
Element	Present (Yes/No)	NE	NW
Properties			
SIDEWALK	Width (ft):	N/A	5
	Obstructions in sidewalk? (Yes/No):	N/A	N/A
	Clear width to obstruction (in):	N/A	N/A
	X cross slope range:	N/A	0.9
	Surface (Concrete/Asphalt):	11	6
	Surface level (Yes/No):	11	Y
	Grade (%):	11	2.0
	Width (ft):	N/A	3
	Distance from Railroad (ft):	N/A	15
	Color:		Y
Stamped asphalt/Truncated Domes:			
CROSSING SURFACE	Level with top of rail (Yes/No):	Y	Y
	Slip resistant surface (Yes/No):	Y	Y
	Crossing surface material:	C	C
	Flangeway gap (in):	2.5	2.5
	Crossing path clearly delineated (Yes/No):	N	N
	Crossing at 90 degrees (Yes/No):	Y	Y
	Sight distance problems (Yes/No):	N	Y
	Grade (%):	0.5	0.5
	Across each sidewalk approach (Yes/No):		N/A
	Flashing light (Yes/No):	Y	Y
Distance from curb (in):		N/A	
PEDESTRIAN MOVEMENTS CONTROL	Signal (Yes/No):		
	STOP sign (Yes/No):		
	Pavement Markings (Yes/No):		
	Swing gates (Yes/No):		
	Automatic gates (Yes/No):		
	All signs/signals visible (Yes/No):		
	Bells (Yes/No):	Y	
	Train Horn Allowed (Yes/No):	Y	
	Flashers (Yes/No):	Y	
	Warning Signs (Yes/No):	Y	
PEDESTRIAN WARNING DEVICES			

Appendix G: Field Review Evaluation Results

Field View Data Matrix

The following locations were field-checked for existing conditions. This information along with specific selection criteria will be used to identify recommended crossings for further review and analysis. This list includes the 73 original crossing locations and additional crossings added in November 2012.

