



SOUTHEAST FLORIDA REGIONAL
Transportation Plan
2035

**Technical Memorandum #9:
Regional Transit Quality of Service
Assessment**

FINAL

November 2009



KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

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Section 1
Introduction

Introduction

This report summarizes the Transit Quality of Service Assessment for existing regional transit conditions in Southeast Florida. This effort has been conducted as a part of the 2035 Southeast Regional Long Range Transportation Plan efforts. The draft report was reviewed and commented on by the Regional Transportation Technical Advisory Committee (RTTAC) in October 2009 (RTTAC comments received on the draft may be found in Appendix A).

Under this activity, both the *Transit Quality of Service Applications Guide* developed by the FDOT Public Transportation Office and the *Transit Capacity and Quality of Service Manual* (TCQSM) were applied. Regional level analyses were performed between a set of regional origins and destinations for the following three performance measures:

1. Service frequency level of service (LOS)
2. Hours of service LOS
3. Transit-auto travel time LOS

The following sections summarize the methodology, performance measures, quality of service assessment, and the findings and recommendations of the existing regional transit analysis.

Section 2
Methodology

Methodology

The regional transit quality of service assessment evaluates three performance measures for one analysis period (existing conditions weekday p.m. peak period). The performance measures, discussed in detail under the following section, include: (1) service frequency LOS, (2) hours of service LOS (i.e. service coverage), and (3) transit-auto travel time LOS. The weekday p.m. peak period was selected for analysis under the service frequency and travel time measures, allowing the evaluation to be comparable to the weekday p.m. peak period analysis procedures identified in FDOT's *Quality/Level of Service Handbook*. The service coverage LOS assessment is measured for a typical weekday.

For this evaluation, existing transit service was assessed between key origins and destinations (including regional activity centers) throughout the three county region. As stated in the FDOT *Transit Quality of Service Applications Guide*, there are several reasons why this approach is taken:

- It allows the quality of service framework to be applied on a large scale by focusing on corridors with the highest level of travel in the region.
- It provides results for a variety of trip purposes and geographic locations while avoiding the need to analyze all of a transit system's routes.
- It generates useful results that can help MPO's and transit agencies assess whether the quality of service for particular trips matches the demand for those trips.

O-D Pair Selection

Twenty regional origin-destination (O-D) pairs were selected based on previous work prepared by the SFRTA in their *SFRTA Strategic Regional Transit Plan*. The specific section of work referenced in this study was the three county region trip flow map (see Appendix B). To better understand how the trip flow map was prepared and how regional activity centers were identified and defined, below is an excerpt from the Plan discussing the work performed:

"Major trip flows between regional superzones throughout the project study area were analyzed to determine the magnitude of travel demand between Regional Activity Centers (RACs) and other regions within the study area. The study area was divided into 85 regional superzones, created by aggregating TAZs, excluding those TAZs that were part of RACs. The boundaries of the regional superzones were defined by major transportation facilities. Generally, areas with similar residential character, identity, and densities were aggregated together to make up one superzone. The RACs were each considered their own superzones. For analysis purposes, regional superzones representing RACs are typically considered trip destinations, while all other superzones are generally considered trip origins. The SERPM V regional model was used to analyze trip flows throughout the region using Year 2030 demographics."

In addition to the SFRTA plan, Kittelson and Cambridge conducted an independent assessment of travel making characteristics using SERPM, but ultimately found that the SFRTA plan's information was the most reasonable for the RL RTP existing transit assessment purpose.

The 20 O-D pairs were reviewed by the RTTAC and approved by the RL RTP Contract Manager. Table 1 summarizes the selected O-D pairs. Figure 1 geographically displays the O-D pairs on a regional map.

Table 1 Origin-Destination Pairs Selected for the 2035 RL RTP Transit Assessment (Existing Service Only)

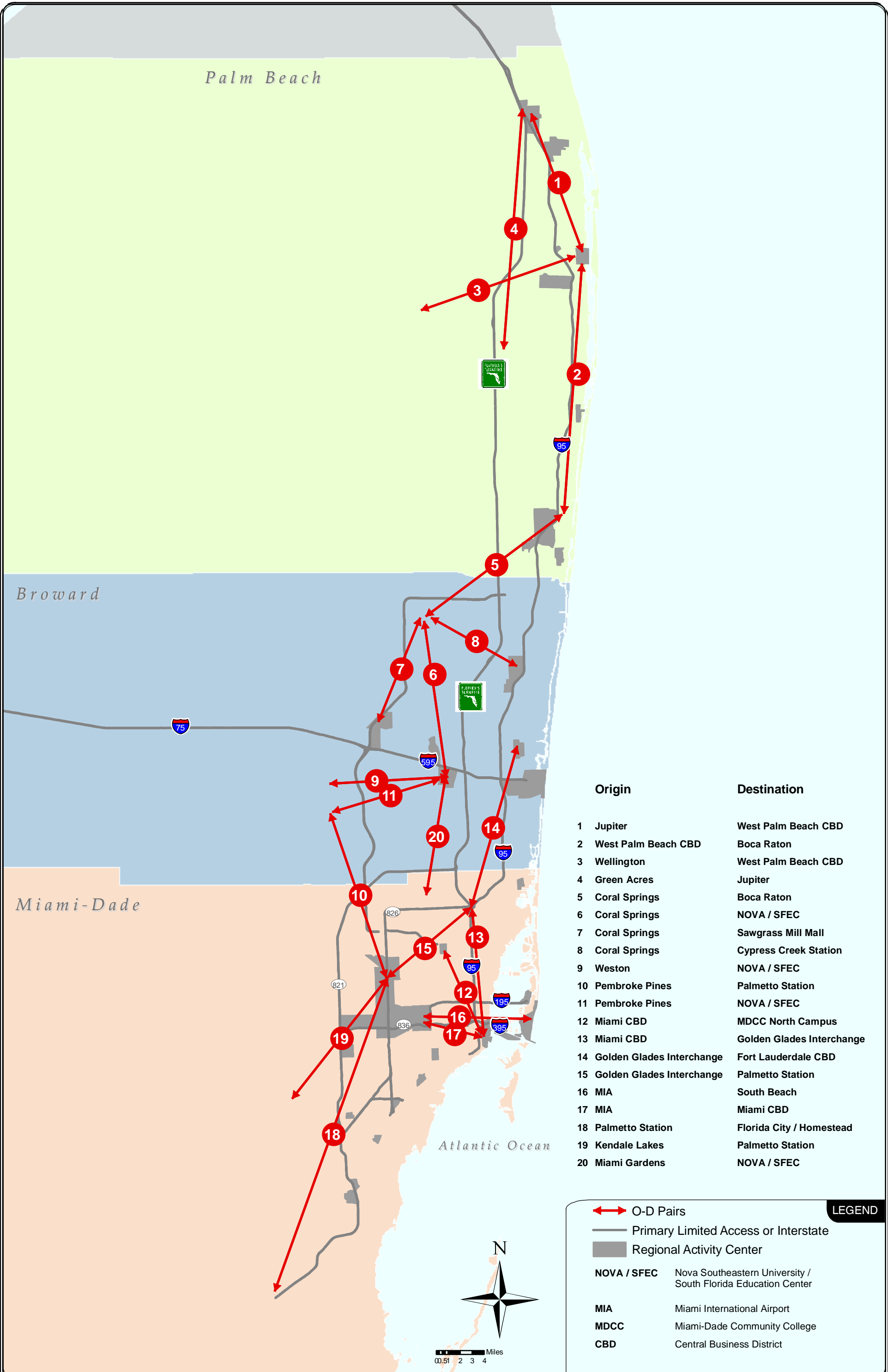
#	Origin	Destination	Agency	Associated Transit Routes
1	Jupiter (Town Hall)	West Palm Beach CBD (City Hall)	Palm Tran	Route 10 Route 1
2	West Palm Beach CBD (City Hall)	Boca Raton (Mizner Park)	Palm Tran SFRTA	Route 1 Tri-Rail
3	City of Wellington (Mall at Wellington Green)	West Palm Beach CBD (City Place)	Palm Tran	Route 40
4	Green Acres (Lake Worth Road/Jog Road)	Jupiter (Town Hall)	Palm Tran	Route 62 Route 1 Route 10
5	Coral Springs (City Center – University Drive/Sample Road)	Boca Raton (Mizner Park)	BCT Palm Tran	Route 34 Route 10 Route 92
6	Coral Springs (City Center – University Drive/Sample Road)	NOVA / SFEC (Davie)	BCT	Route 2
7	Coral Springs (City Center – University Drive/Sample Road)	Sawgrass Mills Mall (Sunrise Boulevard)	BCT	Route 2 Route 36
8	Coral Springs (City Center – University Drive/Sample Road)	Cypress Creek Station	BCT	Route 34 Route 14
9	Weston (Weston Road/Griffin Road)	NOVA / SFEC (Davie)	BCT	Route 23 Route 7 Route 2
10	Pembroke Pines (Broward Community College)	Palmetto Station	BCT SFRTA MDT	Route 7 Tri-Rail Metrorail
11	Pembroke Pines (Broward Community College)	NOVA / SFEC (Davie)	BCT	Route 7 Route 2
12	Miami CBD (Government Center)	Miami-Dade Community College North Campus	MDT	Metrorail Route 27
13	Miami CBD (Government Center)	Golden Glades Interchange	MDT	Route 95
14	Golden Glades Interchange Multimodal Facility	Fort Lauderdale CBD	SFRTA BCT	Tri-Rail Tri-Rail Shuttle 22
15	Golden Glades Interchange Multimodal Facility	Palmetto Station	SFRTA MDT	Tri-Rail Tri-Rail Shuttle 132
16	MIA	South Beach (8 th /Washington)	MDT	Route J (110) Route C (103)
17	MIA	Miami CBD (Government Center)	MDT	Metrorail Route 238
18	Florida City/Homestead (Turnpike/US 1)	Palmetto Station	MDT	Metrorail Route 34/38
19	Kendale Lakes (Kendall Drive/SW 137 th Avenue)	Palmetto Station	MDT	Metrorail Route 288 (Kendall Kat)
20	Miami Gardens (Southwest of Dolphin Stadium)	NOVA / SFEC (Davie)	MDT BCT	Route 97 Route 2

Note: BCT also includes Breeze services on US1, SR 7, and University Drive

BCT= Broward County Transit
SFRTA= South Florida Regional Transportation Authority
FAU=Florida Atlantic University

MIA=Miami International Airport
CBD=Central Business District

MDT=Miami-Dade County Transit
SFEC=South Florida Education Center



Section 3
Performance
Measures

Performance Measures

This section discusses the three performance measures used in the regional analysis of the selected twenty O-D pairs: service frequency LOS, hours of service LOS, and transit-auto travel time LOS. These performance measures were analyzed according to the guidelines provided in the *Transit Capacity and Quality of Service Manual (TCQSM)*. Below, each measure is defined and discussed in detail.

Service Frequency

“Service frequency is an indicator of transit service availability. Service frequency LOS measures passenger satisfaction with the frequency provided. At high levels of service, passengers don’t need to consult schedules to make trips and their wait time for a bus is minimized. At low levels of service, transit still provides a mobility option but is unlikely to be attractive to persons who have access to an automobile.”

Service frequency LOS was calculated based on transit schedules dated May 2009 from the websites of Tri-Rail, Metrorail, Miami-Dade Transit, Broward County Transit, and Palm Tran. The time at the origin of the trip is the first available train/bus to leave after the start of the peak hour (i.e., 4 p.m.). For the transfer time, it was assumed the travelers transfer to the first available train/bus.

Service frequency LOS was evaluated based on the thresholds provided in Table 2.

Table 2 Service Frequency LOS Standards

LOS Headway (min)	veh/h	Comments	
A	<10	>6	Passengers don't need schedules
B	10-14	5-6	Frequent service, passengers consult schedules
C	15-20	3-4	Maximum desirable time to wait if bus/train missed
D	21-30	2	Service unattractive to choice riders
E	31-60	1	Service available during the hour
F	>60	<1	Service unattractive to all riders

Source: *Transit Capacity and Quality of Service Manual (TCQSM)*, 2nd Edition

Hours of Service

“Hours of service measure the number of hours during the day when people have an opportunity to travel by transit at least once during that hour. Hours of service LOS measures the ability of transit service to meet a wide variety of travel needs. At high levels of service, transit is a travel option at most times of the day. At low levels of service, transit provides mobility during times when many people need to travel, but focuses on serving only one or two types of trips (e.g., traditional commute trips).”

Hours of service LOS was calculated based on May 2009 schedules from the websites of the transit agencies in the three counties. Hours of Service LOS was evaluated using the thresholds in Table 3.

Although specific routes have been identified for travel time LOS purposes, hours of service may be measured against any available options between two points, not just one particular route.

Table 3 Hours of Service LOS Standards

LOS	Hours of Service	Comments
A	19-24	Night or "owl" service provided
B	17-18	Late evening service provided
C	14-16	Early evening service provided
D	12-13	Daytime service provided
E	4-11	Peak hour service only or limited midday service
F	0-3	Very limited or no service

Source: *Transit Capacity and Quality of Service Manual (TCQSM)*, 2nd Edition

Transit-Auto Travel Time

"Transit-auto travel time is one measure of the competitiveness of transit with the automobile for a given trip. The longer a trip takes by transit, the less attractive transit is as an option for that trip."

Transit Travel Time Methodology

Transit travel time was measured during the weekday p.m. peak period using the Google Trip Planner tool for BCT and MDT systems. Trip Planner is a recently developed web based tool that calculates travel time by car or public transit. For public transit, routes are selected based on fastest travel time, not shortest distance. In addition, walk time is included in the transit trip travel time calculation.

For systems not incorporated into the Trip Planner web based system, transit travel time was calculated based on peak period transit schedules and assumed the following: a walk time of 3 minutes at the beginning and at the end of the transit trip, plus a waiting time of 5 minutes, plus the appropriate transfer time plus the in-vehicle travel time.

Auto Travel Time Methodology

Auto travel time was obtained from the SERPM 2035 output network. The year 2035 Existing plus Committed (E+C) scenario was used to represent future congestion. Model outputs were provided by the Florida Department of Transportation, District 4.

As mentioned under the methodology section, the weekday p.m. peak period (3:30 PM – 6:30 PM) statistics were summarized for analysis purposes. Auto travel time between the twenty O-D pairs was based on modeling congested time for the weekday p.m. peak period in the final loaded output network.

Network nodes were used in some cases to identify locations instead of transportation analysis zone centroids. Table 4 shows a list of nodes that were used when choosing the location of each origin or destination.

Table 4 Origin-Destination SERPM Network Nodes

ID #	Origin (O)	Destination (D)	O-Node	D-Node
1	Jupiter	West Palm Beach CBD	1260	42
2	West Palm Beach CBD	Boca Raton	1260	1442
3	City of Wellington	West Palm Beach CBD	1260	728
4	Green Acres	Jupiter	1335	42
5	Coral Springs	Boca Raton	1862	1442
6	Coral Springs	NOVA / SFEC (Davie)	1862	2670
7	Coral Springs	Sawgrass Mills Mall	1862	2228
8	Coral Springs	Cypress Creek Station	1862	2133
9	Weston	NOVA / SFEC (Davie)	2339	2670
10	Pembroke Pines	Palmetto Station	17530	3381
11	Pembroke Pines	NOVA / SFEC (Davie)	17530	2670
12	Miami CBD	Miami-Dade Community College North Campus	27489	2966
13	Miami CBD	Golden Glades Interchange	2878	27489
14	Golden Glades Interchange	Fort Lauderdale CBD	2878	2083
15	Golden Glades Interchange	Palmetto Station	2878	3381
16	MIA	South Beach (8 th /Washington)	3443	3337
17	MIA	Miami CBD	3443	27489
18	Florida City/Homestead	Palmetto Station	4140	3381
19	Kendale Lakes	Palmetto Station	25445	3381
20	Miami Gardens	NOVA / SFEC (Davie)	2832	2670

Transit-auto travel time LOS was evaluated according to the thresholds in Table 5. The final auto travel time in Table 6 is composed of the in-vehicle travel time computed by the SERPM model plus an additional walk time of 3 minutes at the beginning and the end of the trip to account for travel to/from parking garages, etc.

Table 5 Transit-Auto Travel Time LOS Standards

LOS	Travel Time Difference (min)	Comments
A	<0	Faster by transit than by automobile
B	1-15	About as fast by transit as by automobile
C	16-30	Tolerable for choice riders
D	31-45	Round-trip at least half-hour longer by transit
E	46-60	Tedious for all riders; may be best possible in small cities
F	>60	Unacceptable to most riders

Source: *Transit Capacity and Quality of Service Manual (TCQSM)*, 2nd Edition

Section 4
Quality of Service
Assessment

Quality of Service Assessment

The regional quality of service assessment summary is presented in Tables 6 and 7 for the 20 O-D pairs.

Table 6 Summary Analysis of Origin-Destination Pairs 1-10

#	Origin	Destination	Agency	Associated Transit Routes	Frequency of Service		Hours of Service		Travel Times				
					Vehicle ¹ /hr	LOS	Hours ¹	LOS	Transit (min)	Auto (min)	Difference (min)	Difference (%)	LOS
1	Jupiter (Town Hall)	West Palm Beach CBD (City Hall)	Palm Tran	Route 10 Route 1	1	E	13	D	151.0	39.1	111.9	74	F
2	West Palm Beach CBD (City Hall)	Boca Raton(Mizner Park)	Palm Tran SFRTA	Route 1 Tri-Rail	2	D	14	C	117.0	43.5	73.5	63	F
3	City of Wellington (Mall at Wellington Green)	West Palm Beach CBD (City Hall)	Palm Tran	Route 40	1	E	14	C	76.0	62.0	14.0	18	B
4	Green Acres (Lake Worth Road/Jog Road)	Jupiter (Town Hall)	Palm Tran	Route 62 Route 1 Route 10	1	E	13	D	161.0	47.2	113.8	71	F
5	Coral Springs (City Center – University Drive/Sample Road)	Boca Raton (Mizner Park)	BCT Palm Tran	Route 34 Route 10 Route 92	1	E	11	E	136.0	35.0	101.0	74	F
6	Coral Springs (City Center – University Drive/Sample Road)	NOVA / SFEC (Davie)	BCT	Route 2	3	C	17	B	81.0	34.7	46.3	57	E
7	Coral Springs (City Center – University Drive/Sample Road)	Sawgrass Mills Mall (Coral Springs)	BCT	Route 2 Route 36	3	C	17	B	56.0	24.0	32.0	57	D
8	Coral Springs (City Center – University Drive/Sample Road)	Cypress Creek Station	BCT	Route 34 Route 14	1	E	15	C	66.0	26.0	40.0	61	D
9	Weston (Weston Road/Griffin Road)	NOVA / SFEC (Davie)	BCT	Route 23 Route 7 Route 2	2	D	11	E	87.0	26.3	60.7	70	F
10	Pembroke Pines (Broward Community College)	Palmetto Station	BCT SFRTA MDT	Route 7 Tri-Rail Metrorail	2	D	14	C	105.0	31.6	73.4	70	F

PBCT = Palm Beach County Transit

MIA=Miami International Airport

GGI= Golden Glades Interchange

FAU=Florida Atlantic University

BCT= Broward County Transit

WPB=West Palm Beach

CBD=Central Business District

SFEC=South Florida Education Center

MDT=Miami-Dade County Transit

¹ When more than one public transport mode composes the trip, the service frequency and the hours of service for the trip are based on the lowest frequency and hours of service.



Table 7 Summary Analysis of Origin-Destination Pairs 11-20

#	Origin	Destination	Agency	Associated Transit Routes	Frequency of Service		Hours of Service		Travel Times				
					Vehicle ¹ /hr	LOS	Hours ¹	LOS	Transit (min)	Auto (min)	Difference (min)	Difference (%)	LOS
11	Pembroke Pines (Broward Community College)	NOVA / SFEC (Davie)	BCT	Route 7 Route 2	2	D	17	B	57.0	22.0	35.0	61	D
12	Miami CBD (Government Center)	Miami-Dade Community College North Campus	MDT	Metrorail Route 27	4	C	19	A	46.0	21.9	24.1	52	C
13	Miami CBD (Government Center)	Golden Glades Interchange	MDT	Route 95	8	A	13	D	35.0	19.1	24.1	69	C
14	Golden Glades Interchange Multimodal Facility	Fort Lauderdale CBD	SFRTA BCT	Tri-Rail Tri-Rail Shuttle 22	2	D	11	E	50.0	40.2	9.8	20	B
15	Golden Glades Interchange Multimodal Facility	Palmetto Station	SFRTA MDT	Tri-Rail Tri-Rail Shuttle 132	1	E	16.5	C	82.0	29.0	53.0	65	E
16	MIA	South Beach (8 th /Washington)	MDT	Route J (110) Route C (103)	5	B	24	A	92.0	36.5	55.5	60	E
17	MIA	Miami CBD (Government Center)	MDT	Metrorail Route 238	2	D	15	C	38.0	35.0	3.0	8	B
18	Florida City/Homestead (Turnpike/US-1)	Palmetto Station	MDT	Metrorail Route 34/38	7	A	15	C	135.0	55.0	80.0	59	F
19	Kendale Lakes (Kendall Drive/SW 137 th Avenue)	Palmetto Station	MDT	Metrorail Route 288 (Kendall Kat)	4	C	16	C	102.0	24.5	77.5	76	F
20	Miami Gardens (Southwest of Dolphin Stadium)	NOVA / SFEC (Davie)	MDT BCT	Route 97 Route 2	2	D	13	D	69.0	36.0	33.0	48	D

PBCT = Palm Beach County Transit

MIA=Miami International Airport

GGI= Golden Glades Interchange

FAU=Florida Atlantic University

BCT= Broward County Transit

WPB=West Palm Beach

CBD=Central Business District

SFEC=South Florida Education Center

MDT=Miami-Dade County Transit

¹ When more than one public transport mode composes the trip, the service frequency and the hours of service for the trip are based on the lowest frequency and hours of service.



Section 5
Findings and
Recommendations

Findings and Recommendations

Based on the results of the assessment, low quality of service measures were identified among the twenty O-D pairs evaluated. Below, the quality of service findings are summarized along with recommendations to assist in the planning for regional transit service in southeast Florida.

Findings

In general, the *hours of service* LOS is sufficient for many of the O-D pairs. On the contrary, *service frequency* LOS is very low across the region, and the transit-auto travel time difference is significant (>50% travel time difference) for sixteen of the twenty pairs. Overall, these three LOS measures reveal limited transit service in the region. Specific performance measure summaries are discussed below.

Service Frequency LOS

Based on the results presented in Tables 6 and 7, six of the twenty pairs (30%) measure LOS E for service frequency during peak period travel, which corresponds to one transit vehicle per hour. The remaining fourteen pairs have a frequency LOS of D or better.

Hours of Service LOS

Three of the twenty pairs (15%) measure LOS E for hours of service, meaning transit service is available for no more than 11 hours during a typical weekday.

Transit-Auto Travel Time LOS

Transit travel times are significantly higher (>50%) than auto travel times for sixteen of the twenty O-D pairs. In the case of eight of these pairs, the difference in travel time is more than one hour, representing LOS F. Although poor quality of service measures were identified among all three counties, it appears that the farther the trip length (and more regional) the less likely the transit travel time will be competitive with auto travel time.

Recommendations

The need for peak period transit service frequency improvements is demonstrated in Tables 6 and 7. The increase in the occurrence of trains/buses would not only benefit the service frequency LOS but would also improve connections between different transit modes and therefore reduce transit travel times compared to auto travel times.

The need for transit travel time improvements is evident for several O-D pairs. Transit travel times may be improved through methods such as introduction of express transit service, transit stop consolidation, transit signal priority, dwell time reduction (e.g., through off-board fare collection), transit preferential treatments at critical locations (e.g., construction of queue jump lanes at congested intersections), and use of semi-exclusive or exclusive transit right of way. Such improvements should be evaluated on a case-by-case basis using corridor-specific data on transit delays. Packages of such improvements may lead to implementation of a premium transit service.

Section 6
Appendices

**Appendix A –
RTTAC Comments**



MEMORANDUM

Date: November 17, 2009 **Project #:** 9338.12

To: RTTAC

From: Jessica Josselyn, John Zegeer, PE, Kelly Blume, PE

Project: 2035 Southeast Florida Regional Long Range Transportation Plan

Subject: Technical Memorandum #9: Regional Transit Quality of Service
Response to Comments

This memorandum summarizes the comments received from the Regional Transportation Technical Advisory Committee (RTTAC) on the Transit Quality of Service Assessment report prepared for the 2035 Regional Long Range Transportation Plan (LRTP). Kittelison responses are provided after each RTTAC comment.

1. This analysis provides very useful information for considering transit improvements in the region. However, the O-D pairs selected in Broward County are mostly related to the western communities of Coral Springs and Pembroke Pines. The selections are fine if the purpose of the analysis is to show where transit services are lacking. If the purpose of the analysis is to represent an 'overall transit quality of service' in Broward County then we might be presenting a skewed picture. It might be a good idea to include number of trips (total, not just transit riders) for each OD pair to demonstrate potential demand. Providing good transit services in an area of low demand is not necessary a good investment.

KAI Response: The O-D pairs were selected based on the peak period trip flows derived from the regional travel demand model. Locations with the highest trips flows were selected for assessment. In addition, it was the recommendation of the RTTAC that the western communities be more accounted for in the O-D pair selection.

2. page 1, 'This memorandum summarizes a Transit Quality of Service Assessment for the 2035 RL RTP' may lead the reader to think that the analysis was performed based on 2035 conditions when it's based on current conditions.

KAI Response: The text will be revised to eliminate this perception.

3. Page 3, table 1, agency for Tri-Rail shuttle 22 should be BCT.

KAI Response: The table will be revised accordingly.

4. Page 6, a walk time of 3 minutes for transit seems too short. Please clarify which SERPM model, 2005? 2035 E+C? , was used to compute in-vehicle travel time.

KAI Response: Three minutes of transit walk-access time is an assumption from the TCQSM (Page 3-49). The SERPM 2035 existing plus committed network was used to derive the auto travel times. Additional language regarding the modeling efforts related to this task will be added to the final report.

5. Page 8, table 5, agency for Tri-Rail shuttle 22 should be BCT. Were BCT Breeze services on US1, SR 7, and University Drive used to compute transit travel time?

KAI Response: The Breeze services' schedules were used. The table should have noted this and will be updated.

6. There are a couple of grammatical errors.

KAI Response: Grammatical errors will be corrected.

7. Overall, using the O-D Pairs as a data source is fine at an abstract level, but the real Original/Destinations of current and potential future transit users is missing. An accurate account of the transit problem in these areas would need these things better defined, otherwise this really could be viewed as a run of the old SERPM 5.2 (?) model by SFRTA.

KAI Response: Due to budget limitations, this work was scoped to rely on a limited number of O-D pairs. We recognize that a finer level of detail, as well as more O-D pairs, would provide useful results. A finer level of detail is certainly necessary to explore the locations for potential improvements that were identified by our analysis.

8. This type of study clearly brings up the idea of how far a local transit operator will go into another county to provide service *once clear transit travel markets are defined with more transit O/D data*. Perhaps the forthcoming RLRTP policy section can deal with this? That said, I WOULD LOVE TO SEE THE THREE MPOs TEAM UP AND DO A REGIONAL TRANSIT AND COMMUTER O/D SURVEY AS PART OF THE RLRTP FOLLOW-UP.

Per Table 5:

#5 - the Coral Springs to Boca Raton needs are interesting. Would the Broward LRTP transit projects (Sample Rd. BRT-Rapid Bus connecting to both enhanced Tri-Rail/US 1 BRT-Rapid Bus/SR 7 BRT-Rapid Bus) give us a better grade eventually?

#6 - do we presume the University BRT-Rapid Bus option could give us a better grade here?

#7 - will the Nob Hill Rapid Bus be enough here?

#8 – will the Cypress Creek Rapid Bus route take care of this need?

#9 – will the Griffin Rd. Rapid Bus route take care of this need?

#10 – the eventual I-75 Express Bus service should help us here.

#11 – perhaps a combo of north-south-east-west Express Bus service on I-75 and I-595 will help us here?

KAI Response: These questions are appropriate for the Broward MPO; however, they will not be addressed as a part of the regional plan transit quality of service assessment.

9. There should be a section within the report that addresses the selection of the selected regional activity centers including where are they actually located at. The TAZ used may be good to include for locating purposes.

KAI Response: Additional language will be added to the report discussing the regional activity center selections and the associated TAZ's.

10. The activity center names in Miami-Dade County need to be corrected, as such; 1) Palmetto Corridor should be a location (i.e. Doral or Medley), 2) North Kendall/Doral is actually West Kendall, 3) Miami Gardens (see O-D Pair #20) is not shown on the map rather the connection from Nova is made with Doral/Medley.

KAI Response: Errors were identified with the naming convention of O-D pairs. An update will be provided that is clearer for the reader and accurately represented. The naming convention however will remain as consistent as possible with the SFRTA Strategic Regional Transit Plan information.

11. Having Figure 2 and Table 4 on the same page is confusing. It would be nice to have Table 4 shown on the same page as its corresponding text.

KAI Response: The table and figure will be placed on separate pages. Table 4 will be relocated to follow its corresponding text.

12. How is the transfer time calculated? Show methodology on the flow chart (i.e. half the headway of transfer route).

KAI Response: Transfer times were derived from transit schedules. Overall transit travel time reflects one representative trip during the p.m. peak period, selected from published schedules.

13. The transit routing needs to be checked for the following O-D pairs; #12, #15, #16, #17, #18, #19, #20. Why wasn't the model minimum transit paths utilized for this exercise?

KAI Response: The transit routing for O-D pair numbers 12, 15, 16, 17, 18, 19 and 20 will be reviewed and any necessary changes will be made to the tables and LOS analysis.

The model minimum transit paths were not utilized for this exercise because the TQOS is a rider-oriented evaluation. KAI selected transit routes and calculated transit travel times as a transit user would; from published maps and schedules.

14. Table 5 column should be changed from Associated Bus Routes to Associated Transit Routes.

KAI Response: The column title will be revised.

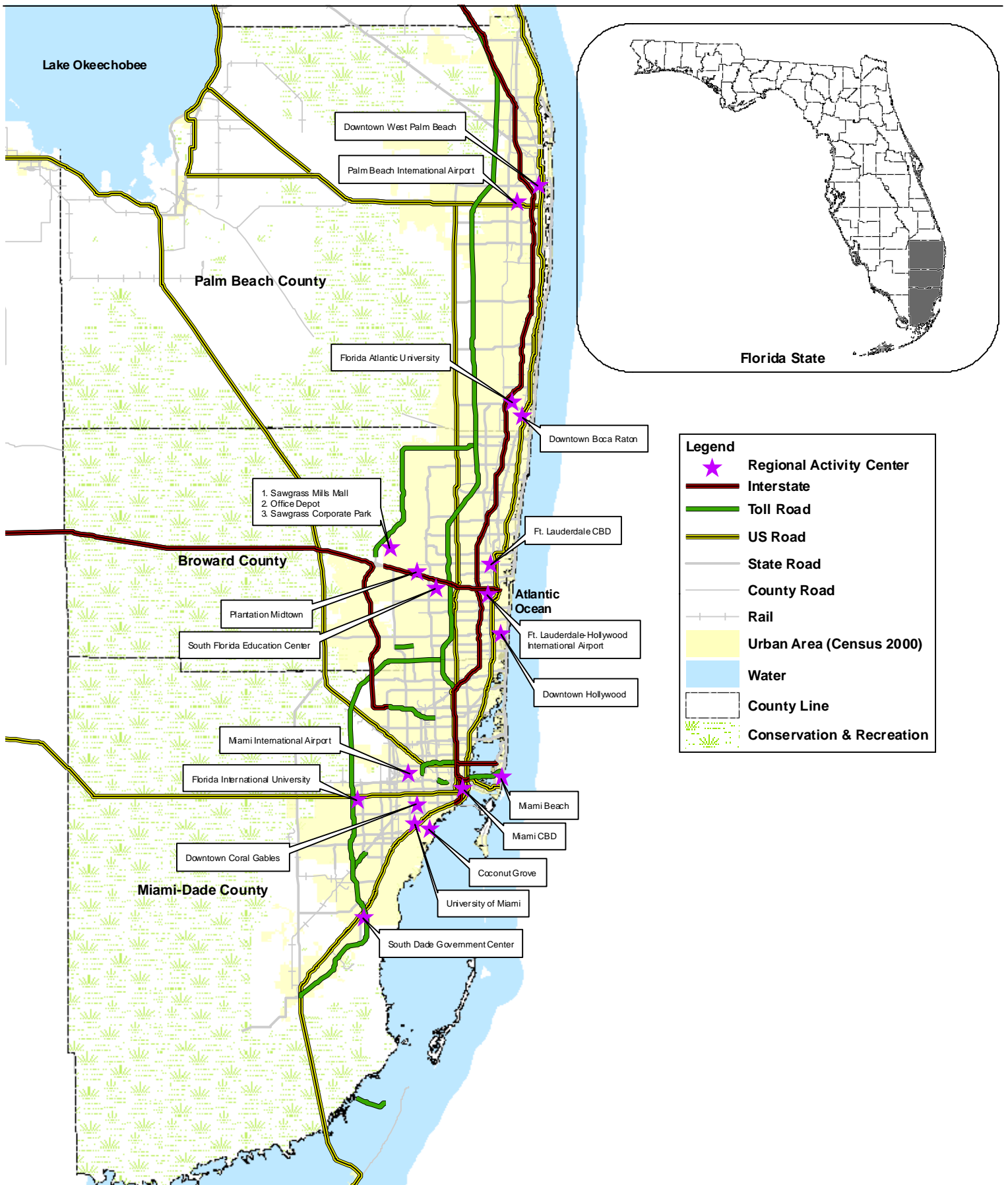
15. Does the TCQOS Manual allow for you to use the effective headways along corridors with multiple routes reaching the intended activity center? This is the case on several paths such as Broward Blvd. to access Ft Lauderdale CBD.

KAI Response: The TCQSM allows for the use of effective headways to evaluate transit availability at a given transit stop or station. For the purposes of calculating travel time, however, our evaluation reflects one representative trip during the p.m. peak period, selected from published schedules, and an assumed origin wait time of five minutes per Page 3-49 of the TCQSM.

16. Could you graphically depict the results from Table 5, possibly using the Figure 1 map and color coding the desire lines (20) according to their respective LOS for each category? Just as a way to enhance communication of the results.

KAI Response: KAI agrees graphical depiction is more user friendly; however, due to budget constraints additional mapping can not be accommodated. The tables will be revised to emphasize the LOS results.

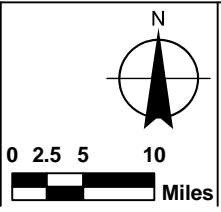
Appendix B – SFRTA Strategic Regional Transit Plan Excerpts



Source: Florida Department of Transportation (FDOT), Florida Geographic Data Library (FGDL), US Census Bureau

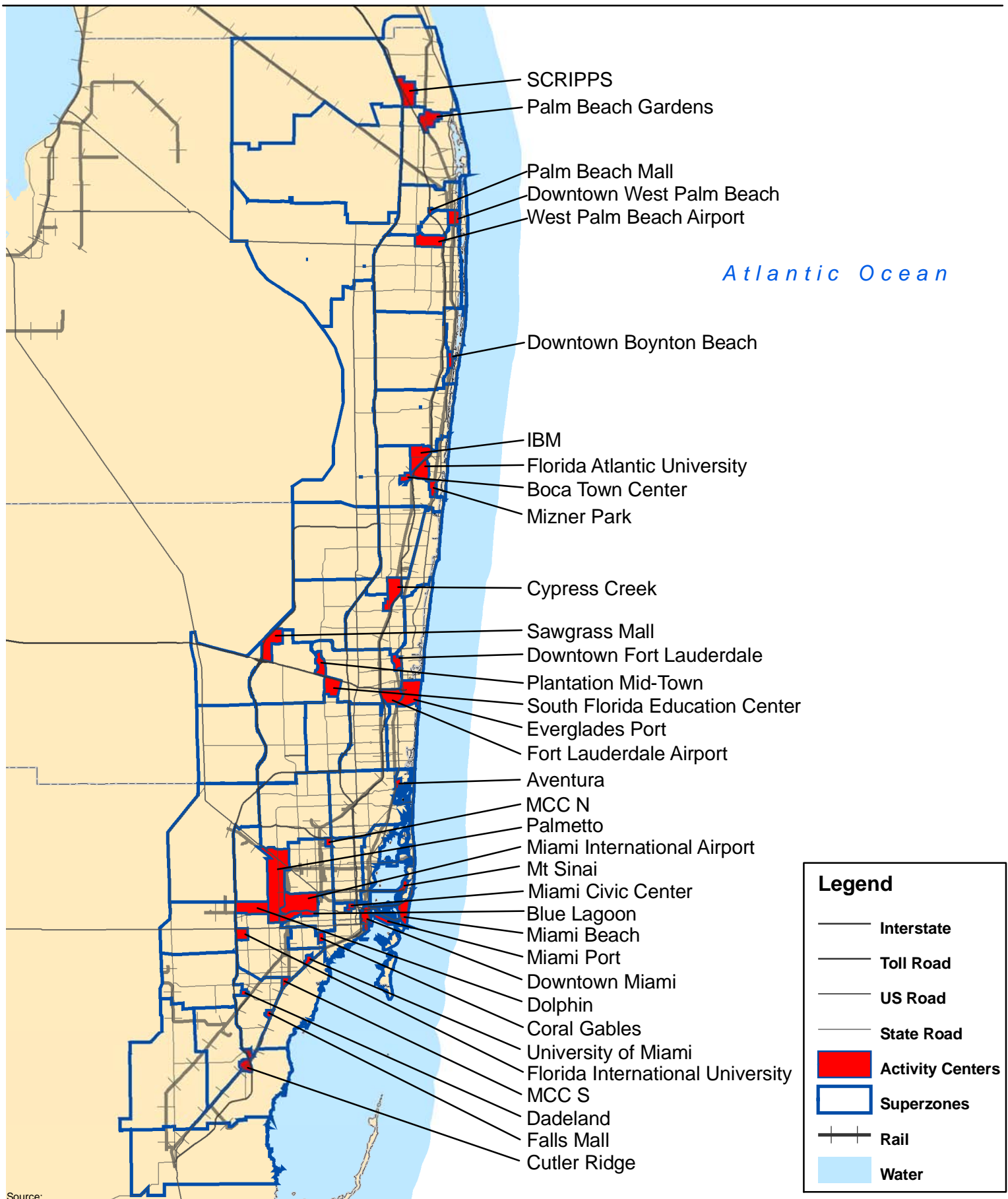


Prepared: May 2007
Revised:
 Prepared by:
Carter Burgess
 Engineering, Architecture & Related Services
 6363 NW 6 Way, Suite 300
 Fort Lauderdale, FL 33309



REGIONAL ACTIVITY CENTERS

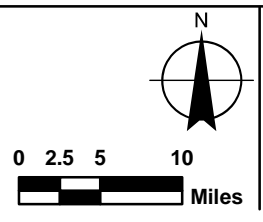
Figure 35



Source:



Prepared: May 2007
 Revised:
 Prepared by:
Carter Burgess
 Engineering, Architecture & Related Services
 6363 NW 6 Way, Suite 300
 Fort Lauderdale, FL 33309



**SUPERZONES
 &
 ACTIVITY CENTERS**

**Figure
 36**

Downtown West Palm Beach: This central business district includes a high concentration of private and government employment with some residences scattered throughout. Roads feeding this RAC are Okeechobee Road, Australian Avenue, US 1, and I-95.

PBIA: This area contains a relatively high concentration of jobs in Palm Beach County, and is located west of I-95. The RAC is served by SR 80/Southern Boulevard, Military Trail, and Australian Avenue. Congress Avenue feeds into the airport from north. The airport handled 6.8 million travelers in 2006.

Downtown Boynton Beach: Compared to typical central business districts, this area is small in terms of total employment but has a good mix of activities and a variety of land uses. It is served by South Federal Highway, Woolbright Road, Boynton Beach Boulevard, and Seacrest Boulevard. This activity center is expected to see immense employment density growth in the future.

T-Rex Center: The triangular land area bounded by I-95, Yamato Road, and Military Trail is a dense employment center. The area was formerly known as *Integrated Business Management (IBM)* headquarters. However, it is a typical suburban employment center with large parking lots and big swales, or drainage ditches, along the roads.

Florida Atlantic University (FAU): This suburban activity center is located on either side of I-95 between Glades and Yamato Roads. It is a major employment center with offices, schools, and supporting land uses. Main feeder roads are North Federal Highway/US 1, I-95, Glades Road, Yamato Road, and Boca Raton Boulevard.

Boca Town Center: Located along Glades Road, west of I-95, this area has a high concentration of retail commercial employment in the southern Palm Beach County. Its proximity to FAU and IBM makes it a logical consideration while planning for new transit service.

Mizner Park: This mixed-use development, lying east of North Federal Highway between Glades and Palmetto Park Roads, has first floor retail and residences on the upper floors.

4.2 BROWARD COUNTY

Cypress Creek: The Cypress Creek area is generally bounded by I-95, Cypress Creek Road, Atlantic Boulevard, and Florida's Turnpike/SR 91. The area is a major suburban employment center with land use characterized by large office parks/buildings, expansive surface parking lots, and supporting land uses. While individual development may have pedestrian elements, the area in general is not designed for the pedestrian.

Sawgrass Mills Mall: Located in the northwest corner at West Sunrise Boulevard and Flamingo Road, this mall is a major retail center adjacent to a high concentration of employment centers and medium to high density residential development. Roads feeding this activity center are Sunrise Boulevard, Flamingo Road, I-595 and Sawgrass Expressway/SR 869.

Plantation Mid-Town: As the largest commercial district in the City of Plantation, in size and concentration of office and retail uses, this RAC is over 860 acres. This RAC lies immediately north of I-595 and is bounded by Broward Boulevard, Pine Island Road, and University Drive/SR 817. The area contains approximately 2.5 million square feet of retail and 3 million square feet of office space. The businesses employ approximately 20,500 people, while 34,500 households live with a one-mile radius. In 2002, the city adopted the Central Plantation Conceptual Plan, and projects are in the works to change this predominantly commercial district into a live, work, and play Town Center for Plantation and Central Broward.

South Florida Education Center (SFEC): This is the consortium of educational institutions located on Davie Road south of I-595. Feeder roads are I-595, University Drive, Griffin Road, and Davie Road. The SFEC campus is one of the biggest generators of traffic in Broward County, resulting in the formation of the SFEC Transportation Management Area (TMA) to help with mobility and parking problems.

Downtown Fort Lauderdale: As the main central business district for Broward County, this RAC includes government services, educational centers, high density employment, and residential buildings. Downtown Fort Lauderdale has changed dramatically in the last seven years in both appearance and substance. Since 2000, more than a dozen residential high-rises have been built transforming it into a vibrant multi-use activity center.

Port Everglades: The seaport's jurisdiction encompasses a total of 2,190 acres of which there are approximately 1,742 acres of upland and 448 acres of submerged land. It is a major employment center in Broward County and the South Florida region, and supports a thriving cruise industry. The roads serving this port include US 1, I-595, SE 17th Street, and SR 84.

FLL Airport: The airport is located in the southeast corner of the I-95/I-595 interchange. This is a major employment center and is anticipated to grow dramatically in future. In 2000, it provided approximately 3,360 jobs. The airport served 21.4 million passengers in 2006.

4.3 MIAMI-DADE COUNTY

Aventura Mall: This is a major retail center surrounded by high-density residential developments and employment centers. It is located near the Broward County line, and is served Biscayne Boulevard, NE 203rd Street, Collins Avenue, and I-95.

MIA: This RAC is a major employment center served by I-95, SR 112, SR 836/Dolphin Expressway, and LeJeune Road. In the vicinity of MIA, the MIC is being constructed.

Palmetto: This two-mile wide area along SR 826/Palmetto Expressway north of SR 836/Dolphin Expressway is one of the largest employment areas in Miami-Dade County. The predominant land use is light industrial. The general boundaries of this activity center are NW 87th Avenue, NW 72nd Avenue, and W 49th Street.

Dolphin: The area along SR 836/Dolphin Expressway encompassed by the HEFT, SR 826/Palmetto Expressway, NW 25th Street and Flagler Street is major employment

center. The Mall of Americas and Miami International Mall are also included in this activity center.

Blue Lagoon: The suburban office complex is located south of SR 836/Dolphin Expressway across from MIA. Feeder roads serving this activity center are LeJeune Road, SR 836, and SW 57th Avenue.

FIU: The university campus lies in the southeast corner of SW 8th Street and HEFT In Miami-Dade County. It is a major employment generator. The FIU has limited on-campus housing.

Miami Civic Center: West of Downtown Miami and north of State Road 836, this area is roughly bounded by NW 20th Street, the Miami River, NW 7th Avenue, and NW 12th Avenue. It is home to many local medical, legal, and educational institutions including the University of Miami School of Medicine, Jackson Memorial Hospital, Veteran Administration Medical Center, Cedars Medical Center, Richard E. Gerstein Justice Building, the State's Attorney's Office, Miami-Dade College Medical Campus, and the Lindsey Hopkins Technical Education Center. The area boasts three mass-transit stations and eight bus routes and can be accessed from I-95, SR 836, and SR 122. According to a University of Miami Study, the Civic Center area provided an average of one in 28 jobs in the State of Florida.

Downtown Miami: This activity center is the main central business district for Miami-Dade County. It consists of government service buildings and high-rise office buildings. Downtown Miami continues to grow with the opening of several condominium projects. The main feeder roads are US 1, US 41, I-95, and SR 836.

Mt. Sinai: The Mt. Sinai Medical Center is a major employment center north of the Miami Beach RAC, and east of the Julia Tuttle Causeway.

Miami Beach: This RAC is one of the major tourist attraction areas in the region with a high concentration of hotels, restaurants, and high-rise residential buildings. This area is served by SR A1A, I-195, and MacArthur Causeway.

Miami Port: The Miami Port is a major component in providing support for cruise industry from passenger travel standpoint. It also provides a large employment base for the people in the South Florida region.

Coral Gables: This area has characteristics of a central business district, and is enclosed by Bird Road, LeJeune Road, Douglas Road, and SW 24th Street.

University of Miami (UM): The university is located west of US 1 in the City of Coral Gables. The major roads serving the university are Ponce De Leon Boulevard, San Amaro Drive, Granada Boulevard, and Blue Road. More than 15,000 students are enrolled at UM.

Miami-Dade Community College North (MCC-N): The 245 acre MCC-N campus is located in unincorporated Miami-Dade County. It is served by Gratigny Boulevard/SR 934, NW 106th Street, SR 9/NW 27th Avenue, and NW 32nd Avenue.

Miami-Dade Community College South (MCC-S): The MCC-S campus lies midway between HEFT and SR 874, along SW 104th Street. This 185-acre campus site is also known as the Kendall Campus.

Dadeland: This RAC includes the general area in the vicinity of the SR 826/Palmetto Expressway and US 1 interchange at Kendall Drive. It has a mix of uses ranging from low to high intensity commercial development and significant residential development. The terminal station for Metrorail is located in this area.

Falls Mall: This large retail employment center is located west of US 1 in southern Miami-Dade County. Other land uses in this area include high density residential, industrial business, single-family residential, and strip commercial centers. Major roads serving this activity center are US 1, SW 136th Street/Howard Drive, and SW 87th Avenue.

Cutler Ridge: This area has a good mix of activities including low and high density residential development, office buildings, government services, and supporting retail business. The area is served by SR 821/HEFT, US 1, Caribbean Boulevard, Eureka Drive, SW 117th Avenue, and Quail Roost Drive.