South Miami-Dade Busway

System Summary

May 2003

National BRT Institute

FTA

MIAMI-DADE

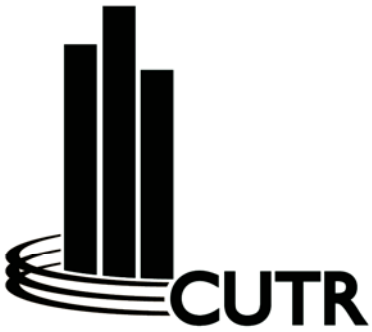

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Table of Contents

List of Exhibits

Executive Summary

The Federal Transit Administration (FTA) has determined the South Miami-Dade Busway as one of its Bus Rapid Transit (BRT) demonstration projects. The demonstration projects, located throughout the United States, were selected based on a solicitation published in the Federal Registrar and are to be evaluated by the FTA. The aim of the BRT Demonstration Program is to implement features of successful BRT systems located throughout the world in a manner that will be compatible with conditions in the US. The purpose of the evaluation of each site is to determine what specifications are the most effective among BRT systems and the types of features that benefit and hinder the operation of the system in order to develop an approach to BRT that is suitable within the US.

The objectives of the FTA's Demonstration Program are to improve bus service, operations and ridership through improved bus speeds and schedule adherence. The FTA specifically aims to minimized the effect on other traffic and local businesses, determine the benefits of Intelligent Transportation Systems/Automated Public Transportation Systems and evaluate the effect BRT systems have on land use and development.

The purpose of this evaluation is to provide an initial record and analysis of the South Miami-Dade Busway system as a newly implemented BRT system within the US. Information compiled and presented in Chapter One acts as a historical summary, including details of system characteristics, ridership data, marketing efforts and the use of technologies. Chapter Two reports results extracted through an on-board survey distributed among Busway users to serve as a review of the system. The National Bus Rapid Transit Institute (NBRTI) completed this assessment of the Busway system with assistance from the Miami-Dade Transit Authority (MDT) and the FTA.

CHAPTER ONE – THE BUSWAY

Introduction

The South Miami-Dade Busway is an eight-mile two-lane roadway designed for exclusive use by transit buses and emergency security vehicles. Constructed in February 1997, the Busway maintains a former rail right-of-way, located approximately 100 feet from US 1. An extension of the Busway is currently being constructed and will extend further south to Florida City and Homestead. The Busway was implemented in an effort to provide faster travel choices for customers of Miami-Dade Transit (MDT).

In order to address the need for faster travel choices through the Busway, MDT worked with the community and conducted public meetings, random telephone surveys, surveys of users on existing bus routes, and surveys of drivers on US 1 along the Busway corridor. Input from the community assisted in the development of the system's characteristics, including scheduling needs, safety concerns and design of stations. Efforts to market the Busway included the production of printed materials, television coverage and a kick-off celebration.

Since the onset of service, ridership reports have been completed, and travel behavior along the Busway has been assessed. While the MDT reports that service on the Busway has not witnessed a large decrease in travel times as compared to service when it ran on US 1, ridership increased up to approximately 50% on both weekdays and weekends and continues to remain high.

This chapter serves as historical documentation of the Busway and includes information regarding system configuration, costs, station design, ridership reports, marketing efforts and technology used. Information concerning the extension is included as well. The documentation reported herein is only a phase one evaluation of the system.

Busway Characteristics

In February 1997, the South Miami-Dade Busway, which connects the Dadeland South Metrorail station and Cutler Ridge, opened for service. The Busway, an eight-mile two-lane exclusive roadway designed for the use of buses operated by Miami-Dade Transit and local emergency vehicles, was built by the Florida Department of Transportation. The Busway runs along a former rail right-of-way parallel to US 1, the majority of the stretch within 100 feet from the road. The US 1 corridor was originally developed along Henry Flagler's Florida Coast Railroad from Miami to Key West. The area currently surrounding the corridor is characteristic of middle and upper class suburbs of Miami. The area south of the existing corridor has farming and small unincorporated areas until it reaches the cities of Homestead and Florida City, to which the Busway will eventually extend.

According to the County's Long Range Transportation Plan, the population in the southern portion of the County is expected to increase 185% between 1990 and 2020. Due to the estimated growth and the lack of a plan to increase roadway capacity, the Long Range Plan determined the US 1 corridor as a high passenger capacity facility with an estimated increase in automobile usage of 175%.

Eighteen intersections and 15 stations are along the Busway in each direction; each station located approximately a half-mile apart. The locations of stations are displayed in Exhibit 1. Bus lanes are in the center of the 100-foot right-of-way, each lane being 12 feet wide with a 3 foot striped median in between. The exception to this is the approach to the Dadeland South Metrorail Station. Exhibit 2 shows a bus stopped at a station and the roadway.

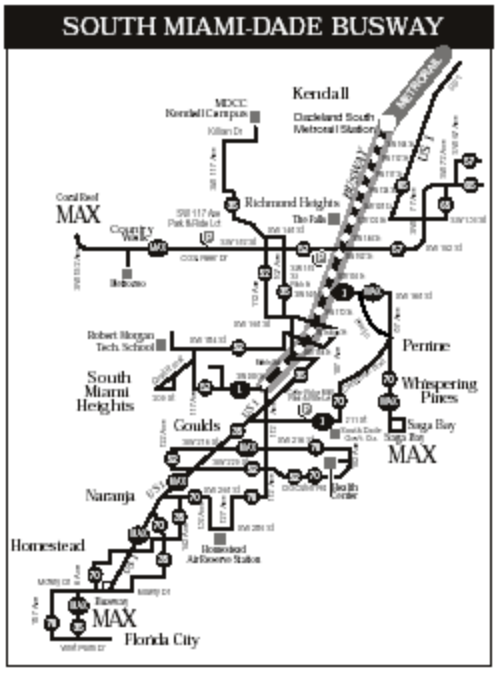


EXHIBIT 1. Busway

EXHIBIT 2. Busway Characteristics

Costs

In August 1992, Hurricane Andrew caused over $20 billion in damage within the area that the corridor is located. While considering redevelopment options, a plan was drafted to build a heavy rail line to serve as an extension to the County's Metrorail. The estimated cost of the rail line, $300 million, was deemed too expensive for a transit facility in the area, whereas the state began to consider lower cost options. The direct cost to build Phase I of the Busway was $42.9 million, with the purchasing costs of the right-of-way being $17 million.

Time Savings

Express buses transport riders to and from the Dadeland South Station and Cutler Ridge in 25 minutes. Since the Busway is at grade with US 1, decreased travel time has been noted to be less than ten percent than travel times recorded when the buses operated on the roadway. While buses are traveling at grade with the adjacent roadway they continue to interact with intersections that are located approximately every one-half mile along the corridor.

Fares

The cost for a one-way trip on the Busway is $1.25. Reduced fare, available to persons with disabilities and students in grades K-12, is $.60. These fares are the same as for other bus service within the County. The farebox on the bus accepts tokens, dollar bills, quarters, dimes and nickels. A monthly pass shown to the bus operator may also be used.

In order to enhance connectivity among buses and rail, the fee that was originally charged for transferring from the bus to Metrorail was eliminated. There are no parking costs for park-and-ride lots along the Busway.

Stations

A total of thirty stations are located along the corridor, with fifteen stations in each direction. This distance is more than two times that of customary stops for local service. Most stations are located on the far side of intersections. Two of the stations are located mid-block in order to serve major trip generators, a strip mall and vocational school. Stations are either 40 or 60 feet in length and have large shelters designed to protect transit customers from the elements, as shown in Exhibit 3. The shelters have a large, waterproof, fiber canopy that is translucent. Information kiosks are at each station, with current maps, schedules and brochures posted. Additional amenities at each location include telephones, newspapers, benches and wastebaskets. Special lights to light up the canopy of the station were installed and additional light from street and walkway lights illuminate the area.

EXHIBIT 3. Busway Stations

Dadeland South Metrorail Station

Many Busway customers access the Dadeland South Metrorail station. The station, which witnesses approximately 5,300 Metrorail boardings each weekday and a 92% use of the nearby parking facility, was in need of a rearrangement of existing facilities once plans for the Busway were implemented. The station, with a 2,000 car parking garage, a Marriott Hotel and two office buildings (Datran Center), originally opened in 1984 and was designed to allow transfers among Metrorail, Metrobus and automobiles. After construction of the Busway, the station was located above the ground. Changes to the area around the

station included the construction of a new kiss-n-ride area, five bus bays, and a conversion of a stairway to an escalator to enhance station circulation among passengers.

Bike Path

The bike path, which stretches the entire length of the Busway, was constructed on the far west side in an effort to separate the transit customers from bicyclists (see Exhibit 4). The path is approximately 2 ½ meters wide (8 feet) except along the approach to the Dadeland South station where the right-of-way narrows. Along this area the path is only separated from the Busway by a curb. The path is designated as the South Dade Trail and is considered the backbone of the Greenways network in Miami-Dade County.

EXHIBIT 4. Bike Path

Park and Ride

Two free park and ride lots are located along the Busway, offering convenience to customers that choose to commute to the system. The parking lots are located at the Cutler Ridge Mall and at the Palmetto Golf Course on SW 152nd Street.

The park and ride lot at the Cutler Ridge Mall is approximately ½ mile south of the end of the Busway. The number of parking spaces at this location is essentially unconstrained (see Exhibit 5) since customers of the mall do not access the particular area of the lot. Across the street from the lot are a number of public offices, including a regional library, the South Miami-Dade Government Center, a police station and administrative offices.

In comparison to the lot at the Cutler Ridge Mall, the park and ride lot located at the Palmetto Golf Course has a limited number of parking spots. Only 100 spaces are available at this location. Commuters use the lots during the workweek and on weekends patrons of the golf course use the lot. A third informal lot located at the Turnpike at SW 152nd Street and 117th Avenue offers parking capability as well.

EXHIBIT 5. Cutler Ridge Mall Park and Ride

Americans with Disabilities Act (ADA)

Every bus within the MDT's fleet is equipped with a wheelchair lift. In addition to fulfilling this requirement, all features of the Busway are in compliance with ADA regulations. Consideration was taken to ensure that all bus stations are fully accessible to populations with physical disabilities.

Ridership

Within the first year, ridership increased nearly 50% on weekdays and more than 50% on weekends. As of October 2002 the MDT reported an increase of ridership along the Busway since operations commenced of 71% on weekdays and 130% on weekends. Results from an on-board survey conducted by the Center for Urban Transportation Research, detailed in Chapter Two of this report, showed 68.8 percent of Busway users accessed the service at least five to six days a week, with 42.7 percent reporting they rode every day and 26.1 percent using it five or six days. According to MDT, the increase in ridership is the result of several factors:

- The availability of new routes in areas previously not provided transit service;
- The high level of frequency;
- Previous customers of the system increasing their use of the system.

Ridership Reports

In order to accommodate the increase in ridership, the MDT designated full size buses to the Busway MAX service, which was originally planned to be a minibus route except during peak periods.

Every three months, the MDT submits ridership data on the five bus services (maps of each service are located in Appendix A) operating on the Busway. This data includes information on the number of boardings, passengers per revenue hour and the net cost per passenger.

Busway MAX

The Busway MAX operates on the Busway north of Cutler Ridge and continues south on US-1 to Goulds, Homestead and Florida City. Busway stations between SW 152 Street and Dadeland South Metrorail stops are only served during off-peak weekday rush hours. During peak weekday hours, service along the Busway is nonstop.

Of the five transit services serving the Busway, the Busway MAX had the highest number of average boardings per day during the July through September quarter of 2002, with over 3,000 riders during the weekdays and on Saturday. The average quarterly average for Sunday ridership was 2,418. The Busway MAX also had the highest average passengers per revenue hour for weekend trips, with an average of 34.9 riders on Saturdays and 25.9 riders on Sundays. Exhibit 6 displays monthly data during the reported quarter.

EXHIBIT 6. Busway MAX Ridership Information, 2002

	July	August	Sept.	Qtr. Avg.
Average Boardings Per Day				
Weekday	3,512	3,539	3,313	3,455
Saturday	3,211	3,565	3,001	3,259
Sunday	2,404	2,467	2,384	2,418
Average Passengers Per Revenue Hour				
Weekday	25.7	25.9	24.3	25.3
Saturday	34.4	38.2	32.1	34.9
Sunday	25.8	26.4	25.6	25.9

Busway Local

The Busway Local provides service seven days a week with full-size buses running on 15 minute headways during weekday peak hours and every 30 minutes during off peak hours and weekends with minibuses. The system services all stops between Cutler Ridge and the Dadeland South Metrorail station. During weekdays, the Busway Local recorded the highest average passengers per revenue hour at 33.3 persons, as shown in Exhibit 7.

EXHIBIT 7. Busway Local Ridership Information, 2002

	July	August	Sept.	Qtr. Avg.
Average Boardings Per Day				
Weekday	1,494	1,683	1,687	1,621
Saturday	817	813	889	840
Sunday	715	559	610	628
Average Passengers Per Revenue Hour				
Weekday	30.0	34.9	34.9	33.3
Saturday	25.4	19.9	27.7	24.3
Sunday	22.3	17.4	19.0	19.6

Busway Coral Reef MAX

The Coral Reef MAX provides minibus service on weekdays and weekends between Country Walk and the Dadeland Metrorail Station by both SW 152nd Street and the Busway. During weekday peak hours, service is available every 20 minutes. Service during off peak hours is available every 45 minutes and 40 minutes on weekends. Ridership data listed in Exhibit 8 shows that the Coral Reef MAX had the lowest average boardings per day and average passengers per revenue hour on Saturdays in comparison to other services operating on the Busway.

EXHIBIT 8. Coral Reef MAX Ridership Information, 2002

	July	August	Sept.	Qtr. Avg.
Average Boardings Per Day				
Weekday	786	999	884	890
Saturday	585	580	506	557
Sunday	343	483	444	423
Average Passengers Per Revenue Hour				
Weekday	16.8	21.4	18.9	19.0
Saturday	22.3	22.1	19.3	21.2
Sunday	13.1	18.4	17.0	16.2

Saga Bay MAX

Minibuses are used for the Saga Bay MAX, which serves limited stops on the Busway between SW 168th Street and the Dadeland South Metrorail station. Service is only available on weekdays, with 24-minute headways during peak hours to assist commuters in meeting their connection to every fourth Metrorail train. The average boardings per day and average passengers per revenue hour were the lowest of the four busway services with an quarter average of 255 average boardings per day and 14.2 average passengers per revenue hour, as shown in Exhibit 9.

EXHIBIT 9. SAGA BAY MAX Ridership Information, 2002

	July	August	Sept.	Qtr. Avg.
Average Boardings Per Day				
Weekday	274	262	230	255
Average Passengers Per Revenue Hour				
Weekday	15.2	14.5	12.8	14.2

Route One Busway

Every twenty minutes during peak hours full-size buses serve the Busway between South Miami Heights, East Perrine, Dadeland Mall and both the Dadeland Metrorail Stations for Route 1. During off-peak times and Saturdays, service is provided every 40 minutes and every hour on Sundays. Minibuses are used on the weekends.

Service on Route 1 had the lowest average boardings per day and average passengers per revenue hour on Sundays with 346 and 11.9 boardings and passengers respectively. Exhibit 10 shows data from July through September 2002.

EXHIBIT 10. Route 1 Busway Ridership Information, 2002

	July	August	Sept.	Qtr. Avg.
Average Boardings Per Day				
Weekday	1,615	1,608	1,582	1,602
Saturday	1,278	813	592	894
Sunday	412	310	315	346
Average Passengers Per Revenue Hour				
Weekday	23.9	23.8	23.4	23.7
Saturday	31.3	19.9	14.5	21.9
Sunday	14.2	10.7	10.9	11.9

On-Board Survey

In October 2002, the National Center for Transit Research at the Center for Urban Transportation Research produced a report containing information regarding trip information along the Busway obtained through an on-board survey (see Chapter Two). Results of the survey are organized in the report in four categories.

- Trip Characteristics
- Fare and travel behavior
- Rider Demographics
- Customer Satisfaction.

Approximately one-half of the surveyed customers did not use the transit system prior to the implementation of the Busway, previously using automobiles, jitneys or taxis. One-third of survey respondents had used the Busway system since service commenced, and one-fourth reported they were new users of the system.

Survey results conveyed an overall satisfaction of patrons using the Busway system and a greater satisfaction with the Busway service than usual service provided by MDT. Satisfaction was also noted in regard to the cost associated with usage of the service and the level of safety.

Busway Extension

An extension of the Busway (Phase II) will provide service further south of the existing corridor to Florida City and Homestead (see Appendix B). The extension will be broken down into segments, the Northern Segment that will be 5.02 miles long, the Central Segment (3.75 miles), and the Southern Segment, which is the shortest, at 2.73 miles for a total of 11.5 miles. Plans for the extension will be similar to the existing infrastructure, and will add 13 state-of-the-art bus bays and shelters, the locations displayed in Exhibit 11. Five park and ride lots are also included in plans for the construction of the new BRT facility. Other additions include landscaping work, a bike path and the implementation of new traffic signalization. The extension of the Busway is also paired with the urban reconstruction project intended to remove and replace existing asphalt, construct sidewalks, and install water drainage. These improvements will be implemented along the US-1 corridor from SW 112th Avenue to 264th Street.

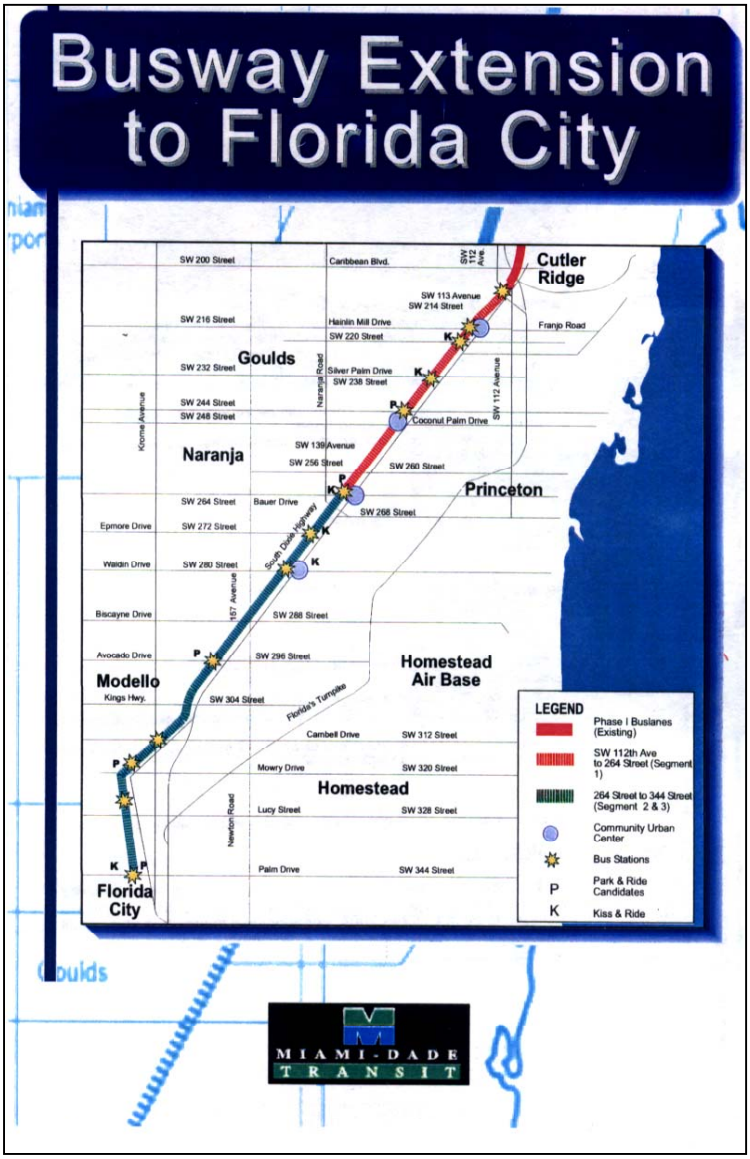


EXHIBIT 11. Busway Extension

Segments

The Busway extension consists of three segments, each segment varying in distance. Local roadways designate the nodes of each segment.

- Segment 1 North (Segment 1N)
  - SW 112nd Avenue to SW 232nd Street
- Segment 1 South (Segment 1S)
  - SW 232nd Street to SW 264th Street
- Segment II
  - SE 264th Street go 344th Street and Bike Path

Costs and Project Schedule

The cost of the extension is approximated at $85.5 million, of which $20.8 million will be used for the acquisition of right-of-way. An estimated date for completion of the extension is October of 2004. Construction commenced in September 2002.

Stations

Slight modifications to the station design of Phase I will include the addition of side and rear panels extending to the ground in order to increase protection from the elements such as rain and wind. A secondary roof below the canopy to protect transit customers from the sun will be added as well as a narrow panel in the front of the station. In addition to enhancing coverage to the stations, the added panels are intended to assist in the maintenance of the stops. Concrete louvers will be added to the back walls of stations rather than plexiglass, which is more susceptible to vandalism. Exhibit 12 displays a computer generated model of the proposed stations. As in Phase I, sidewalks and curb cuts will be included at each stop. In order to coordinate with the surrounding infrastructure, the materials and colors of each station are to be determined based upon existing structures.

EXHIBIT 12. Phase II Proposed Station

Bike Path

Currently, there is a bicycle path on the east side of US 1/South Dixie Highway from SW 304 Street to approximately SW 312 Street. The Metro-Dade Bicycle/Pedestrian Program, however, determined US 1/South Dixie Highway as unbefitting for bicycle use. The bicycle path from Phase I will be extended the distance of the Busway (11.5 miles) to NW 3rd Avenue in Florida City where it will link up with another bicycle path that continues to the Florida Keys.

Marketing

Prior to the implementation of the Busway, a number of research techniques were used in order to understand the needs for potential users. Public meetings, random telephone surveys, surveys of users on existing bus routes, and surveys of drivers on US 1 along the Busway corridor were conducted. The findings of the surveys were taken into consideration when designing facilities and service schedules of the Busway. Results of the survey found concerns about traffic delays on US 1 and cross streets, security and frequency of service were prevalent among survey participants. Additional concerns were expressed regarding the ability to serve an entire trip. Convenience of the system was also mentioned among new riders and improvements of travel patterns among current users.

Goals

There were several goals associated with the marketing of the Busway:

- Inform the community and non-users of the system of it's value;
- To encourage those that did not utilize public transportation to use the transit system;
- Educate transit users of enhancements of transit service that would be accessible upon completion of the Busway.

Printed Materials

Four route guides were printed for the new routes implemented once service along the Busway corridor began. As well as producing the four new route guides, a compilation of Miami-Dade public transportation schedules and maps for routes that operated on the Busway or provided a transfer link was produced and titled the South Miami-Dade Directory.

Television Coverage

The Miami-Dade Chamber of Commerce addressed the Busway for six months prior to the implementation of the system and for six months after operations had begun, and provided television coverage of the meetings. Several 30-second shots were aired on the cable network, showing various points along the corridor, along with a four-minute video that was played during a number of public meetings that were held for homeowner associations, civic and business groups, and other organizations.

Kick-Off Celebration

Thousand of County residents attended a party held the Sunday morning before service on the Busway was to commence. In addition, all rides on the Busway were fare-free during the first two weeks of system operation.

Public Participation – Voiced Concerns

Two particular groups within the community expressed concerns over the Busway.

Representatives of the Disabled Community

Citizens and advocates of the community concerned with station accessibility for persons with disabilities voiced concern over the determination of far side stations and encourage a change for near side stops. The near side stops were advocated by this group since buses would stop adjacent to the intersection rather than as far as 60 meters (200 feet) from that point.

Representatives of the Homeowners Community

Homeowners that lived adjacent to the corridor expressed concern regarding the noise level of buses along the Busway. Prior to the implementation of the Busway, residential homes along this stretch were divided by vacant land of at least 30 meters (100 feet) from US 1. Tests conducted determined the noise factor of the Busway was not significant.

Technology

Vehicles

Both full-size buses and minibuses operate on the Busway. The Peak Vehicle Requirement (PVR) for the Busway Corridor is 49 buses. Currently 41 buses, 25 full size and 16 minibuses, are required to service the completed portion of the corridor. The buses used on the Busway are the same as conventional service in appearance. The head sign, which informs users of the type of service, is the only display that distinguishes Busway and conventional service.

Signal Operation

All 16 of the intersections operate under signal control. A number of signal control technologies are installed at each intersection, including semi-actuated signal operation, advanced loop detection, and optically programmable signals. Exhibit 13 on page 18 represents traffic signals along the entire Busway.

Semi-actuated Signal Operation

Semi-actuated signal operation allows for faster headways along the Busway corridor without having a great impact on traffic travel on US 1. Semi-actuated signal operation provides two phases for Busway signal lights. When there is not a demand for the Busway signal to be green, it will remain red so that side street traffic may cross the Busway. When the system registers a bus traveling at the signal, the signal will turn to green on the Busway, allowing the bus to cross the intersection.

Advanced Loop Detection

Advanced loop detection allows for the registering of demand of buses approaching an intersection. Loop detectors are installed under the roadway surface at 600 feet, 300 feet and at the stop line before an intersection. When loop detectors are functioning, buses do not need to stop at the intersections. If loop detectors are not operating, buses must stop at the intersection before receiving a green light.

Countermeasures

In October 2000, all upstream (600 and 300 feet before an intersection) loop detectors were deactivated. Loop detectors located at the stop line of the intersection remain functioning. This decision was

implemented as a result of numerous accidents. In addition, buses were to slow their approach and travel speed of intersections to 15 M.P.H., compared to the 45 M.P.H. allowed on the remainder of the corridor.

Optically Programmable Signals

Optically programmable signals work to ensure a driver traveling along an east/west side street does not confuse the Busway traffic signal light with their own. The programmable signals limit signal visibility to lanes other than the one that they are designated to.

Automatic Vehicle Location System (AVL)

All of the Metro-Dade Transportation Agency bus fleet is equipped with automatic vehicle location systems. The AVL systems allow for the processing of real time information that allows for the tracking and facilitation of schedule adherence.

Communications

The Transportation Agency has a Computer Aided Dispatching (CAD) system, which enables communication between the bus operator and the Miami-Dade dispatch office and traffic controllers throughout the County.

EXHIBIT 13. Traffic Signals

Crash Analysis

In August 2001, the "South Miami-Dade Busway Safety Study" was completed. DMJM Harris and FR Aleman and Associates conducted the study in response to a number of crashes occurring along the Busway. From February 1997 to November 2000, 67 crashes that involved buses were recorded at Busway intersections. Seventy three percent of the recorded crashes resulted in injuries and two in fatalities.

The study found that a greater likelihood (seven times) of crashes existed at Busway intersections that were independent of other intersections. Locations and crash rates that experienced the highest number of crashes were:

- SW 186th Street
- SW 168th Street
- Marlin Road
- Banyan Street
- Hibiscus Street

The intersection with the highest number of crashes was SW 186th Street, with 0.815 crashes per million vehicles entering (MEV).

The study also determined that crashes were seven times more likely when the advanced loop detectors, installed for signal priority, were enabled than when they were not. When the loop detectors were activated, buses were able to receive a green signal and continue along the Busway at the corridor speed of 45 m.p.h.

At intersections that were shared between the Busway and US 1, a high number of crashes were the result of right turn on red violations. A study conducted at three intersections that were susceptible to right turn on red violations found that approximately 12.5 percent of drivers were in violation of the turn restrictions.

Signage along the Busway was also a consideration of the study. When the report was completed, the location of existing crossway signs was more than 100 feet from the bus crossings. This placement was inconsistent with the Manual on Uniform Traffic Control Devices (MUTCD), which suggest placing crossway

signs at intersections or as close as possible. The visibility of signs along the corridor was also a consideration. Vegetation was overgrown along areas of the Busway, thereby restricting the visibility for some of the signs.

Recommended Countermeasures

The report provided recommendations as "Crash Countermeasures" for the short, medium and long term. Some of the provided recommendations follow.

Short Term Recommendations

- Modify loop detectors installed at near side bus stops;
- Modify the advanced loop operations for a bus approach speed of 15 m.p.h.;
- Remove overgrown vegetation;
- Install additional Busway Crossing Warning signs.

Medium Term Recommendations

Install a textured road surface at isolated Busway intersections;

Install in-roadway amber-red lights;

Install a raised central island on side street approaches of isolated intersections.

Long Term Recommendations

- Install flashing signals, such as those used for moveable bridges and railroad crossings;
- Install automatic gates;
- Install grade separated intersections.

CHAPTER TWO – ON-BOARD SURVEY

Introduction

Survey Summary

CUTR conducted an on-board survey of Busway customers on March 20 - 21, 2001. A total of 1,164 surveys were completed, or 6.2% of the ridership population sampled. Survey results are organized into four sections:

1. Trip characteristics – provides details about customers' individual trips.
2. Fare and travel behavior – examines customers' overall transit usage characteristics.
3. Rider demographics – provides information about the customers making trips.
4. Customer satisfaction – reviews customer satisfaction with specific aspects of Busway services.

Trip Characteristics

Trip characteristics include routes used; modes of access and egress to/from Busway stops; a transfer analysis; and the customers' initial original and final destinations. Survey findings included:

- Busway trips originate from home or work (60.1 percent and 21.7 percent, respectively).
- Customers walk to bus stop and final destination (63.8 percent and 55.7 percent, respectively).
- 40.1 percent use Busway to travel to work.
- 74.0 percent start or end trip on the Busway.
- Majority of customer trip origins and destinations are in South Dade (65.8 percent and 53.0 percent, respectively).
- Among customers that use Dadeland South Station for access to the Busway, 73.1 percent transferred from Metrorail.
- 51.1 percent of customers who egressed at the Dadeland South Station transferred to Metrorail.

Fare and Travel Behavior

Information was collected about Busway customers' frequency of use; type of fare used; previous mode choice; reasons for using Busway; and length of time using Busway. Survey findings included:

- 68.8 percent of customers use the Busway five to seven times per week (42.7 percent reported riding every day and 26.1 percent ride five or six days per week).
- Full cash fare of $1.25 is paid by 56.3 percent of the Busway customers, while 14.1 percent use the full-fare Metropass.
- 5.8 percent use a Metrorail Transfer to board a Busway bus.
- 3.1 percent use a Golden Passport to board a Busway bus.
- 2.8 percent use a MDT Bus Transfer to board a Busway bus.
- Prior to the opening of the Busway, 21.6 percent drove; 20.2 percent rode with someone; 17.8 percent did not make the trip or did not live in the Miami-Dade area; and 17 percent used another MDT bus route to make the trip.
- The most frequent response cited by customers for using the Busway service is that they do not drive or do not have a valid driver's license (30.1 percent) followed by not having an available car for use (29.6 percent).
- 37.8 percent have used the service between six months and one year, and 36.1 percent have used the Busway since it's inception in 1997.

Rider Demographics

Information about customer age, ethnicity, and income was used to construct a Busway customer profile.

The "typical" Busway customer is:

- Between 25 and 44 years of age.
- Black (non-Hispanic) or Hispanic.
- Earns less than $25,000 in 2000.
- Rides between five and seven days per week.
- Does not drive or have an available car.
- Pays the full cash fare.

Customer Satisfaction

Customers rated Busway service characteristics as well as overall quality of the Busway and MDT services. Additionally, customers identified potential improvements to existing Busway services. Survey findings included:

- Busway customers are most satisfied with the level of safety on Busway vehicles (mean score = 3.81) and with the Busway fares (mean score = 3.76).
- Concerning the cost of riding the Busway, 24.4 percent rated the cost as "very good," and 38.5 percent rated the cost as "good."
- Service aspects resulting in lower overall customer satisfaction ratings included: hours of Busway operation (mean score = 3.50); frequency of the Busway service (mean score = 3.25); and dependability, or on-time performance, of the Busway buses (mean score = 3.18).
- 36.1 percent indicated that the most important improvement, if funding were available, would be to increase the frequency of the service. An equal percentage said that they would extend Busway hours-of-service and the Busway corridor length (12 percent).

Conclusions

Significant survey findings show that almost one-half of the Busway customers were not previous transit users. Most customers made the trip by driving alone or carpooling, or using a jitney or a taxi. These findings suggest that the available Busway services have contributed to increased transit usage in the region. Almost one-third of the customers have used Busway services since its' inception. However, more than one-fourth are new users (less than 6 months, including first day riders) suggesting that the Busway continues to attract new customers. Results also suggest that the Busway attracts customers with slightly higher incomes compared to traditional MDT users.

Overall, the results from the on-board survey clearly show that Busway customers are satisfied with the service offered by the Busway. In fact, customers who responded to the survey indicated that they are more satisfied with the Busway service compared to that offered by conventional MDT local bus service. Customers are also more satisfied with the increased service speeds offered by the Busway. As for

Busway service characteristics, customers are most satisfied with the level of safety and the cost to use the service. If funding were available, one-third of the customers would increase the frequency of the service.

Survey Methodologies and Procedures

The Busway survey instrument was printed in English on one side and Spanish on the other. It contained 18 questions and provided space for additional written comments by customers. CUTR and MDT staff developed the survey instrument jointly. The on-board surveying of customers was conducted on March 20 and 21, 2001. On March 27, 2001, CUTR staff re-surveyed selected bus trips that were under- sampled on the original survey days.

The on-board survey specifically targeted customers riding only those routes that operate along the Busway for either all or a portion of their trips. At least half of all trips on a particular bus route were selected for surveying. For example, if there were eight trips on a route, four were to be surveyed. If there were nine trips, five were surveyed. The trips selected for survey distribution spanned the service hours, i.e., morning peak, mid-day off-peak, afternoon peak, and evening.

Surveyors were instructed to offer a survey form to each customer upon boarding a bus, even if the customer had completed a survey previously, either on another day and/or route. It is important to note that a major purpose was to survey the trip, not just the individual making the trip. Surveyors were instructed to do the best they could to encourage participation in the survey.

Survey data were entered into an Excel spreadsheet for analyses. CUTR staff performed the review and data analyses using SPSS (Statistical Product and Service Solutions) software. It should be noted that CUTR researchers re-classified survey responses to comply with the survey format in cases in which the respondent did not fully consider the available response choices.

Prior to the analyses, survey responses were weighted based on the total weekday ridership and completed surveys for each route to more accurately reflect respondent characteristics to Busway ridership as a whole. Weighting factors were derived on a route-by-route basis to ensure proper representation of each route's respective riders. Specifically, a weight for a particular route was calculated by dividing the total weekday ridership (obtained from MDT staff) for the route during the survey period by the number of

surveys returned on that route. The resulting weight factor was applied to each completed survey's data on that route for statistical analysis. The reader should keep in mind that the survey methodology involved the survey of willing customers as often as possible. This methodology corresponds most closely with ridership data that are reported as "unlinked trips." Exhibit 14 indicates the ridership figures for March 19-23, 2001, provided by MDT staff and subsequently used for the weighting. The data in Exhibit 14 are representative of the five-day (Monday through Friday) total weekday ridership for each route; however, daily ridership figures were not available. The on-board survey was conducted during two of these five days.

EXHIBIT 14. Total Weekday Ridership—March 19-23, 2001

Entire Route	Total Weekday Ridership*	Percent of Total Ridership
1	8,182	17.4
31/231 (Busway Local)	8,820	18.8
38 (Busway MAX)	17,368	37.0
52	6,619	14.1
252 (Coral Reef MAX)	4,491	9.6
287 (Saga Bay MAX)	1,491	3.2
Total Busway Routes Ridership	46,971	100

* total weekday ridership for the entire route length

Response Rates by Route

Survey forms were coded with a unique serial number and assigned for distribution on board specific runs. This facilitated the calculation of response rates for individual routes and was used to help weight the response data. Exhibit 15 indicates the proportion of completed surveys for each route to the 1,164 total completed valid Busway surveys.

EXHIBIT 15. Response By Route

Route	Total Survey Responses	Average Number of Passengers on Route During Survey Period	Survey Responses/Average Number of Passengers on Route (%)
1	211	3,273	6.45
31/231 (Busway Local)	196	3,528	5.56
38 (Busway MAX)	238	6,947	3.43
52	256	2,648	9.67
252 (Coral Reef MAX)	201	1,796	11.19
287 (Saga Bay MAX)	62	596	10.42
Total Responses	1,164	18,788	6.20

Organization of Survey Analysis

The on-board survey analyses are presented in four sections: Trip Characteristics; Fare and Travel Behavior; Rider Demographics; and Customer Satisfaction. Each section provides information about the survey results that will be useful to MDT as it evaluates and prioritizes enhancements to the Busway services.

The Trip Characteristics section details specific attributes of the customers' individual trips. Trip characteristics gathered from the customers include routes used, modes of access and egress to/from Busway stops, a transfer analysis, and the customers' initial original and final destinations. The Fare and Travel Behavior section examines the customers' overall transit usage characteristics. The type of fare paid, how frequently the customers ride each week, and how long they have been using the Busway are discussed in this section. Customer reasons for using transit and their potential alternative modes of transportation are explored as well. In conjunction with the individual trip information, these data can contribute to effective scheduling, planning, and general policy decisions regarding overall service on the Busway.

The Rider Demographics section changes the focus from the trips that are being made to the customers making them. Information presented about customers includes age, ethnicity, and total household income in 2000. Also, utilizing both demographics and travel behavior information, a ridership profile for a typical Busway customer is constructed and discussed. The rider characteristics and resulting profile are an important part of an on-board survey analysis. Specifically, the compilation of these data will enable MDT to better identify and understand the current market characteristics of its ridership and target specific rider characteristics/segments that can help direct more focused marketing strategies. Also, this information can assist in determining the need for customer amenities.

The final section reviews customer satisfaction with specific Busway service attributes including open-ended questions regarding Busway improvements. Primarily, this section analyzes the responses to Question 17, which asked customers to rate their perception of 11 different service characteristics and two questions on the overall quality of Busway service and MDT service. A five-point scale (1 to 5) was provided to customers to rate their perception. On this scale, a score of "5" indicates a "very good" rating, while a score of "1" indicates a "very poor" rating. Another survey question (Question 18) asked customers to identify the single most important improvement to Busway service, given funding availability. MDT can address the identified areas for improvement through changes to the Busway. By distinguishing rider sensitivities regarding specific service characteristics, MDT can better prioritize Busway improvements.

Survey Completion

The survey instrument contained a total of 18 questions, some with multiple components. A copy of the survey instrument is included in Appendix C. The majority of questions were closed-ended in nature, simply requiring customers to select from a list of responses provided. Because answering every question on the survey was not a requirement for the survey to be included in this analysis, many of the records in the final survey database had missing values for various questions. To help understand the respondent sample sizes for each of the questions analyzed herein, Exhibit 16 has been provided on the following page. The response rates for all questions have been calculated based on a total of 1,164 completed surveys.

EXHIBIT 16. Response Rate By Survey Question

Question	Valid Responses	Response Rate	Question	Valid Responses	Response Rate
1	1,135	97.5%	*17a*	1,004	86.3%
2	847	72.8%	*17b*	963	82.7%
3	1001	86.0%	*17c*	934	80.2%
4	1,119	96.1%	*17d*	926	79.6%
5	876	75.3%	*17e*	926	79.6%
6	1,112	95.5%	*17f*	926	79.6%
7	1,110	95.4%	*17g*	930	79.9%
8	752	64.6%	*17h*	930	79.9%
9	1,094	94.0%	*17i*	934	80.2%
10	1,100	94.5%	*17j*	913	78.4%
11	1,049	90.1%	*17k*	914	78.5%
12	1,087	93.4%	*17l*	926	79.6%
13	1,079	92.7%	*17m*	899	77.2%
14	1,088	93.5%	*18*	644	55.3%
15	1,082	93.0%	*Comments*	469	40.3%
16	902	77.5%			

Based on the individual question response rates shown in Exhibit 16 and a review of a random sample of completed surveys, it appears that an overwhelming majority of customers understood and responded properly to each of the survey questions. Because survey questions concerning sensitive items such as income generally do not elicit high response rates, it is surprising that Question 16, which inquires about the customer's total household income for 2000, had a relatively high response rate (77.5 percent). The lowest response rates were exhibited by the open-ended questions, for which respondents had to do more than just place a check (√) by a response choice. There was a 55.3 percent response rate for Question 18 regarding improvements and a 40.3 percent response rate for comments and suggestions. Improvements suggested by respondents are categorized by type and presented graphically in Exhibit 52 (see page 58).

Trip Characteristics

The purpose of Questions 1, 4, 6, and 7 was to allow customers to describe the nature of their trip in terms of place of origin, mode of access, mode of egress, and final destination. From Exhibits 17 through 20, which highlight the frequency distributions for the four questions, it is clear that most Busway customers:

- Begin trips from either home or work
- Walk to bus stops
- Ride the Busway to work or home
- Walk to final destinations

EXHIBIT 17. Question 1 – Where Did You Come From Before You Got On The Bus For This Trip?

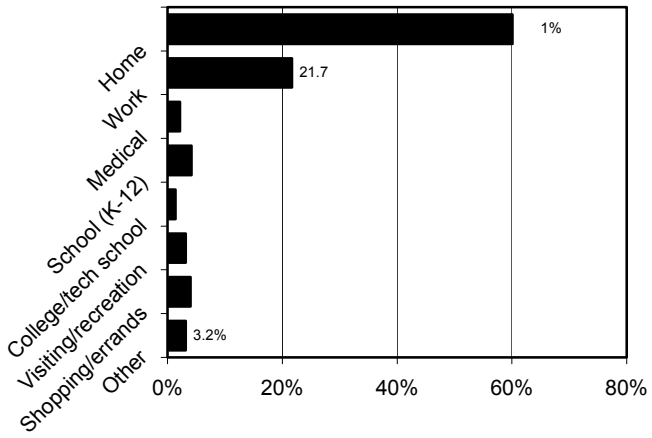


EXHIBIT 18. Question 4 – How Did You Get To the Bus Stop For This Particular Trip?

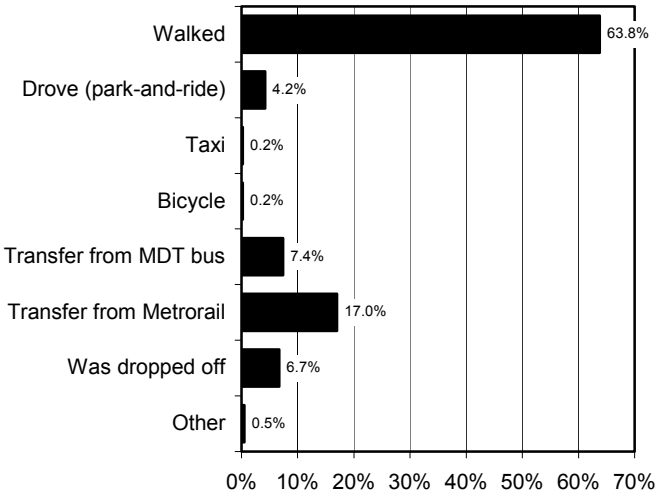


EXHIBIT 19. Question 6 – How Will You Get To Your Final Destination?

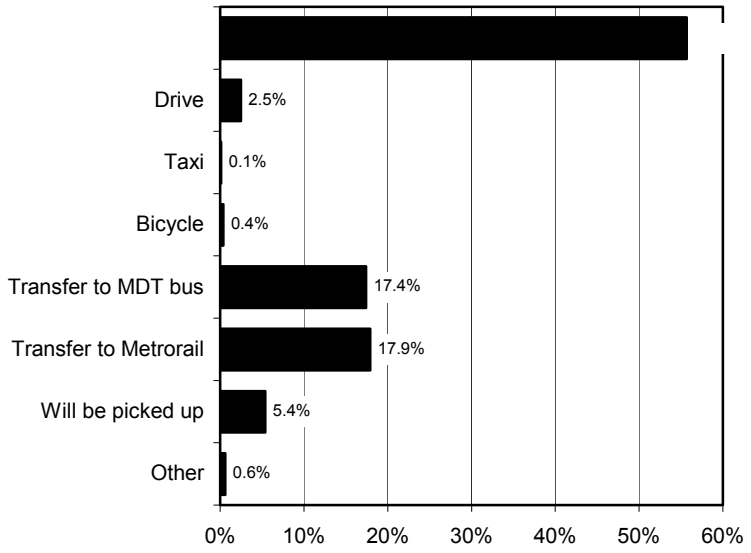
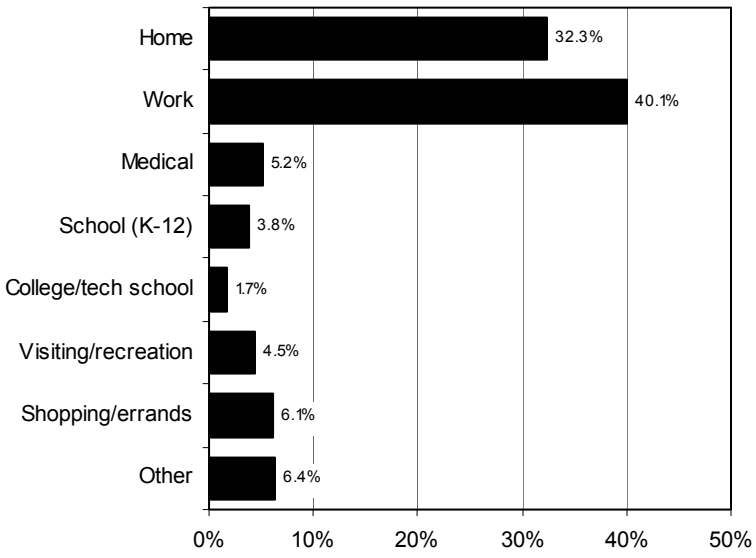


EXHIBIT 20. Question 7 – Where Are You Going on THIS Trip?



Percent of Route Ridership with Portion of Trip on Busway

A cross-tabulation was performed to determine how many customers started and ended their trip on the Busway or off the Busway. Just fewer than 24 percent of customers started and finished their trip on the Busway and just fewer than 32 percent of customers started their trip off of the Busway and finished their trip on the Busway. Further, nearly 19 percent of customers started their trip on the Busway and ended their trip off the Busway. In total, more than 74 percent of the responding customers either started or ended their trip on the Busway. Finally, almost 26 percent of customers started and finished their trip off of the Busway. Exhibits 17, 18, and 19 show the detailed results for this cross-tabulation.

EXHIBIT 21. Percent of Route Ridership with Portion of Trip on Busway

Trip Started	Trip Ended	
	On Busway	Off Busway
On Busway	23.7%	18.7%
Off Busway	31.7%	25.8%

In Exhibit 22, presented on the following page, the origin station is listed in the left-hand column of the table while the destination station is shown along the top row. "Metrorail" is included as a station because some respondents wrote "Metrorail" as their destination station instead of "Dadeland South." It should be noted that the Dadeland South Station is the southern terminus of Metrorail and the northern terminus of the Busway (as such, the responses that indicated an origin station of Dadeland South and a destination station of Metrorail should be ignored). The results show that the majority of Busway customers ride the entire length of the corridor. For example, the largest share of riders travel from Cutler Ridge to Dadeland South/Metrorail and, likewise, from Dadeland South/Metrorail to Cutler Ridge.