List of Crossings for Field Review & Findings Summary														WARNING DEVICES				ROADWAY										Difference from Data Used to Select Crossings for Field Evaluation - Tab#2	Within 1/4 mile of a school unless otherwise noted below (from tab 2)
CROSSING	RR	TYPE	STREET	S.R.	US_ROUTE	CITY	SIDEWALK	DWS*	PED GATES	BELLS	HORN	FLASHERS	SIGNS	GATES ONE SIDE	GATES TWO SIDES	STOP LINE	PAVEMENT MESSAGING	SIGNS AT CROSSING	APPROACH SIGNS	SIDE LIGHTS	OVERHEAD LIGHTS								
628430Y	CSX	Public	NW 10th AVE			Miami	YES	NO	NO	YES	YES	YES	YES	NO	NO	YES	NO	YES	NO	YES	NO	OK							
628432M	CSX	Public	NW 11th AVE			Miami	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	Sidewalk-Yes							
628437W	CSX	Public	NW 11th AVE			Miami	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	Sidewalk - Yes							
628438D	CSX	Public	NW 12th AVE	SR 933		Miami	NO	NO	NO	NO	YES	NO	YES	NO	NO	NO	YES	NO	YES/NO	NO	NO	Sidewalk - Yes							
628440E	CSX	Public	NW 22 ST			Miami	NO	NO	NO	NO	YES	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	Sidewalk - Yes							
628352U	CSX	Public	NW 58th ST			Hialeah	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	OK							
628359S	CSX	Public	NW 37th AVE			Hialeah	NO	NO	NO	YES	YES	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	Gates - Yes							
628360L	CSX	Public	NW 46th/SE 8th			Hialeah	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	Sidewalk - No							
628366C ¹	CSX	Public	Dunan Brick			Hialeah	NO	--	NO	--	--	--	--	NO	NO	YES	YES	YES/NO	NO	NO	NO	Sidewalk and Gate - No							
628404J	CSX	Public	NW 30th AVE			Miami	NO	NO	NO	YES	YES	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	Gate - Yes							
631057T	CSX	Public	SW 8th Street	SR 90	US 41	Miami	YES	NO	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	Sidewalks - No data							
631084P	CSX	Public	SW 112th Avenue			South Miami	YES	NO	NO	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	Gate - Yes							
631097R	CSX	Public	SW 137/Tallahasse			South Miami	YES	NO	NO	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	Gate - Yes							
631122W	CSX	Public	SW 137th/Lingren			South Miami	YES	NO	NO	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	Gate - Yes							
631156R	CSX	Public	NW 10th Avenue			Homestead	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	Sidewalk - Yes							
631157X	CSX	Public	NW 10th Avenue			Homestead	NO	NO	NO	YES	YES	YES	NO	NO	NO	NO	NO	YES	NO	YES	NO	Sidewalk - Yes							
628320N	CSX	Public	NW 22nd Avenue			Carol City	YES	YES	NO	YES	--	YES	YES	YES	YES	YES	YES	YES	N/A	YES	YES								
628321V	CSX	Public	NW 27th AVE	SR 817		Carol City	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	OK							
628322C	CSX	Public	CODADAD AVE			Carol City	NO	NO	YES	YES	YES	YES	YES	YES	YES/NO	YES	YES	YES	NO	YES	NO	Sidewalk - Yes							
628323J	CSX	Public	OPA-LOCKA BLVD			Carol City	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	OK							
628325X	CSX	Public	DUNAD AVE			Carol City	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO	NO	YES	NO	YES	NO	Gate - Yes							
628336K	CSX	Public	NW 36th AVE			Carol City	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	YES	NO	OK	No						
628337S	CSX	Public	NW 36th AVE			Carol City	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	OK	no						
628334W	CSX	Public	NW 135th ST	SR 916		Carol City	YES	YES	YES	YES	YES	YES	YES	YES	YES/NO	YES	YES	YES	YES	YES	YES	OK							
628350F	CSX	Public	NW 37th AVE			Hialeah	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	YES	NO	Gate - Yes							
628355P	CSX	Public	NW 54th/Hialeah D	SR 944		Hialeah	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	OK							
631054X ²	CSX	Public	NW 130th Avenue			Hialeah	NO	--	NO	--	--	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Sidewalk & Gate - No							
621501U	CSX	Public	SR 112	SR 112		Miami	NO	NO	NO	NO	NO	NO	NO	YES	NO	YES	YES	YES	NO	YES	NO	Gate - Yes							
628431F	CSX	Public	NW 22nd ST			Miami	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO/YES	NO/YES	NO	YES	NO	OK							
631055E	CSX	Public	W Flagler Street	SR 968		Miami	YES	NO	NO	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	Gate - Yes	no						
628426J	CSX	Public	NW 13th AVE			Miami	NO	NO	NO	YES	YES	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	Sidewalk & Gate - Yes							
631063W	CSX	Public	SW 21st Street			West Miami	NO	NO	NO	YES	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	NO	Sidewalk & Gate - Yes							
631064D	CSX	Public	SW 22th Street			West Miami	NO	NO	NO	NO	YES	NO	YES	NO	NO	YES	YES	NO	YES	NO	NO	OK							
631065K	CSX	Public	SW 23rd Street			West Miami	NO	NO	NO	NO	YES	NO	YES	NO	NO	YES	YES	NO	YES	NO	NO	Sidewalk - Yes							
631056L	CSX	Public	SW 4th Street			Miami	YES	NO	NO	YES	YES	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	Gate - Yes							
631077E	CSX	Public	SW 56th/Mill Dr.			South Miami	YES	NO	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	OK							
627901H	CSX	Public	SW 39th ST			South Miami	NO	NO	NO	YES	YES	YES	YES	YES	NO	YES	YES/NO	YES	YES/NO	YES	NO	Gate - Yes							
628296P	CSX	Public	NE 181st ST			Miami Beach	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES/NO	NO	NO	NO	OK							
628303X	CSX	Public	NE 1nd CT			Miami Beach	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	OK							
628377P	CSX	Public	NW 36th ST	SR 25	US 27	Hialeah	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	Gate - Yes							
631079T	CSX	Public	SW 72nd/Sunset	SR 986		South Miami	YES	NO	NO	YES	YES	YES	NO	YES	NO	YES	YES	YES	YES	YES	YES								

Field View Data Matrix

The following locations were field-checked for existing conditions. This information along with specific selection criteria will be used to identify recommended crossings for further review and analysis. This list includes the 73 original crossing locations and additional crossings added in November 2012.

List of Crossings for Field Review & Findings Summary														WARNING DEVICES				ROADWAY										Difference from Data Used to Select Crossings for Field Evaluation - Tab#2	Within 1/4 mile of a school unless otherwise noted below (from tab 2)
CROSSING	RR	TYPE	STREET	S.R.	US_ROUTE	CITY	SIDEWALK	DWS*	PED GATES	BELLS	HORN	FLASHERS	SIGNS	GATES ONE SIDE	GATES TWO SIDES	STOP LINE	PAVEMENT MESSAGING	SIGNS AT CROSSING	APPROACH SIGNS	SIDE LIGHTS	OVERHEAD LIGHTS								
272950U	FEC	Public	W 19th Street			Hialeah	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES/NO	YES	NO	NO	OK							
272951B	FEC	Public	W 18th Street			Hialeah	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO	YES	NO	NO	OK							
272952H	FEC	Public	W 17th Street			Hialeah	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	NO	NO	OK							
272954W	FEC	Public	W 16th Street			Hialeah	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	NO	NO	OK	no						
272965J	FEC	Public	W 15th Street			Hialeah	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES/NO	YES	NO	NO	OK	no						
272966R	FEC	Public	W 14th Street			Hialeah	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	NO	NO	OK	no						
272734B	FEC	Public	NW 37th AVE			Hialeah	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	YES	YES	Gate - Yes							
272620N	FEC	Public	NE 82nd ST	SR 934		Miami	YES	NO	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	OK							
272778B	FEC	Public	NW 70 AVE			Miami	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	YES	NO	Gate - Yes							
272787A	FEC	Private	NW 68th AVE			Miami	YES	NO	YES	YES	YES	YES	NO	NO	NO	NO	NO	YES	NO	NO	NO	Sidewalk and Gate - No	no						
272792W	FEC	Public	SW 4th ST			Miami	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	YES		YES	NO	Gate - Yes							
272927A	FEC	Public	NW 70th AVE			Miami	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	YES	NO	Gate - Yes							
272931P	FEC	Public	NW 105th Circle			Miami	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	YES	NO	Gate - Yes							
272733U	FEC	Public	NW 35th AVE			Miami	NO	NO	NO	YES	YES	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	OK							
272634W	FEC	Public	NE 29th ST			Miami	YES	NO	YES	YES	NO	YES	NO	YES	YES	YES/NO	YES	YES	YES/NO	YES	YES	OK							
272708L	FEC	Public	N MIAMI AVE			Miami	NO	NO	NO	NO	NO	NO	NO	YES	NO	YES	YES	YES	YES	YES	YES	Sidewalk and Gate - Yes							
272603X	FEC	Public	NE 172nd ST			N. Miami Beach	NO	NO	NO	YES	YES	YES	NO	YES	NO	YES	NO	YES	YES	YES	YES	Gate - Yes							
272604E	FEC	Public	NE 163rd ST	SR 826		N. Miami Beach	YES	NO	YES	YES	YES	YES	NO	YES	NO	YES	NO	YES	YES	YES	YES	OK							
272606T	FEC	Public	NE 151st ST			N. Miami Beach	YES	NO	YES	YES	YES	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	OK							
272607A	FEC	Public	NE 146th ST			North Miami	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	YES	YES	YES	YES	Gate - Yes							
272609N	FEC	Public	NE 141st ST			North Miami	NO	NO	NO	NO	NO	NO	NO	YES	NO	YES/NO	YES/NO	YES	NO	YES	YES	Gate - Yes							
272610H	FEC	Public	NE 135th ST	SR 916		North Miami	YES	NO	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	OK							
272967X	FEC	Public	W 13th Street			Hialeah	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	NO	NO	OK	no						
272969L	FEC	Public	N.W. 100th Road			Medley	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	OK	no						
272972U	FEC	Public	N.W. 100th Street			Medley	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	YES	NO	OK	no						
272973B	FEC	Public	NW 101st Street			Medley	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	YES	NO	OK	no						
273008H	FEC	Public	W 21st Street	SR 934		Hialeah	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	NO	NO	OK							
273009P	FEC	Public	W 20th Street			Hialeah	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES/NO	YES	NO	NO	OK							
272755U ³	FEC	Public	NW 74th Street			Medley	YES	--	YES	--	--	--	--	YES	NO	NO	YES	YES	NO	YES	YES	Sidewalk and Gate - Yes							
272756B	FEC	Public	NW 72/Milan Dairy			Medley	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	NO	OK							
272757H	FEC	Public	NW 72/Milan Dairy			Medley	YES	YES	NO	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES/NO	Sidewalk - No							
272762E	FEC	Public	NW 93rd ST			Medley	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	YES	NO	Gate - Yes	no						
273261D	FEC	Public	NW 122 St./107 Av			Medley	NO	NO	NO	NO	NO	NO	NO	YES	NO	YES/NO	YES/NO	YES	YES/NO	YES	NO	Gate - Yes	no						
273012X	FEC	Public	NW 105th CIR			Miami	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	YES	NO	Gate -Yes							
272707E	FEC	Public	NE MIAMI CT			Miami	NO	NO	NO	YES	YES	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	N/A							
272791P	FEC	Public	W FLAGLER ST	SR 968		Miami	YES	NO	NO	YES	YES	YES	NO	YES	NO	YES	YES	YES	YES	YES	YES	N/A							
272793D	FEC	Public	SW 8th ST	SR 90	US 41	Miami	YES	NO	NO	YES	YES	YES	NO	YES	NO	YES	YES	YES	YES	YES	YES	N/A							
272788G	FEC	Public	NW 16TH ST			Miami Springs	NO	NO	NO	YES	YES	YES	NO	YES	NO	YES	YES	YES	NO	YES	NO	N/A							
273386D	FEC	Public	N AMERICA W E	At Port		Miami	YES	NO	NO	NO	NO	NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A							
273387K	FEC	Private	PARK LOT EX	At Port		Miami	YES	NO	NO	NO	NO	NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A							
272768V	FEC	Private	NW 121ST WAY			Medley	NO	NO	NO	YES	YES	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A							

* Detectable Warning Surface

Missing Information Explanation (from field view notes)

- ¹ 272755U
- FEC
- Under Construction and not open to traffic at this time
- ² 628366C
- CSX
- On private property and access was restricted by gates
- ³ 631054X
- CSX
- The crossing was closed due to SR 836 Extension construction

Appendix H: Final Crossings Rankings Results

Final Crossing Rankings

Project Location Identification Information	Rail	Street_Name	State Road	Has the location involved a pedestrian incident?	Is the location a state route with no sidewalks?	Is the location within 1/4 mile of a school or bus stop and does have a sidewalk but no gate?	Is the location within 1/4 mile of a school or bus stop but does not have a sidewalk?	Obstructions in sidewalk?	Crossing surface not level with top of rail?	Flangeway Gap >3 inches?	Crossing path not clearly delineated?	Crossing not at 90 degrees?	Sight distance problems?	Lack of Pedestrian Gate Control?	3 or more ped movement control devices missing? *	2 or more pedestrian warning devices missing? **	Pedestrian Total	Lacking One sided gate	Lacking Two sided gates	Missing Stop line	Missing Pavement messaging	Missing Signage at crossing	Missing Approach warning signs	Lacking Side warning lights	Lacking Overhead warning lights	Automobile Total	Level of train activity at crossing?	Priority Location	General Total	Total Points	Top 10 ranking
628438D	CSX	NW 12th AVE	SR 933		5		5	3			1		2	4	3	2	25	8	3	8		8	2	6	4	39			0	64	
273387K	FEC	PARK LOT EX	AT PORT						3		1			4	3	2	13	8	3	8	4	8	4	6	4	45		X	0	58	
272951B	FEC	W 18th Street				5			3	3	1		2	4	3	2	23	8	3			8		6	4	29	2		2	54	1
272965J	FEC	W 15th Street				5		3	3	3	1		2	4	3	2	26	8	3			4		6	4	25	2		2	53	2
272950U	FEC	W 19th Street				5			3	3	1		2	4	3	2	23	8	3			4		6	4	25	2		2	50	3
273009P	FEC	W 20th Street				5			3	3	1		2	4	3	2	23	8	3			4		6	4	25	2		2	50	4
628432M	CSX	NW 11th AVE					5										5	8	3	8	4	8	4	6	4	45			0	50	
628437W	CSX	NW 11th AVE					5										5	8	3	8	4	8	4	6	4	45			0	50	
631156R	CSX	NW 10th Avenue					5										5	8	3	8	4	8	4	6	4	45			0	50	
272952H	FEC	W 17th Street				5			3	3	1		2	4	3	2	23	8	3					6	4	21	2		2	46	
272967X	FEC	W 13th Street				5		3		3	1		2	4	3	2	23	8	3					6	4	21	2		2	46	5
628296P	CSX	NE 181st ST					5										5	8	3	8	4	4		6	4	41			0	46	
272966R	FEC	W 14th Street				5				3	1		2	4	3	2	20	8	3					6	4	21	2		2	43	
628325X	CSX	DUNAD AVE		8			5										13			8	4		4		4	20	10		10	43	6
272787A	FEC	NW 68th AVE													3		3	8	3	8	4		4	6	4	37	2		2	42	
628303X	CSX	NE 1nd CT					5										5	8	3	8	4		4	6	4	37			0	42	
628337S	CSX	NW 36th AVE					5										5	8	3	8	4		4	6	4	37			0	42	
628352U	CSX	NW 58th ST					5										5	8	3	8	4		4	6	4	37			0	42	
272954W	FEC	W 16th Street				5				3	1			4	3	2	18	8	3					6	4	21	2		2	41	
272969L	FEC	N.W. 100th Road															0	8	3	8	4		4	6	4	37	4		4	41	
631056L	CSX	SW 4th Street				5			3		1			4	3		16		3	8	4		4		4	23	2		2	41	
272931P	FEC	NW 105th Circle					5										5	8	3	8	4		4		4	31	4		4	40	
628430Y	CSX	NW 10th AVE				5			3		1			4	3		16	8	3		4		4		4	23			0	39	
273386D	FEC	N AMERICA WAY	AT PORT						3		1			4	3	2	13	8	3				4	6	4	25		X	0	38	
628366C	CSX	Dunan Brick					5							4			9	8	3			4	4	6	4	29			0	38	
628431F	CSX	NW 22nd ST					5										5	8	3	8	2	4	4	4	4	33			0	38	
628440E	CSX	NW 22 ST															0		3	8	4	8	4	6	4	37			0	37	
631157X	CSX	NW 10th Avenue					5										5	8	3	8	4		4		4	31			0	36	
272768V	FEC	NW 121ST WAY									1			4	3		8	8	3	8	4		4			27		X	0	35	
273012X	FEC	NW 105th CIR															0	8	3	8	4		4		4	31	4		4	35	
631064D	CSX	SW 22th Street					5										5	8	3			8		6	4	29			0	34	
631065K	CSX	SW 23rd Street					5										5	8	3			8		6	4	29			0	34	
272733U	FEC	NW 35th AVE					5										5		3	8	4		4		4	23	2		2	30	
272762E	FEC	NW 93rd ST								3							3		3	8	4		4		4	23	4		4	30	
628350F	CSX	NW 37th AVE					5										5		3	8	4		4		4	23	2		2	30	
628359S	CSX	NW 37th AVE					5										5		3	8	4		4		4	23	2		2	30	
628404J	CSX	NW 30th AVE					5										5		3	8	4		4		4	23	2		2	30	
628426J	CSX	NW 13th AVE					5										5		3	8	4		4		4	23	2		2	30	
273008H	FEC	W 21st Street	SR 934			5					1	1		4	3	2	16	8	3							11	2		2	29	
628322C	CSX	CODADAD AVE					5								3		8		3				4		4	11	10		10	29	
272707E	FEC	NE Miami CT					5										5		3	8	4		4		4	23		X	0	28	

