

Revisit & Update Mobility Hubs

Methodology, Results and
Recommendations
Final Report

February 2018

Revisit & Update

Methodology, Results and Recommendations

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Revisit & Update

Methodology, Results and Recommendations

Overview

The Broward 2035 Long-Range Transportation Plan (LRTP) adopted by the Broward MPO (BMPO) in December 2009 introduced the concept of Mobility Hubs. The plan identified 103 possible Mobility Hubs in Broward County where the BMPO and other local agencies expected to make targeted investments to facilitate transit and multimodal travel throughout the County. One of three Mobility Hub typologies – Gateway, Anchor, and Community - were assigned to each hub location and each typology had a defined set of project elements. The overarching goal of the introduction of Mobility Hubs was and is to meet transportation needs with new transit-oriented and transit-supportive development and infrastructure that increases access to opportunity and organizes land use.

“Mobility Hubs are locations where people meet transit and are classified by the expected transit use and surrounding land use.”

Source: Broward County 2035 LRTP, page 39

In early 2017, the BMPO initiated this Revisit and Update study to reassess the Mobility Hub concept and reevaluate candidate locations in Broward where Mobility Hub investments may be warranted. An assessment of the original evaluation and prioritization of the original Mobility Hub prioritization process completed in the 2035 LRTP was completed early during this study (Assess Current Methodology, January 2018). The initial take-aways were carefully considered during the planning process. A Market Assessment (July 2017) was also conducted to better understand development trends throughout Broward and inform our evaluation of potential for candidate locations.

Revisit Planning Process

There are two aspects to the process that were developed sequentially – evaluation criteria and typology. The first task was to develop a spreadsheet tool to aggregate available data around criteria that would help evaluate candidate locations. Then, typology was developed for those candidate locations that characterizes and defines each of those candidate locations. Methodology and data used has evolved through the reviews of the screening tool and interim results with the Broward MPO staff and agency stakeholders. Two facilitated stakeholder working sessions were conducted on

April 5, 2017 and October 5, 2017 when the project team presented methodology along with interim results and questions for the reviewers. This report includes the final methodology recommendations for the evaluation criteria screening tool, methodology, project elements, results and recommendations. Stakeholder input influenced the development process getting us to this stage of the Revisit process.

One of the initial ‘take-aways’ in review of the original methodology created with the 2035 LRTP is to question why so many hub locations were identified and whether over one hundred locations were too many. Further, some locations were identified based on the introduction of a Bus Rapid Transit system that never happened and for which sufficient funding was not available. In other developments since the 2035 LRTP, the Wave modern streetcar was funded and private-sector All Aboard Florida began implementation of Brightline, an intercity rail line on the Florida East Coast (FEC) rail line whose startup is expected to be complete for South Florida in 2018. The Miami Central Station will also be served by an extension of Tri-Rail along the Iris Spur opening the door to further extensions along the FEC rail line into Broward.

Despite the concern early in the process that there were too many locations, the analysis carried forward all 103 original Mobility Hubs as *candidate locations* rather than Mobility Hubs. The purpose was to let the data drive the results with the understanding that as data is updated, so are the results. There was also a comparison of the original scoring results with the revised methodology results to better understand what has changed, test evaluation assumptions, and raise new questions.

Expanded criteria added more candidate locations to recognize certain changes that have occurred since the original 2035 LRTP prioritization. All reasonable locations with the potential to facilitate transit and multimodal travel within Broward were identified for evaluation based on recommendations from the Market Assessment, Qualified Transit Areas identified in the BrowardNext Land Use and Comprehensive Plan update for 2017, terminus of a Broward County Transit (BCT) bus route, and intersection of two BCT routes with 30-minute peak headway or better. Even so, there will likely be locations in future that were not considered in this round. Altogether, 175 candidate locations were identified for final screening and disposition prior to determining what type of Mobility Hub could be recommended for candidate locations that advance to program-ready implementation stage.

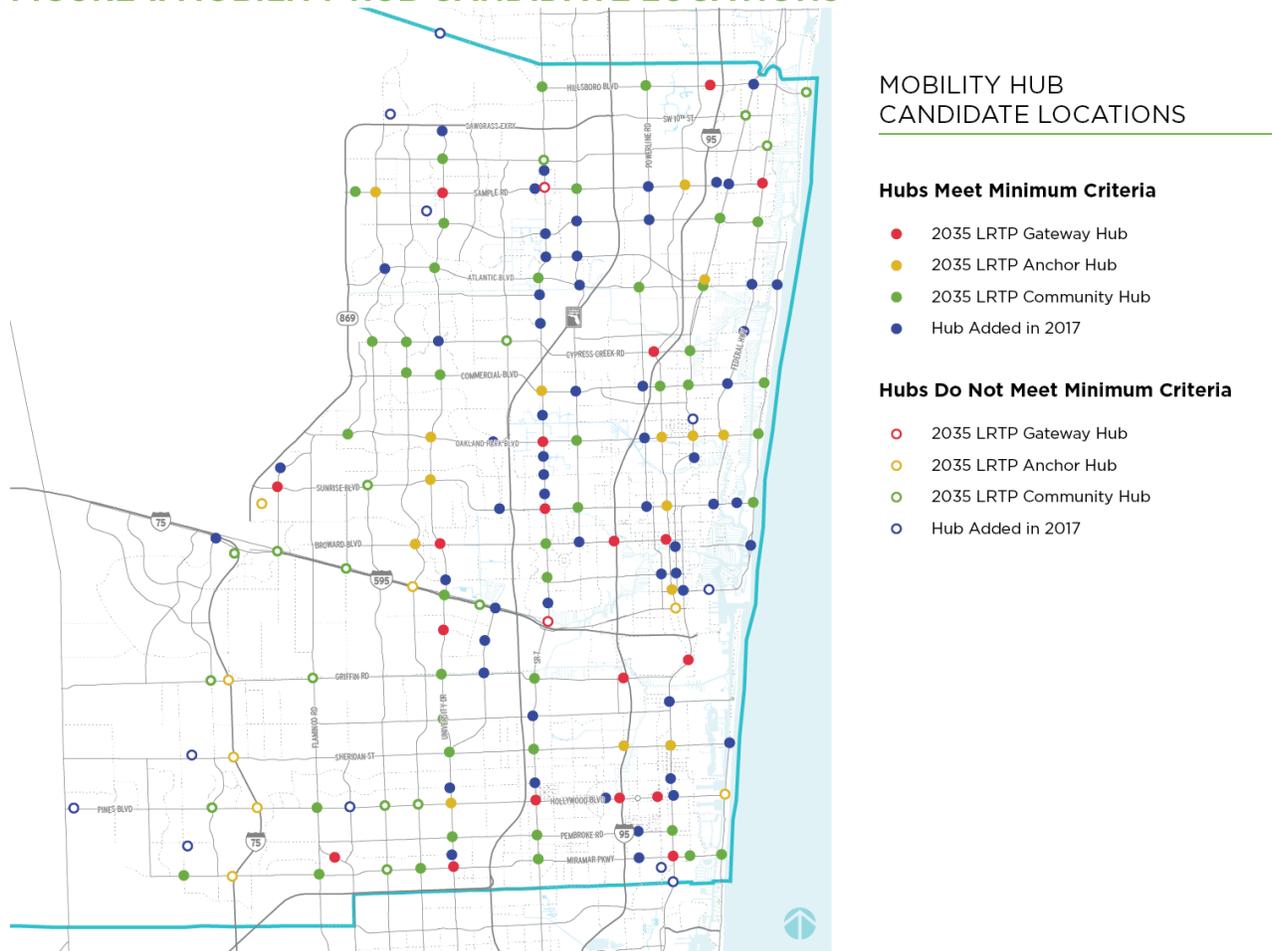
Other factors are considered later during the evaluation to develop an action plan for final recommendations. Factors such as readiness of project sponsors and the potential to leverage funding and implementation partnerships for candidate locations are also critical to success of Mobility Hubs.

Candidate locations were measured, normalized and ranked relative one to the other based on the established evaluation criteria. For each measure, raw data for each candidate site was compared with all sites to determine the highest value, which is given 100 percent score and the lowest value, which is given zero percent score. All

other sites were scored proportionally to their relation from highest and lowest values. Currently both scores, Market Readiness and Network Readiness, are weighted equally with the capability to weigh scores such that a percentage weight can be given to individual evaluation criterium to reflect priority objectives.

Finally, the establishment of minimum criteria helped determine whether to continue consideration of a candidate location. Minimum criteria capture all candidate locations with at least two bus stops for transfers, park & ride termini (beginning of the routes), and all fixed facilities (rail and all off-street transfer facilities). Over time, locations not meeting the minimum criteria may emerge as future candidate locations when multimodal activity increases and land use in the area evolves. Market conditions could change to support priority infrastructure investment and public private partnerships that promote Mobility Hub objectives.

FIGURE 1: MOBILITY HUB CANDIDATE LOCATIONS



Evaluation Criteria

Evaluation criteria were defined for evaluating potential *candidate locations* for Mobility Hubs in consideration of insights gained from the previous criteria used in prioritizing projects for the 2035 LRTP. Because the previous criteria relied on a Bus Rapid Transit system plan that did not materialize, a data-driven approach based on reliable and up to date information was preferred. The best information available consists of origin and destination surveys conducted by BCT in 2014 and from South Florida Regional Transportation Authority (SFRTA) conducted in 2013. Route-level information is more recent. Although stop-level information may not be as recent, the transit systems are basically the same except for express service. The fact that the transit systems and service provided have not changed substantially is a good indication that even if it was more current, the primary difference today would be lower ridership.

This update occurs during the initiation of the 2045 Metropolitan Transportation Plan (MTP) when new socio-economic data is published and a new regional travel demand activity-based model is developed. In November 2017, BCT met with their commissioners to unveil a draft strategic plan for a new transit vision for an expanded premium rapid bus service (limited stop routes operating with traffic) and possibly a new light rail system. Like the Bus Rapid Transit system envisioned during the 2035 LRTP, funding for a new transit vision is not secured.

Updates for the Mobility Hub Evaluation Criteria are recommended when project details (alignment, ridership, and operating plans) are available for a vetted transit system and when committed financial plans are secured. Mobility Hubs by themselves would not drive any of these strategic planning decisions and may benefit from site-specific plans for project features of major capital investments or for desired local projects with committed project sponsors.

When does a candidate location become a Mobility Hub?

There is an important distinction between identification of a candidate location and a Mobility Hub. Not all candidate locations will result in a future Mobility Hub. Pre-requisite characteristics and conditions will be used to screen for the best locations for near-term investment priority. In the longer term, more locations could be added with the introduction of new routes and service extensions combined with increased intensity of

Focus on Readiness

Readiness is the indicator applied to evaluation criteria within the categories of Market (existing and planned land use) and Network (ridership and peak period service frequency). A screening tool was developed in a spreadsheet format to provide an objective scoring and ranking of potential Mobility Hubs within this planning framework. Relative scores are then normalized and ranked separately and as one composite score that provides an overall ranking from highest to lowest for each criterion within the Market readiness and Network readiness results for each candidate location. The project team tested and refined the readiness evaluation criteria with currently available information, and in full expectation that future updates will be required to reflect changing service and land use patterns. A description of each category is summarized in this section and a more technical guide is provided in Appendix B.

Market readiness reflects the estimated number of trips generated from all land uses within a half mile of a candidate location. Market readiness includes both existing trips generated and any potential additional trips within one-half mile from planned development projects (information provided by municipalities in mid-2017). Separate scores for existing and potential future daily trips recognize favorable market conditions for locations with high development activity. For the most part, the information from the Market Assessment is consistent with Broward County's information about Future Growth Areas from their November 2017 presentation; however, there are additional areas where development is trending, namely, the Fort Lauderdale-Hollywood International Airport, Fort Lauderdale Convention area, City of Plantation Midtown, and Cypress Creek Uptown District. An equity criterion was added to this category to identify carless households where there should be a greater need for alternative travel options such as transit.

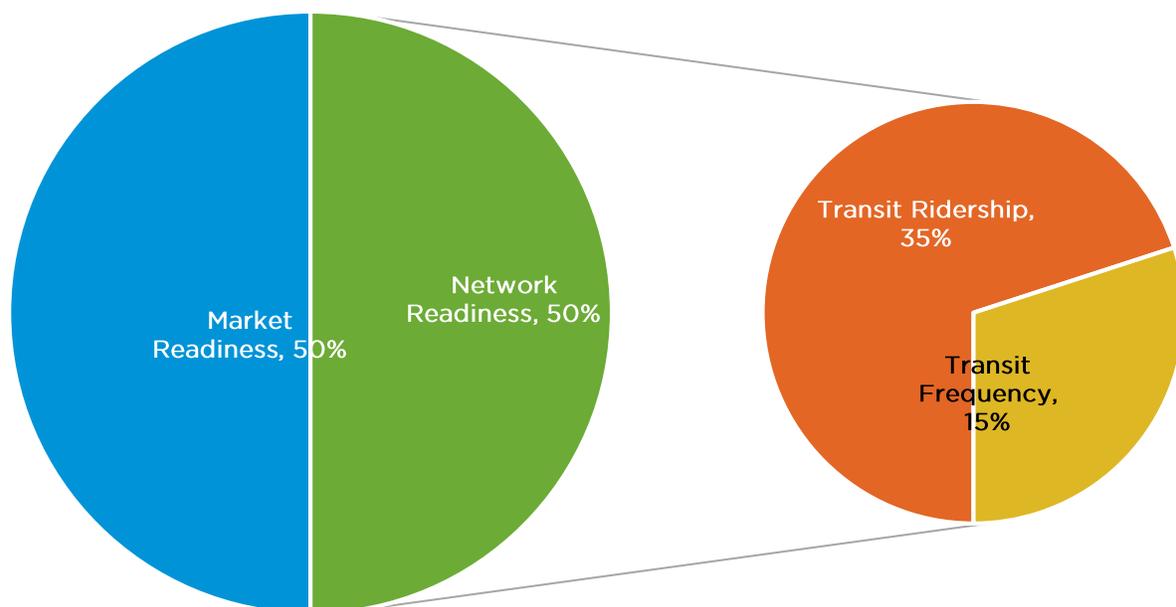
Network readiness relates to the transit service use and availability at a location. Origin and destination surveys are dated with stop-level boardings and alightings last collected by BCT in 2014 and by SFRTA in 2013. The Southeast Florida Regional Planning Model data is being updated as part of the 2045 Regional Transportation Plan. Although ridership by route is more current, it does not reflect activity in the immediate vicinity of a given Mobility Hub. The project team opted for the stop-level information as the best available information for evaluation of Mobility Hubs. Changes to the transit system have been largely incremental to maintain the status quo to the extent that budget levels allow. Most new service includes the introduction of I-595 and I-95 express service. While a significant growth area for regional travel, it is still a small segment of the total systemwide ridership.

Frequency of vehicles serving the one-mile radius of a candidate location is considered to account for the opportunity to use transit. An earlier version of the Network evaluation criteria included route-level trips for all routes that occur within one-half mile of the location which are more current. Concerns were expressed by

our stakeholder review team that route-level information was less accurate and that even if the stop-level activity was not as current, it would be a better measure of the candidate locations' potential return. Another early development version of the screening tool included the number and capacity of peak hour transit vehicles serving a candidate location to evaluate the capacity of transit service at a given candidate location. This was proposed to account for different capacity for rail, standard bus, articulated bus and community/shuttle buses. (This is consistent with the Federal Transit Administration's Capital Investment Grant evaluation criteria.) Using the capacity measure, all seven Tri-Rail stations fell in the top 10 for Network readiness. It was felt that even though the rail vehicles had more seats, that did not necessarily mean those seats could be filled. Frequency of vehicles was selected as the preferred approach to measure availability of transit.

Normalized scoring and weighting. Raw scores from the scoring criteria were then normalized to allow the criteria to be combined into one composite score. For each criterion, hubs are assigned a normalized score from 0 to 100. This normalized score is based on the relative position between the highest and lowest raw score. The normalized scores for the four criteria are then summed and assigned a composite score from 0 to 100. The highest performing candidate hub location is given a score of 100. The lowest performing candidate hub location is given a score of 0. In addition to the normalized scoring, the screening tool is set up to weigh individual criterium to represent a greater importance of certain measures relative to the Broward MPO's goals and objectives.

FIGURE 2: COMPOSITE SCORE WEIGHTING



Minimum criteria were established to identify pre-requisites for consideration as a candidate location. All candidate locations were evaluated by the evaluation criteria described in this section and further explained below for the Screening Tool Methodology. Candidate locations may be added to the list for ranking in future updates should changes occur that would meet the following minimum criteria.

TABLE 1: MINIMUM CRITERIA FOR CONSIDERATION AS A CANDIDATE LOCATION

Must Haves	Rationale
2 or more transit routes within one-half mile	Mobility Hubs are intended to provide additional streetside features needed to support transit connections at nearby stops. Previous versions and the 2035 LRTP considered at least 3 routes. Two was established as the limiting pre-requisite to include all critical connections. Locations serving only one route may still provide important boarding and alighting locations, but they serve a different function than transfer locations.
Rail Station	The seven Tri-Rail commuter rail stations in Broward County and the new Brightline station in downtown Fort Lauderdale have different requirements. Modern streetcar stops are generally located more closely together than light rail stations and while they may have high activity, they have higher frequencies because of shorter routes. Future designations for candidate locations will need to consider station needs and transit connectivity.
Park & Ride Terminus	Broward County Transit currently operates six Park & Ride routes with two routes originating at the BB&T Center, and one each at Miramar Regional Park, Pembroke Commons Shopping Center, North Perry Airport, CB Smith Park, and Ansin Sports Complex. Inclusion of terminus locations is to ensure they are considered even though one route may serve the location. New terminus locations may be added in future with expansion of Express service, especially on I-75 serving a new destination of the Miami Intermodal Center at Miami International Airport. FDOT and SFRTA also operate park & ride locations in conjunction with rail stations such as Cypress Creek and Fort Lauderdale Tri-Rail stations.
Transfer Center	Broward County Transit operates four fixed facilities where multiple routes meet off-street on property they own, namely, Broward Central Terminal (listed as a Rail Station because of Brightline service set to begin late 2018), West Regional Terminal, Lauderhill Transfer Facility, and Northeast Transit Center. At these facilities, bus bays are provided at covered loading platforms and restrooms may be provided for drivers and the public. The Fort Lauderdale-Hollywood International Airport is on the list because the County owns this facility giving them more control over the inclusion of on-site facilities and Tri-Rail serves the airport connecting to the Tri-Rail station at Griffin Road and I-95. Three additional off-street bus stops are within private property at the Sawgrass Mills Mall, Pompano Citi Centre, and Pembroke Lakes Mall.

Twenty-six of the original 2035 LRTP locations did not meet minimum criteria for Mobility Hub consideration because they are not served by transit or are served by only one transit route. Because conditions will change, they remain on the list for future consideration.

The project team considered a criterium to measure sponsor-readiness to evaluate the degree to which a sponsor may have taken actions to promote Mobility Hubs or Complete Streets. The rationale is that the key ingredient to a successful Mobility Hub implementation would surely be the sponsor's support and partnership to advance projects in their area of interest. Because a common basis for quantifying candidate locations is not evident or comparable from one location to another, special and/or unique circumstances are considered separately. Each candidate location was scored relative to their performance in the market and transit network. This approach maintains a data-driven evaluation of a candidate location's readiness for implementation and their relative value in terms of potential returns for infrastructure and transit-oriented and transit-adjacent development opportunities.

Typologies

Separately, typologies were developed to describe the type of Mobility Hub activities planned and to characterize the land use surrounding the candidate location. Typologies do not score or evaluate candidate locations in any way; rather they are intended to help develop a network of hub locations that fosters systemwide connectivity with a focus on first/last mile connections to reduce perceived or real barriers to transit use. Typologies are shown in relation to the data-driven scores based on the evaluation criteria, but they are intended to be viewed as a planning tool to develop an action plan for next steps and identify partners and potential sponsors.

Three aspects of a candidate site are considered in defining the area surrounding the site and the activity around the site: Existing Transect, Future Land Use, and Transit Activity. Candidate locations that did not meet the minimum pre-requisites are typified by existing transect and future land use only. These sites may have one route only or no routes currently. Again, conditions could change in future with new routes or extensions of existing routes.

Existing Transects

The Florida Department of Transportation served to inspire the use of transects to classify the existing land use in the immediate vicinity of the candidate locations. The new Florida Design Manual effective January 1, 2018 draws from context classifications of a given corridor to determine complete streets design elements, integration of multimodal uses within the corridor and speeds.

FIGURE 3: FLORIDA DOT TRANSECTS



Source: *Florida Design Manual* (effective January 2018)

The project team reviewed the concept of using transects consistent with the FDOT classifications. Stakeholders expressed concern that there may be confusion should FDOT's application may not be consistent with the Mobility Hub application of transects. The solution in response to the expressed concern is to differentiate from the FDOT system and use only context classifications that are appropriate to Mobility Hubs. The definitions used in Mobility Hub typology, though very similar to FDOT's transects, are described in Table 2 for purposes of application to Mobility Hub candidate locations only. These are expected to be updated as existing land use changes.

Most Mobility Hubs are within a suburban land use context of which the majority are commercial in nature. Only two meet the Urban Core criteria and those are the top two based on the evaluation criteria. Urban General are found east of I-95 in town centers, locations with high rises along the beach, and in special situations such as the Fort Lauderdale Convention Center. One location is identified west of I-95 at SR7 and Davie.

TABLE 2: TRANSECT BASED ON EXISTING LAND USE CONTEXT

Suburban Residential



SW 4th Avenue and SW 12th Street

Suburban Commercial



Sunrise Boulevard and Andrews Avenue

Description	Mostly residential uses within large blocks and a disconnected/sparse roadway network.	Mostly non-residential uses with large building footprints and large parking lots. Buildings are within large blocks and a disconnected/sparse roadway network.
Meets Minimum Criteria	30	90
Does Not Meet Minimum Criteria	17	18

Urban General



US 1 and Young Circle Park

Urban Core



SE 3rd Avenue and Las Olas Boulevard

Description	Mix of uses set within small blocks with a well-connected roadway network. Typically concentrated around a few blocks and identified as part of the community, town, or city of a civic or economic center.	Mix of uses set within small blocks with a well-connected roadway network. Typically concentrated around a few blocks and identified as part of the community, town, or city of a civic or economic center.
Meets Minimum Criteria	19	2
Does Not Meet Minimum Criteria	9	0

Note: Suburban transects may include both residential and commercial with the western half listed first, then the eastern half.

Future Land Use

The dominant adjacent future land use is provided from the most recent Broward County Comprehensive Plan. In cases where there are multiple uses, the identification is according to the dominant land uses beginning with northeast to northwest. This balances out what has been developed to date with aspirations or expectations represented in public plans. Table 3 lists all land use types identified.

TABLE 3: FUTURE LAND USE DISTRIBUTION FOR CANDIDATE LOCATIONS

Land Use Category	# of Hubs
ACTIVITY CENTER	65
COMMERCE	124
TRANSPORTATION	18
COMMUNITY	9
RECREATIONAL OPEN SPACE	9
CONSERVATION	2
AGRICULTURAL	1
IRREGULAR RESIDENTIAL	9
ESTATE 1 RESIDENTIAL	5
LOW 2 RESIDENTIAL	3
LOW 3 RESIDENTIAL	10
LOW 5 RESIDENTIAL	7
LOW-MED RESIDENTIAL	8
MED 16 RESIDENTIAL	1
MED-HIGH RESIDENTIAL	5
HIGH RESIDENTIAL	2
HIGH 50 RESIDENTIAL	1
LAND USES IDENTIFIED ALL CANDIDATE LOCATIONS	279

Transit Activity

Another important aspect of Mobility Hubs is the mode of transit use at a candidate location and will be a key determinant as to what project elements are appropriate for this site. All fixed facilities (rail and off-street facilities) are categorized according to their transit function. Candidate sites are classed according to four types of transit activity as follows:



RAIL STATIONS are provided by Tri-Rail for the seven commuter rail stations in Broward County: Deerfield at Hillsboro Blvd), Pompano Beach (south of Sample Road), Cypress Creek (south of Cypress Creek Blvd), Fort Lauderdale (at Broward Blvd), Dania Beach (at Griffin Road), Hollywood (at Hollywood Blvd), and Sheridan (at Sheridan Rd). Stations as designed today include a stair/elevator tower on each side of the tracks with an elevated walkway for passengers to safely cross from northbound to southbound station platforms. Brightline's station for intercity rail opened in January for service in Downtown Fort Lauderdale. This is a new type of station for Fort Lauderdale with a much bigger footprint than would be required for commuter rail, light rail, streetcar or bus stations/stops.



BUS TRANSFER facilities represent a fixed location where Broward County Transit operates multiple routes meeting at one off-road facility with room for customer amenities and covered waiting platforms.



PARK & RIDES are another type of fixed facility at a location operated by BCT, FDOT or SFRTA where customer amenities and covered waiting platforms are provided for patrons.



STREETSIDE TRANSFER locations are places with multiple stops on either side of the streets that intersect at that candidate location. An example of this is Hollywood Blvd/SR7 where seven stops provide waiting areas within publicly owned right-of-way with bus shelters and seating, pedestrian crosswalks and lights, and bike lanes within the roadway.

Most of the transit activity types in Broward are Streetside Transfer locations. Seven Tri-Rail commuter rail stations are now in operation and the intercity Brightline station in Fort Lauderdale opened service to West Palm Beach in January 2018. A breakdown of the transit activity types is shown in Table 4.

TABLE 4: TRANSIT ACTIVITY FOR CANDIDATE LOCATIONS

Transit Activity	Candidate Locations
Rail Station	8
Bus Transfer Center	7
Park & Ride	6
Streetside Transfer	119

Note: Only candidate locations that meet minimum criteria are assigned a transit activity type.

Project Elements

Mobility Hubs may be implemented as renovations to an existing high-transfer streetside location or included in a major capital investment project for a new station, park & ride or transfer facility. Certain features will be necessary for the success of all types of Mobility Hubs whereas transit activity may drive project elements selection. Project elements are considered in three categories – on-site, access, and systemwide.

A summary of each provides guidance on typical expectations. Treatment suggested does not dictate project elements and significant variation could and should occur within a given transit activity type. For example, different rail transit types (commuter, light rail, or streetcar) will have different station types. