Miami-Dade Transportation Planning Organization

FEASIBILITY OF IMPLEMENTING DIRECT TRANSIT SERVICE CONNECTING MIAMI INTERNATIONAL AIRPORT WITH PORTMIAMI

Final Report

September 2025

Miami-Dade Transportation Planning Organization

Technical Assistance by: TranSystems

Miami-Dade Transportation Planning Organization

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1. Study Introduction

The purpose of this study is to examine the feasibility of implementing a direct transit service between PortMiami and Miami International Airport (MIA), as there is currently no direct public transportation link between these two locations. A direct transit service could address the need for a safe, convenient, efficient, fast, and reliable connection between these two major transportation hubs in Miami-Dade County, thereby enhancing mobility throughout the greater Miami area. The study will assess whether such a service is an option to further extend and augment the existing Strategic Miami Area Rapid Transit (SMART) Program.

1.1. Study Area

South Florida, comprised of Broward, Miami-Dade, and Palm Beach Counties is one of the fastest growing regions in the United States, expected to grow to eight million within the next 20 years.[1] South Florida's regional transportation system is critical to maintaining the region's economic competitiveness and quality of life.[2] The metropolitan area, which, with a population of over six million according to Census 2020, is the largest metropolitan area in Florida and the ninth largest in the United States.[3] Miami-Dade County itself has 2.7 million residents according to Census 2020,[4] and is expected to grow to 3.5 million inhabitants by 2045.[5] The study area is located within the City of Miami, the seat of Miami-Dade County, and includes PortMiami, MIA, and the areas in between, including Downtown Miami (Figure 1-1). The City of Miami had a population of over 440,000 according to the 2020 Census.[6]

PortMiami

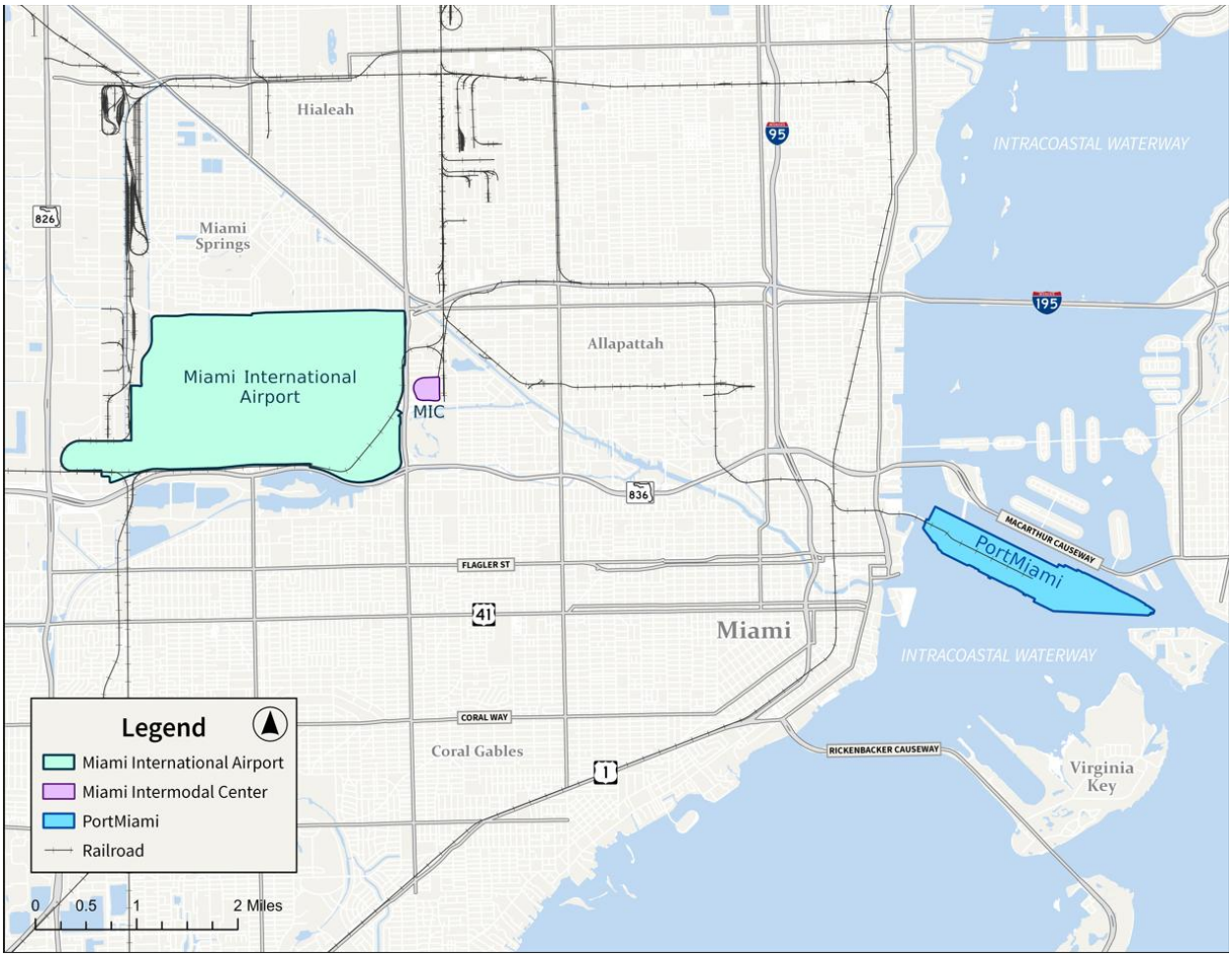
PortMiami is situated on an island with a land mass of 520 acres in central Biscayne Bay. It is bounded to the north by the Main Channel adjacent to MacArthur Causeway (Interstate I-395), to the west by Downtown Miami, to the east by Miami Beach and Fisher Island, and to the south by Fisherman's Channel and Biscayne Bay. PortMiami is approximately one mile east of Downtown Miami and approximately eight miles southeast of MIA.

PortMiami is both the "*Cruise Capital of the World*," the World's leading cruise port, and the "*Cargo Gateway of the Americas*," a strategically located cargo port at the crossroads of north-south and east-west trade lanes.[7] PortMiami is Miami-Dade County's second most important economic engine contributing $61 billion annually to the local economy and supporting more than 340,078

[1] (Tri-Rail, 2024)
[2] Ibid.
[3] (U.S. Census Bureau, n.d.)
[4] (Miami-Dade Transportation Planning Organization, 2024)
[5] (Miami-Dade Transportation Planning Organization, 2024)
[6] (U.S. Census Bureau, 2024)
[7] (Miami-Dade County, 2024)

jobs.[8] PortMiami is owned by Miami-Dade County and managed as a "*non-operating port*" by the Seaport Department of Miami-Dade County.[9]

Figure 1-1 Study Area



In 2023, almost 7.3 million cruise passengers traveled through the Port (Table 1-1).[10] On April 9, 2023, the Port had its busiest cruise day in its history with 67,594 passengers.[11]

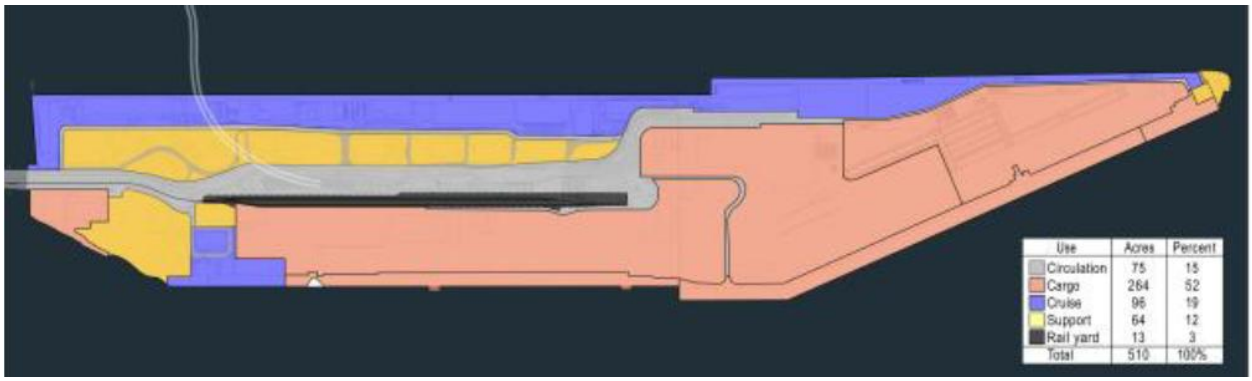
Table 1-1 Port Miami 2023 Cruise Statistics[12]

Passengers	7,299,294
Lines	23
Ships	60
Vessel Calls	1,125

[8] Ibid.
[9] A non-operating port is one that provides, manages, maintains, and leases the facilities (terminals and berths) for private entities to operate its shipping activities. (PortMiami, 2024)
[10] (Miami-Dade County, 2024)
[11] Ibid.
[12] Ibid.

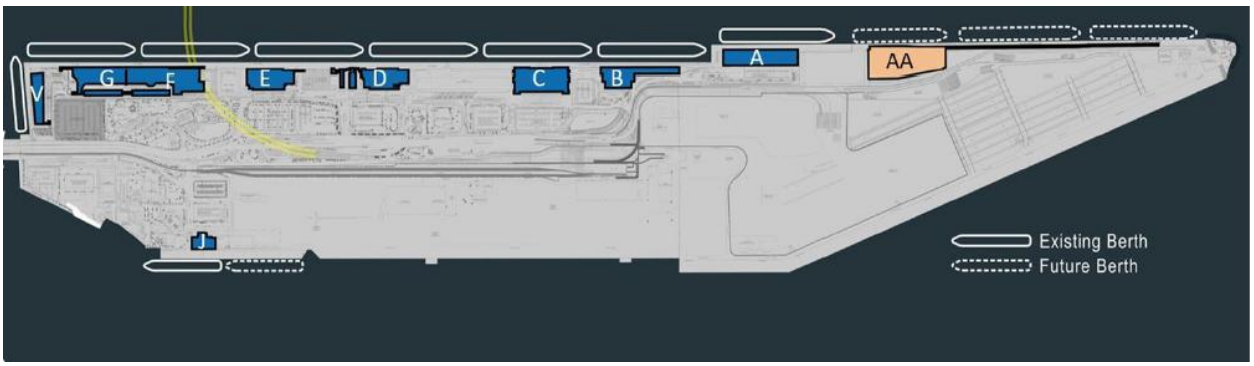
The PortMiami footprint includes cruise terminals, cargo areas, support spaces, circulation areas, and a rail yard (Figure 1-2). The terminals for the cruise lines are primarily on the north side of the island. There are currently nine cruise terminals at the Port, eight on the north side and one on the south side; a new Terminal AA is under construction on the northeast side of the Port (Figure 1-3). The cruise terminals are comprised of interior operational space, cruise berths, cruise ship loading, support aprons, customs inspections, storage areas, gangways, and parking areas. The Port's cruise facilities are a primary embarkation/debarkation port for the Caribbean region. The Port is used by the World's largest cruise lines, Carnival Cruise Line (CCL), Royal Caribbean Group (RCG), MSC Cruises, and Norwegian Cruise Lines (NCL), and Virgin Voyages. Table 1-2 summarizes the characteristics of the nine cruise terminals. The cargo terminals are located on the south and east sides of the Port. There are also tenant spaces at the Port, primarily in the center of the island, for offices, administration, operations, maintenance, fire and rescue, and United States Customs Border Protection.

Figure 1-2 Existing Port Functional Areas By Type



Source: PortMiami 2050 Master Plan, 2024.

Figure 1-3 Existing and Under Construction Cruise Terminals



Source: PortMiami 2050 Master Plan, 2024.

Table 1-2 Cruise Terminal Characteristics

Terminal	Interior Facility Size (Square feet)	Primary Tenant	Passenger Capacity	Year Built / Refurbished
A	208,953	RCG	>6,000	2018
B	189,730	NCL	5,000	2021
C	190,995	NCL	5,000	1980 / 2020
D	141,548	CCL	>4,000	2007 / 2013
E	127,851	CCL	>4,000	2007 / 2018
F	216,384	CCL	>7,000	2023
G	143,744	RCG	3,000	1999
J	56,706	SMALL SHIPS	<1,500	1988
V	129,613	Virgin	<3,000	2022

Source: PortMiami 2050 Master Plan, 2024.

Since initial construction in the early 1970's, the cruise terminals have undergone a series of development and redevelopment to address increased ship sizes, market growth, and additional

government functions at the Port. The Port is continuously making improvements to address changes in the cruise industry and market. To prepare for the future, PortMiami developed a 2050 Master Plan, completed in 2024, which identifies facilities that will require on-going capital projects to manage increased passenger throughput and accommodate mega-vessels.

There are more than 10,000 public parking spaces at the Port for cruise ship passengers, visitors, and employees to use (Table 1-3). These spaces are in both surface lots and parking structures located throughout the Port. The locations of available parking spaces are often not within close proximity to the cruise terminal that passengers are accessing, creating circulation challenges (Figure 1-4). In addition, as depicted in Figure 1-3, the cruise terminals themselves are also widely spaced, making pedestrian access between terminals difficult. Passengers often must walk long distances with luggage or be transported between the parking areas and cruise terminals, increasing traffic circulation within the Port's premises.

Table 1-3 Port Parking Facilities

Type	Garage Facility	Capacity (spaces)	Uses
Garage	A	1,046	Cruise
	B	809	Cruise / Govt Agency
	C	1,355	Cruise / Port staff
	D	822	Cruise / Govt Agency
	V-G	1,735	Cruise / Tenants
	J	703	Cruise
	K	2,218	Tenants / Cruise
Surface Lots	D	135	Cruise / Govt Agency
	E	511	Cruise
	RCG	1,173	Tenants
	Under Bridge / Admin and Tenant Lots	335	POM / Visitor
Total		**10,842**	

Source: PortMiami 2050 Master Plan, 2024.

Figure 1-4 Port Parking Locations

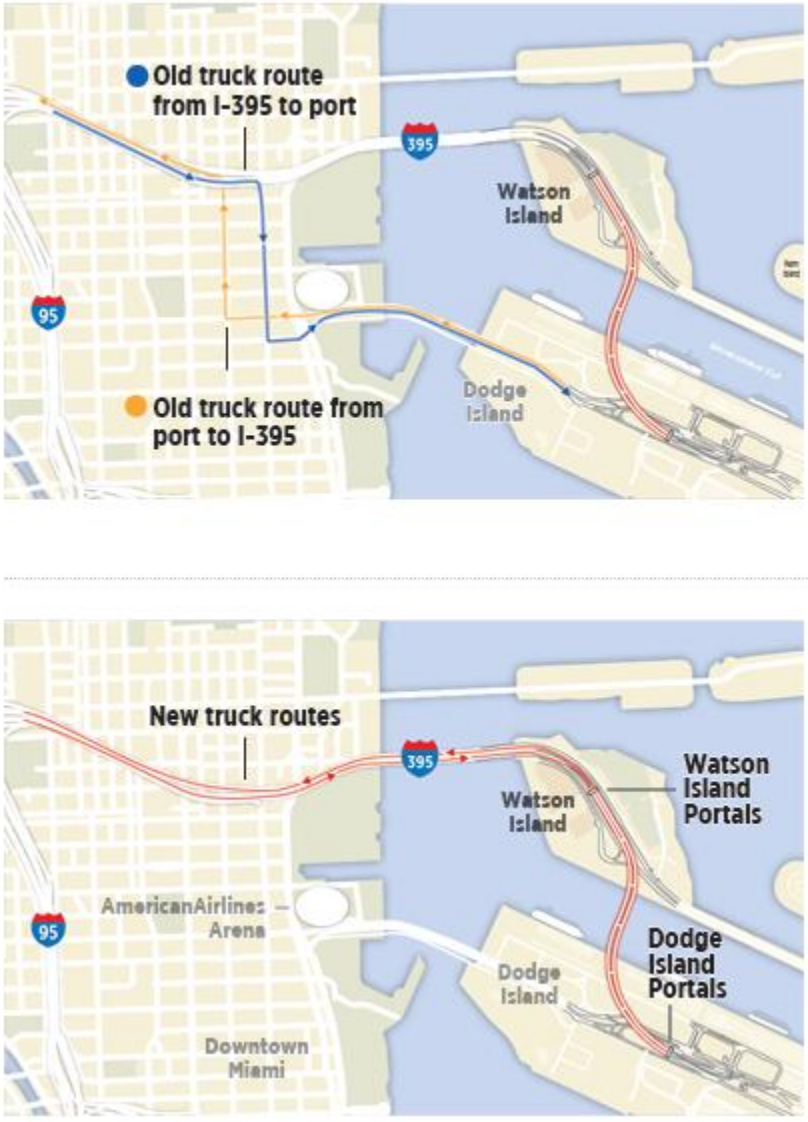
Source: PortMiami 2050 Master Plan, 2024.

There are currently three surface transportation connections to PortMiami from the mainland: a roadway bridge, a roadway tunnel, and a railroad bridge.

The roadway bridge is a high-level fixed bridge carrying Port Boulevard over the Intercoastal Waterway. The bridge has six-lanes, three in each direction. It was constructed in 1991 because of an Agreement between the City of Miami and Miami-Dade County, which also committed to build a tunnel to relieve port traffic from the Downtown streets, and envisioned that part of the bridge would be converted for a potential mass-transit connection between the Port and Downtown in the future after tunnel construction. The Port Bridge was designed to support a Metromover Extension to the Port with minimal cost for retrofit. The current Port Bridge replaced the first vehicular bridge connection between the Port and Downtown, which was built in the 1960's. This vehicular bascule bridge is still in place but is no longer in use and has been left in place in an open position since the current, high-level fixed bridge was built to its north.

PortMiami Tunnel was constructed and opened to traffic in 2014. The Tunnel allowed Port traffic to move directly to and from the Interstate Highway System to the Port. Prior to the construction of the tunnel, the only vehicular route to and from the Port was over the roadway bridge (Figure 1-5).

Figure 1-5 Port Miami Access Before and After Tunnel



source: https://media.miamiherald.com/static/media/projects/2014/port-tunnel/. Retrieved 5/21/24. (Miami Herald)

The railroad bridge was constructed in the 1960's and operated until it was damaged in 2005 by Hurricane Wilma and rail service was suspended. This bascule bridge and rail line were rehabilitated using a Transportation Investment Generating Economic Recovery (TIGER) II federal grant and rail service was restored in 2014. The TIGER II grant indicated that the restored rail connection could include a passenger rail station that may be added at the Port in the future. Florida East Coast (FEC) currently operates freight rail service on the line connecting cargo to and from PortMiami with the FEC yard in Hialeah, which from there connects to the United States rail network.

Public transportation access options to PortMiami from MIA currently take approximately 45 minutes or longer (including walking times on either end), and require the use of several different services:

- MIA Mover to Miami Intermodal Center (MIC) (3 minutes)
- Metrorail Orange Line to Historic Overtown/Lyric Theatre Station (15 minutes)
- Metromover to Freedom Tower Station (3 minutes)
- City of Miami Coral Way Trolley across the PortMiami Bridge (20 minutes)

Figure 1-6 Existing Public Transportation from Port Miami to MIA

Miami-Dade County Metrobus could also be utilized requiring connections between several routes and over an hour of travel time. In addition, many cruise operators offer private shuttles between the airport and their cruise terminal. Cruise passengers also utilize "*ride-hailing*," "*ridesharing*," or private car services, transportation network companies (TNC) such as Uber and Lyft, private taxis, and rental cars.

Miami International Airport (MIA)

MIA is located on 3,230 acres west of Downtown Miami and approximately eight miles west of PortMiami. MIA is owned by Miami-Dade County and operated by the Miami-Dade Aviation Department (MDAD). As the busiest airport for international cargo and the second busiest airport for international passengers in the United States, MIA leads the nation in flights to Latin

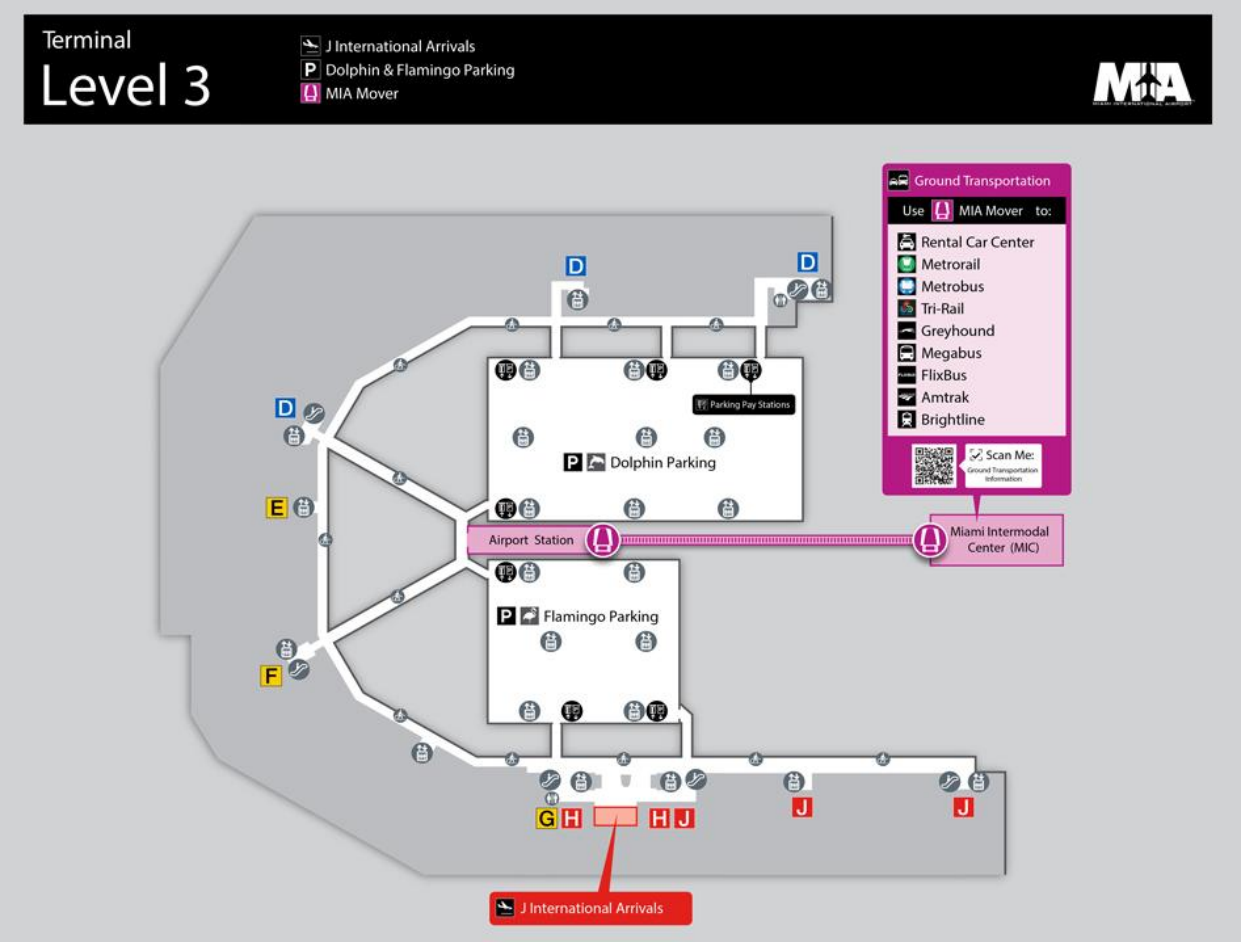
America and the Caribbean.[13] In 2023, the airport served 52.3 million passengers. To accommodate anticipated growth, MIA is currently undertaking a $7 billion capital improvement program focused on modernization and expansion projects.[14]

The MIA Mover is a free elevated people mover system which connects MIA's passenger terminals, the Rental Car Center, and the MIC.[15] It is located on the third level between the Dolphin and Flamingo garages (Figure 1-6). The MIA Mover has the capacity to transport more than 3,000 passengers per hour.[16]

The MIC is a ground transportation hub located to the east of MIA with Tri-Rail, Metrorail, Metrobuses, MIA Mover, and bus services under one roof. The MIC opened in 2015 and is the largest transportation hub in Florida. The MIA Rental Car Center at the MIC is a 3.4 million square foot facility that opened in 2010 consolidating under one roof the operations of 13 rental car companies, with a combined inventory of 6,500 rental cars.[17]

[13] (Miami-Dade Aviation Department, 2024)
[14] Ibid.
[15] Ibid.
[16] Ibid.
[17] Ibid.

Figure 1-7 MIA Mover



Source: (Miami-Dade Aviation Department, 2024)

Downtown Miami

Downtown Miami is the Central Business District (CBD), governmental, and cultural center of the Miami metropolitan area. Downtown is one of the oldest areas of Miami with several historic districts. Downtown Miami is a center for high-rise residential buildings and office towers, making it one of the most populated downtowns in the United States. Areas of Downtown nearby the Port include the Flagler Street Corridor, Dupont Plaza, Brickell, Government Center, Miami Bayfront, and the Historic Overtown neighborhood. Two major developments in downtown are located immediately across the bridge from the Port. First, the Bayside Marketplace, located on a City of Miami-owned waterfront site, which is a major retail and entertainment complex in the region as well as a destination for PortMiami cruise ship passengers and crews. Additionally, there is the Kaseya Center, located at the entrance to PortMiami, which is a 20,000-seat arena with a 1,200-car parking garage. The Kaseya Center is home to the Miami Heat professional basketball team and hosts a variety of concerts and other entertainment activities. The Port is located approximately one mile east of Downtown, while MIA is located seven miles northwest of this area.

1.2. Existing Transportation Services

The study area includes a mix of heavy rail, automated people mover (APM), bus, commuter rail, intercity rail, trolley service, and micromobility provided by several different operators.

The Miami-Dade County Department of Transportation and Public Works (DTPW) provides transportation services and manages public works services in the County. DTWP is the largest transit agency in Florida, and the 15th largest public transit system in the United States.[18] Transportation services provided include Metrobus, Metrorail, Metromover, paratransit, other transportation services and policy development.[19] DTPW is also responsible for the planning, design, construction, and maintenance of 7,690 road miles, 18.56 million feet of sidewalk, 199 fixed and eight moveable roadway bridges, as well as 400 miles of bicycle lanes, trails, and greenway. DTPW is also responsible for 27,668 streetlights, 80,000 stormwater drainage structures, telecommunications infrastructure, and micromobility network.[20] Public transportation services provided by DTPW include:

Metrorail: The Metrorail system is a 25-mile two track heavy rail system that provides service to MIA, Kendall, South Miami, Coral Gables, Downtown Miami, Civic Center/Jackson Memorial Hospital area, Brownsville, Liberty City, Hialeah, and Medley.[21] (Figure 1-7) There are two Metrorail lines, the Orange Line and the Green Line. The Orange Line provides service from MIA to Downtown and Dadeland South, and the Green Line provides service from the Palmetto Station in Medley to the Dadeland South Station in Kendall. Green Line passengers to MIA must transfer at Earlington Heights to a northbound Orange Line train to MIA.

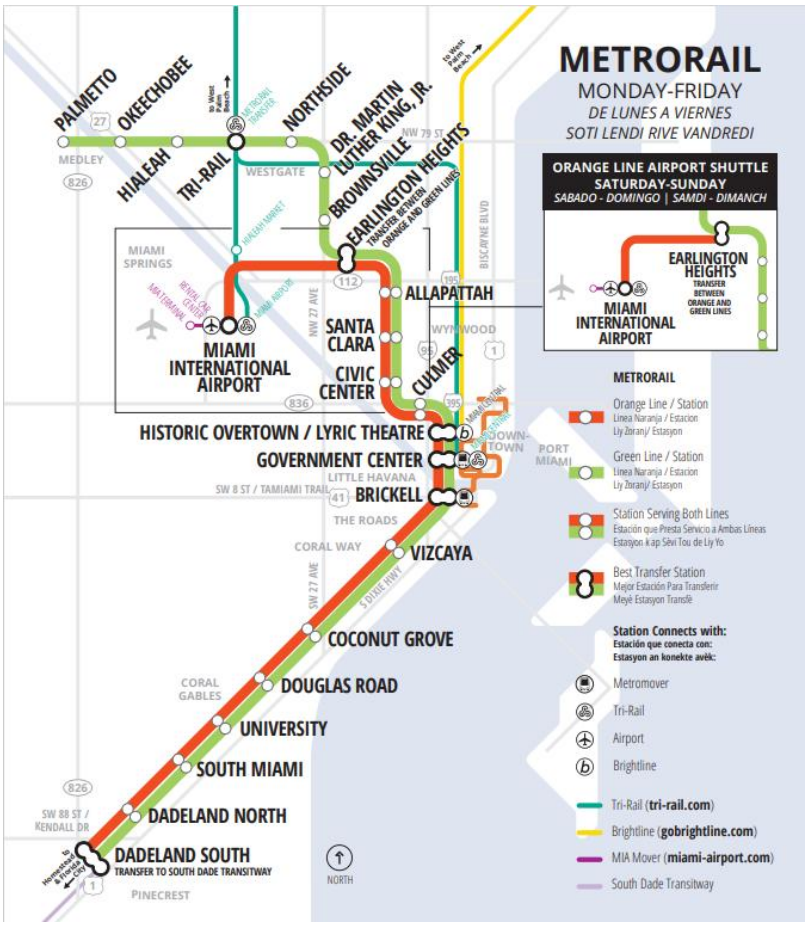
Metrorail operates from 5:00 a.m. to 12:00 a.m. seven days a week. Weekday service frequency is 10 minutes during the morning and evening peak periods on each line (five minutes on the combined sections), 15 minutes daytime off peak (7.5 minutes on the combined sections), and 30 minutes at night. Weekend frequency on the Orange Line is 15 minutes and Green Line is 30 minutes.

The Orange Line provides service to MIA on weekdays. On weekends, Orange Line trains only provide Airport Shuttle train service between Earlington Heights and MIA with a 15-minute frequency.[22] All Metrorail passengers to MIA must transfer at Earlington Heights on weekends.

The Historic Overtown/Lyric Theatre station is the closest Metrorail station to the Port. Nearby this station, transfers can be made to Brightline, Tri-Rail, Metromover, or Metrobus.

[18] (Miami-Dade County, 2024)
Ibid.
[20] Ibid.
[21] (Miami-Dade County, 2024)
[22] This is due to maintenance work on the tracks.

Figure 1-8 Metrorail System



Source: https://www.miamidade.gov/transit/library/metrorail-map.pdf.