Final Crossing Rankings

Top 10 ranking	Total Points	General Total	Priority Location	Level of train activity at crossing?	Automobile Total	Lacking Overhead warning lights	Lacking Side warning lights	Missing Approach warning signs	Missing Signage at crossing	Missing Pavement messaging	Missing Stop line	Lacking Two sided gates	Lacking One sided gate	Pedestrian Total	2 or more pedestrian warning devices missing? **	3 or more ped movement control devices missing? *	Lack of Pedestrian Gate Control ¹	Sight distance problems? ¹	Crossing not at 90 degrees? ¹	Crossing path not clearly delineated? ¹	Flangeway Gap >3 inches? ¹	Crossing surface not level with top of rail? ¹	Obstructions in sidewalk? ¹	Is the location within 1/4 mile of a school or bus stop but does not have a sidewalk?	Is the location within 1/4 mile of a school or bus stop and does have a sidewalk but no gate?	Is the location a state route with no sidewalks?	Has the location involved a pedestrian incident?	State Road	Street_Name	Rail	Project Location Identification Information		
	28	4		4	19			4		4	8	3		5										5						NW 37th AVE	FEC	272734B	
	28	0			23			4		4	8	3		5										5						NW 70 AVE	FEC	272778B	
	28	0			23		4	4		4	8	3		5										5						NW 70th AVE	FEC	272927A	
	28	0			23		4	4		4	8	3		5										5						NW 36th AVE	CSX	628336K	
7	26	4	X	4	11						8	3		11			4	2	1	1	3		3		5					NE 151th ST	FEC	272606T	
	26	2	X	2	3							3		21		3	4	2	1	1	1		3		5					W Flagler Street	CSX	631055E	
	25	2		2	23	4		4		4	8	3		0																N.W. 100th Street	FEC	272972U	
	25	2		2	23			4		4	8	3		0																NW 101st Street	FEC	272973B	
8	25	10		10	0									15			4	3		1					5					NW 36th ST	CSX	628377P	
	24	4		4	15						8	3		5										5						NE 146th ST	FEC	272607A	
	24	0			19					4	8	3		5										5						SW 4th St	FEC	272792W	
	23	2		2	11	4		4				3		10									5		5					SR 112	CSX	621501U	
	22	4		4	13			4		2	4	3		5									5							NE 141st ST	FEC	272609N	
	22	4		4	15			4				3		3							3									NW 74th Street	FEC	272755U	
	22	4		4	5	2		4				3		13			4	3	1											NW 72/Milan Dairy	FEC	272757H	
	22	2		2	15	2						3	8	5										5						SW 21st Street	CSX	631063W	
	22	2		2	3							3		17			4	3	1	1					5					SW 112th Avenue	CSX	631084P	
	20	4	X	4	7					4		3		9						1										NE 163rd ST	FEC	272604E	
	20	4		4	7	4						3		9			4	3		1										NW 72/Milan Dairy	FEC	272756B	
	20	0	X	0	11	4		4				3		9			4	3	1	1										NW 16TH ST	FEC	272788G	
	20	10		10	4									6				2		1										NW 46th/SE 8th	CSX	628360L	
	19	4		4	15	4		2			4	3		0																NW 122 St./107 Av	FEC	273261D	
9	19	10	X	10	0									9								3								NW54th/Hialeah D	CSX	628355P	
	19	0	X	0	3							3		16			4		1				3		5					SW 72nd/Sunset	CSX	631079T	
	19	2		2	3							3		14			4		1	1					5					SW137th/Lingren	CSX	631122W	
	18	0	X	0	3							3		15			4						3		5					W Flagler Street	FEC	272791P	
	18	0	X	0	3							3		15			4						3		5					SW 8th Street	FEC	272793D	
	18	2		2	11	4		2				3		5										5						SW 39th ST	CSX	627901H	
10	18	2	X	2	3							3		13			4	3		1						5				SW137/Tallahasse	CSX	631097R	
	17	4		4	6			2			4			7					1	1										NE 29th ST	FEC	272634W	
	17	10		10	4			4						3																OPA-LOCKA BLVD	CSX	628323J	
	16	4		4	7							3		5										5						NE 172nd ST	FEC	272603X	
	16	2	X	2	3							3		11			4			1										SW 8th Street	CSX	631057T	
	15.5	10	X	10	1.5							1.5		4					1											NW 135th ST	CSX	628334W	
	14	10	X	10	0									4																NW 27th AVE	CSX	6283321V	
	13	4		4	3							3		6								3								NE 82nd ST	FEC	272620N	
	11	4		4	3							3		4					1											NE 135th ST	FEC	272610H	
	10	2		2	3							3		5					1	1										SW 56th/Mill Dr.	CSX	631077E	
	7	4		4	3							3		0																N MIAMI AVE	FEC	272708L	
	5	4	X	4	0									1																NW 121ST WAY	FEC	628320N	
	2	2		2	0									0																	NW 130th Avenue	CSX	631054X

* (Signal, Stop sign, Pavement markings, Swing gates, Automatic gates, All signs/signals visible)

** (Bells, Train horn allowed, Flashers, Warning signs)

¹ - Field View Criteria - Physical Conditions Issues for locations with an existing sidewalk

631054X Closed for Construction - No field data obtained

The Miami-Dade MPO has set a policy that assures that no person shall on the basis of race, color, national origin, sex, age, disability, family, or religious status, as provided by Title VI of the Civil Rights Act of 1964, the Civil Rights Restoration Act of 1987, and the Florida Civil Rights Act of 1992 be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination or retaliation under any program or activity. It is the policy of Miami Dade County to comply with all of the requirements of the Americans with Disabilities Act. To request this document in accessible format please call (305) 375-1881. If you are interested in participating in the transportation planning process, please contact the Miami-Dade MPO at (305) 375-4507 or mpo@miamidade.gov, or visit www.miamidade.gov/mpo.



Prepared by

**CDM
Smith**

JACOBS™



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