Optimizing NOMI Express Routes, Connections, and Technology

JUNE 2017

THE CORRADINO GROUP

NORTH MIAMI FLORIDA

Miami-Dade Transportation Planning Organization

This report was made possible in part through the Miami-Dade MPO Municipal Grant Program.

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

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Executive Summary:

The City of North Miami is a diverse community of approximately 61,000 (2013) in Miami-Dade County. One of the most populated cities in the region, the City currently runs the NoMI Express, a 4 route local circulator system, as a free service moving residents and visitors around the City. The City of North Miami commissioned this study in order to evaluate ways it can enhance service via improvements to its existing routes and technology.

To evaluate the local travel needs and account for ridership attitudes, this study reviewed local existing conditions such as transit generators and potential linkages to other transit systems, and administered an on-board survey in January/February 2017. Generally, patrons of the NoMi Express system are regular riders, with close to 60% riding 4 or more times a week. Riders typically utilize the service to reach shopping or medical/civic areas, with over 60% utilizing the service in order to reach Miami-Dade Transit service. In addition, more than a third utilize North Miami Beach's service, and despite no direct connection, 10-15% of the ridership utilize Aventura and Miami Shores circulator services, indicating a need for more direct regional linkages. Of the four routes, the Green Line service is the most utilized, with the Orange and Blue Line utilization being roughly equal, and the Red route receiving the least riders. Of these, recent service cuts in hours has resulting a corresponding drop in Red Line ridership.

In considering the existing service, riders are generally happy with driver appearance, as well as existing bus stop locations; however, they would like to see better efforts to improve the air conditioning on the buses, driver friendliness, and the overall cleanliness of the buses. Riders were given the opportunity to provide open-ended responses; when combined with the rest of the survey data, the ridership desires more frequent bus service (less than one hour), weekend service, and better amenities at the bus stops.

Various technology were reviewed in regards to transit service. These were evaluated from the viewpoint of ridership needs, assistance for long-term transit planning, and management options for day-to-day operations. Based on this review, the NoMi Express service should invest in web application technology that will allow transit riders to access real-time information for their next bus. This same technology will also provide for NoMi Express dispatchers and system administrators to manage the system by monitoring the bus's progression and dwell times. WiFi to enhance service is another easy to implement option, which, when implemented, will bring the NoMI Express service's amenities in line with those offered by neighboring local bus systems. In addition, the City of North Miami should explore additional coordination with Miami-Dade Transit, given the high ridership, to streamline ridership access to real-time data on one app.

While other technology such as signal priority and LED screens/kiosks at bus stops were also researched, these improvements are more viable with larger systems. However, in some cases,

systems such as signal priority is utilized by others, such as emergency services, and there are opportunities in those cases for the NoMi Express to utilize these same systems to improve upon its service. In other cases, some vendors may provide the service for free or a low start-up cost, in exchange for the ability to generate ad revenue.

Operationally, multiple changes are necessary to enhance the system. In reviewing the NoMi Express system, it is clear that some of the route overlaps are unnecessary, and service can be streamlined with some changes to the routes. The Red Line is a very low performing route which does not provide adequate connections between homes and businesses. Overcrowding on Green, Orange, and Blue Lines during peak hours can be reduced through the addition of larger buses or an additional bus to the Green Line. Weekend service and reduced headways will require additional funding, but are viable and were noted items desired by ridership in the on-board survey.

Importantly, the NoMi Express system lacks a city staff member whose sole role is to administer the system. Compared to other systems in Miami-Dade with similar ridership or number of routes to maintain, this is an anomaly which should be addressed. This study also recognizes the need for better driver training and more timely relief of the system when a bus break down, in order to maintain reliability of the NoMi Express system for the general ridership.

General Recommendations involve increasing capacity, safety improvements, creation of new linkages to the North Miami “B” Line at Target/Costco and to the Miami Shores local circulator at Barry University. Additionally, better driver training, improved headways and weekend service, and improved administration via dedicated staffing are action items which the City should address immediately.

The cost of the various improvements will vary, and will depend on decisions to be made by the City. Some safety improvements, such as re-routing, will cost the system only information and marketing costs to inform riders of new routes. Others, such as expansion of services for the weekend shuttle and hours, vary. Identifying revenue sources will be an essential part of implementing changes, and the City should explore exercising options that will allow for the generation of ad revenue.

Increased funding is necessary to maintain and enhance the NoMi Express service, as the financial review demonstrated funding and service cuts led to a corresponding drop in ridership. Ultimately, this investment is worth its value, as not only does the NoMi Express provide a vital, well utilized service, but from a ridership generated to cost perspective, it does so in a cost-effective manner.

Introduction:

The City of North Miami is a diverse community of approximately 61,000 (2013) in Miami-Dade County. One of the most populated cities in the region, North Miami is undergoing changes with the adoption of various district master plans, and implementation has begun to develop the downtown core and will contribute to the future growth of corridors such as State Route 7.

The City of North Miami currently operates a local shuttle, the NOMI Express, which serves to move people around locally and could operate as a "first and last mile" component of regional travel, and commissioned this study to better study how technology could be integrated into the system, as well as evaluate route improvements to enhance the system and maintain ridership.

Funded by CITT funds, monthly ridership is close to 40,000 among its existing 4 routes, with ridership heaviest in the western portion of the City. However, the circulator system was originally designed as a closed system, operating with a 1-hour headway. To better service the City's future needs, the goals of the shuttle need to be realigned to establish time schedule and locational links to better service the local population while accounting for areas where new development is encouraged or expected to take place. This naturally requires a new look at how the routes are structured in relation to its ridership's needs as well as how the system creates linkages to the greater Miami-Dade region.

Major upcoming changes to the regional transportation network will also affect North Miami, ranging from short term items such as optimizing bus routes and stop locations to longer term projects such as the Tri-Rail Coastal Link system. Major local developments, such as SoleMia, and any expansion of the local FIU facilities, will drive future growth and result in increased transportation needs in the future.

This study, consisting of six tasks, examined opportunities to link intra- and intercity transportation through a comprehensive service and operations analysis of existing routes. This resulting result recommends changes based on local needs, an on-board survey in January/February 2017, and a review of technology options available to enhance local service. Implementation of new technology and the recommended route alternatives will increase system efficiency and help North Miami in creating a better transit system for its residents and visitors.

Existing Conditions:

The role of the North Miami NoMi Express is primarily a feeder transit system for Miami-Dade Transit and for local access for schools and retail for residents. The system provides mobility to residents such as seniors, students, and any other customer that either does not have a private automobile, chooses not to drive, or who prefer to make a trip via transit instead of walking or biking.

The market analysis conducted for the City is intended to better understand the market for transit and unmet needs based on current service structure and provision. In lieu of detailed customer data the market assessment was primarily based on charts of transit likelihood created for the City based on Environmental Protection Agency (EPA) Smart Location Database metrics. These charts were used to suggest target markets for new service.

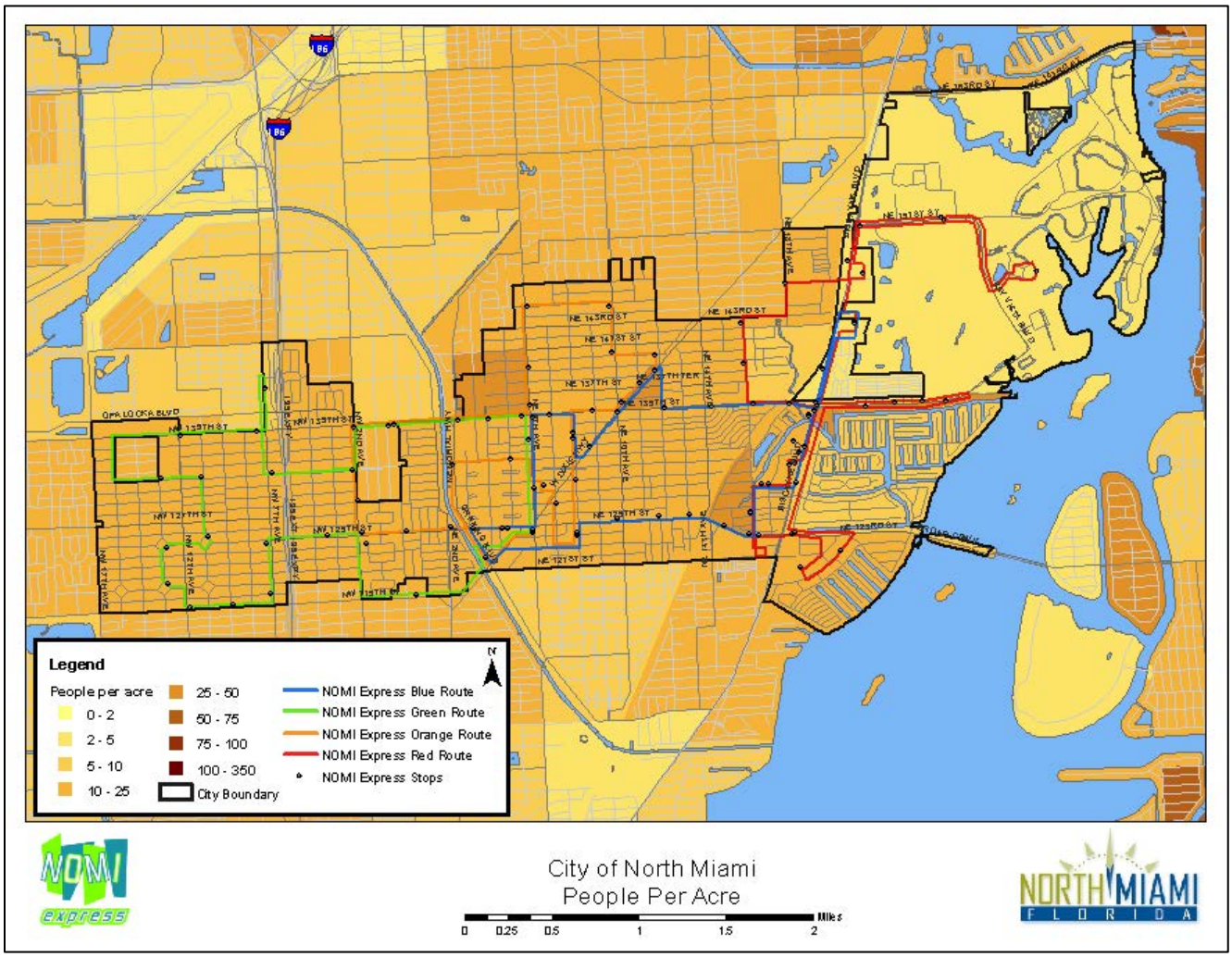
The four factors involved in the market analysis charts were:

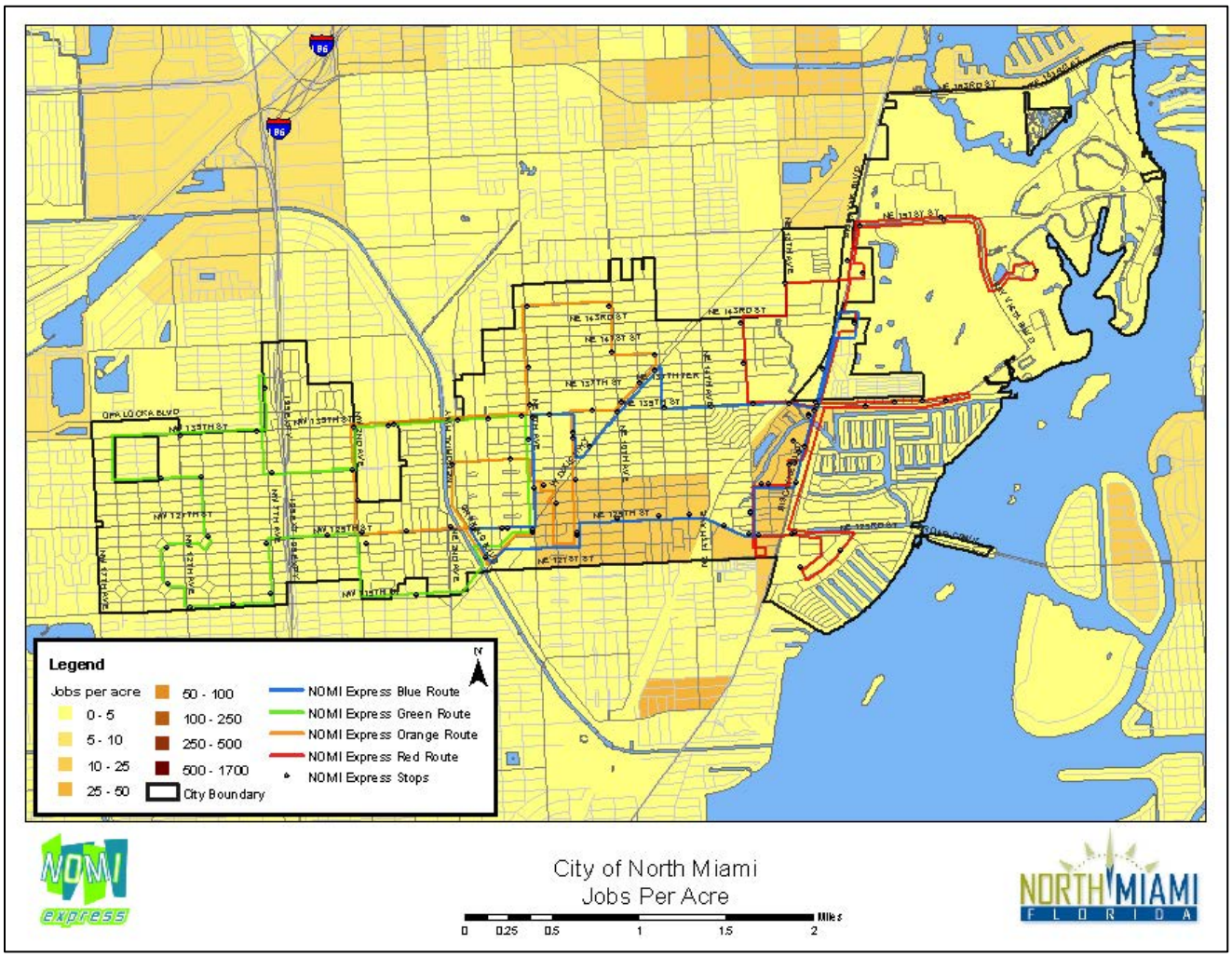
- Number of Households in census block group that own zero automobiles
- Gross Population Density [people/acre]
- Gross Employment Density [jobs/acre]
- Street Intersection Density [weighted, auto oriented intersections eliminated]

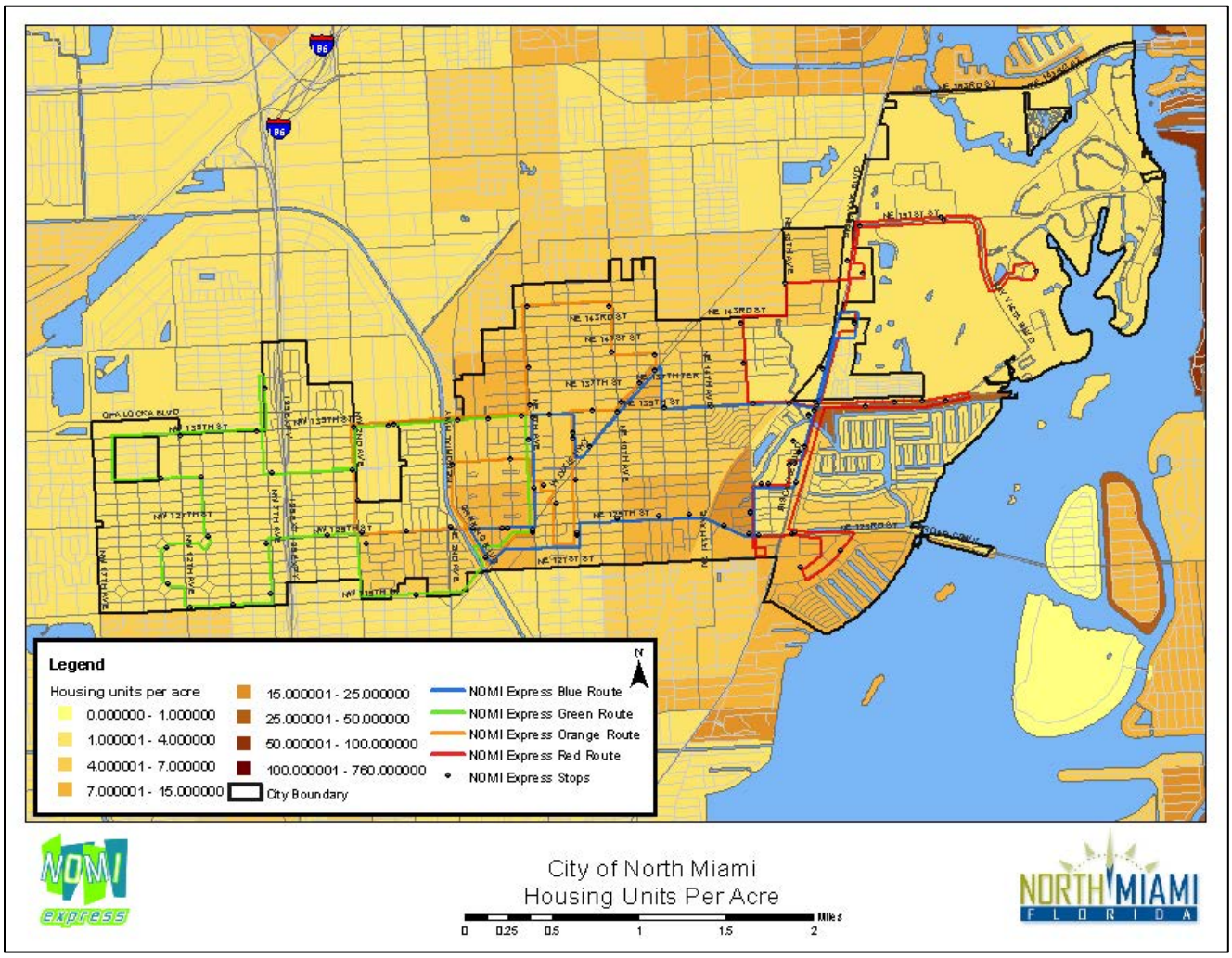
This analysis allows us to visualize the varying levels of concentration of activity centers across the City likely to generate transit ridership. This assessment ensures transit is provided in the locations with the highest ridership potential.

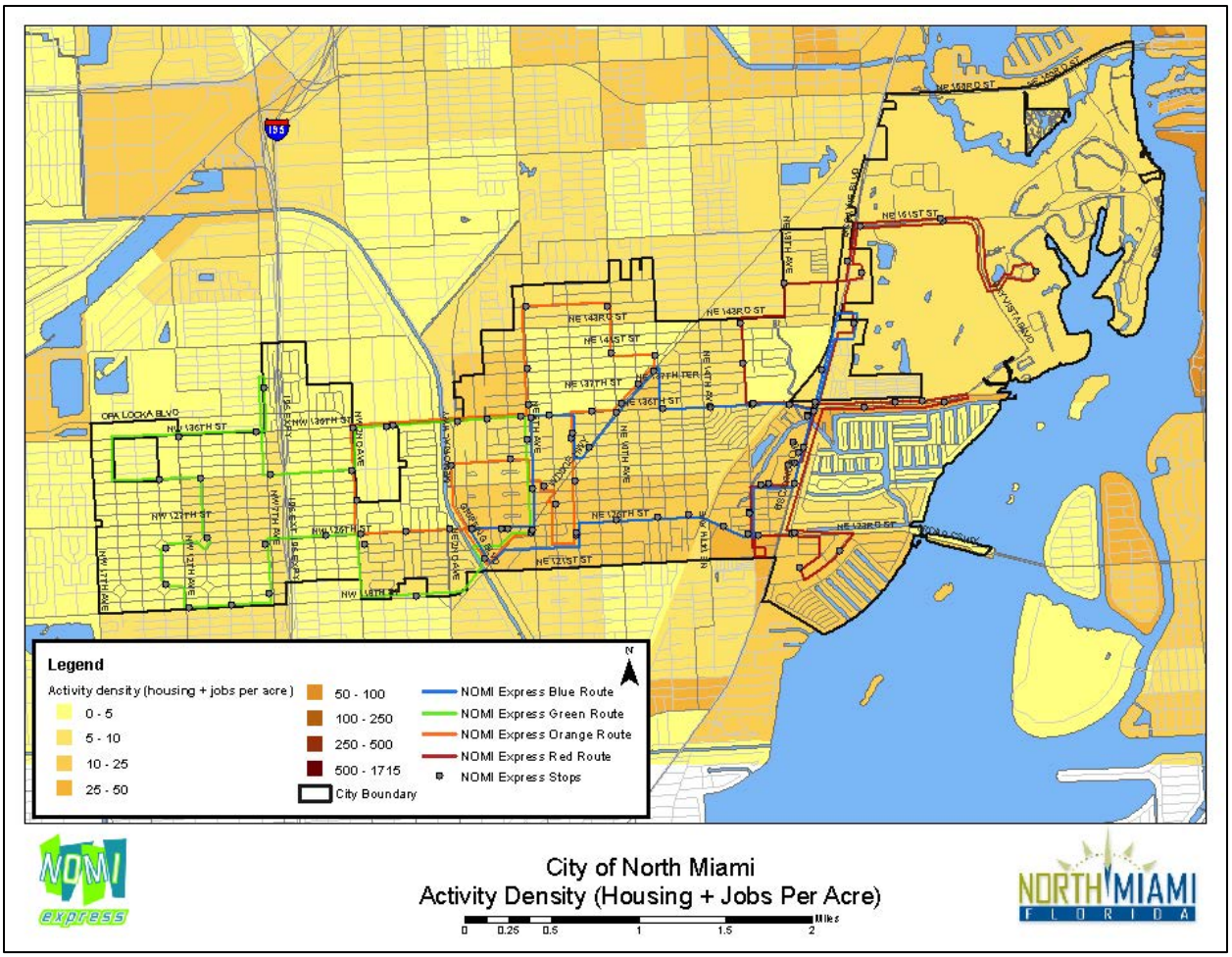
Each of the following maps gives an insight into the market within North Miami. The first map, People per Acre, shows that the highest ridership expected will be along the Green Route, and the least by the Red Route, which serves less people. The other three maps, Gross Population Density, Gross Employment Density and Street Intersection Density, highlight the areas with the highest transit likelihood within the City.

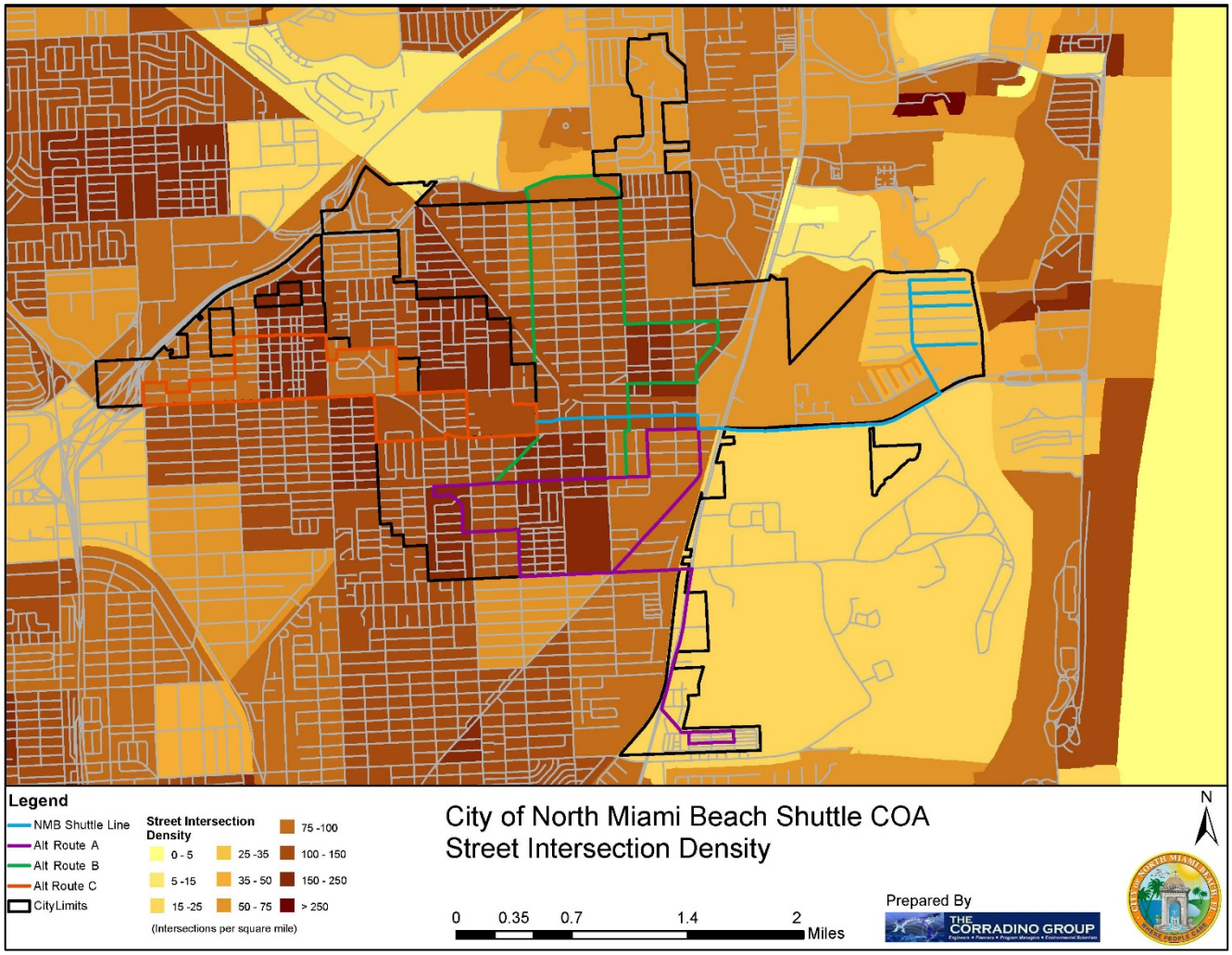
In addition, the transit generators were mapped for consideration, as these key locations provide the destinations from which travel demand derives. The following maps show us that coverage needs to be evenly distributed across the City, based on demographics and the location of housing versus jobs. With the highest concentration of stops within the general vicinity of the city's center, the Civic Center area and surrounding environs.


Legend
People per acre
0 - 2
2 - 5
5 - 10
10 - 25
25 - 50
50 - 75
75 - 100
100 - 350
City Boundary
NOMI Express Blue Route
NOMI Express Green Route
NOMI Express Orange Route
NOMI Express Red Route
NOMI Express Stops
N
City of North Miami
People Per Acre
0 0.25 0.5 1 1.5 2
Miles


Legend
Jobs per acre
0 - 5
5 - 10
10 - 25
25 - 50
50 - 100
100 - 250
250 - 500
500 - 1700
City Boundary
NOMI Express Blue Route
NOMI Express Green Route
NOMI Express Orange Route
NOMI Express Red Route
NOMI Express Stops
N
City of North Miami
Jobs Per Acre
Miles
0
0.25
0.5
1
1.5
2
NORTH MIAMI
FLORIDA


Legend
Housing units per acre
0.000000 - 1.000000
1.000001 - 4.000000
4.000001 - 7.000000
7.000001 - 15.000000
15.000001 - 25.000000
25.000001 - 50.000000
50.000001 - 100.000000
100.000001 - 760.000000
City Boundary
NOMI Express Blue Route
NOMI Express Green Route
NOMI Express Orange Route
NOMI Express Red Route
NOMI Express Stops
N
City of North Miami
Housing Units Per Acre
0 0.25 0.5 1 1.5 2 Miles
NORTH MIAMI FLORIDA


Legend
Activity density (housing + jobs per acre)
0 - 5
5 - 10
10 - 25
25 - 50
50 - 100
100 - 250
250 - 500
500 - 1715
City Boundary
NOMI Express Blue Route
NOMI Express Green Route
NOMI Express Orange Route
NOMI Express Red Route
NOMI Express Stops
N
City of North Miami
Activity Density (Housing + Jobs Per Acre)
Miles
0 0.25 0.5 1 1.5 2
NORTH MIAMI
FLORIDA


Legend
NMB Shuttle Line
Alt Route A
Alt Route B
Alt Route C
CityLimits
Street Intersection Density
0 - 5
5 -15
15 -25
25 -35
35 - 50
50 - 75
75 -100
100 - 150
150 - 250
> 250
(Intersections per square mile)
City of North Miami Beach Shuttle COA
Street Intersection Density
0 0.35 0.7 1.4 2
Miles
N
Prepared By
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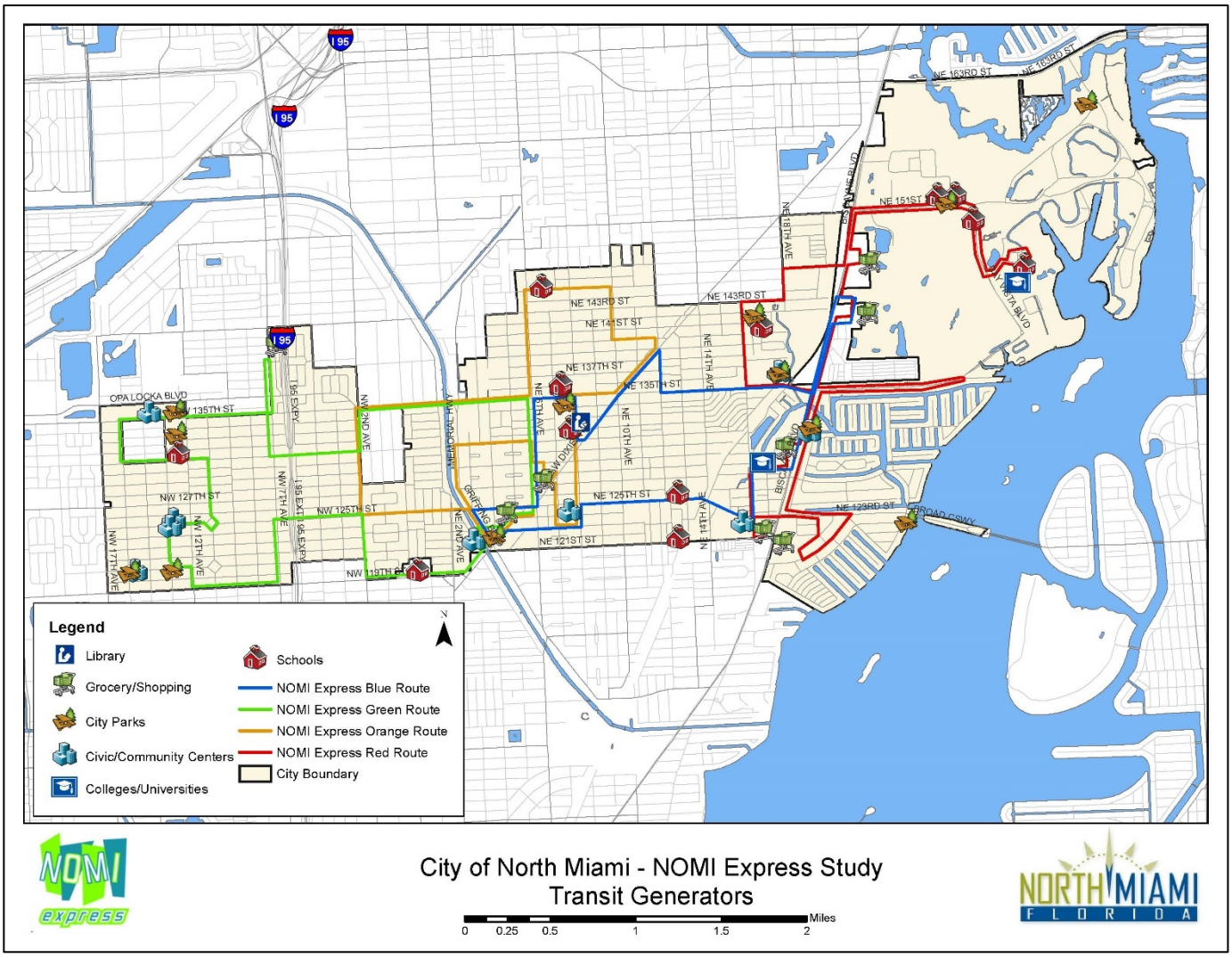
Legend
Library
Grocery/Shopping
City Parks
Civic/Community Centers
Colleges/Universities
Schools
NOMI Express Blue Route
NOMI Express Green Route
NOMI Express Orange Route
NOMI Express Red Route
City Boundary
City of North Miami - NOMI Express Study
Transit Generators
0 0.25 0.5 1 1.5 2 Miles
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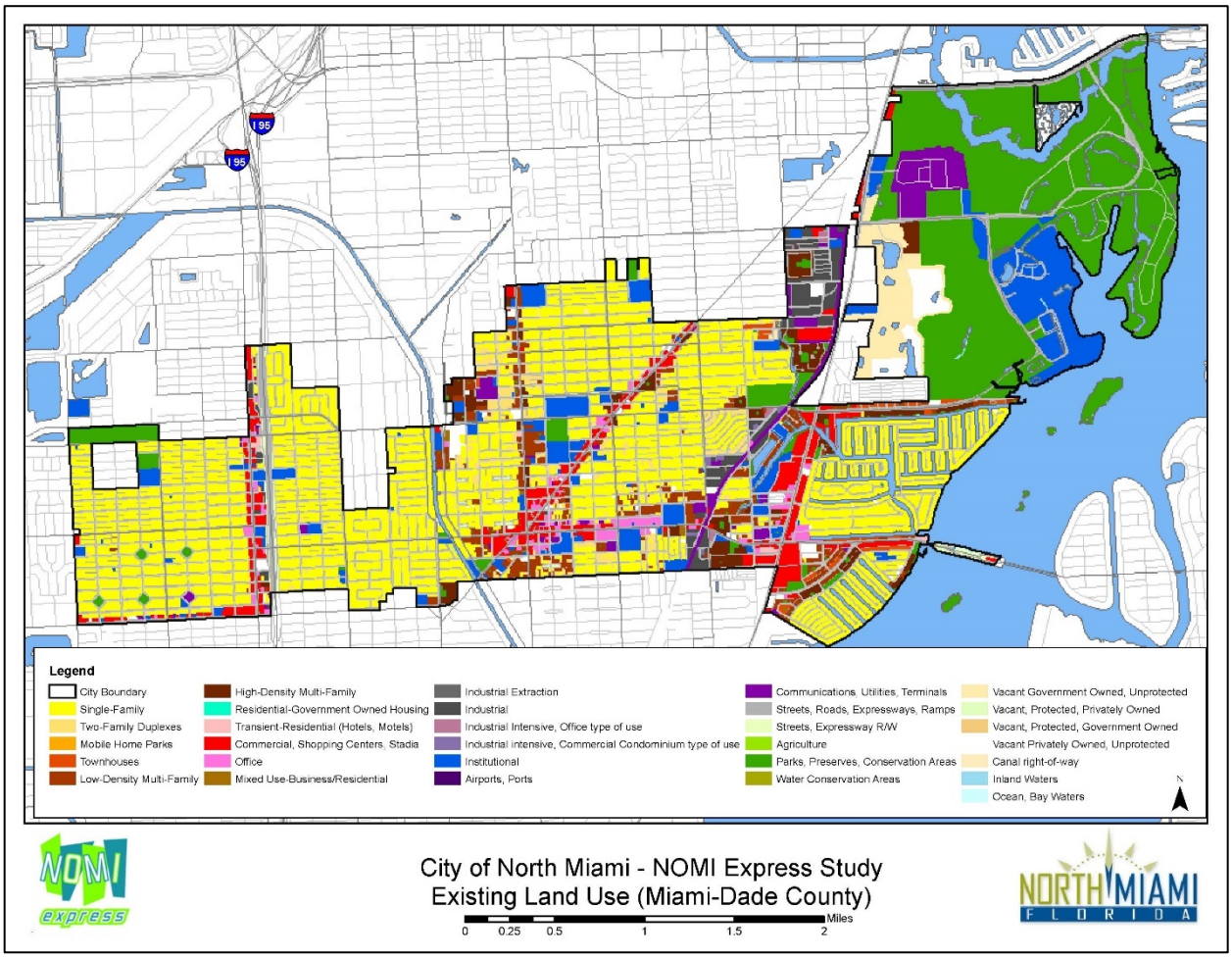
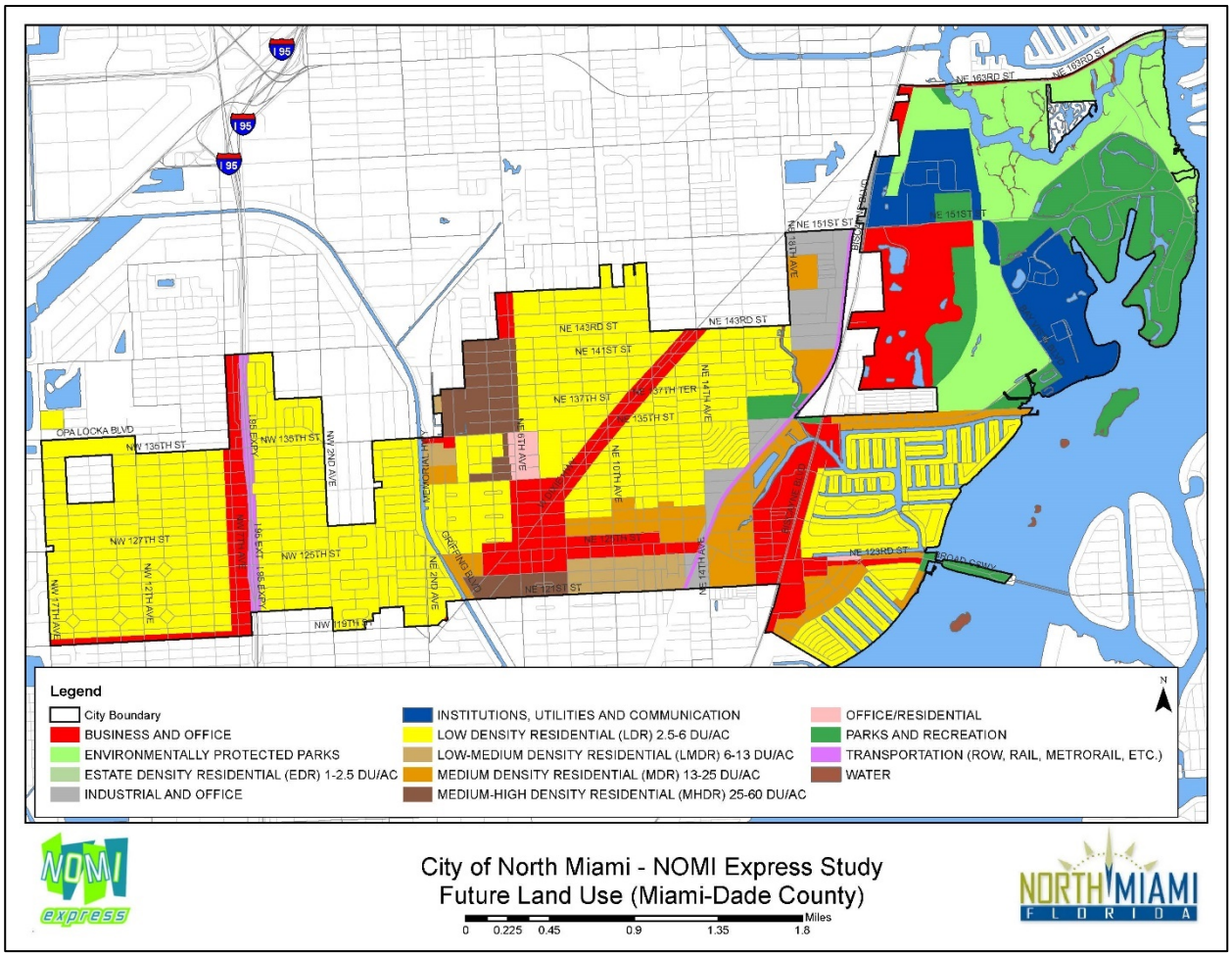
Land Use and Local Transit Generators:

A review of existing retail, recreation, education, medical facilities and grocery locations was undertaken to determine locations for shuttle service. Of these, access to grocery locations such as Publix and Bravo Supermarket and schools within the area were the most often cited destinations, with local community centers, churches, Target, and other retail second.

The following maps show current and future land use within North Miami. Primarily, 6 corridors must be serviced – NE 125th Street, NW 7th Avenue, SR 909, NE 6th Avenue, Biscayne Boulevard, and NE 119th Street (noted by the red parcels on the map) and connected to the residential areas denoted in yellow.





Destinations/Transportation Generators within and around North Miami

City's Community Centers & Parks

North Miami offers a variety of parks and community centers providing its residents and the community with many programs and activities to enjoy throughout the year. Most of the centers and parks are currently serviced by the NOMI express, however, not all are within the coverage. A total of seven community centers and twelve park facilities are located within the city with many other points of interest such as the Museum of Contemporary Art (MOCA), Oleta River State Park, North Miami Chamber of Commerce, Enchanted Forest Park, North Miami Library and City Hall. The following list includes a brief description of some of these facilities:

North Miami City Hall

Located at 776 NE 125th Street, the North Miami City Hall houses various departments including Public Works, Finance, the City Clerk and City Attorney's office, as well as the Council Chambers. The building is also conveniently located next to the Museum of Contemporary Art (MOCA), the City's Police Department, the Community Planning and Development Building, and the Building and Zoning Department building.

Griffing Community Center:

Located at 12220 Griffing Boulevard, the Griffing Community Center, offers various classes & activities for North Miami's adult population. This adult activity center also offers space for a variety of meetings for the local community.

Gwen Margolis Community Center:

Located at 1590 NE 123 Street, this community center offers rental space for parties, receptions, clubs and meetings for the local community.

Joe Celestin Community Center

This community center located at 1525 NW 135 Street, offers space for events and meetings for the local community with adjacent access to tennis basketball and baseball courts from the Claude Pepper Park.

Oleta River State Park

Located in 3400 NE 163rd Street, the Oleta River State Park is a 1,043-acre Florida State Park on Biscayne Bay offering a variety of recreational opportunities such as miles of off-road bicycling trails, mangroves forest preserves, pavilions for picnics, fishing, swimming, kayaking, hiking and overnight campgrounds. The Oleta River State Park is considered the state's largest urban park.

Other community centers and parks in the city include:

- Clyde W. Judson, Jr. Community Center
- Keystone Community Center
- Sunkist Grove Community Center
- Ben Franklin Park
- Cagni Park
- Claude Pepper Park
- Jaycee Pak
- Keystone Pak

- Kiwanis Park
- North Bayshore William Lehman Park (Dog Park onsite)
- North Miami Athletic Stadium
- Oleander Park
- Thomas Sasso Pool and Water Playground
- Veterans Memorial at Griffing Park

Florida International University, Biscayne Bay Campus:

Located at 3000 NE 151 Street, the Florida International Biscayne Bay Campus is home to the FIU Hospitality, Journalism, and Marine Science programs as well as the Royal Caribbean and MAST Academy partnerships serving approximately 7,000 students. The campus has its own student housing, library and recreation center and university shuttle (Golden Panther Express) providing service between FIU'S two main campuses: Modesto A. Maidique (in southwest Miami) and the Biscayne Campus (in North Miami). Connections to the FIU Biscayne Bay Campus is currently serviced by the existing NOMI Express Red Route.

Johnson & Wales University, North Miami Campus:

Located at 1701 NE 127 Street, the Johnson & Wales University North Miami Campus is located within 29 acres of land, serving over 1,900 students from +55 countries. The campus includes 7 residence halls and is home to the university's School of Business, College of Culinary Arts and School of Hospitality.

Barry University

Located at 11300 NE 2nd Avenue, Barry University is not within City boundaries, but it is just a few blocks south of North Miami. The university, along with its Miami Shores campus, is considered one of the largest catholic universities in the southeast, offering over 100 degree programs serving thousands of students within the area. The university has on-campus housing, as well as off-campus apartments.

Local Grocery Stores

North Miami has a variety of grocery stores located throughout the City. Although certain stores such as Costco and Target are not located within the city limits, they are popular destinations for

city residents and are serviced by the city bus. The following list includes the main supermarkets serviced by the NOMI Express bus:

- Publix – 12855 NE 6th Avenue
- Publix – 12850 Biscayne Boulevard
- Publix – 14641 Biscayne Boulevard
- President Supermarket – 450 NE 125th Street
- Target – 14075 Biscayne Boulevard
- Whole Foods Market – 12150 Biscayne Boulevard
- Costco Wholesale – 14585 Biscayne Boulevard

Area Schools

The NOMI Express services numerous schools within the City, in fact, many students ride the bus on the way to and from school. The main schools the buses serve are the North Miami Elementary, Middle and High Schools. The North Miami Senior High, located next to the North Miami Library, is the school with the highest number of students riders. Besides the two main Universities previously mentioned, the following list includes other schools within the city:

- Alonzo & Tracy Mourning Senior High – 2601 NE 151 Street
- American Worldwide Academy – 13227 NW 7 Avenue
- Arch Creek Elementary – 702 NE 137 Street Avenue
- Benjamin Franklin K-8 Center – 13100 NW 12 Avenue
- David Lawrence Jr. K-8 Center – 15000 Bay Vista Boulevard
- Gratigny Elementary – 11905 N Miami Avenue
- Holy Family Catholic School – 14650 NE 12th Avenue
- Natural Bridge Elementary – 1650 NE 141 Street
- North Miami Elementary – 655 NE 145th Street
- North Miami Middle School – 700 NE 137 Street Avenue
- North Miami Senior High School & North Miami Adult Education Center – 13110 NE 8th Avenue
- St. James Catholic Elementary – 601 NW 131 Street
- W.J. Bryan Elementary – 1201 NE 125 Street

Biscayne Commons Retail Center

Biscayne Commons, located at 14641 Biscayne Boulevard, is a local neighborhood shopping center, including retail and personal services as well as restaurants and Publix. Although not technically located within city grounds, this shopping plaza is surrounded by North Miami and serviced by the NOMI Express Red Route.

7th Avenue Flea Market

Located at 13999 NW 7th Avenue, just west of I-95, the 7th Avenue Flea Market is a +28,000 square foot main commercial area with a variety of stores and services including restaurants, beauty shops, grocery store, clothing apparel, and a banquet hall.

Local Churches

Many churches exist within the city. The NOMI Express offers stops at the First Church of North Miami and at St. Paul's Church. The following is a list of sixteen of these churches within the city:

- First Glorious Church of Love – 1200 NE 135th Street
- Fraternity Baptists Church – 13300 NE 7th Avenue
- Greek Orthodox Church – 12250 NW 2nd Avenue
- Holy Cross Lutheran Church – 650 NE 135th Street
- Holy Family Catholic Church – 14500 NE 11th Avenue
- House of the Living God – 13700 NE 10th Avenue
- New Birth Baptists Church – 13230 NW 7th Avenue
- New Vision-Christ Ministries – 13650 NE 10th Avenue
- North Miami Christian Church – 405 NE 135 St
- North Miami Church, The Nazarene – 1195 NW 124 Street
- North Miami Seventh-Day Adventist Church – 12800 N Miami Avenue
- Peniel French Seventh-Day Adventists Church – 12600 NW 4th Avenue
- Saint James Catholic Church – 13155 NW 7th Avenue
- Sixth Avenue Church of God – 625 NE 131 Street
- Tabernacle of Glory – 990 NE 125 Street #200
- Trinity Church – 12685 NW 7th Avenue

Public Engagement:

On-board surveying of the NoMi Express bus routes was conducted as part of the overall analysis of the system operations. This survey was conducted during the last week of January, and continued through mid-February, with outreach to riders in English, Spanish, and Creole. Results in this survey are within +/- 5.1% of the results at the 95% confidence interval, and we are confident that the general findings represent the attitudes of the NoMi Express ridership.

Overall, ridership on the NoMi system is diverse, but trends towards patrons aged 30-59 who use the system to reach shopping areas or medical services. The second largest group were students; these include younger students going to the local schools. Ridership on the system consists mainly of regular riders, who ride based on need, as many do not have personal vehicles. While generally,

the ridership is pleased with the system's services, there was concern about cleanliness and the air conditioning, as well as service frequency. The survey results also indicated a desire for weekend service, unsurprising given the ridership's focus on reaching retail and medical facilities. Riders generally have to transfer between NoMi Express lines to reach their destination or to transfer to the North Miami Beach and Miami-Dade Transit lines.

Methodology and Response Rate:

On-board surveying of the NoMi Express Lines were conducted on January 31, February 1, 7, 8, 14, 15, and 16, 2017. One-page, 13 question surveys were provided in English, Spanish, and Creole, and are attached as Appendix A. Development of the survey was based on prior surveys the City of North Miami conducted regarding the NoMi Express, with changes to reflect differences from past studies (i.e. Question 9 involved an answer option for the Miami Shores shuttle bus system, an option which did not exist for riders at the time of the last survey).

Surveys were distributed as riders boarded, and collected as the riders alighted the bus. Riders understood not to fill out the survey more than once to avoid duplication of results. Each route was canvassed on a separate week, but on the same days of the week (Tuesday, Wednesday). Individual surveys were then scanned and manually entered into Survey Monkey for processing of results in a central location. Where open responses were given in Spanish or Creole, native speaker staff with knowledge of these respective languages translated accordingly.

The survey received 353 on-board responses. System-wide, the average monthly ridership was expected to number approximately 27,000 riders/month during the first quarter of the year (based on 2016 numbers). Based on this expected ridership population number and the response rate, results in this survey are within +/- 5.1% of the results at the 95% confidence interval. Given the polarity of the survey results, we are confident that the general findings represent the attitudes of the NoMi Express ridership.

Discussion of Results:

The following summarizes the findings of the survey. Full survey results are enclosed as Appendix B of this report. Post survey, interviewers are debriefed during a general group meeting on February 20, 2017. A summary of their field observation notes are enclosed as Appendix D.

Ridership demographics:

Respondents indicated their residence's general location as part of answer one. While most are within North Miami, some riders come from adjoining communities/municipalities.
Unlike surrounding communities, the predominant age group riding the buses is 30-59. As a result, it is unsurprising that the main answer to question 4 regarding usage of the NoMi Express (Shopping and Medical - 55.12% of respondents). Approximately 1/5 of the ridership are under 18, another 1/5 of the ridership are the elderly aged 60 and older. More than 60% of the ridership do

not own cars; 25% cannot drive. Similarly, approximately one-quarter of the respondents indicated that they could not travel locally without the NoMi Express service. Students and employed persons together make up two-thirds of the ridership. A little over one-tenth of the ridership is retired. Observations on the bus indicated that ridership includes parents riding with children to school or to stores.

Ridership Patterns:

Generally, patrons of the NoMi Express system are regular riders, with close to 60% riding 4 or more times a week. Survey ridership indicated that the most utilized route is the Green route, with ridership for Blue and Orange approximately equal and the Red route receiving the least ridership. The numbers received align with actual ridership data collected by the City. Riders typically utilize the service to reach shopping or medical/civic areas (55.12%), or school (41.57%). A quarter of the ridership uses the service to get to work.

About a quarter (25.23%) of the respondents indicated that they never transfer between the different NoMi routes, and a little more than a quarter of the ridership (28.04%) indicated that they usually transfer to other routes. However, close to 60% of the riders transfer to Miami-Dade Transit; the NoMi Express serves as a feeder route for that system. 36% of the riders indicated that they transfer to the North Miami Beach "B" Line, indicating a need to maintain those transfer points in any route revisions.

Further, about 10-15% of the riders also utilize the Miami Shores or Aventura local shuttle lines. As currently there are no direct connections from the NoMi Express to either service, this is significant and ways to effectively transfer to both lines are potential service expansion considerations that may benefit local riders. 1/3 of the NoMi Express riders who also utilize the Miami Shores shuttles are students, 1/3 are workers; most do not have a car. For the NoMi Express riders who utilize the Aventura routes, more than half (53.4%) are in the 30-59 age group, and approximately 2/3 indicate they use the NoMi Express to reach shopping or medical services. The second largest group within this subset are younger workers. Bay Harbor Islands/Bal Harbour/Surfside also provides service that connects directly to the NoMi Express; however, this represents approximately only 4% of the population.

Perception of Service:

Service perception was evaluated on the following: Bus Cleanliness, Bus Air conditioning, Driver friendliness, Driver Appearance, Buses on Time, Bus Stop Location, Hours of Operation, Frequency of service, and Schedule and Information. Generally, overall perception of NoMi Express Bus service is fair to positive, with riders generally happy with driver appearance, as well as existing bus stop locations. While it scored highly, driver friendliness also ranked second when negative ratings were compiled. While still slightly positive, there was a marked difference overall scoring regarding air conditioning, cleanliness, and frequency of service, topics on which riders were less

enthusiastic. Further, air conditioning received the most negative "poor" (1 on a scale of 1 to 5) scores of any of the evaluated categories, close to more than double the (1) score when compared to all but one of the other categories, and ranking first amongst scores with negative ratings (1 or 2). Bus cleanliness was the third ranked negative score. It should be noted that in comparing number of negative responses, there was a gap between the number of negative responses for the top three and the rest of the topics. In other words, people generally felt more negative feelings for three particular topics (Bus Air conditioning; driver friendliness, and bus cleanliness) if they felt negativity regarding the bus service. Finally, frequency of service, hours of operation, and schedule and information availability also had higher instances more neutral scores, indicating a need for further review.

Riders were polled on potential improvements; over half the respondents indicated a desire for weekend service. A third of the respondents indicated that more frequent service was desired. Approximately a quarter of the respondents indicated that they would like the stop closer their residence. Lastly, about a fifth of the respondents indicated that bus shelters would be appreciated.

Free Response Questions:

Question 13 provided riders with the opportunity to provide open-ended comments regarding the buses. These comments varied from positive comments regarding the services to requests for more service and the A/C, the need for chairs and benches, and working bicycle racks on the bus.

While some of the sentiments have been noted in prior questions regarding service, the comments provided more insight into why riders were requesting more service or extended hours. Extended night service was a frequent comment, with notes that it will aid those who are attending night classes to further their education. Weekend service was also an oft mentioned comment. In addition to suggesting more buses; comments also include including more buses to make a more frequent service. Noting that 40 minutes to 1 hour is long and that service should be 30 minutes were suggestion provided in regard to how frequent the service should be.
For the red route, additional comments may provide insight to why the ridership has been declining recently, with specific note that cutting the service one hour had led to people not being able to utilize the service. Specific locational needs such as Costco were also noted.

Lastly, scheduling and connectivity were issues which were noted and which may need further evaluation. Specifically, comments noted the lack of directional information, and that scheduling especially with transfers was difficult. Various connections were suggested (i.e. Bus 103 in Little Haiti).

Full comments as provided by respondents are included in this report in Appendix C, under Question 13.

Outreach to Bus Drivers:

Corradino and City Staff met with drivers on February 25, 2017, to conduct and informal focus group interview regarding the NoMi Express routes and potential improvements. Notes from that meeting are enclosed as Appendix C.

Generally, discussion revolved around potential trouble areas for driving at key locations on the route. In addition, the drivers noted the locations where the bus was full, and supplemented with observations that some of the transfers occurring were because of inadequate capacity on the buses. The number of shopping bags was an issue discussed.

The drivers also noted that while most patrons are regulars, the older riders have dropped off, some because of perception of children behavior. This noted shift may explain recent ridership declines, and supports the survey results. As previously noted, unlike in surrounding communities, the predominant age group riding the buses is 30-59, and this age group will have different consumer needs as related to transit usage.

A major concern noted by the drivers was the overcrowding on the buses, particularly around mid-day on the Orange/Green/Blue routes at specific stops. This was noted to be potentially related to transfers; where overcrowding on one route resulted in another route having to pick up the excess for part of the route. Unfortunately, this created extra travel time in the system, and resulted in multiple routes having an overcrowding issue. The drivers noted that the destination for many of these folks were on the Green Line, and suggested that an additional bus on the green route would alleviate this pressure.

Technology Review:

Technology is a tool designed to aid. In selecting technology to implement, it is first important to understand why it is needed, and how certain tools will fit that specific need. In studying potential technological improvements that will enhance transit services in North Miami, we began by first trying to understand the questions people are trying to answer when they are traveling. “Where am I going?” “How am I going to get there?” Understanding how people make decisions regarding travel and transit ridership lets us understand what information they need. Questions such as these then yield insight into categories of information that is needed, and by extension, data by which we need aid to gather.

Data Flow and Understanding Infrastructural Needs				
	Traveler/Person			Operations
Data User Type	**Planning a Trip**	**Beginning Transit**	**In Transit**	**Systemic Needs**
Items to consider/Thought Process	Can I get there? How can I get there?/What's out there I can take? How long will it take me?	Where am I going/What's my route?, When will I arrive?, Alternative Routes?	What's taking so long?, Detour options?, Will I miss my connection? How long until the next one? Do I need to call to let someone know I'm running late?	Signal timing adjustments, TDM, Bus reserve Queueing, Congestion Pricing, Automation Interlink, Disaster/Emergency Traffic Planning, Congestion Mangement
Categorical Needs	Transportation Options, Standard Time Estimate, Timetables	Real time data, Route Info, Delays/Construction Info, Transit Timetables	Real time data, Detour Data	Real time data, Route option Data, Occupancy data
Data Need	Route options (multimodal), Bus/Train Schedules	Current traffic data/ETA, Specific Route taken, Transfer locations and timetables (Transit)	Current traffic data, detour data, changes in ETA, Transfer locations and layover times (Transit)	Transit ridership, accident data, congestion data, construction/roadwork data
Data Sources:	Existing maps, schedules, Destination data (Geolocated data, i.e. Google Earth, Maps), Crowdsourcing	Existing maps, schedules, Destination data (Geolocated data, i.e. Google Earth, Maps), Crowdsourcing, Current traffic data (accidents, incidents, congestion)	Schedules, Wireless data, Police, Crowdsourcing,Current traffic data (accidents, incidents, congestion)	Sensors (Proximity Sensors, Infrared), Cameras, Wireless data (Pings), GPS, Police, Crowdsourcing
Data Distribution:	Maps (printed and electronic), internet, word of mouth, Bus/Transit schedules, Online trip planners	Phone (Waze, Google Maps, etc.), Computer, Word of Mouth, Maps (Printed and Electronic), Schedules (Printed and Electronic)	Phone (Waze, Google Map), GPS, Transportation displays (Nextbus, Overhead displays); Text message	Computer interfaces between systems (Wiring, Wireless, Net), Dispatcher systems (Uber, Taxi, Can be manual/people or automated), Digital Signage, Radio, Phone, Text

By assessing what they need versus what the NoMi Express currently offers, we have targeted research on various available options for technology in this review, ranging from GPS and real time bus passenger information. Overall, communication and the methods data and information are common threads among transit riders and operations. While they look at these from a different angles, much of the information that technology is able to help with overlap in their ability to address specific needs, and the technology we see today is an extension how people access and receive information.

Understanding the questions previously noted in the "Data Flow and Understanding Infrastructural Needs" table, we have organized the discussion of technology into three distinct needs and groups:

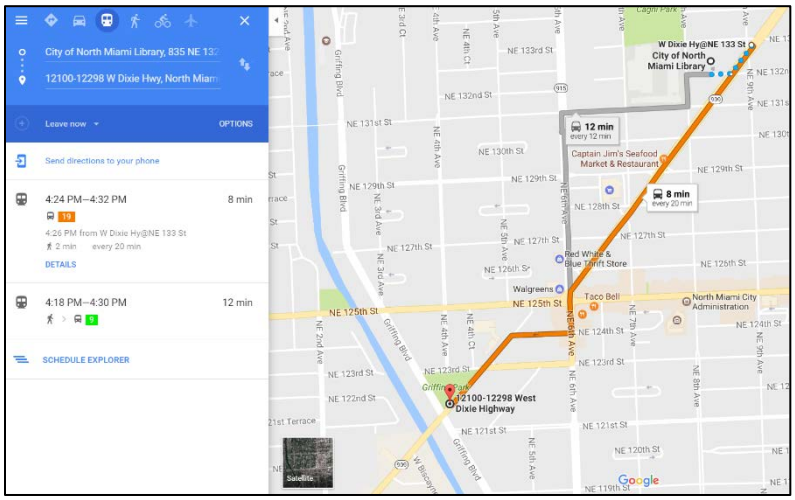
1. Technology for Riders
2. Technology to Assist in Long-Term Transit Planning
3. Technology to Assist in Day-to-Day Operations

Connecting Technology for the Ridership

Technology for people taking transit generally involves being able to plan out their trips, though security and comfort are also items that can be enhanced through the implementation of various technologies.

Trip Planning

Trip planning is the primary step for all transit riders, whether assisted through technology or not. Trip planning can be web-based or conducted through an app. Web Based programs generally include information from multiple sources, and will ask a rider for their origin and desired destination, from which it will provide a route for the person to travel. Regular folks generally prefer easier to navigate sites, such as Google Earth, over more complex websites generally put out by transit agencies. However, it should be noted that systems such as google require route specific General Transit Feed Specification (GTFS) data to be published and incorporated into its system for the trip planning site to work; thus, existing applications will not have the NoMi Express in its system. One way for the NoMi Express to tap into existing programs is to develop and publish this data, as Miami-Dade Transit does with its routes. This may not only be a cheaper option that trying to develop its own system, but will be of more utilization to its riders as this trip planning software will take into account the various options available.



Above, an example of existing, commonly used trip planning (Google Earth), using North Miami's Library and Griffing Park as the origin and destination. While Miami-Dade Transit routes are listed on the left with multiple route options, this system does not account for the NoMI Express because it doesn't have the corresponding GTFS data.
Source: Google Maps

App development costs vary, and range between $5,000 and $500,00 depending on complexity. A system like North Miami's, which with multiple routes is complex, and with the need to develop input data such as GTFS data, could feasibly cost $25,000 to $50,000. Alternatively, Miami-Dade Transit includes programming of local circulator routes into its app technology as part of its Interlocal Agreement with cities, and this cost saving measure should be explored for the NoMi Express system.

Real-time Passenger Information System

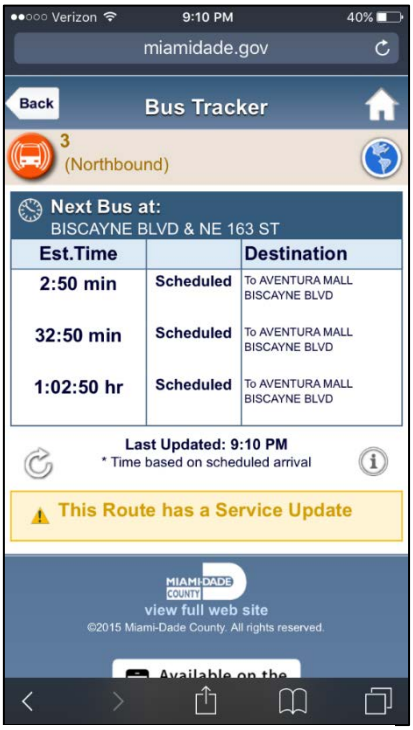
Displays at bus shelters like the above allow passengers to know when the next bus is coming. Source: www.nileguide.com

Real-time passenger information systems can inform riders of the expected time of arrival. Systems like NextBus, one such example of this technology, utilizes GPS technology installed on each bus, and a proprietary algorithm that incorporates historical travel data to track vehicles and predict the arrival time. By taking into account the actual position of the buses and typical traffic patterns, the system can estimate vehicle arrivals for each scheduled stop with a high degree of accuracy. This time estimate is refreshed constantly to provide riders with current information, including any delays.

Any real-time information system should take into account the developments of neighboring systems which connect to North Miami. For example, Miami-Dade Transit already has an existing app. By working with these communities and encouraging intergovernmental cooperation in providing route information, both systems benefit in providing a more cohesive information system for riders to plan their trips and arrange for appropriate transfers to different lines.

Under a basic NextBus-like system, passengers could access a website or a free app on a smart phone to get a real-time estimate on when the bus closest to the stop will arrive. A local phone number can be called or the user can input a request to receive a text for this information as well. QR codes can be installed on the bus stop pole. Scanning this code allows a smart phone user with the appropriate QR-reading app to log into the NextBus information without having to enter a web site going to app loaded on their device. The URL for the NextBus information can be also included as part of the bus schedule information at each stop.

The cost for a NextBus (a proprietary vendor) is approximately $56,000 for hardware and implementation, with approximately $14,000 in annual operating costs. This system can be integrated with a traffic signal priority system as discussed later in this report. Information for the NextBus system is GPS based and therefore can be displayed on LED displays either at bus stops, on smartphone apps, or sometimes on buses equipped with screens. The display of this information in North Miami, however, would



Real-time information is not new to Miami-Dade County; systems similar to NextBus are already being used by the County residents on MDT lines

require the installation of bus shelters in many locations in order to accommodate this technology; this should be effected with the installation of the shelter for cost effectiveness purposes. LED displays would cost approximately $4,000 each. Free-standing kiosks are also possible, but are probably not warranted given the relatively low number of boardings at any individual station. However, due to the convergence of 15 transit lines at Walmart, a display at that stop may be highly beneficial.

NextBus systems can also be incorporated in an automatic passenger counter system to give real-time, ongoing information on passenger activity. The system can also be used to link passengers to Wi- Fi, to report back engine operating information to the dispatcher, and to announce stops as a bus approaches. While these features are all attractive, they are not recommended at this time due to ridership levels.

Miami-Dade uses a similar tracking system for its buses, with riders able to note the time until their next bus or train at specific stations. This is important when thinking about technology from the viewpoint of the ridership. It is far easier to have all of the information one needs in one place, rather than with multiple apps. Locally, the North Miami system has an opportunity to tap into an already existing app, though it will take coordination with Miami-Dade Transit's (MDT) existing real-time passenger info system. This will likely be low cost, and of high benefit to the NoMi Express, since a large proportion (60%) of the ridership transfers to MDT bus service.

Ridership Interaction via Connected Vehicles Technology

Various applications have been used by bus systems to connect users to data. However, there are also applications that may be used to inform drivers as well, and ensure for passengers that a bus will stop at a particular stop for them. The Santa Clara Valley Transportation Authority, located in Silicon Valley, is currently testing "Smart Stop" applications. With this application, a waiting passenger can send a message to a driver telling him that they want to take the bus, and the bus, can in turn, be designed to let the passenger at a stop know it is on its way. As opposed to a sign, which can be updated but at times provides little other information, this technology provides a direct connection to each rider utilizing the system. Similar technology has been used to inform people of changes in gates or flight delays via text.

Example of data display kiosk used by Smart Stop in Santa Clara Valley, CA.
Source: chkamerica.com

This technology uses Dedicated Short Range Communications (DSRC), for safety and mobility applications. The underlying V2X technology connects the bus fleet with infrastructure, and utilizes 5.9 GHz Wi-fi connections to

communicate. As an added bonus, over time, buses can begin to bypass stops with no passengers, helping with timing and fuel efficiency, resulting in savings for cost and maintenance. While there is a concern that this would leave people with no cell service vulnerable, with proper planning at bus stops a queue system can be implemented at the various stops.

Generally, this technology will require the same technology for wireless applications on the buses, but will also have additional costs due to the need to install wireless communications devices by bus stops. However, while general costs installation by location will vary based on the actual need, they generally are low on a per stop basis, and additionally overlap with other technologies for roadways that cities have been considering (i.e. Connected vehicle technology).

Wi-fi Internet

Internet access during bus rides has been an increasingly common technology found on buses, and over time, transit riders have increasingly expect that their buses have internet. This had led to recent applications adding WiFi to Miami-Dade Transit's Metrorail and some Express buses, Doral's Trolley system, and North Miami Beach's B-Line Shuttle systems, among others. In addition to providing entertainment options for people with hand held/mobile devices, Wi-Fi on buses also allow people to monitor their travel and plan out or remember their next steps. Various vendors provide Wi-fi installation, and costs vary; wiring and hardware installation on the bus ranges between $300 and $2,000, with additional variable costs for the internet service. Generally, Wi-Fi service to the public is offered for free, though it can be set up with a service charge. In some places, ad revenue on buses is utilized to provide such services. However, there are also opportunities to partner up with the private sector in providing these services, similar to how Starbucks's free wi-fi is sponsored by Google and AT&T.

Cameras on Board - Security

Cameras on board buses can provide a sense of security for some riders. These cameras can be colored, and should be aimed at critical vantage points on the bus, including the entrance, exit, the front windshield, and other areas as needed. Although North Miami's buses are small, additional cameras will also help should it use larger buses, as systems can be set up for the driver to see that people have completely disembarked before driving.
Camera systems include not only the camera, but generally also a storage device such as a digital hard drive. This device, which is normally locked to be guarded against theft, tampering, and vandalism, can be used in instances such as with threatening incidents which occurred to staff during this study. In addition, with links to Wi-Fi, such camera systems can be used to assist with occurring emergencies.

Camera systems range in cost, depending on the vendor, and it is recommended that at least 4 vendors be approached and evaluated in order to select the best service for the City should it choose to add additional security to any new buses. Various additional options, such as microphones, are available, and during any demo or evaluation, the City should ask for a listing and prices for each desired application.

A screen above the driver shows a camera feed, allowing for better rider and driver safety.
Source: Hampton Roads Transit Blog

Only one camera system is needed on the bus, and currently, the contracted bus operator for North Miami has cameras installed. However, these cameras can be linked to WiFi systems. In addition, easier access by North Miami staff is needed in order to adequately address issues as they arise. Consideration should also be given on the assumption that all vendors have cameras on their system – this may be a requirement of insurance in some cases and is overall good policy, but is not always a given. The City should require any vendor chosen to operate its system to have cameras as part of its contract. Further, in the long term, should the City decide to purchase its own vehicles, then there is a need to incorporate camera costs into the vehicle purchase allocations.

Bus Stops and Comfort

Passenger comfort at bus stops include technology that range from incorporating smart screens that allow for weather, news, and restaurant offers, and which can serve as sites where people can connect to a trip planner. Other amenities which have been or are currently being considered

(Left) Miami-Dade Transit's pilot air conditioned shelter in Hialeah, FL.
(Right) Informational, touch screens at bus shelters in UK.
Source: miamiherald.com (Left), screenmediadaily.com (Right)

in cities like Chicago, New York, Sunny Isles Beach, and other places include various add-ons such as USB charging ports and local information on stores and sites of interest. These displays also serve a dual purpose – for systems which are connected with bus tracking technology, they can also display for riders when to expect the next bus.

Other amenities can also be considered given the need for shade in south Florida's climate. Locally, Miami-Dade County has installed a pilot test program with an air conditioned bus stop in Hialeah. Air-conditioning Hialeah's air conditioned bus stop. This air-conditioned pilot shelter was constructed at a cost of $60,000.

Using Technology as a System Operator

Circulator system operations generally can be categorized into Long Range Planning and Day-to-Day Operations, both with data needs that can be enhanced with technology applications. These technologies are not necessarily exclusive when compared to that for passengers. For example, the same technology that allows riders to track the buses also allows dispatchers to see where a bus has broken down; cameras may provide a sense of security for some riders, and at the same time allows system operators to coordinate with law enforcement in enhancing safety for both riders and employees.

Long-Range Transit Planning and Technology

The following details technology applications as applied to Long Range Planning:

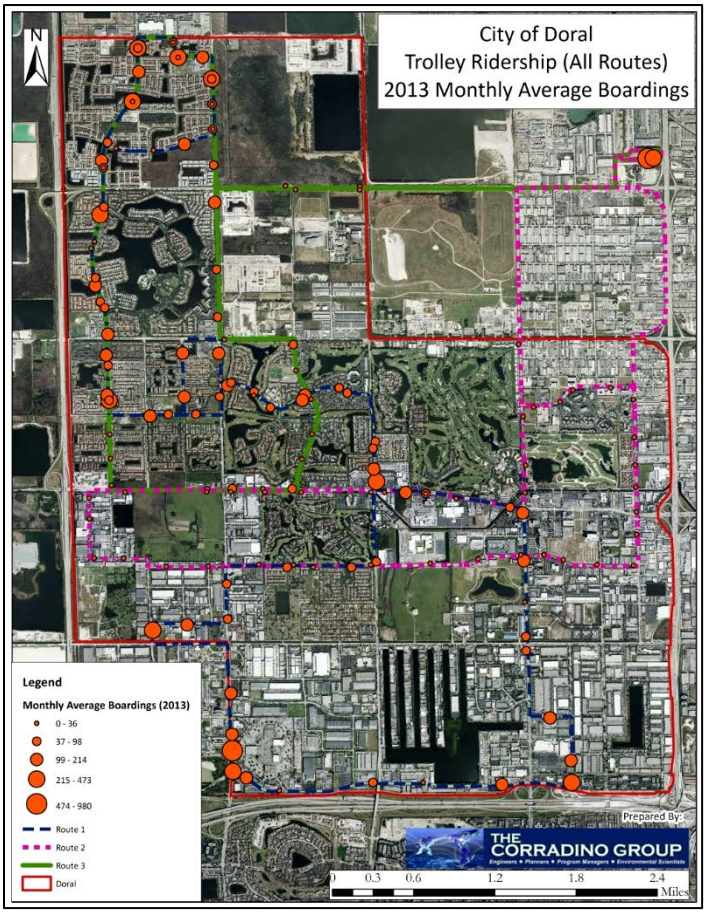
Daily/Weekly/Number Ridership Tracking

Usage of GPS technology on buses like with NextBus applications allows for the addition of input of ridership numbers for each stop. This data is then pegged to a specific geolocation based on the geographic coordinates. Currently, North Miami drivers manually input the ridership numbers on a sheet, and on and off boarding data is incomplete, making a full assessment of system needs very difficult. Using this technology can allow North Miami to better track specific needs by bus stop or route, streamline the process, and allow for the data to be graphically displayed in GIS systems for presentation and analysis.

For systems like Miami-Dade Transit, which charges a fare, drivers do not necessarily have to input the boarding numbers. However, this is not the case for North Miami, which is a free service. Under any system, drivers will still be the primary person who needs to input numbers. However, with an electronic system, drivers should be entering the data into a keypad at each stop, instead of a physical sheet. The inputted data then, being in computer systems, will take less time to compile and analyze.

During this study, outreach was conducted for peer cities in Miami-Dade County which have utilized these systems. Notably, the lessons learned were that staff would have to be hired and trained to use these systems and monitor the data gathered. In addition, the data has to be cleaned from time to time. While the GPS system will peg to specific routes and stops, any stopping for passengers outside a small range from the bus stop may register separately in the data output. This data would then need to be manually reconciled. In addition, there are also issues with the data compilation when different buses are used, such as when a bus is pulled in to replace another bus in need of repair.

For North Miami, the utilization of an electronically based tracking system will be an improvement as data management will be easier. During this study, the ridership numbers by stop had to be manually entered and composited; this can instead be done in excel or other programs, with time and cost savings, with the utilization of technology that links the tracking of boarding and alighting of riders to specific bus stops. Despite the challenges noted in peer city interviews and analysis of this technology, it is highly recommended for the City of North Miami's NoMi Express system to adopt this technology as it will make regular service evaluations easier and cheaper.



The collection of data in electronic form, by stop, is possible with the installation of GPS systems. Above, each dot represents the boardings by bus stop for the Doral Trolley system. By using GIS, analysis of bus system operations and needs is streamlined, enhanced, and rendered visually.
Source: Doral Transit Mobility Plan

Routes and Scheduling

Routes and scheduling are generally considerations for the long-term planning of the bus system, except in cases of road closures for construction and other matters, and for special events. North Miami does not currently have a system which can account for these changes easily, and planning for any of these circumstances will likely have higher than average financial impact on system operations as compared to other bus systems. This issue is further exacerbated because of the need for additional staff to run the bus system in North Miami, and timing issues with general contracting when dealing with issues of temporary needs for route adjustments.

Routes and scheduling naturally depend on having a database which has light signal, traffic, and ridership numbers information. However, there are also programs which allow for providers to quickly make changes to routes and gauge potential impacts. Programs like Remix (https://www.remix.com/), which are solely offered to transit service providers, also provide electronic tools and scenario planning. Currently used by Miami-Dade Transit, this program allows for an estimate of run time/speed and gives insight into the effects of changing routes on runtimes and ridership demographics. In addition, by importing another system's General Transit Feed Specification (GTFS) data, linkages to other systems can be evaluated as well.

A look at the potential scenarios and impacts in planning out route revisions.
Source: Remix.com

Information Distribution

Information distribution needs for system operators include schedules and expectations of when the next bus is coming. Internally, system operators need to know when to add additional buses to a route due to real-time service considerations, and if there are accidents.

Different options exist on the bus as well – some buses, such as the new North Miami Beach shuttles and the Los Angeles Metro, among others, install monitors within the buses that display the next stop, and sometimes music videos, news, and the weather.

Being able to track where the buses are via GPS also provides for the opportunity to track dwell times and arrivals. Buses that arrive significantly more than 5 minutes early on their scheduled stops should wait to resume their routes, especially if this occurs regularly. Some transit systems have set up, at their bus stops, devices which the buses can "ping" as they arrive, indicating their location and logging it into a system where it can be tracked. However, overall, the ability to know

where the bus is, on a map populated by GPS data from the buses, is generally sufficient for dispatchers to know the on-time performance of a bus and whether it should be "held."

Operationally, it is important that both a visual and verbal notice of the next bus stop be present on a bus to guide riders to their destinations after boarding.

Traffic Signal Priority

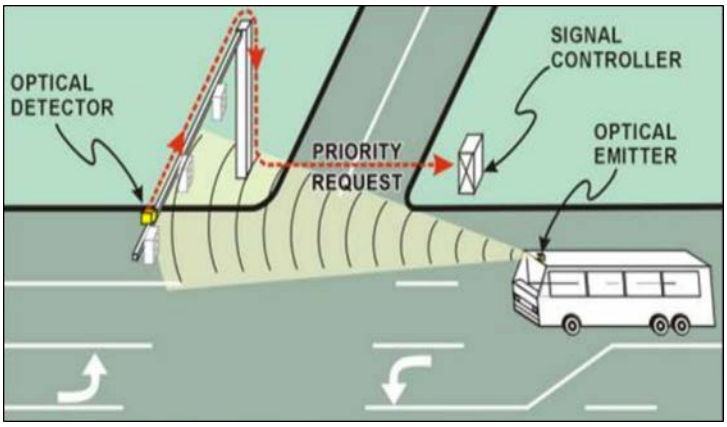
The existing North Miami routes combined passes through approximately 64 traffic signals, for a total of over 85 potential traffic light stops on the route per cycle among the four routes. This delay will technically account for an average 12 minutes of runtime per route.

Traffic signals are maintained by Miami-Dade County and are utilized to manage the traffic flow. Signals at each intersection are generally set to minimize total delay for all traffic approaching from all directions. However, in some cases, the signals may be timed to permit traffic moving at a pre-determined speed to travel along a corridor or route with a minimum of stops. Signal systems generally are not set to accommodate transit vehicles, which because they stop at bus stops along the route, pausing for varying lengths of time depending upon passenger activity. Consequently, in planning the runcutting for transit routes, the number of lights are incorporated into the schedule at a rate of 40 seconds per light. These delays are often more absorbable under systems that have longer headways with more buffer times.

The current system both minimizes the amount of traffic signals the route must run and maximizes the consistency of the flow-through speed, which is affected by the timing of signals. However, any delays are cumulative through the course of the day, and must be accounted for in advance planning for route scheduling, and may affect the number of stops or route length and alternative route path options. Currently, based on timing, signals delays have been built appropriately into the timetable; however, traffic remains an issue on routes such as the Red Line, and in these instances TSP systems may help and should be explored further. Future routes will also utilize routes with a heavy amount of signalization, and traffic signal priority is, as with other systems, a natural consideration for any such routes.

Traffic signal priority (TSP) utilizes a predetermine set of conditions to either advance a green signal or delay a red signal. Using technology to initiate a message, a bus approaching a signal within 10 or 15 seconds of a normal phase change from red to green will initiate that particular phase change earlier. This permits the bus to pass through the intersection without having to wait for the normal change in signal. Similarly, the same system previously noted could be programmed to extend the green time, opting to delay the red phase for 10 or 15 seconds so that the bus can pass through the intersection without stopping. Buses running late could receive an advanced green or delayed red while those running ahead of schedule or on time would not.

Changes in normal signal timing, however, can adversely impact general traffic. Prolonging a green in one direction also prolongs the red light in the intersecting direction. Cross streets, therefore, may experience traffic with longer delays and queues. This effect may also be seen on dedicated turn lanes (e.g., left turn lanes with separate turn phases). To limit this effect, from which congestion may take several light cycles to recover, some transit systems will limit TSP use to buses traveling behind schedule. The North Miami "NoMi Express" service operates every 60 minutes. Signal preemption of 10 to 15 seconds for this frequency would therefore not anticipated to have an severe impact on the general flow of traffic on North Miami.



Traffic Signal Priority Systems utilize a series of signal devices to detect approaching vehicles, Source: streetsblog.org

Utilizing a GPS-based traffic signal priority in conjunction with a bus location system, necessary for information improvements for systems like NextBus, could result in cost efficiency as the vehicle tracking system could serve both a traffic priority signal and an information function, the latter of which could then be used for any transit planning app or for system dispatcher tracking. For example, a $20,000 vehicle tracking system (software and hardware) could track buses. At each signal location, the location of the bus and even status (running behind, on, or ahead of schedule) could be transmitted to the signal controller and apply the appropriate response. This would cost approximately $2,000 per location to install a network transponder.

Traffic signal priority systems typically result, depending on field conditions, in a four to almost ten percent reduction in travel time. Maintenance costs for the system would also be reduced under a single system. Maintenance costs vary between $400 to $800 annually. These costs cover repair or replacement of controller equipment.

Day-to-Day Operations and Technology

The following details technology applications as applied to Day-to-Day Operations:

Security

As previously noted, security can be enhanced through the linking of camera and streaming technology. Given recent events with passengers and staff on the NoMi Express, it is recommended that the City of North Miami enhance its existing on-board surveillance via the

implementation of camera and WiFi technology, and in addition, establish a link between this transit monitoring and the local Police Departments.

Bus Tracking

Bus tracking is important on a day-to-day operations basis because of the need to account for any emergencies and need for service changes. This monitoring can be achieved through the installation of GPS systems on buses as previously discussed.

Ridership number monitoring and backup buses

North Miami has one of the higher ridership amounts in the County, but has smaller buses. One of the current issues during peak hours has been the overcrowding of buses, which has caused passengers to be left at bus stops behind on a system that runs hourly. This is not an issue which is necessarily unique to the NoMi Express. University bus systems, like the one at Rutgers University, run route systems similar to North Miami, and have encountered the same issue when students leave class. While the general result in the long run is to have additional buses added to the route, often this only occurs when a general system analysis is conducted, especially with local buses for small to mid-sized systems in Miami-Dade County. The danger of this is that over time, this causes the perception of unreliability within a system. In turn, this results in decreases in ridership over time in systems where the headways are greater than one quarter-hour.

From the standpoint of day-to-day and short term operations, a monitoring of bus stops, as well as having a good reporting system has allowed for better dispatching of reserve/back-up buses during these periods. Having an active GPS system with good driver training and technology at bus stops can help with day-to-day management of the bus system in this regard.

With implementation of any technology for day-to-day operations, it's important for the City to consider having a designated staff member to monitor, and for access to be given as needed for system dispatchers.

Discussion of Technology Options and NoMi Express

The research on available technology is one which generally leads to a wishlist, with priorities that should be linked to ridership satisfaction with service as well as enticing choice riders. High on the list for implementation, however, are WiFi, as it is implemented in neighboring Cities and increasingly expected by ridership, better GPS tracking for better management of the system – a necessity based on current review of the system and operator and administrator feedback, as well as distribution of ridership information for the local ridership, reflected in survey results. Partnerships with local agencies such as Miami-Dade Transit will allow for easier implementation in some cases, as it will cost less to add onto an existing system which has already been set up and which is utilized, such as the Miami-Dade Transit phone app.

Some technologies, such as signal priority, and more advanced amenities at bus stops, are not high on the priority list because the NoMi Express is a small to mid-sized system. However, some technological applications are not restricted to sole applications for buses. Signal priority technology, while not high in priority for implementation with smaller bus systems such as North Miami, could however be installed for emergency vehicle services should the City elect to utilize this technology. In those cases, while not a high priority, there exists an option for the NoMi Express to tap into a system be utilized by other parts of the City, and this opportunity should be taken when presented to advance the local bus service. Further, the City should still keep these options in mind because in some cases, a vendor may pro-offer severely discounted or free installation and/or upkeep of amenities such as air-conditioned bus stops and LED screens, in exchange for ad revenue.

Some of the technology discussed involved routine rescheduling or route alterations involving software. On these route tracking items, since the need is not daily as it is with larger, regional systems, the usage of consultants periodically on items such as ReMix will likely be cheaper than having the City purchase and utilize planning software itself.

The Future of Transportation

Autonomous and Connected Vehicles

Autonomous vehicles have recently been the focus of many studies in Florida, which is one of 4 states which has laws that allow for this technology to be tested. The City of Tampa is developing testing a fully autonomous on-road bus system on the Marion Street Transitway, with will operate with cross street traffic and is being funded by a $1 million Florida Department of Transportation grant. This new transit corridor will initially consist of 6-12 person capacity micro transit pods, but with future evaluation for larger buses to be implemented.

Example of Driverless, Automated Shuttle
Source: Tampa Bay Times

While the autonomous bus is not necessarily in North Miami or many local municipalities' immediate future, the ability to utilize this technology requires the implementation of other intelligent transportation systems that other vehicles share. These items also require gradual implementation over time. Most automated systems as currently envisioned is heavily reliant on the gathering and distribution of data, and the linking of this data in a central intelligence. It is important for the NoMi Express operators to be aware of these systems because connected vehicles technology have other applications. Connected vehicles technologies can warn drivers or provide guidance with safety, such as when entering an intersection, and could be utilized to enhance bus safety as well. As previously mentioned in this study, connected vehicles technology

can also result in enhanced communications between buses and the people waiting at a bus stop, allowing for fuel and time savings. Installation in North Miami of connected vehicle technologies should not be difficult, as generally the largest impediments to this technology are tall buildings and line of sight issues.

A key concern that has been voiced and which has been a limiting factor for local service has been cost. It is important to note that while automated systems may still require monitors to ensure safety and good system operations, overall, there is an expected reduction in operating costs. These savings could then be reinvested into the bus system and translate into additional/improved service or an extension of hours.

It is also important to consider that should the City build a Tri-Rail Coastal Link Station, this is a potential application of technology that may help the NoMi Express adapt to local circulator needs feeding into the station area. Since this is new technology, there are available grant monies that the City can pursue for pilot programming in the future.

Electric and Zero Emissions Vehicles

As gas fuel becomes more uneconomical, it may be necessary to further review electric and hybrid buses to effect cost savings. Further, such systems, which trend towards zero emissions, are also important for the preservation of the environment. Below is a listing of as described by the US Department of Transportation on the type of electric and zero emissions buses that are being manufactured.

Battery Electric Vehicle (BEV) Buses

Battery electric vehicles (BEV) have a battery pack and an electric motor instead of a fuel tank and an engine. This battery is the vehicle's sole source of power and must be recharged, often from the electric grid.

Medium- and heavy-duty BEVs have been predominantly used on urban or suburban routes, characterized by frequent stops and starts, high idle times, lower average speeds, and a daily range of 100 miles or less. These BEVs have included, but are not limited to, urban transit buses and intracity delivery vehicles.

BEV maintenance costs can be as low as 20%[1] that of conventional vehicles. Furthermore, the electricity used to power the vehicle can cost less than diesel fuel further lowering operational costs. Electric powertrains are more efficient than internal combustion powertrains[2] and are able to perform the same amount of work as other vehicles while using less fuel.

As battery technology continues advancing with increased use of electric vehicles, overall costs of BEVs and their batteries are projected to decrease over time.

Hybrid Electric Vehicle Buses

Hybrid electric vehicles (HEV) have both an electric motor and an internal combustion engine, utilizing both electricity and gasoline. While the vehicle can use gasoline for part of its mileage, it can also run emission-free once switching to electric mode.

There are two primary categories of HEVs: **parallel** hybrids use both the electric motor and the engine to move the vehicle, while **series** hybrids' engines can generate electricity for the motor as well to move the vehicle. Series hybrids are Hybrid Electric Vehicle Buses also known as **extended range vehicles**, as the engine can be used to operate the vehicle in the event that the battery is completely depleted.

There are several types of hybrid vehicles.

Conventional Hybrids

Conventional hybrid vehicles recharge their electric batteries from the energy created from braking. Because it also has a battery, hybrids have an increased fuel economy compared to conventional vehicles when it combines both its gasoline and electric mileage. Increased fuel economy reduces fuel costs and can save fleets money.

Plug-in Hybrids

Like BEVs, **Plug-in hybrid electric vehicles (PHEV)** can be charged by being plugged into an outlet. While these hybrids have gasoline capabilities, its ability to be charged reduces the need for gasoline present in conventional hybrids. Users can opt to operate entirely on electricity, with gasoline for emergencies.

Fuel Cell Electric Vehicle (FCEV) Buses

Fuel cell electric vehicles (FCEV) contain a fuel cell system powered by hydrogen that generates electricity to operate the vehicle. This electricity used to power the vehicle, along with heat and water vapor, are the only byproducts of fuel cells. Electricity is stored in a battery system.

FCEVs have performed a variety of tasks but have mostly been used as transit buses since 1991. Recent demonstrations show the technology's growth to become competitive to conventional transit buses in terms of availability, performance, and durability. Other forms of FCEV have included step vans, walk-in delivery vans, shuttle buses, and semi-tractors for drayage services.

While fuel cell vehicles have demonstrated comparable performance with conventional vehicles, their capital costs are still high due to low production volumes. However, manufacturers are projecting that increasing the amount of buses built and used will decrease individual bus costs[3] due to a better positioning for purchasing components and transition toward assembly line production. Larger volumes makes on-site hydrogen fueling feasible, which can make it equivalent or cheaper than diesel fuel.

Electric vehicles also have implications for the overall cost of running a bus system. Hybrid and Electric buses currently are expensive, and can cost upwards of over $800,000 per bus, as opposed to $160,000-$300,000 for a regular bus (depending on size). This may explain the current slow rate of adoption in many areas. However, over time, this cost different will be offset by gasoline fuel costs. Planning in advance for the future for these vehicles will require North Miami to set aside places for charging stations in a garage area, which the City does not currently have.

Route Optimization Analysis:

As part of this evaluation, recommendations on potential route reconfigurations were analyzed on the basis of the passenger surveys; transit generator data, as noted in the previous section; and existing operational data (boarding and alighting numbers). The evaluation placed emphasis on connectivity with regional routes, other city circulators and local areas of activity.

Based on the review of roadways conditions, demographics and transit generators identified during Tasks 1 and 2 of this study, along with the on board survey, alternative routes were considered.

Evaluation of Alternative Routes considered:

- Benefits and detriments of linking routes;
- Viability and Structure of Potential Weekend Routes;
- Viability and Structure of a School Service Route;
- Analysis of transfer locations/times to determine the efficiency of route connectivity; and
- Assessment of the feasibility of express and limited stop services.

Mainly, it should be noted that based on the evaluation, the Red Line should undergo changes with a goal of creating a better balance between residential and commercial destinations – it is currently skewed towards commercial destinations, resulting in lower ridership. In addition, the Green Line should be reconfigured for safety; additional access to new transfer opportunities; and relieve overflow demand on the Orange and Blue Lines. Improving the Green and Red Lines will help to maintain and enhance the quality of the NoMi Express system.

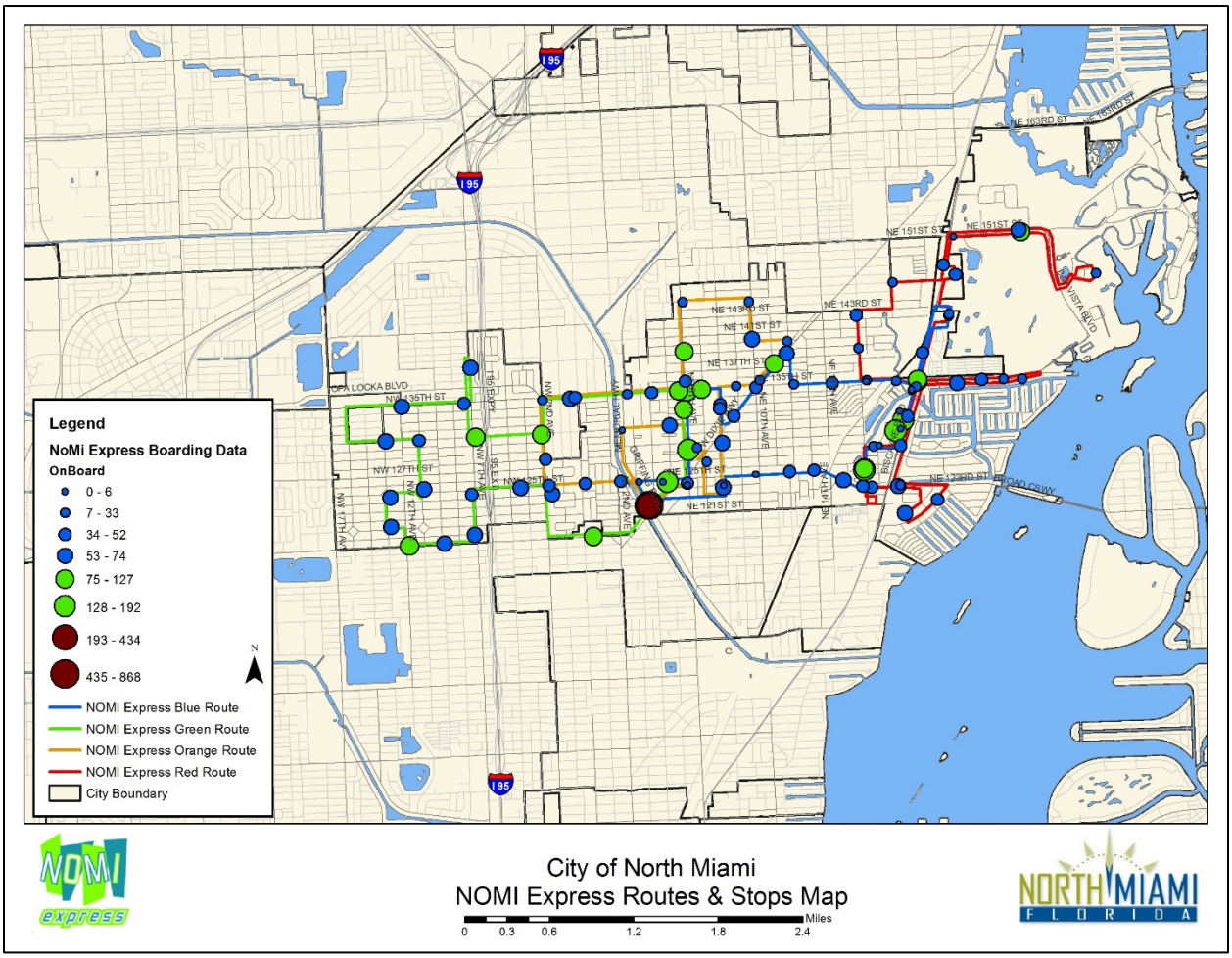
System overview:

The current NoMi Express system consists of 4 routes which operate on an hourly schedule.

Below is the route map for the system as provided by the City.

Boarding: NoMi Express

The following map depicts the ridership for a sample period in May, one of two peak months for transit ridership in North Miami. In this map, we see that the primary clusters of activity occur at Griffing Park, at the intersection of NE 135th and NE 6th Avenue, along Biscayne Boulevard and NW 115th Street/NW 12th Avenue. These are unsurprising, and related to either very specific transit generators (Supermarkets) or transfer point from MDT. Primary hub locations include the Civic Center and Griffing Park, and NE 6th Avenue/NE 135th Street. When compared to Miami-Dade Transit Data (discussed later in this report), secondary hub locations can be found at NE 135th Street/Biscayne Boulevard, West Dixie Highway, and NE 123rd Street/Biscayne Boulevard. This map also shows a healthy distribution of stops, though for efficiency, any stop noted as 0-6 are prime candidates for removal if the schedule needs to be compressed.

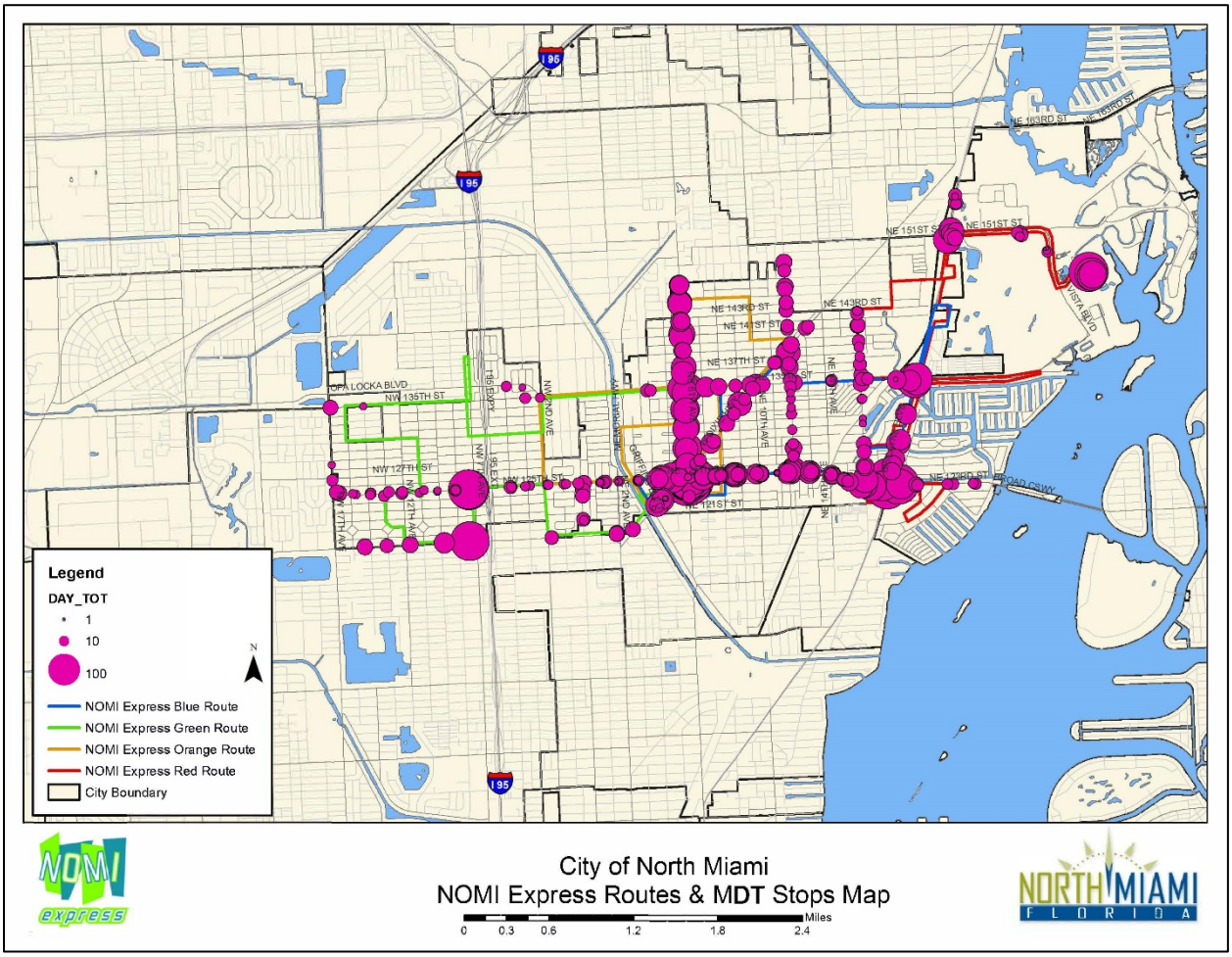


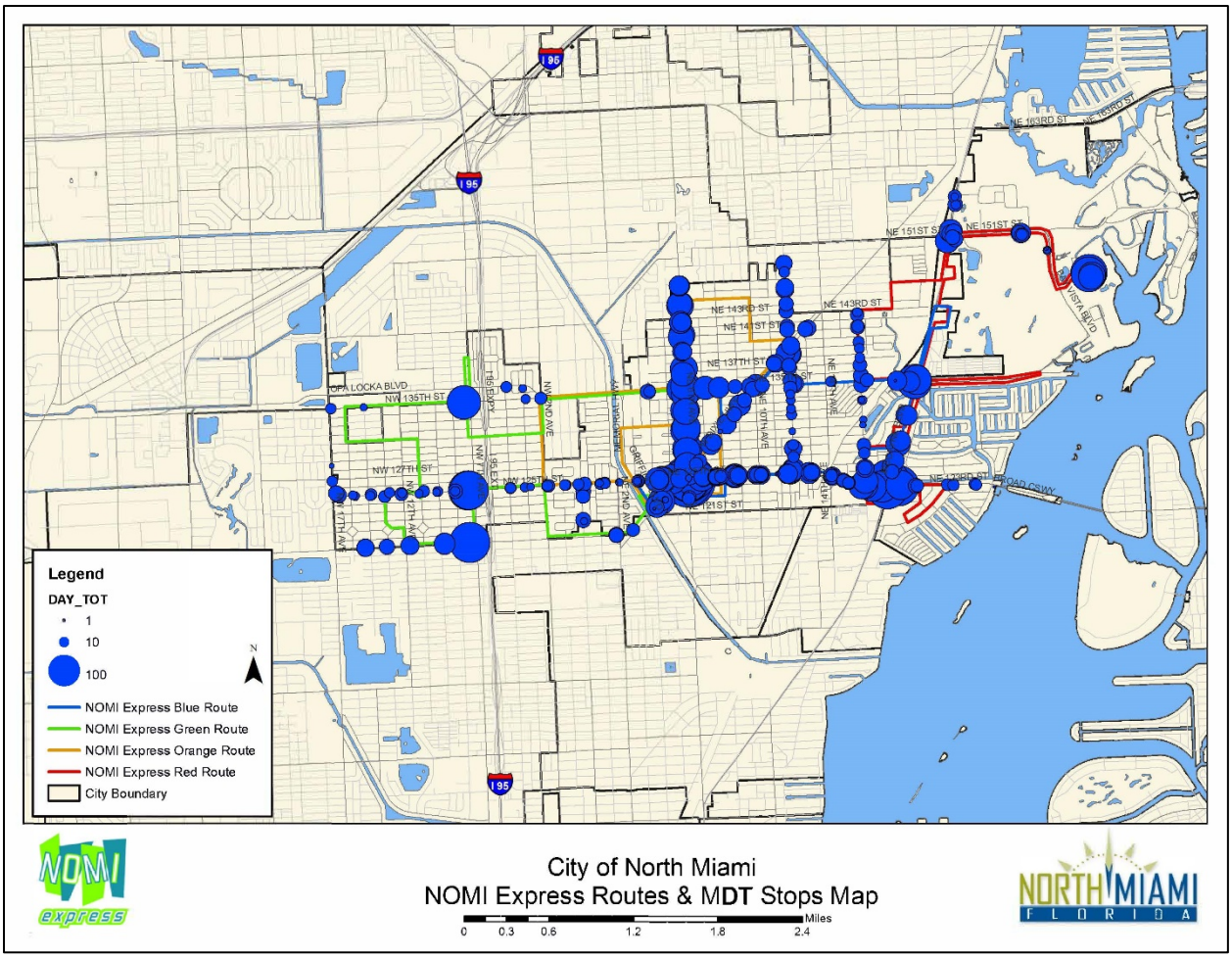
Boarding: Miami-Dade Transit

The following maps depicts the MDT average daily boarding and alighting ridership, by stop, for the months of March and May 2016. March and May are the primary peak transit months for ridership on the NoMi Express. Locations of clusters indicate key transfer points which should be maintained with any service change, especially given the high percentage of the ridership which utilizes NoMi Express services to reach MDT routes. Generally, these cluster points hold to be the same across multiple months, and are anchor locations in the local transit system. These anchor locations include Griffing Park, North Miami City Hall, FIU, and the intersections of NE 135th Street/NE 6th Avenue, NE 123rd Street/Biscayne Boulevard.

Of these locations, Griffing Park is the most logical site for a hub, given its central location in the City, and the concentration of boarding and transfers for both NoMi Express and MDT routes within North Miami. However, more facilities need to be included on site. This includes the installation of bus shelters, as well as bus bays on Griffing Boulevard or NE 123rd Street by the Park. As the City is currently undergoing potential redesign of the roadways around the park,

there is a potential opportunity for incorporating multimodal transportation into local urban design at this hub.





Tri-Rail Transfer Point Considerations

1. Potential Tri-Rail Stations locations

   The South Florida Regional Transportation Authority is planning for a new passenger rail service for local communities along the existing FEC rail corridor. Current planning for the Tri-Rail Coastal Link is important for the NoMi Express because local routes should connect residents and businesses to and from the planned service, expected soon. Potential locations include US-1 and NE 151st Street, the planned SoleMia development; US-1 and NE 135th Street, and at NE 125th Street and NE 14th Avenue. Currently the South Florida Regional Transportation Authority is planning for the Coastal Link Station in North Miami to be at NE 125th Street.

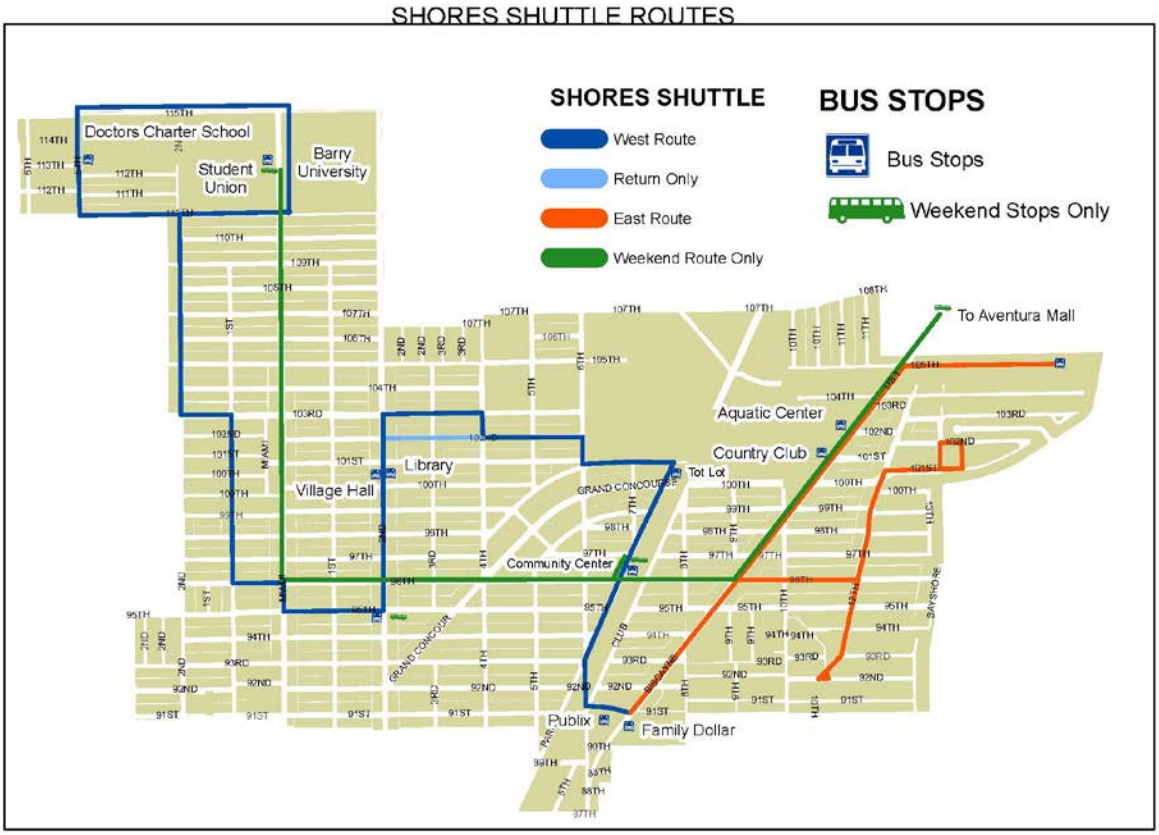
2. Connections to Existing Tri-Rail Facilities

Transit access for visitors and residents to the closest current Tri-rail Station, located in Opa-Locka may be achieved via transfer to MDT Route 135 on NW 135th Avenue, from all NoMi Express routes. Access may be also be achieved via a transfer point at North Miami City Hall as a hub, which requires riding MDT Route 19 and transferring to route 135.

Connection points to other local transit systems:

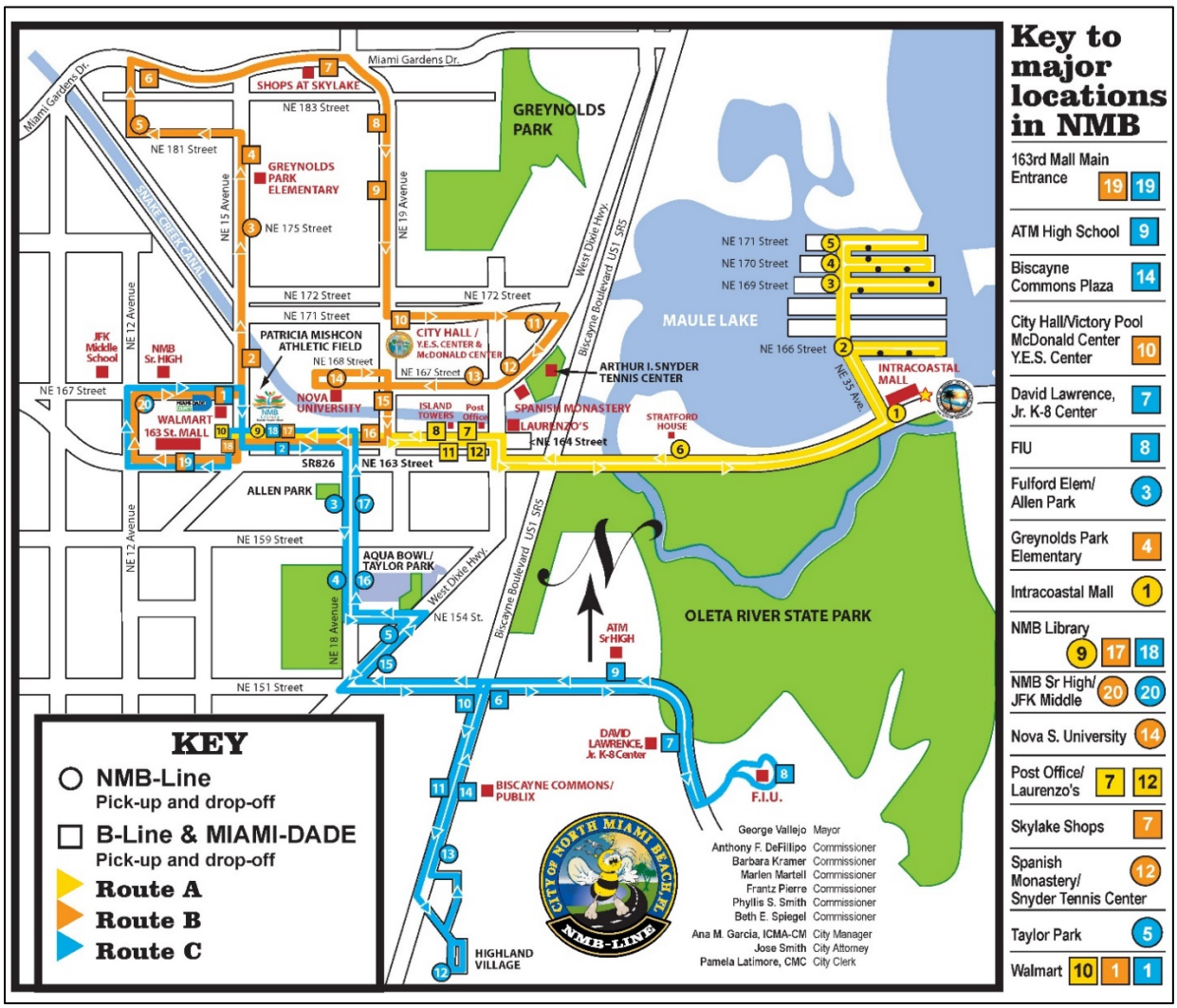
Miami Shores

The closest Miami Shores stop is at Barry University, approximately 0.25 miles from the closest NoMi Express Stop on the Green Line on NE 115th Street. Miami Shores runs a regular service during the day and a modified weekend express service from Barry University to Aventura Mall.



North Miami

Connections to the North Miami Beach B Line system, which recently added two new routes, can be accessed at FIU and various locations along US-1/Biscayne Boulevard, including Target/Costco. The North Miami system operates Monday to Saturday, from 7:30 am to 7:30 pm.



Bay Harbor/Bal Harbour/Surfside

Connections to the Bay Harbor/Bal Harbour/Surfside circulator system can be effected via routing to the intersection of US-1/Biscayne Boulevard and NE 123rd Street. The Bay Harbor Islands shuttle currently stops at Starbucks, Costco, Publix, and Walgreens in North Miami. Currently Surfside and Bay Harbor Islands routes operate Monday through Friday, from 7:30 am – 5:16 pm and 9 am – 5 pm, respectively. The Bal Harbour route runs Sunday through Thursday from 9 am – 5 pm and on Fridays and Saturdays from 5 pm – 9 pm.


Together We Will Get You There!
Get to where you need to go by making the connection among our three free shuttle routes
The Bal Harbour shuttle continues north to stops at Haulover Beach Sunny Isles Beach and the Aventura Mall
The Bay Harbor Islands shuttle continues west to stops at Starbucks, Costco, Publix and Walgreens in North Miami
The Surfside shuttle continues south to the North Shore Library, where riders can connect to the North Beach Trolley and the Miami Beach Trolley system.
SURFSIDE shuttle stops
BAL HARBOUR shuttle stops
BAY HARBOR ISLANDS shuttle stops
SHOPS, SERVICES, and DINING AREAS
Miami-Dade Transit stops
For bus routes, updated schedules and the live bus tracker, visit www.miamidade.gov/transit
DISCLAIMER
Note that each municipality provided the accompanying routes, times and stops in this guide. Each municipality is responsible for the operation of their shuttle bus. Schedules may change based on ridership levels, special events, traffic or other variables. Riders should check with each municipality for details and more information.
COLLINS AVENUE
Bal Bay Drive
Harbor Way
Bal Cross Drive
96th ST
95th ST
94th ST
93rd ST
92nd ST
91st ST
90th ST
89th ST
88th ST
87th Terr.
87th ST
86th ST
HARDING AVENUE
Kane Concourse
West Broadview Drive
East Broadview Drive
West Bay Harbor Drive
East Bay Harbor Drive
Bay Harbor Terrace
103rd ST
Bay Drive
Dickens Avenue
Carlyle Avenue
Byron Avenue
Abbott Avenue
Hawthorne Avenue
Emerson Avenue
Publix
N
S
E
W

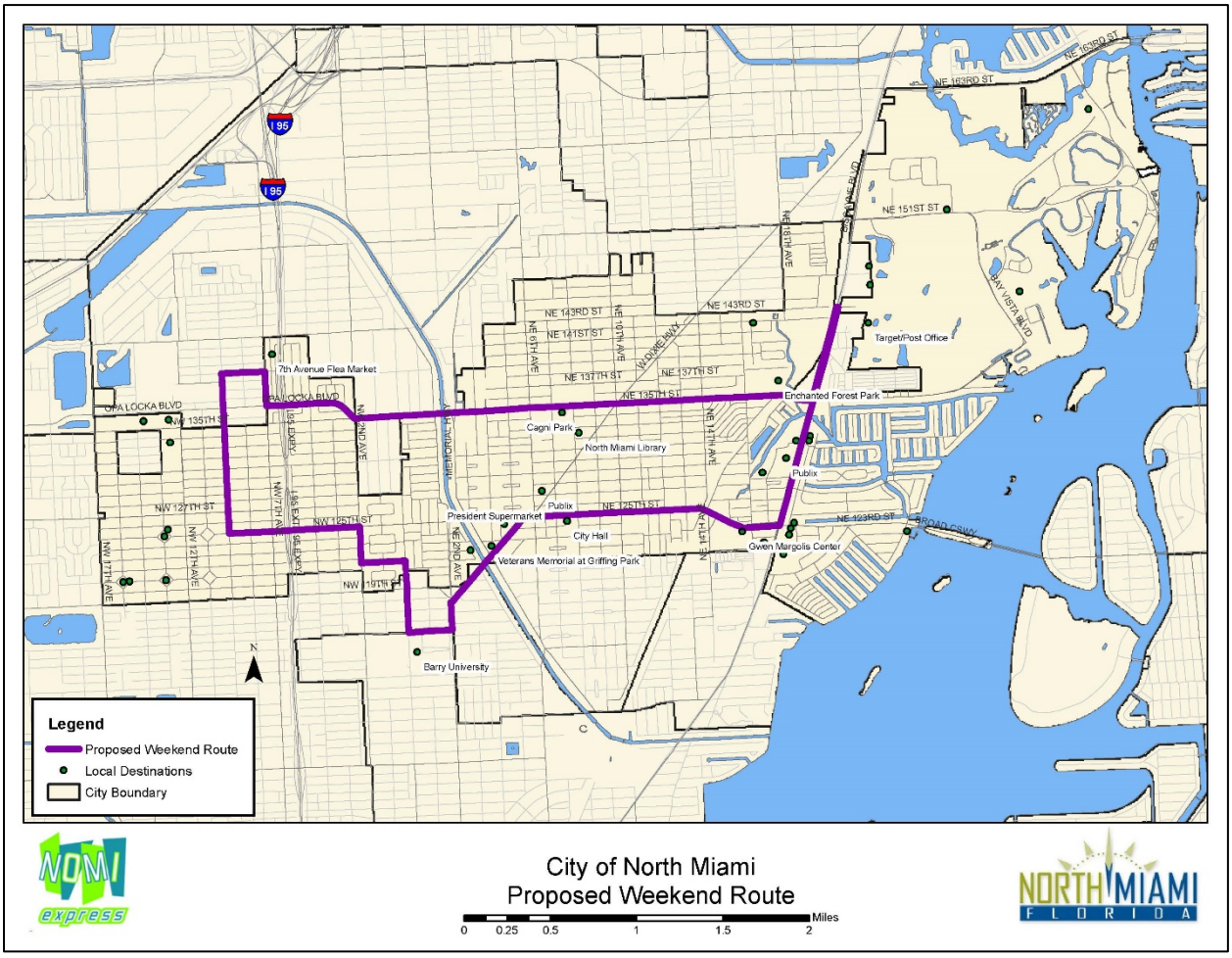
Weekend Routes:

Based on the passenger surveys and the high levels of boarding at stops located along commercial boulevards, it is evident that the purpose of a majority of non-school related trips are generally geared towards retail and other household errand based trips (i.e. medical, groceries, personal services, etc.). For those that prefer or need to make these types of trips on the weekends, an additional weekend service is an option which should be explored. A weekend service in North Miami benefit from linkages to existing weekend service in neighboring communities.

A weekend route in North Miami does not have to serve all the locations under the current weekday system. The most viable weekend route will connect the residential neighborhoods served by the Green Line with retail and the supermarket, local parks (such as Griffing Park), and transfer points. Because the weekend has less traffic, it is expected that using a modified, longer version of the green route's neighborhood component, along with travel in a loop consisting of direct travel on NE 125th Street to Biscayne Boulevard, and back to the western neighborhoods along NE 135th Street will result in the most successful pilot route for initial weekend service. Future consideration should be given for access to shopping on NE 125th Street with more stops than initially planned, and any future Tri-Rail development. Additional expansions of weekend service will be needed after the pilot phase.

A pilot testing of weekend route service may be a good candidate for grant funding opportunities. It is recommended that if the City elects to enact a weekend service, that it do so first as a one- to two-year pilot program. If the pilot program is less than one year, the test period should encompass March and May as part of the schedule, as these are the local peak service months for transit. Pilot testing should involve a schedule of 7:30 AM – 7:30 PM on a Saturday, with timing adjustments coming later. Utilizing this timeframe, and ensuring that the route reaches Barry University and Costco will allow for the opportunities to create new linkages to the existing Miami Shores and North Miami routes, providing residents with free transit service to Walmart, Oleta State Park, and Aventura Mall. The potential cost for creating and running an hourly system on Saturdays is estimated to cost approximately an additional $40,000 - 45,000/year, per bus, depending on the contractual service rate. Implementation will require additional study and timing revisions, which will require $15,000 - $20,000 in start-up and marketing costs.

The following map provides a proposed weekend 10.7 mile route, in purple. The green points note transit generators within the City, ranging from City Hall and the Museum of Contemporary Art, local grocery stores, local parks and community centers. These points of interest include transfer linkages for North Miami Beach's B Line (C Route) at Target and to Miami Shore's Weekend Shuttle to Aventura Mall at Barry University. In the future, should Bay Harbor Islands decide to implement a weekend service based on their existing route, a linkage point is already available at the intersection of NE 123rd Street and US-1. The route as currently envisioned will take approximately 1 hour to run, and is currently configured for clockwise movement through the City, starting with the residential neighborhoods in the west.



School Routes:

The NoMi Express system serves local schools by proximity of the routes and with designated stops. These stops are generally well utilized and account for a significant portion of the ridership. With younger students, parents have been observed “bus pooling,” with one parent being responsible for riding with the children of multiple families, which reduces cars on the road. However, there has also been discipline issues with older students. While not all students are rude, as observed during the field student, some were very respectful, there are local concerns that the misbehaving portion of this ridership has lowered the quality of transit for other riders. This report studied whether students should be disallowed from the bus or a separate service should be enacted, and the potential costs of such programs.

1. Status Quo

The first option is to maintain the status quo. However, this option is subject to periodic issues, as noted by the bus drivers during the focus group conducted as part of this study, and as evidenced by issues of student rowdiness on the buses. In addition, rowdy students may be lowering the

quality of transit for older riders and causing some of them to not ride the bus anymore, as implied by the bus driver focus group. The choice to remove any stop regarding service is a difficult one, and must be weighed carefully. Resumption of service to locations such as ATM with monitoring; but, because of potential liability purposes, it is unlikely that a school will provide this needed additional monitoring.

Unlike public schools, charter schools pose a different issue as they do not necessarily provide for busing under current Miami-Dade Public School District rules. Further, some parents may not necessarily be able to escort their children to school, and in some cases, do utilize the system because they have no other alternative. While inconvenient, the reality is that for some children, the ability to take the NoMi Express is safer than the alternative.

Therefore, there are policy and equitable treatment considerations involved that point to maintaining some of the current policies as a minimum basis moving forward. In addition, the only effective way to discourage student ridership is to eliminate stops. This works only for ATM because of the remoteness of that school; however, the other schools are in the City's urbanized area, and as demonstrated by their walking to other buses, removal of a school based stop will realistically only result in students having to walk further to reach transit. This is not necessarily the safest option for the City to pursue. Further, there are additional legal issues with denial of service based on age for a publicly funded transit system. At a minimum, a child with parent's policy may be maintained. However, it was noted during the focus group and survey that some parents' lack of discipline is part of the issue.

Barring any serious complications, maintaining the status quo as a minimum should be considered acceptable given the above considerations. Barring any minor changes, the additional cost of this option to the NoMi Express System is zero.

2. Registration System

A second option is to create and administer a registration system, utilized ridership cards, for students under 18 years old. Each should have a number assigned, so that privileges are revocable if the student misbehaves. Teachers and principals should be engaged to assist in education and outreach for such programs.

While this is not a cure-all, it introduces a measure of accountability within the system; over time, this may change student ridership behavior.

Certain precautions have to be undertaken with such a system. First, rules of ridership must be clear, and agreed to in writing by the student and parents – bus ridership is a privilege. Second, student data must be verified with the School, and in addition, be additionally safeguarded per existing laws.

Administration of this program would require a part-time staff member or a full-time staff member with this as part of their job portfolio as one of serval duties. Outreach and

administration, which should include printing and sending of bus passes and maintenance of this system, are also program costs. Driver education for the new system should also be arranged. Considering these needs, this option should cost the City approximately $30,000 - $35,000 to administer.

3. Specialized School Bus System

A third option is to emulate the Village of Pinecrest and options under consideration by the Village of Palmetto Bay in Miami-Dade County. Currently, Pinecrest only provides bus service to students under a specialized program, where parents register their children, are assigned pick-up points, and the school buses run for specific hours of the day, for registered students. For North Miami, since the rest of the system has a need based population, it is not recommended that service be cut to create such a system; rather, it would be an add on service.

It should be noted that in planning for such school routes, under a turnkey service, there is generally a need to schedule on a 4 hour block basis, unless the vendor agrees to something different. This means that for the morning route, the most likely time for the school bus, given a school start time of 7:20 AM, should arrive at the first boarding point for high school students by around 6:00 AM. In addition, it may require two different school buses to serve the entire City in the short timeframe, given distance and morning traffic between ATM and North Miami Senior High. If this is the case, then afterwards, one bus could be rededicated to Elementary School students, which have staggered arrivals ranging from 8:15 AM to 8:35 AM, and the other bus for middle school/junior high, which starts a little after 9 AM. However, these timetables are close together, with little leeway, and under this system, occasional tardiness may occur for Elementary School students. The afternoon would work similarly, and the 4 hour timeblock affords some students the ability to catch the bus after school activities. Alternatively, a 12 pm – 4 pm service time could allow for additional regular peak hour first before changing to a bus route, though afterschool activities will not be serviced under this timeframe. Based on current ridership, there is no need for this service, but, it is a potential future consideration and should be noted should this specialized route be implemented.

Requiring upwards of at least 16 service hours a day for the school year (appx. 2900 service hours), at the standard rate of approximately $47 per hour as currently established, the estimated base cost for hiring the vendor is approximately $135,000 per year. In addition, there should be additional costs for an annual review, outreach for surveying and for new information, dedicated staff monitoring of the school routes, and adjustment of routes given varying attendance from year to year. This should cost approximately $35,000 - $40,000 annually. Combined, the total estimated cost for this option is an additional $170,000 to $175,000 annually. This is reasonable compared to Pinecrest, which uses this system, where the annual cost as noted in Appendix E is $171,950.

Financial Review:

Operations

The City of North Miami currently uses a turnkey service to run its local trolley circulator services. These services are currently outsourced to Limousines of South Florida LSF, by contract to the City's Public Works Department. Costs to run the system are currently $47.20 per revenue hour, and was approximately $550,000 during FY 2015-2016.

The NoMi Express operations were reviewed from the standpoint of overall cost versus revenue hours and resulting ridership as a measure of efficiency. The time period for evaluation were FY 2011-2012 through FY 2015-2016. It should be noted that the NoMi Express underwent service changes in February of 2011 and September/October of 2014. Such changes may have a general boost or decline to a system, and in both cases, seems to have impacted ridership as they adjusted to the new schedules.

Year	**2011-2012**	**2012-2013**	**2013-2014**	**2014-2015**	**2015-2016**
Service Hours	14917	14754	15047	11198	11617
Service Costs	$655,092	$658,042	$671,103	$528,564	$548,367
Cost per Revenue hour	$44.59	$44.60	$44.60	$47.20	$47.20
Average Ridership per revenue hour	29.05	30.38	31.09	33.72	30.87
Average Cost per Rider per revenue hour	$1.53	$1.47	$1.43	$1.40	$1.53

Overall, the average cost per rider per revenue hour indicates a healthy system from a cost perspective. If we are to use Miami-Dade Transit's current $2.25 fare as a benchmark, at that fare level and under current ridership levels, there would be a budgetary surplus. Compared to other local circulators, the NoMi Express has one of the lowest cost per rider ratios in Miami-Dade County, and is an efficient system.

However, the average cost trends do indicate that changing the service hours did not have substantial impact on the efficiency of the system from a cost per rider standpoint. Rather, these numbers have low variability over the years, and have remained relatively stable despite the various service changes. This indicates that the cut in service due to costs likely contributed to a corresponding decrease in ridership over time. Since demographically the system has a need based ridership, the reduction of the transit budget resulted in cutting of hours for people who

would normally utilize the service; this conclusion aligns with survey feedback conducted during this study, which indicated that cuts to services such as the Red Line resulted in people not being able to ride due to the limitations based on service hours. While an increase in budget will affect the overall bottom line, it will likely still be efficient from a cost per rider standpoint, and is a necessary consideration for improving ridership for the NoMi Express system.

Alternatives for the future include soliciting for a different vendor or operating the shuttle internally. Each option varies in cost, ranging from $44 to $101.36 per service hour. It should be noted, however, that there are tradeoffs in the operations. Generally, outsourcing to firms for operations requires schedules to be placed on a 4 hour block basis; cities with self-operated systems have more time flexibility and for mid-sized to larger systems, will be able offset slightly higher hourly rates with more precise hours of operations. This should be considered if the City decides to add additional buses to service riders to and from the schools as those routes may not need to run for the full 4 hour block.

Miami-Dade Transit (MDT) is an option utilized by some communities, such as Cutler Bay. This is an option for North Miami, and by County statute MDT is allowed to bid to be the service provider, though there is no right of first refusal. Generally, this service is the most expensive option, but also the most integrated in terms of trip planning and information distribution.

Full details of comparative costs and system operations with other peer systems in Miami-Dade County can be found as Appendix E.

Change of Buses:

Larger buses will require changes to the contract with LSF, which provides the buses to the City. Depending on the bus type, the additional cost will be approximately $10,000 to $20,000 per bus. However, not all buses within the system will need to be changed given existing ridership and transit capacity.

Ownership of Buses:

All vehicles are lift equipped, and owned and maintained by the LSF. Changing of vendors therefore would either require the new vendor to provide the same service or will result in an additional capital cost by the City to procure new vehicles.

A fundamental question for any analysis is whether the City should own its vehicles, as it does today, or meet its vehicle needs as part of a lease or turnkey vendor. In most business situations, owning is considered marginally cheaper than leasing when equipment has a long service life. Operating costs may be marginally lower, if there is less downtime positioning buses to and from the beginning and ends of routes.

Another advantage of the City purchasing its own buses is it can get the vehicles it wants, rather than what is provided by a vendor. However, in buying so few vehicles, there is no economy of scale discount, therefore, the City would likely pay a premium. In addition, advanced budget planning is required to address the capital cost needed. Based on existing operational needs, the City in this case should expect to procure 5-6 vehicles. Based on existing routing, each bus should be up for replacement in approximately 5 years, which should be budgeted for accordingly, with a 1/5 of cost set aside each year for future replacement.

Operationally, there have been issues with the turnkey service during field observation conducted as part of this study. Multiple service interruptions have resulted from breakdown of buses. While spare buses have been dispatched, the original buses which were to return to service, were at times, delayed. Spare buses are not always configured to the same specifications, nor necessarily painted in the City's identifiable design. Moving forward, since North Miami should be instituting differences on the bus's configurations to account for the higher levels of shoppers, accommodations for more riders, etc., timeliness in returning vehicles to service is important and should be carefully monitored, with clawback provisions in any new contract for poor performance by a vendor.

In addition, as the closest service facility is in Fort Lauderdale, and this is where the back-up vehicles are stored. Therefore, replacement buses will take over an hour to arrive. This service disruption is severe, and has occurred several times during the course of this study. It is recommended that a spare bus be made regularly available no more than 15 minutes from the City.

Table 1: Minimum Service-life categories for Buses and Vans

Category	Typical Characteristics			Minimum Life (Whichever comes first)	
	Length	Approx. GVW	Seats	Years	Miles
Heavy-Duty Large Bus	35 to 48 ft /60 ft artic.	33,000 to 40,000	27 to 40	12	500,000
Heavy-Duty Small Bus	30 ft	26,000 to 33,000	26 to 35	10	350,000
Medium-Duty and Purpose-Built Bus	30 ft	16,000 to 26,000	22 to 30	7	200,000
Light-Duty Mid-Sized Bus	25 to 35 ft	10,000 to 16,000	16 to 25	5	150,000
Light-Duty Small Bus, Cutaways, and Modified Van	16 to 28 ft	6,000 to 14,000	10 to 22	4	100,000

Source: Useful Life of Transit Buses and Vans, http://www.fta.dot.gov/documents/Useful_Life_of_Buses_Final_Report_4-26-07_rv1.pdf

Table 2: Bus Ownership Pros and Cons

Owner	Advantage	Disadvantage
North Miami	Full control of bus features. Use of existing maintenance workers, if there are such City staff. Tax advantages through depreciation.	No economy of scale on purchases. Requires dedicated maintenance staff and facilities for bus storage and maintenance, or a reliable vendor. Full capital cost is paid up front. Money must be budgeted in advance to allow for improvements and future vehicle purchases.
Vendor	City responsibilities reduce to managing the vendor contract.	Little control over vehicle selection (if not stipulated in contract, old equipment could be provided) Operating costs could be marginally higher, if buses are housed and maintained at a distance.

Source: The Corradino Group

Table 3: Operations Pros and Cons

Operator	Advantage	Disadvantage
North Miami	Full control of routes and flexibility to change. Full control of drivers and courtesy expectations.	Requires dedicated transit staff, including backups. Requires adequate driver and maintenance staff training, and facilities. For future school and demand-response options, someone must take calls and schedule rides.
Vendor	Hands off operations. Reliable spare vehicles and drivers Control of routes and flexibility to change, through contract provisions. Control of drivers through contract language.	Requires understanding of service negotiations and contracting. Need to manage non-municipal staff. Need to establish performance criteria and monitor same.
MDT	Full integration with MDT system, like with Cutler Bay and other MDT contracted services. Elimination of redundancy with MDT routes. Reliable spare vehicles and drivers. User friendly for riders making transfers and using the MDT system easier.	Potentially higher cost of service. Different system objectives. Lack of control.

Source: The Corradino Group

Advertisement on buses:

The current NoMi Express shuttles do not have paid advertisements on board. Revenue generation via advertisements on the transit system is allowed and currently utilized by peer cities in Miami-Dade County. Ads can be partially screened and selected within the confines of the law, and is so regulated in peer cities to avoid issues of profanity and obscenity. Ad revenue generated on local shuttles, because the buses are currently funded via CITT monies, must be reinvested into the local circulator system. Ad revenue potential will vary, with the City's share dependent on how it negotiates its contracts.

While generally this does not generate enough to run the entire system, the monies received can go into operations for extra buses, as well as transit stop improvements. In the case of the latter, this allows for annual improvements to the bus system while maintaining the same service hours. This is important as current funding may not necessarily allow for these needed improvements while maintaining existing levels of transit service. Therefore, it is recommended that the City institute an advertisement program on its circulators. This, like with the case of Doral, can be outsourced to a private firm. Various means of addressing this contract exists, include a flat service fee or profit sharing. Expected advertisement areas include inside and outsider of buses, as well as any bus stop that is not co-located with Miami-Dade Transit stops.

Cost of new recommended new technology and bus stop improvements:

1. Application technology

   Two options exist with varying costs to provide an web-based application for local riders. The first option is to connect to the MDT app, which is done as part of an interlocal agreement. The cost to the City should be approximately $500 per route update, in order to provide MDT with new GIS files and timetables.

   A second option, an independent app system will have varying development costs, ranging between $5,000 and $50,000 depending on complexity. A system like North Miami's, which with multiple routes is complex, and with the need to develop input data such as GTFS data, could feasibly cost $25,000 to $50,000. Further additional marketing costs may be incurred.

2. On-Board Wi-Fi

   Installation of new Wi-Fi systems will require an approximate $10,000 to cover existing buses and the back-up vehicle. However, annual costs will vary and subject to negotiations by the city with vendors.

3. Bus Stop Information Kiosks

One option for tech improvement exists based on current proposals at Miami-Dade Bus stops with co-location for North Miami's system, with the installation of touch screen kiosks being rolled out over the next several years. Each kiosk may cost upwards of $60,000, based on local estimates for the Civiq program currently proposed for Miami-Dade Transit, but is currently being installed for free by the company, which expects their capture of the ad revenue to cover costs. Coordination with Miami-Dade; with integration of North Miami shuttle schedules as previously discussed, is an option to expand technology in the City with little to no financial impact. Some incidental costs related to right-of-way procurement may occur, but can only be estimated on a case-by-case basis with regards to financial impact. Additionally, the City may consider electing to provide match funding in order to fully secure their stops; however, in these cases, costs will still be highly subsidized, and would have low fiscal impact on the NoMi Express operations.

4. Enhanced Bus Stops

Various options exist systemwide. Bus shelters average $15,000 per shelter for the narrow version, or $25,000 for the larger, standard MDT stop. Benches cost $5,000. An air-conditioned stop will cost $60,000. Next bus digital displays would require an additional $4000 per stop, and should be placed at stops with a shelter. In addition, the installation of new stops or amenities at old stops will require that full ADA compliance be met at these stops. Not all stops will require additions. However, the City should have benches and signs at each stop and consider shelters. Potential costs for improvements range, and will be dependent on the final policy decisions by the City. This should be implemented over time, allowing for alternative funding sources to be applied towards improvement costs.

5. Bus signage

Bus signs should be installed at each stop, including signage for schedules and route maps. At $300 per stop, this is approximately $25,000 for the entire existing system.

General Recommendations:

The following summarizes previously noted general findings and resulting from the comprehensive system analysis and on-board ridership survey:

1. Routing Needs:
    a. Green Line – This route requires additional capacity, and higher frequency of service is desired by ridership.
    b. Red Route – Future usage of this low-performing route must correct Origin to Destination Ratio, as well as service times, in order to be viable.
    c. There is a large overlap with the Orange Line, Blue Line, and portions of the Green Line, allowing for service revisions.
    d. Increased frequency of service as well as weekend service is desired by the ridership, and should be implemented.
2. Linkage Needs:
    a. Link up to Miami Shores Shuttle – A new linkage can be created at Barry University, and is needed to help provide better service for the existing 10%-15% of the ridership who already utilize this system via 2 transfers, and to provide new options for other transit riders.
    b. Link up to new North Miami "B" Line C Route- New linkages should be created to the newly implemented routes (April 2017), allowing for more destinations and alternatives to adjust the Red Line service.
3. Service and Operational Needs:
    a. Additional driver training is necessary to maintain the routes, reduce transit rider confusion, and better the on-board riding experience.
    b. Closer facilities for backup vehicles are needed to allow for better response rates when the bus breaks down.
4. Safety and Technology Improvements Needs:
    Should be implemented as needed, particularly to provide:
    a. Real-time information for transit riders
    b. Enhanced Trip-planning capabilities
    c. Better management tools for staff

Through review of the various technology and system needs as noted in the general recommendations, we have found some issues to require more immediate action to remedy safety or service issues. These are noted in the following chart:

#	Name	Description	Estimated Cost
1	Adjust Green Line by Flea Market for safety	Adjust Green Line to utilize NW 10th Avenue and NW 140th Street instead of a less safe U-turn on NW 7th Avenue.	$500
2	Adjust Green Line for access to Barry University	Adjust Green Line to route the bus south on North Miami Avenue at NW 119th Avenue to NE 115th Street, to create a connection to Barry University and Miami Lakes Circulator service.	$800
3	Driver Training	Additional training needed regarding policies, specific stop locations, routes, etc. that affect consistency of service.	$ 0
4	Dedicated Staff member in Public Works/Dedicated Transit Staff	Hire trolley manager to run system.	$55,000/yr.
5	Larger Capacity Green Line Bus	Increase the capacity of the Green Line Bus to meet ridership demand.	$40,000
6	Implement Weekend Service	Implement specialized weekend route on Saturdays from 7 am - 7 pm.	$20,000 administrative cost, $40,000/yr.
7	Enact Bag Limit Policy	Baggage currently are placed on seats or on the floor, with the latter creating a safety hazard, necessitating bag/luggage limit policies.	$0
8	Improved Reporting Procedure	Improved incidence reporting should be required of vendor.	$0

Additional, recommended courses of action require future decision-making and additional funding. These are listed in order of recommended priority as below, though the City should re-prioritize as monies become available or as local needs evolve over time:

#	Name	Description	Estimated Cost
1	Technology – GIS and Apps	Develop GIS App for real-time and trip planning applications. Incorporate into trolley system management.	$50,000
2	Increase Red Line Service	Realign Red Line service and increase hours of operations. *Note: If realigning service to 3 lines, this project no longer applies.	$150,000/yr.
3	Realign Service to 3 Lines	Multiple options exist, either through elimination and redistribution of Orange Line, Red Line buses. Additional hours are needed as Red Line bus hours are shorter than other routes.	$25,000 for route change administration, $50,000/yr.
4	Signage and Facilities Improvements	Improve facilities at existing bus stops through the addition of signage and shelters. Shelter cost will vary based on decisions, ranging from $15,000 for a small shelter to $60,000 for an air-conditioned shelter.	$25,000 for signage for system. Other cost components varies and dependent on City's design and choice decisions.
5	Double Service on the Green Line	Increase capacity and headways on the Green Line by adding an additional route to the route from 7 am – 7 pm.	$172,000/yr.
6	Closer Backup Facilities	Currently, backup buses are located in Fort Lauderdale, and require an hour or more to replace out of service vehicles. Closer backup facilities at 15-30 minutes travel from the City are needed. The City may purchase a bus as a reserve option and house in city facilities.	Reserve Bus Option: $193,000 Vendor Contract Requirement: Varies
7	On-Board WiFi	Install and offer On-board WiFi	TBD
8	30 Minute Headways – All Routes	Ensure all routes are operating at 30 minute headways.	$550,000/yr. (Appx. 378,000/yr. if Green Line Service has been implemented)

Project List – Immediate Action Items

The following provides more in-depth details for the recommendations noted for immediate implementation:

1. Adjust Green Line by Flea Market

Synopsis: Currently, the green route makes a U-turn maneuver by the Flea Market to backtrack. Based on feedback from the drivers and a review of the current location, this is potentially dangerous, and the practice should be stopped via a route adjustment. This adjustment results in no net change in the route mileage. Service time change is expected to be minimal in impact.

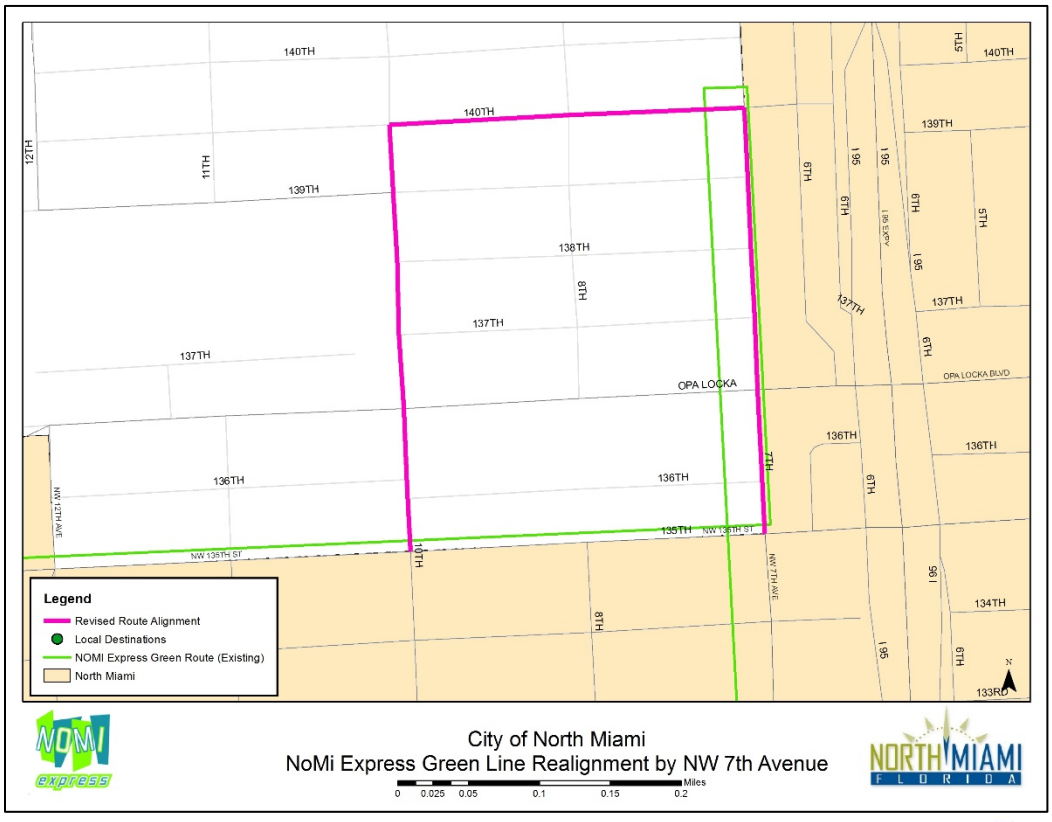
Crossings are currently a concern, and will continue to be even with this route revision. However, the moving of the route should also discourage current behavior where people run across the street to wave down the bus, which does not stop on the southbound side of the roadway.

The entirety of the NoMi Express system is within the City; while this deviation will cause it to go slightly outside the City, this is acceptable since overall, the route is at least 80% within North Miami.

Implementation: Adjust Green Line to utilize NW 10th Avenue and NW 140th Street instead of a less safe U-turn on NW 7th Avenue.

Route Mapping: In the enclosed map, the solid green line represents the existing route, and the magenta line indicates the proposal route adjustment.

Budget Implications: Minor revisions to mapping and update of information will require $500 for administrative costs,



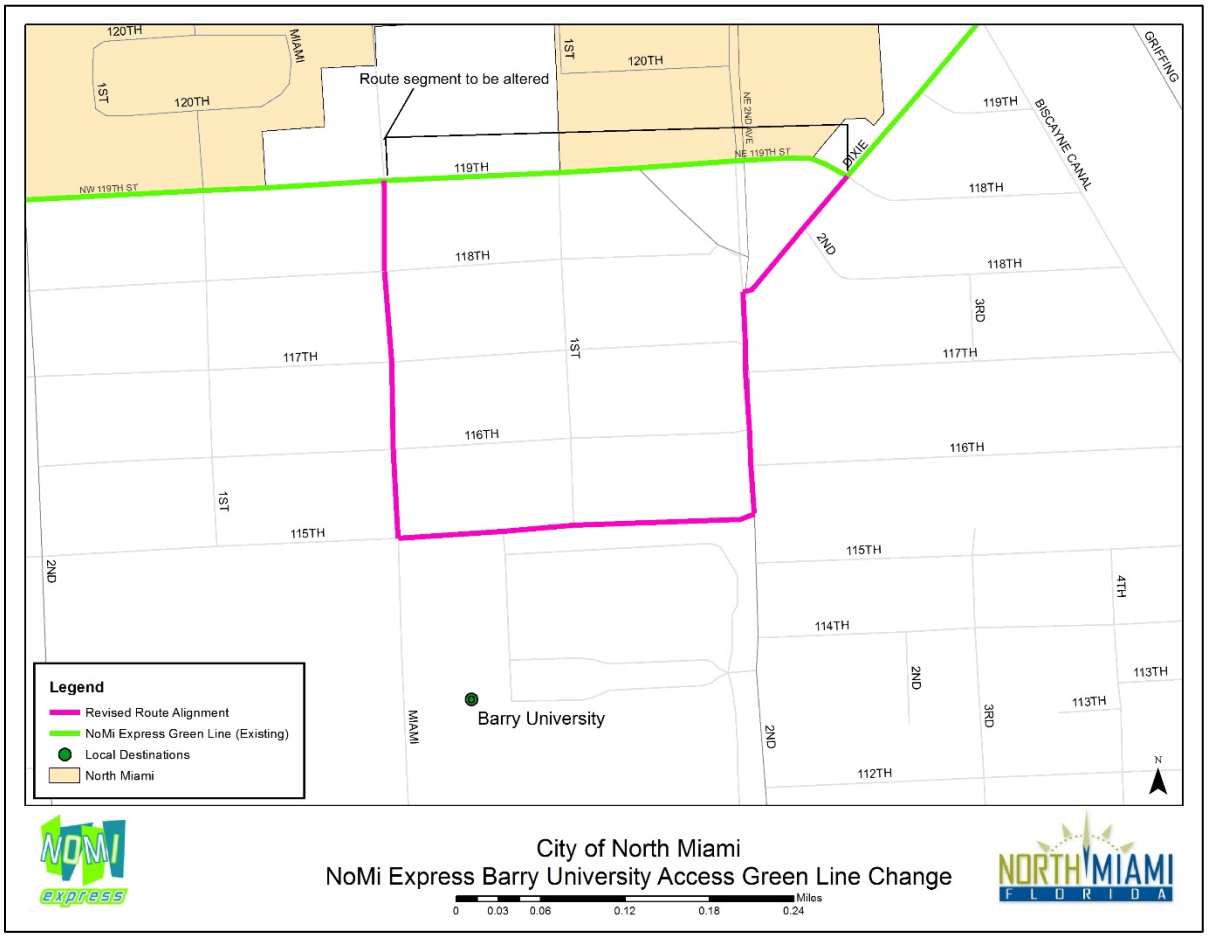
with additional costs dependent on how new information on service changes is displayed and distributed.

2. Adjust Green Line for access to Barry University

Synopsis: Barry University is south of North Miami, in Miami Shores, but within range of the Green Line. Survey data indicates the this should be considered as a service expansion, both to access Barry University, and also to provide a direct connection to Miami Shores' shuttle system. Currently, North Miami riders do transfer to the Miami Shores system, but this requires riders to transfer to two different systems.

Implementation: An interlocal agreement with Miami Shores is needed. A slight route deviation will result in an additional 0.5 miles to the route, and up to 5 minute route time to accommodate, which could be absorbed with ease in the schedule if an additional bus is added to the Green Line.

Route Mapping: In the following map, the solid green line represents the existing route, and the magenta line indicates the route change.



Budget Implications: Minor revisions to mapping and update of information will require $500 for administrative costs, with additional costs dependent on how new information on service changes is displayed and distributed. Since the stop should be collocated with the Miami Shores village circulator, the fiscal impact of the new stop should be for the installation of a new sign, approximately $300.

3. Driver Training

Synopsis: Through the course of this study, it was clear that additional driver training is needed. In addition to customer service, where the ridership clearly liked or disliked the staff in a highly-polarized response, it was found that stopping at specific stops was inconsistent – in the case of some Publix stops, the drivers would either stop at the bus sign on the street or at the door. This inconsistency confused the ridership. In addition, there was noted confusion during the bus driver focus group as to where the bus route actually was supposed to go with certain intersections. While the general route remains the same, this results in timing and safety implications in those instances, as the route had been specifically adjusted to account for congestion and cross traffic considerations. Drivers were also observed to make stops when they saw riders or when a request was made, even when it was not at a designated bus stop. Additionally, with any new implementation of technology, additional driver training should be included as part of the process.

Implementation: Work with vendor to set specific guidelines and enforceable rules in future contracts, including clawback and penalty provisions.

Budget: $0. Should be incorporated into vendor's training.

4. Additional Staff member in Public Works/Dedicated Transit Staff

Synopsis: In other peer cities with operations of a similar size, a dedicated staff member has been hired to manage the local circulator system. This has also been done with cities with smaller systems. Administratively, improving the system and keeping it running is a full time position which requires oversight of the vendor, field visits to troubleshoot and document issues as they arise, and regular evaluations for service adjustments.

Implementation: It is ***strongly recommended*** the City include a full-time transit manager position in its general operating budget.

Budget: Approximately $55,000/yr.

5. Larger Capacity Green Line Bus

Synopsis: Analysis of the existing Green Line indicates that at various points of the day, particularly after school, there is a temporary lack of capacity which results in overflow to other buses, constraining the Orange and Blue Lines' capacity as well. This has resulted in transit riders being left behind at stops, which while generally acceptable with systems that have frequent headways, should be avoided with systems with half-hour headways and above, as is the case with the NoMi Express.

Implementation: Negotiate with vendor for larger capacity bus.

Route Mapping: Current route mapping for the green line will remain the same (except where changed by other actions).

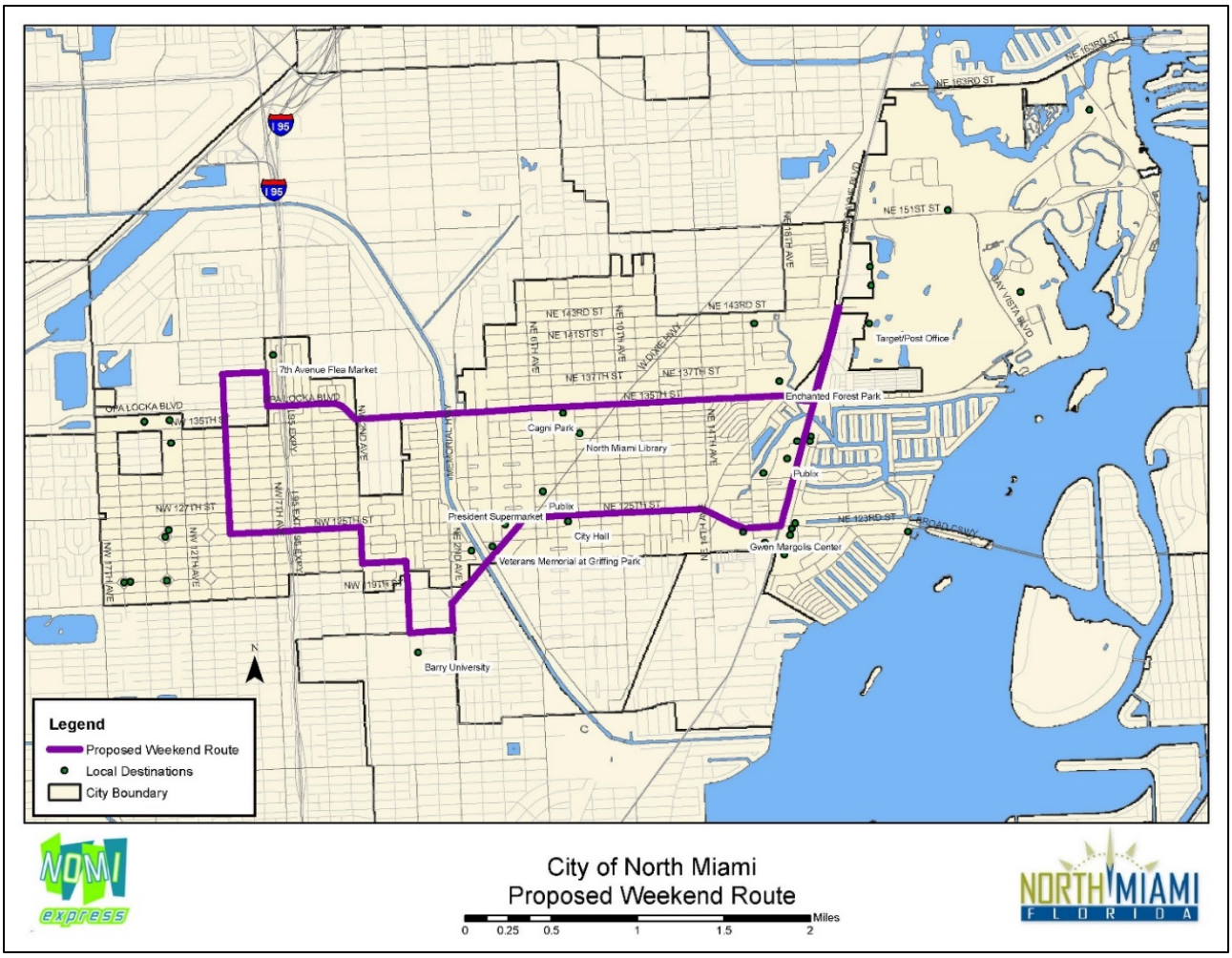
Budget Implications: $40,000

6. Weekend Service

Synopsis: Based on the passenger surveys and the high levels of boarding at stops located along commercial boulevards, it is evident that the purpose of a majority of non-school related trips are generally geared towards retail and other household errand based trips (i.e. medical, groceries, personal services, etc.) and that weekend service is desired by the ridership. For those that prefer or need to make these types of trips on the weekends, an additional weekend service is an option which should be explored. A weekend service in North Miami benefit from linkages to existing weekend service in neighboring communities.

Implementation: Implementation of a new route will require administrative work in creating the route, determination of stop locations, timetable creation (runcut), contract negotiations with a vendor, and advertising to the public. A pilot test program should be utilized.

Route Mapping: The following map provides a proposed weekend 10.7 mile route, in purple. The green points note transit generators within the City, ranging from City Hall and the Museum of Contemporary Art, local grocery stores, local parks and community centers. These points of interest include transfer linkages for North Miami Beach's B Line (C Route) at Target and to Miami Shore's Weekend Shuttle to Aventura Mall at Barry University. In the future, should Bay Harbor Islands decide to implement a weekend service based on their existing route, a linkage point is already available at the intersection of NE 123rd Street and US-1. The route as currently envisioned will take approximately 1 hour to run, and is currently configured for clockwise movement through the City, starting with the residential neighborhoods in the west.



Budget Implications: $40,000 - 45,000/year, per bus, depending on the contractual service rate. Implementation will require additional study and timing revisions, which will require $15,000 - $20,000 in start-up and marketing costs.

7. Enact Bag Limit Policy

Synopsis: Based on rider surveys, unlike with neighboring circulators, North Miami's ridership population are making frequent trips to the market or other retail. Therefore, shopping bags considerations are needed for the NoMi Express shuttles in how the buses are designed. Currently, the buses are designed without this need in mind. Small amenities like extendable hooks that fold in and out of the back of the seats can be explored, and allows folks to hold onto their bags without placing them on the seat or on the floor, which can be a safety hazard. Alternatively, overhead storage or a dedicated space by the entrance/exit may be designed for these bags. However, there are tradeoffs in space on the buses, especially if the buses are

normally near capacity. To provide for additional space for bags, a larger bus will be needed for the Green Route, and is also likely for the Blue and Orange Routes.

It is also recommended that the City implement bag limits on boarding the bus. Neighboring cities have similar policies. With current bus sizes, the limit should be no more than 2 paper bags or 4 plastic bags per rider. In addition, riders should not be allowed to place bags on seats. However, the latter problem should decrease if the interior of the bus is redesigned.

Implementation: Policy once adopted should be promulgated via on bus notices and Driver training. To better prepare ridership, notice should be posted 30 days before it takes effect.

Budget Implications: $0.

8. Improved Reporting Procedure

Synopsis: Improved reporting procedure should be developed by the existing vendor, and videos of incidents should be archived and delivered the City. Further, direct connections between the departments of North Miami, North Miami Beach, and North Miami Public Works should be developed in order to address issues during operations.

Implementation: Coordination between vendor, police services, and City of North Miami Public Works will be needed to revise standard operating procedures. A file share system should be developed to provide the City with records of incidents on buses for tracking and monitoring purposes.

Budget Implications: $0

Project Sheets – Future Action Items

The following provides more in-depth details for the recommendations noted for future implementation as monies become available:

1. Technology – GIS App Enhancements

Synopsis: Real-time passenger information systems can inform riders of the expected time of arrival. Improvement of this service allows passengers to plan their trip and note their potential transfer times, important especially during instances of inclement weather.

Any real-time information system should take into account the developments of neighboring systems which connect to North Miami. For example, Miami-Dade Transit already has an existing app. By working with these communities and encouraging intergovernmental cooperation in providing route information, both systems benefit in providing a more cohesive information system for riders to plan their trips and arrange for appropriate transfers to different lines.

Implementation: Evaluate the current GPS system on the NoMi Express Buses and their ability to interface with other systems; replace hardware as necessary. Develop app or enter into interlocal agreement with Miami-Dade County Transit to piggyback onto their app, and publicize to the general ridership and population.

Budget Implications: $50,000. Cost may be lowered through coordination with Miami-Dade County Transit (MDT).

2. Adjust Red Line hours, adjust Red Line service route

Synopsis: Adjust the Red Line's hours to match the rest of the City, and expand service to more local residential areas. The Red Line, based on field review of on-time arrivals, needs timing adjustments in the schedule to account for frequent tardiness to FIU. This is not good for the Line's image for the riding public, which may see it as needing to be more reliable.

Implementation: Route service can be extended into the residential neighborhoods in the south, where there are service gaps due to distance, or in the north, providing additional direct connections between commercial and residential neighborhoods. However, because the route is already extended, an additional bus is needed to maintain acceptable headways.

Budget Implications: Additional service hours are needed, but are dependent on how much time the City is willing to add to the schedule. Further, this is also dependent on actual route adjustments, for which there are many potential options for the Red Line, in serving system gaps in the City. It is expected that at a minimum, this change will cost approximately $150,000 annually.

3. Realign service to three (3) Routes

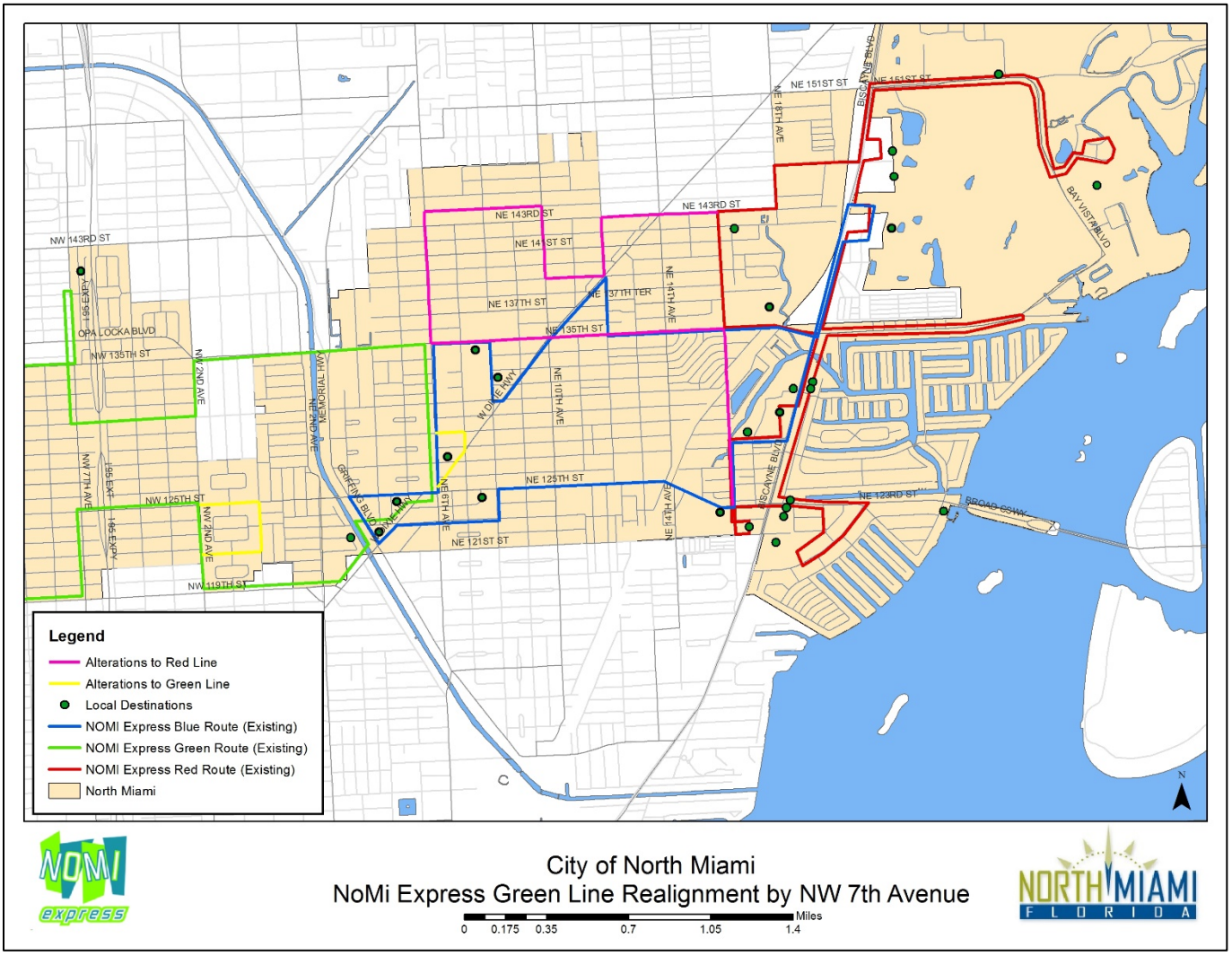
Multiple options exist to realign the routes to 3 Lines. For systems with one-hour headways, more direct routes better serve the ridership. This is a recommended project as the City is of a size which can be covered by these three lines, and increased direct access will reduce the need for transfers.

The two primary options as follows involve either eliminating the Orange Line or the Red Line, with adjustment to the other routes to maintain coverage areas.

Option A: Eliminate Orange Line, shift Green Line east, Realign Red and Blue Lines

Synopsis: Under this scenario, the Orange Line, which does contain some stops with low viability, would be replaced via an extension of the Red Line in the north of the City. The Orange Line experienced the highest level of dwell time, during the mid-day due to low ridership. This would balance the residential to commercial destinations ratio of that line, which is currently skewed and contributing to poor route performance.

Route Mapping: The following map details the potential route configuration. The Red Line's adjustment is noted by Magenta, and also requires movement down NE 16th Avenue to balance the runtime. The adjustment to the Green Line is noted by Yellow, and adjustment to the Blue Line is by Light/Bright Blue. The Blue Line will remain almost the same, except for a small segment in the west, where the bus will continue on Griffing Boulevard for 2 blocks more, turning onto NE 129th Street and connecting to the rest of the existing route, which remains unchanged, at NE 6th Avenue. The Green Route will shift slightly in the eastern portion to cover one additional block in two areas, and not only is the time impact minimal, but this is highly viable if an additional Green Line bus is added in the future. Under this system, similar coverage as with the Orange Line can be achieved.



Implementation: The Orange Line's bus would be reallocated to either the Red or Blue Line, depending on which route is longer after both routes are restructured. Part of the need to reallocate the bus from the Orange Line to either line is from the need to service FIU, which adds a long segment to the existing routes. Because this segment primarily services the FIU stop, it is inefficient. Elimination of this segment also potentially allows the City to reallocate the Orange Line bus to the Green Line route. This is also feasible since the newly implemented C Route on North Miami Beach "B" Line system services FIU, and aligning the shuttle schedule to allow for minimal transfer time will allow for this to be a viable option for riders.

Budget Implications: It is expected that the area covered under the longer route can be covered by the shifting of buses; however, as the Red Line is on a shorter schedule, there is a need to account for additional service hours in the change. Additional budget considerations involving administrative items (GIS, marketing, new interlocal agreements) are expected. However, route timing and retiming are necessary. These administrative items are estimated at $15,000 - $20,000 of staff effort.

Option B: Eliminate Red Line, Adjust Blue and Orange Lines

Synopsis: The Red Line currently has the lowest "fit" in regard to direct service between origins and destinations. In addition, it is the least reliable route time-wise, and distributing the Red Line's destination to the other two routes is a viable option to increase direct accessibility via transit.

Implementation: Under this alternative, the Red Line, which currently is underperforming, would be eliminated. Instead, the same route coverage would be assumed by realigning the Orange and Blue Lines. No service coverage will be reduced. It will likely be needed to make both routes have 2 buses running simultaneously, given the new route lengths. The new headways should approximate 35 to 40 minutes, which may increase ridership over time due to more convenient service.

Route Mapping: The Blue Line as realigned will take all the Red Line service areas south of NE 135th Street, and the Orange Line as realigned will take all of the Red Line service areas north of NE 135th Street. Other route adjustments may be necessary to account for route timing and headways.

Budget Implications: The fiscal impact of this decision is limited to the retiming of the routes, GIS work, and marketing of the new routes. New route timing will need to be developed and adjusted after monitoring. This is expected to be a one-time cost of approximately $25,000. Additionally, adding buses and timeslots will require approximately $222,000/yr.

4. Signage and Facilities Improvements

Synopsis: One issue noted during field observations was the lack of schedules or route maps at bus stops. This can be remedied through the installation of new signage which will aid riders and future potential riders.

Further, field study observations showed that it was difficult to distinguish the buses between the different routes. For regular riders, the process was easier due to established routine, but non-regular ridership may have trouble distinguishing the actual bus they are boarding due to how route signage on the bus is handled. One way to resolve this is to redesign the buses so that while they retain the same overall features, the colors are slightly altered to reflect their route, as is the case in Sunny Isles Beach. However, as a short term fix, larger prominent identification signage at stops and the buses will be an improvement.

Implementation: Emplace new signage and determine type of facilities desired (i.e. regular versus air conditioned shelters, electronic display kiosks, etc.)

Budget Implications: $25,000 for signage systemwide; however, other cost components varies and dependent on City's design and choice decisions.

5. Double the Service on the Green Line, same service all other routes

Synopsis: Analysis of the existing Green Line indicates that at various points of the day, particularly after school, there is a temporary lack of capacity which results in overflow to other buses, constraining the Orange and Blue Lines' capacity as well. This has resulted in transit riders being left behind at stops, which while generally acceptable with systems that have frequent headways, should be avoided with systems with half-hour headways and above, as is the case with the NoMi Express.

Route Mapping: Current route mapping for the green line will remain the same (except where changed by other actions); however, the timetable will be realigned to meet the new 30 minute headway. Alternatively, the add on service can be for peak hour only.

Budget Implications: The budget would be equivalent to adding one additional route. At current rates of approximately $47.20/hour, with an expected service need of about 3,600 hours, this will require an additional $172,000/year to run.

For peak hour additions only, one 4-hour block may be needed, in the afternoon. In this case, the cost to add additional peak service will be approximately $50,000 under existing vendor contracts.

6. Closer service and backup vehicle facilities

Synopsis: During the course of this study, several vehicles broke down and had to be replaced. Unfortunately, the vendor currently services the vehicles from Fort Lauderdale, and in heavy traffic, route replacements can be projected to take more than an hour. North Miami currently

does not have the storage facilities on site within the City which can accommodate the buses. However, with new development or parking, this should be a priority consideration as it will allow for better servicing and back-up of the route. Bus breakdowns and accidents do occur; quick restoration of service is essential to preserving the quality of transit and reinforcing the notion of reliability for existing and would-be transit riders within the City.

Implementation: If needed, the City could require as a contract requirement the need to have a replacement bus located with a specific travel time of the City. Alternatively, the City could also budget to purchase a bus and utilize their own CDL licensed drivers as the backup until a vendor can arrive.

Budget Implications: $193,000 for the purchase of a 17/2 Type Passenger Bus

7. On-board WiFi

Synopsis: Internet access during bus rides has been an increasingly common technology found on buses, and over time, transit riders have increasingly expect that their buses have internet. This had led to recent applications adding WiFi to Miami-Dade Transit's Metrorail and some Express buses, Doral's Trolley system, and North Miami Beach's B-Line Shuttle systems, among others. In addition to providing entertainment options for people with hand held/mobile devices, Wi-Fi on buses also allow people to monitor their travel and plan out or remember their next steps.

Implementation: Install WiFi devices on buses, and contract with vendor for airtime.

Budget Implications: Varies and TBD. Different vendors will provide variable costs for servicing of airtime, and for installation costs, vendors may opt to provide some services for free. Hardware installation otherwise will range between $300 and $2,000 per bus.

8. 30 Minute Headways - All routes

Synopsis: Results from the rider surveys and best practices show that with the amount of transfers needed, the City should consider 30 minute headways for the buses. One hour headways and multiple transfers discourages usage of the bus system.

Implementation: 30 minute headways can be achieved through the addition of a bus to each route. New route timetables will have to be developed and advertised.

Budget Implications: $550,000/yr. (Appx. 378,000/yr. if Green Line Service improvements noted in Project #5 has been implemented)

Appendices:

A. **Survey**
B. **Survey Results**
C. **Bus Driver Interviews**
D. **Additional Field Notes**
E. **Comparative Costs and Services, Miami-Dade Local Circulators**

Appendix A: Survey

City of North Miami
NOMI Express User Survey – English

The City of North Miami is planning for possible improvements to the NOMI Express which connects residents to places they need to go. Your input is very important. Please take a few minutes to complete this survey.

1. Near which intersection do you live? _____

2. Are you?: (Check all boxes that apply)
☐ Employed ☐ Unemployed ☐ Student ☐ Retired ☐ Stay-at-home parent

3. What is your age? (Check box that applies)
☐ Under 18 ☐ 19-29 ☐ 30-59 ☐ 60 or more

4. How do you use the NOMI Express in your travel? (Check boxes that apply)
I use NOMI Express to travel between:
☐ Home and my job
☐ Home and places with shopping or services (doctor, beauty shop, city hall, etc.)
☐ Home and school
☐ Home and Miami-Dade Transit bus stop
☐ Other reason (please explain):
_____
_____

5. How often do you use NOMI Express? (Check box that applies)
☐ Once in a while ☐ 1 to 3 times a week ☐ 4 or more times a week

6. Why do you use NOMI Express? (Check boxes that apply)
☐ I can't drive ☐ No car available ☐ I like the NOMI Express ☐ Less expensive than driving

7. Which NOMI Express route do you use? (Check boxes that apply)
☐ Green #1 (west part of City)
☐ Blue #2 (East part of City)
☐ Orange #3 (north-central part of City)
☐ Red #4 (far east side of City along Biscayne Blvd)

8. Do you transfer between NOMI Express Routes to complete your trips? (Check boxes that apply)
☐ Never transfer ☐ Sometimes ☐ Usually

9. Do you use any of the following local buses? (Check boxes that apply):
☐ Miami Shores ☐ North Miami Beach "B" Line ☐ Bal Harbor Islands ☐ Aventura ☐ Miami-Dade Transit

10. What improvements to NOMI Express would be useful for you? (Check boxes that apply)
☐ More frequent service ☐ Bus shelters ☐ Closer to my house ☐ Weekend Service
☐ Other places I would like to go (state where): _____
☐ Other improvements: _____

11. How does NOMI Express help you in your local travels? (Check boxes that apply)
☐ I could not travel locally without it
☐ Free service is attractive
☐ Service is friendly and helpful
☐ Nice to have when I need it
☐ Gets me to where I need to go

12. Please rate the present NOMI Express service (On a scale of 1 to 5, 5=good, 3=neutral, 1=poor)

_____ Bus cleanliness	_____ Driver appearance	_____ Hours of operation
_____ Bus air conditioning	_____ Buses on time	_____ Frequency of service
_____ Driver friendliness	_____ Bus stop location	_____ Schedule & information

13. Any other comments or suggestions? _____
_____
_____

Your information and opinions are important in helping to plan possible improvements to the NOMI Express. THANK YOU VERY MUCH FOR YOUR TIME AND ASSISTANCE!

SURVEYOR USE
Location:_____
Time:_____

City of North Miami
Keksyon pou moun ki itilize Bus NOMI Express – Creole

City North Miami ap planifye, pou kelke chanjman ak bus NOMI Express la, ki mennen rezidan yo kote yo vle ale. Respons ou eportan. Silvouple pran yon ti tan ou konplete keksyon yo.

1. Bo ki kote ou rete? _____

2. Kisa ou fé?: (Tcheke youn nan bwat yo)
☐ Wap travay ☐ Pap travay ☐ Etidyan ☐ Ou pap travay ☐ Paran ki rete lakay -li

3. Ki laj ou?
☐ Andba 18 ☐ 19-29 ☐ 30-59 ☐ 60 osnon plis

4. Kijan pou ou itilize NOMI Express bus la? (Tcheke youn nan bwat yo)
Kijan ou itilize NOMI Express bus lé ou ap vwayaje:
☐ Kay ou ak travay ou
☐ Kay ou ak lot kote ki genyen shopping ak lot sévis (tankou dokté, beauty salon, city hall-la, etc.)
☐ Kay ak lekol
☐ Kay ak stop bus autobús de Miami-Dade Transit yo
☐ Lot rezon (silvouplé esplike): _____

5. Konbyen fwa itilize NOMI Express Bus?
☐ Yon fwa konsa ☐ 1 jiksa 3 fwa pa semen ☐ 4 osnon plis fwa nan yon semen

6. Pou k isa ou sevi ak NOMI Express Bus? (Tcheke youn nan bwat yo)
☐ Mwen pa kondwi ☐ Mwen pa gen machine ☐ Mwen renmen NOMI bus la ☐ Li pa koute'm kob

7. Ki route ou fe pi plis le ou nan NOMI Express bus la? (Tcheke youn nan bwat yo)
☐ Bus vet #1 (pati wes citi-a) ☐ Bus orange #3 (nan mitan citi-a)
☐ Bus vet #2 (pati isid citi-a) ☐ Bus rouge #4 (Kiska tout anba Biscayne Blvd nan citi-a)

8. Eske ou itilize nenpot nan bus say yo local? (Tcheke youn nan bwat yo)
☐ Miami Shores ☐ North Miami Beach "B" Line ☐ Bal Harbor Islands ☐ Aventura ☐ Miami-Dade Transit

9. Eske ou sevi ak transfer nan mitan wout bus NOMI Express la, pou ou rive kote ou bezouin ale? (Tcheke youn nan bwat yo)
☐ Pa janm pran transfer ☐ De fwa ☐ Preske tout tan

10. Kisa ke ou kapab fe nan amelyorason bus NOMI Express la, ki kapab sevi ou? (Tcheke youn nan bwat yo)
☐ Bay plis sevis ☐ Bay kote pou chita, le wap tan bus la ☐ Pou li pi pre lakay mwen ☐ Bay sevis le weekend
Lot kote mwen ta renmen ale (Ekri ki kote): _____
Lot ameluorason: _____

11. Ki jan bus NOMI Express la ede ou le wap voyaje local? (Tcheke youn nan bwat yo)
☐ IMwen pa kab voyaje local san li ☐ Li fe byen le'm bezoin li
☐ Sevis gratis la se yon bel bagay ☐ Li mene mwen kote mwen vle ale
☐ Sevis ede mwen anpil

12. Sou yon echèl nan 1 a 5 tanpri kalifye Nomi Express sèvis (5= bon, 3=net, 1=move)
_____ Pwòpte bus la _____ Aparans chofè a _____ Orè bus la
_____ Èkondisyone bus la _____ Bus yo a lè _____ Frekans sevis bus la
_____ Amitye chofè a _____ Anplasman bus yo _____ Orè & enfòmasyon

13. Nenpot lot lide ak panse?: _____
_____

Enfomayson ou ak lide ou enpotan pou ede planifye changman bus posib ak bus NOMI Epress la. Mesi anpil pou tan ou a ked ou!

SURVEYOR USE
Location:_____
Time:_____

City of North Miami
Encuesta sobre el NOMI Express – Español

Stop Location:_____ **Time:**_____

La Ciudad de North Miami está planificando posibles mejorías del NOMI Express, servicio de autobús que conecta a los residentes a lugares donde necesitan ir. Su colaboración es muy importante. Por favor, tome unos minutos para completar esta encuesta.

1. ¿Cerca de cual intersección vive usted? _____

2. ¿Cuál de estas clasificaciones aplica a usted?: (Marque la casilla que aplique)
☐ Empleado ☐ Desempleado ☐ Estudiante ☐ Retirado ☐ Madre/Padre de Casa

3. ¿Qué edad tiene?
☐ Menos de 18 ☐ 19-29 ☐ 30-59 ☐ 60 o más

4. ¿Cómo utiliza el NOMI Express en sus viajes?
Yo uso el NOMI Express para viajar entre: (Marque la casilla que aplique)
☐ Casa y mi trabajo
☐ Casa y lugares de compras o servicios (medico, salón de belleza, alcaldía, etc.)
☐ Casa y escuela
☐ Casa y otras paradas de autobús de Miami-Dade Transit
☐ Otra razón (por favor explique): _____

5. ¿Con qué frecuencia utiliza el NOMI Express?
☐ De vez en cuando ☐ 1 a 3 veces a la semana ☐ 4 o más veces a la semana

6. ¿Porque usa el NOMI Express? (Marque la casilla que aplique)
☐ No puedo manejar ☐ No tengo carro ☐ Me gusta el NOMI Express ☐ Cuesta menos que manejar

7. ¿Cuál es la ruta NOMI Express que más usa? (Marque la casilla que aplique)
☐ Verde #1 (parte oeste de la ciudad)
☐ Azul #2 (parte este de la ciudad)
☐ Naranja #3 (parte norte-central de la ciudad)
☐ Rojo #4 (parte más este de la ciudad, por Biscayne Blvd)

8. ¿Cambia usted entre las rutas de NOMI Express para terminar sus viajes? (Marque la casilla que aplique)
☐ No Cambio ☐ A veces ☐ Usualmente

9. ¿Usa usted algunas de las siguientes rutas? (Marque la casilla que aplique)
☐ Miami Shores ☐ North Miami Beach Linea "B" ☐ Bal Harbor Islands ☐ Aventura ☐ Miami-Dade Transit

10. ¿Cuáles mejorías al NOMI Express serian útil para usted? (Marque la casilla que aplique)
☐ Servicio más frecuente ☐ Mas paradas con techo ☐ Parada cerca de mi casa ☐ Servicio de fin de semana
☐ Otros lugares que me gustaría ir (por favor de ejemplos): _____
☐ Otras mejorías: _____

11. ¿Como el NOMI Express ayuda en sus viajes locales? (Marque la casilla que aplique)
☐ No podría viajar localmente sin el autobús
☐ Un servicio gratis es muy atractivo
☐ Me lleva a donde quiero ir
☐ Es agradable tenerlo cuando me hace falta
☐ El servicio es amable y útil

12. Por favor califique el servicio actual del NOMI Express (En escala del 1 al 5: 5=bueno, 3=neutral, 1=malo)
____ Limpieza en el autobús ____ Apariencia del conductor ____ Horarios de operación
____ Aire acondicionado en el autobús ____ Puntualidad de los autobuses ____ Frecuencia del servicio
____ Cordialidad del conductor ____ Locación de paradas de autobús ____ Rutas e información

13. Otros comentarios o sugerencias: _____
_____

Su información y opinión es importante para ayudar a planear mejorías al NOMI Express.
¡Gracias por su tiempo y ayuda!

SURVEYOR USE
Location:_____
Time:_____

Appendix B: Survey Results

Q1: Where is the closest intersection by where you live?

131 St & W Dixie Hwy
North Miami Beach
123 St & 16 Ave
1469 S
137 St & 16 Ave
123 St & Biscayne Blvd
Biscayne
125 St & NE 15 Ave
135 St & Biscayne
135 St & Biscayne
135 St & Biscayne
North Miami
Golden Glade
123 St & 18 Ave
123 St
135 St
13510 NE 24 St
Biscayne
Biscayne
126 St & NE 16 Ave
Biscayne
135 St & Biscayne
139 St & Biscayne
West Dixie
123 St & 16 Ave
3 & 4
1540 NE 125 Ter
Griffing Park
1550 - 125 Ter
135 St & 14 Ave
West part of the City
135 St & Biscayne
79 St & Biscayne Blvd
125 St
143 St & 16 Ave
143 St & 18 Ave
East of NE 135 St (2500)
Sans Souci Blvd
1515 NE 25 Ter
17 Ave
135 St & Biscayne
135 St & Biscayne
125 St & 11 Ave
135 St NE

125 St
135 St
135 St
2 Ave
NW
125 Ter & 16 Ave
1800 Sans Souci Blvd
127 St & NW 14 Ave
1895 Venice Park Dr
139 St & Biscayne
123 St & 16 Ave
West towards Pepper Park
125 St
125 St & 13 Ave
125 St & 3 Ave
135 St & NE 6 Ave
Griffing Park
132 St & NE 5 Ave
#23
West Dixie Hwy & NE 12 Ave
160 St
1590 NE 127 St (16 Ave)
West towards Pepper Park
451 NE 136 St
137 St & NE 12 Ave
117 St & NE 2 Ave
13285 NE 6 Ave
NE Miami
1311 NE 148 St
123 St & Biscayne Blvd
135 St
14040 Biscayne Blvd
138 St & NE 10 Ave
13335 Arch Creek Rd
NE 16 Ave
135 St
NE 129 St
6 Ave
390 NE 6 Ave (125 St)
NE North Miami
NW Miami
North Miami
West Dixie
North Miami
135 St
1522 W Dixie Hwy
North Miami Ave

125 St & NE 16 Ave
North Miami
Bus 2, 3
125 Ter & NE 16 Ave
14056 NE 2 Ct
123 St & 6 Ave
Miami-Dade
139 St & 12 Ave
135 St & 6 Ave
145 St
132 St & 6 Ave
163 St
125 St
North Miami
North Miami
Griffing Blvd & W Dixie Hwy
Griffing Blvd & W Dixie Hwy
125 St & 3 Ave
Biscayne Blvd
135 St & W Dixie Hwy
Homeless
Griffing Park
125 St & 13 Ave
North Miami
North Miami
123 St & 16 Ave
135 St & Biscayne
NE 131 St & Memorial Hwy
13280 NE 6 Ave
North Miami
360 NE 125 St
360 NE 125 St
5 Ave
54th
123 NW 13 Ave
7 Ave
135 NE
NE 6 Ave
North Miami
North Miami
North Miami Beach
North Miami
122 St NW 2 Ave
54 NW
461 NW 131 St
1348 NE 6 Ave
125 St

West Dixie
13685 NE 10 Ave
125 St
130 St & NW 12 Ave
North Miami
118 St
11 Ave
5 Ave
126 Street
144 St 6 Ave
12905 NE 16 Ave
134 St
North Miami
North Miami
125 St
123 St & 6 Ave
North Miami
North Miami
1531 NW 132 Terrace
1351 NW 133rd St
1531 NW 131 St
NW 119 St
North Miami (West)
North Miami
12605 NW 1 Ct
Memorial Hwy & NE 31 St
12920 NW 12 Ave
140 St
143 St Ne 6 Ave
Bus #2
North Miami Ave
145 St & 9 Ave
135 St
126 St & NW 6 Ave
146 St & N Miami Ave
141 St & 1 Ave
125 St & 4 Ave
13315 NE 6 Ave
205 NW 125 St
143 NE & 6 Ave
140 St & 8 Ave
175 NE 132 St
125 St & 15 Ave
145 St & 10 Ave
147 St & 10 Ave
135 St & 138
125 St & N Miami

135 St & 2nd Ave
145 St & NE 6 Ave
822 NE 125 St
North Miami
North Miami
141 St & 6 Ave
116 St & 10 Ave
119 Street
129 St & 6 Ave
122 Ter & 12 Ave
151 St & NW 7 Ave
125 & NE 14 Ave
125 St & NE 14 Ave
North Miami Library
125 St
117 NW 2 Ave
205 NW 125 St
131 St & NE 7 Ave
129 St & 1 Ave
1320 NW 115 St
119 St & NE 2 Ave
Biscayne Blvd
860 NW 11 St
132 St & 15 Ave
135 St & NW 7 Ave
119 Street
131 St & NW 12 Ave
11680 North Miami Ave
12300 NE 4 Ave
117 ST & 11 Ave
North Miami
1578 NW 132 St
NW 125 St & 2 Ave
North Miami
12300 NE 4 Ave
Biscayne Park
Miami
Homeless
1.5 mile
140 St & 7 Ave
North Miami
10 NW 131 St
North Miami
147 NE 125 St
13720 NW
125 St & 2 Ave
100 NE 121 Ter

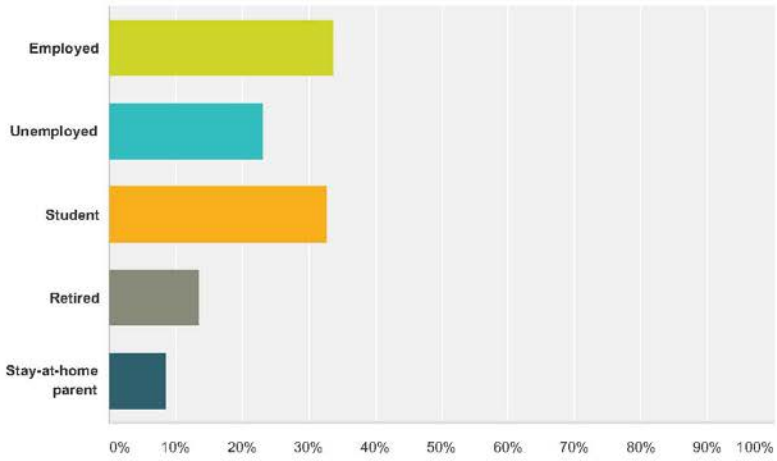
12905 NE 16 Ave
1035 NW 129 St
1225 NW 122 St
630 NE 138 St
Eureka Dr (SW 184 St) & SW 137 Ave
146 St & 10 Ave
544 NE 124 St
13280 NE 6 Ave
134 NE 6 Ave
230 NW 128 St
1531 NW 131 St
North Miami
North Miami
North Miami St
NW 124 St
The City of North Miami
1185 NW 134 St
17 Ave
North Miami
North Miami
132 St & NE 2 Ave
125 St
Northwest
135 St & NW 7 Ave
West part
1425 NE 7 Ave
447 NE 125 St
Griffing Rd
135 St
1101 NW 122 St
125 St
125 St
135 St & NW 2nd Ave
127 St
141 St & 6 Ave
139 St & 12 Ave
13801 NE 3 Ct
126 St
120 St & 2 Ave
13150 Memorial Highway
North Miami
Miami
Miami Dade Transit
7 Ave & 119 St
North Miami
NW 2 Ave & 126 St
119 St & 10 Ave

14560 NE 6 Ave
540 128 St
89 St & 25 Ave
980 NE 8 Ave
14175 6 Ave
12920 NW 12 Ave
12 Ave

City of North Miami - NOMI Express User Survey

Q2 Are you?

Answered: 338 Skipped: 15

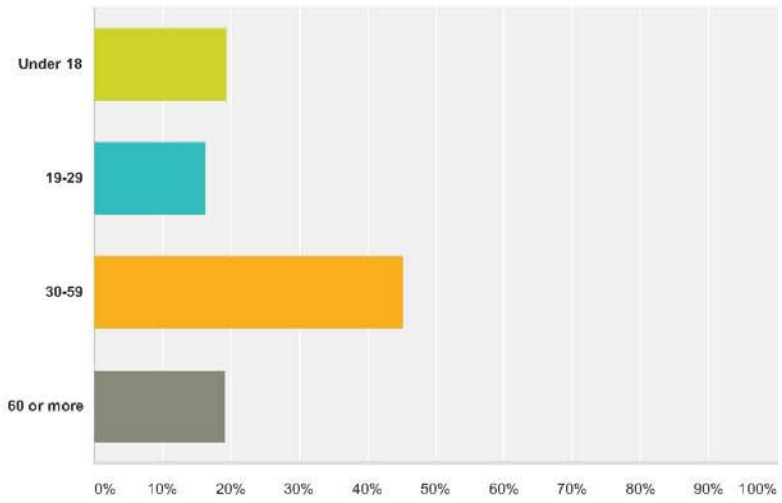


Answer Choices	Responses	
Employed	33.73%	114
Unemployed	23.08%	78
Student	32.84%	111
Retired	13.61%	46
Stay-at-home parent	8.58%	29
Total Respondents: 338		

City of North Miami - NOMI Express User Survey

Q3 What is your age?

Answered: 345 Skipped: 8

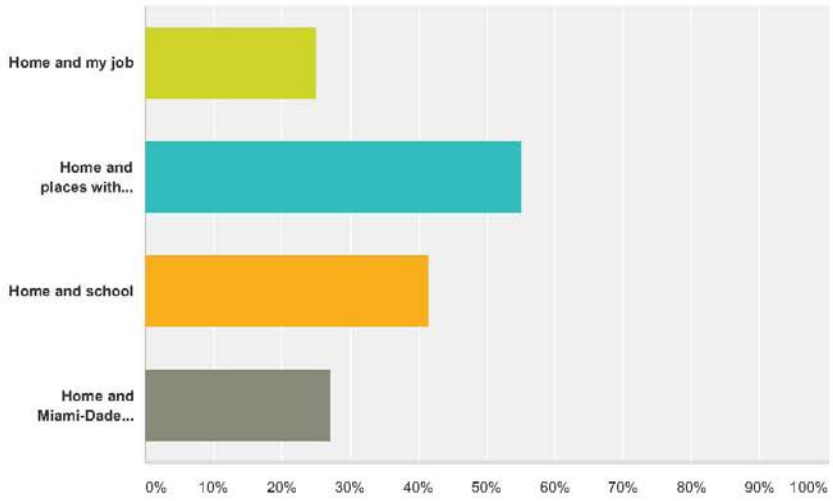


Answer Choices	Responses	
Under 18	19.42%	67
19-29	16.23%	56
30-59	45.22%	156
60 or more	19.13%	66
Total		345

City of North Miami - NOMI Express User Survey

Q4 How do you use the NOMI Express in your travel? (Check boxes that apply)I use NOMI Express to travel between:

Answered: 332 Skipped: 21

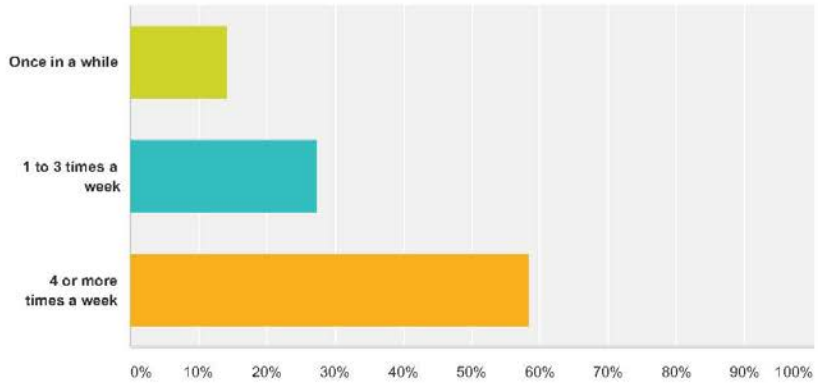


Answer Choices	Responses	
Home and my job	**25.00%**	83
Home and places with shopping or services (doctor, beauty shop, city hall, etc.)	**55.12%**	183
Home and school	**41.57%**	138
Home and Miami-Dade Transit bus stop	**27.11%**	90
Total Respondents: 332		

City of North Miami - NOMI Express User Survey

Q5 How often do you use NOMI Express?

Answered: 332 Skipped: 21

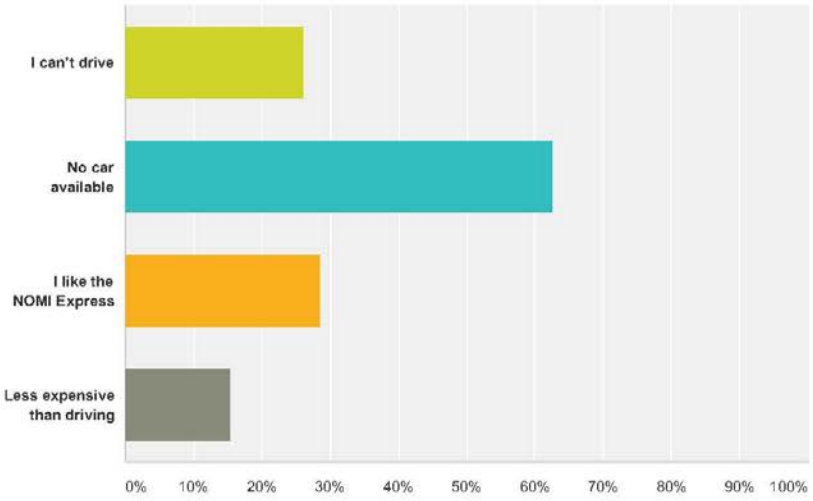


Answer Choices	Responses	
Once in a while	14.16%	47
1 to 3 times a week	27.41%	91
4 or more times a week	58.43%	194
Total		332

City of North Miami - NOMI Express User Survey

Q6 Why do you use NOMI Express? (Check boxes that apply)

Answered: 338 Skipped: 15

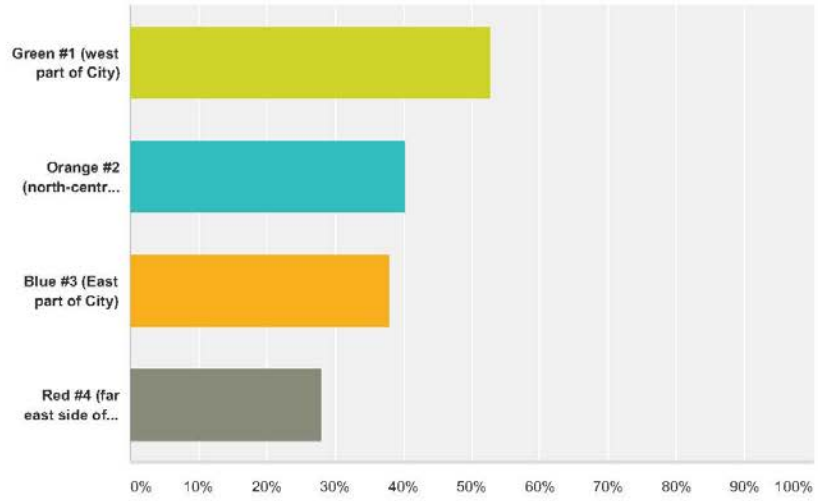


Answer Choices	Responses	
I can't drive	26.04%	88
No car available	62.72%	212
I like the NOMI Express	28.70%	97
Less expensive than driving	15.38%	52
Total Respondents: 338		

City of North Miami - NOMI Express User Survey

Q7 Which NOMI Express route do you use? (Check boxes that apply)

Answered: 335 Skipped: 18

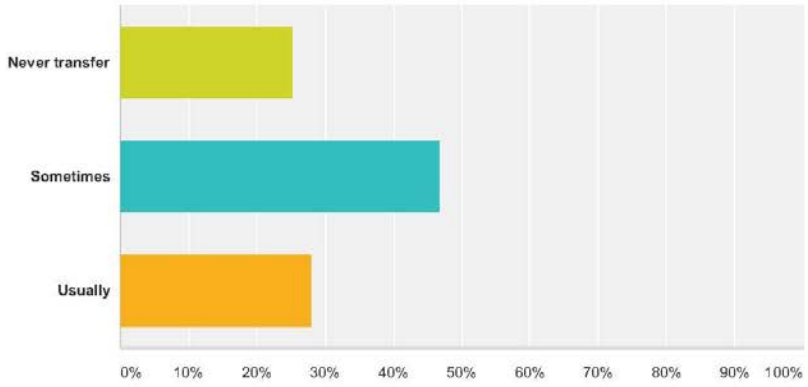


Answer Choices	Responses	
Green #1 (west part of City)	52.84%	177
Orange #2 (north-central part of City)	40.30%	135
Blue #3 (East part of City)	37.91%	127
Red #4 (far east side of City along Biscayne Blvd)	28.06%	94
Total Respondents: 335		

City of North Miami - NOMI Express User Survey

Q8 Do you transfer between NOMI Express Routes to complete your trips?

Answered: 321 Skipped: 32

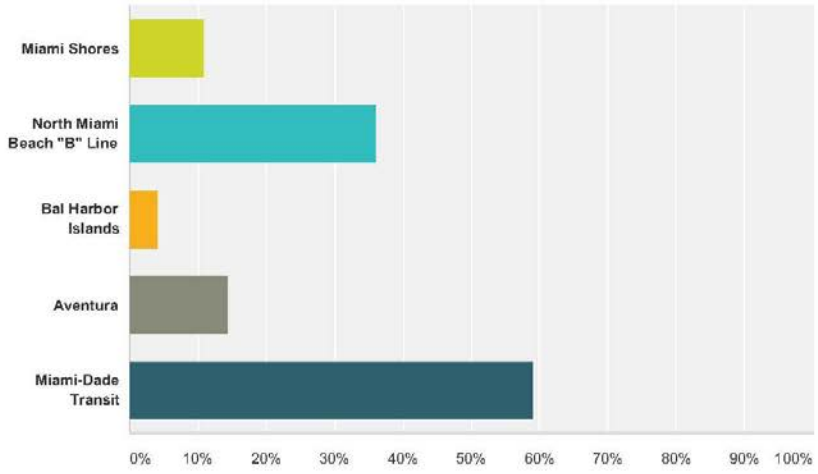


Answer Choices	Responses	
Never transfer	25.23%	81
Sometimes	46.73%	150
Usually	28.04%	90
Total		321

City of North Miami - NOMI Express User Survey

Q9 Do you use any of the following local buses? (Check boxes that apply):

Answered: 293 Skipped: 60

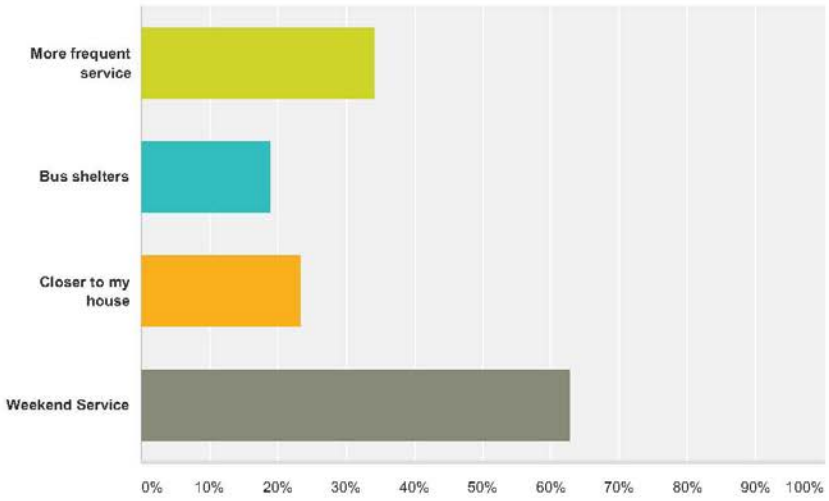


Answer Choices	Responses	
Miami Shores	10.92%	32
North Miami Beach "B" Line	36.18%	106
Bal Harbor Islands	4.10%	12
Aventura	14.33%	42
Miami-Dade Transit	59.04%	173
Total Respondents: 293		

City of North Miami - NOMI Express User Survey

Q10 What improvements to NOMI Express would be useful for you? (Check boxes that apply)

Answered: 290 Skipped: 63

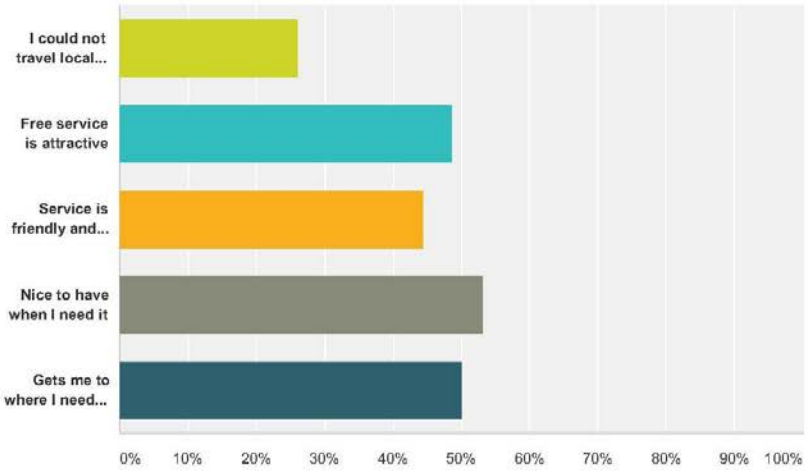


Answer Choices	Responses	
More frequent service	34.14%	99
Bus shelters	18.97%	55
Closer to my house	23.45%	68
Weekend Service	62.76%	182
Total Respondents: 290		

City of North Miami - NOMI Express User Survey

Q11 How does NOMI Express help you in your local travels? (Check boxes that apply)

Answered: 317 Skipped: 36

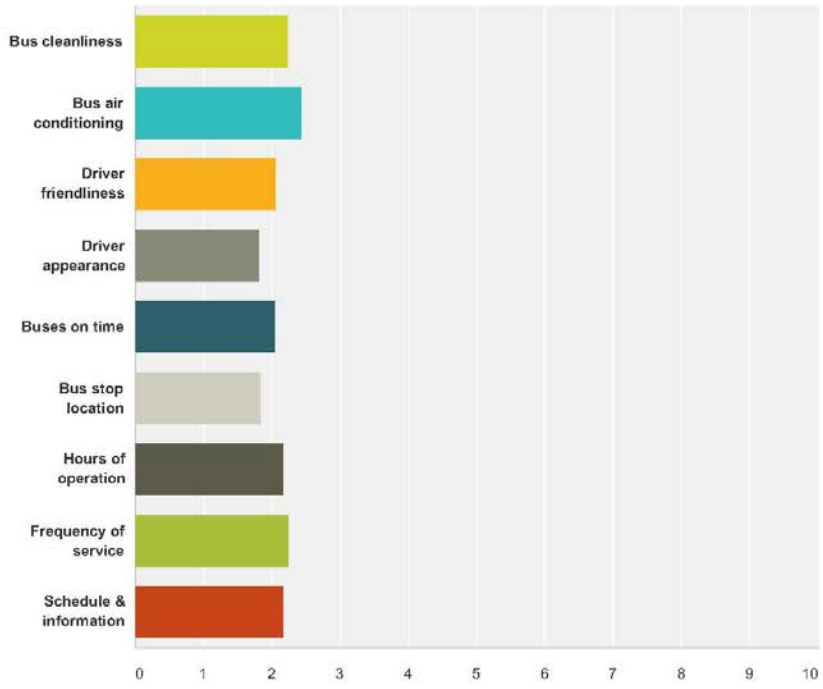


Answer Choices	Responses	
I could not travel locally without it	**26.18%**	83
Free service is attractive	**48.58%**	154
Service is friendly and helpful	**44.48%**	141
Nice to have when I need it	**53.31%**	169
Gets me to where I need to go	**50.16%**	159
Total Respondents: 317		

City of North Miami - NOMI Express User Survey

Q12 Please rate the present NOMI Express service (On a scale of 1 to 5, 5=good, 3=neutral, 1=poor)

Answered: 242 Skipped: 111



	5	4	3	2	1	Total	Weighted Average
Bus cleanliness	45.11% 106	12.77% 30	24.68% 58	8.51% 20	8.94% 21	235	2.23
Bus air conditioning	43.35% 101	11.16% 26	21.03% 49	7.30% 17	17.17% 40	233	2.44
Driver friendliness	57.02% 134	8.94% 21	15.74% 37	6.38% 15	11.91% 28	235	2.07
Driver appearance	58.59% 133	15.86% 36	16.30% 37	3.08% 7	6.17% 14	227	1.82
Buses on time	47.62% 110	16.88% 39	24.68% 57	4.76% 11	6.06% 14	231	2.05
Bus stop location	57.33% 129	11.56% 26	23.56% 53	4.44% 10	3.11% 7	225	1.84
Hours of operation	44.84% 100	13.90% 31	27.80% 62	6.73% 15	6.73% 15	223	2.17
Frequency of service	38.71% 84	18.43% 40	28.57% 62	6.91% 15	7.37% 16	217	2.26

City of North Miami - NOMI Express User Survey

Schedule & information	**42.99%** 92	**17.76%** 38	**25.70%** 55	**5.14%** 11	**8.41%** 18	214	2.18

City of North Miami - NOMI Express User Survey

Q13 Any other comments or suggestions?

Answered: 173 Skipped: 180

Any other comments or suggestions?
Open-Ended Response

Other Improvements: Friendlier Driver
Some drivers are very rude like the one that drivers the #4
More routes (Translated from Creole)
Other improvements: Air conditioner. (Translated from Spanish)
Fix A/C
Routes to go further. (Translated from Spanish)
Buses should run until 10 pm because people who want to go to school at night don't have transportation.
Other improvements: More frequent stops. Other comments/suggestions: Make a pickup station at 135 St. Stop at 1995 NE 135 St
It's okay and very useful
No
Other Improvements: "Come every 30 min or less". Come sooner.
Extend route hours to 9pm. It would be also good Saturday and Sunday service. (Translated from Creole).
Weekend service
It would be nice if they can work on weekends.
Other improvements: Consistent transfers between shuttles. Other suggestions: Better maintenance for the Red Route shuttles, too many breakdowns.
Service takes too long, 40 min-1 hr to arrive. More stops. (Translated from Spanish)
Other improvements: Clean buses with no roaches.
Very good service. (Translated from Spanish)
The bus needs to be cleaner and A/C cooler.
Very nice driver (Richard Dessin)
Weekend service needed.
Bus driver is excellent (Richard). But afternoon bus does not go into Costco
None
Everything is perfect (Translated from Spanish)
Fix the cameras. Routes more clean. (Translated from Creole)
No more suggestions
Efficient system. Have drivers check engines through out the day.
Route #4 was cut 1 hour and a lot of people cannot use it now. (Translated from Spanish)
The driver's very nice (female driver) very friendly and helpful
Bigger buses and running on weekends
New buses or trollies
N/A
No
It would be better if it went longer routes and different places.
Service is perfect
The driver is very friendly. (Translated from Spanish)
None. Bigger buses/more seats would be nice though.
I like this bus because it helps in my transportations. (Translated from Creole)
I would like this bus to always be available. (Translated from Creole)
Good service
service 7 days a week (translated form Creole)

NOMI Tracker
6 am bus
Weekend service.
We need an extra stop on 135 St. (Translated from Spanish)
I would like the bus on weekends
Saturday and Sunday
I wish it runs on the weekends, saturdays and sundays
The driver is very nice and helpful #3 (Blue route 5:25 pm)
I would like the route to go to the NW. (Translated from Spanish)
Expand bus service
Just more service on Saturday
It would be nice if bus stopped every 15 or 20 minutes and not every hour. (Translated from Spanish)
Need more stops
Please provide more stations on NW
Cleaner buses. Schedules available on buses.
Enforce rules. Spray buses occasionally. More schedules. Once roaches were all over the bus.
Thanks for NOMI
No
None
I love to ride the bus
to make cleaner and don't eat on the buses
don't have people that are crazy and rude on the bus
Longer hours
A/C sometimes doesn't work. On Red route please stop at David Lawrence school after 2pm!
Make sure bike racks are always functioning. Would be nice to have 3 slot racks
The bus leave at different time that should change
Change schedule for later 9:30pm (translated from Creole)
Make it drive later, school finishes at 9pm (Translated from Creole)
This bus needs serious help with keeping it clean
The cities should give a bigger bus
Bus divers should spend less time taking their breaks
Need more NOMI buses
To have more air conditioner
Put more Nomi Express
Everything is going well in North Miami, thank you.
Have the bus more protection for kids like security.
Earlier times. Convenient. Needs cleaner buses.
I would like to see cleaner buses
Rain covers. More buses, more routes.
Make them finish at 8:00 pm
Something to cover from rain and sun. I like the driver schedule Michelle. Bus schedule later than 7pm
Go further. Stay later
Go further. Make stops closer. Make it go every half hour.
Go further. Change the schedule and make it later.
Go further and more routes

Go further. More stops. Weekend service.
Go further. More routes, more stops. Earlier/later service.
More places and bigger buses. Service until 10:00 pm. Weekend route
Bigger Bus. Thanks to you and the community.
Bigger buses. Start earlier/finish later. Places to sit down.
Starts at 6:00 am and finish later. Chairs/benches
Please more routes. Bus 103 near Little Haiti.
Service in the weekend. Service to Start earlier/ end later
Bigger bus
I would like the bus to pass faster of every 30 minutes
I think the bus should start from 7:00 am to 9:00 pm because it will help me get to school on time. A bigger bus and an air conditioner will be great. For the time to be 6am to 9pm or 7am to 9pm.
Better A/C. Please turn on the A/C
It's too hot fix the A/C
I suggest the fix the A/C and give out snacks
The cities should give a bigger bus!
I need more buses
I want more time for the service from 7:00 8:00
Very very noisy school kids at 2:00 pm. Bus is very loud when school kids are on and bus driver won't do anything about it. Overcrowded during school time, not safe.
No comments
I want more service Saturday and Sunday
Thank you for offering this service. As a housewife without a car it is a big help. Bless you.
Need benches
Need it on Satrurdays
Would like routes to go further and have extended hours past 7PM
Thank you for the free bus service
The bus service is very helpful. I'll take this time to say thank you for this great service to me and the community. (Translated from Creole)
They need to do something about the A/C
Weekend Service
Connec to to other City shuttles (e.i. NMBline, Ball Harbor, Aventura).
None
Good for me
More frequent stops (translated from Spanish)
Thank you very much for the service, may God bless you. (Translated from Creole)
Thanks for the bus service
Good job
Sometimes the driver doesn't stop, they let you behind.
Faster schedule
Put destination sign on buses! It's confusing to figure out where buses are headed sometimes.
We need the weekend service too
None
Please say not to put the volume so high. (Translated from Spanish)
Good service 100%. (Translated from Creole)
Good service on the front end. (translated form creole)

Make one stop closer to 17 Ave and 119 Street
Nope but it is a very good service for us in North Miami
More frequent stops, faster service
I hope every society is not perfect. But I hope to find on my way 1ot have 149 St Chrurchs. D.A on Wednesday morning please.
Its ok, maybe have it on weekends.
N
Instead every hour need to run every 30 min.
You could add some other stops at schools.
All buses should stop at 7th Street. Need more buses so have more time options.
Very helpful. Thank you
No
I like the bus working 7 days a week & holiday also.
Cleaning with spray very often
The bus needs to come in time.
Need to talk to all drivers. Bus driver NW 125 Streeet
I like the bus because it does me good. I have 2 kids at school and I go to work. It helps a lot. (translated from creole)
I like the buses a lot (translated from creole)
Want more buses (translated from creole)
The NOMI Bus should work on weekend day
It better come weekends
Bad connection. 281, 282 when you got off 135th St the bus 280 is not connected to 282. Sometimes bus is too hot. Timing is difficult.
I'm really greatful
Make the A/C stop making noise
N/A
No
The driver needs to be more friendly
Weekend service and have bus run until 9 PM please
No
I would like the bus to be in time more often and make me less prone to missing the bus.
Thank you for the service and thanks for pastor the Green bus and the afternoon #3 bus route driver
No other comment
No
To pick up everybody
Not Wiely
The buses need to be fumigated because of roaches
Everything is ok. Would like weekend and holiday service.
Should close a little bit more late
Sometimes I have to run to go to stop and bus would not wait.
Good Driver
Yes! The driver barely stops for the passengers.
To be more nice and stop at all the stops to pick up everybody

Appendix C: Meeting Notes

Meeting notes from interviews with shuttle bus drivers; routes green, blue and orange (February 25, 2017)

Most of the crowding due to student riders occurs in the afternoon
Many student riders board the bus on the blue and orange routes and transfer to the green routes to go home in the afternoon, peak period for the transfer is between 2 and 3 pm. This overcrowds the green route
Peak period for the orange route is between 2 and 5 pm
Some student riders behave badly
Most student riders are from the middle and high schools
The middle school students will walk down to the high school bus stop and also to NW 131st St and NW 6 Ave stops
Some parents are using the bus to "bus pool" the younger student riders, one mom will chaperone several children
There was a discussion of a registration system so that student riders that register in advance can have a seat on the bus when it is crowded
It was noted that Miami-Dade police are present at the high school in the afternoon when school gets out
The Publix on NW 6 Ave has complained about kids getting off at that stop and stealing candy
Drivers should be given the direct phone number of police in the event they have unruly passengers
Blue route at NW 132nd St left turn onto Dixie Highway is dangerous. It was noted that the drivers should be making the left at NW 131st St at the light, but drivers stated this is still somewhat of a dangerous intersection
Making a left turn from NW 125th St to NW 8th Ave is sometimes hard to make
When the bus on the green route leaves the flea market to continue south on SR 7 there are 6 lanes of traffic to cross. This is a problem to be able to pick passengers on the opposite side of the street, often they are left behind because the driver can't get over to them in heavy traffic
Bus timing is affected when traffic is heavy, especially on NW 125th Street
Buses can stop to pick-up and drop-off wherever they need to in the neighborhoods, but not on the major streets. They can only stop at designated bus stops on major streets
More signs are needed, especially in the neighborhoods
The green route is always full
Another bus may be needed during peak times, this could be refined
Some drivers have left the bus while it is running to take a short break (at Publix and other places), they are reluctant to turn the bus off because are afraid it will not turn back on
Not very many riders in wheel chairs, the red route has the most elderly, but there are less elderly riders now than before because of the student riders. Elderly riders are fearful of them.

Appendix D: Field Survey Comments

NOMI Express | Field Surveys Comments

GREEN ROUTE #1

MID (11AM-3PM)

- Numerous boards/alights in between stops.

BLUE ROUTE #2

MID (11AM-3PM)

- The route is taking just over 1 hour due to the heavy traffic caused by construction of sidewalks in the area.
- Some of the passengers who rode round 2 got back on the bus on round 3 and 4.

PM (3PM-7PM)

- Passenger informed us it is hard to know which bus is which and their routes
- Numerous passengers alighted right before last stop of route (MDT bus stop on Dixie Hwy in front of Griffing Park)
- Numerous passengers alighted and boarded in between stops. Bus driver will stop every time a passenger needed to get off.

ORANGE ROUTE #3

MID (11AM-3PM)

- Stops with no visible bus stop signs: #4 at NW 2 Ave & 125 St, #22 at 7 Ave & 127 St
- Stop #27: pole fell down
- Passenger commented he was waiting for the bus a couple of weeks before, at the Publix stop and the bus never showed up.
- Passenger made comment that “stop cord” should be better maintained
- Bus driver said Green Route very full in the afternoon
- Observations:
    - Most of the passengers spoke only in Creole
    - Parents taking bus to pick up/drop off small children at school
    - Passengers get off at Target and board bus on next round
    - Bus driver helped passengers with groceries to get in the bus ☺
    - Bus driver spoke in Creole to people that didn’t want to take the survey, explained why it was being conducted and people were convinced to take it ☺

PM (3PM-7PM)

- Not all passengers could board because there weren’t enough seats

RED ROUTE #4

AM (7AM-11AM)

- Several stops without any boarding or alight
- Some buses are too old and stop working on their routes
- Lack of bus schedule/route map copies in the bus
- Most passengers had already completed survey, only one person on Round 1 hadn't completed the survey and did not want to fill it out.
- There is a NOMI sign on Biscayne Blvd in front of the Costco almost between Costco and Publix.
- Bus has a beeping sound that goes off almost every time there is a bump, quite annoying sound.

MID (11AM-3PM)

- Bus 279- A/C does not cool. Driver says they need better mechanics. On round 2 the engine lost power when leaving Publix (128 St). Bus running 30 min late because of bus mechanical issues. Then waited 25 min at stop #1 (Publix) to get back on track with the time.
- Noticed some passengers were same as day before.
- 4 tourists boarded.
- Round 2, 3 and 4 had some of the same passengers from before.
- Observed some students riding to FIU

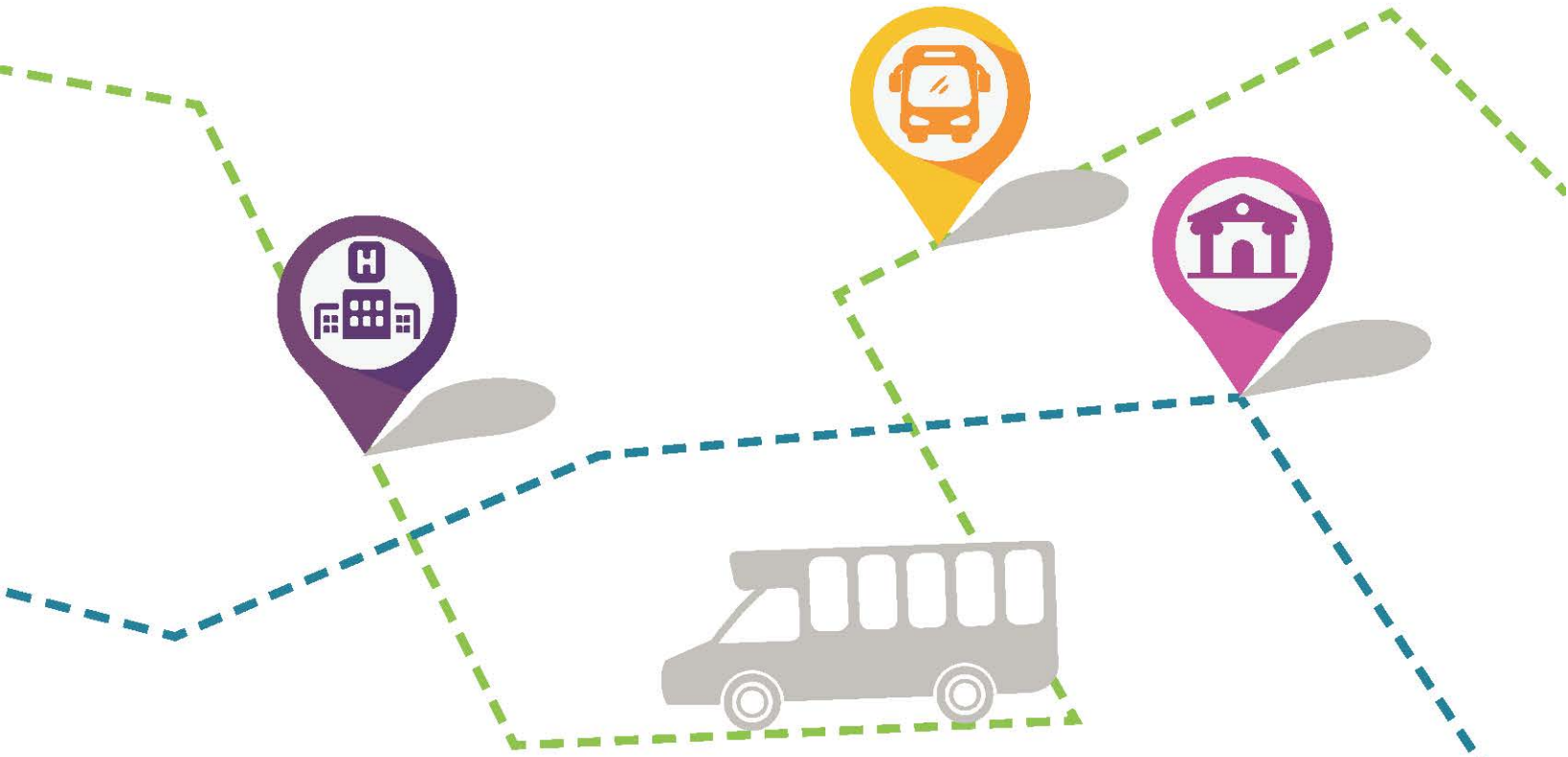
PM (3PM-7PM)

- Picked up parents with kids.

Appendix E: Comparative Costs and Services, Miami-Dade Local Circulators

	Palmetto Bay – I-Bus	Hialeah Transit System	Doral Trolley	Aventura Express
Goals/Objectives	Increase the number of destinations that can be reach via fixed public transit routes throughout Palmetto Bay and surrounding areas, as well as to connect with MDT transit routes and the South Miami-Dade Busway	Mission is to provide a safe, reliable, and quality transportation services with a smile	Provide public transportation for residents linking them to work, shopping, and school; complement MDT service; carry minimum of 10 passengers per hour on routes	Aventura Express serves your busy lifestyle with a convenient schedule to better serve the Aventura community
Number of Routes	2	2	3	5
Do Routes Extend Beyond City Boundaries	No	Hialeah Gardens	Yes, Medley (to Palmetto MetroRail System)	No
Is There a Central Terminal/Transfer Point	Routes overlap along SW 168th Street	Hialeah Metrorail Station serves as hub; routes intersect at several locations	No	Aventura Mall
Service Span	Route A: Mon. - Fri. 10 AM to 1:10 PM; Route B: Mon. - Fri.7 AM - 5:30 PM	Mon. - Fri. 6 AM to 7:30 PM; Saturday 9 AM - 3:30 PM; Holidays 9:00 AM - 3:30 PM	Mon. - Fri. 6 AM to 9:48 PM; Saturday 7 AM – 7:24 PM; Sunday 7 AM – 7 PM	Mon. - Fri. 7:45 AM to 6:30 PM; Saturday - 8:45 AM to 6:30 PM
Headways	Route A: 55 minutes (AM) Route B: 60 minutes (PM)	40 minutes weekdays, 60 minutes weekends	Route 1: 20 min Peak Service (6:00 AM – 10:15 AM & 2:17 PM – 7:15 PM) 40 minutes (10:15 AM – 2:16 PM & 7:16 PM – 9:48 PM); Route 2: 60 min; Route 3: 30 min	60 minutes
Fare	Free	Full - $2.25 or $60.00 monthly pass; Reduced - $1.10 or $30.00 monthly pass; Golden Passport Pass - Free	Free	Free
Ridership	Approximately 600 per month	1,800 - 2,200 riders per weekday; 400 - 500 riders per Saturday; 100 - 200 riders per Sunday; 42,400 per month	FY 13/14: 362,891	17,000 per month
Vehicle Type	El Dorado 20 passenger buses with handicap accessibility	26 passenger Blue Bird buses leased to own from First Transit	Biodiesel; vintage; Classic American Trolley; 24 seats with room for 10 standing; handicap accessible	Shuttle buses equipped with wheelchair lifts and bicycle racks - 22 person capacity (1 bus has 26 person capacity)
When Did the System Start Service	2006	Jan-03	Feb-08	Jan-99
Expansion/Changes to System since Inception	Routes have been modified to better serve riders	Routes eliminated and realigned	Modified and added routes to 3, increases in buses in increase headways	Expanded from 3 to 4 to 5 routes and added Saturday service
Funding of Service Development (Capital and Operating)	People's Transportation Plan	FDOT Public Transit Service Development Program grant	Locally funded; seeking FDOT Public Transit Service Development Program grant to expand service	City - general fund
Cost of System Development (Capital and Operating)	Contract out as turnkey service for $33.25 per revenue hour (Village purchased buses). $140,397/ yr	$2.2 million annually; contract with First Transit approximately $1.2 million annually with remainder for fuel, maintenance, administration	$361,000 for trolley start-up includes lease of vehicles, signage, administration, marketing, and 1-year of operations and maintenance	Turnkey - entire system contracted out
Additional Costs (eg. Advertising)	Negligible	Negligible	Allocate 10% of costs for marketing	Negligible
Source of Funding for Operations/Maintenance	People's Transportation Plan	Fares, People's Transportation Plan	Pilot phase locally funded, FDOT; Citizens Independent Transportation Trust Funding (CITT: PTP); City General Fund	General fund; PTP for service added since inception of PTP; about 50/50 split
Who Operates Service	2 part-time City employees	City - administration, maintenance, storage, fuel; First Transit - operations and owns buses	City purchased vehicles, contract operations and maintenance with Limousines of South Florida	Contract with Limousines of South Florida; $44.00 per hour
Coordination with Other Municipalities/MDT	Designated transfer with MDT; interlocal agreement with Miami-Dade County	Designated transfer with MDT; interlocal agreement with Miami-Dade County; interlocal agreement with Hialeah Gardens	Connections available to MDT routes along NW 87th Avenue, NW 107th Avenue, NW 25th Street, NW 36th/41st Street, and at International Mall, Interlocal agreement with MDT; FOOT JPA to access funds for trolley	Connections to MDT at Aventura Mall
Lessons Learned/Challenges	Challenges include adhering to on-time schedule, satisfying riders, increasing ridership	Difficult to maintain precise schedule with traffic congestion and rail crossings; FDOT System Safety and Security Program Plan; accident procedures, hurricane procedures	Have processes procedures in place before starting system (eg. System Safety and Security Program Plan)	Listen to customers/residents; make transfers easy; clock face schedule
Annual Service Hours	2,133.50	3848	FY 13/14: 17,827 Hours	16,250
Annual Service Miles	4,342		FY 13/14: 206,501 Miles	**107244**
Service Cost/Hr	$65.80	**$311.85**	$ 59.84 (Operations & Maintenance); FY 13/14: $52.34	$44
Cost per Rider	$19.50	**$2.38**	FY 13/14: $ 2.62	$3.05
Annual Ridership	7200	504000	362891	204000
Annual Cost	$ 140,000.00	$ 1,200,000.00	$ 361,000.00	$ 715,000.00

	Coral Gables Trolley	Pinecrest ppm@pinecrest-fl.gov	Cutler Bay
Goals/Objectives	Relieve local traffic congestion; alleviate parking requirements; connect Downtown Coral Gables to surrounding areas via the Metrorail	To provide alternative transit for schoolchildren to school	To help residents access different areas of City and connect with other transportation serving the County
Number of Routes	1	4	1
Do Routes Extend Beyond City Boundaries	No	No	No
Is There a Central Terminal/Transfer Point	Douglas Road Metrorail Station	No	Town Center/Southland Mall
Service Span	Mon. - Friday. 6:30 AM to 8:00 PM; Extended service operates on the 1st Friday of each month until 10 PM	Mon.- Fri., 6:30 AM to 9 AM & 2:30 PM to 7:25 PM	Mon - Sat 8:35 AM to 5:38 PM
Headways	10-15 minutes	N/A	50 minutes
Fare	Free	Free	0.25
Ridership	5,000 per day, 100,000 per month	FY 13/14 - Avg: 2,261 per month	Avg weekday: 76 passengers, Avg monthly: 1,293
Vehicle Type	Low-floor, low-emission trolley vehicles with vintage body and aesthetics; some vehicles are hybrid electric and some are low-emissions diesel	24 passenger mini-buses	Handicap accessible MDT Bus with bicycle rack
When Did the System Start Service	Nov-03	Jan-12	2012
Expansion/Changes to System since Inception	In March 2006, service was extended north to Flagler Street. In July 2015 service was extended by adding the Grand Avenue Loop (starting at the Douglas Metrorail Station leaving Southbound on Douglas, Westbound on Grand Ave, North on LeJeune Rd then traveling East on Granello back to Douglas Station)	Routes change every year, twice a year.	Service days have been extended from 3 days a week to 6 days (Mon-Sat)
Funding of Service Development (Capital and Operating)	PTP; FDOT Public Transit Service Development Program grant; advertising	CITT	Partially by Town's People's Transportation Plan. Circulator purchased with American Recovery and Reinvestment Act transit grant
Cost of System Development (Capital and Operating)	Vehicles approximately $300,000 each; signs and amenities at stops approximately $3,000 per; parts and maintenance about 10% of cost of vehicle annually **FY 12-13 TOTAL Operating Budget $1,357,512**	$161,950	146,000 (For 3 day service)
Additional Costs (eg. Advertising)	Unknown	$10,000	Negligible
Source of Funding for Operations/Maintenance	People's Transportation Plan	CITT – cost above includes all costs associated with the service	CITT
Who Operates Service	Contract with Limousines of South Florida (now Keolis, Inc.). Their contract was recently renewed for three years and they are eligible to two one-year extension options. (FY 12-13 Cost: $721,000) Trolley is maintained by the city's Department of Public Works.	Pinecrest contracts the services to a private company.	MDT per an interlocal agreement
Coordination with Other Municipalities/MDT	Connects to MDT at Douglas Road Metrorail Station and intersects with several MDT bus routes; interlocal agreement with Miami-Dade County	None	Connects to MDT Routes 1, 31, 35, 38, 52, 70, 137 and 287.
Lessons Learned/Challenges	In March 2006, the city conducted a study to consider the expansion of the Coral Gables Trolley, which ran from the Douglas Rd Metrorail station to SW 8th St. That study concluded that service be extended north to Flagler St as an extension of the then existing trolley operation. An additional 2013 Master Plan was developed, with further service recommednations.	In the summer of 2012, since school is not in session and the buses were not being used, Pinecrest used the circulator system for seniors. However, it was realized the senior population need more door-to-door service since many are not able to stand at a bus stop for long periods of time or walk to the nearest stop very easily. That service was discontinued.	N/A
Annual Service Hours	FY 12/13: 3,659 Hours	Approximately 3,370 annual hours	Appx. 2824
Annual Service Miles	16800	Unknown	39611
Service Cost/Hr	$371.01	$48/hour	*$103.41/Hour
Cost per Rider	$6.22	Approximately $6.80	$11.35
Annual Ridership	1200000	26592	28598
Annual Cost	$ 1,357,512.00	$ 171,950.00	$ 324,620.00



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