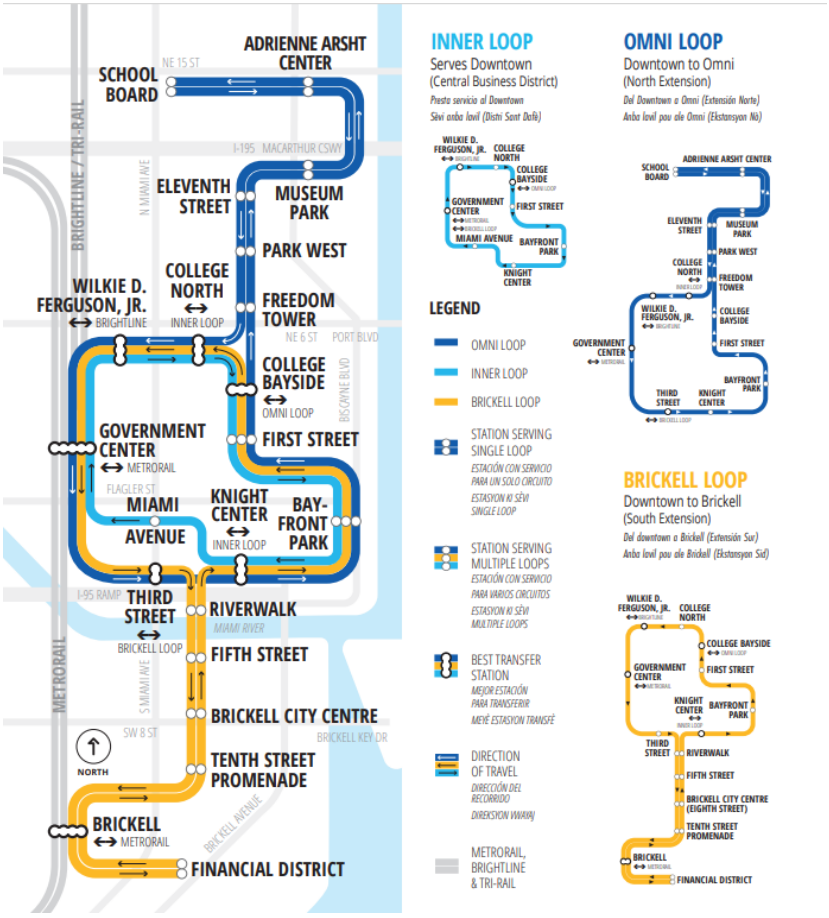
Metromover: The Metromover is an elevated APM system that operates seven day a week in the Downtown Miami, Omni, and Brickell areas (Figure 1-8).[23] Destinations served include the Kaseya Center, Bayside Marketplace, Miami Dade College, the Miami-Dade County School Board, and Brickell's Financial District. There are 21 Metromover stations. Service is fare-free, and operates from 5:00 a.m. to 12:00 a.m. The system includes 4.4 miles of track and consists of three separate loops:

- Omni Loop
- Inner Loop
- Brickell Loop

The closest Metromover stations to PortMiami are Freedom Tower Station on the Omni Loop, as well as College Bayside Station and College North Station, which are on all three loops.

[23] (Miami-Dade County, 2024)

Figure 1-9 Metromover System



source: https://www.miamidade.gov/transit/library/metromover-map.pdf

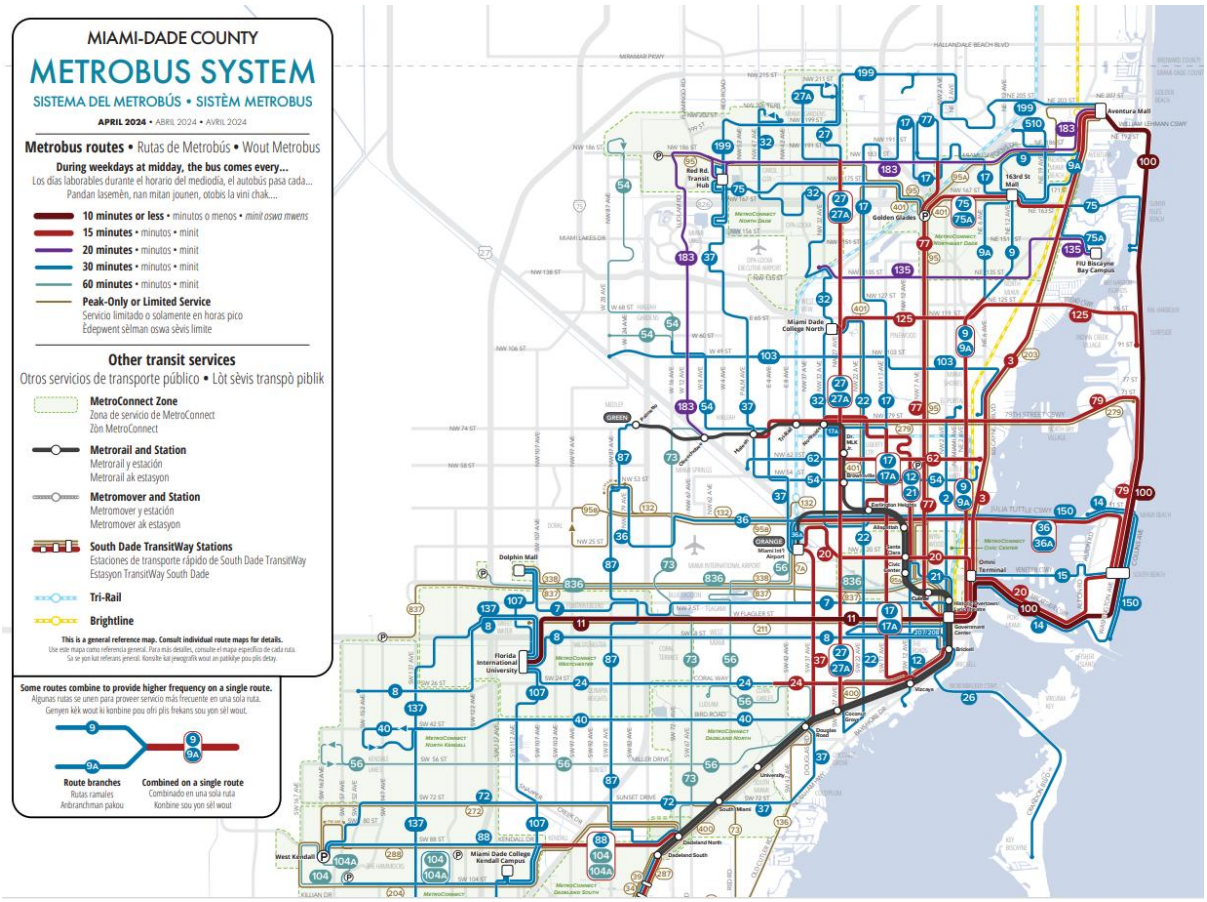
Metrobus: Metrobus serves Miami-Dade County major shopping, entertainment, and cultural centers, as well as major hospitals and schools. It has services available from Miami Beach, Key Biscayne, West Miami-Dade, Broward County, Homestead, Florida City, and the Middle Keys. There are 70 Metrobus routes (Figure 1-6),[24] with the routes serving MIA including:

- Route 7/7A Downtown Miami-Dolphin Mall-Airport via 7 Street
- Route 20 Airport Station–Miami Beach-Lincoln Road
- Route 36/36A Miami Beach-Airport-Doral
- Route 37 Miami Lakes-South Miami via Palm/NW 37 Avenue
- Route 56 Airport-Miler Road/162 Avenue via Coral Gables
- Route 150 Miami Beach Airport Express

There are no Metrobus routes to PortMiami; the closest routes are Routes 3, 100, and 203 at the stop on Biscayne Boulevard and NE 6 Street (Figure 1-10).

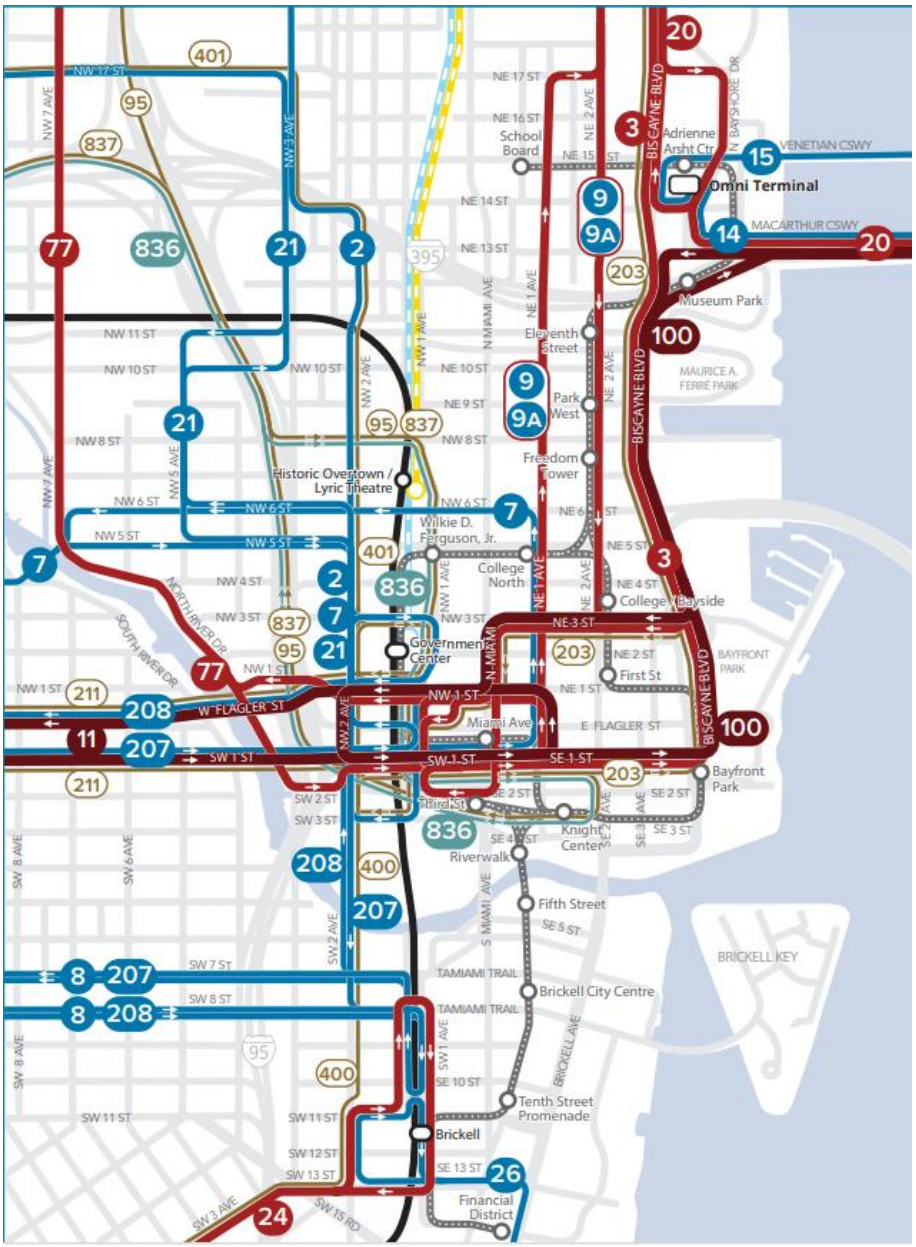
[24] (Miami-Dade County, 2024)

Figure 1-10 Metrobus System in Miami-Dade County



Source: https://www.miamidade.gov/transit/library/system-map-brochure.pdf (Miami-Dade County, n.d.)

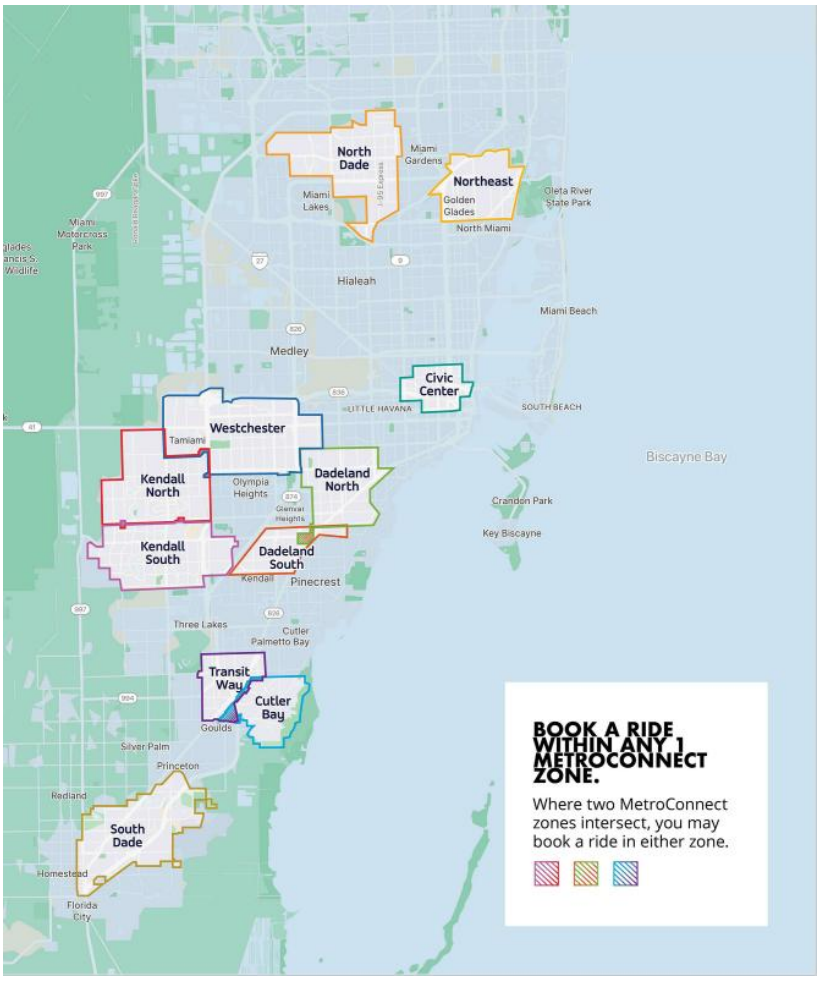
Figure 1-11 Metrobus System in Downtown Miami



Source: https://www.miamidade.gov/transit/library/system-map-brochure.pdf

MetroConnect: MetroConnect is an on-demand, shared ride micromobility service, formerly known as GO Connect, serving 10 areas across Miami-Dade County (Figure 1-11). It is a free service powered by the MetroConnect app, which can be downloaded to connect with others heading in the same direction. Downtown Miami falls within the Civic Center zone, but neither PortMiami nor MIA are included in any of the MetroConnect zones.

Figure 1-12 MetroConnect in Miami-Dade County



Source: https://www.miamidade.gov/transit/library/metroconnect-zones-map.pdf (Miami Dade County, 2024)

Coral Way Trolley

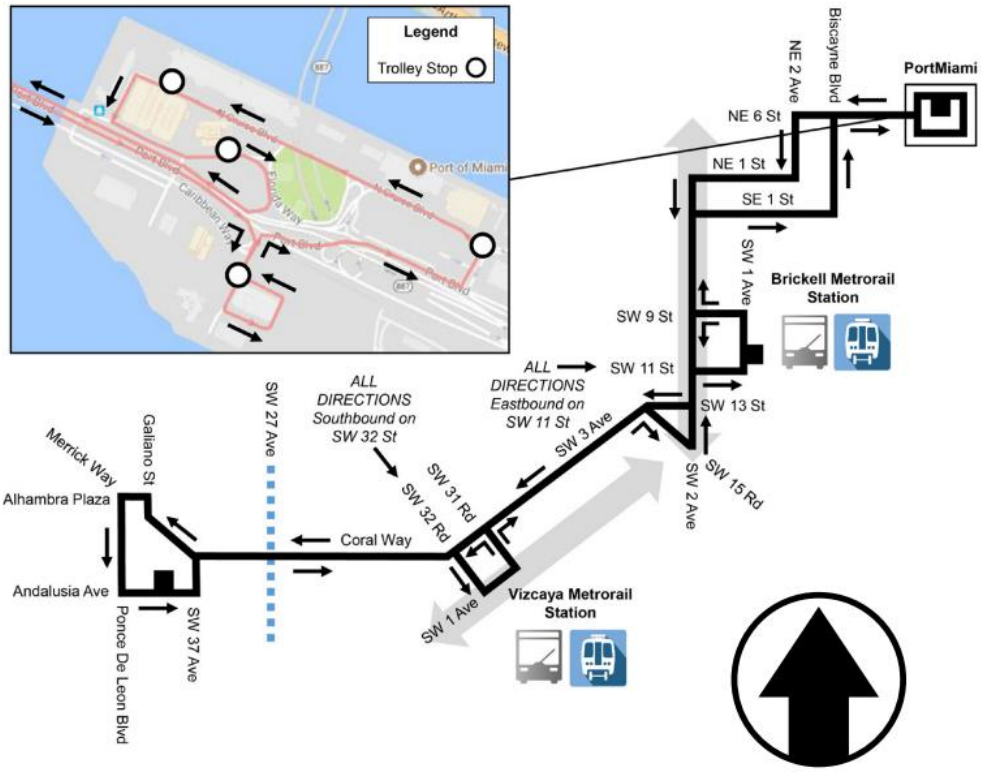
The City of Miami operates several trolley routes using rubber tire buses with the appearance of historic trolleys. The Coral Way Trolley route operates through downtown with stops at the Port. It is a free service every 15 minutes from 6:30 a.m. to 11:00 p.m. during weekdays and Saturdays, and from 8:00 a.m. to 8:00 p.m. on Sundays. There are several on-Port stops,[25]which are:

- Southside across from Cruise Terminal J Parking Garage
- Northside across from Cruise Terminal E Parking Lot and North Cruise Boulevard
- Northside across from PortMiami administrative offices

[25] (City of Miami, 2024)

The trolley crosses the PortMiami Bridge and serves off-port stops at numerous downtown locations including Freedom Tower/Kaseya Center, Miami-Dade College, and the Government Center.

Figure 1-13 Coral Way Trolley



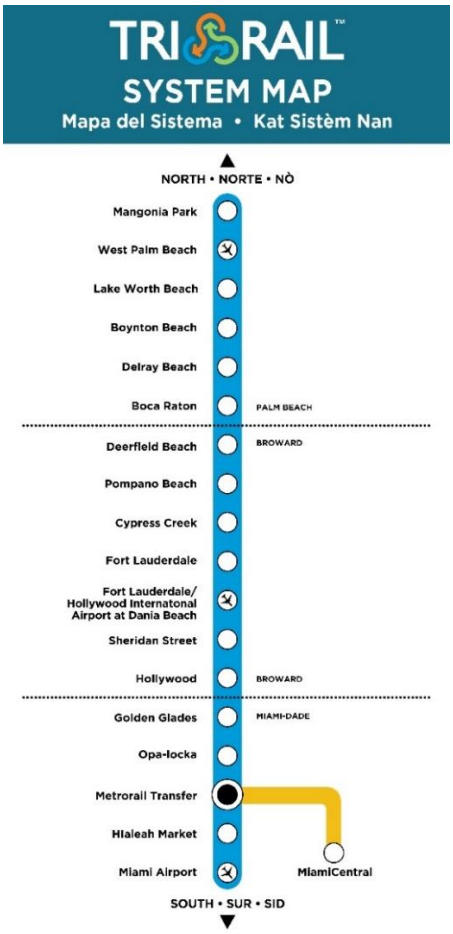
Source: https://www.miami.gov/files/assets/public/v/1/document-resources/pdf-docs/trolley-maps/trolley-maps-2024-coralway_508.pdf (City of Miami, 2024)

Tri-Rail

Tri-Rail is the 73.5-mile commuter rail system operated by the South Florida Regional Transportation Authority (SFRTA) in Broward, Miami-Dade, and Palm Beach Counties. Tri-Rail provides service to 19 stations (Figure 1-12). It operates 50 weekday trains (3:50 a.m. to 11:40 p.m.) and 30 weekend/holiday trains (4:50 a.m. to 10:40 p.m.) at 30-minute headways during weekday peak hours, and 60-minute headways during weekday off peak hours, weekends, and holidays.[26] Tri-Rail had approximately 3.7 million riders in 2023.[27]

[26] (Tri-Rail, 2024)
[27] Ibid.

Figure 1-14 Tri Rail System



Source: https://www.tri-rail.com/pages/view/system-map

Service on the nine-mile Tri-Rail Downtown Miami Link (DTML) began operations on January 13, 2024. The new service is a shuttle train between the Tri-Rail/Metrorail Transfer Station in Hialeah and MiamiCentral Station in Downtown Miami, which is the closest to the Port. The service operates from the South Florida Rail Corridor (SFRC) onto the Florida East Coast (FEC) Railway, switching to the FEC's Little River Branch on the Iris Connection south of the Tri-Rail/Metrorail Transfer Station, heading east to the FEC main line. A train-to-train transfer to other services can be made at the Tri-Rail/Metrorail Transfer Station and the Miami International Airport Station at the MIC. There are 26 trains per day, which represents 13 daily round trips.

Brightline

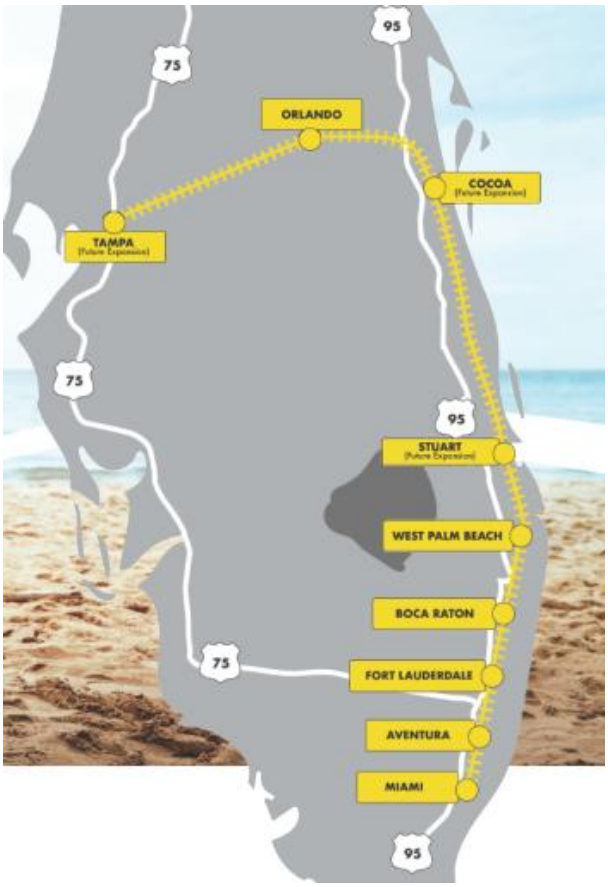
Brightline provides intercity rail service between Miami and Orlando with stops in Aventura, Fort Lauderdale, Boca Raton, and West Palm Beach (Figure 1-13). Most of the route, including in Miami-Dade County, runs on track owned by, and shared with, the FEC Railway. Brightline serves Miami at MiamiCentral Station, located at 600 NW 1 Avenue, since 2018. The station contains three million square feet of mixed-use development, including residential, office, commercial, and

retail uses. At or nearby the station connections can be made to Metrorail, Metromover, Metrobus, City of Miami trolley, and Tri-Rail.

There are 16 daily round trips between Miami and Orlando. Service is approximately hourly from 6:00 a.m. to 12:00 a.m.[28] The trip from Miami to Orlando is approximately 3 hours and 25 minutes.[29]

Brightline offers a premium "*From Station to Vacation*" ticket that includes a complimentary Brightline+ ride from the station to the Port.[30] Brightline also operates a fixed route shuttle from Central Station to MIA that runs daily, departing 10 minutes after southbound train arrivals.[31] The cost is $10 for the first passenger and $5 for additional riders in the same party.

Figure 1-15 Brightline Florida Route



Source: https://www.gobrightline.com/press-room/media-kit-maps (Brightline, 2024)

[28] (Brightline, 2024)
[29] Ibid.
[30] (Brightline, 2024)
[31] (Brightline, 2024)

2. Port and Airport Plans and Projects

PortMiami and MIA planning documents were reviewed, including projects related to public transportation.

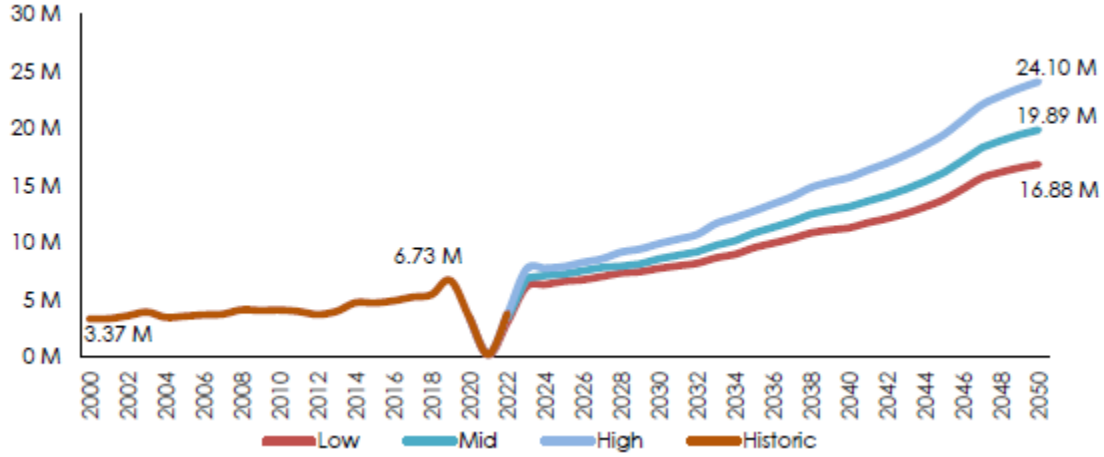
2.1. PortMiami 2050 Master Plan

The PortMiami 2050 Master Plan completed in 2024 establishes concepts to address the future needs at the Port including capital improvement projects to support the anticipated increase in cruise passengers and ships and the growth in cargo traffic. [32] The PortMiami Master Plan is a sub-element of the Miami-Dade County Comprehensive Development Master Plan (CDMP).

2.1.1. Cruise Demand

Five major cruise operators, Carnival Cruise Lines, Royal Caribbean Group, Norwegian Cruise Line, MSC Cruises, and Virgin Voyages, serve PortMiami, carrying approximately 87% of all passengers at the Port.[33] The Master Plan projects cruise ship passengers to increase from 7 million in 2023 to 24 million in 2050, and cargo to increase from 1.2 million TEUs in 2023 to 3 million in 2050[34] (Figure 2-1).

Figure 2-1 Cruise Passenger Projections

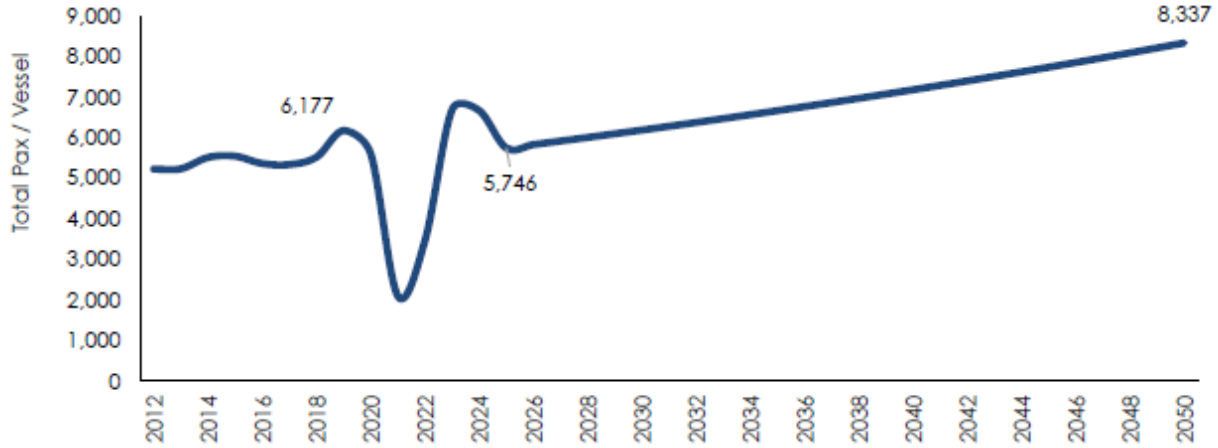


Source: PortMiami 2050 Master Plan, 2024.

Vessel size is anticipated to continue increasing during the same period, leading to growth in the average number of passengers per vessel from the current 5,000 cruise ship passengers to more than 8,000 cruise ship passengers per vessel by 2050 (Figure 2-2).

[32] (PortMiami, 2024)
[33] (PortMiami, 2024)
[34] A TEU is the twenty-foot equivalent unit used to describe the capacity of container ships and container terminals

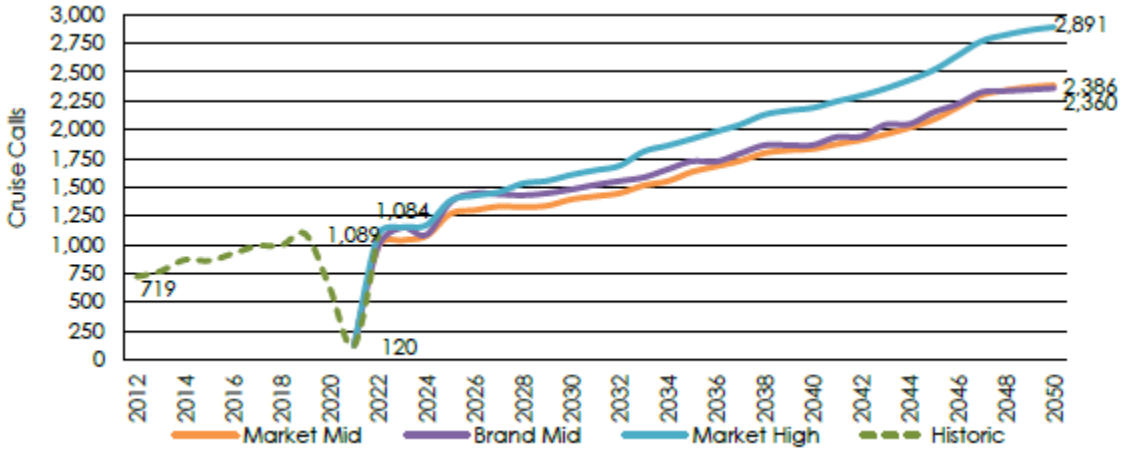
Figure 2-2 PortMiami Average Passengers Per Vessel, 2012 - 2050



Source: PortMiami 2050 Master Plan, 2024.

During the same period, the total number of cruise ship calls is projected to increase from approximately 1,000 currently to up to almost 3,000 by 2050 (Figure 2-3).

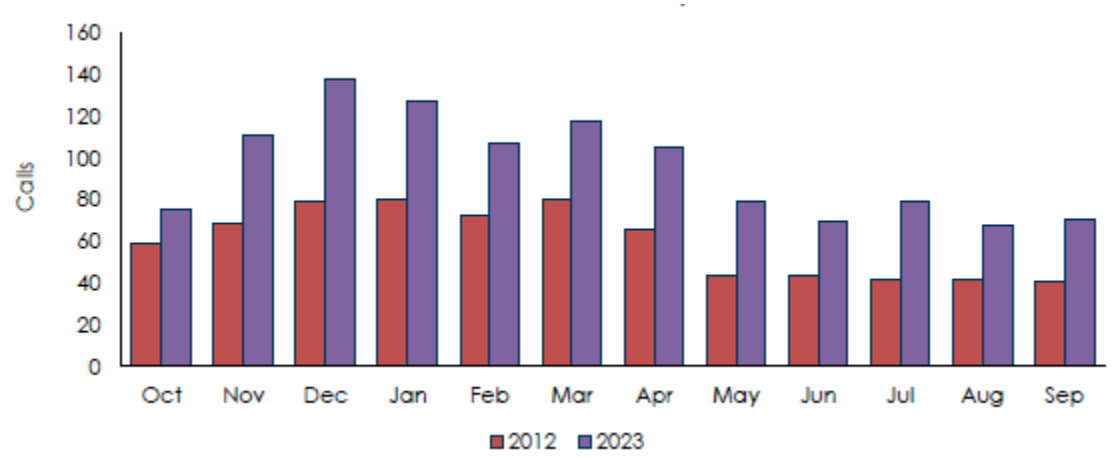
Figure 2-3 PortMiami Cruise Ship Calls, 2012 - 2050



Source: PortMiami 2050 Master Plan, 2024.

The cruise ship calls are distributed according to several distinct utilization patterns. Seasonal patterns affect PortMiami, as the winter season has more operations, due in large part to travelers from colder climates going on cruises to the Caribbean. The peak occurs in the winter months from November to April, with the slowest cruise season being the summer from June through September (Figure 2-4).

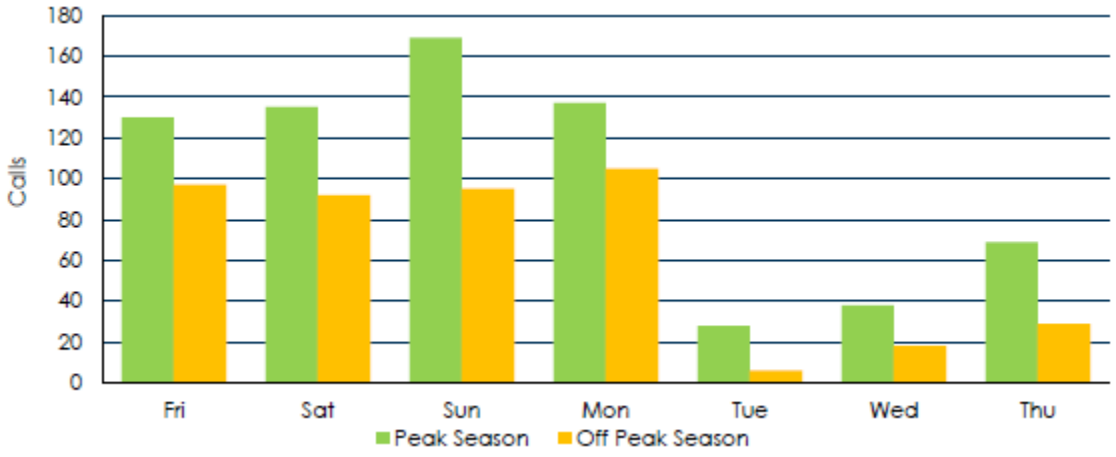
Figure 2-4 PortMiami Cruise Ship Seasonality



Source: PortMiami 2050 Master Plan, 2024.

Daily patterns of use have evolved over time. While at one time virtually all cruises would leave home port on Saturday, use on other days of the week has increased, with many terminals now being used up to four days per week. Friday, Saturday, Sunday, and Monday are the busiest days, with 84% of passengers traveling to/from the Port on these weekend days, while only 16% of passengers doing so on midweek days (Figure 2-5).

Figure 2-5 PortMiami Cruise Ship Daily Calls in Peak and Off-Peak Seasons



Source: PortMiami 2050 Master Plan, 2024.

The hourly patterns of use follow morning and afternoon peak periods of travel. Cruise ships typically arrive in PortMiami between 6 a.m. and 8 a.m. Therefore, the peak hours for cruise ship passenger disembarkation occur between 7 a.m. and 11 a.m. The peak hours for cruise ship passenger embarkation are between 10:30 a.m. and 3 p.m. Cruise ships typically depart PortMiami between 4 p.m. and 6 p.m.

Cruise ship passengers to PortMiami are increasingly requiring automobile parking. Factors that determine demand for parking are[35]:

- Cruise Length: Shorter cruises have a higher parking demand than longer cruises
- Cruise Line: Cruise operators that source passengers locally have a higher parking demand than other operators that source passengers from further away or internationally
- Market Source: The closer the marker source, the higher the parking demand, except for very close sources which may utilize rideshare or taxi.

The Master Plan estimates that by 2050 the Port will need a total of between 13,000 and 17,000 parking spaces to meet demand. Therefore, 4,000 to 8,000 additional spaces would be needed.

2.1.2. Master Plan Recommendations

The Master Plan includes a $7.9 billion capital improvement plan with major investments that Miami-Dade County will make by 2050. Because PortMiami is an island port, the proposed projects support future space needs with densification and by maximizing bulkhead usage. New projects in the Master Plan to support increased cruise passengers include[36]:

- Strengthening of the cruise bulkhead for the mega-cruise vessels
- Development of a new cruise terminal G and a smaller terminal next to J
- Construction of a triple cruise terminal AA/AAA, which will be the world's largest cruise terminal along with new wharfs (8, 9, and 10) to support the triple terminal
- Upgrades to existing terminals
- New parking garages
- Roadway improvements

The projects in the Master Plan are phased into three 10-year periods:

- The first 10-year period includes completion of the new cruise terminal on the north side of the island, development of an inland port in Miami-Dade County, funding of the Royal Caribbean Group campus, and starting the Cargo Central Project
- The second 10-year period includes the off-site port facilities and ongoing infrastructure, parking, dredging, and further work on the Cargo Central Project
- The third and last 10-year period includes two additional cruise terminals on the south side and an additional cargo berth

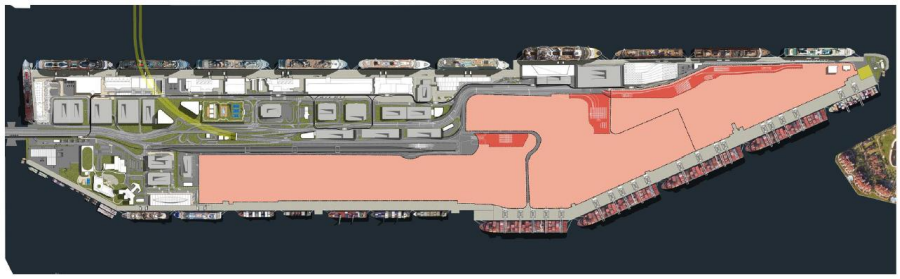
The Master Plan includes in years 2040 through 2043 a Metromover Extension project with a 10 percent local share of $26 million per year.[37]

The Master Plan outlines that, to accommodate the projected cruise demand, the 12 existing terminals will need to adjust their usage patterns. This includes increasing daily utilization and varying operating hours to include off-peak times, thereby reducing peak periods for staffing,

[35] (PortMiami, 2024).
[36] Ibid.
[37] Ibid.

operations, and traffic. The Plan also proposes to add two new cruise terminals towards the end of the planning period, which are on the south channel and would therefore be limited to small ships that can navigate the area. Figure 2-6 depicts the Master Plan at the Port in the year 2050.

Figure 2-6 PortMiami Preferred 2050 MasterPlan



Source: PortMiami 2050 Master Plan, 2024.

The Master Plan projects that 16,000 parking spaces will be needed by 2050. The Plan proposes consolidating parking for different terminals in the Port Central area. The Port Central Plan (Figure 2-7) also includes ground transportation areas for taxis, rideshare providers, and future stations for transit connections to the mainland, as well as other support functions including a park, open space, offices, and possible hotel development.

Figure 2-7 Port Central Plan

Source: PortMiami 2050 Master Plan, 2024.

The 2050 Master Plan notes that by far, the biggest challenges facing the Port in the future will be access and transportation. The Port is undertaking a separate Transportation Master Plan; therefore, the 2050 Master Plan deferred transportation recommendations to that document. The Master Plan notes that some of the operational strategies that need to be considered include:

Cruise

- Shift sailing hours of the cruise ships to stretch the traffic peak period as all the terminals cannot operate at the same time
- Study a smart system to allocate berths at the time berths are assigned, which will consider ship capacity to avoid peaking (i.e., not bringing in all the big ships at the same time on the same day)

- Develop off-site cruise passenger parking with shuttle service to the Port

Cargo

- Work with terminal operators to shift cargo truck patterns and gate operating hours
- Provide off-site truck marshalling areas with smart dispatch to the Port for arrival at the best possible time
- Relocate cargo storage to off-site Port locations and use rail to move it
- Implement a more robust intermodal capacity for cargo carriers
- Shift more traffic to intermodal rail

Infrastructure

- Develop an internal circulation master plan and execute
- Provide as many direct access routes as possible to the tunnel, bypassing other activities
- Study the final disposition of NE 5 Street and NE 6 Street to provide more capacity
- Smart allocation of tunnel capacity for cruise and cargo customers in a planned fashion
- Start the process of implementing a transit connection between the Port and MIA

Development

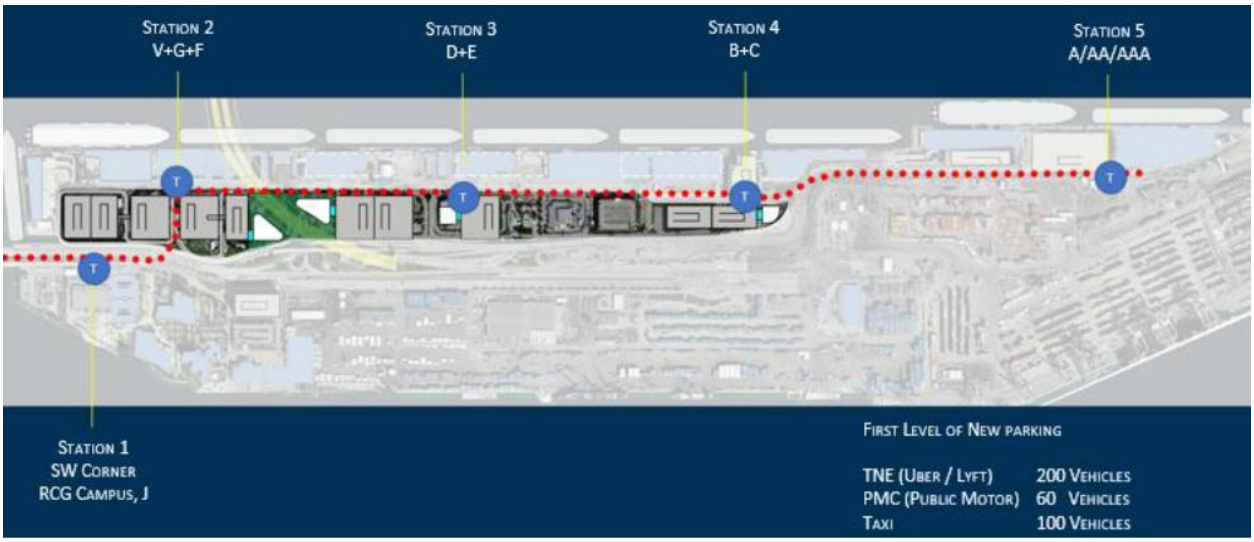
- Prioritize development at the Port that will minimize traffic peaking such as hotels, which will generally limit guests' use of the roadways at peak hours.
- Centralize employee parking and employee services at the Port

The site analysis in the Master Plan includes a description of a possible extension of the Metromover system to the Port which would achieve the following:

- Connect the Port to Downtown, alleviating business traffic between the two sites.
- Serve the commuter needs for employees at the Port including the major employers at the Port and the thousands of employees working there.
- Along with the Metrorail connection that was built to serve MIA, this would provide the highly desirable airport-port connector allowing passengers to transfer from MIA to ships at the Port.
- The Metromover can also serve as a connector between cruise terminals at the Port allowing parking to be shared across most terminals.
- The Metromover would take advantage that the Port's high-level bridge was designed so that the Metromover could run on it by realigning the traffic lanes and guard rails.

The Master Plan indicates that the stations could be located within walking distance of the terminals, and provides a conceptual layout as a guide to the location of the potential construction envelopes so that possible right-of-way acquisition can be avoided in future plans (Figure 2-8)

Figure 2-8 Port Central Conceptual Transit Layout



Source: PortMiami 2050 Master Plan, 2024.

The Preferred Plan in the Master Plan indicates that the Transportation Master Plan should consider:

> *Future inclusion of a connection to the Metromover system. The Metromover extension was the subject of a study by the Miami-Dade TPO, which concluded that the system could be extended from outer loop of the existing Metromover into the port using one of the existing high-level bridge lanes as the bridge was designed originally for this purpose. Internally within the port, the system can be connected to a series of stations serving the main cruise terminal hubs and the port's southwest corner and cruise central area. By incorporating the Metromover into the port, cruise passengers coming from MIA can move to and from the port using mass transit.*

2.2. MIA Master Plan and Capital Improvement Program

In 2008, MDAD initiated the Strategic Airport Master Planning Study (SMP) for the Miami-Dade County System of Airports. The SMP was an update to the previous Master Plans, comprising MIA and its four general aviation airports. In lieu of submitting a comprehensive airport master plan report to the Federal Aviation Administration (FAA), MDAD elected to submit stand-alone Aeronautical Forecasts documents and Airport Layout Plan (ALP) set for FAA review and approval[38]. The ALP Narrative Report described the planning and rationale that resulted in the identification of a preferred development scenario for MIA, and summarizes the drawings included in the ALP set. The purpose of the ALP set was to provide Airport management with a scaled, graphic presentation of the Airport's 20-year development program through 2035. For capital planning considerations, the Plan included facilities and infrastructure development

[38] (Miami-Dade Aviation Department, 2015)

initiatives for a preferred development scenario categorized into four development phases from 2016 through 2035.

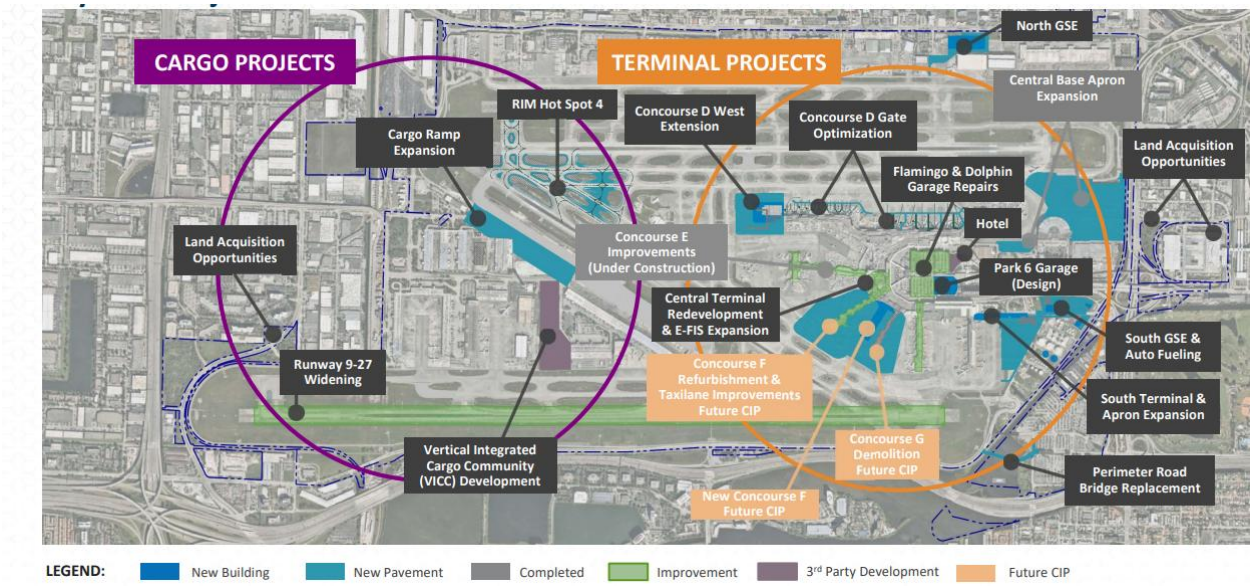
MIA has an economic impact of $118 billion, 700,000 jobs to the local economy.[39] In 2023, MIA ranked as second busiest in U.S. for international passengers, first in international cargo, tenth for total aircraft operations.[40] MIA had 52.3 million passengers in 2023, the second record breaking year in a row. By the year 2040, MIA is anticipated to reach 77 million passengers and 4 million tons of freight cargo. [41] Annual aircraft operations were 429,454 in 2023 and are projected to reach 646,000 by 2040. To address this projected capacity growth and associated operational needs, MIA has adopted a Capital Improvement Program (CIP) which will fund up to $7 billion in airport modernization projects to address the airport's future capacity and operational needs over the next 15 years. [42] As the demand for air travel in the County continues to grow, the undertaking of the CIP is vital for enabling this growth while elevating the customer experience.

Implementation of the CIP is on-going, with projects planned through 2040. There are five main parts of the program (Figure 2-9):

- Redevelopment of Central Terminal concourses E and F,
- Expansion of South Terminal concourses H and J,
- Renovation of Concourse D to accommodate additional wide- and narrow-body aircraft and larger regional jets,
- Construction of two new hotels and miscellaneous landside projects, and
- Expansion of aircraft parking and cargo warehouses.

[39] (Miami-Dade Aviation Department, 2024)
[40] Ibid.
[41] (Miami-Dade Aviation Department, 2024)
[42] Ibid.

Figure 2-9 MIA Capital Improvement Program Key Projects



source: CIP Summary Map, https://www.miami-airport.com/capital_improvement.asp.

The ALP and CIP do not contain any projects which will significantly affect travel between the airport and the Port, other than improvements that will increase overall passenger capacity at the airport.

3. Port and Airport Transit Connection Studies and Project Plans

Planning and engineering studies completed within the past 15 years related to connecting PortMiami with MIA in Miami-Dade County were reviewed and are summarized below. Additionally, because of its similarity to this study, previous and ongoing Broward County studies and plans to link Fort Lauderdale International Airport (FLL) with Port Everglades were also reviewed and summarized.

3.1. Transit Options to PortMiami Feasibility Study

The 2013 Miami-Dade TPO study "*Transit Options to PortMiami Feasibility Study*" examined the potential to provide a transit connection between PortMiami and Downtown Miami.[43] Eight alternatives were evaluated in a Tier 1 screening:

Alternative 1: Commuter Rail Extension. Two-mile extension to the Port of the South FEC Corridor from the proposed "*Overtown*" Station (near MiamiCentral). In the Tier 1 screening this Alternative was not advanced because it rated poor in passenger convenience because it would

[43] (Miami-Dade Metropolitan Planning Organization, 2013)

have limited headways, limited station locations, infrequent service, and lower capacity and may not serve the needs of cruise passengers.

Alternative 2: Heavy Rail Metrorail Extension. 1.9-mile extension of elevated Metrorail from the Historic Overtown/Lyric Theater Metrorail Station. In the Tier 1 screening this Alternative was not advanced because it was found to be fatally flawed, having high operational impacts to the existing Metrorail system, high capital costs, and high operating costs.

Alternative 3: Metrorail Shuttle between Overtown and Port. 1.9-mile Metrorail Shuttle operation from the Historic Overtown/Lyric Theater Metrorail Station to the Port. In the Tier 1 screening this Alternative was advanced. However, in the Tier 2 screening it was not advanced because of relatively high construction costs, the need for a new bridge to cross the channel, historic impacts from the elevated guideway on Freedom Tower, and impacts to Overtown Station

Alternative 4: Metromover Shuttle between Freedom Tower Station and Port. 1.6-mile Metromover Shuttle operation from the Freedom Tower Station on the Omni Loop. In the Tier 1 screening this Alternative was not advanced because it because it rated poor in passenger convenience because it may have capacity limitations for cruise with luggage and would require two transfers, and would have high capital costs.

Alternative 5: Metromover Shuttle between Overtown and Port. 1.9-mile Metromover Shuttle operation from south the Historic Overtown/Lyric Theatre Metrorail Station utilizing the 6 Street corridor. In the Tier 1 screening this Alternative was advanced. In the Tier 2 screening this Alternative was advanced as a recommended study Alternative (Figure 3-1).

Figure 3-1 Feasibility Study Recommended Metromover Shuttle Alternative

Source: Miami-Dade MPO, *Transit Options to PortMiami Feasibility Study*, 2013.

Alternative 6: Metromover Outer Loop Extension from Freedom Tower Station. 1.6-mile Metromover extension from just south of the Metromover Freedom Tower Station by providing a new mover switch. In the Tier 1 screening this Alternative was advanced. However, in the Tier 2 screening it was not advanced because it would not meet peak ridership demand and would impact existing Metromover operations.

Alternative 7: Metromover Inner/Outer Loop Extension from College North Station. 1.8-mile Metromover extension would switch from the Inner loop just east of the Metromover College North Station to a new guideway that would cross the Outer Loop and then cross the Omni Loop. In the Tier 1 screening this Alternative was not advanced because it rated high in operational impacts as the construction of this Port Loop would impact the Inner and Outer Loops of the existing Metromover, as well as increasing network headways once operational and would have high traffic impacts and high capital costs.

Alternative 8: Light rail/Streetcar Shuttle from Overtown. 1.9-mile light rail/streetcar shuttle along NW/NE 6 Street and the Port Boulevard Bridge, including new tracks, overhead catenary, and at-grade stations. In the Tier 1 screening this Alternative was advanced. In the Tier 2 screening this Alternative was advanced as a recommended study Alternative (Figure 3-2).

Figure 3-2 Feasibility Study Recommended Light Rail Shuttle Alternative

Source: Miami-Dade MPO, *Transit Options to PortMiami Feasibility Study*, 2013.

The study concluded by recommending the Metromover Shuttle and the Light Rail/Streetcar Shuttle for further study to select an alternative for advancement in design and environmental review. The Metromover Shuttle Alternative advantages were that the extension is short and will be supported by the existing Port Bridge, both of which save on costs, and that there were no identified impacts to wetland or any identified historical resources. The Light Rail/Streetcar advantages were that it would not impact current Metrorail or Metromover operations, had the lowest capital costs, would be able to accommodate various demands in ridership, and could act as a catalyst and precedent for more lights rail in the city. Given the age of the study and the significant transportation improvements and development in the surrounding vicinity in the intervening years, the alternatives screened in this study should be reviewed for consideration.

3.2. Metromover System Expansion Study

The Miami-Dade TPO performed a study of the potential expansion of the Metromover system in 2014. [44] The study examined an East Concept Alternative which would begin at the Overtown/Historic Lyric Theater Metrorail Station, travel east along NW 6 Street, east along Port Boulevard, and terminate mid-port at Panama Way (Figure 3-3). The study identified the following qualitative metrics for the East Extension:

- Infrastructure Constraints – major infrastructure constraints at the Intracoastal Waterway
- Geometric Constraints – high elevations required to cross the Intracoastal Waterway
- Constructability – Intracoastal Waterway increases construction complexity
- Pedestrian Environment – pedestrian environment varies along route

Order of magnitude cost estimates were developed for the East Extension. The first component of the cost was the guideway length. This route has a length slightly over 1.7 miles. Of the total length, approximately 3,700 feet are considered difficult/constrained guideway that travels over the infrastructure constraints such as the Intracoastal Waterway. A unit cost of $15,000 per foot was assumed for the standard guideway length, and a higher unit cost of $30,000 per foot was assumed for the difficult/constrained guideway construction. An additional cost for the supporting columns was also added to the guideway estimate. In addition to the guideway costs, estimates were applied to account for the stations, systems, and vehicle costs. Based on the additional 1.7-mile guideway length, eight new stations were assumed with a total of 14 new vehicles, including spares. The additional guideway length and new vehicles were assumed to require a new maintenance facility, which was also incorporated into the estimate. Other costs include traffic control, the addition of two propulsion power substations, system costs, and other miscellaneous costs. The order magnitude cost for the East Extension was estimated at $560 million.

The increase in operation and maintenance (O&M) costs for the East Extension were estimated using an average annual operational cost of $4.77 million per mile and an average annual maintenance cost of $2.57 million per mile. This resulted in an average annual O&M cost of $7.34 million per mile. The additional O&M cost for the 1.7-mile proposed extension was estimated to be approximately $12.6 million per year.

The East Extension was included as one of six alternatives in a Metromover Master Plan; however, it was not selected as the preferred short-term concept. The preferred short-term concept selected in the study was a South Loop to the Brickell area.

[44] (Miami-Dade Metropolitan Planning Organization, 2014)

Figure 3-3 Metromover System Expansion Study East Extension Alternative

Source: Metromover System Expansion Study Final Report

3.3. Transportation Improvement Program (TIP)

The Transportation Improvement Program (TIP), managed by the Miami-Dade TPO, specifies transportation improvements for the next five years and is updated every year, containing all

projects that receive federal funds, as well as other major projects. The current TIP from Fiscal years 2025-2029 was approved June 27, 2024.[45]

PortMiami's TIP is comprised of approximately $2 billion in funded projects over the next five years. The TIP reflects participation from the Florida Department of Transportation (FDOT) with $32.7 million in support of roadways, cargo improvements and other infrastructure projects. In addition, current PortMiami cruise projects listed include[46]:

- Cruise Terminal G: Expansion to include solar panels, a multimodal parking garage, and roadway improvements.
- Berth 10: An additional berth for Cruise Terminal AA (Shared Terminal) and introduces a resilient bulkhead system capable of addressing future sea level rise.
- Cruise Terminals A and AA Roadways: Construction of a roadway flyover and associated roadway and stormwater improvements, in response to cruise growth and to optimize Cruise Terminal access and circulation, minimize traffic congestion and reduce delays.
- Cruise Terminals AA (Shared Terminal): Partnered with MSC Cruise Line on the design and construction of two new cruise berths, a shared "*state of the art*" multi-vessel Cruise Terminal, and Parking Garage Complex.
- Shore Power: Provision of shore power to cruise terminals which will allow ships to turn off their primary engines while docked, resulting in reduced air emissions.
- Cruise Terminal K: Design and construction of a new cruise terminal to support expanding operations.
- Brightline Train Station: Construction of a new train station for passengers and employees at a location that reduces congestion and emissions by optimizing access to terminals and employment destinations. The potential Brightline Train Station is listed as a $5.2 million project in the planning phase with no funding allocated in the TIP.[47]

Other projects in the area in the TIP include:

- SR 886/Port Boulevard pavement rehabilitation (2025-2026)
- PortMiami Tunnel repayments and oversight
- Bulkhead rehabilitation
- New federal inspection facility for United States Custom Border Patrol

3.4. 2045 Long Range Transportation Plan (LRTP)

The Miami-Dade TPO Long Range Transportation Plan (LRTP) is updated every five years to meet Federal and State requirements as part of Miami-Dade County's transportation planning process. Almost 250 improvement projects were included in the Cost Feasible Plan for the period 2020 to 2045 in the 2045 LRTP, dated September 26, 2019.[48] PortMiami and the Downtown area are located within Miami-Dade TPO's Transportation Planning Area (TPA) 7, the CBD,

[45](Miami-Dade Transportation Planning Organization, Approved June 27, 2024)
[46] Ibid.
[47] TPO Project No. SP20000013.
[48] (Miami-Dade Transportation Planing Organization, September 26, 2019)

representing an area of 19 square miles within the City of Miami, while MIA is in TPA 2, Central Miami-Dade. Within these study areas, the LRTP 2045 projects include:

- Transit: There is one "*Priority 1*" project, the Beach Express South, which aims to provide bus express rapid transit services from Miami Beach to a Downtown Intermodal Terminal. Additionally, there is a one partially funded project, the Beach Corridor[49], which aims to provide rapid transit services, connecting Midtown and the CBD to Miami Beach.[50]
- Miami-Dade Seaport Department: There are two partially funded projects, Cruise Road to PortMiami Tunnel and the Cruise Boulevard Roadway Extension.[51]
- Private and developers: Under projects that can or will be funded by the private sector or a developer, a new passenger station and rail connection between MIA and PortMiami by Brightline Connection.[52]
- Freight: There is one unfunded project, PortMiami Inland Terminal, aiming to develop and operate an inland terminal to expand the capacity of PortMiami for cargo storage and truck parking. The Inland Terminal would serve as a storage facility for empty cargo containers until they are ready for transport by vessels. This solution addresses the problem of empty containers occupying valuable space at Port Miami after being returned by shipping line customers from warehouses or other facilities. Currently, off-site locations are being evaluated for this purpose.

The 2050 LRTP, themed SMART M.A.P. (Mobility. Accessibility. Prosperity), began in 2022 and is anticipated to be adopted by the Miami-Dade TPO Governing Board in September 2024.

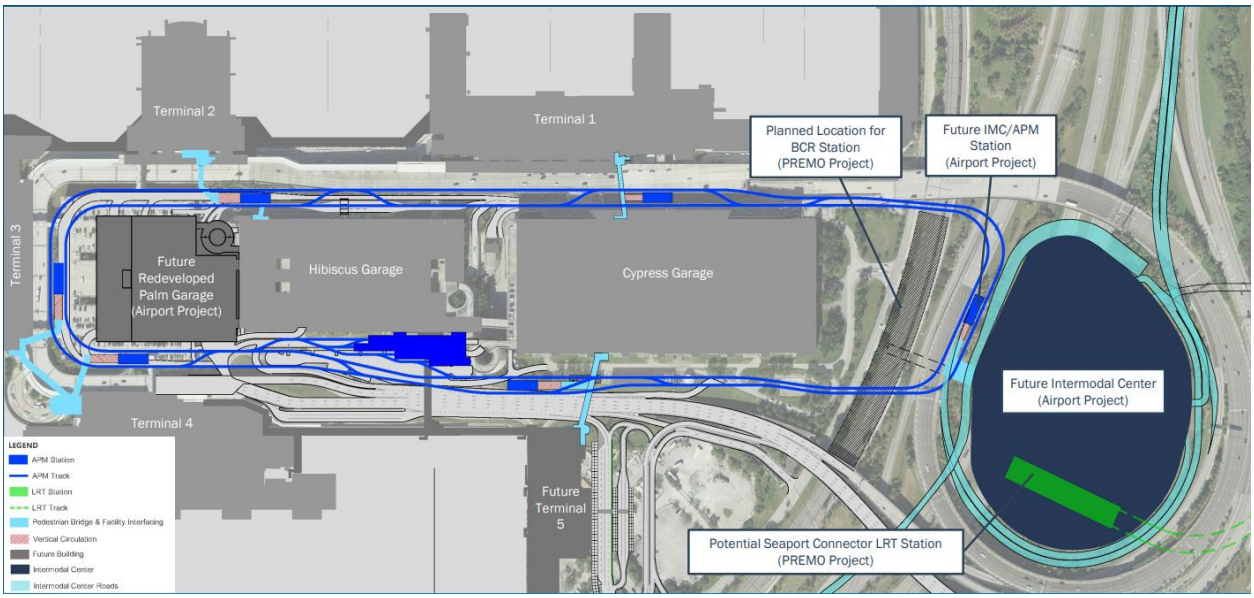
3.5. Port Everglades to FLL Studies

Previous and ongoing Broward County studies and plans to link Fort Lauderdale International Airport with Port Everglades were reviewed. The distance between Fort Lauderdale Airport and Port Everglades is approximately four miles. For many years transit alternatives between the two destinations have been explored. Previous proposals have included a direct service termed "*SunPort*" and an extension of the proposed Wave streetcar system from Downtown Fort Lauderdale. The most recent proposal for access between the airport and the Port would use an APM system with a transfer to a light rail line. The planned 2.1-mile people mover system would operate from FLL to an intermodal center within the right-of-way of Route 1 (Figure 3-4).[53] The proposed 3.5-mile elevated light rail line would operate from the Intermodal Center to Port Everglades, and then on to the Broward County Convention Center[54] (Figure 3-5). The light rail would operate on elevated guideway primarily on Broward County property and would serve three stations.[55] The estimated capital cost, not including maintenance facility and property

[49] Projects identified without revenues available to fund the projects through construction with allocation for an early or partial phase.
[50](Miami-Dade Transportation Planing Organization, September 26, 2019)
[51]Ibid.
[52]Ibid.
[53] (Broward County Transit, 2024)
[54]Ibid.
[55] Ibid.

acquisition, of the light rail line is $1.25 billion and ridership is projected to be between 130,000 and 665,000.[56] The project is currently in the conceptual design phase,[57] with anticipated completion dates in 2028 for the light rail and 2030 for the APM system.

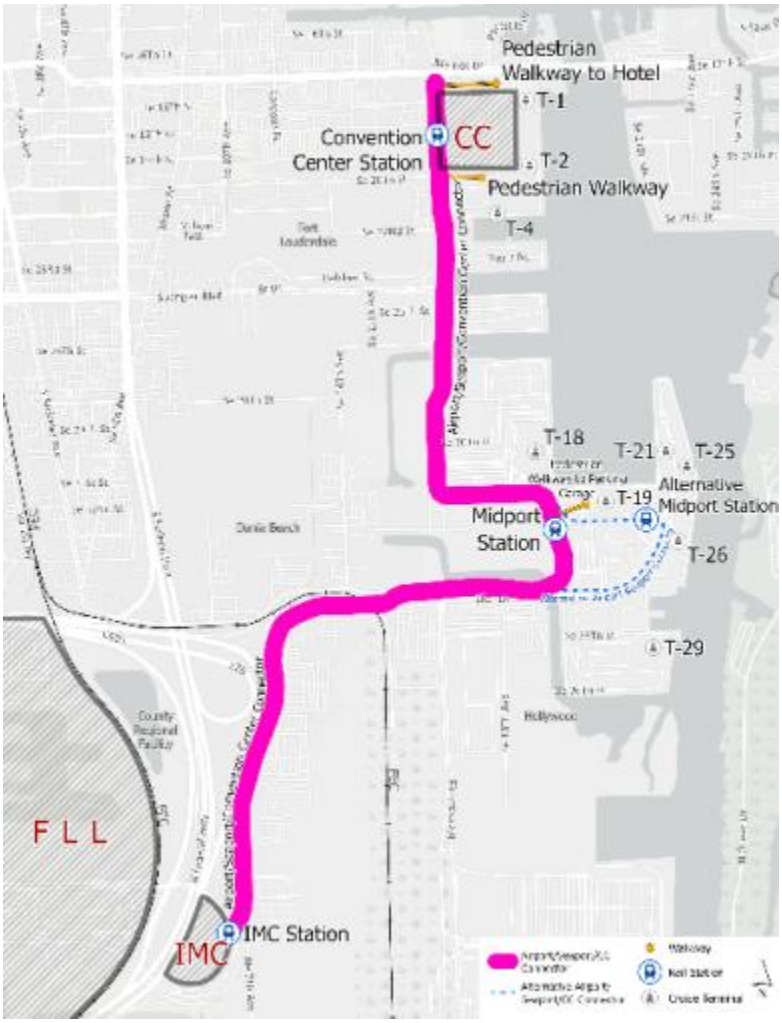
Figure 3-4 Proposed Fort Lauderdale Airport People Mover and Intermodal Center



source: https://www.broward.org/BCT/PREMO/Documents/PREMOLRTIndustryDayPresentation.pdf.

[56] Ibid.
[57] Ibid.

Figure 3-5 Proposed Fort Lauderdale Airport–Seaport–Convention Center Light Rail



source: https://www.broward.org/BCT/PREMO/Documents/PREMOLRTIndustryDayPresentation.pdf.

4. Related Study Area Studies and Plans

Studies and plans in the project study area were reviewed for context and information pertinent to this study are summarized below.

4.1. Strategic Miami Area Rapid Transit (SMART) Program

The SMART Plan corridors were adopted by the Miami-Dade TPO Governing board in April 2016.[58] The SMART Plan seeks to improve mobility through the prioritization of premium transit service. FDOT District Six and DTPW have initiated Project Development and Environment (PD&E) Studies to evaluate the proposed transit services. Examples of premium transit modes

[58] (Miami-Dade Transportation Planning Organization, 2024)

are bus rapid transit (BRT), light rail transit (LRT), and heavy rail transit (HRT/Metrorail.) The SMART Program is advancing six rapid transit corridors in Miami-Dade County as seen in Figure 4-1.[59]

Figure 4-1 Smart Program Projects

[59] (Miami-Dade County, 2024)

source: https://www.miamidade.gov/transit/library/smart-plan-map.pdf

The six SMART Program corridors are:

North: The North Corridor is being studied for rapid transit service and infrastructure along the NW 27 Avenue Corridor extending from NW 215 Street to approximately NW 38 Street along NW 27 Avenue and from the MIC at MIA to NW 27 Avenue via SR 112. The PD&E is anticipated to be undertaken in 2024.

Northeast: The Northeast Corridor is the Miami-Dade portion of the Coastal Link's commuter train passenger service, which would extend from Downtown Miami to the City of Aventura, along the existing FEC railway tracks, currently used for intercity passenger service by Brightline for approximately 13.5 miles (Figure 4-2).[60] In 2021, the Miami-Dade TPO selected passenger/commuter rail, such as Tril-Rail, as the LPA. A Categorical Exclusion for the project was received in 2023. The commuter rail project would provide commuter rail service every 30 to 60 minutes between Miami and Aventura with five stations in between.

[60] (Miami-Dade County, 2024)

Figure 4-2 Northeast Corridor Project

East-West: The East-West Corridor runs along SR 836/Dolphin Expressway from the MIC adjacent to MIA to the Tamiami Terminal. In 2020, the Miami-Dade TPO Governing Board selected the Locally Preferred Alternative (LPA) as BRT on dedicated transit only lanes along SW 8 Street from the Tamiami Terminal to SW 137 Avenue, along SW 137 Avenue to the SR 836 Extension, and then on the SR 836 Extension's shoulders. The BRT routes would be running on dedicated lanes in the center of SR 836 and along NW 7 Street until NW 62 Avenue. Completion of 30% design plans in anticipated in 2024.[61]

Beach: The Beach Corridor runs from the Design District/Midtown Miami area and Downtown Miami to the Miami Beach Convention Center area (Figure 4-3). In 2020, the Miami-Dade TPO Governing Board selected the Locally Preferred Alternative (LPA) as elevated rubber tire technology for the Beach Corridor Trunkline, and extension of the Metromover along Miami Ave to NW 41 Street for the Beach Corridor Design District extension, and dedicated lanes for bus/trolley along Washington Avenue for the Beach Corridor Convention Center extension. The Bay Crossing/Trunkline has been advanced into an EA, the Design District Extension will

[61] (Miami-Dade County Department of Public Works, 2023)

complete the National Environmental Policy Act (NEPA) process in FY 2023/2024, and the Miami Beach Extension on Washington Avenue will require further analysis[62].

Figure 4-3 Beach Corridor Locally Preferred Alternative

Source: https://www.miamidade.gov/transit/library/2022-08-beach-corridor-fact-sheet.pdf

Kendall: Curbside business access transit (BAT) lanes were identified as the locally preferred alternative in the Kendall Corridor in 2019. The project is currently on hold pending feasibility finding about BAT lanes in the Flagler Demonstration Project.[63]

South: The South Dade TransitWay (South Corridor) is 20 miles in length and extends from the Dadeland South Metrorail Station to the SW 344 Street Park-and-Ride/Transit Terminal. BRT was selected by the Miami-Dade TPO as the LPA in 2018, and construction started in 2021, with completion expected in Fall 2024.[64]

4.2. Metromover Upgrade Project

DTPW is currently working on upgrades to improve equipment reliability and availability for the Metromover system.[65] The wayside system is undergoing a comprehensive overhaul including

[62] (Miami-Dade County, 2022)
[63] (Florida Department of Transportation, 2024)
[64] (Miami-Dade County, 2024)
[65] (Miami-Dade County, 2024)

upgrades to the operating system and guideway electrical components and overhaul of the track switches and Central Control Center.[66] The $150 million project is being funded with People Transportation Plan and Federal Transit Administration (FTA) funds. Construction began in July 2022 and is scheduled to be completed in 2025. Once complete, DTPW will start a procurement process for new Metromover cars.

4.3. Brightline

In March 2024, Brightline announced that its next intercity passenger rail station would be in the City of Stuart in Martin County.[67] Brightline also indicates that a future station is planned for Cocoa, and future expansions plans include an extension of intercity service to Tampa.[68]

4.4. Flagler Corridor

The SR 968/Flagler Street SMART Demonstration Project will convert a segment of one travel lane on SR 968/Flagler Street and one travel lane on SW 1 Street from SR 9/27 Avenue to SW 6 Avenue to a BAT lane. The project will apply appropriate pavement markings and install signage to inform the public of the enhanced, dedicated bus infrastructure. Construction of the Demonstration Project is anticipated to begin in Fall 2025. Once construction is completed, FDOT will monitor the operation for one year and collect important performance data to measure the effectiveness of the transit and safety improvements as part of the PD&E study covering SR 968/Flagler Street.

4.5. *SHIFT*305

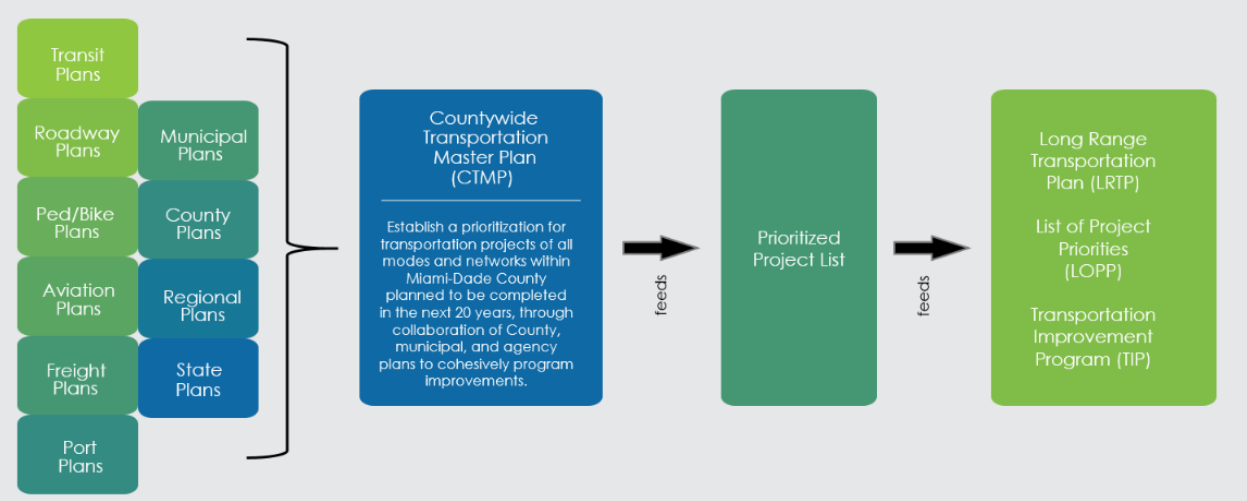
In 2023, DTPW launched *SHIFT*305, an initiative to create a roadmap action plan to move Miami-Dade toward a cleaner, greener, more efficient, and more connected future.[69] The *Shift*305 Two-Year Action Agenda is 135 prioritized and measurable actions toward addressing transportation challenges organized around the principles of Safety, Cleanliness, Connectivity, and Efficiency.[70]

4.6. Countywide Transportation Master Plan

DTPW is developing the County's first transportation master plan to identify transit, pedestrian, bicycle, roadway, and freight projects and initiatives for the County over the next 20 years (Figure 4-4). The CTMP project began with visioning sessions in Fall 2022 and an adopted Master Plan is anticipated late in Summer 2024.[71]

[66] Ibid.
[67] (Brightline, 2024)
[68] (Brightline, 2024)
[69] (Miami-Dade County Department of Transportation and Public Works, 2024)
[70] Ibid.
[71] (Miami-Dade County, 2024)

Figure 4-4 Roadmap for Countywide Transportation Master Plan



source: https://www.miamidade.gov/global/transportation/countywide-transportation-master-plan.page

4.7. Better Bus Network

In 2023 the Better Bus Network was implemented, which redesigned the Metrobus network in Miami-Dade County. The new redesigned network significantly expanded the number of bus routes that run every 15 minutes all day from five routes to 19 routes.[72] In addition, the Better Bus Network initiative expanded weekend and evening services, changed route letters/numbers, extended routes to new places, and discontinued some routes.

4.8. Transit Oriented Communities

DTPW is supporting the development of transit-oriented communities (TOC) that have a mix of housing, office, retail, and amenities walkable within a half mile of public transportation facilities. Several of the TOCs are in this study area next to the Historic Overtown/Lyric Theater Metrorail Station and with close access to Brightline, Metrorail, Tri-Rail, and Metromover service. Completed projects include the Overtown Transit Village North, a 17-story office building with ground floor retail completed in 2006, and Overtown Transit Village South, a 21-story office building completed in 2010. An upcoming TOC, Atlantic Square, will be the largest single-phase mixed-income development in Miami-Dade County and will include 616 apartments, 25,000 square feet of ground floor retail and restaurants, and recreational amenities.[73]

4.9. Miami DDA Master Plan

The Miami Downtown Development Authority (Miami DDA) is an independent agency of the City of Miami funded by a special tax levy on properties within its district boundaries. Their mission is to grow, strengthen, and promote the economic health and vitality of Downtown

[72] (Miami-Dade County Department of Transportation and Public Works, 2023)
[73] (Miami-Dade County, 2024)

Miami. The Miami DDA staff and Board of Directors are considering an update to the previous Master Plan or creating a new Strategic Plan. The last Master Plan, the 2025 Downtown Miami Master Plan, was published in October 2009.[74] One of the five Master Plan goals was to "*Promote Transit and Regional Connectivity*" within initiatives such as implementing street, expanding Metromover, providing rubber tire trolley service, expanding Metrorail, supporting commuter and high-speed rail, and developing a Downtown Intermodal Center.

4.10. Municipal and County Comprehensive Development Master Plans

Chapter 163 of the Florida Statutes requires each local government to adopt a comprehensive plan and sets forth minimum criteria including an identification of the required elements of a comprehensive plan. The two comprehensive plans covering the study area, the local municipal plan for the City of Miami, and the county plan for Miami-Dade County, were reviewed to determine study alternatives' consistency with these plans. The master plan for Miami-Dade County addresses both incorporated and unincorporated areas of the County. Each of the thirty-four municipalities in Miami-Dade County, of which the City of Miami is one, is also required by Chapter 163, F.S. to adopt its own comprehensive plan.

Miami-Dade County Comprehensive Development Master Plan

The Miami-Dade County Comprehensive Development Master Plan (CDMP) outlines how and where the County intends land development or conservation over the next 10 to 20 years, and the County's policies to accomplish the Plan's objectives. The Plan is updated every seven years and includes a tri-annual amendment process. The most recent CDMP, the July 2020 Edition, has been amended through April 2022.[75] The CDMP includes 12 Elements, including land use and transportation.

The most recent CDMP land use element plan update was August 2023.[76] PortMiami and MIA are designated as "terminals" in the land use plan, with the area in between a mix of "business and office", "institutions, utilities, and communications", "high density residential", and "medium density residential".

The transportation element includes a PortMiami sub-element.[77] It includes goals, objectives, and policies providing for the implementation of the PortMiami 2035 Master Plan, as well as a program for monitoring and evaluating measurements for the implementation. In support of Objective PM-1 that the Port provide, maintain, improve, and enhance its cruise ship facilities to accommodate passengers and ships, the Plan includes Policy PM-1E "*PortMiami shall coordinate and support projects that promote an effective and efficient multimodal transportation system necessary for the competitive and rapid movement of passengers such as direct access to the interstate highway, railroad, and mass transit systems*". The sub-element includes a list of expected major PortMiami projects during the 15-year planning period and implementation interval. "*Development of Passenger Rail On-island*" and

[74] (Miami Downtown Development Authority)
[75] (Miami-Dade County, 2024)
[76] (Miami-Dade County)
[77] (Miami-Dade County)

"*Development of a Multi-modal Transportation Facility*" are projects listed in the near-term/long-term interval.

City of Miami Comprehensive Neighborhood Plan

The Miami Comprehensive Neighborhood Plan was originally adopted in 1989, and the goals, objectives, and policies have been amended by the City Commission regularly as needed, most recently in 2019.

The Plan contains "*Port, Aviation, and Related Facilities*" element.[78] This element includes goals and objectives specific to the Port of Miami and MIA:

> *Goal PA-1 Port of Miami: Ensure that the development and expansion of Miami-Dade County's Port of Miami is compatible with and furthers the physical development of Miami's Greater Downtown area while mitigating negative impacts to neighborhoods, yet protecting the Port's economic function, operation, and potential improvements.*
>
> *Objective PA-1.1: The City of Miami, through its land development regulations, shall coordinate land use in areas of the city adjacent to the Port of Miami with the transportation related activity which occurs within the port to ensure compatibility and complementary land uses and activities while mitigating negative impacts to neighborhoods, yet protecting the Port's economic function, operation, and potential improvements.*
>
> *Policy PA-1.1.3: All surface transportation improvements providing access to the Port must be compatible with the needs, goals, and objectives of the City of Miami as related to the development of the Greater Downtown area, and such improvements will be financed with an appropriate share of County, State, and Federal funds.*
>
> *Goal PA-2 Miami International Airport: Ensure that the development and expansion of Miami-Dade County's Miami International Airport is compatible with and furthers the physical development of the City of Miami.*
>
> *Objective PA-2.1: The City of Miami, through its land development regulations, shall coordinate land use in areas of the city adjacent to Miami International Airport with the transportation related activity which occurs within that facility to ensure compatible and complimentary land uses and activities. Through such land development regulations, the City will mitigate negative impacts to neighborhoods that might result from airport activities, while protecting the airport's economic function, operation, and potential improvements.*
>
> *Policy PA-2.1.2: All surface transportation improvements providing access to Miami International Airport and impacting upon transportation within the City of Miami must be compatible with the needs, goals, and objectives of the City and such improvements will be financed with the appropriate share of County, State, and Federal funds.*

[78] (City of Miami, 2024)

5. Best Practices Research

Research on countrywide and international best practices for direct connections via public transportation between airports and cruise ports was conducted. The top 10 busiest cruise ports in the world were identified (Table 5-1), with PortMiami leading as the busiest. However, like the other top ports, PortMiami lacks direct access to rail or fixed guideway transit. Research revealed that none of these top ports have direct transit access, relying instead on buses and shuttles. This is likely because cruise ports are typically situated in industrial and maritime zones, which are often beyond the reach of the nearest urban transport networks.

Table 5-1 Busiest Cruise Ports

Sr. Number	Name of the Port	Country	Cruise Passengers Received
1	Port of Miami	USA	7.3 million
2	Port of Canaveral	USA	6.8 million
3	Port of Nassau	Bahamas	4.49 million
4	Port of Cozumel (San Miguel de Cozumel)	Mexico	3.72 million
5	Port of Barcelona	Spain	3.6 million
6	Port of Civitavecchia	Italy	3.3 million
7	Port Everglades	USA	2.88 million
8	Port of The Balearic Islands (Palma de Mallorca)	Spain	2.5 million
9	Port of Galveston	USA	1.49 million
10	Port of Shanghai	China	1.2 million

Source: (Marine Insight, 2024)10 Largest Cruise Ports in the World (marineinsight.com), May 16, 2024

Additional research was performed to identify any ports in the World with direct rail or fixed guideway transit access. Four locations were identified for further research: Vancouver, Boston, San Francisco, and Singapore (Table 5-2). Vancouver, Canada, was identified as having direct rail transit between the airport and the port. The other three transit services between an airport and a port identified are not direct and require users to transfer.

5.1. Vancouver, British Columbia, Canada

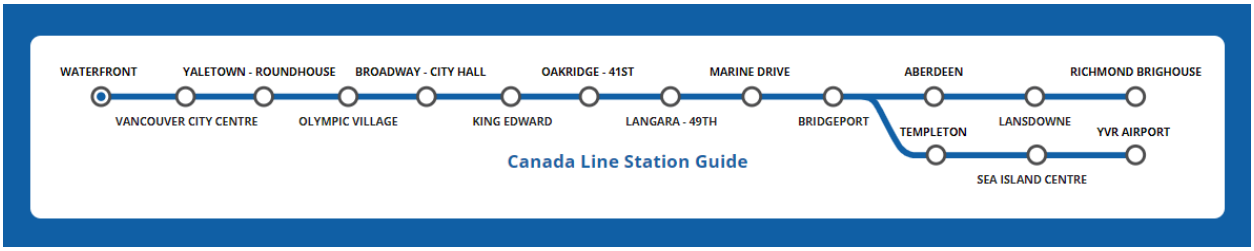
One example of direct rail access between a port and an airport was identified, located in Vancouver, Canada, the 39th busiest cruise ship port in the World. The Canada Line provides service between the Airport Station and Waterfront Station, located eight miles apart (Figure 5-1).[79] The Line provides fully automated light rapid transit service on a grade separated fixed guideway (Figure 5-2). The system uses electric powered from a third rail.

The trip from Vancouver Airport to the Vancouver Cruise Port is approximately 30 minutes. From the Airport Station, the SkyTrain Canada Line can be taken directly to the Waterfront Station (26 minutes) which located across the street from the cruise terminal, approximately a four-minute walk. Services operate every 6 minutes in the peak and every 12-20 minutes in the

[79] (TransLink, 2024)

off-peak.[80] The fare eastbound is $9.25 (CAD) or $6.84 (USD) and the fare westbound is$4.25 (CAD) or $3.14 (USD.)[81]

Figure 5-1 Canada Line Route



Source: https://thecanadaline.com/station-guides/waterfront/

Figure 5-2 Vancouver Canada Line Vehicle

Source: https://thecanadaline.com/station-guides/waterfront/

5.2. Boston, Massachusetts

The distance from the Logan International Airport to the Boston Cruise Port in Boston is 4.5 miles. The Massachusetts Bay Transportation Authority (MBTA) operates the Silver Line BRT between the destinations (Figure 5-3); however, one transfer between Silver Line BRT routes SL1 and SL2 is required to link these two destinations. Boston is ranked as the 74th busiest cruise ship port in the World.

The trip from the airport to the port is approximately 40 minutes. From the airport terminal, the walk to the Silver Line stop is 6 minutes, then the Sliver Line BRT SL1 route can be taken to the Silver Line Way stop (10 minutes), where a transfer can be made to the SL2 route to the Drydock Avenue stop (8 minutes) which located one block from the cruise terminal, approximately a 10-

[80] Ibid.
[81] Ibid.

minute walk.[82] Services operate every 5-12 minutes in the peak and every 8-15 minutes in the off-peak. The SL1 fare departing Logan is free and the SL2 fare is $2.40.[83]

Figure 5-3 Boston Silver Line Vehicle

Source: (Massport, 2024)

5.3. San Francisco, California

The distance from the San Francisco International Airport to the Port of San Francisco is 16 miles. Bay Area Rapid Transit (BART) operates the Yellow Line heavy rail service between the airport and Downtown, where a transfer can be made to the F Streetcar service which has a stop at the port (Figure 5-4). San Francisco is not ranked in the top 100 busiest cruise ports.

The trip from the airport to the port is approximately 60 minutes. From the airport terminal, the walk to the Yellow Line is 10 minutes, then the Yellow Line trip to Embarcadero Station is 32 minutes, where a transfer can be made to the F Streetcar.[84] The F Streetcar is a 10-minute trip to the Embarcadero and Sansome Street stop, which located across the street from the cruise terminal, approximately a 6-minute walk.[85] Services operate every 10-15 minutes in the peak and every 12-20 minutes in the off-peak. The fare is $13.55.[86]

[82] (Massachusetts Bay Transportation Authority, 2024)
[83] Ibid.
[84] (San Francisco Bay Rapid Transit District, 2024)
[85] (San Francisco Municipal Transportation Agency, 2024)
[86] Ibid.

Figure 5-4 San Fracisco BART and Trolley Vehicles

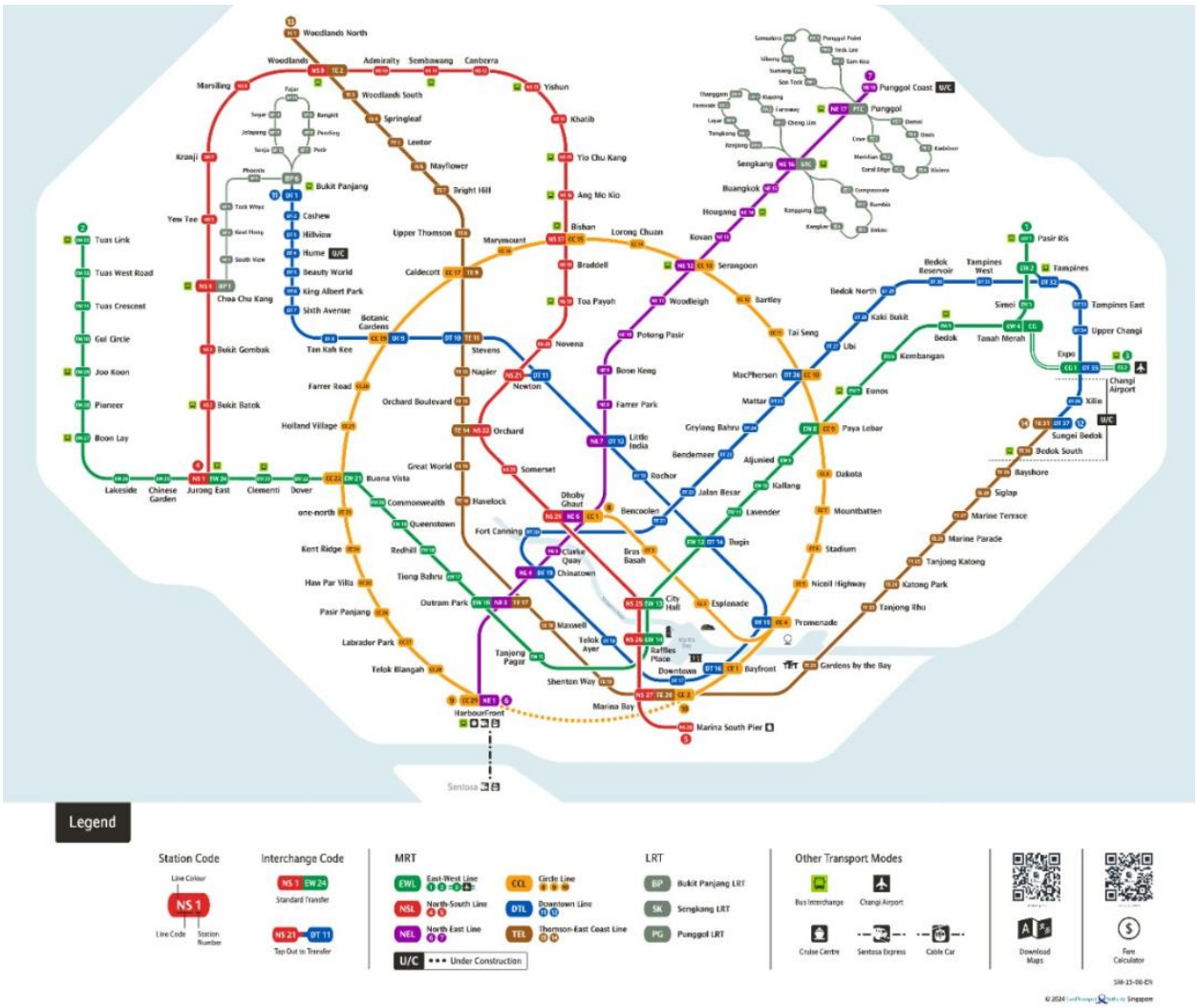
Source: (San Francisco Bay Rapid Transit District, 2024), (Market Street Railway, 2020)

5.4. Singapore

Singapore is an island country located in Southeast Asia on the southern tip of the Malay Peninsula. The Port of Singapore ranks 20th in the busiest cruise ports in the World and includes two separate cruise port areas, the Singapore Cruise Centre and the Marina Bay Cruise Centre. The distance from the airport to the Singapore Cruise Centre is 15 miles and to the Marina Bay Cruise Centre is 13 miles. The cruise port are approximately 15 minutes to the Downtown area of Singapore. The Land Transport Authority (LTA) manages Singapore's rail transit system, the Mass Rapid Transit system, known as the MRT (Figure 5-5). The MRT is an island-wide, grade-separated system that uses high-capacity heavy rail vehicles powered by an electric third rail (Figure 5-6).[87] MRT lines operate daily from 5:30 am to 1:00 am and cost per ride is $2-$4 (U.S.).[88] Both cruise port areas have direct connections to the rail transit system.

[87] (Land Transport Authority, 2024)
[88] Ibid.

Figure 5-5 Singapore MRT System



Source: (Land Transport Authority, 2024)

Figure 5-6 Singapore MRT Vehicle

Source: (Land Transport Authority, 2024)

The Singapore Cruise Centre opened in 1991 and has two berths for cruise ships, handling approximately 950,000 cruise passengers per year.[89] The Singapore Cruise Centre is approximately a quarter mile or a seven-minute walk to the HarbourFront MRT Station, which is served by two MRT Lines, the North East Line (NEL) and the Circle Line (CCL). To reach the Changi Airport via the MRT, the NEL can be taken one stop to the Outram Park Station (three minutes) for a transfer (approximately 3-minute walk) to the East West Line (EWL) for 12 stops (25 minutes) to Tanah Merah Station, for a transfer to the EWL Changi Airport Branch Line for 2 stops (13 minutes) to the line terminus at the Changi Airport Station, and approximately walk for about 5 minutes to the airport terminals. Using these three MRT lines requiring two transfers, the trip time from the Singapore Cruise Center to the Airport is approximately an hour.

The Marina Bay Cruise Centre opened in 2012 at Marina South, a location that has deep waters, a large turning basin, and no height restrictions which accommodates the largest cruise ships currently being built.[90] It has two berths for cruise ships, handling approximately 1.8 million cruise passengers per year. The Marina Bay Cruise Centre is near the Marina South Pier MRT station, approximately a quarter mile or a seven-minute walk.[91] The Marina South Pier MRT Station is located at the southern terminus of the North South Line (NSL), which opened in 2014. To reach the Changi Airport via the MRT, the NSL can be taken for 2 stops (4 minutes) to the Raffles Place Station where a transfer is made to the EWL, taking 10 stops (21 minutes) to the Tanah Merah Station, for a transfer to the EWL Changi Airport Branch Line for 2 stops (13 minutes) until the

[89] (Singapore Cruise Centre, 2024)
[90] (Global Port Holding, 2024)
[91] (Marina Bay Cruise Centre Singapore, 2023)

line terminus at Changi Airport Station, for an approximately 5-minute walk to the airport terminals. (3 lines, 2 transfers). Using these three MRT lines requiring two transfers, with the trip time from the Marina Bay Cruise Centre to the Airport taking approximately 55 minutes.

Future transit and cruise port plans will change cruise access in the future. An additional station on the NSL, the Marina South MRT station, is planned to open in the future, which will also serve the Marina Bay Cruise Centre.[92] While the Changi Airport Branch Line is currently on the EWL, after 2040, it will be converted to be on the planned Thomson-East Coast Line.[93] When complete, a one seat ride from the Marina Bay Cruise Centre and the airport will be possible. To form a single cruise hub as the cruise industry grows and to free up space along Singapore's southern waterfront, merging the Singapore Cruise Centre with the Marina Bay Cruise Centre is being studied, but is not in current plans.[94]

[92] (Land Transport Authority, 2024)
[93] (Land Transport Authority, 2024)
[94] (Channel News Asia, 2024)

Table 5-2 Peer Review Fixed Route Transit between Port and Airport

City, State, Country	Airport – Cruise Port	Distance	Transfers/Transit Route from Airport to Cruise Port	Frequency	Travel Time	Cost (One-Way)
Vancouver, British Columbia, Canada	Vancouver Airport - Vancouver Cruise Port	13.5 km (8.5 miles)	Direct, no transfer: SkyTrain Canada Line Rapid Transit Sky Train to Waterfront station. Cruise terminal is across the street from the train stop	6 min. peak 12-20 min. off-peak	Approx Total 30 min. *SkyTrain: 26 min.* *Walk to cruise terminal: 4 min.*	$9.25 (CAD), $6.84 (USD) eastbound $4.25 westbound (CAD), $3.14 (USD)[95]
Boston, MA, US	Boston Logan International Airport - Boston Cruise Port	4.5 miles	1 transfer: Silver Line BRT SL1 bus to Silver Line Way stop, transfer to SL2 BRT to Drydock Avenue stop. Cruise terminal is one block walk	5-12 min. peak 8-15 min. off-peak	Approx. 40 min. total *Terminal to SL1: 6 min.* *SL1: 10 min* *SL2: 8 minutes* *SL2 to Cruise port: 6 min.* *Walk to cruise terminal: 10 min.*	SL 1: free departing Logan SL2: $2.40
San Francisco, CA, US	San Francisco International Airport - Port of San Francisco	16 miles	1 transfer: BART Yellow Line to Embarcadero, transfer at Market St. & Main St. to the F streetcar to the Embarcadero & Sansome St. stop. Cruise terminal is across the street from the streetcar stop	10- 15 min. peak 12-20 min. off-peak	Approx. 60 min. total: *Terminal to Yellow Line: 10 min.* *Yellow Line to Embarcadero: 32 min.* *F streetcar: 10 min.* *Walk to cruise terminal: 6 min.*	$13.55
Singapore	Changi Airport – Singapore Cruise Center and Marina Bay Cruise Centre	Singapore Cruise Center: 15 miles Marina Bay Cruise Centre: 13 miles	2 transfers: Singapore Cruise Center: East West Line (EWL) Changi Airport Branch to Tanah Merah Station, transfer to EWL to Outram Park Station, transfer to North-East Line (NEL) to HarbourFront Station Marina Bay Cruise Centre: East West Line (EWL) Changi Airport Branch to Tanah Merah Station, transfer to EWL to Raffles Place Station, transfer to North South Line (NSL) to Marina South Pier Station	7 min. peak 13 min. off-peak	Approx. 55/50 min. total: *Airport to MRT Station: 5 min.* *EWL Airport Branch: 13 min.* to Singapore Cruise Center: *EWL: 25 min.* *Walk to NEL: 3 min.; NEL: 3 min.* *Walk to cruise terminal: 7 min.* to Marina Bay Cruise Centre: *EWL: 21 min.* *NSL: 4 min.* *Walk to cruise terminal: 7 min.*	Singapore Cruise Center: $2.18 (SGD) or $1.67 (USD) Marina Bay Cruise Centre: $2.13 (SGD) or $1.63 (USD)[96]

[95] Canadian Dollar (CAD) to United States Dollar (USD) conversion 1 CAD = 0.739935 USD, September 4, 2024 (Forbes, 2024).
[96] Singapore Dollar (SGD) to United States Dollar (USD) conversion, 1 SGD = 0.76683 USD, September 4, 2024 (Forbes, 2024).

6. Long List of Potential Modes

Modes are differing transportation systems for carrying transit passengers defined by their specific right-of-way, vehicle technology, and operational features. Transit modes can be categorized as either rail modes or non-rail modes.

Rail modes are those whose vehicles travel along fixed rails forming a track. The vehicles are usually electrically self-propelled typically through motors onboard the vehicles, but motors may also be at a central location not onboard the vehicles to pull the vehicles by cables, or vehicles may be drawn by a locomotive. The National Transit Database (NTD) recognizes nine rail modes, of which six have been considered in this study: cable car, commuter rail, heavy rail, light rail, automated guideway transit/monorail, and streetcar.[97] Intercity rail is also described below.

Non-rail modes are those whose vehicles typically operate on roadways - streets, highways or expressways - but may also operate on waterways or via aerial cable. Vehicles are typically powered by motors onboard the vehicle. NTD recognizes eight non-rail modes, of which two have been identified for consideration in this study: aerial tramway and bus rapid transit.[98] Also included in this study are roadway-based technologies such as autonomous vehicle networks.

The following is the long list of potential modes for consideration:

- aerial tramway
- automated guideway transit /monorail
- automated people mover
- bus rapid transit
- cable car
- commuter rail
- heavy rail
- intercity rail
- light rail
- streetcar

[97] Rail modes recognized by NTD but not included in this study are Alaska Railroad, hybrid rail, and inclined plane. Alaska Railroad has a special Federal designation only found in Alaska and inclined plane operates on steep grades which are not present in the study area. Hybrid rail, which is defined by NTD as systems that primarily operate routes on the national system of railroads, but do not operate with the same characteristics as commuter rail and typically operate similar to light rail, was not evaluated as a separate mode since it is a blend of commuter and light rail, both of which were considered. (National Transit Database (NTD), 2024)

[98] Non-rail modes recognized by NTD but not included in this study because they are either already present, cannot move the passenger volumes required, or are not specific for this market include bus, commuter bus, demand response, demand taxi, ferryboat, jitney, publico, trolleybus, and vanpool.

6.1. Aerial Tramway

Aerial tramway uses an electric system of aerial cables with suspended powerless passenger vehicles. The vehicles are propelled by separate cables attached to the vehicle suspension system and powered by engines or motors at a central location not on-board the vehicle. While most aerial tramways in the United States are located in the western mountain states such as Alaska, Utah, New Mexico, California, and Wyoming for sight-seeing and access to skiing, urban trams are located in states such as New York, with the New York City Roosevelt Island tram, and in Oregon, with the Portland Aerial tram.

Figure 6-1 Aerial Tramway, New York City

source: Shutterstock

6.2. Automated Guideway Transit /Monorail/Automated Transit Network

Automated guideway transit (AGT), which includes monorail, is an electrically powered mode of transit operating in an exclusive guideway over relatively short distances. The service is characterized by either monorail systems with human-operated vehicles straddling a single guideway or by automated operation systems powered by an electric rail. The Metromover is an example of automated guideway transit in the Miami area. Similar to AGT, automated transit networks (ATN) are an electrically powered mode of transit operating in an exclusive guideway typically over relatively short distances with fully automated operation. ATN, however, are self-powered electric vehicles with rubber tires that operate on a roadway surface. This is an emerging technology not currently present in the Miami area but is being developed in other U.S. locations such as the San Jose Airport to downtown corridor, San Bernardino County to airport corridor, and in the San Francisco Bay area.

Figure 6-2 Automated Guideway Transit, Miami Metromover

source: (Miami-Dade County, 2024)

source: Glydways, 2024

6.3. Automated People Mover

Similar to automated guideway transit, automated people movers are an electrically powered mode of transit operating in an exclusive guideway typically over relatively short distances with fully autonomous operation. Automated people movers, however, are usually self-powered electric vehicles with rubber tires that operate on a roadway surface. An example of this technology in Miami is the MIA Mover at MIA.

Figure 6-3 Automated People Mover, MIA Mover

source: (Miami-Dade County Aviation Department)

6.4. Bus Rapid Transit

Bus rapid transit is a fixed-route bus systems that operates at least 50 percent of the service in dedicated right-of-way.[99] These systems have defined passenger stations, traffic signal priority or preemption, short headway bidirectional services for a substantial part of weekdays and weekend days; low-floor vehicles or level-platform boarding, and separate branding of the service.[100] This is often a lower-cost alternative to light rail. The Metrobus South Dade Transitway is an example of bus rapid transit in the Miami area.

Figure 6-4 Bus Rapid Transit, Miami South Dade Transitway

source: (Miami Herald, 2021)

[99] https://www.transit.dot.gov/ntd/national-transit-database-ntd-glossary. Retrieved 6/10/24.
[100] https://www.transit.dot.gov/ntd/national-transit-database-ntd-glossary. Retrieved 6/10/24.

6.5. Cable Car

A cable car is an electric railway with individually controlled transit vehicles attached to a moving cable located below the street surface and powered by engines or motors at a central location, not onboard the vehicle. The best-known traditional cable car system is the San Francisco cable car system. Modern cable car systems can be found at some airport people mover systems such as the Oakland Airport Connector; however, these systems are fully automated and run on a dedicated right-of-way.

Figure 6-5 Cable Car, San Francisco

source: (San Fransisco Municipal Transportation Agency, 2024)

6.6. Commuter Rail

Commuter rail is an electric or diesel propelled railway for urban passenger train service consisting of local travel which operates between a central city and outlying areas.[101] Commuter rail is generally characterized by multi-trip tickets, specific station-to-station fares, railroad employment practices, relatively long distance between stops, and only 1-2 stations in the central business district.[102] Tri-Rail is an example of commuter rail service in the Miami area.

Figure 6-6 Commuter Rail, Miami Tri-Rail

source: (South Florida Regional Transportation Authority, 2024)

[101] (National Transit Database (NTD), 2024)
[102] Ibid.

6.7. Heavy Rail

Heavy rail is an electric railway with the capacity for a heavy volume of traffic.[103] It is characterized by high speed and rapid acceleration passenger rail cars operating singly or in multi-car trains on fixed rails, separate rights-of-way from all other vehicular and foot traffic, complex signaling, and high platform stations.[104] Metrorail is an example of heavy rail service in the Miami area.

Figure 6-7 Heavy Rail, Miami Metrorail

source: (Miami-Dade County, 2024)

[103] https://www.transit.dot.gov/ntd/national-transit-database-ntd-glossary. Retrieved 6/10/24.
[104] https://www.transit.dot.gov/ntd/national-transit-database-ntd-glossary. Retrieved 6/10/24.

6.8. Intercity Rail

Intercity rail is an electric or diesel propelled railway passenger rail operating on the national system of railroads that is not classified as commuter rail because it is characterized by trains making less frequent stops over longer distances, often between metropolitan and city centers. Amtrak and Brightline are examples of intercity rail in the Miami area.

Figure 6-8 Intercity Rail, Brightline

Source: (Greater Miami Convention & Visitors Bureau, 2024)

6.9. Light Rail

Light rail is typically an electric railway with a light volume traffic capacity compared to heavy rail.[105] It is characterized by passenger rail cars operating in short one or two car trains on fixed rails in shared or exclusive right-of-way with vehicle power drawn from an overhead electric line.[106] METRORail service in Houston is an example of a light rail system in the United States.

Figure 6-9 Light Rail, Houston METRORail

source: (METRO, 2024)

[105] https://www.transit.dot.gov/ntd/national-transit-database-ntd-glossary. Retrieved 6/10/24.
[106] https://www.transit.dot.gov/ntd/national-transit-database-ntd-glossary. Retrieved 6/10/24.

6.10. Streetcar

Streetcar rail is a rail transit system operating with its entire route predominantly on streets in mixed traffic. This service typically operates with single-car trains powered by overhead catenaries and with frequent stops. The TECO Line in Tampa is an example of streetcar service in Florida.

Figure 6-10 Streetcar, Tampa TECO Line

source: (Visit Tampa Bay, 2024)

7. Long List of Potential Alignments

A long list of potential alignments between MIA and PortMiami was developed, informed by previous planning and engineering studies reviewed in Sections 2, 3, and 4.

7.1. Railroad Alignments

Four railroad alignments are located between MIA and Port Miami (Figure 7-1).

The **South Florida Rail Corridor (SFRC)** is a railroad corridor that is oriented in a north-south direction. The SFRC is owned by FDOT and used by Tri Rail for commuter rail services linking Palm Beach, Broward, and Miami Dade Counties. The line was part of CSX's former Miami Subdivision, purchased by FDOT in 1989, and CSX maintains freight rights on the SFRC. Currently, there is a Tri-Rail Station servicing MIA located at the Miami Intermodal Center (MIC), where passengers can transfer to the Metrorail and Metrobus services.

The **Florida East Coast Railway (FEC) Little River Branch**, also known as the Miami Belt Line, is a railroad corridor that is oriented in an east-west direction. The Little River Branch used for FEC freight service and the Tri Rail Downtown Miami Link commuter rail service to MiamiCentral Station. Tri Rail trains switch from the SFRC to the FEC's Little River Branch on the Iris Interlocking, located just south of E 25 Street by the Tri Rail's Metrorail Transfer Station in Hialeah. The Branch connects FEC's Main Line with Hialeah Yard.

The **FEC Mainline** is a railroad corridor that is oriented in a north-south direction. The FEC operates freight trains on the Mainline between Jacksonville and Miami. Passenger service was discontinued in 1968 and reintroduced by Brightline in 2018, connecting all major downtowns in South Florida, and then Tri Rail in 2024 with its express train service connecting different stops in the region. Tri Rail trains switch from the FEC's Little River Branch to the FEC Mainline heading south to MiamiCentral Station in downtown Miami. The FEC Mainline is the exclusive provider of rail service to PortMiami; however, service is exclusively freight, as rail passenger service diverges in Downtown Miami before reaching MiamiCentral, transitioning to an elevated rail line with no direct connections to the port area.

The **Downtown Spur**, also known as the Downtown Lead, is a railroad corridor that is oriented in an east-west direction. The Downtown Spur is an active freight branch between the SFRC and NW 7th Avenue. CSX serves customers in the Allapattah Industrial District from the Spur. The Spur was a part of the former Seaboard Air Line Railroad that ran along the east coast of Florida to Miami (Figure 8-2). The Miami passenger station was located at 2210 NW 7th Avenue at NW 22nd Street in Allapattah, two miles north of downtown. Amtrak took over operation of intercity passenger rail service on the Seaboard Air Line in 1971 and continued to use this line and passenger station until it was discontinued in 1977 when the Miami Station was moved to a new location near the Hialeah Yards, close to the Metrorail Transfer Tri-Rail Station in Hialeah.

East of NW 7th Avenue, the former Seaboard Air Line Railroad crossed the FEC's main line near NW 11th Street and connected with the Miami Municipal Railway, which continued the line a short distance to the city docks at Miami's original port, located at the site of the current Museum

Park. By 1964 Miami's original port was largely replaced by the current PortMiami, and tracks east of the station to the original port were subsequently removed. Remnants of the former railroad right-of-way can be seen in some locations but it is no longer intact. The Downtown Spur, MP SXD-36.6 to MP SXD-40.4, is considered part of the SFRC owned by FDOT.

Figure 7-1 Railroad Alignments

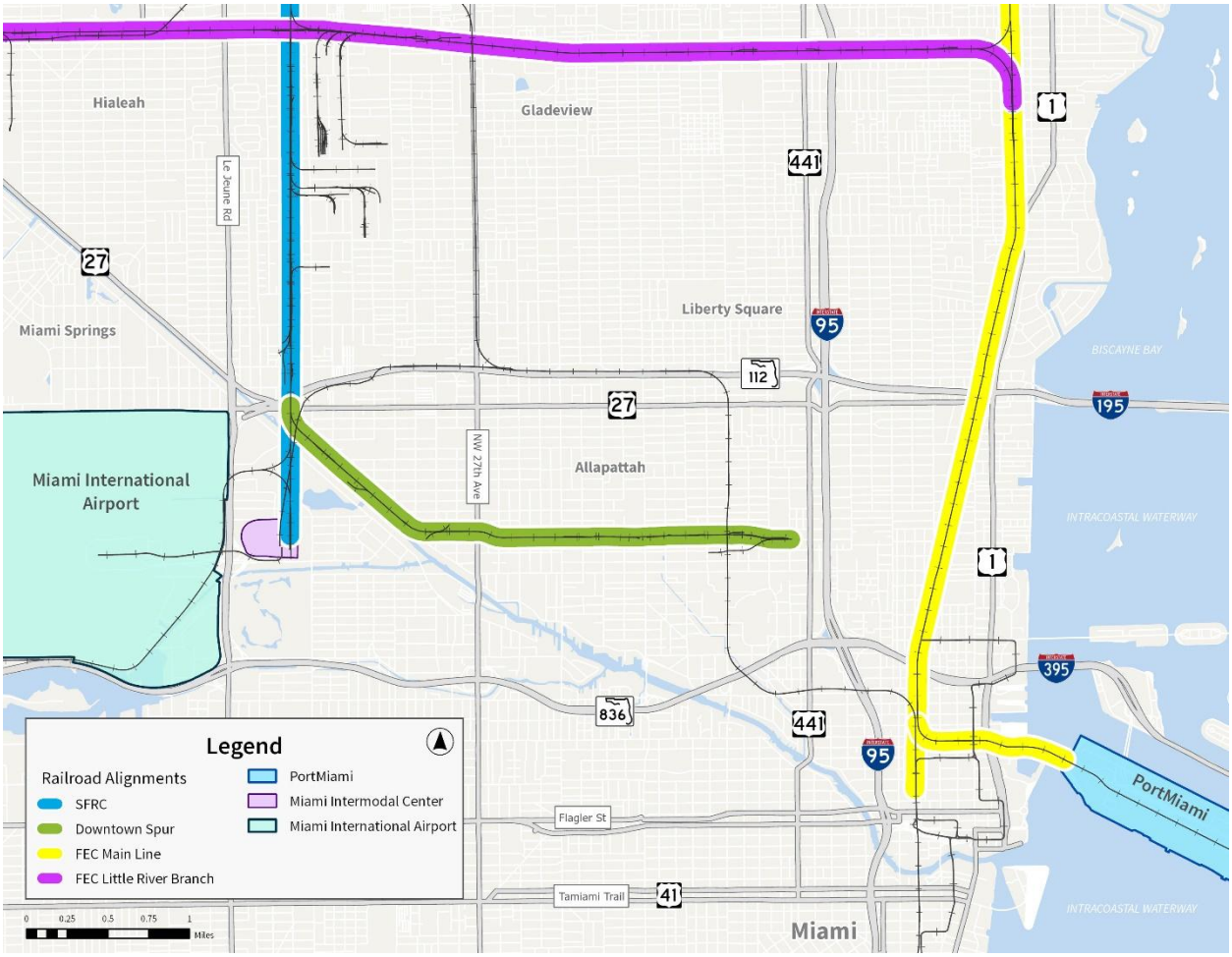
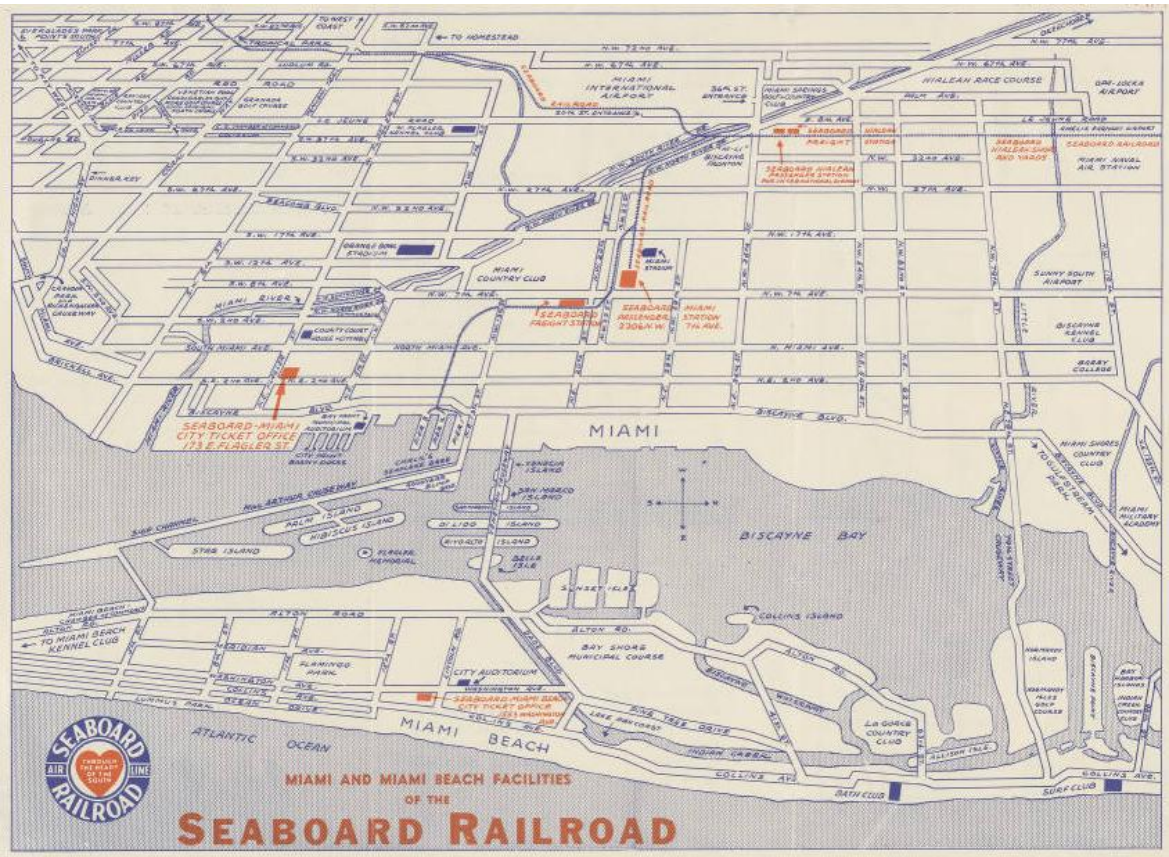


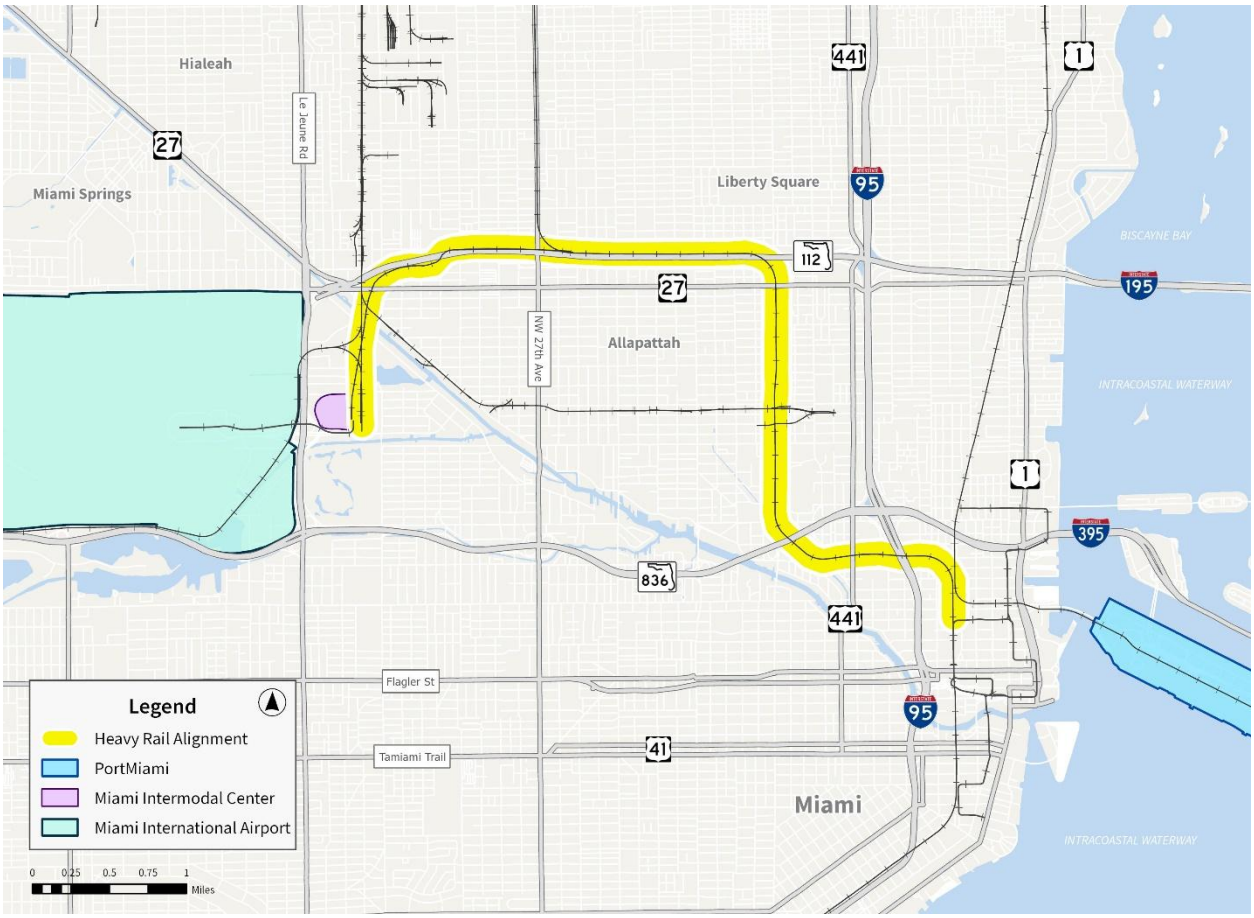
Figure 7-2 Former Seaboard Railroad Facilities in Miami



7.2. Heavy Rail Alignment

A heavy rail alignment is located between MIA and Port Miami for Metrorail service. The alignment travels north from the MIC, then turns east through the Allapattah neighborhood before turning south into downtown Miami (Figure 7-3).

Figure 7-3 Heavy Rail Alignment

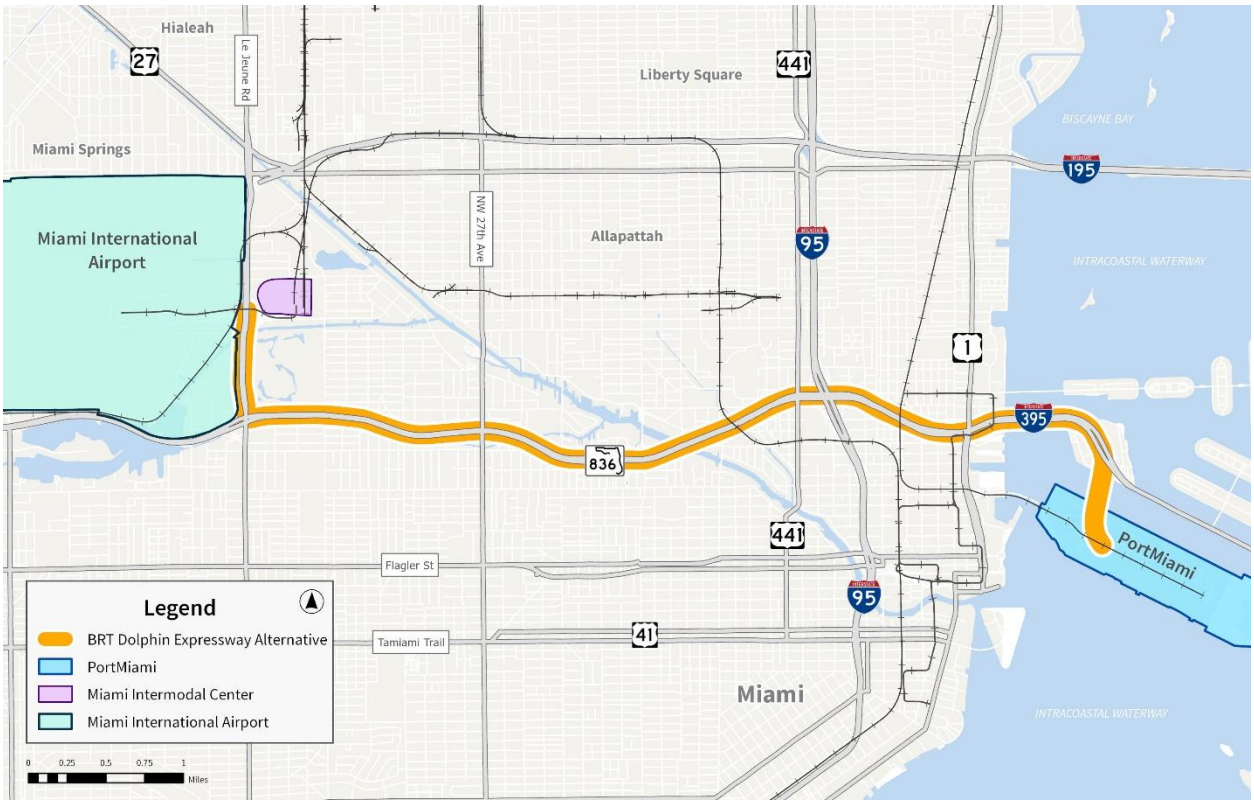


7.3. Highway Alignments

A highway alignment, the Dolphin Expressway, is located between MIA and Port Miami. The Dolphin Expressway is a 15-mile toll road designated on the western 14 miles as SR 836 and the eastern 1.3 miles as I-395. The Expressway connects to MIA using LeJeune Road (SR 953) and to PortMiami using MacArthur Causeway (SR A1A) to the Port Tunnel. (Figure 8-4). The Dolphin Expressway is maintained and operated by the Greater Miami Expressway Agency (GMX) and I-395 is maintained by FDOT. A project known as "Connecting Miami" is under construction. The project includes a new SR 836/I-95/I-395 interchange, a new double-deck span of SR 836, and the replacement of I-395, including a new cable-stayed bridge over Biscayne Boulevard and urban parks and art installations as part of what is called "The Underdeck." Anticipated project completion date is 2027.

The alignment continues via the Port Miami Tunnel, also known as SR 887, a 4,000-foot bored tunnel beneath Biscayne Bay connecting the MacArthur Causeway/I-395 on Watson Island with PortMiami on Dodge Island. The Tunnel was built as a public-private partnership between FDOT, Miami-Dade County, the City of Miami, and a private entity that holds a 30-year contract to operate the tunnel.

Figure 7-4 Highway Alignment

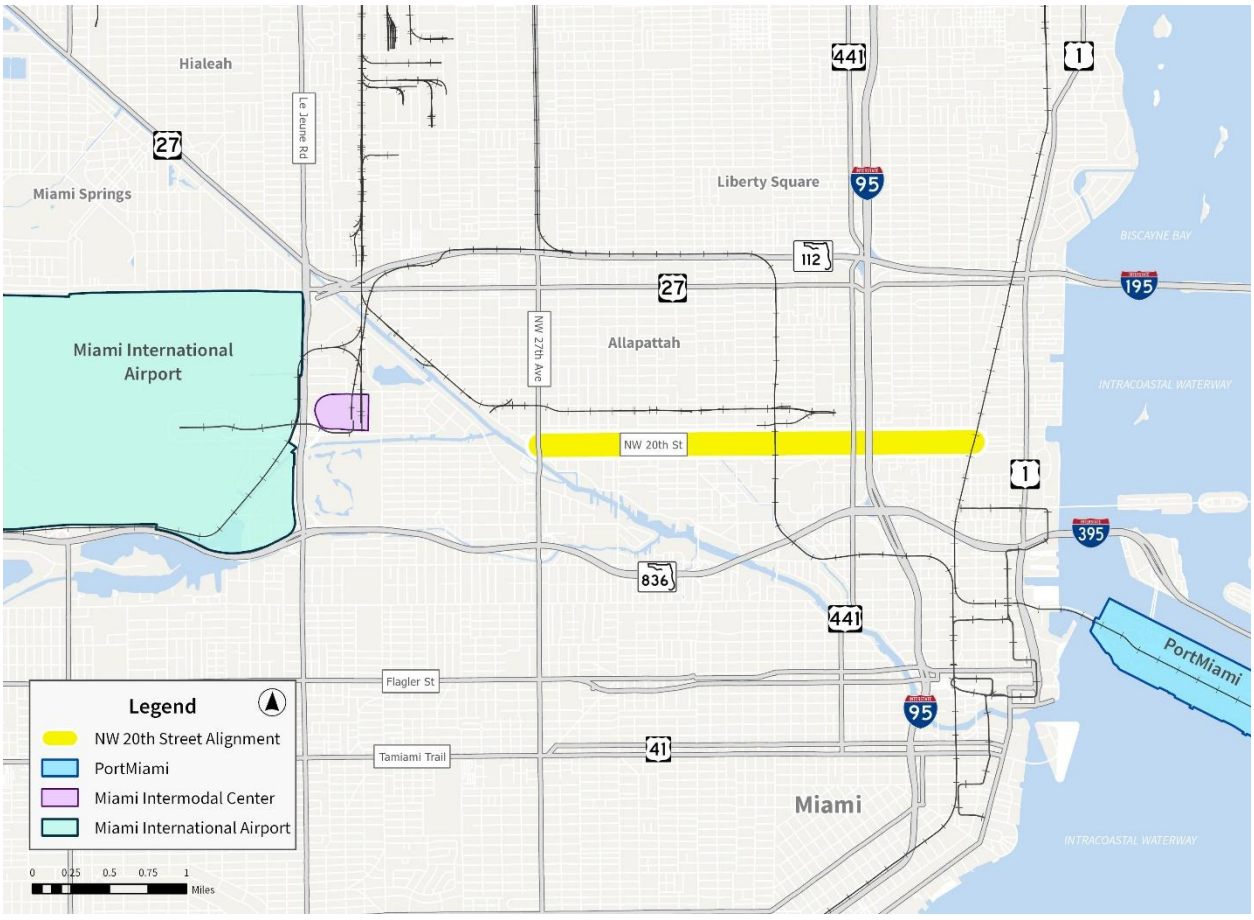


7.4. Local Road Alignments

Four main east-west local road alignments are located between MIA and Port Miami:

NW 20th Street, within the study area, is an east-west local roadway from the Miami River/NW 2nd Avenue to N Miami Avenue (Figure 7-5). The land use along the roadway includes a mix of commercial, institutional, recreational development, including destinations such as Curtis Park, City of Miami General Service Administration Department, City of Miami Fire Rescue Station 5, City of Miami Property Maintenance Division, Miami Dade College – Medical Campus, Lindsey Hopkins Technical College, retail and wholesale businesses, and multifamily residences east of I-95. The roadway contains five travel lanes, two in each direction and a center turn lane. Most sections contain no shoulder and sidewalks on both sides. Traffic signals are located at key cross streets. NW 20th Street crosses beneath Metrorail and is a half block south of the Santa Clara Metrorail Station.

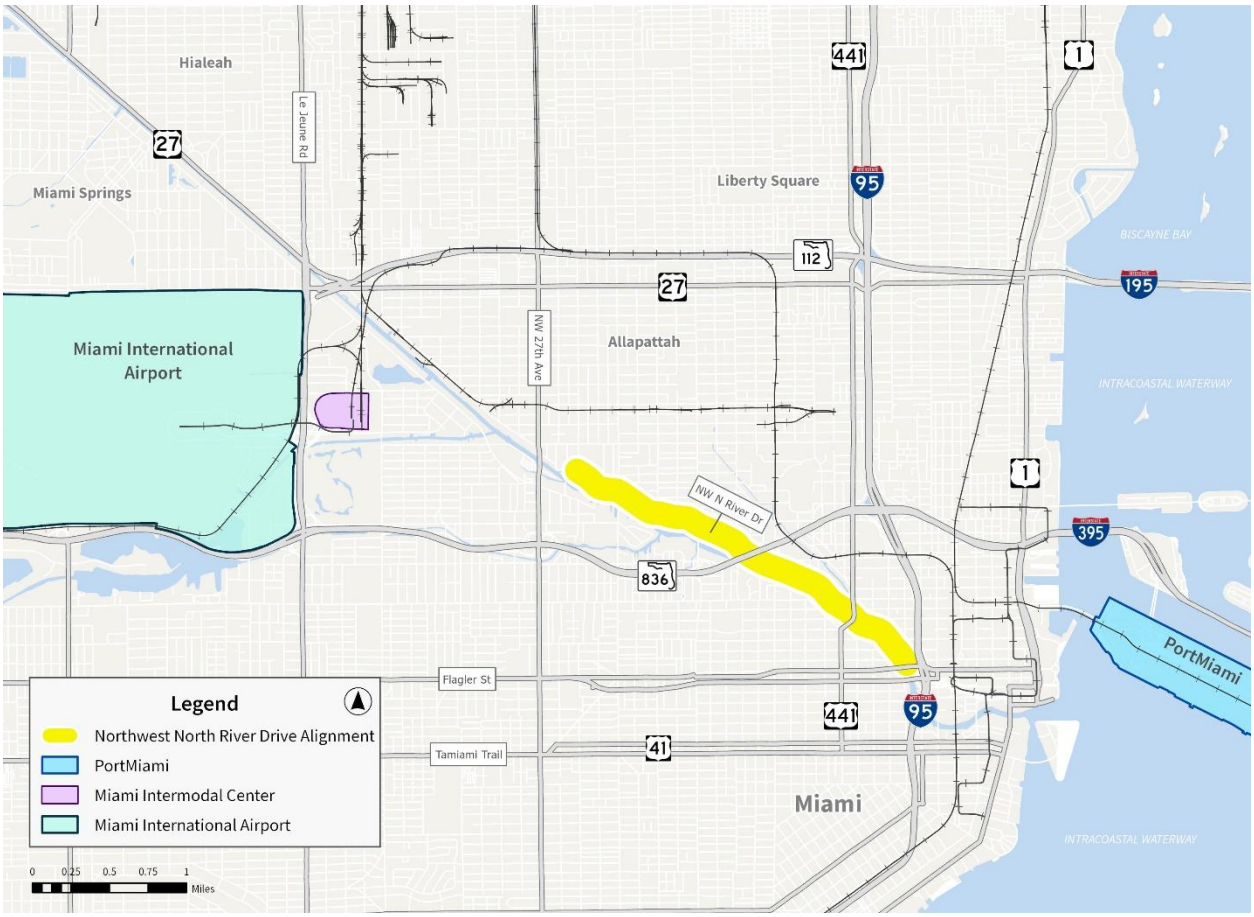
Figure 7-5 NW 20th Street Local Road Alignment



NW N River Drive, within the study area, is a northwest-southeast roadway from NW 36th Street in the vicinity of SR 112/Airport Expressway to the vicinity of I-95 (Figure 7-6). The land use along the roadway is influenced by its location adjacent to the Miami River including marinas,

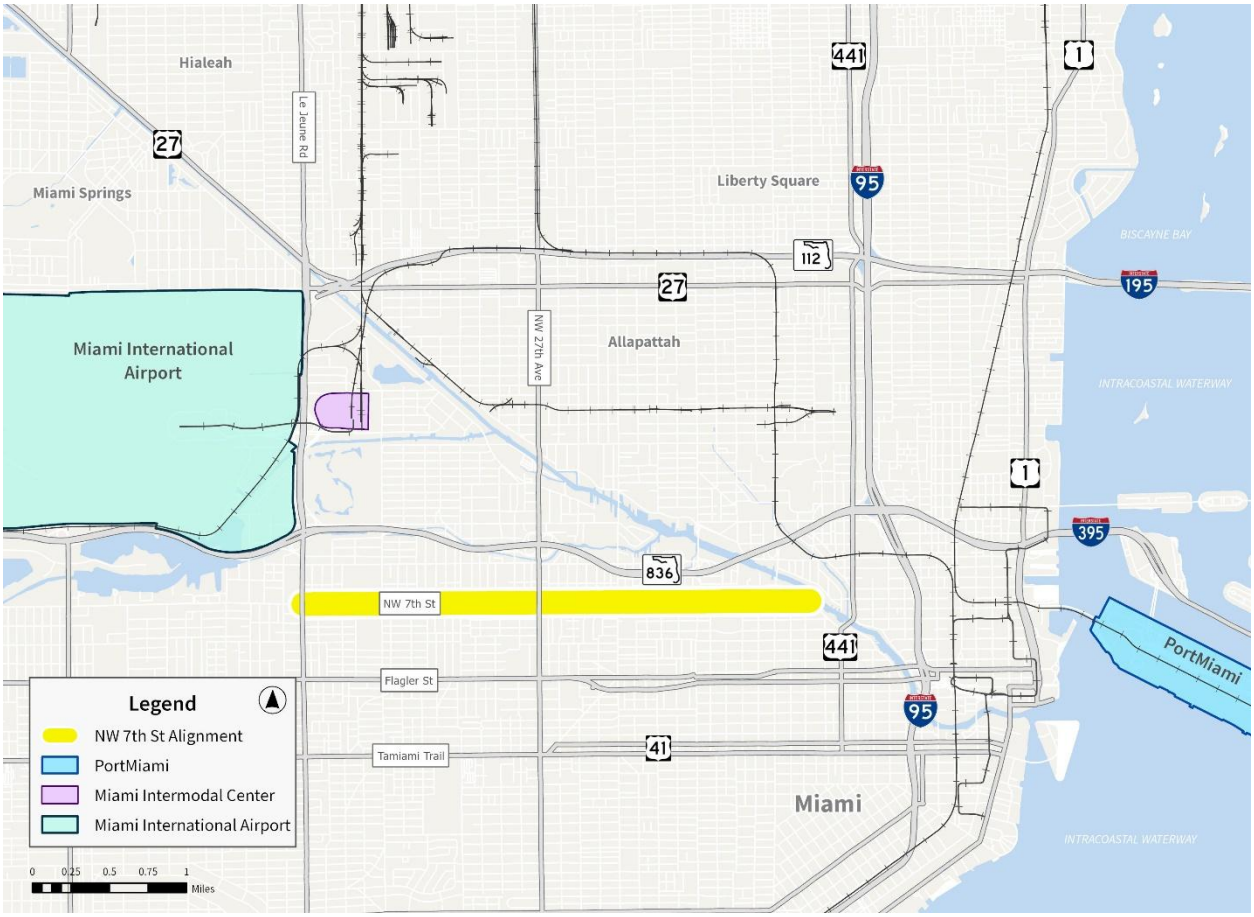
maritime industries, and destinations such as Curtis Park as well as several single and multifamily residential areas. West of NW 17th Avenue, the roadway contains two travel lanes, one in each direction. East of NW 17th Avenue, the roadway contains four to five travel lanes, two in each direction plus a turning lane in some locations. Most sections contain sidewalks on both sides but no shoulder. Traffic signals are located at key cross streets.

Figure 7-6 NW N River Drive Local Road Alignment



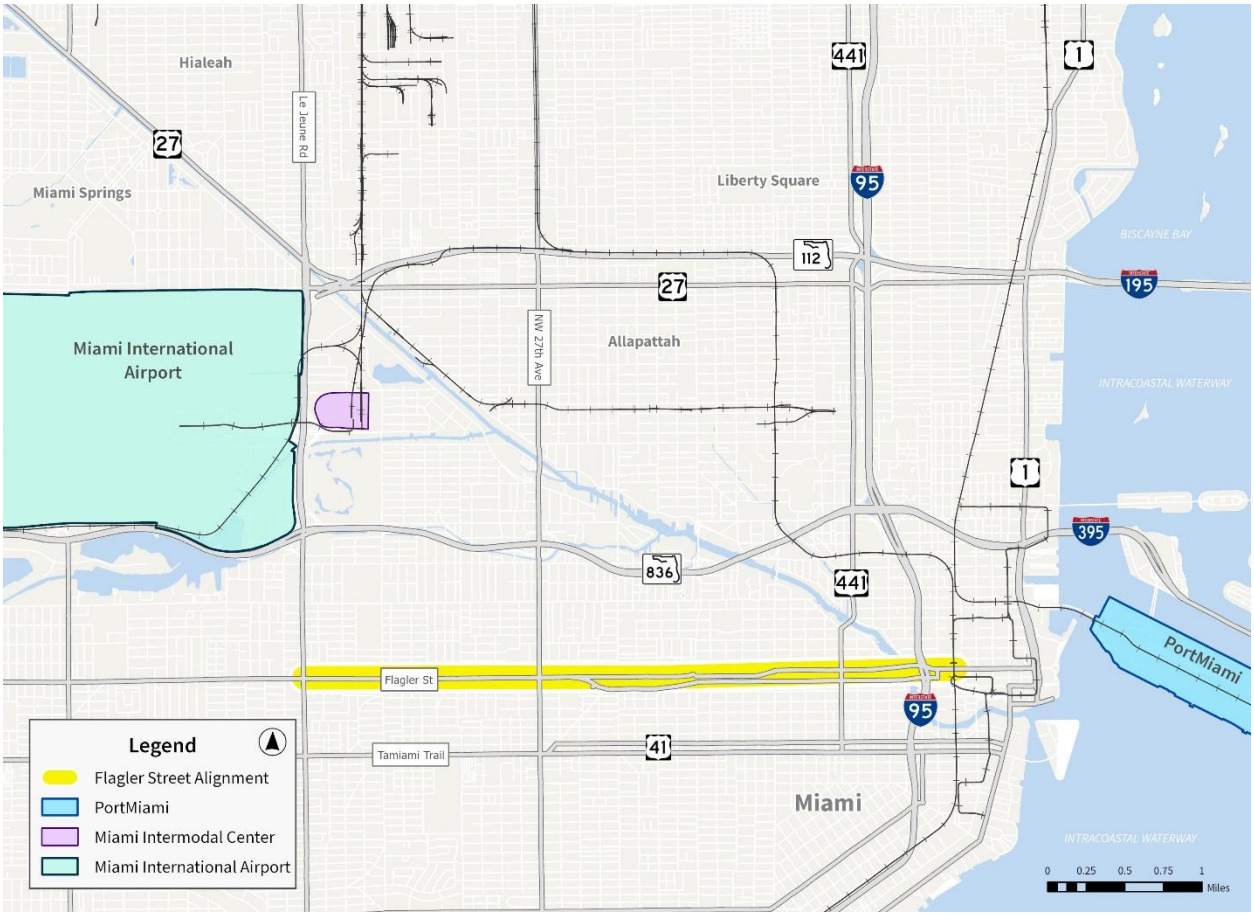
NW 7th Street, within the study area, is an east-west local roadway from LeJeune Road/SR 953 to NW 8th Avenue. The land use along the roadway includes a mix of commercial, office, retail, medical, shopping centers, multifamily residential, education, and recreation/entertainment including destinations such as Magic City Casino, South Florida Institute of Technology, and the Loan Depot Park. The roadway contains five travel lanes, two in each direction and a center turn lane. Most sections contain sidewalks on both sides but no shoulder. Traffic signals are located at key cross streets.

Figure 7-7 NW 7th Street Local Road Alignment



Flagler Street (SR 968), within the study area, is an east-west local roadway from LeJeune Road/SR 953 to downtown Miami. The land use along the roadway includes a mix of commercial, office, retail, medical, shopping centers, multifamily residential, and education including destinations such as Miami-Dade County Auditorium, Miami Senior High School, Lincoln-Marti Charter Schools (Little Havana Campus), the Miami Cultural Arts Center, and Miami Police Department South Substation. West of SW/NW 27th Avenue, the roadway contains five travel lanes, two in each direction and a center turn lane or a planted center median in some locations. Most sections contain no shoulder and sidewalks on both sides. East of SW/NW 27th Avenue, the roadway splits into a pair of two one-way streets in each direction. SW/NW 1st Street has three eastbound travel lanes, sidewalks on both sides, and a bicycle lane or on street parking. W Flagler Street has three westbound travel lanes, sidewalks on both sides, and a bicycle lane or on-street parking. Traffic signals are located at key cross streets.

Figure 7-8 Flager Street Local Road Alignment



8. Purpose and Need, Goals and Objectives, and Screening Criteria

Based upon the data collected and studies reviewed, issues, benefits, and challenges were identified which established the purpose and need for the project. Using the purpose and need, goals and objectives were determined to guide the identification of alternatives for this study and the development of criteria to screen the alternatives.

8.1. Purpose and Need

Purpose:

- Examine the feasibility of implementing a direct transit service between PortMiami and MIA that will improve mobility with a safe, convenient, efficient, fast, and reliable transportation connection.

Need:

- Existing transportation access options for cruise ship passengers traveling outside the region to/from MIA, within the region's to/from central station/transit hubs such as Government Center or MiamiCentral, and locally to/from Downtown are limited.
- Existing transportation access options for cruise, cargo, and office employees at the Port are limited.
- Vehicular traffic congestion within the Port, on the Port Miami Bridge, and on connecting roadways in Downtown occurs because of large cruise ship passenger volumes, which are heavily peaked during certain months, days of the week, and times of day.
- Land for additional parking at the Port for passengers is constrained.
- Future growth in the cruise ship passenger market is anticipated to be significant which will further exacerbate access, congestion, and parking constraints at the Port.
- Existing transit options to/from the Port do not have attractive travel times, and do not take into consideration special cruise ship travel needs such as luggage transport.
- PortMiami is a premiere global cruise destination adjacent to Miami's vibrant Downtown but an attractive and reliable transit connection between these important hubs is lacking.
- Port terminals are widely spaced, creating long walking distances and demand is not balanced between the locations of parking and the cruise terminals.

8.2. Goals and Objectives

Goal 1:

- **Create a direct "one seat ride" transit service between PortMiami and MIA.**

Objective:

- Eliminate from consideration transit services that would require a transfer or would not be appropriate for the distance between PortMiami and MIA.

Goal 2:

- **Develop a transit service that is safe, reliable, convenient, and efficient.**

Objective:

- Maximize passenger safety, service frequency and reliability, as well as passenger movement.

Goal 3:

- **Provide a fast and reliable transit service between PortMiami and MIA.**

Objective:

- Minimize travel time and delay between PortMiami and MIA.

8.3. Screening Criteria

Based on these project goals and objectives, criteria to screen the alternatives to be developed in this study were identified (Table 8-1).

Table 8-1 Goals, Objectives, and Screening Criteria

Goal 1: Create a direct "one seat ride" transit service between PortMiami and MIA.
Objective: Eliminate from consideration transit services that would require a transfer or would not be appropriate for the distance between PortMiami and MIA.
Screening Criteria: ❑ **Mode Suitable for the eight- to ten-mile route between PortMiami and MIA**

Goal 2: Develop a transit service that is safe, reliable, convenient, and efficient.
Objective: Maximize passenger safety, service frequency and reliability, as well as passenger movement.
Screening Criteria: ❑ **High frequencies are possible to meet demand.** ❑ **Vehicles have the capacity to move cruise ship passenger volumes.**

Goal 3: Provide a fast and reliable transit service between PortMiami and MIA.
Objective: Minimize travel time and delay between PortMiami and MIA.
Screening Criteria: ❑ **Travel time is competitive with private vehicle time.** ❑ **Dedicated right-of-way will eliminate delay and promote reliability.**

Alternatives will be evaluated qualitatively, and the following symbols will be assigned for each screening criteria:

● = Anticipated to fully meet these criteria.

◑ = Anticipated to partially meet these criteria.

○ = Not anticipated to meet these criteria.

9. Mode Screening and Alternatives Development

One of the objectives of the study is to investigate a mode that would be suitable to connect PortMiami to MIA, a distance of approximately eight miles. Typically, aerial tram, automated guideway transit, cable car, and streetcar are modes that are only suitable for short distances. On the other hand, intercity rail is a mode only suitable for long distances. Therefore, they were not advanced for study.

Modes retained for consideration in the development of the long list alternatives are automated people mover, bus rapid transit, commuter rail, heavy rail, and light rail, as presented in Table 9-1.

Table 9-1 Mode Screening Results

	Mode Suitable for 8-Mile Route Between PortMiami and MIA
Aerial Tramway	○
AGT/Monorail/ATN	○
Automated People Mover	●
Bus Rapid Transit	●
Cable Car	○
Commuter Rail	●
Heavy Rail	●
Intercity Rail	○
Light Rail	●
Streetcar	○

The modes that advanced for further consideration were compared to the identified alignments, and the modes appropriate along each of these alignments were determined (Table 9-2). Using this matrix, a list of potential transit alternatives between MIA and PortMiami was developed.

Table 9-2 Development of Alternatives for Alignments and Modes

	Automated People Mover	Bus Rapid Transit	Commuter Rail	Heavy Rail	Light Rail
Railroad Alignments	⊖	⊖	☑	⊖	⊖
Heavy Rail Alignment	⊖	⊖	⊖	☑	⊖
Highway Alignment	☑	☑	⊖	⊖	⊖
Local Road Alignments	☑	⊖	⊖	⊖	☑

Based on this screening, the following is the long list of five potential alternatives that were identified for consideration in the following sections:

- Automated People Mover with Highway, Rail, and Local Road Alignment Options
- Bus Rapid Transit Dolphin Expressway
- Commuter Rail SFRC and FEC Railroad
- Heavy Rail Metrorail Extension
- Light Rail with Local Road Alignment Options

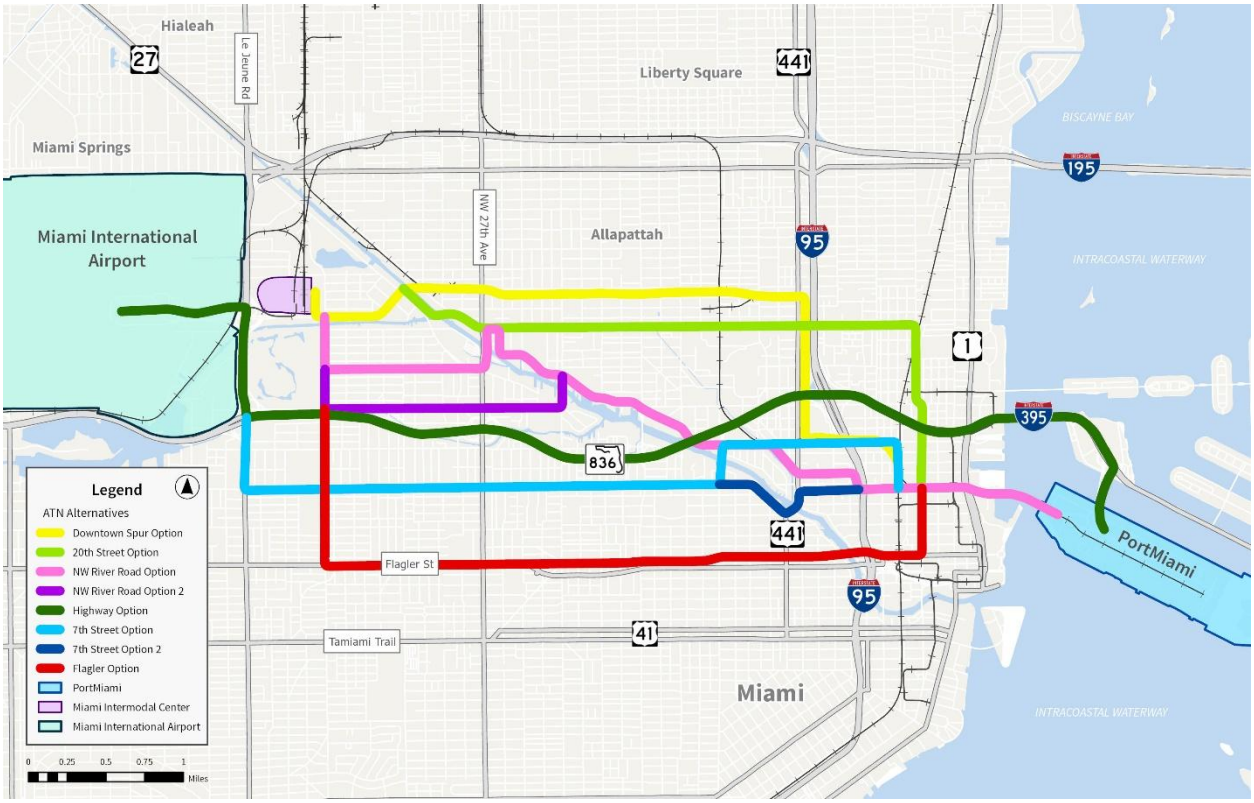
10. Tier I Alternatives

10.1. Automated People Mover with Highway, Rail, and Local Road Alignment Options

This alternative is an eight- to ten-mile automated people mover using a dedicated alignment on elevated structure. A variety of route options using roadway or railroad alignments can be considered to reach PortMiami including:

- **Downtown rail spur** to NW 7th Avenue
- **NW 20th Street** to NW 1st Avenue
- **NW N River Drive** via NW 17th Street/NW 27th Street Bridge or NW 14th Street/NW 22 Street Bridge and NW 11th Street and NW 1st Avenue
- **Dolphin Expressway** to Port Tunnel
- **NW 7th Street** to NW 12th Avenue Bridge to NW 11th Street or NW 5th Street Bridge
- **West Flagler Street**/SW 1st Street (FL-968) to SW 2nd Avenue

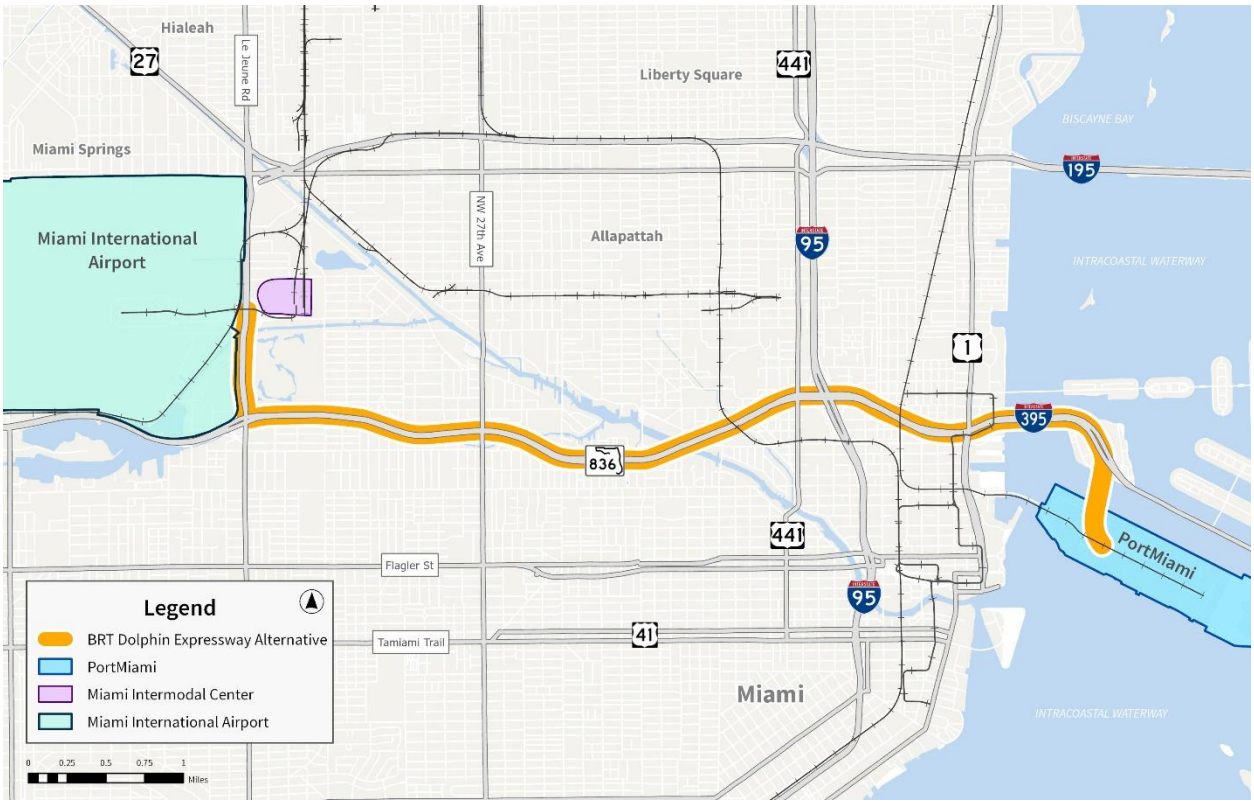
Figure 10-1 Automated People Mover Highway, Rail, and Local Road Alignment Options



10.2. Bus Rapid Transit Dolphin Expressway

This alternative is an eight-mile BRT service using LeJeune Road/SR953, SR 836/Dolphin Expressway, I-395/MacArthur Causeway, and the PortMiami Tunnel. An alternate routing could be considered via downtown using NE 5th Street to Port Boulevard.

Figure 10-2 Bus Rapid Transit Dolphin Expressway



10.3. Commuter Rail SFRC and FEC Railroads

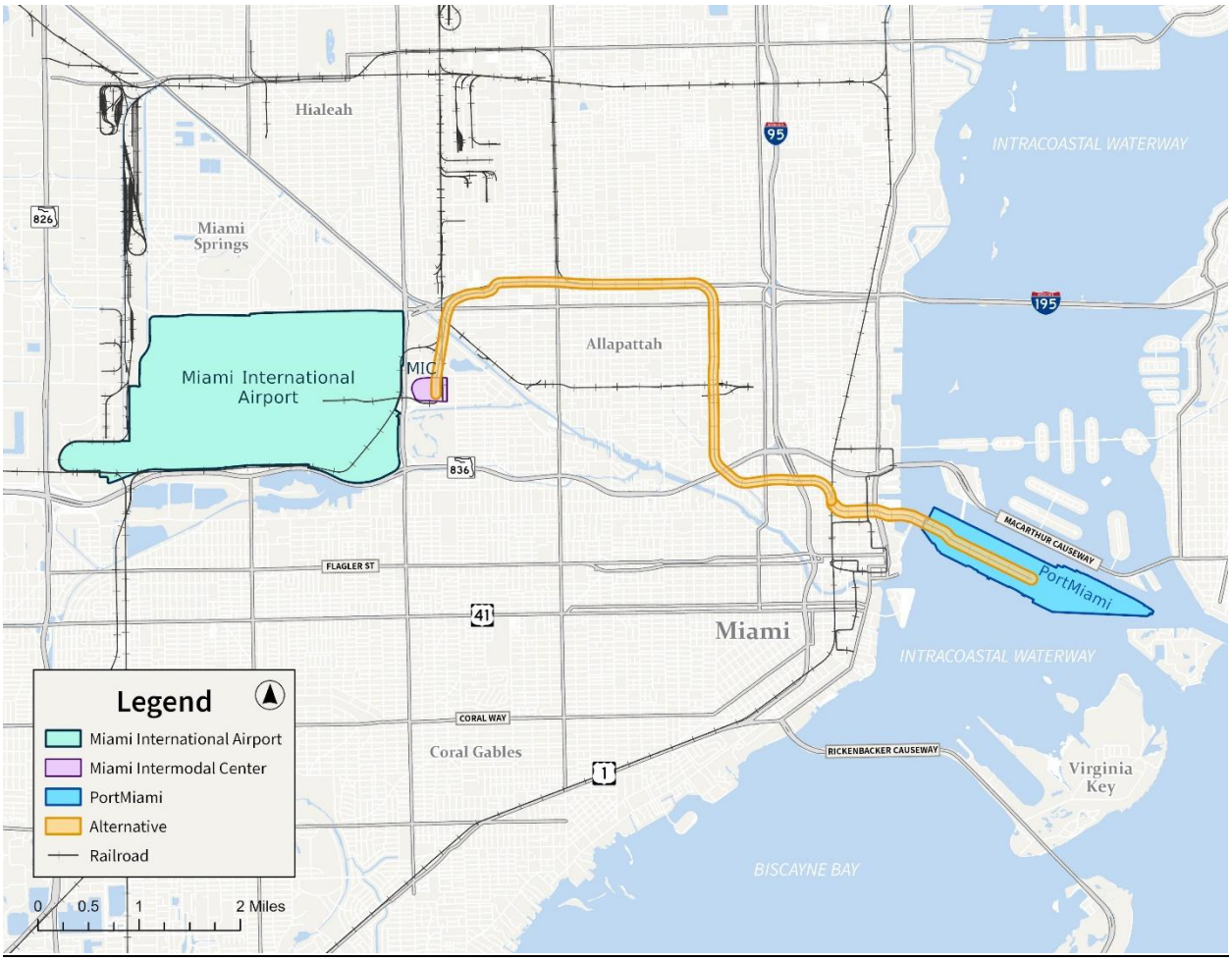
This alternative is a 14-mile commuter rail service from the MIC using SFRC/Tri Rail Airport Line track, with a new connection to the FEC Little River Branch (used by Tri Rail service to MiamiCentral Station) just south of E 25th Street by the Metrorail Transfer , then staying on the FEC tracks at-grade to PortMiami using the existing rail bridge and rail track.

Figure 10-3 Commuter Rail SFRC and FEC Railroads

10.4. Heavy Rail Metrorail Extension

This alternative is a 10-mile Metrorail heavy rail service using a 1.9-mile extension from the Overtown/Lyric Theater Station to PortMiami. The route would use the existing Metrorail alignment from the Miami International Airport Metrorail Station to the vicinity of the Overtown/Lyric Theater Metrorail Station, where it would continue through downtown to a new bridge over the Intercoastal Waterway into PortMiami to future elevated station(s) on the Port site.

Figure 10-4 Heavy Rail Metrorail Extension

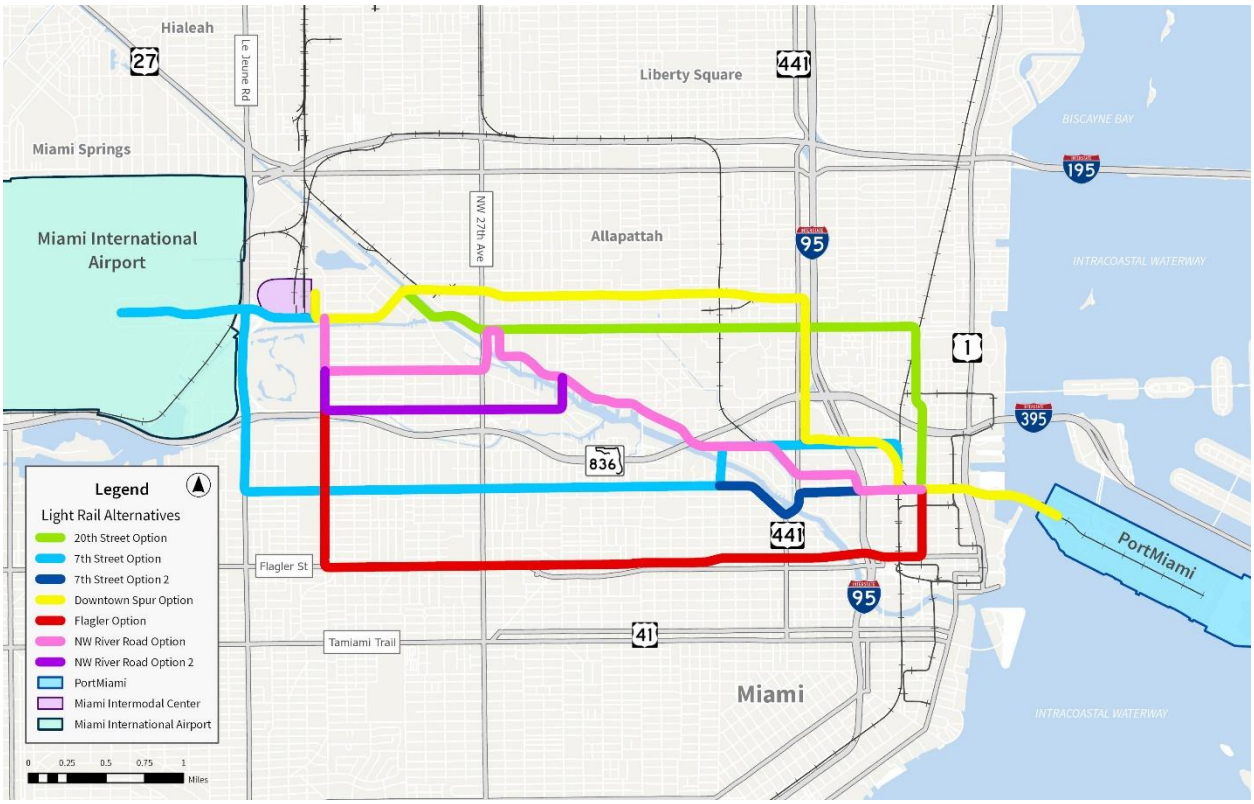


10.5. Light Rail with Local Road Alignment Options

This alternative is a nine- to ten-mile light rail service operating at-grade within existing roadway or railroad alignments. A variety of route options can be considered to reach NW 5th/NW 6th Street to Port Boulevard including:

- **Downtown rail spur** to NW 7th Avenue
- **NW 20th Street** to NW 1st Avenue
- **NW N River Drive** via NW 17th Street/NW 27th Street Bridge or NW 14th Street/NW 22 Street Bridge and NW 11th Street and NW 1st Avenue
- **SR 836/Dolphin Expressway** to Port Tunnel
- **NW 7th Street** to NW 12th Avenue Bridge to NW 11th Street or NW 5th Street Bridge
- **West Flagler Street**/SW 1st Street (SR 968) to SW 2nd Avenue

Figure 10-5 Light Rail Various Alignment Options



11. Screening of Tier 1 Alternatives

The characteristics of the Tier 1 Alternatives were screened to determine the short list of Tier 2 Alternatives using the screening criteria based on the project goals and objectives presented in Section 8.3. Goal 1 was used as screening criteria in Section 9 to screen for suitable modes. Goal 2 and Goal 3 were used as screening criteria in this Section to refine the alternatives developed in Section 10.

11.1. Automated People Mover via Highway, Rail, or Local Road Alignments Screening

Screening Criteria: High frequencies are possible to meet demand.
The Automated People Mover via Highway, Rail, or Local Road Alignments Alternative fully meets the criteria that high frequencies are possible to meet demand. Automated People Mover technology permits the deployment of vehicles at whatever frequency is needed to meet the demand, and it can be flexible to match the variability of the cruise market travel patterns. Vehicle departures can be every five to ten minutes, or less, if needed.

Screening Criteria: Vehicles have the capacity to move cruise ship passenger volumes.
The Automated People Mover via Highway, Rail, or Local Road Alignments Alternative fully meets the criteria that vehicles have the capacity to move expected cruise ship passenger volumes. Automated People Mover vehicle capacities vary, typically ranging from 50 to 75 passengers, with some systems using multiple-car trains to increase capacity with each train holding up to 200 passengers. Vehicles have interior space to accommodate travelers with luggage. The vehicles can be platooned if needed to move higher capacities, and the fleet can be sized to meet cruise passenger volumes. The movement of people per hour for this mode ranges widely dependent on the number of vehicles in the system and is scalable, and can transport 2,000 to 25,000 passengers per hour, per direction.

Screening Criteria: Travel time is competitive with private vehicle time.

The Automated People Mover via Highway, Rail, or Local Road Alignments Alternative fully meets the criteria that travel time is competitive with private vehicle time. Fast travel times would be possible because a dedicated right-of-way for transit only is required; therefore, vehicles would not be mixed with vehicular traffic.

Screening Criteria: Dedicated right-of-way will eliminate delay and promote reliability.

The Automated People Mover via Highway, Rail, or Local Road Alignments Alternative fully meets the criteria that a dedicated right-of-way will eliminate delay and promote reliability. An Automated People Mover must operate within a dedicated right-of-way which is typically elevated or physically separated from other modes and is not shared with other services. A dedicated right-of-way removes conflicts with other vehicles which makes the service reliable and avoids delays.

11.2. Bus Rapid Transit via SR 836/Dolphin Expressway Screening

Screening Criteria: High frequencies are possible to meet demand.
The Bus Rapid Transit via SR 836/Dolphin Expressway Alternative partially meets the criteria that high frequencies are possible to meet demand. Bus Rapid Transit uses bus equipment which permits the deployment of vehicles at whatever frequency is needed to meet the demand, and it can be flexible to match the variability of the cruise market travel patterns. Vehicle departures can be every five to ten minutes if needed. Frequencies would be limited because it would share right-of-way with other vehicles along portions of the route.

Screening Criteria: Vehicles have the capacity to move cruise ship passenger volumes.
The Bus Rapid Transit via SR 836/Dolphin Expressway Alternative partially meets the criteria that vehicles have the capacity to move cruise ship passenger volumes, which ranges from 50 passengers for a single bus up to 150 passengers for an articulated bus, accommodating travelers with luggage. The fleet can be sized to meet cruise expected passenger volumes. The movement of people per hour for this mode is 8,000 to 30,000 passengers per hour, per direction.

Screening Criteria: Travel time is competitive with private vehicle time.

The Bus Rapid Transit via SR 836/Dolphin Expressway Alternative partially meets the criteria that travel time is competitive with private vehicle time. Fast travel times would not be possible because there would only be dedicated right-of-way for transit for portions of this alternative; therefore, vehicles would be mixed with vehicular traffic in several locations.

Screening Criteria: Dedicated right-of-way will eliminate delay and promote reliability.

The Bus Rapid Transit via SR 836/Dolphin Expressway Alternative partially meets the criteria that a dedicated right-of-way will eliminate delay and promote reliability. Delay and impacts to reliability would be likely in some portions of this alternative that must operate mixed with vehicular traffic.

11.3. Commuter Rail via SFRC and FEC Railroad Screening

Screening Criteria: High frequencies are possible to meet demand.
The Commuter Rail via SFRC and FEC Alternative partially meets the criteria that high frequencies are possible to meet demand. Commuter rail via SFRC and FEC would use passenger rail equipment which limits the service frequency to a set schedule which would not be flexible as the tracks must be shared with multiple other services over the route, including Tri Rail, Brightline, and FEC freight. This may meet the demand but would not be flexible to match the variability of the cruise market travel patterns. Train departures can be every 15 minutes if needed. Frequencies would be limited because it would share right-of-way with other rail passenger or freight services over the route.

Screening Criteria: Vehicles have the capacity to move cruise ship passenger volumes.

The Commuter Rail via SFRC and FEC Alternative fully meets the criteria that vehicles have the capacity to move cruise ship passenger volumes. Commuter rail trains have a capacity of 250-1,000 passengers and can accommodate travelers with luggage. A set vehicle fleet would need to be established based on a service plan. The movement of people per hour for this mode varies greatly depending on the train length and frequency from 1,000 to 60,000 passenger per direction.

Screening Criteria: Travel time is competitive with private vehicle time.

The Commuter Rail via SFRC and FEC Alternative does not meet the criteria that travel time is competitive with private vehicle time. Fast travel times would not be possible because of the lack of schedule flexibility and the 14-mile route length, circuitous route, with curves and turns that reduce speeds.

Screening Criteria: Dedicated right-of-way will eliminate delay and promote reliability.

The Commuter Rail via SFRC and FEC Alternative partially meets the criteria that a dedicated right-of-way will eliminate delay and promote reliability. The SFRC and FEC rights of way are exclusively designated for railroad use. However, this service would operate alongside existing rail services, including FEC freight operations to PortMiami, Tri-Rail commuter service to the MIA and MiamiCentral Station, Brightline intercity passenger service to MiamiCentral Station, and the proposed Northeast Corridor commuter rail. Commuter rail would also increase the number of closures at existing grade crossings for new trains. Additionally, a shared right-of-way with grade crossings can have operating conflicts with other operators and vehicles, which can affect service reliability and create delays.

11.4. Heavy Rail Metrorail Extension Screening

Screening Criteria: High frequencies are possible to meet demand.

The Heavy Rail Metrorail Extension Alternative fully meets the criteria that high frequencies are possible to meet demand. Metrorail operates at a five-to-ten-minute frequency. If the extension operated at a similar headway, it could meet the demand of the cruise market travel patterns. Vehicle departures can be every five to ten minutes if needed.

Screening Criteria: Vehicles have the capacity to move cruise ship passenger volumes.

The Heavy Rail Metrorail Extension Alternative fully meets the criteria that vehicles have the capacity to move cruise ship passenger volumes. Heavy rail trains have a capacity of 500 passengers and can accommodate travelers with luggage. A set vehicle fleet would need to be established based on the service plan. The movement of people per hour for this mode ranges from 40,000 to 60,000.

Screening Criteria: Travel time is competitive with private vehicle time.

The Heavy Rail Metrorail Extension Alternative fully meets the criteria that travel time is competitive with private vehicle time. Fast travel times would be possible because a dedicated right-of-way for transit only would be used; therefore, vehicles would not be mixed with vehicular traffic.

Screening Criteria: Dedicated right-of-way will eliminate delay and promote reliability.

The Heavy Rail Metrorail Extension Alternative fully meets the criteria that a dedicated right-of-way will eliminate delay and promote reliability. Metrorail operates within a dedicated, elevated right-of-way physically separated from other modes and services. This dedicated right-of-way removes conflicts with other vehicles which makes the service reliable and avoids delays.

11.5. Light Rail via Local Roadway Alignments Screening

Screening Criteria: High frequencies are possible to meet demand.

The Light Rail via Local Roadways Alternative partially meets the criteria that high frequencies are possible to meet demand. Light Rail would rely on dedicated vehicles, tracks, and stations, resulting in a fixed schedule that lacks flexibility. While this could accommodate demand, it may not adapt effectively to the variable travel patterns of the cruise market. Vehicle departures can be every five to ten minutes if needed. Frequencies would be limited because services would share right-of-way in some locations with vehicular traffic.

Screening Criteria: Vehicles have the capacity to move cruise ship passenger volumes.

The Light Rail via Local Roadways Alternative partially meets the criteria that vehicles have a capacity to move cruise ship passenger volumes that range between 200 to 240 passengers, accommodating travelers with luggage. The movement of people per hour for this mode ranges from 15,000 to 20,000.

Screening Criteria: Travel time is competitive with private vehicle time.

The Light Rail via Local Roadways Alternative does not meet the criteria that travel time is competitive with private vehicle time. Fast travel times would not be possible because it would not use a dedicated right-of-way for transit only; therefore, light rail vehicles would be mixed with vehicular traffic in some locations. Additionally, vehicle stops at intermediate stations would add to the travel time between MIA and PortMiami.

Screening Criteria: Dedicated right-of-way will eliminate delay and promote reliability.

The Light Rail via Local Roadways Alternative does not meet the criteria that a dedicated right-of-way will eliminate delay and promote reliability. Light rail typically operates at-grade within a street right-of-way and is subject to conflicts with other vehicles which can affect service reliability and create delays. Travel times will be negatively impacted because all or portions of the service

alignment must be operated mixed with vehicular traffic, not in a dedicated right-of-way for transit only.

11.6. Tier 1 Alternatives Screening Summary

A summary of the screening of the long list alternatives is presented in Table 11-1. The two alternatives – **Automated People Mover and Metrorail Extension** – meet all the screening criteria and were selected for more detailed study in Tier 2.

Table 11-1 Tier 1 Alternatives Screening

Screening Criteria / *Alternative*	**High frequencies are possible to meet demand.**	**Vehicles have the capacity to move cruise ship passenger volumes.**	**Travel time is competitive with private vehicle time.**	**Dedicated right-of-way will eliminate delay & promote reliability.**
Automated People Mover via Highway. Rail, or Local Road Alignment	●	●	●	●
Bus Rapid Transit Dolphin Expressway	◑	◑	◑	◑
Commuter Rail SFRC and FEC Railroad	◑	●	○	◑
Heavy Rail Metrorail Extension	●	●	●	●
Light Rail Local Road Alignment Options	◑	◑	○	○

● = Anticipated to fully meet these criteria.

◑ = Anticipated to partially meet these criteria.

○ = Not anticipated to meet these criteria.

12. Development of Tier 2 Alternatives

The following section presents the more detailed analysis performed on the two alternatives selected for further study in the Tier 2 analysis, an Automated People Mover alternative and a Heavy Rail Metrorail Extension alternative. The Automated People Mover alternative would use driverless rubber-tired vehicles operating on a guideway within an exclusive right-of-way. The Metrorail Extension alternative would extend the existing heavy rail system from downtown to PortMiami.

12.1. Route Alignments

The route alignments for the alternatives were defined in more detail.

12.1.1. Automated People Mover

The Automated People Mover alternative uses a dedicated alignment that can be on elevated structure and/or at grade. A variety of route options using roadway or railroad alignments were identified in Section 10.1 that are all potential options for consideration between PortMiami and MIA (Figure 10-1). These options were screened for the purposes of this study; however, it is noted that any of these could be pursued if the alternative is advanced and additional input on benefits and challenges is obtained. A summary of the features of these potential alignments is presented in Table 12-1.

Based on this Automated People Mover alignments screening, the corridor along 7th Street appears to have the most benefits in terms of route length, travel time, and destinations served, while having a similar potential for community concerns as the other alignments. Therefore, for planning purposes in this study, the following proposed nine-mile route from the MIC to PortMiami was evaluated (Figure 12-1):

- NW 37th Avenue
- NW 7th Street
- 5th Street Bridge crossing the Miami River
- NW 5th Street/NE 5th Street
- Port Boulevard and bridge crossing Intercoastal Waterway

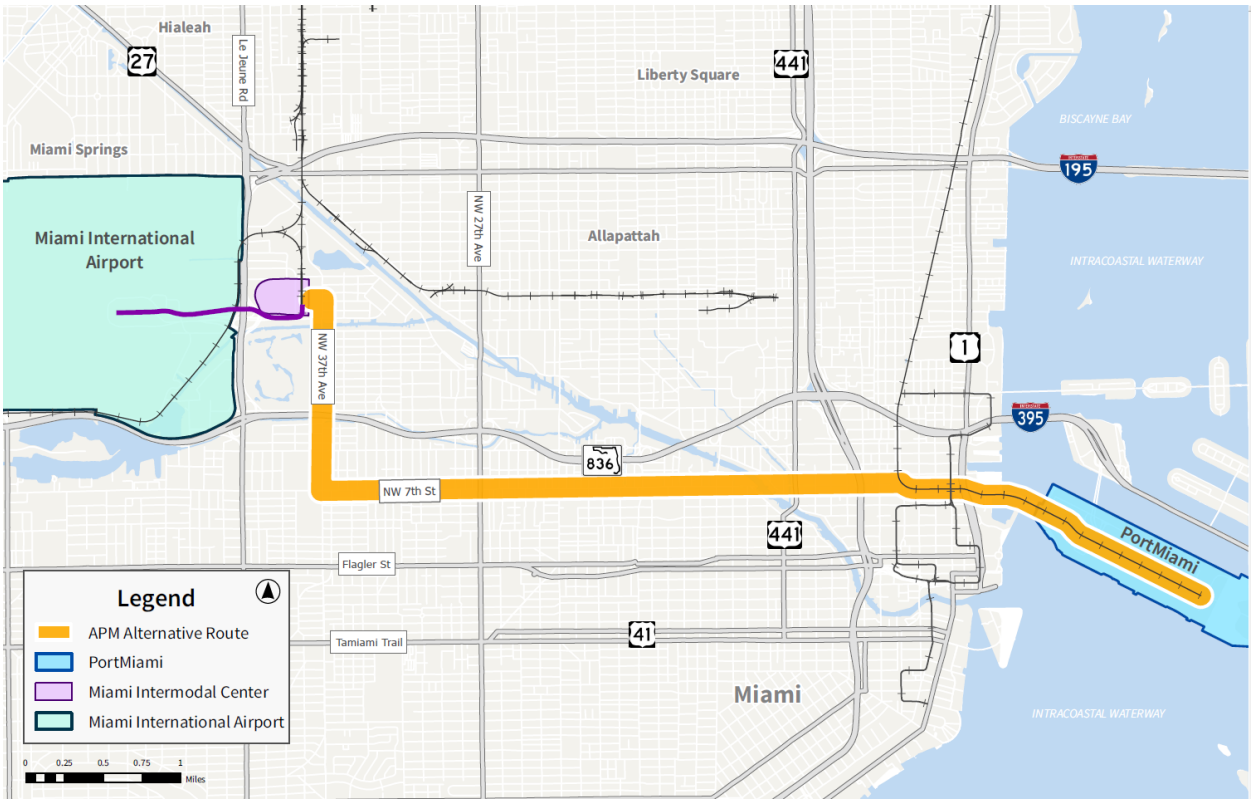
For the purposes of this planning study, five station stops were assumed. One or more of these stops was assumed at PortMiami. Off PortMiami, two station stops were assumed as part of this study at the MIC by MIA, and in downtown in the vicinity of the Metrorail Overtown/Lyric Theater Station and MiamiCentral. Though beyond the purpose of this study to serve the PortMiami-MIA market, many other additional stations/stops could be considered to serve other destinations such as the Kaseya Center, Loan Depot Park, and Freedom Park, the future home of the InterMiami CF soccer club.

TPO Miami-Dade Transportation Planning Organization

Table 12-1 Automated People Mover Route Alignments Screening

	Downtown Rail Spur	NW 20th Street	NW N River Drive	Dolphin Expressway/836	NW 7th Street	Flagler Street
Western Route Options from MIC	a. NW 21st Street, NW 33rd Avenue, NW S River Drive. to New Miami River Crossing	a. NW 21st Street, NW 33rd Avenue, NW S River Drive, New Miami River Crossing to NW N River Drive	a. NW 17th Street, 27th Street Bridge b. NW 14th Street, 22 Street Bridge	a. NW 21st Street to SR 953/LeJeune Road b. NW 21st Street to NW 37th Avenue	a. NW 21st Street to S. River Drive/Del. Parkway, NW 27th Avenue. b. NW 21st Street to SR 953/LeJeune Road c. NW 37th Avenue	a. NW 21st Street to SR 953/LeJeune Road b. NW 21st Street to NW 37th Avenue
Eastern Route Options to Port Blvd to PortMiami	a. NW 22nd Street, NW 1st Avenue, over I-95, 5th Street b. NW 7th Avenue, NW 11th Street to NW 5th Street	a. NW 1st Avenue, NW 5th Street b. NW 7th Avenue, NW 11th Street, NW 5th Street	a. NW 11th Street, NW 5th Street	a. I-395 E, MacArthur Causeway, PortMiami Tunnel	a. NW 12th Avenue Bridge, NW 11 Street, NW 1st Avenue, NE 5th Street b. 5th Street Bridge, NE 5th Street c. 5th Street Bridge, NW N River Drive, NW/NE 2nd Street, Govt. Center Unused Platform, US 1	a. SW 1st Street (FL-968) to 2nd Avenue
Distance	10.0 miles	9.3 miles	8.8 miles	8.9 miles	9.0 miles	10.5 miles
Opportunities/ Benefits	• Underutilized ROW	• Wide roadway width	• Shorter distance • Shorter travel time	• Shorter distance • Shorter travel time	• Shorter distance • Shorter travel time • Serves other destinations, Loan Depot Park	• Increased transit service to local communities
Constraints/ Other Considerations	• Longer distance • Longer travel time • Use of Freight ROW • Grove Park, Spring Garden, Overtown community concerns	• Longer distance • Longer travel time • Allapattah area already served by Metrorail	• Roadway width and constraints • Conflicts with maritime uses	• SR 836 ROW Constraints • Port Tunnel Use • Would not serve local communities	• Community concerns	• Longer distance • Longer travel time • Traffic demand exceeds capacity • Removing parking/travel lanes • Little Havana community concerns

Figure 12-1 Automated People Mover Alternative Route



12.1.2. Heavy Rail Metrorail Extension

The route for this alternative proposes a ten-mile Metrorail service using a 1.9-mile extension from downtown to PortMiami (Figure 12-2). The route would use the existing Metrorail from MIA to the vicinity of the Historic Overtown/Lyric Theatre Metrorail Station. From there, a new 1.9 mile elevated segment would extend east, either over the Florida East Coast (FEC) railway corridor or along NE 6th Street. The extension would rise above the Metromover at NE 2nd Street, continue elevated over US-1, and then cross the Intracoastal Waterway on a new bridge. From there, the route would proceed along Port Boulevard and terminate at a new elevated Metrorail station within PortMiami.

Figure 12-2 Heavy Rail Metrorail Extension Alternative Route

12.2. Physical Features

The physical features for the alternatives were defined in more detail. Potential station locations were identified. Vehicle storage and maintenance facilities requirements were identified.

12.2.1. Automated People Mover

The physical features of the Automated People Mover alternative are:

- Stations: Station sizes for an Automated People Mover can be scaled based on ridership demand and can vary along the route. Five station stops were included as part of this study. Additional stops could be pursued to meet other regional goals beyond the purposes of this study of transit between PortMiami and MIA.
- Guideway: An Automated People Mover uses a narrow guideway, similar to a traditional roadway. A minimum 15-foot-wide guideway would be necessary to accommodate two-travel lanes. Travel lanes are a paved roadway surface for use by rubber-tired vehicles. A 40-foot-wide guideway section would accommodate three lanes, including space for a passing/merge lane and emergency walkways on each side. The right-of-way for the guideway must be dedicated with no interface with pedestrians or cars.
- Structures: The guideway would be mostly on elevated structure; however, sections could be at grade if required or desired. The guideway would either cross the Intercoastal Waterway and the Miami River on the existing structures, or new crossings may be required. Additional structural analysis would be required to make this determination.
- Vehicles: Vehicles are rubber tired, driverless/autonomous, and bi-directional. Automated People Mover vehicle capacities vary, typically ranging from 50 to 75 passengers, with some systems using multiple-car trains to increase capacity with each train holding up to 200 passengers. The capacity of the service is scalable to match required demand. Fleets can be sized to accommodate 2,000 to 25,000 passengers per hour per direction. Vehicles can accommodate luggage storage and bicycles. Vehicles permit level boarding are Americans with Disabilities Act (ADA) compliant, and can accommodate wheelchairs. Automated People Mover vehicles can be added to trains when large volumes of riders are going in between the same points, such as would be the case between PortMiami and MIA, particularly on days when cruise ships come into Port.
- Motive power: Vehicles are electric powered from a battery or rail. As such, vehicles are quiet and emissions free.
- Vehicle storage and maintenance: A new facility for the storage and maintenance of the vehicles would be required. The facility would need to be equipped to accommodate electric charging for the fleet if battery powered. Possible locations for the facility could be at a station, a nearby existing parking garage, or at a warehouse.
- Command Center: An office or central command center would be required for the management of the system.

12.2.2. Heavy Rail Metrorail Extension

The physical features of the Heavy Rail Metrorail Extension alternative are:

- Stations: An elevated Metrorail station downtown and at PortMiami would be constructed. The PortMiami station would be in a central location, with pedestrian and vehicular connections linking the new Metrorail station to the cruise terminals.
- Guideway and track: A new 1.9-mile dedicated guideway would be elevated straddled 50 to 60 feet above the FEC or NE 6th Street for clearance over the existing FEC tracks and above the existing Metromover. Support columns for the elevated structure would be

located along the FEC right-of-way or within the existing sidewalks on NE 6th Street.[107] Crossover tracks would be located beyond the PortMiami station to connect the eastbound and westbound track alignments. A tight turning radius would be required from the existing Metrorail guideway onto the extension, slowing vehicle speeds below the 30-mph average.

- Structures: A new bridge across the Intracoastal Waterway would be required.
- Vehicles: Capacity of each car is approximately 75 seated passengers. Maximum vehicle capacity, without luggage, is 165 passengers assuming 90 standing. Metrorail vehicles operate at a top speed of 58 mph, with an average speed of 31 mph. Metrorail vehicles operate in pairs and can be joined to form four-car trains, with six-car trains also possible.
- Motive Power: Vehicles draw power from an electric third rail.
- Vehicle storage and maintenance and command center: Metrorail has existing vehicle storage and maintenance and command center facilities. Use of the existing Metrorail facilities are assumed.

12.3. Operations

Service operating characteristics, including frequency and span of service, were considered for the alternatives. Operating travel times between stations and from end to end were estimated. Passenger travel times, including wait times and transfer times, were also estimated for each alternative.

12.3.1. Automated People Mover

An Automated People Mover operates a schedule which can be flexible and can be scaled to meet demand when passenger surges are anticipated. Vehicles can average 30 mph. The Automated People Mover alternative hours of operation and frequency assumptions are presented in Table 12-2.

Table 12-2 Automated People Mover Frequency

Daily (Monday -Sunday)	
Hours of Operation	Frequency
5:00 AM - 12:00 AM	5-15 minutes, as needed

Travel time assumptions are presented in Table 12-3. Travel times include wait time, vehicle acceleration, and vehicle deceleration.

[107] Use of this straddle bent type elevated guideway would maintain vehicular access on NE 6th Street; however, pedestrian sidewalk access would be eliminated or constrained to accommodate the support columns. An option using support columns within existing NE 6th Street (prohibiting vehicular access, permitting pedestrian sidewalk access) was previously examined in the *Transit Options to PortMiami Feasibility Study*, and was dropped from further consideration because it was determined that maintaining vehicular access on NE 6th Street was necessary because it provides direct access westbound between PortMiami and I-95 and to the Miami-Dade College Parking Garage.

Table 12-3 Automated People Mover Travel Times to MIA

Station	Toal Distance (miles)	Total Travel Time*
PortMiami	9.0-10.0 miles	24-36 minutes

*varies depending on route option and on-Port station location

12.3.2. Heavy Rail Metrorail Extension

Hours of operation for the Heavy Rail Metrorail Extension alternative were assumed to be 5:00 a.m. to 12:00 a.m., seven days a week, the same as existing Metrorail service.

On weekdays (Monday - Friday), existing Metrorail Green Line and Orange Line trains run every 10 minutes during peak hours for a combined frequency of every 5 minutes between Earlington Heights and Dadeland South Stations in each direction, or a train every 2.5 minutes. The switching system on Metrorail is limited to 3.5-minute headways; therefore, it would not be possible to insert additional trains using current headways between Earlington Heights and Dadeland South. Two service scenarios are possible for an extension to PortMiami during peak periods:

- Adjust current Metrorail operating frequencies plans to permit trains operating to PortMiami
- Require peak period PortMiami passengers to transfer downtown to Metrorail

More detailed operating analysis would be required to determine the feasibility of adjustments to Metrorail service patterns to accommodate direct service to PortMiami during weekday peaks. For planning purposes, the Heavy Rail Metrorail Extension alternative assumes that on weekdays during the peak periods (6:00 a.m. to 9:45 a.m. and 3:45 p.m. to 6:45 p.m.), when there are no available Metrorail slots, a shuttle service between PortMiami and the Metrorail Overtown Station would be used, where a transfer would be made to the Orange Line for the trip between downtown and MIA.

There is more flexibility in the existing Metrorail service plan during the weekdays off-peak and on weekends to accommodate operating slots for the Heavy Rail Metrorail Extension alternative to PortMiami. During non-peak hours, Green and Orange Line trains run every 15 minutes, with a combined frequency of 7.5 minutes between Dadeland South and Earlington Heights Stations until 8:00 p.m., then every 30 minutes until 12:00 a.m. Weekday service frequency for the Heavy Rail Metrorail Extension alternative is assumed to be 15 minutes from 5:00 a.m. to 8:00 p.m. and 30 minutes from 8:00 p.m. to 12:00 a.m.

On weekend days (Saturday and Sunday) the Metrorail Orange Line currently operates every 15 minutes as the "Airport Shuttle" only between the MIA and Earlington Heights stations; all passengers must transfer at Earlington Heights to Green Line trains for trips between MIA and downtown. The Heavy Rail Metrorail Extension alternative assumes that the Orange Line trains on weekends are extended from Earlington Heights to PortMiami. Weekend service frequency for the Heavy Rail Metrorail Extension alternative is assumed to be every 15 minutes, the same as existing Metrorail Orange Line service.

Table 12-4 Heavy Rail Metrorail Extension Frequency

Monday -Friday		
	PORT LINE	PORT SHUTTLE
	MIA <--> PRT	OVT <--> PRT
Hours of Operation	Frequency	
5:00 AM - 6:00 AM	15 minutes	
6:00 AM - 9:45 AM		15 minutes
9:45 AM - 3:45 PM	15 minutes	
3:45 PM - 6:45 PM		15 minutes
6:45 PM - 8:00 PM	15 minutes	
8:00 PM - 12:00 AM	30 minutes	
Saturday - Sunday		
	PORT LINE	
	MIA <--> PRT	
Hours of Operation	Frequency	
5:00 AM - 12:00 AM	15 minutes	

Average speed for Metrorail would be 30 mph. With dwelling time and acceleration/deceleration at stations, the trip time from PortMiami to the Historic Overtown/Lyric Theater Metrorail Station would be seven minutes, and to the MIC Station would be 22 minutes.

Table 12-5 Heavy Rail Metrorail Extension Travel Times

Station	**Distance**	**Travel Time**
PortMiami	--	--
Historic Overtown/Lyric Theater	2.00 miles	7 minutes
MIC	6.50 miles	15 minutes
Total	8.50 miles	22 minutes

12.4. Ridership

Planning level ridership estimates were prepared for the alternatives. The ridership forecasts are categorized by two key markets – cruise passengers to/from MIA, and employees working at PortMiami. Further, the forecasts are developed for the horizon year of 2050, and a range is provided based on the low-, mid-, and high-growth projections of the cruise passengers. Fleet size was estimated based on peak vehicle requirements and spares.

12.4.1. Cruise Passengers

The PortMiami 2050 Master Plan projects that the number of cruise passengers are expected to increase from about seven million annually in 2023 to 16.9 million in 2050 in the low growth scenario. The projections in the mid-growth and high-growth scenario are 19.9 million and 24.1 million, respectively.

Data from the Strategic Airport Master Planning Study (SMP 2015-2050) shows that roughly 10 percent of the cruise passengers arrive in Miami/Fort Lauderdale one day before their cruise departure date. Further, 60 percent of the cruise passengers arriving/departing from PortMiami fly through MIA. Therefore, using the low growth scenario of 16.88 million cruise passenger forecasts in 2050, the maximum annual potential market from the cruise passengers for this transit corridor is about 18.2 million. Table 12-6 below provides a summary of the potential cruise passengers likely to use the project in the three growth scenarios for 2050.

Table 12-6 Potential Cruise Passengers, 2050

Scenario	Low Growth	Mid Growth	High Growth
2050 Cruise Passenger Projections	16,880,000	19,89,000	24,100,000
Potential Transit Market	18,230,400	21,481,200	26,028,000

Table 12-7 provides a summary of ridership forecasts for the cruise passenger market for the alternatives. Depending on the alternative and scenario, the ridership forecasts for the cruise passenger market range from about 1.1 million to 2.1 million. The difference between the transit mode share is due to operational differences between the alternatives. The Automated People Mover alternative provides a one seat ride throughout the day from MIA to PortMiami, while the Heavy Rail Metrorail Extension alternative provides a one-seat ride in the weekday off-peak periods and on weekend days, but during weekday peaks, due to potential capacity limitations on the existing Metrorail alignment in the peak period discussed in Section 12.3.2, a transfer is required to Metrorail downtown.

Table 12-7 Annual Ridership Forecasts, 2050 – Cruise Passengers

Alternatives	Transit %	Scenarios		
		Low Growth	Mid Growth	High Growth
Automated People Mover	8%	1,458,000	1,718,000	2,082,000
Heavy Rail Metrorail Extension	6%	1,094,000	1,289,000	1,562,000

12.4.2. PortMiami Employees

In addition to cruise passengers, PortMiami employees represent another key ridership market for this transit corridor. Ridership for the employee market across was estimated using the Simplified Trips on Project Software (STOPS) model, developed by the TPO in December 2024. The model, based on post-pandemic ridership patterns, has a base year of 2023 and a horizon year of 2050. It incorporates the 2050 population and employment projections from the recently adopted Southeast Regional Planning Model (SERPM 9), which estimates approximately 9,200 employees at PortMiami by 2050.

Employee ridership forecasts from the STOPS model correspond to the low-growth scenario. To generate forecasts for the mid- and high-growth scenarios, the low-growth forecasts are scaled proportionally based on the projected increase in cruise passenger volumes for these scenarios. The numbers from STOPS represent an average weekday, which are annualized using an annualization factor of 310. This factor was estimated based on the ridership in the 2023 NTD profile for the MDT system.

Table 12-8 presents a summary of ridership forecasts for the employee market for the alternatives.

Table 12-8 Annual Ridership Forecasts, 2050 – Employees

Alternatives	Scenarios		
	Low Growth	Mid Growth	High Growth
Automated People Mover	155,000	183,000	221,000
Heavy Rail Metrorail Extension	403,000	475,000	575,000

Depending on the alternative and scenario, the ridership forecasts for the employee market range from about 403,000 to 620,000. The Heavy Rail Metrorail alternative would stop at intermediate existing Metrorail stations, attracting more employee ridership.

12.4.3. Total Annual Ridership Forecasts

Table 12-9 presents a summary of the total ridership forecasts for the alternatives, including both cruise passengers and employees. The total ridership forecasts in 2050 range from about 1.5 million to 2.3 million depending on the alternative and growth scenario.

Table 12-9 Annual Ridership Forecasts, 2050 – Total

Alternatives	Scenarios		
	Low Growth	Mid Growth	High Growth
Automated People Mover	1,613,000	1,901,000	2,303,000
Heavy Rail Metrorail Extension	1,497,000	1,764,000	2,137,000

12.4.4. Average Daily and Peak Hour Ridership Forecasts

Table 12-9 and 12-11 present summaries of the average daily and peak hour ridership forecasts. Average daily ridership used an annualization factor of 310. Peak hour ridership accounts for the seasonality of cruise passenger demand, peaking November through April, and day of the week volumes, peaking Friday through Monday. It assumes disembarkation over a four-hour period. Peak hour demand ranges from 650 to 1,160 riders.

Table 12-10 Average Daily Ridership Forecasts, 2050 – Total

Alternatives	Scenarios		
	Low Growth	Mid Growth	High Growth
Automated People Mover	5,203	6,132	7,429
Heavy Rail Metrorail Extension	4,829	5,690	6,894

Table 12-11 Peak Hour Ridership Forecasts, 2050 – Total

Alternatives	Scenarios		
	Low Growth	Mid Growth	High Growth
Automated People Mover	820	960	1,160
Heavy Rail Metrorail Extension	650	770	930

12.4.5. Fleet Requirements

The mid growth scenario was used to estimate vehicle requirements. Assuming 960 passengers in the peak hour for the Automated People Mover alternative and 770 passengers for the Heavy Rail Metrorail Extension alternative, and that each vehicle can only be used once per hour given the time to MIA from PortMiami and back takes approximately an hour, the following are the estimated fleet requirements:

- Automated People Mover (50 passengers per vehicle, 10 percent spares): 21 vehicles
- Heavy Rail Metrorail Extension (75 passengers per vehicle, 10 percent spares): 11 vehicles

12.5. Capital Costs

Planning level order of magnitude capital cost estimates were prepared for the alternatives.

12.5.1. Automated People Mover

Capital costs for the Automated People Mover alternative were developed using industry estimates for similar projects. For the 9.5 miles of elevated two-way guideway the cost would be $177 million and five stations would be $26 million. The mid growth scenario was used to estimate vehicle fleet requirements, and a 10 percent spare ratio was assumed. For the 21 Automated People Mover vehicles required to meet peak demand the cost is estimated to be

$63 million and for the vehicle facility the cost is estimated to be $20 million. The total estimated cost with soft costs (design, administration, insurance), contingency, and escalation would be approximately $689 million.

Table 12-12 Automated People Mover Capital Costs

Guideway	$177 million
Stations	$26 million
Vehicles	$63 million
Maintenance & Storage Facility	$20 million
Soft costs	$143 million
Contingency	$171 million
Escalation	$90 million
TOTAL	**$689 million**

Note: Right-of-way/property acquisition and roadway utility/civil costs not included.

As these costs are conceptual and the future year of expenditure if the project were to be pursued is unknown at this time, the likely capital cost range for the alternative is anticipated to be between approximately $600 million and $700 million.

12.5.2. Heavy Rail Metrorail Extension

The Heavy Rail Metrorail Extension alternative costs were based on the cost of the several recently constructed heavy rail projects including the Chicago Transit Authority Red Purple Modernization, Durham-Orange North Carolina Light Rail, Broad Run Expansion Virginia Railway Express Manassas Virginia, and the Southwest Transitway Metro Green Line Extension Hennepin County Minnesota, as well as local Miami construction costs. Cost totals were checked against and found to be similar to the Metrorail Airport Link (MIC/Earlington Heights Connection) cost, escalated to reflect inflation. For 1.5 miles of the extension, the track, guideway, and systems costs would be $285 million. Elevated station costs were estimated to be $30 million. Vehicle costs for the most recent Metrorail and MARTA procurements, with inflation, were used to estimate the cost for 11 new vehicles at $34 million. The total estimated cost, with soft costs (design, administration, insurance) and contingency, would be approximately $683 million. These costs assume use of the existing Metrorail storage and maintenance facility.

Table 12-13 Heavy Rail Metrorail Extension Capital Costs

Track, Guideway & Systems	$285 million
Stations	$31 million
Vehicles	$33 million
Soft costs	$108 million
Contingency	$137 million
Escalation	$89 million
TOTAL	**$683 million**

Note: Right-of-way/property acquisition not included. Assumes using of existing Metrorail maintenance facility.

As these costs are conceptual and the future year of expenditure if the project were to be pursued is unknown at this time, the likely capital cost range for the alternative is anticipated to between approximately $700 million and $800 million.

12.6. Operating and Maintenance Costs

Planning level annual operating and maintenance (O&M) cost estimates were prepared for the alternatives.

12.6.1. Automated People Mover

O&M costs for the Automated People Mover alternative were developed using industry unit cost estimates for similar projects. The estimated number of passenger miles traveled for the alternative varies depending on the low-, mid-, or high growth scenario. The mid growth scenario was used to estimate passenger miles. The O&M cost for the Automated People Mover alternative would be $10 million. As these costs are conceptual, and the future year of expenditure if the project were to be pursued is unknown at this time, the likely annual O&M cost range for the alternative is anticipated to between approximately $9 million and $11 million.

12.6.2. Heavy Rail Metrorail Extension

O&M costs for the Heavy Rail Metrorail Extension alternative were developed using operating cost per vehicle revenue hour for the Metrorail system. Approximately 33,000 additional revenue hours are assumed for the extension to PortMiami. The additional annual operating and maintenance costs for the Heavy Rail Metrorail Extension alternative are estimated to be approximately $13 million. As these costs are conceptual, and the future year of expenditure if the project were to be pursued is unknown at this time, the likely annual O&M cost range for the alternative is anticipated to be between approximately $12 million and $15 million.

12.7. Environmental and Community Considerations

The following section provides a general overview of the types of environmental and community considerations for these alternatives. Considerations regarding social, cultural, natural, and physical resources are summarized below.

12.7.1. Social Resources

Property Displacements/Relocations: The Automated People Mover alternative alignment options would likely require displacements and/or relocations of roadways, residents and/or businesses to achieve a nine-mile dedicated transit guideway. The Heavy Rail Metrorail Extension alternative alignment in downtown may have limited displacements or relocations for the two-mile guideway. More detailed analysis of property requirements would be required to determine the extent of these impacts.

Neighborhood/Community: Both alternatives can be anticipated to create neighborhood and community changes. The Automated People Mover alternative alignment options within neighborhoods such as Downtown, Overtown, the Miami River area, Little Havana, Grove Park, Allapattah, and Grapeland Heights may have community concerns that would need to be explored in more detail. Similarly, the Heavy Rail Metrorail Extension alternative alignment in Downtown may have community concerns that would need to be explored in more detail as well.

Visual/Aesthetics: New elevated structure for both alternatives can be anticipated to change the visual environment in the surrounding area. The Automated People Mover alternative would be expected to create a smaller change than the Heavy Rail Metrorail Extension alternative because the size guideway would be smaller; however, the Automated People Mover would impact a greater distance. The connection to the main Metrorail guideway in the vicinity of downtown would affect the visual environment. Construction of a new bridge across the Intercoastal Waterway would have the potential to affect visual/aesthetics.

Land Use: Land uses in the surrounding areas can generally be described as retail/office, residential, public, and institutional. Both alternatives would introduce a new transportation land use, which would change access and circulation.

12.7.2. Cultural Resources

Historic resources: The Freedom Tower is located adjacent to the proposed alignments and would be potentially affected by both alternatives.

Parks: Maurice A Ferré and Bayfront Parks are located in the vicinity of the Intercoastal Waterway which may require a new bridge structure for the alternatives. If the Automated People Mover alternative can use the existing Port Bridge, there would be no or minimal impacts. Several parks are in the vicinity of the alignment options for the Automated People Mover, which would require further investigation of potential for impact.

12.7.3. Natural Resources

Water Resources: The alternatives would require crossing the Biscayne Bay, a designated Outstanding Florida Waterway and Aquatic Preserve. If the Automated People Mover alternative can use the existing Port Bridge, there would be no or minimal impacts. The Heavy Rail Metrorail Extension alternative would require a new elevated structure which could potentially impact this resource. Impacts could potentially be minimized by using footprint of the former road alignment which remains intact. Both alternatives would require a crossing of the Miami River, most likely on elevated structure.

Water Quality: Both alternatives would increase the area of impervious surface. The Automated People Mover alternative would be expected to have a smaller increase than the Heavy Rail Metrorail Extension alternative where they are in a common area because the size of the guideway would be smaller; however, the new guideway distance for the Automated People Mover is greater, likely resulting in more new impervious surface.

Threatened/Endangered Species: The alternatives would require crossing the Biscayne Bay, a known habitat for the endangered Florida Manatee. If the Automated People Mover alternative can use the existing Port Bridge, there would be no or minimal impacts. The Heavy Rail Metrorail Extension alternative would require construction of a new elevated structure, which could have temporary short-term impacts on this resource. Impacts could potentially be minimized by using footprint of the former road alignment, which remains intact.

12.7.4. Physical Resources

Air Quality: Both alternatives would shift users from roadway vehicles to electric transit vehicles and would be expected to have no to minimal impact on air quality.

Noise and Vibration: Both alternatives would be expected to operate within a dedicated transit guideway; therefore, some wayside noise and vibration would be anticipated. No horn noise impacts would be expected for either alternative because of the use of dedicated transit guideway.

Hazardous Materials/Contaminated Sites: Because the study area is located in an urban environment, contaminated sites may be located along the proposed alignments of both alternatives requiring further investigation.

12.8. Governance, Challenges, and Phasing

12.8.1. Automated People Mover

If an Automated People Mover is pursued, governance of the project for both construction and operation would need to be determined. Different governance structures can be considered. For example, some Automated People Movers in other parts of the country are being advanced using a public-private partnership model, in which private companies take some ownership or risk in the project, such as construction cost overruns or lower than expected return, in partnership with the government agency.

The development of an Automated People Mover is scalable and could be pursued in phases to minimize risk by testing a two-mile demonstration project between PortMiami and downtown. Passengers going to MIA would transfer to the existing Metrorail service at the Historic Overtown/Lyric Theatre Metrorail Station to complete their trip. The frequency would be the same as above for the full alternative. The total travel time to MIA would be longer because of the transfer required Metrorail downtown. The times from PortMiami to downtown would range from five to seven minutes. The total trip with transfer to Metrorail would be approximately 25 to 27 minutes or possibly longer, depending on wait times for the transfer. Annual ridership would be projected to be 1.2 million to 1.7 million, depending on the cruise market growth scenario. The estimated capital cost of an Automated People Mover demonstration project between PortMiami and downtown would be approximately $247 million, and the O&M cost would be approximately $2 million.

12.8.2. Heavy Rail Metrorail Extension

As an extension of the existing system, the existing Metrorail operator would most likely be the lead in construction and operation of the project. As an existing system, there would be fewer unknowns, and therefore, a lesser degree of risk.

The development of a Metrorail service is not scalable. All the infrastructure investments to connect the existing Metrorail system would need to be made to access the vehicle maintenance and storage facilities, even if the PortMiami service were to be operated like a shuttle requiring a transfer in downtown Miami to the Metrorail system to complete the trip to MIA. Trip times would be longer, 27 minutes or more, because a transfer would be necessary. Because of the additional transfer, a shuttle can be expected to have 50 percent fewer cruise passengers and 25 percent fewer employees than the one seat ride alternative, or approximately 1.0 to 1.4 million annual riders, depending on the cruise market growth scenario. The only capital cost difference would be fewer vehicles would be required because of lower demand and ability to cycle equipment because of the shortened service route. O&M costs would be less because vehicles would only operate between downtown and PortMiami, not the entire route to MIA. The estimated capital cost of a Metrorail shuttle would be approximately $661 million, and the O&M cost would be approximately $6 million.

13. Study Recommendations and Next Steps

13.1. Summary of Alternatives

The features of each of the Tier 2 alternatives were defined in detail in Section 12. Table 13-1 summarizes the features of each alternative.

Table 13-1 Summary of Alternative Features

	Automated People Mover Alternative	**Heavy Rail Metrorail Extension Alternative**
Service Distance	9 miles	10 miles
New Infrastructure Length	9 miles	2 miles
New Stations	5 stations	2 stations
New Guideway	9 miles, 15-40 feet wide	2 miles, 30-60 feet wide
New Structures	May be able to use existing Port Bridge and/or Miami River bridge	Likely need a new bridge over the Intercoastal Waterway
Vehicles	Rubber tired on paved surface	Steel wheel on rail
Vehicle Passenger Capacity	50 passengers	75 passengers
Vehicle Motive Power	Electric, battery or power rail	Electric third rail
Vehicle Storage & Maintenance	New facility	Existing facility
Command/Control Center	New facility	Existing facility
Travel Time	24-34 minutes (depending on routing/stations)	22-27 minutes (depending on time of day)
Annual Riders	1.6-2.3 million	1.5-2.1 million
Capital Cost	$600-$700 million	$700-$800 million
Annual O&M Cost	$9-11 million	$12-15 million

Each of the Tier 2 alternatives has strengths and weaknesses which are summarized in Table 13-2.

Table 13-2 Summary of Alternative Strengths and Weaknesses

	Automated People Mover Alternative	**Heavy Rail Metrorail Extension Alternative**
Stations	Small size and scalable footprint	Large size and standard footprint
PortMiami Circulation	Close to cruise terminals, walkable to destination	Central location, other means of circulation required to cruise terminals
Operations	Vehicles operate on a fixed schedule	Vehicles operate on a fixed Metrorail schedule
Frequency	Service frequency can be scheduled to match demand	Service frequency can be scheduled to match demand within the parameters of Metrorail schedule
Flexibility	Flexibility to size the fleet capacity to the demand	Technology must conform to the existing Metrorail system with limited flexibility to size for demand
Guideway	Flexibility to permit shared use of the guideway for one or more system technologies initially or in the future	Guideway dedicated only for Metrorail
Vehicle Technology	As technology evolves, vehicles can be replaced/ updated without major guideway or infrastructure modifications	Vehicle replacement requires technology consistency systemwide
Costs	Less per line item but guideway infrastructure is a longer distance	More costs per line item but guideway infrastructure is a shorter distance
Governance	Existing mode, new or existing owner/operator	Existing mode, existing owner/operator
Challenges	Right-of-way availability	Proven system, technology and costs are more predicable
Environment & Community	Nine miles of new alignment with associated potential for impacts	Only two miles of new alignment with associated potential for impacts
Scalability	Technology is scalable, which could have a demonstration service between PortMiami and downtown	Scalability is not applicable

13.2. Takeaways

Providing transit connections between MIA and PortMiami to serve the large cruise passenger market presents both challenges and opportunities.

- **Transfers and Convenience:** Cruise passengers often travel with large luggage and are frequently families with children, making transfers between transit modes a significant deterrent. Services requiring multiple transfers would likely discourage ridership.
- **Preference for Direct Service:** Cruise passengers, already spending substantial amounts on their trips, may prioritize convenience over cost. They are more likely to opt for direct, door-to-door transportation from the airport to the cruise terminal, even at a higher price, rather than navigating a multi-step transit journey.
- **Trip Timing and Schedule Coordination:** Cruise passengers arrive and depart in large waves, typically concentrated around ship embarkation and disembarkation times. Transit services must align with these schedules to be viable.
- **Seamless Luggage Transfers:** A key opportunity to enhance transit appeal is facilitating easy luggage transfers from MIA to PortMiami. Streamlined luggage handling, similar to airport-to-hotel transfer services, could make transit more attractive by reducing passenger burden.
- **Dedicated or Express Services:** Implementing a direct or express transit service with minimal stops between MIA and PortMiami could improve convenience and competitiveness with private transportation options.
- **Partnerships with Cruise Lines:** Collaborating with cruise operators to integrate transit services into their passenger experience, such as offering bundled transit fares or designated shuttles, could encourage more cruise passengers to use transit.

By addressing these challenges and leveraging these opportunities, a transit alternative between MIA and PortMiami can be optimized to serve the cruise passenger market and enhance overall corridor mobility.

13.3. Short Term Action Items

There are possible short-term measures that could be implemented to incrementally improve trip making between PortMiami and MIA using transit. These short term action items to improve transit trips could include:

- **Branded PortMiami Shuttles from Miami Central/Overtown Station** – Operate cruise-specific branded shuttles from the existing downtown transit stations to PortMiami. The cost of the shuttle could be included in the cruise reservation fee.
- **Integrated Fares** – Provide one ticket fare solution that includes the Metrorail fare from MIA to downtown as well as the shuttle bus that is easy for travelers to use instead of having to purchase a ticket for transit.
- **PortMiami Wayfinding** – Develop signage specific to cruise passengers at the MIA terminals, MIA mover, MIC, Overtown Station, and PortMiami terminals that makes it

clear for users how to access transit. Signage can use a standard transit symbology and unique colors to be immediately recognizable to travelers, indicating the direction of transit access and the location for each link in the trip between PortMiami and MIA.

- **Take Transit to Cruise Marketing Campaign** – Design a marketing campaign to spread awareness about using of transit to get between PortMiami and MIA. Working with the individual cruise providers at PortMiami, custom marketing efforts can be targeted at specific cruise passenger types.
- **Port Transit Customer Service Ambassadors** – Assign customer service staff to welcome cruise passengers, direct them to transit, assist with fare payments, and answer questions. Ambassadors could be located at MIA terminals, MIA mover, MIC, Overtown Station, and PortMiami terminals during the peak seasons, days, and times for cruise travel.
- **PortMiami-MIA Travel Social Media Pages** – Develop a social media page or presence on platforms such as Facebook, Instagram, and/or TikTok devoted to communicating with customers about traveling between Port Miami and MIA. Travel tips using transit can be shared, and followers can share real time information experiences and recommendations.

13.4. Conclusions

This study evaluates both Metrorail and Automated People Mover (APM) alternatives for establishing a direct transit connection between Miami International Airport (MIA) and PortMiami. While both modes are technically feasible, further planning and evaluation are required for the selection of a Locally Preferred Alternative on this corridor. At this time, the project is recommended to be incorporated into the 2050 Long-Range Transportation Plan (LRTP), Priority IV unfunded section, for future advancement and funding opportunities.

In addition to the proposed direct transit connection between MIA and PortMiami, the implementation of an internal circulation service, such as an Automated Transit Network (ATN), could further enhance overall system connectivity and user convenience. ATN systems are electrically powered modes of transit operating in an exclusive guideway, typically over short distances, with fully automated operation. Unlike conventional rail systems, ATNs utilize self-powered electric vehicles with rubber tires that operate on roadway surfaces, offering a flexible, low-emission solution for first- and last-mile connectivity within large facilities such as airports and seaports.

Incorporating this concept into future planning efforts could provide an innovative approach to improving passenger circulation within MIA and PortMiami, complementing the regional transit connection and supporting Miami-Dade County's broader goals for a more efficient multimodal transportation integration.

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