EXHIBIT 22. Breakdown by Station of Customers Using Busway (percentages)

STATION		*Destination Station*																TOTAL
		Dade-land South	104th	1	117th	124th	128th	136th	144th	152nd	160th	168th	173rd	184th	Marlin	200th	Cutler Ridge	
Origin Station	Dade-land South	*	--	1.4	--	--	0.3	0.3	1.8	10.1	0.7	2.0	0.5	2.6	2.0	3.9	7.9	27.1
	104th	0.5	*	--	--	--	--	--	--	0.7	--	--	--	--	--	--	--	1.3
	112th	0.9	--	*	--	--	--	--	--	--	--	--	--	--	--	--	--	0.9
	117th	--	--	--	*	--	--	--	--	--	--	--	--	--	--	--	--	--
	124th	0.7	--	--	--	*	--	--	--	--	--	--	--	0.6	--	--	--	1.3
	128th	2.2	--	--	--	--	*	--	--	--	--	--	--	--	--	--	--	2.2
	136th	2.8	0.6	--	--	--	--	*	--	0.6	0.7	--	--	--	--	--	0.6	5.6
	144th	2.0	--	--	--	--	--	--	*	--	0.6	--	--	--	--	--	--	2.6
	152nd	8.9	--	--	--	--	--	--	---	*	--	--	--	0.3	--	--	--	9.2
	160th	2.1	--	--	--	--	--	--	--	--	*	--	--	--	--	--	--	2.1
	168th	2.8	--	--	--	--	--	--	--	--	--	*	--	--	--	--	--	3.4
	173rd	0.6	--	--	--	--	--	--	--	--	--	--	*	--	--	--	--	0.6
	184th	3.3	--	--	--	--	--	--	--	--	0.5	--	--	*	--	0.7	--	4.6
	Marlin	1.8	--	--	--	--	--	--	--	--	--	--	--	--	*	--	--	1.8
	200th	5.5	--	--	0.6	1.0	--	0.6	--	0.3	1.0	--	--	--	--	*	--	9.0
	Cutler Ridge	16.0	--	--	--	0.6	--	1.9	--	0.9	--	1.0	--	--	--	1.0	*	21.4
TOTAL		20.0	0.6	1.4	0.6	1.6	0.3	2.9	1.8	12.6	4.1	3.3	0.5	3.5	2.0	5.6	8.5	100.0

NOTE: Origin station is shown in the left-hand column; destination station is shown in the top row.

Origin and Destination by Transit Zone

MDT's service area can be divided into six Transit Analysis Zones. The six zones were identified in the *MDT 2000 Tracking Study* (Behavioral Science Research, June 2001), and are used to examine the travel patterns of Busway customers. Questions 2 and 8 on the survey instrument asked respondents to indicate where they started their trip and the location of their final destination, respectively. The intent of these questions was to determine the start and end locations of the entire trip, not just the transit portion. The respondents, who often report only the transit stop or station where they accessed or egressed the system, often misunderstand these questions. In several cases, respondents were not specific enough, thus location could not be determined. However, CUTR researchers analyzed the usable responses to these questions and grouped the trip origins and destinations by zone, as shown in Exhibit 23. The responses shown in Exhibit 23 are still likely skewed to Zone 6 (South Dade), where the Busway operates. The most reliable way to collect this data would be through an interview process rather than a survey.

EXHIBIT 23. Busway Trip Origins and Destinations by Transit Zone

	Zone 1 (NW Dade)	Zone 2 (NE Dade)	Zone 3 (Beaches)	Zone 4 (Central)	Zone 5 (W Central)	Zone 6 (S Dade)
Trip Origin	1.6%	1.8%	0.5%	7.9%	22.4%	65.8%
Trip Destination	2.8%	5.1%	0.7%	17.0%	21.4%	53.0%

Transfer Analysis: To/From Metrorail To/From Busway's Dadeland South Station

A breakdown of Metrorail and other modes of access/egress is given in Exhibit 24. Among customers using the Dadeland South Station for access to the Busway, 73.1 percent transferred from Metrorail. In addition, 51.1 percent who egressed at the Dadeland South Station transferred to Metrorail. It should be noted that, in Exhibit 24, it is unlikely that zero riders are picked up from Dadeland Station; however, these are the results of this sample. It is also possible that, as with other similar questions, some riders misunderstood the response choices. Exhibits 25 and 26, show Busway access and egress by route.

EXHIBIT 24. Access and Egress Patterns Through Dadeland South Station

	Walked	Drove	Bicycle	Transfer to/from MDT Bus Route	Metrorail	Dropped Off Or Picked Up	Other
Access	12.2%	2.7%	0.4%	7.7%	73.1%	3.9%	0.0%
Egress	30.0%	1.6%	0.0%	16.8%	51.1%	0.0%	0.5%

EXHIBIT 25. Analysis of Access to Busway by Busway Station and Route - *Busway Access*

Station							TOTAL
	1	31/231	38	52	252	287	
Dadeland South	11.7%	9.0%	8.7%	2.5%	6.3%	0.7%	38.9%
104th	--	0.3%	--	--	--	0.4%	0.7%
112th	0.3%	0.3%	--	0.2%	--	--	0.8%
117th	0.6%	0.3%	--	--	--	--	0.9%
124th	0.3%	0.6%	0.6%	--	--	--	1.5%
	0.3%	0.6%	--	--	0.9%	--	1.8%
136th	1.9%	2.9%	--	0.6%	0.5%	--	5.9%
144th	1.2%	0.6%	--	0.6%	--	--	2.4%
152nd	0.9%	4.4%	2.9%	--	--	0.2%	8.4%
160th	0.9%	2.2%	2.4%	--	--	--	5.5%
168th	0.6%	0.4%	1.8%	0.2%	--	0.2%	3.2%
173rd	--	0.4%	0.6%	--	--	--	1.0%
Indigo	--	--	--	0.2%	--	--	0.2%
	--	2.0%	2.4%	0.2%	--	0.2%	4.8%
Marlin	--	--	1.7%	--	--	--	1.7%
200th	1.6%	1.9%	1.7%	0.4%	--	0.2%	5.8%
Cutler Ridge	2.2%	3.1%	7.5%	1.7%	--	2.0%	16.6%
TOTAL	22.5%	29.0%	30.3%	6.6%	7.7%	3.9%	100.0%

EXHIBIT 26. Analysis of Egress from Busway by Busway Station and Route - *Busway Egress*

Station	Route						TOTAL
	1	31/231	38	52	252	287	
Dadeland South	5.0%	12.5%	13.0%	3.2%	4.9%	0.5%	39.1%
104th	0.2%	0.3%	0.5%	--	0.3%	0.5%	1.8%
112th	--	0.3%	1.5%	0.4%	--	--	2.2%
117th	--	--	--	0.2%	--	--	0.2%
124th	--	1.0%	--	--	--	--	1.0%
128th	0.3%	1.0%	--	--	--	--	1.3%
136th	0.5%	1.8%	1.0%	0.4%	0.2%	0.2%	4.1%
144th	0.8%	0.5%	--	0.2%	0.8%	0.2%	2.5%
152nd	3.7%	1.6%	--	--	--	0.3%	5.6%
160th	0.5%	0.5%	0.5%	0.4%	--	--	1.9%
168th	1.0%	1.0%	--	0.2%	--	--	2.2%
173rd	--	1.0%	--	--	--	--	1.0%
Indigo	--	--	0.5%	--	--	--	0.5%
184th	--	2.1%	1.0%	--	--	--	3.1%
Marlin	--	9.2%	0.5%	--	--	--	9.7%
200th	1.0%	3.1%	2.0%	1.6%	--	--	7.7%
Cutler Ridge	3.0%	8.7%	4.0%	0.4%	--	--	16.1%
TOTAL	16.0%	44.6%	24.5%	7.0%	6.2%	1.7%	100.0%

Transfer Analysis: To/From Another MDT Metrobus Route

For both Questions 4 and 6, the option of transferring to or from another MDT standard local bus route or Metrorail was among the response choices. If the respondent selected this response in either question, he or she was asked to write which MDT route they transferred from or to. The responses to Question 4 indicated that 7.3 percent of Busway customers accessed the Busway by transferring from a MDT Metrobus route and 17.0 percent accessed the Busway via Metrorail. The responses to Question 6 indicated that 17.4 percent of Busway customers transferred to an MDT Metrobus route and 17.9 percent transferred to Metrorail. Exhibit 27 lists the percentages of customers transferring to or from each route connecting with the Busway.

EXHIBIT 27. Busway Transfers to/from Another MDT Route*

	From	To	Route	From	To
1	11.1%	11.9%	**70**	15.2%	21.2%
24	0.0%	3.7%	**73**	12.0%	5.8%
35	18.1%	10.4%	**87**	7.3%	5.6%
40	0.0%	2.7%	**88**	1.8%	20.2%
52	23.6%	10.3%	**104**	1.8%	6.2%
56	2.0%	1.0%	**137**	3.3%	1.0%
57	3.7%	0.0%			

**Special Note:* *Transfers to/from the Busway are not linked in this survey. In only one case did a respondent both transfer to and transfer from the Busway. It is important to note that there were 82 (7.3 percent) of 1,164 respondents accessing the Busway by transferring from an MDT route and the percentages above for the routes from which riders are accessing the Busway represent slightly more than seven percent of all respondents. For example, of the respondents transferring from another MDT route to the Busway, 13.8 percent transferred from Route 35, as shown in Exhibit 10. In addition, the egress by route percentages represent the approximately 18 percent of respondents who transferred from the Busway to another MDT route. For example, of the 18 percent who transferred to another MDT route, 5.6 percent transferred to Route 35, as shown in Exhibit 10. Finally, cross tabulations were computed for those respondents who were both transferring from an MDT route to access the Busway and transferring back to an MDT route to egress the Busway. It was found that only 3 out of 282 respondents did this, or 1 percent of all riders who made a transfer and only 0.3 percent of all respondents.*

The combined transfer rate to the Busway is 24.3 percent for transfers from other MDT bus routes and Metrorail. The combined transfer rate from the Busway is 35.3 percent for transfers to MDT bus routes and Metrorail. While this might seem to be a relatively high transfer rate, it is important to remember that the Busway is considered to be an extension of Metrorail service. Similar to rail transit, the Busway functions as an attractive, high-capacity trunk line offering higher quality service; thus, transfers to and from trunk services are inevitable and typical. However, it is useful to continually monitor Busway transfer ridership.

Park-and-Ride Access by Busway Station

Only 4.2 percent of the survey respondents indicated that they accessed the Busway by driving (via park-and-ride). Of these riders, more than one-fourth used the 152nd Street Station (Coral Reef Drive), as shown in Exhibit 28. However, nearly one-half used Cutler Ridge Mall. An origin analysis was attempted for the stations at Cutler Ridge, 152nd Street, and Dadeland South to

assess the origin of park-and-ride patrons. However, a very large percentage (82 percent) either provided the station name for Question 2 (which was to be the *trip* origin—the station name should have been indicated only in Question 3) or provided no answer at all. This indicates that the customers had difficulty in understanding what was being asked for Question 2. The remaining answers were "Homestead." Of course, it must be kept in mind that these customers represent only 4.2 percent of all Busway ridership.

EXHIBIT 28. Park-and-Ride Access by Busway Station

Dadeland South	**104th**	**112th**	**117th**	**124th**	**128th**	**136th**	**144th**	**152nd**
10.6%	0.0%	0.0%	0.0%	0.0%	0.0%	2.9%	0.0%	27.4%
160th		**173rd**	**Indigo**	**184th**	**Marlin**	**200th**	**Cutler Ridge Mall**	
5.0%	0.0%	0.0%	0.0%	2.9%	2.9%	2.9%	45.2%	

Fare and Travel Behavior

A series of questions were included on the survey instrument to establish the Busway customers' fare payment and travel behavior characteristics. These questions included:

- Frequency of use (Question 9)
- Type of fare paid (Question 10)
- How the trip was made prior to the existence of the Busway (Question 11)
- Reason for using the Busway (Question 12)
- Length of use (Question 13)

Frequency Of Use

Question 9 asked customers how many days per week they utilized a route that operates on the Busway. As shown in Exhibit 29, on the following page, 68.8 percent of customers use the Busway five to seven times per week (42.7 percent reported riding every day; 26.1 percent reported riding five or six days per week). This result is consistent with the trip origin and destination information presented previously (see Exhibits 17 and 20), which indicated that a majority of Busway customers travel between home and work.

Fare Payment Type

The results of Question 10 indicate that most customers pay full fare, even if they are frequent riders. The full cash fare of $1.25 is paid by 56.3 percent of the Busway customers who completed the survey, while 14.1 percent use the full-fare Metropass. Exhibit 30, shown on the following page, summarizes the payment breakdown by type of fare. According to Exhibit 30, 5.8 percent of those surveyed used a Metrorail Transfer to board a Busway bus. This finding should be distinguished from that presented previously in Exhibit 18, which showed that 17 percent of those boarding a Busway bus had just transferred from Metrorail. The difference between these two results is evidenced by those using a Metropass or Golden Passport to ride the Metrorail and Busway.

A cross-tabulation of data based on responses to frequency of use, income, and fare payment revealed that 49.9 percent of customers with annual household incomes of less than $25,000 use the Busway five or more times per week and pay the full cash fare. This is a common observation throughout the transit industry, because many low-income customers cannot afford the monthly pass, even though it would mean a lower cost (fare) per trip. It is likely that such observations will continue until more advanced fare payment technologies such as SmartCard become widely available.

EXHIBIT 29. Question 9 – How Often Do You Use a Busway Route?

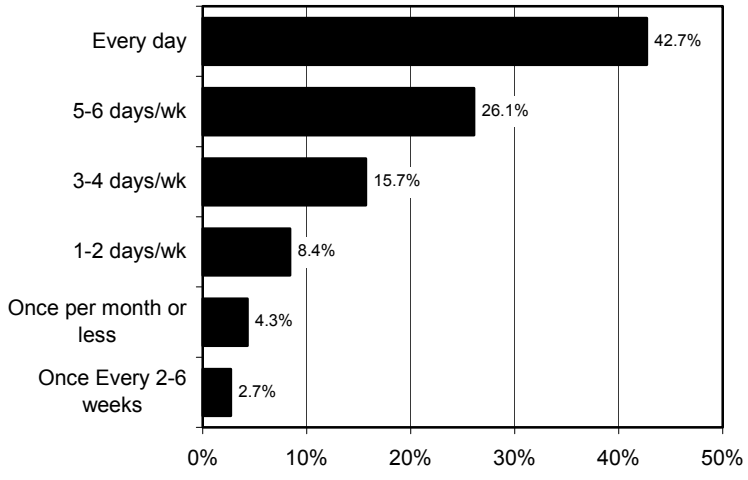
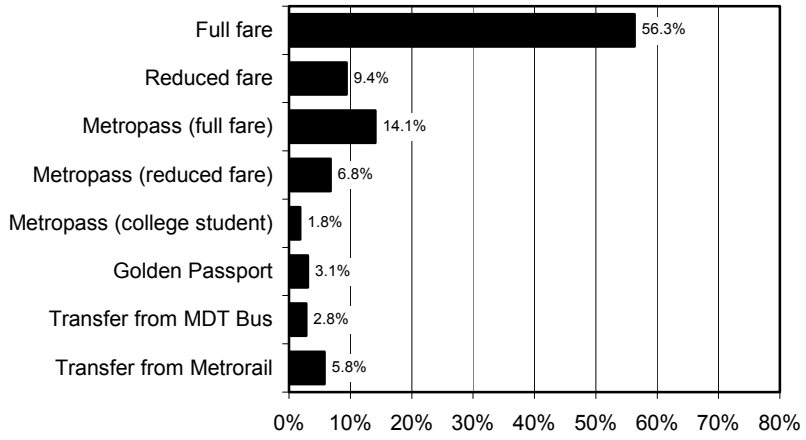


EXHIBIT 30. Question 10 – What Fare Did You Pay In Order To Get On This Particular Bus?



Other Transportation Options

Question 11 asked customers the following question: "Before the Busway opened, how did you make this trip?" Exhibit 31 graphically summarizes the answers to this question. The largest percentage, 21.6 percent, drove, while 20.2 percent rode with someone. In total, 41.8 percent of survey respondents made their trips by automobile prior to the existence of the Busway. This finding is significant because it indicates that new riders are attracted by the services offered by the Busway. Moreover, 17.8 percent did not make the trip before the Busway opened or did not live in the Miami-Dade area. Seventeen percent used another MDT bus route before the Busway opened. Exhibit 32, on the following page, provides a breakdown of the routes that customers indicated that they used prior to the existence of the Busway. Of the 95 valid responses to this part of Question 11, 51 (or 52.6 percent) indicated that they previously rode Route 52, and 29 respondents (or 29.9 percent) indicated riding Route 1 prior to the availability of Busway service. These findings are significant as they show that 67.5 percent of Busway riders are new MDT users because they either used an alternative mode to MDT, such as auto, taxi, or jitney, or did not make the trip at all. This finding also suggests that many of the "new" Busway customers may not be former transit users and that the service offered by the Busway was a major reason to start using public transit.

EXHIBIT 31. Question 11 – Before the Busway Opened, How Did You Make This Trip?

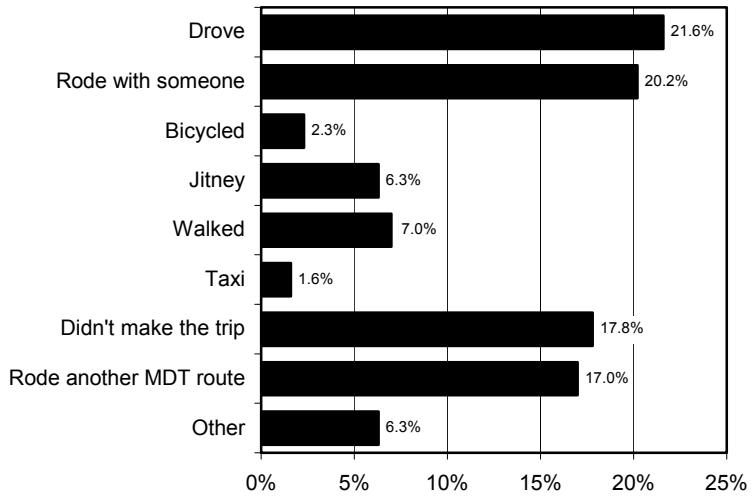


EXHIBIT 32. MDT Routes Used Prior to Busway

MDT Route	Number of	% of Total
1	29	29.9%
35	6	6.2%
38	6	6.2%
52	51	52.6%
65	1	1.0%
70	2	2.1%
73	1	1.0%
88	1	1.0%
TOTAL	97	100.0%

Reason for Riding

Question 12 asked Busway customers the following: "What is the *most important* reason why you currently use a Busway route?" Survey respondents were asked to check only one response. Based on the results shown on the following page in Exhibit 33, the most frequent response (30.1 percent) given by customers is that they do not drive or do not have a valid driver's license. The second most frequent response (29.6 percent) is that a car is not available for use. This means that more than half of all respondents either do not drive or do not have access to a car. In addition, 14.3 percent of respondents indicated "Busway is more convenient" as a major reason for using the Busway.

Length of Use

Question 13 on the survey instrument queried respondents about how long they have been using the Busway. The responses, exhibited in Exhibit 34, on the following page, indicate that 37.8 percent have been using the service between six months and one year, and 36.1 percent—more than one-third—have been using the Busway since it opened in 1997. The responses also show that 26.1 percent—nearly one-fourth—have been using the Busway for less than six months (including first-day riders). This result shows that the Busway is continuing to attract new customers to the service.

EXHIBIT 33. Question 12 – What Is the Most Important Reason Why You Currently Use the Busway?

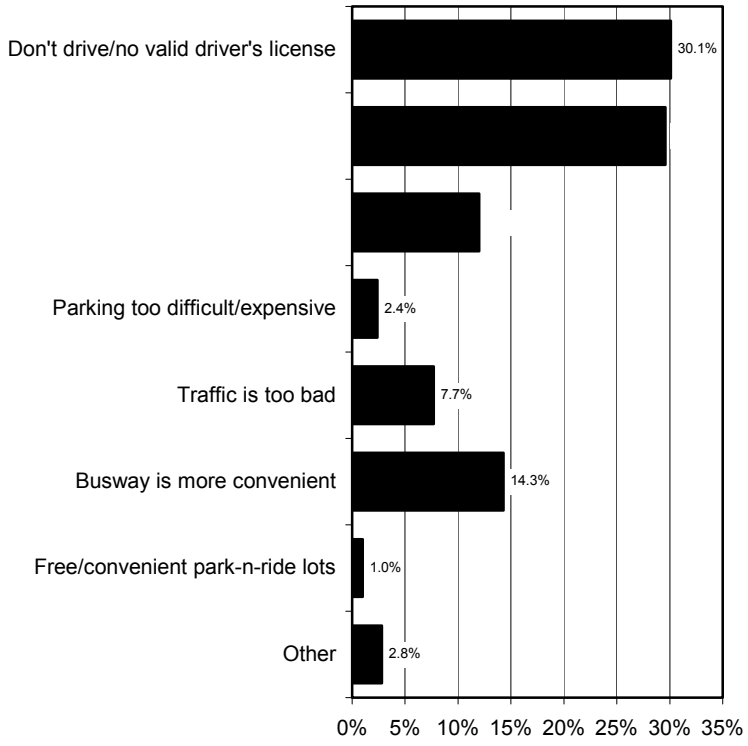
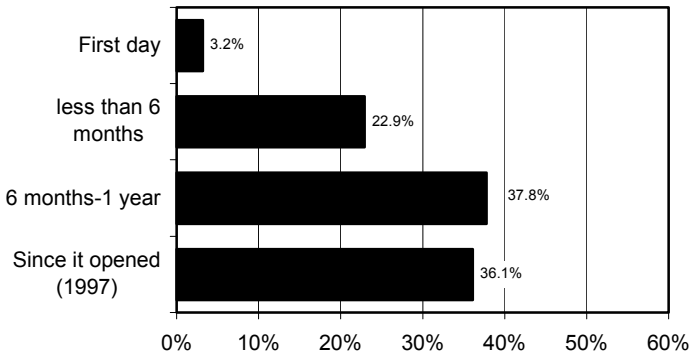


EXHIBIT 34. Question 13 – How Long Have You Been Using the Busway?



Rider Demographics

Three questions were asked on the survey instrument to establish a demographic profile of Busway customers. These demographic-related questions included the following:

- Age (Question 14)
- Race/ethnicity (Question 15)
- Total household income for the year 2000 (Question 16)

Typical Rider Profile

Using the demographic findings as well as travel behavior information, a typical rider profile was generated. Comparing these results with data from the 1993 MDT on-board survey (CUTR, May 1994) and the more recent *Miami-Dade Transit 2000 Tracking Study* (Behavioral Science Research, June 2001) shows that the typical Busway rider is very similar to the average Metrobus rider. However, when comparing household income information from the Tracking Study, which analyzed bus-only riders, rail-only riders, and dual-mode riders separately, to the Busway survey results, there is some evidence to suggest that Busway users have, on average, slightly higher incomes than the average bus-only rider. Because the Tracking Study evaluated the incomes of riders using different income categories than the Busway survey, this difference cannot be determined exactly without being able to examine raw data from the Tracking Study.

The typical Busway customer may be described as follows:

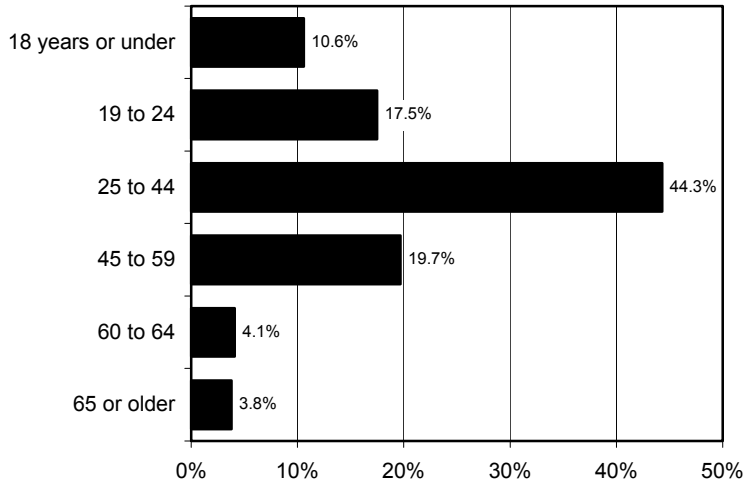
- Between 25 and 44 years of age;
- Black (non-Hispanic) or Hispanic;
- Earned less than $25,000 in 2000;
- Rides between five and seven days per week;
- Does not drive or have an available car; and
- Pays the full cash fare.

Age

As evidenced by the results presented in Exhibit 35, on the following page, the largest share of customers — 44.3 percent — is between 25 and 44 years of age. The second largest group (19.7 percent) includes those between 45 and 59 years of age, while 17.5 percent of customers are

between 19 and 24 years of age. Most (about 82 percent) of Busway customers are of working age, between 19 and 59 years. A cross-tabulation was generated to determine if there was any difference in the age profile of those who used Metrobus before the Busway opened and those who did not use transit prior to the opening of the Busway. No significant difference was found, however.

EXHIBIT 35. Question 14 – Your age is…



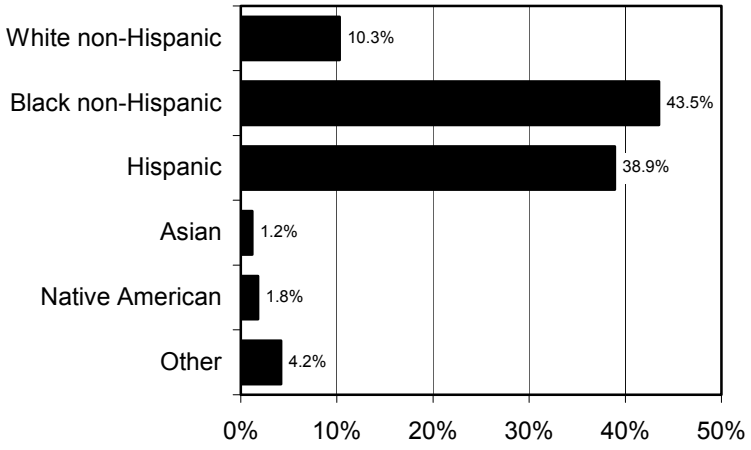
Race/Ethnicity

The majority of survey respondents are "Black (non-Hispanic)" (43.5 percent) or "Hispanic" (38.9 percent), as displayed in Exhibit 36. White, non-Hispanic customers comprise 10.3 percent of riders, according to these survey results, while a total of 7.2 percent indicated that they were either "Asian," "Native American," or "Other." Interestingly, many respondents wrote in either "Black Hispanic" or "White Hispanic" in the "Other" response to Question 15. This is apparently an important distinction to some survey respondents, and may also reflect the increasing number of individuals throughout the country identifying themselves as mixed race, as evidenced by recent Census 2000 figures.

Again, a cross-tabulation was generated to determine if there was any difference in the race/ethnicity profile of those who used Metrobus before the Busway opened and those who did not use transit prior to the opening of the Busway. Of the survey respondents who indicated that

they did not use transit for their trip prior to the opening of the Busway (question #11), 39 percent identified themselves as "Black (non-Hispanic)" and 44 percent identified themselves as "Hispanic." Of those who, in the same question, indicated that they used another Metrobus route before the Busway opened, 61 percent identified themselves as "Black (non-Hispanic)" while 21 percent identified themselves as "Hispanic" (there were no significant differences among the other race/ethnicity categories).

EXHIBIT 36. Question 15 – What is Your Race?



Total Annual Household Income for 2000

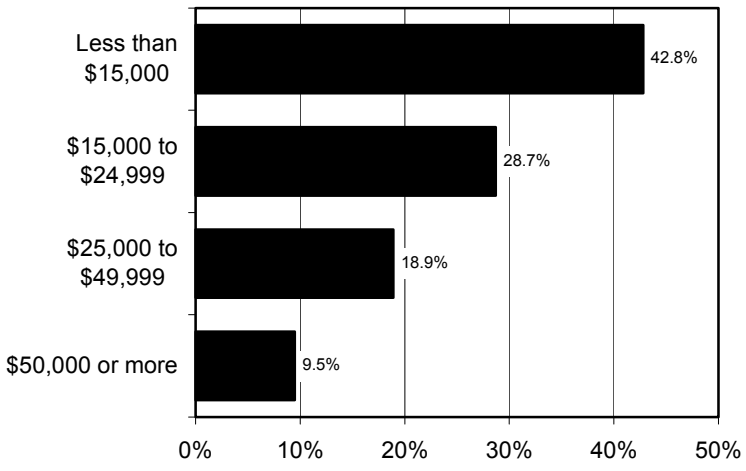
Question 16 asked customers to indicate the range of their total household income for 2000. The results of this question are graphically shown in Exhibit 37. A majority of Busway customers completing the survey reported household incomes of $24,999 or less. Specifically, 42.8 percent of those surveyed indicated total household income levels of less than $15,000 per year, and 28.7 percent had household income levels between $15,000 and $24,999 per year. Nearly 19 percent of customers had incomes between $25,000 and $49,999, while nearly 10 percent reported household incomes of $50,000 or more annually.

These findings related to low annual household incomes suggests that the service offered by the Busway is attracting traditional riders of public transit. However, a cross-tabulation of the

household incomes of previous transit users (before the Busway opened) and those who previously did not use transit showed evidence that the Busway has attracted some previous non-users of transit with slightly higher average incomes. For example, 40 percent of previous non-users of transit had household incomes below $15,000 in 2000, while 46 percent of previous Metrobus users have incomes in the same range. Thirty-one percent of previous non-users had incomes of $25,000 or more, while 22 percent of previous Metrobus users had incomes of $25,000 or more.

Also, as mentioned previously, a comparison of these results with the Tracking Study also provides evidence that Busway riders have slightly higher incomes than typical Metrobus riders (although this cannot be verified without analysis of raw data from the Tracking Study, due to the use of different income-range categories between the two studies). It would be expected that a higher-quality transit service such as the Busway would attract individuals with slightly higher average incomes than the traditional bus rider. It must also be noted that the best way to make these comparisons would be to compare data from the Metrobus routes that operated in the Busway corridor along U.S. 1 before the Busway was implemented. This can be accomplished by re-examining route-level raw data from the 1993 MDT on-board survey; however, those data may not be recent enough to produce a valid comparison.

EXHIBIT 37. Question 16 – What Was the Range of Your Total Household Income for 2000?



Customer Satisfaction

Question 17 is a multi-part question that asked respondents to rate their perception of 11 different aspects of Busway service, as well as their overall satisfaction with the Busway. It also asked riders to rate their overall satisfaction with MDT as a whole, using a five-point scale (1 = "very poor" and 5 = "very good"). In addition, Question 18 allowed survey respondents to list one improvement that they would make to the Busway, if funding were available. Finally, respondents were allowed to write any other comments or suggestions regarding Busway service.

Satisfaction Ratings

As mentioned previously, Question 17 provided respondents with the opportunity to rate individual levels of satisfaction with various Busway service characteristics. Using the five-point rating system's numerical scoring values, an average score was calculated for each service characteristic. The resulting mean scores give a better indication of overall customer satisfaction with each of the service characteristics. Because a score of 5 indicates a "very good" rating, the closer to 5 that a characteristic's mean score is, the higher the degree of customer satisfaction with that characteristic.

Exhibit 18, shown on the following page, presents all of the weighted average customer satisfaction ratings for the service characteristics included in Question 17, rank-ordered from highest to lowest. The responses indicate a general overall satisfaction with Busway service; all mean scores fell between "fair" and "good."

EXHIBIT 38. Customers' Satisfaction Ratings of Service Characteristics

Service Characteristic	Mean Score (best = 5)
Safety on bus	3.81
Cost of riding Busway	3.76
Availability of information/maps	3.69
Convenience of Busway routes	3.69
Satisfaction with recent changes to Busway (traffic signals)	3.68
Safety at Busway stops	3.65
Travel time on Busway buses	3.63
Availability of seats on the bus	3.60
Hours of Busway service	3.50
Frequency of Busway service	3.25
Dependability of Busway buses	3.18

Exhibits 39 through 49, present the frequency distributions for the 11 Busway service characteristics included in Question 17 of the survey instrument. From the data listed previously in Exhibit 22 and Exhibits 39 through 49, it is revealed that Busway customers, as represented by the survey respondents, are most satisfied with the level of safety on Busway vehicles (mean score = 3.81) and with the Busway fares, or cost of riding the service (mean score = 3.76). Nearly 27 percent of respondents rated the level of safety on the buses as "very good," while 40.6 percent rated the safety on the buses as "good." Concerning the cost of riding the Busway, i.e., the fare, 24.4 percent rated the cost as "very good," and 38.5 percent rated the cost as "good."

Other characteristics that rated comparatively well included the availability of system information and maps (mean score = 3.69); the convenience of the Busway routes (mean score = 3.69); and the level of satisfaction with recent changes on the Busway regarding traffic signalization (mean score = 3.68). While the level of safety on the buses was rated the highest among all the other aspects of Busway service, the level of safety at Busway stops was rated somewhat lower, with a mean score of 3.65. Still, a majority (58.5 percent) considers the safety at Busway stops to be "very good" or "good."

Service aspects that resulted in lower ratings of customer satisfaction included the hours that the Busway operates (mean score = 3.50); frequency of the Busway service (mean score = 3.25); and dependability, or on-time performance, of the Busway buses (mean score = 3.18). The hours of operation on the Busway are a function of MDT's service span as a whole. While a majority (54.5 percent) still rated this characteristic as "very good" or "good," 19.2 percent rated the hours of service as "poor" or "very poor." Similarly, the frequency of service on the Busway is a function of MDT's overall resource availability. Approximately one-fourth (25.8 percent) of the survey respondents indicated that their level of satisfaction with the frequency of service on the Busway is "poor" or "very poor."

The service characteristic that was rated the lowest was the dependability of Busway buses, as measured by on-time performance. Nearly 30 percent of those customers responding to the survey reported a "poor" or "very poor" level of satisfaction with Busway dependability. Despite the low rating for this characteristic, a majority (54 percent) rated the dependability of Busway buses as "good" or "fair."

EXHIBIT 39. Question 17a – Hours of Service (mean = 3.50)

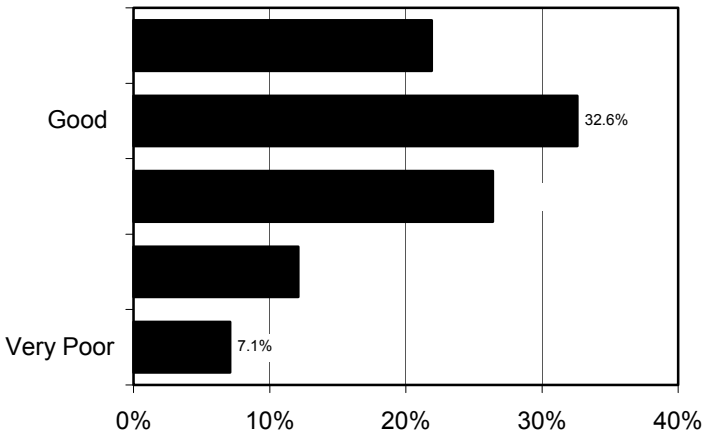


EXHIBIT 40. Question 17b – Frequency of Service (mean = 3.25)

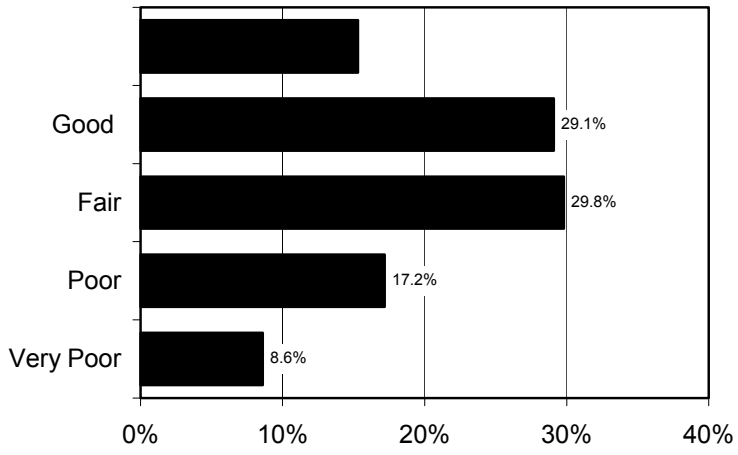


EXHIBIT 41. Question 17c – Convenience of Routes (mean = 3.69)

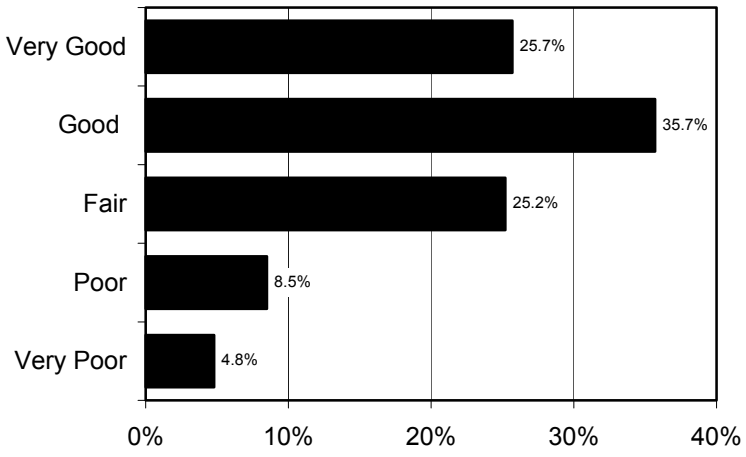


EXHIBIT 42. Question 17d – Dependability/On Time Performance (mean = 3.18)

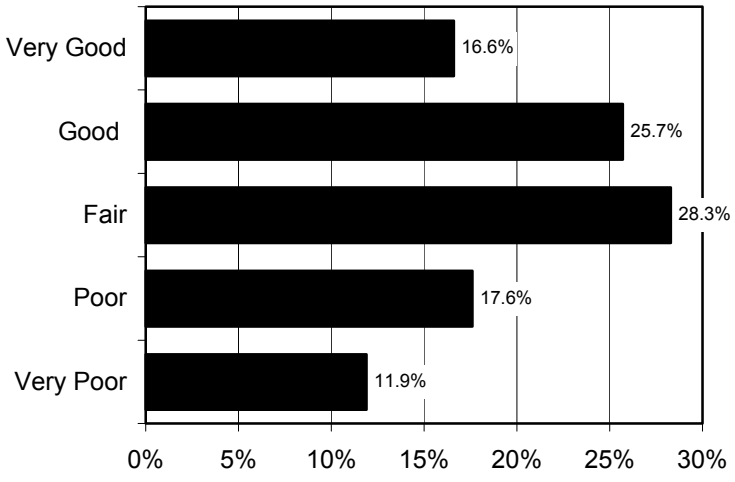


EXHIBIT 43. Question 17e - Travel Time on Busway (mean = 3.63)

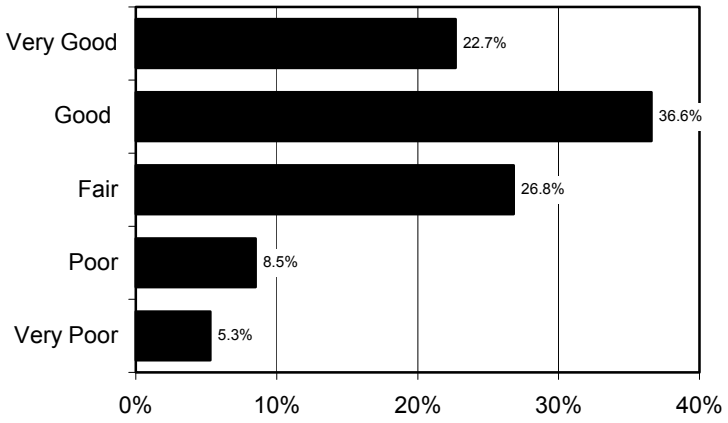


EXHIBIT 44. Question 17f - Cost of Riding the Busway (mean = 3.76)

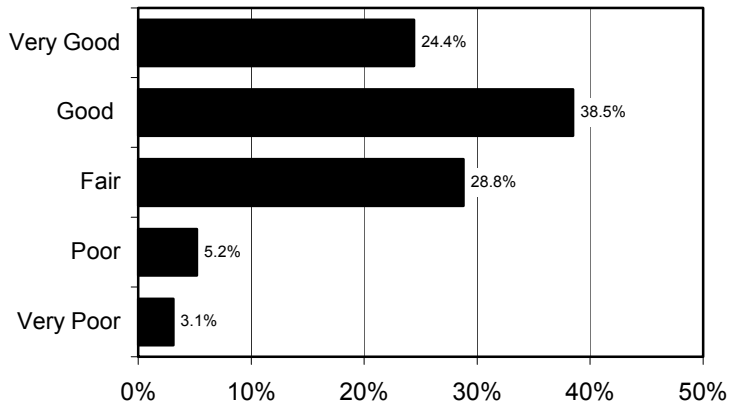


EXHIBIT 45. Question 17g - Availability of Information/Maps (mean = 3.69)

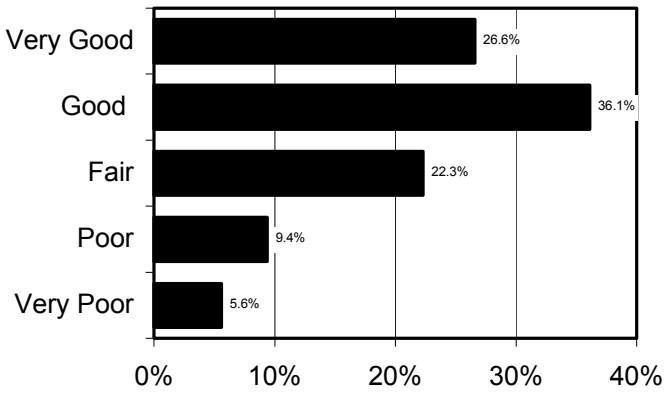


EXHIBIT 46. Question 17h - Availability of Seats on the Bus (mean = 3.60)

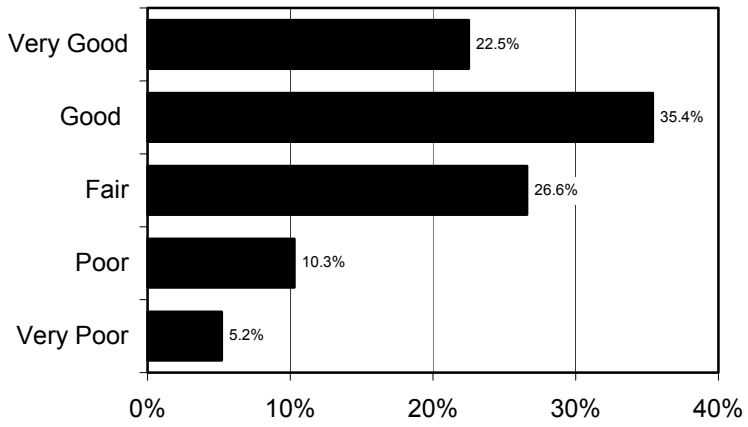


EXHIBIT 47. Question 17i - Safety on the Bus (mean = 3.81)

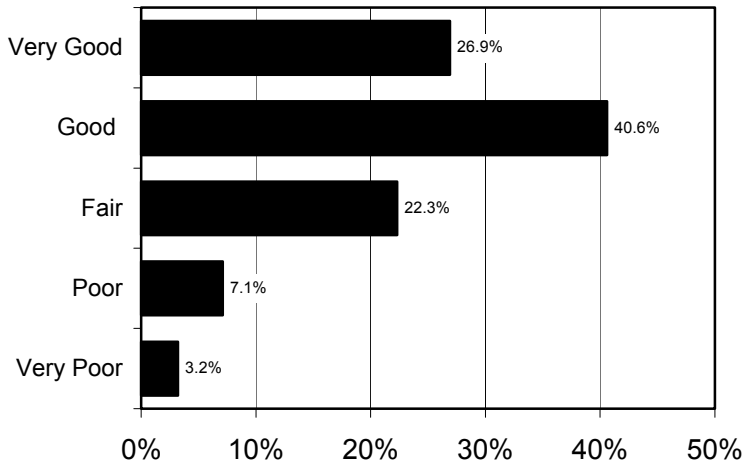


EXHIBIT 48. Question 17j - Safety at Busway Stops (mean = 3.65)

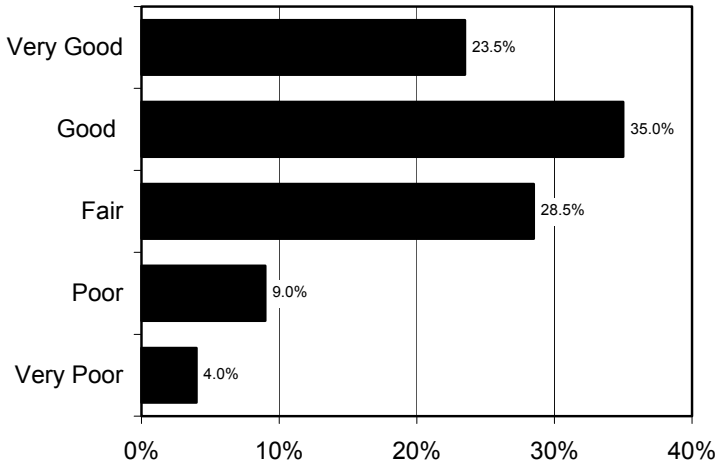
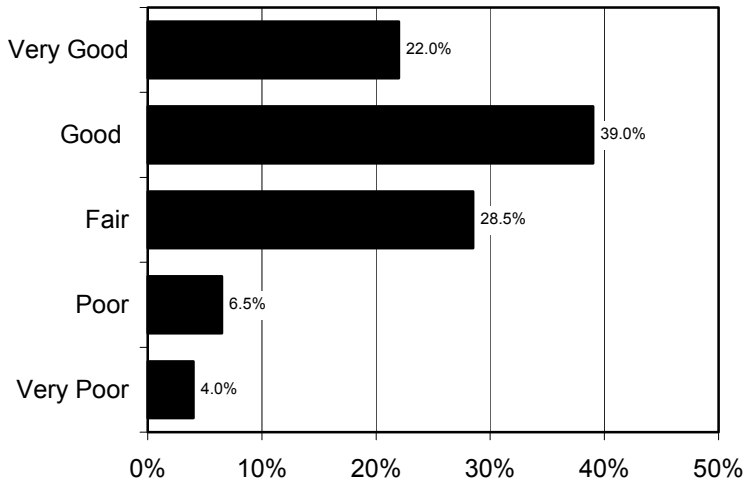


EXHIBIT 49. Question 17k – Satisfaction with Traffic Signals (mean = 3.68)



Overall Satisfaction with Busway versus Conventional MDT Local Service

Questions 17l and 17m asked respondents to rate their overall satisfaction with Busway service compared to their overall satisfaction with MDT services as a whole. As shown in Exhibit 50, nearly 64 percent of the survey respondents rated their overall satisfaction with the Busway service as "very good" or "good" (mean score = 3.75). Exhibit 51 shows this comparison graphically. This finding shows that respondents are more satisfied with Busway service as compared to MDT services as a whole because the mean score for the overall satisfaction with MDT is somewhat lower at 3.61. This difference in means for the two questions was found to be statistically significant at the p = 0.05 level using the statistical procedure known as a T-test of Independent Samples (t=29.688*). This statistical difference means that customers are more satisfied with the Busway's special service attributes such as its perceived faster service[1] and limited stopping than conventional MDT Metrobus routes.

EXHIBIT 50. Customers' Satisfaction Ratings of Busway and MDT

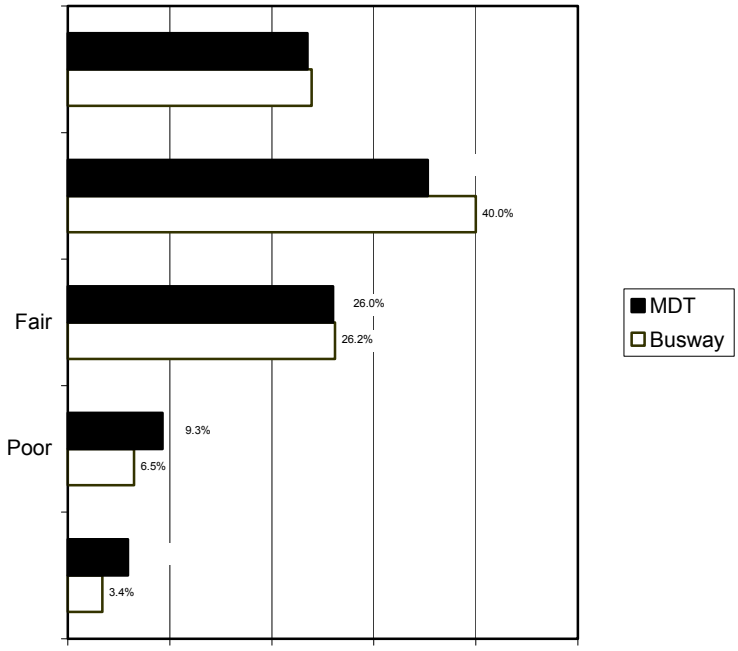
Service Characteristic	Mean Score (best = 5)
Overall satisfaction with the Busway	3.75
Overall satisfaction with MDT	3.61

In addition, a cross-tabulation was performed using the responses to Question 11 in order to isolate those respondents who indicated that they rode an MDT local bus prior to the implementation of the Busway and those respondents who used a mode other than an MDT local bus, such as an automobile, bicycle, or jitney, for their travels prior to shifting trips to the Busway. This information was then used to perform two cross-tabulations using the information from Question 11 with Question 17e (travel time on Busway buses) to determine the difference in mean scores of the two groups. The cross-tabulation revealed that prior MDT riders rated the travel time satisfaction on the Busway higher (mean score = 3.76) than those that had no prior experience with MDT local bus service (mean score = 3.60). This difference in the two mean scores was found to be statistically significant at the p=0.05 level using the statistical procedure known as a T-test of

[1] Currently the scheduled time saving is minimal because buses operate at-grade and are interrupted at intersections located at intervals of about one-half mile. Therefore, Busway service is not much faster than when the conventional MDT local buses operated in the South Miami corridor. MDT calculated the scheduled timesaving to be less than 10 percent. However, MDT believes that customers perceive a reduction in overall travel time.

Independent Samples (t= -6.67*). This is an important finding because it is assumed that persons using MDT local bus service prior to the implementation of the Busway would use their combined experience riding MDT local bus service as a benchmark or point of reference when evaluating the Busway service. In other words, previous customers of MDT local bus services view the Busway as providing a significant increase in service speed. These positive findings for the Busway service may also have a positive spillover effect on how customers perceive conventional MDT Metrobus routes.

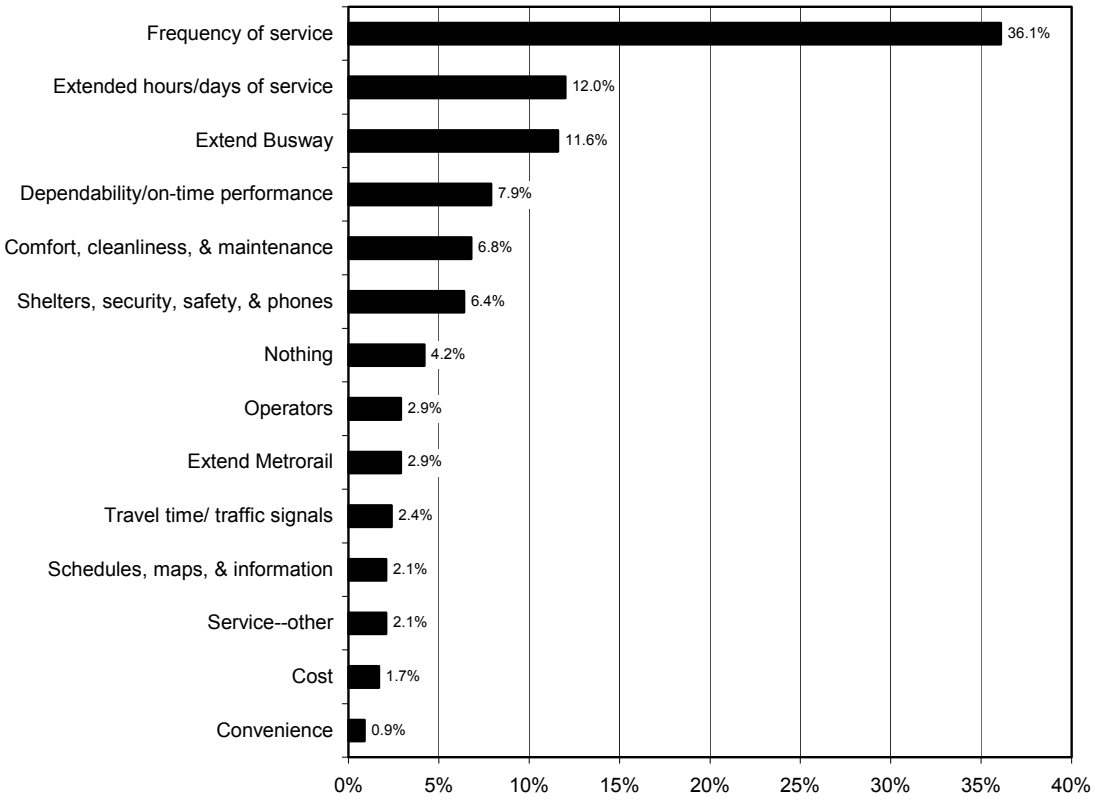
EXHIBIT 51. Questions 17l, 17m – Overall Satisfaction with the Busway versus Overall Satisfaction with MDT (Busway mean = 3.75; MDT mean = 3.61)



Priority Improvements

As stated previously, Question 18 allowed customers to identify a single priority improvement to the Busway system. The responses were categorized so that these results could be more easily summarized. The results of this question reflect those characteristics that customers were least satisfied with in Question 17, which included the frequency of service, hours of service, and dependability of service. The top four highest-prioritized improvements as revealed from Question 18 were: increased frequency of Busway service; extending the Busway farther south; extended hours of service (and days of service, for particular routes); and improved dependability of Busway service. The frequency distribution of the responses for Question 18 is exhibited in Exhibit 52. The results in Exhibit 52 show that 36.1 percent — more than one-third — of those responding to this question indicated that the most important improvement would be to increase the frequency of the service. Twelve percent would extend Busway hours of service, and nearly 12 percent would extend the Busway corridor. (Because the survey did not inquire about this information, it is not clear how many customers are aware of MDT's plans for extending the Busway farther south).

EXHIBIT 52. Question 18 – If funding became available, what is the ONE improvement to the Busway that you would make? (priority improvements by category)



Customer Satisfaction by Busway Route

The survey results based on the customer satisfaction items in Question 17 were also analyzed by Busway Route. Significant findings are highlighted in this section and indicate that the most satisfied Busway customers ride the Saga Bay MAX (Route 287). While Exhibit 14 shows that this minibus route has the lowest ridership of the Busway routes, the table also reveals that this route had the second-highest response rate of all the routes, second to the Coral Reef MAX (Route 252). At least 80 percent of Saga Bay MAX riders consistently rated the items in Question 17 (*a.* through *k.*) as "good" or "very good," which is a significantly higher percentage for these ratings ("good" and "very good") than the other routes. The only exception is for dependability, which had 75 percent of the Saga Bay MAX riders rating this characteristic as "good" or "very good."

Route 52 and the Coral Reef MAX (Route 252) had higher percentages of respondents rating them as "poor" or "very poor" with regard to hours of service and frequency of service. The Busway Local (Routes 31/231) was also rated lower in terms of frequency of service.

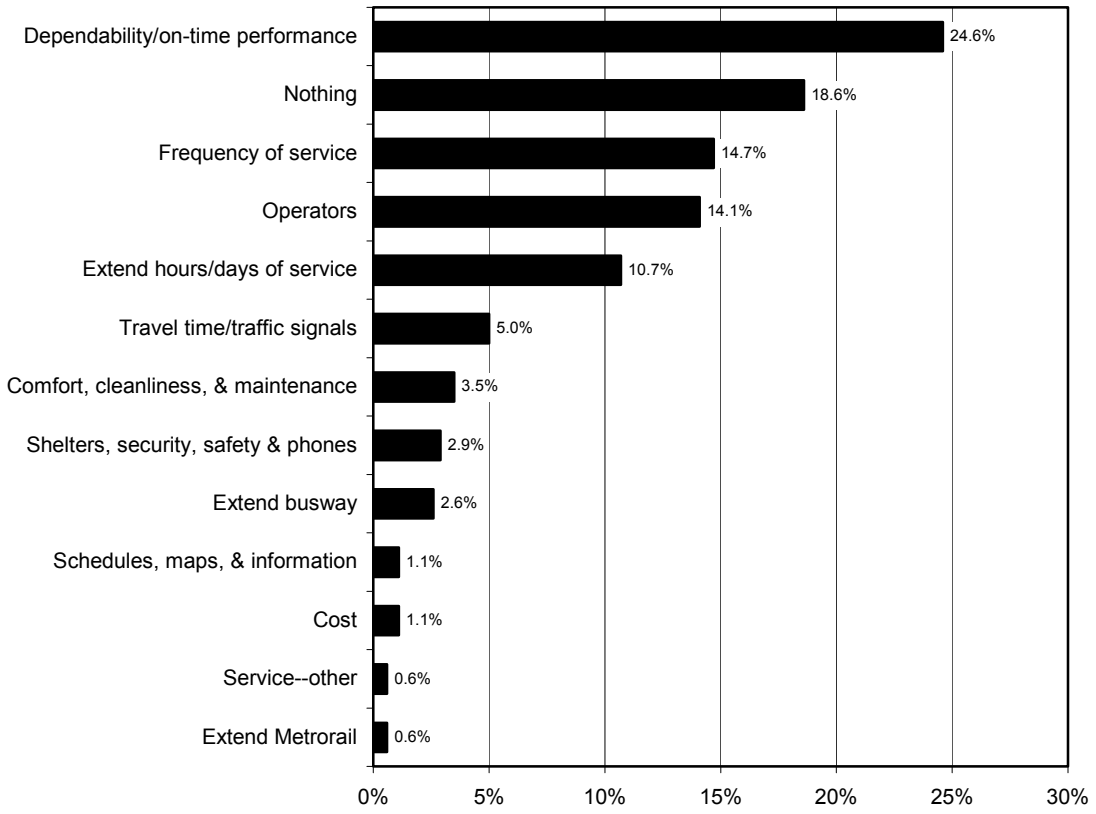
The seat availability item was examined to see whether customers riding the minibus routes (Coral Reef MAX, Saga Bay MAX, and some Busway Local runs) were less satisfied with the availability of seats on the smaller vehicles. However, it was found that satisfaction with seat availability was rated about the same for the minibus routes as for the routes operated with larger vehicles, with slightly less satisfied responses for the Busway Local and the Coral Reef MAX. Specifically, 19 percent of Route 231 riders, 22 percent of Coral Reef MAX riders, and only 4 percent of Saga Bay MAX riders rated seat availability as "poor" or "very poor." For the routes with larger buses, 11 percent of Route 1 riders, 18 percent of Route 31 riders, 17 percent of Route 38 (Busway MAX) riders, and 11 percent of Route 52 riders rated seat availability as "poor" or "very poor."

General Comments

The last section of the survey instrument contained space for customers to write additional comments or suggestions regarding Busway service (see Exhibit 53). Most of the comments echoed those found in Question 18 concerning improvements to the system. Comments regarding "dependability of service" (i.e., on-time performance) represented approximately one-fourth of all general comments. Though "dependability of service" ranked as the fourth highest priority for

improvement in Question 18 (response rate = 55.3 percent), it was the most common of the "Comments and Suggestions" (response rate = 40.3 percent) for those respondents who chose to provide more information on the survey.

EXHIBIT 53. Comments and Suggestions About Busway Service (by category)



Conclusions

In keeping with the FTA's evaluation guidelines for its BRT Demonstration Program, CUTR worked jointly with MDT to conduct an on-board passenger survey of South Miami-Dade Busway customers in March 2001. The on-board survey was conducted to assess Busway customer perceptions, behavior, and profiles. The Busway on-board survey asked customers to evaluate various elements of service as well as overall satisfaction, with the ultimate purpose of measuring the impacts of the Busway on customer perceptions compared to standard local bus service after the introduction of the Busway. Specific questions focused on customer behavior, including trip origins and destinations and frequency of Busway use. Finally, demographic questions provided a basis to assess changes in the demographic profile of Busway and local customers.

Significant survey findings show that almost one-half of the Busway customers were not previous transit users. Most customers made the trip by driving alone or carpooling, or using a jitney or a taxi. These findings suggest that the available Busway services have contributed to increased transit usage in the region. Almost one-third of the customers have used Busway services since its' inception. However, more than one-fourth are new users (less than 6 months, including first day riders) suggesting that the Busway continues to attract new customers. Results also suggest that the Busway attracts customers with slightly higher incomes compared to traditional MDT users.

Overall, the results from the on-board survey clearly show that Busway customers are satisfied with the service offered by the Busway. In fact, customers who responded to the survey indicated that they are more satisfied with the Busway service compared to that offered by conventional MDT local bus service. Customers are also more satisfied with the increased service speeds offered by the Busway. As for Busway service characteristics, customers are most satisfied with the level of safety and the cost to use the service. If funding were available, one-third of the customers would increase the frequency of the service.

Throughout the public transit industry, even slight changes in customer satisfaction are rare, particularly when comparisons are made across bus-based modes. This finding suggests that the Busway service offered by the MDT has elevated the overall quality of the various public transit services offered by the MDT from the customers' perspective. This finding further suggests that

MDT has been successful in implementing and operating the Busway service since the inception of the service in February 1997.

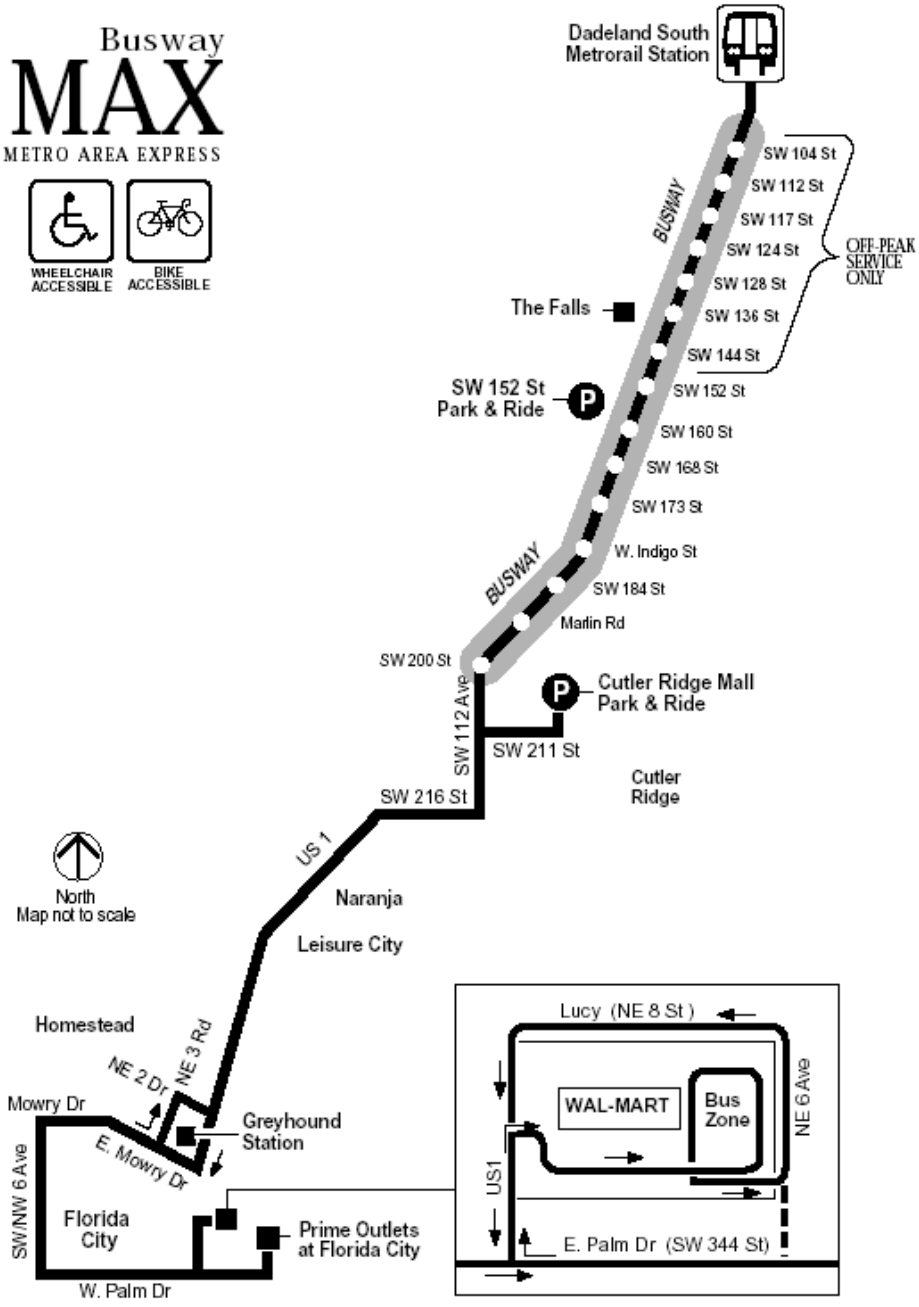
References

Project Status/Progress Report, South Miami-Dade Busway Corridor, April 1, 2002 – June 30, Miami-Dade Transit Service and Mobility Planning Division.

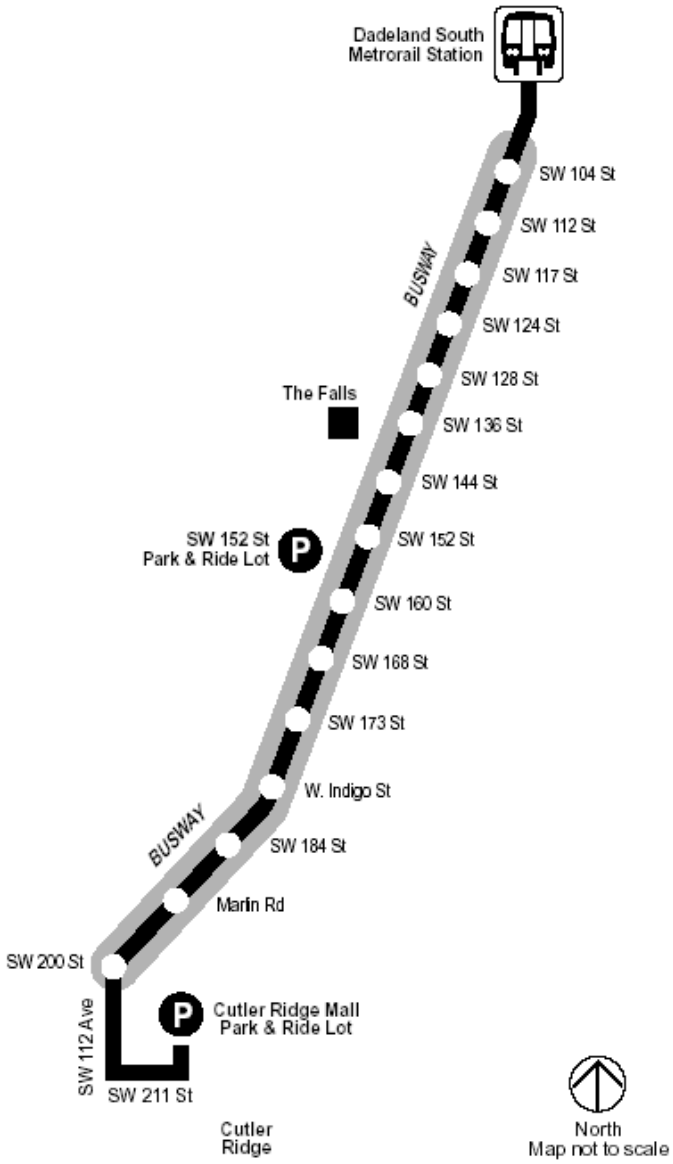
The South Miami-Dade Busway: A Transit and Highway Joint Project. Miami-Dade Transit Agency.

South Miami-Dade Busway Safety, August 2001. DMJM Harris and F.R. Aleman.

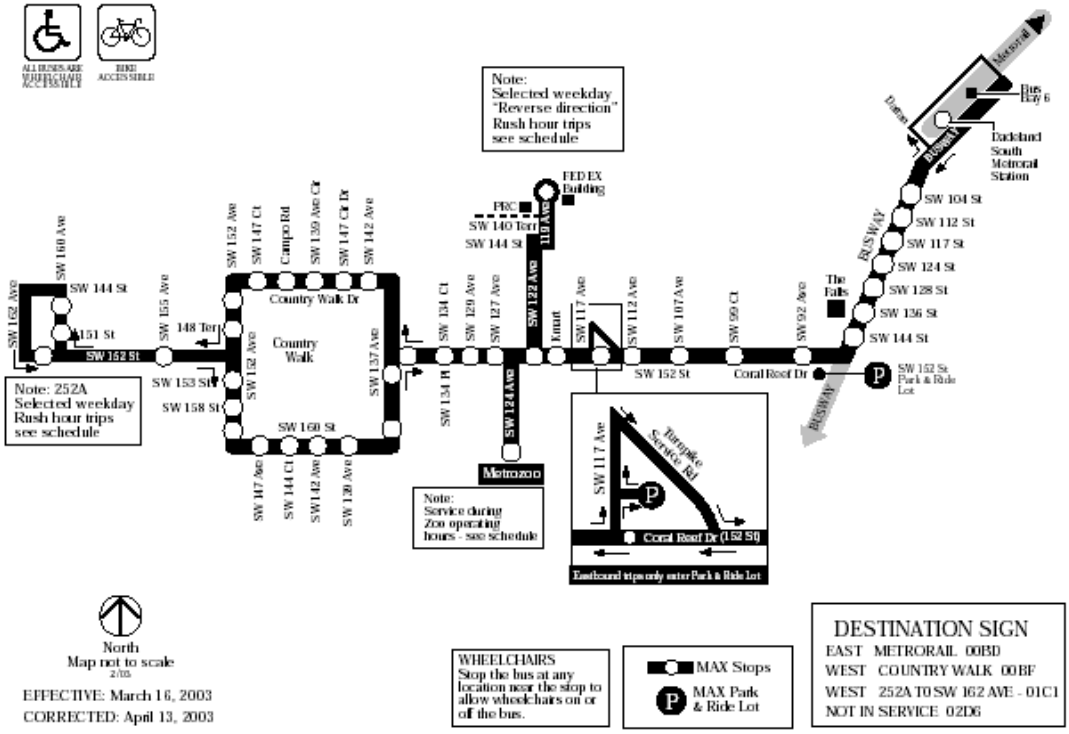
Appendix A – Routes Serving the Miami-Dade Busway

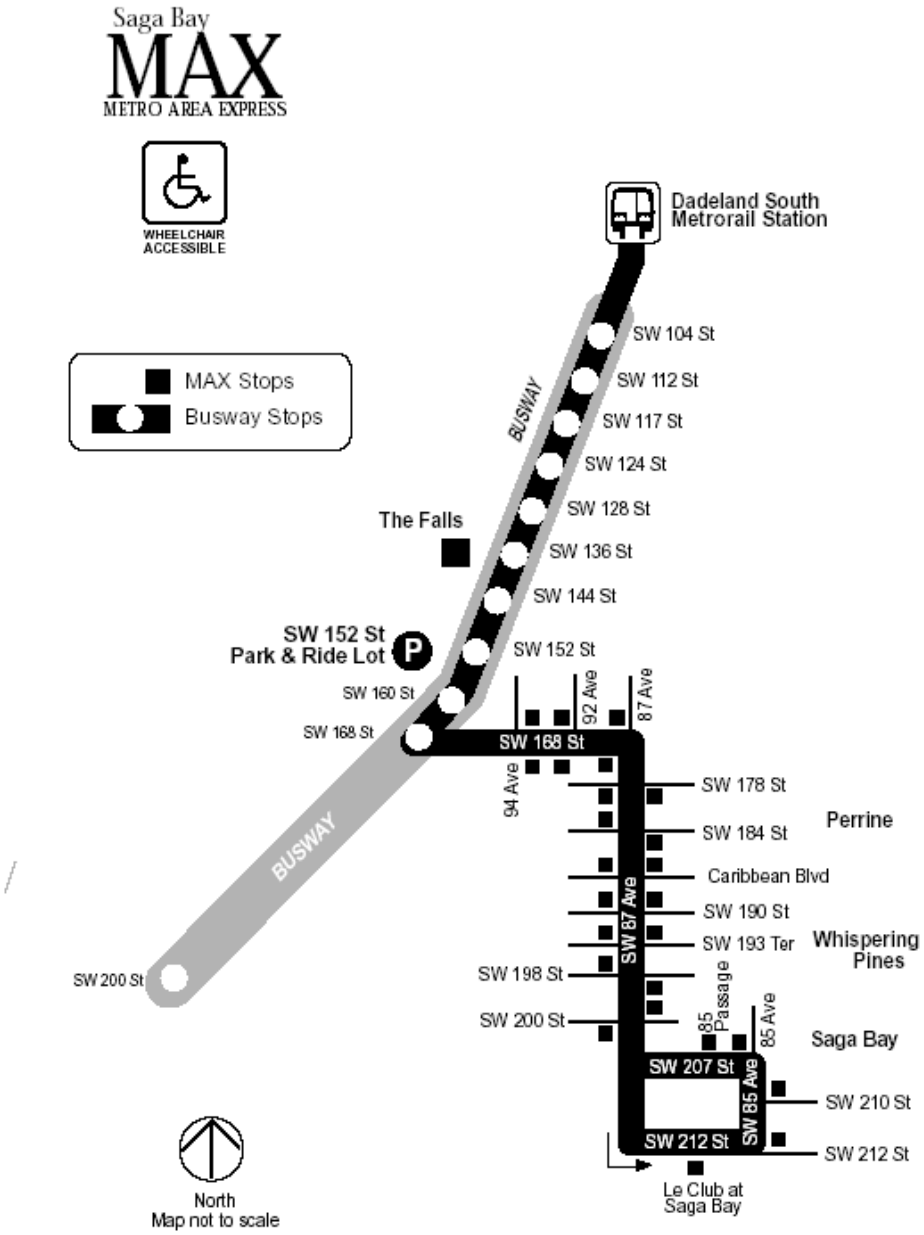

Busway
MAX
METRO AREA EXPRESS
WHEELCHAIR ACCESSIBLE
BIKE ACCESSIBLE
Dadeland South Metrorail Station
BUSWAY
SW 104 St
SW 112 St
SW 117 St
SW 124 St
SW 128 St
SW 136 St
SW 144 St
OFF-PEAK SERVICE ONLY
The Falls
SW 152 St Park & Ride
SW 152 St
SW 160 St
SW 168 St
SW 173 St
W. Indigo St
SW 184 St
Marlin Rd
SW 200 St
SW 112 Ave
Cutler Ridge Mall Park & Ride
SW 211 St
Cutler Ridge
SW 216 St
US 1
North
Map not to scale
Naranja
Leisure City
Homestead
NE 3 Rd
NE 2 Dr
Mowry Dr
E. Mowry Dr
Greyhound Station
SW/NW 6 Ave
Florida City
Prime Outlets at Florida City
W. Palm Dr
Lucy (NE 8 St)
WAL-MART
Bus Zone
NE 6 Ave
US1
E. Palm Dr (SW 344 St)

Busway Local

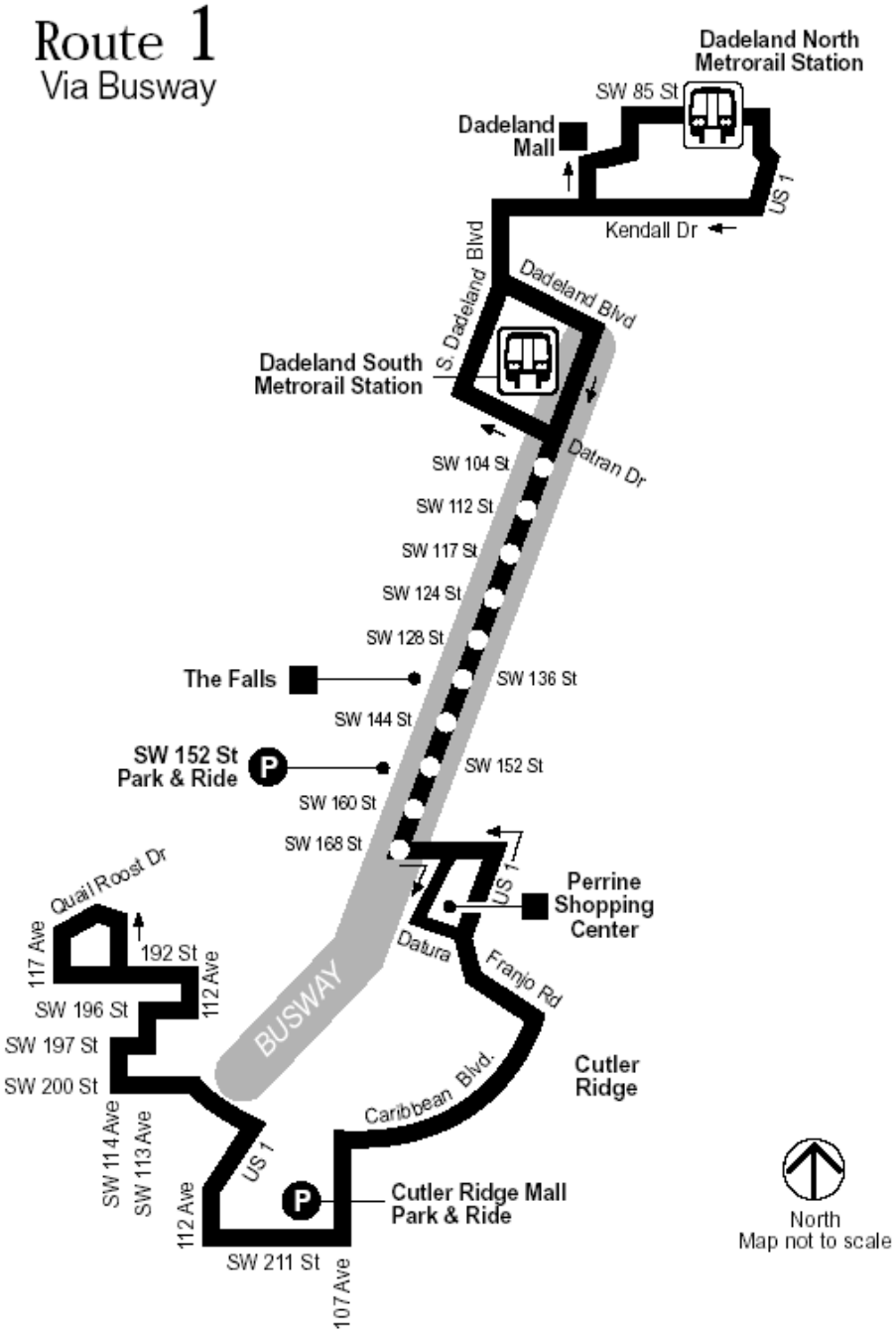


Route 252
CORAL REEF MAX

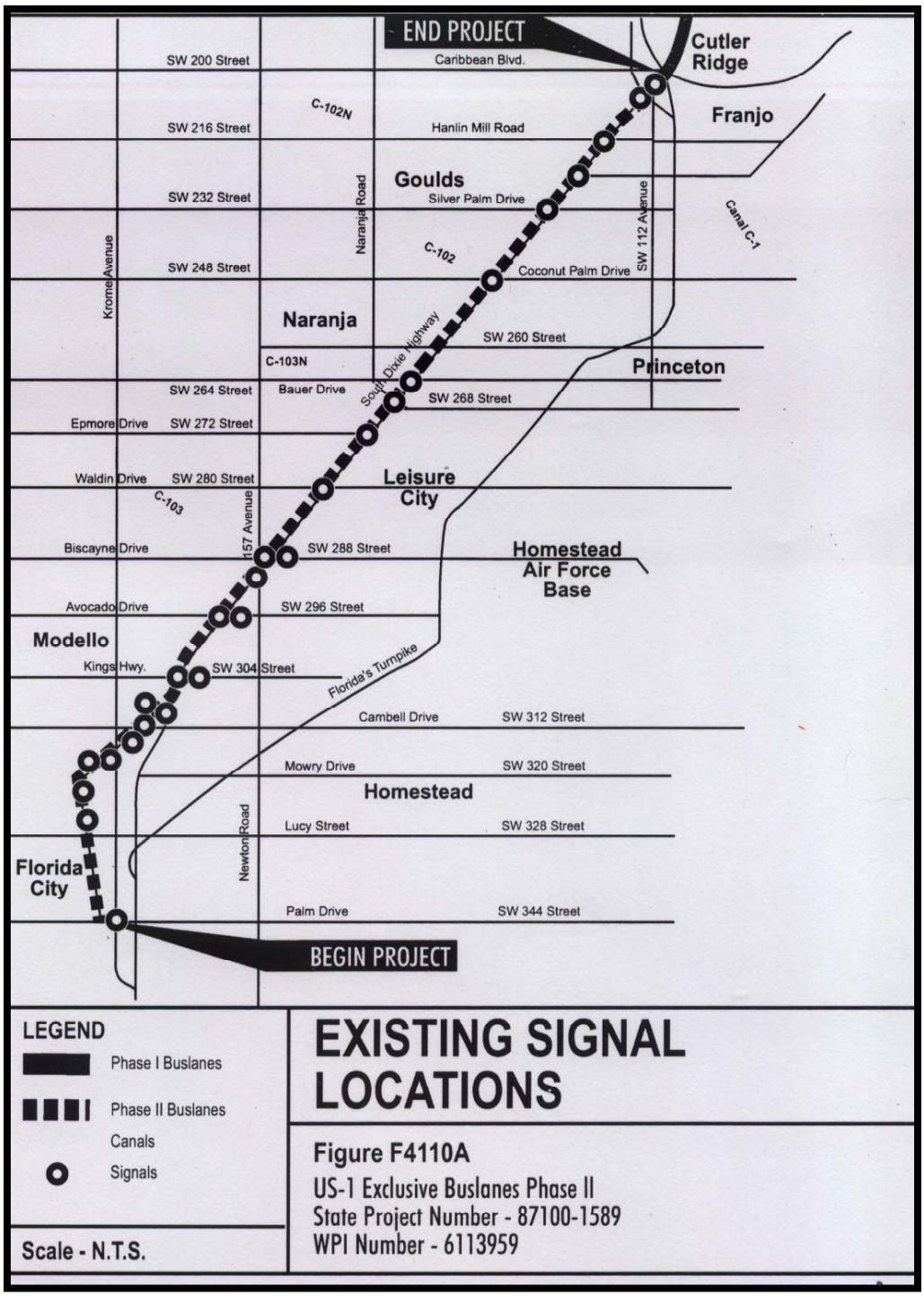


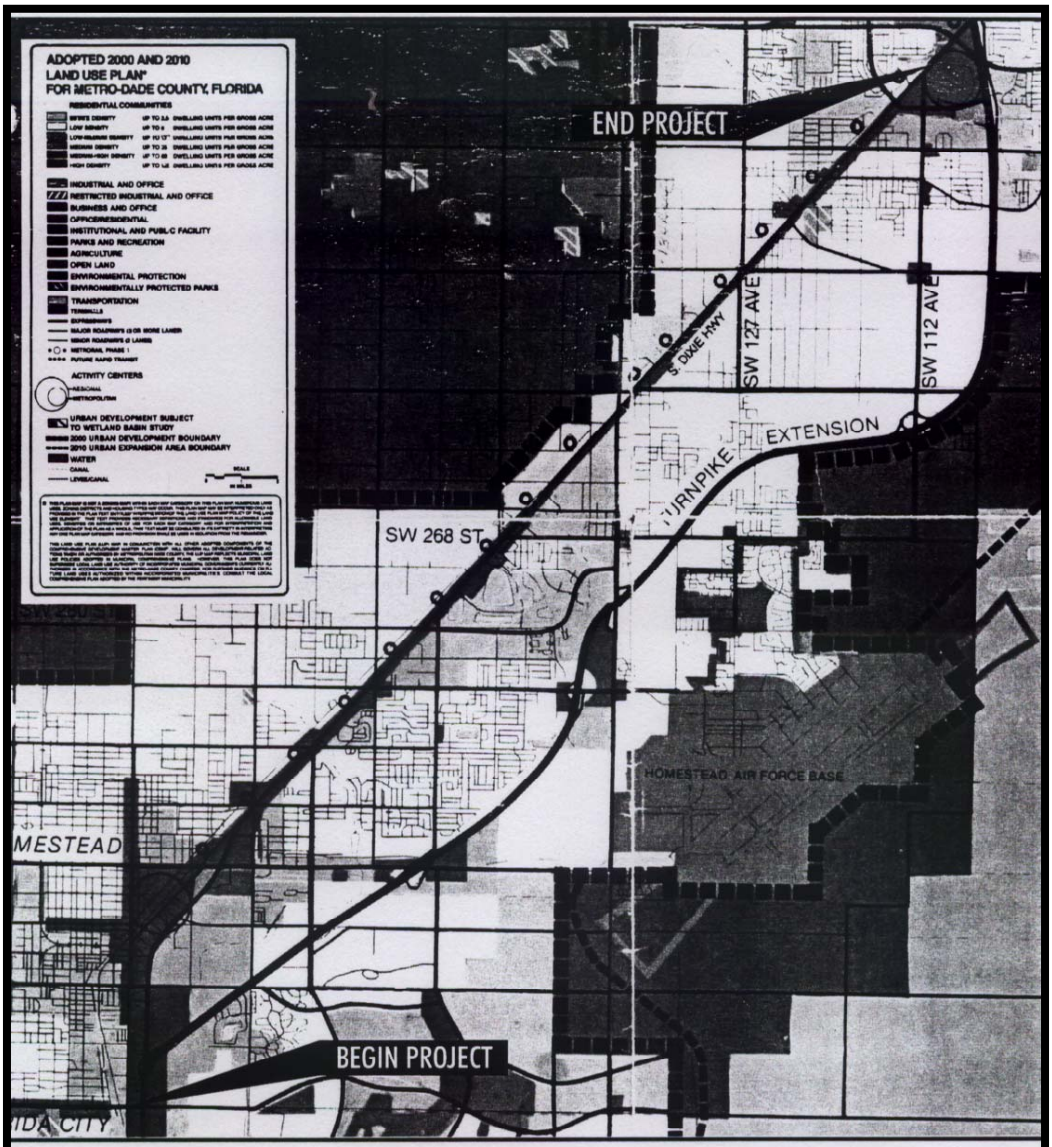

Saga Bay
MAX
METRO AREA EXPRESS
WHEELCHAIR ACCESSIBLE
MAX Stops
Busway Stops
Dadeland South Metrorail Station
SW 104 St
SW 112 St
SW 117 St
SW 124 St
SW 128 St
SW 136 St
SW 144 St
SW 152 St
SW 152 St Park & Ride Lot
P
SW 160 St
SW 168 St
SW 168 St
BUSWAY
BUSWAY
The Falls
92 Ave
87 Ave
94 Ave
SW 178 St
SW 184 St
Perrine
Caribbean Blvd
SW 190 St
SW 193 Ter
Whispering Pines
SW 87 Ave
SW 198 St
SW 200 St
SW 200 St
85 Passage
85 Ave
Saga Bay
SW 207 St
SW 85 Ave
SW 210 St
SW 212 St
SW 212 St
Le Club at Saga Bay
North
Map not to scale

Route 1
Via Busway



Appendix B – Engineering Documents and Project Details Phase II

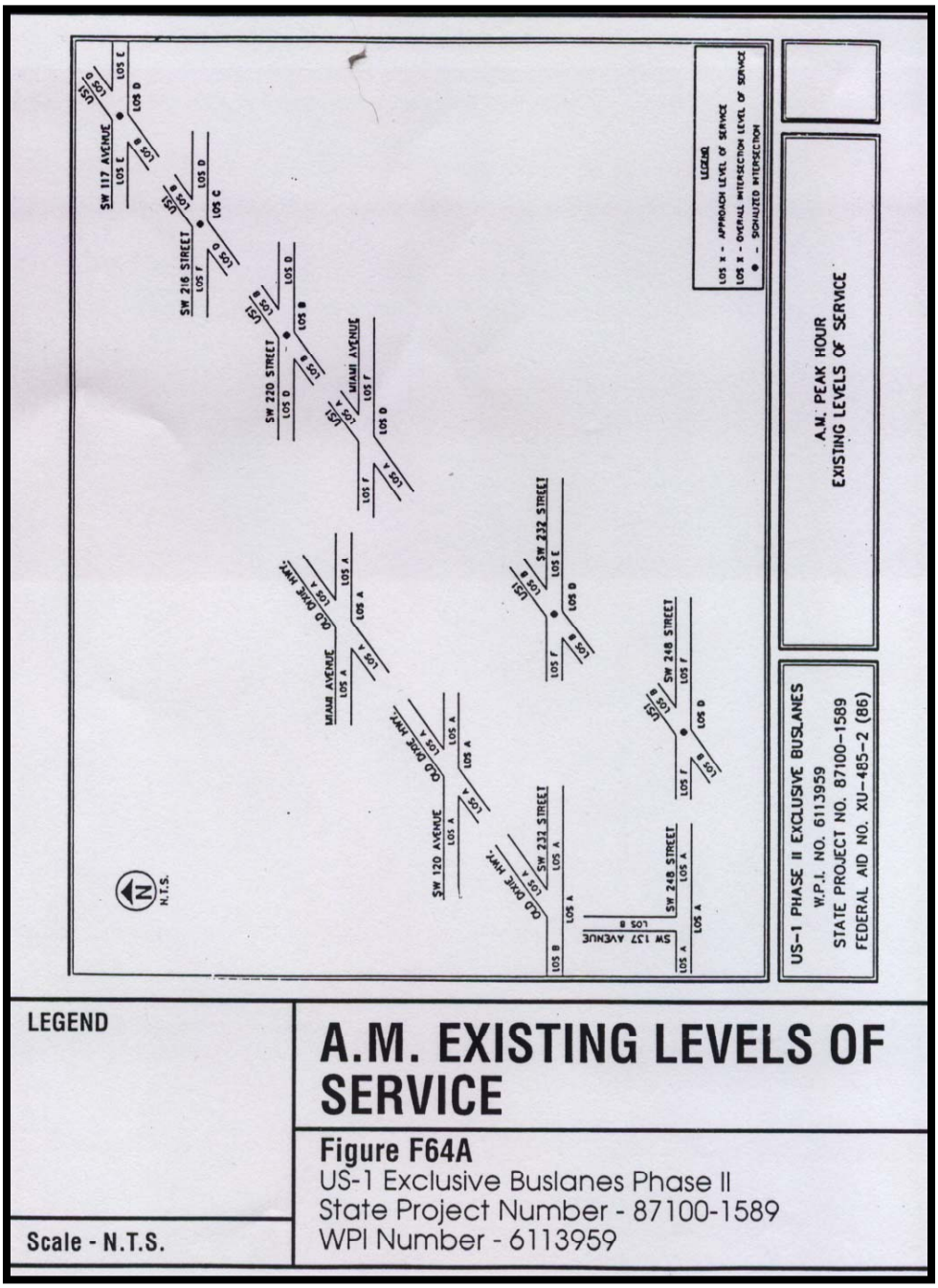

END PROJECT
Caribbean Blvd.
Cutler Ridge
Franjo
SW 200 Street
SW 216 Street
C-102N
Hanlin Mill Road
Goulds
Silver Palm Drive
SW 232 Street
Naranja Road
SW 112 Avenue
Canal C-1
C-102
SW 248 Street
Krome Avenue
Coconut Palm Drive
Naranja
SW 260 Street
South Dixie Highway
C-103N
Princeton
SW 264 Street
Bauer Drive
SW 268 Street
Epmore Drive
SW 272 Street
Waldin Drive
SW 280 Street
Leisure City
C-103
157 Avenue
Biscayne Drive
SW 288 Street
Homestead Air Force Base
Avocado Drive
SW 296 Street
Modello
Kings Hwy.
SW 304 Street
Florida's Turnpike
Cambell Drive
SW 312 Street
Mowry Drive
SW 320 Street
Homestead
Newton Road
Lucy Street
SW 328 Street
Florida City
Palm Drive
SW 344 Street
BEGIN PROJECT
LEGEND
Phase I Buslanes
Phase II Buslanes
Canals
Signals
Scale - N.T.S.
EXISTING SIGNAL LOCATIONS
Figure F4110A
US-1 Exclusive Buslanes Phase II
State Project Number - 87100-1589
WPI Number - 6113959



DADE COUNTY'S COMPREHENSIVE DEVELOPMENT MASTER PLAN EXISTING AND ADOPTED 2000 AND 2010 LAND USE PLAN

Figure F431A

US-1 Exclusive Buslanes Phase II • State Project Number - 87100-1589 • WPI Number - 6113959

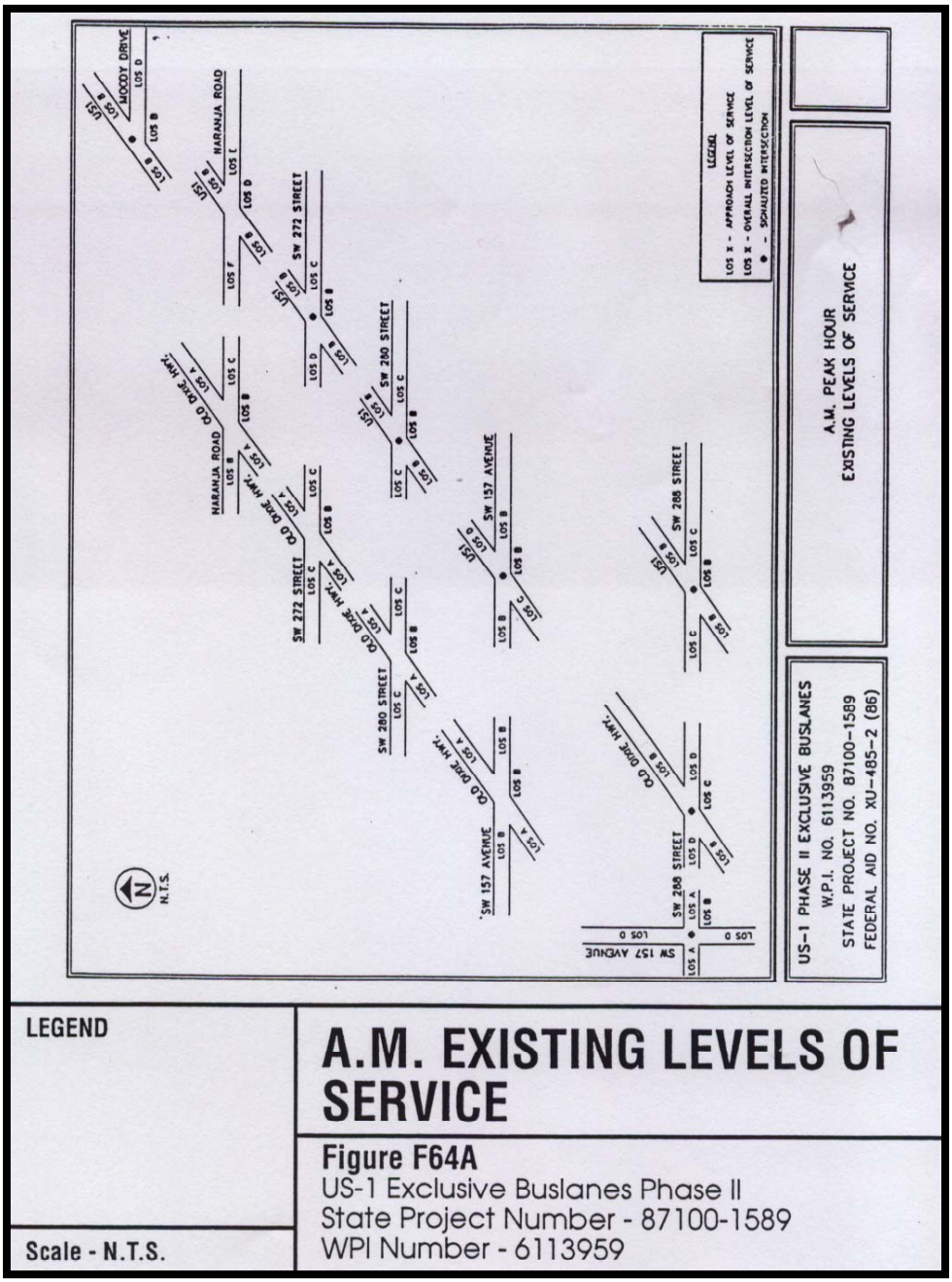


LEGEND

Scale - N.T.S.

A.M. EXISTING LEVELS OF SERVICE

Figure F64A
US-1 Exclusive Buslanes Phase II
State Project Number - 87100-1589
WPI Number - 6113959

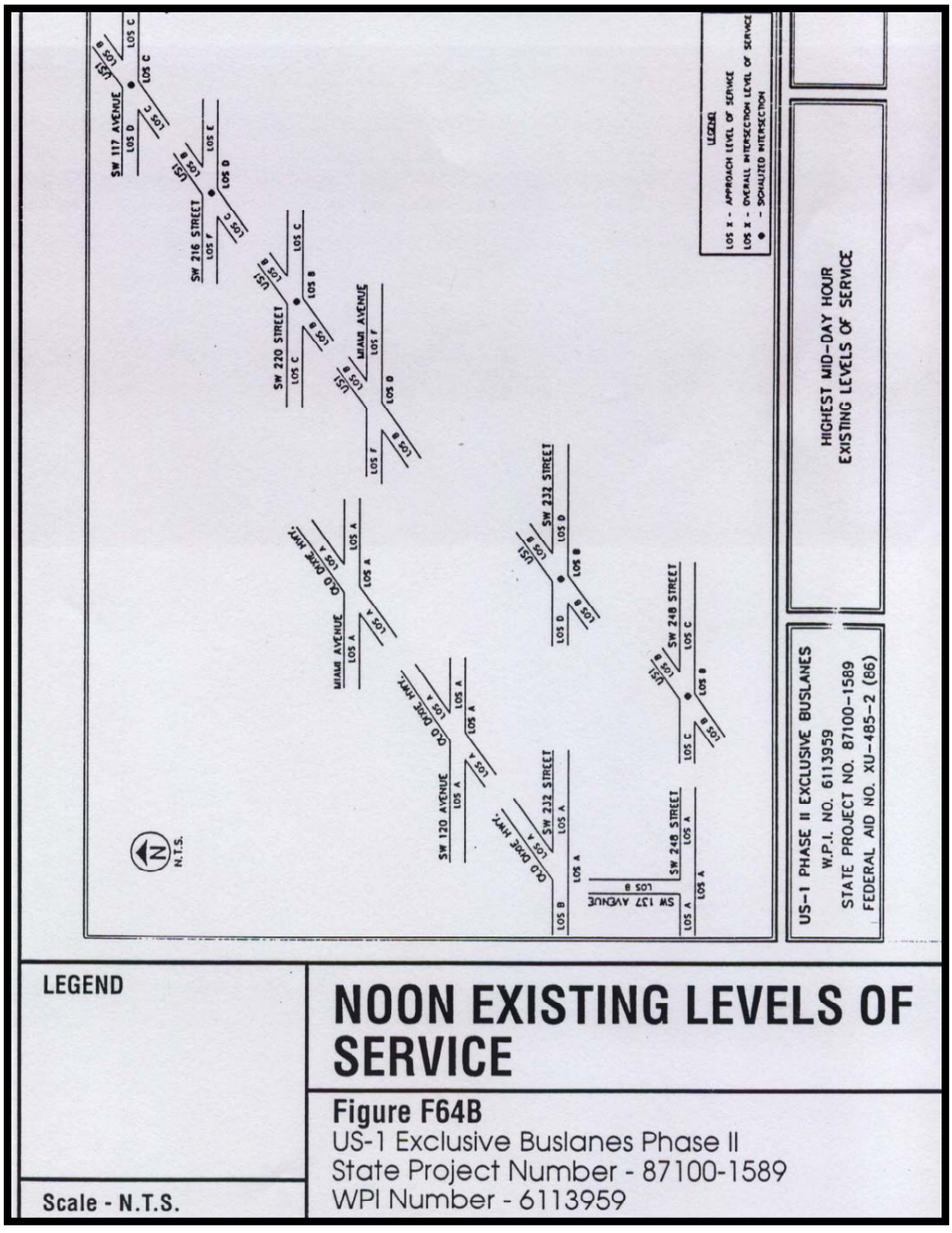


LEGEND

Scale - N.T.S.

A.M. EXISTING LEVELS OF SERVICE

Figure F64A
US-1 Exclusive Buslanes Phase II
State Project Number - 87100-1589
WPI Number - 6113959

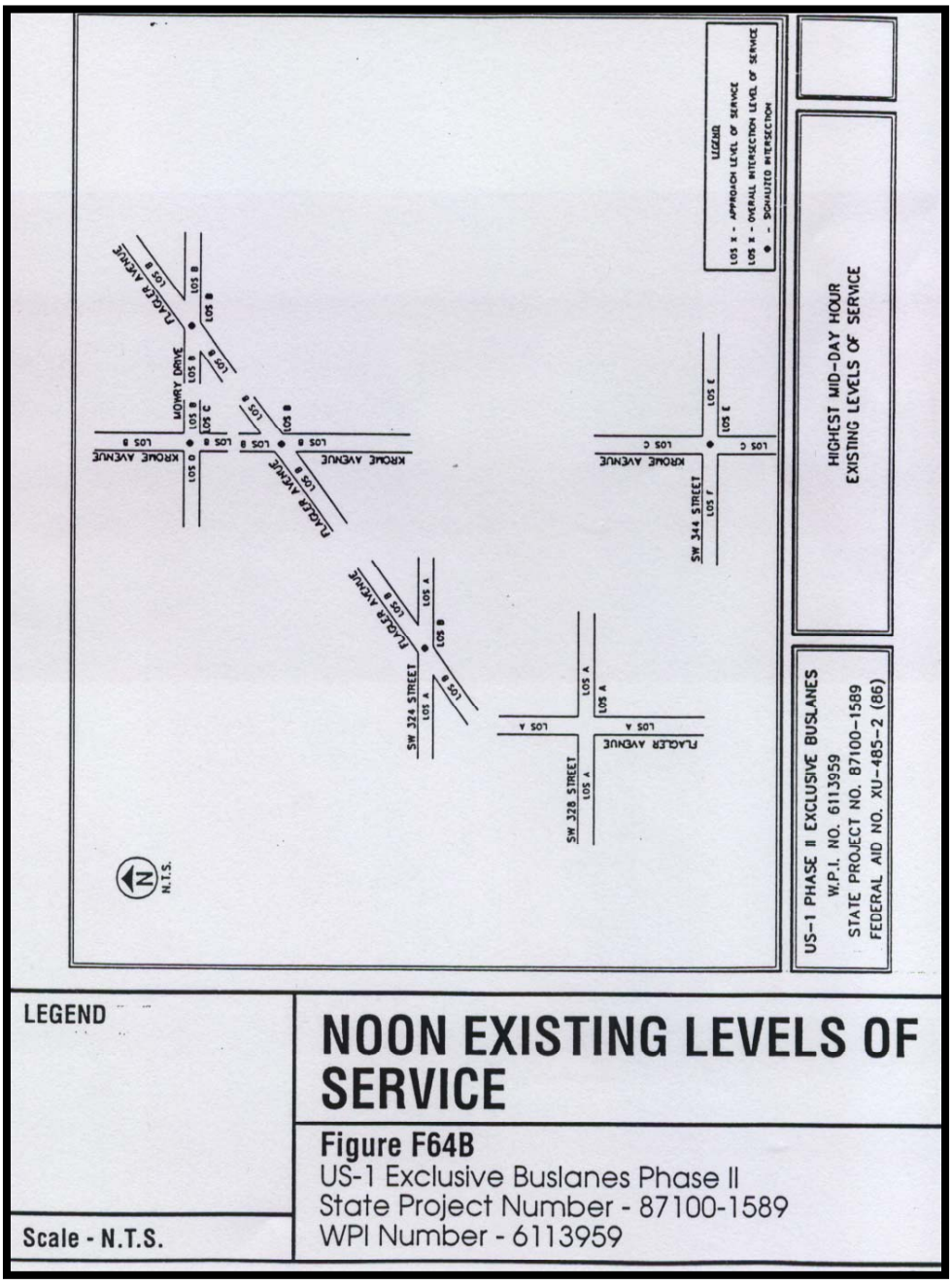


LEGEND

Scale - N.T.S.

NOON EXISTING LEVELS OF SERVICE

Figure F64B
US-1 Exclusive Buslanes Phase II
State Project Number - 87100-1589
WPI Number - 6113959

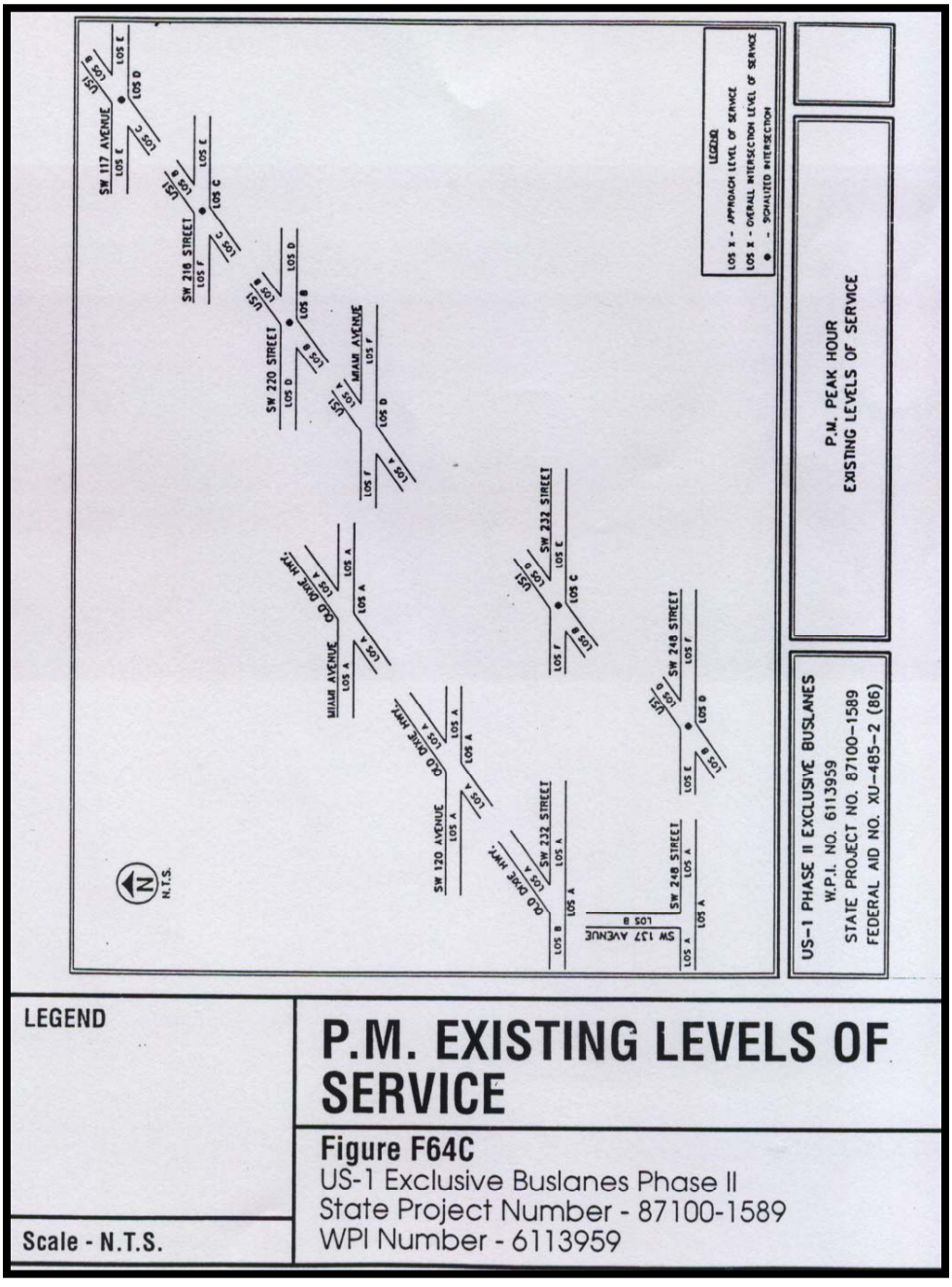


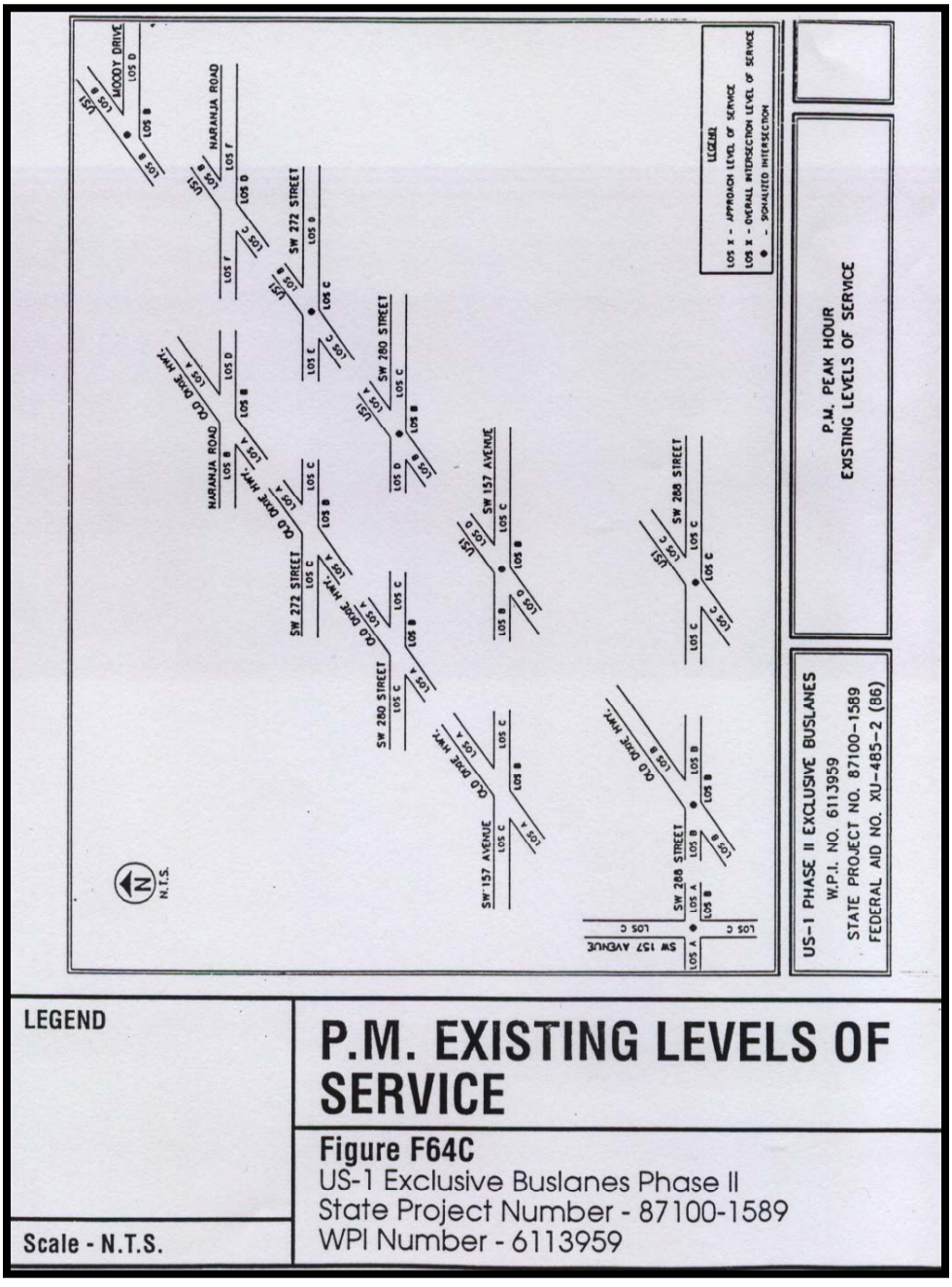
LEGEND

NOON EXISTING LEVELS OF SERVICE

Figure F64B
US-1 Exclusive Buslanes Phase II
State Project Number - 87100-1589
WPI Number - 6113959

Scale - N.T.S.


SW 117 AVENUE
SW 216 STREET
SW 220 STREET
MIAMI AVENUE
OLD DIXIE HWY.
SW 120 AVENUE
SW 232 STREET
SW 137 AVENUE
SW 248 STREET
N
N.T.S.
LEGEND
LOS X - APPROACH LEVEL OF SERVICE
LOS X - OVERALL INTERSECTION LEVEL OF SERVICE
● - SIGNALIZED INTERSECTION
US-1 PHASE II EXCLUSIVE BUSLANES
W.P.I. NO. 6113959
STATE PROJECT NO. 87100-1589
FEDERAL AID NO. XU-485-2 (86)
P.M. PEAK HOUR
EXISTING LEVELS OF SERVICE
LEGEND
Scale - N.T.S.
P.M. EXISTING LEVELS OF SERVICE
Figure F64C
US-1 Exclusive Buslanes Phase II
State Project Number - 87100-1589
WPI Number - 6113959

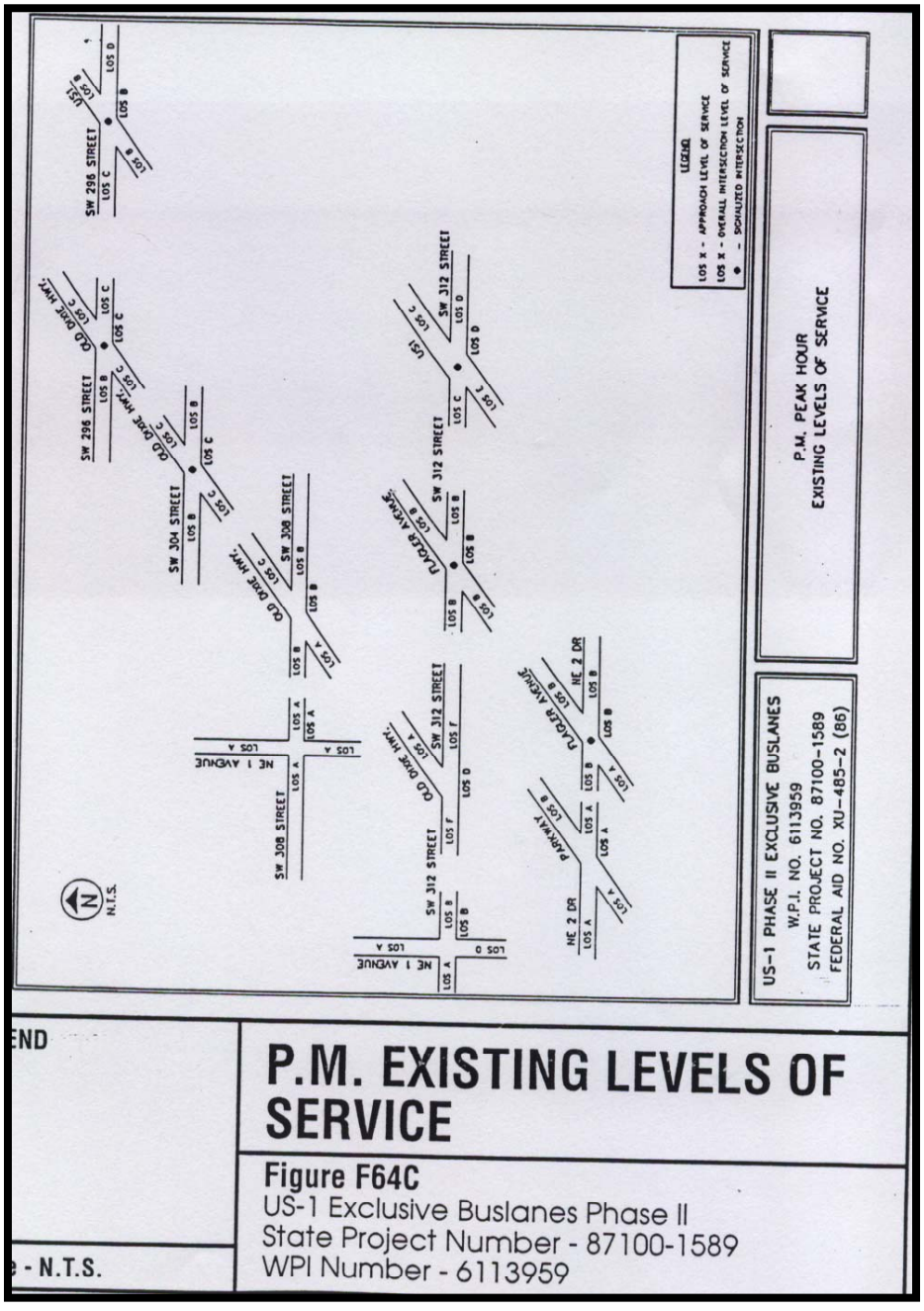


LEGEND

Scale - N.T.S.

P.M. EXISTING LEVELS OF SERVICE

Figure F64C
US-1 Exclusive Buslanes Phase II
State Project Number - 87100-1589
WPI Number - 6113959

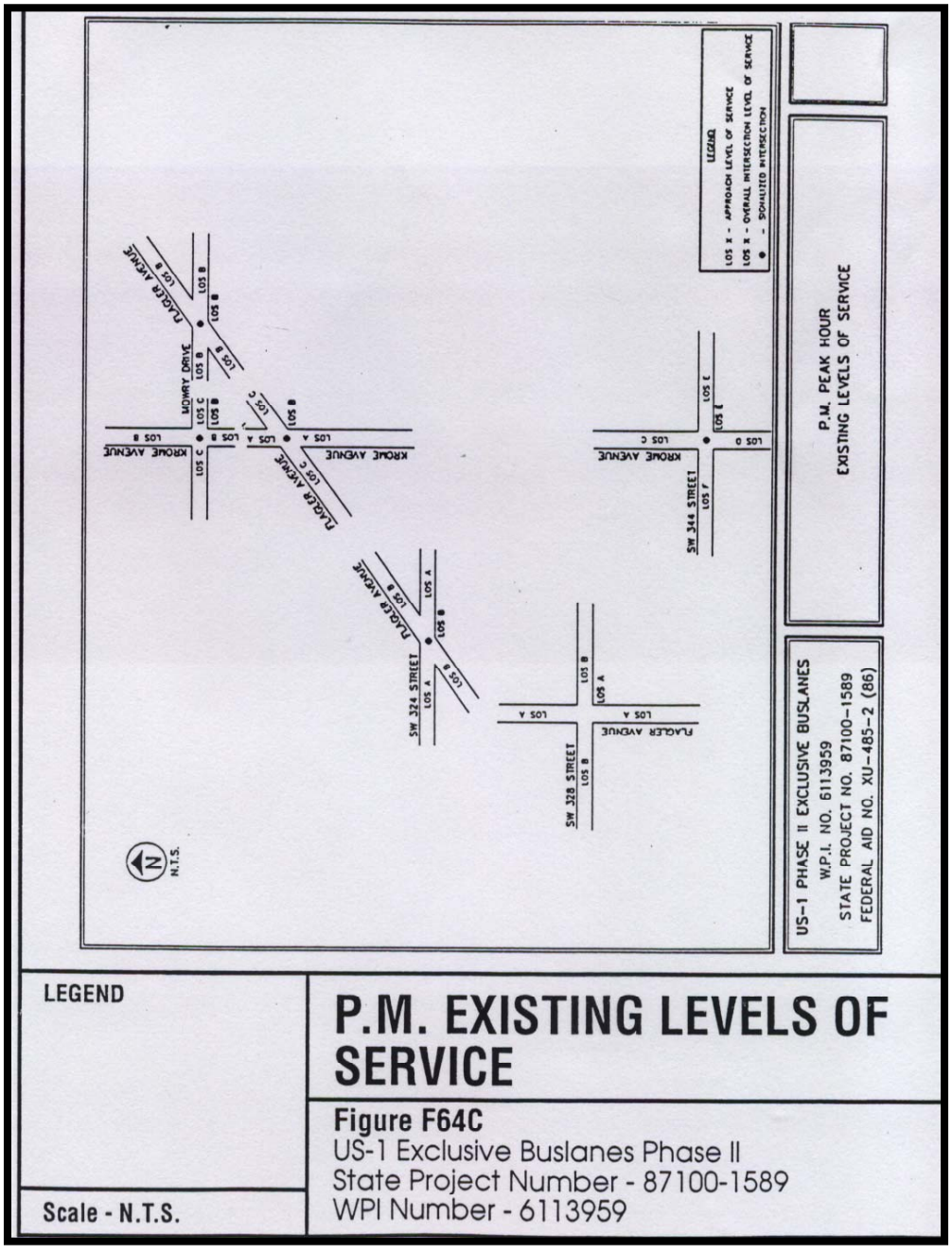


END

- N.T.S.

P.M. EXISTING LEVELS OF SERVICE

Figure F64C
US-1 Exclusive Buslanes Phase II
State Project Number - 87100-1589
WPI Number - 6113959

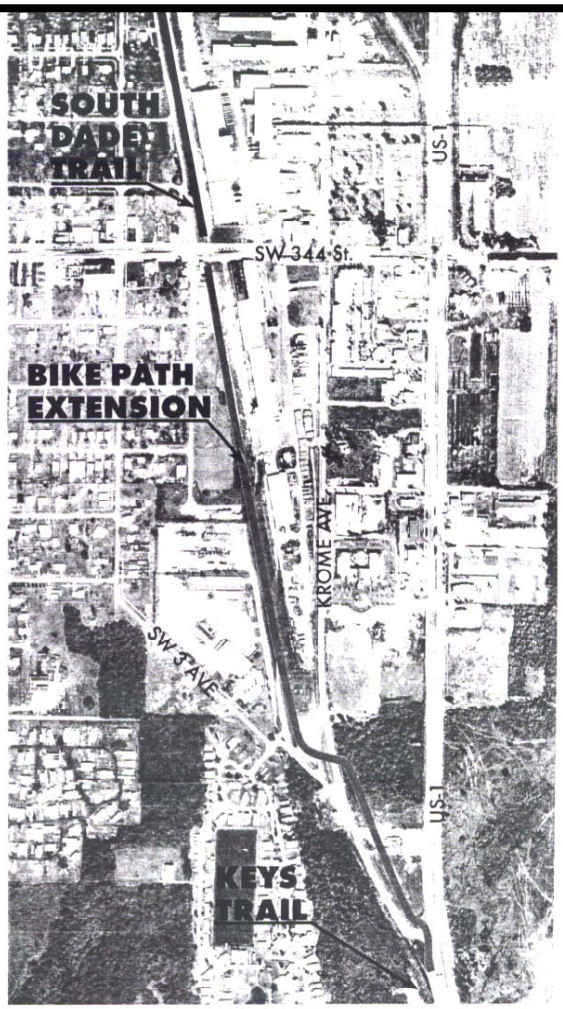


LEGEND

Scale - N.T.S.

P.M. EXISTING LEVELS OF SERVICE

Figure F64C
US-1 Exclusive Buslanes Phase II
State Project Number - 87100-1589
WPI Number - 6113959



PROPOSED TRAIL EXTENSION

From SW 344 St. to US-1

Figure F83A

US-1 Exclusive Buslanes Phase II

State Project Number -87100-1589

SCALE - N.T.S.

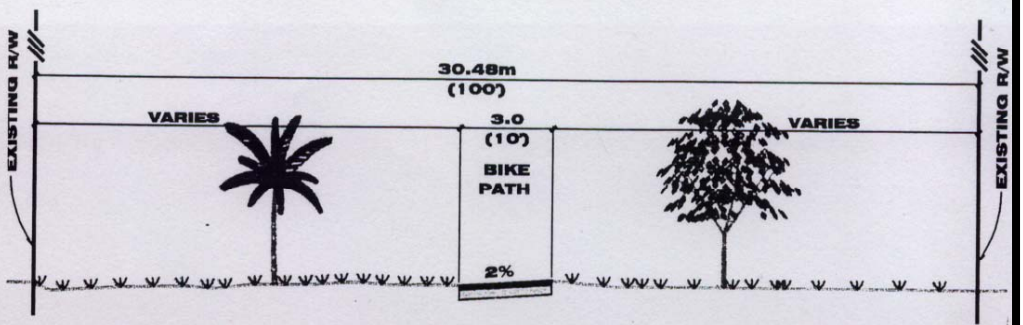


Figure F83B Bike Path Extension between SW 344 St. and SW 3 Ave

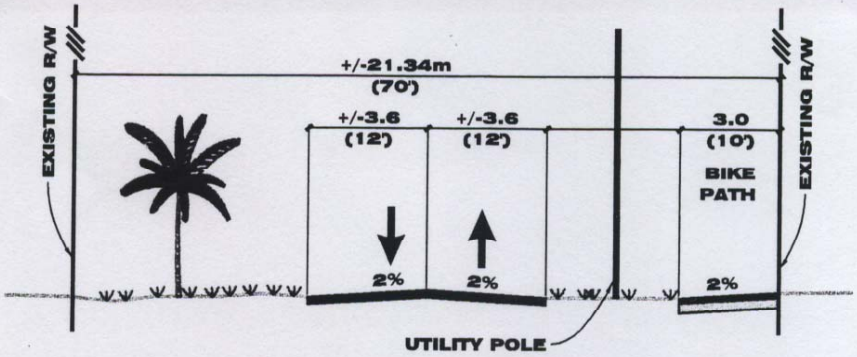
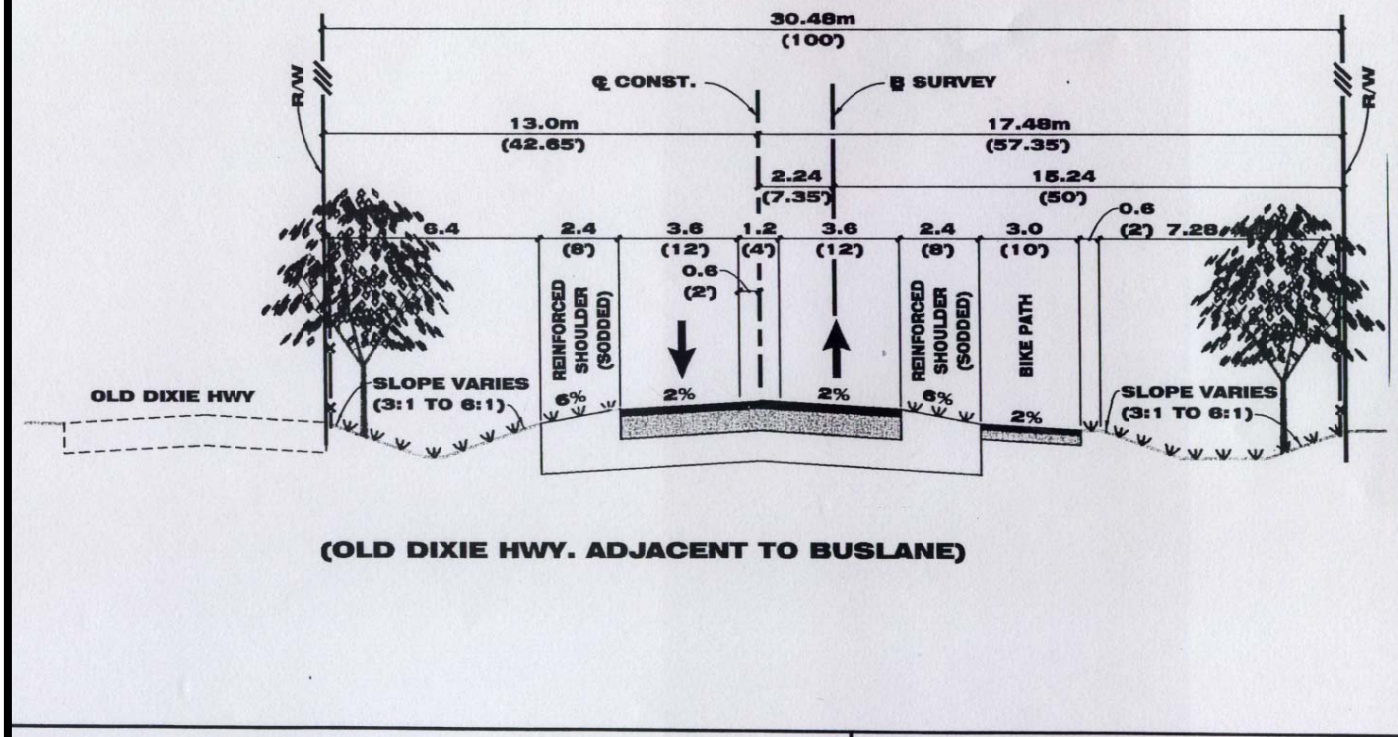


Figure F83C Proposed SW 3 Ave. Bike Path Extension

TYPICAL SECTION

US-1 Exclusive Buslanes Phase II
State Project Number - 87100-1589
WPI Number - 6113959



(OLD DIXIE HWY. ADJACENT TO BUSLANE)

TYPICAL SECTION 2

STA 662 + 71 to 5024 + 80 (673 + 76.114BK = 5003 + 04.801AH)
STA 5029 + 00 to 5036 + 80
STA 5041 + 00 to 5059 + 00

Figure F922A

US-1 Exclusive Buslanes Phase II
State Project Number - 87100-1589
WPI Number - 6113959

PROPOSED BUS SHELTERS

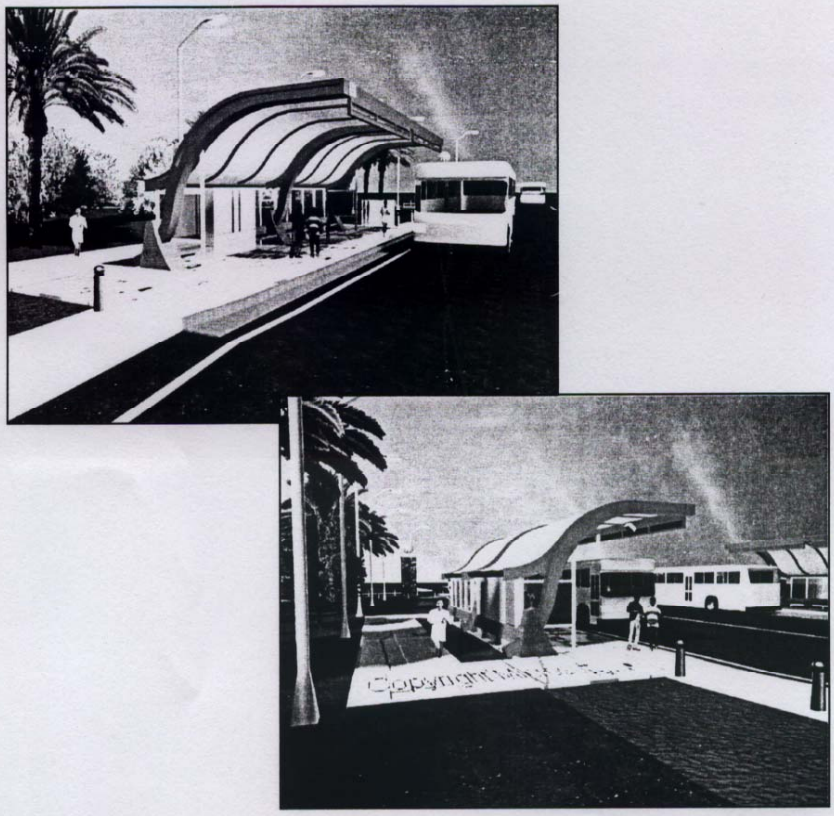
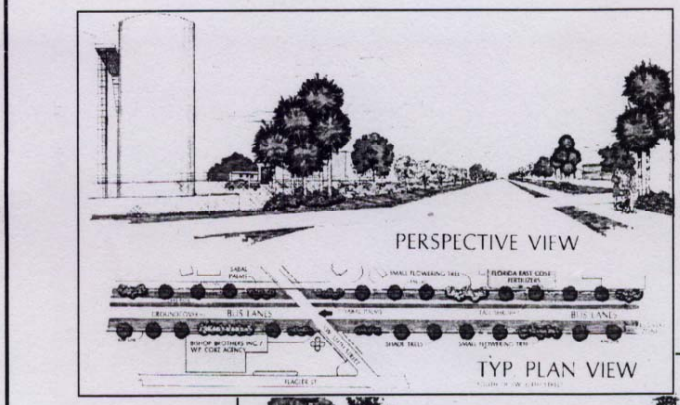


Figure F921A
US-Exclusive Buslane Phase II
State Project Number - 87100-1589
WPI Number - 87100-1589

Scale - N.T.S.

PROPOSED LANDSCAPING



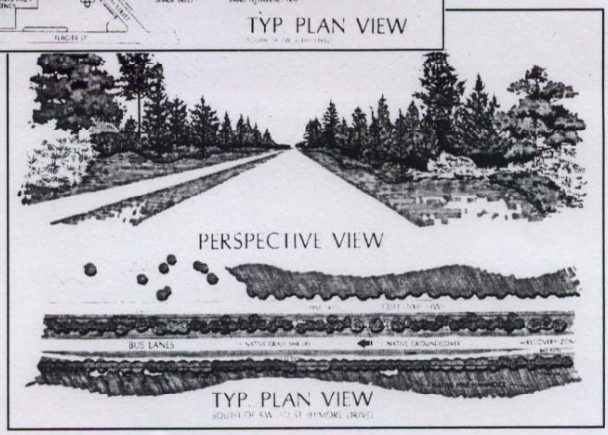
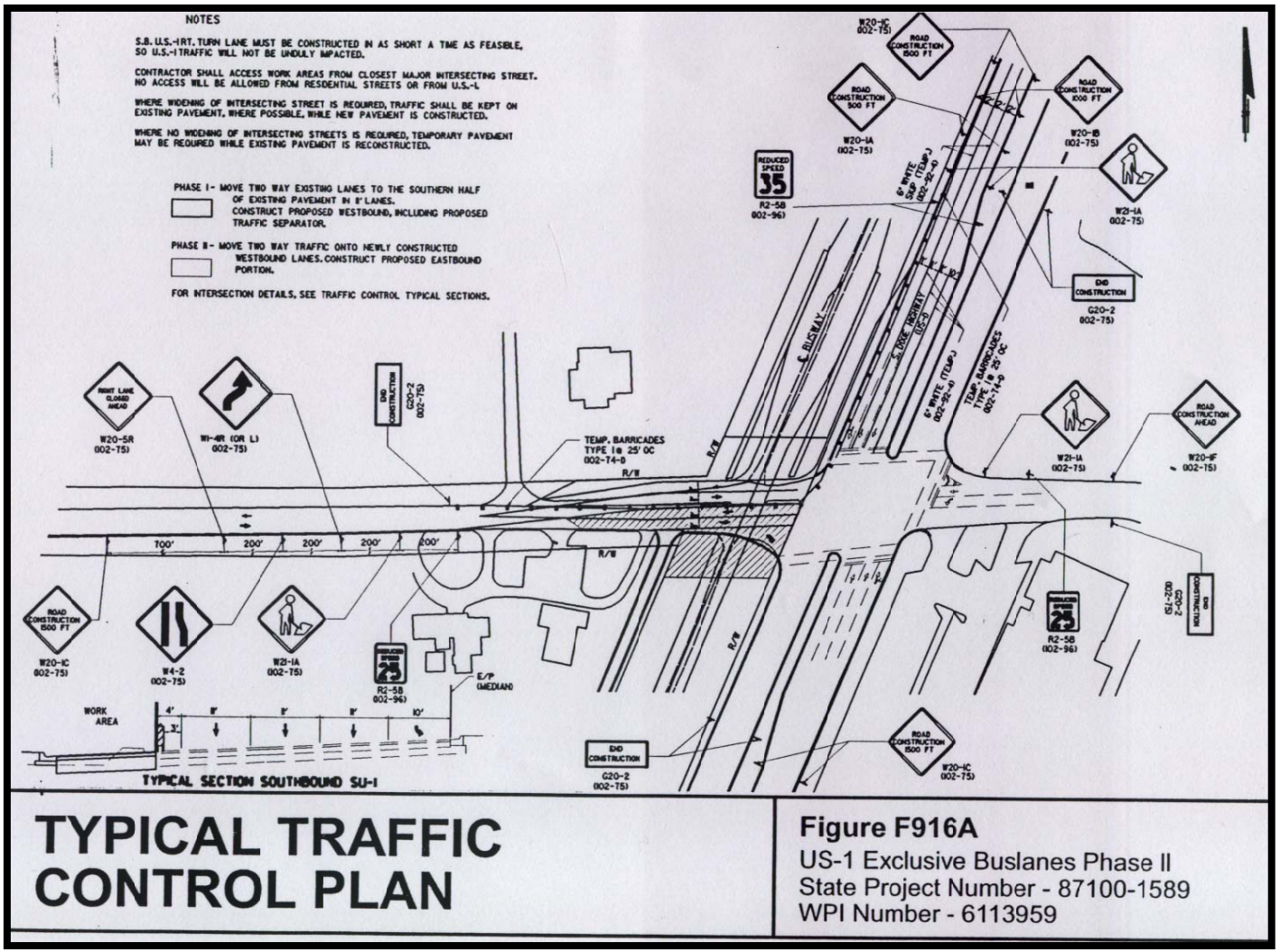


Figure F924A
US-Exclusive Buslane Phase II
State Project Number - 87100-1589
WPI Number - 87100-1589

Scale - N.T.S.



TYPICAL TRAFFIC CONTROL PLAN

Figure F916A
US-1 Exclusive Buslanes Phase II
State Project Number - 87100-1589
WPI Number - 6113959

Appendix C – South-Dade Busway On-Board Survey Instrument

SOUTH-DADE BUSWAY ON-BOARD SURVEY (la version en Español al dorso)

DEAR VALUED TRANSIT RIDER: MDTA would like information about your trip and your opinion to help improve its transit service. PLEASE take a few minutes to complete the following survey. Please do not put your name or other identifying marks on the survey. Please check (✓) the correct item, write out, or circle your answers. Even if you do not complete the survey, please return it to the bus driver or surveyor as you exit the bus. **THANK YOU FOR YOUR COOPERATION!**

1. Where did you come from before you got on the bus for this trip?
1 ___ Home 4 ___ School (K-12) 7 ___ Shopping/Errands
2 ___ Work 5 ___ College/Technical School 8 ___ Other_____(specify)
3 ___ Medical 6 ___ Visiting/Recreation

2. What is the address or nearest intersection of where you started this trip? _____

3. Where did you get on this bus? _____&_____
(Bus stop or nearest street intersection/place to the bus stop)

4. How did you get to the bus stop for this particular bus trip? (**please ✓only ONE**)
1 ___ Walked 5 ___ Transfer from MDTA bus route # or name _____
2 ___ Drove (park-and-ride) 6 ___ Transfer from Metrorail
3 ___ Taxi 7 ___ Was dropped off
4 ___ Bicycle 8 ___ Other_____(specify)

5. Where will you get off this bus? _____&_____
(Bus stop or nearest street intersection/place to the bus stop)

6. How will you get to your final destination? (**please ✓only ONE**)
1 ___ Walk 5 ___ Transfer to MDTA bus route # or name _____
2 ___ Drive 6 ___ Transfer to Metrorail
3 ___ Taxi 7 ___ Will be picked up
4 ___ Bicycle 8 ___ Other_____(specify)

7. Where are you going on <u>THIS</u> trip? (**please ✓only your FINAL destination**)
1 ___ Home 4 ___ School (K-12) 7 ___ Shopping/Errands
2 ___ Work 5 ___ College/Technical School 8 ___ Other_____(specify)
3 ___ Medical 6 ___ Visiting/Recreation

8. What is the address or nearest intersection of your final destination? _____

9. How often do you use a Busway route? (**please ✓only ONE**)
1 ___ Every day 3 ___ 3 or 4 days per week 5 ___ Once per month or less
2 ___ 5 or 6 days per week 4 ___ 1 or 2 days per week 6 ___ Once every _____ weeks

10. What fare did you pay in order to get on this particular bus?
1 ___ Full Fare ($1.25) 5 ___ Metropass (full fare) 9 ___Transfer from MDTA Bus
2 ___ Reduced Fare ($0.60) 6 ___ Metropass (reduced fare) 10 ___Transfer from Metrorail
3 ___ Express Bus Full Fare ($1.50) 7 ___ Metropass (college student)
4 ___ Express Bus Reduced ($0.75) 8 ___ Golden Passport

11. Before the Busway opened, how did you make this trip?
1 ___ Drove 5 ___ Walked 9 ___ Other _____ (specify)
2 ___ Rode with someone 6 ___ Taxi
3 ___ Bicycle 7 ___ Didn't make trip
4 ___ Jitney 8 ___ Rode MDTA bus route # _____

12. What is the <u>most important</u> reason why you currently use a Busway route? (**please ✓only ONE**)
1 ___ I don't drive/no valid license 5 ___ Traffic is too bad
2 ___ Car is not available 6 ___ Busway is more convenient
3 ___ Busway is more economical 7 ___ Free/convenient park-and-ride lots
4 ___ Parking at destination is too difficult/expensive 8 ___ Other _____ (specify)

13. How long have you been using the Busway?
1 ___ This is the first day 3 ___ 6 months to 3 years
2 ___ Less than 6 months 4 ___ since it opened (1997)

14. Your age is...
1 ___ 18 years or under 3 ___ 25 to 44 5 ___ 60 to 64
2 ___ 19 to 24 4 ___ 45 to 59 6 ___ 65 or older

15. What is your race? (**please ✓only ONE**)
1 ___ White Non-Hispanic 3 ___ Hispanic 5 ___Native American
2 ___ Black Non-Hispanic 4 ___ Asian 6 ___Other_____(specify)

16. What was the range of your total household income for 2000?
1 ___ Less than $15,000 2 ___ $15,000 to $24,999 3 ___ $25,000 to $49,999 4 ___ $50,000 or more

17. In general, how would you rate each of the following aspects of Busway service?

Please Circle the number that best	*Very Good*	*Good*	*Fair*	*Poor*	*Very Poor*
a. Hours of Busway service	5	4	3	2	1
b. Frequency of Busway service (how often buses run)	5	4	3	2	1
c. Convenience of Busway routes (where buses go)	5	4	3	2	1
d. Dependability of Busway buses (on time)	5	4	3	2	1
e. Travel time on Busway buses	5	4	3	2	1
f. Cost of riding the bus	5	4	3	2	1
g. Availability of bus route information/maps	5	4	3	2	1
h. Availability of seats on the bus	5	4	3	2	1
i. Safety on bus	5	4	3	2	1
j. Safety at Busway stops	5	4	3	2	1
k. Your satisfaction with recent changes to the Busway (traffic signals)	5	4	3	2	1
l. Your overall satisfaction with the Busway	5	4	3	2	1
m. Your overall satisfaction with MDTA	5	4	3	2	1

18. If funding became available, what is the **ONE** improvement to the Busway that you would make?

_____

_____

Comments and Suggestions about Busway service:

_____

_____

THANK YOU FOR COMPLETING THE SURVEY!!!
PLEASE RETURN THE COMPLETED SURVEY TO THE BUS DRIVER, SURVEYOR, OR SURVEY RETURN BOX.

If you have any additional comments or questions, please call 305-654-6586.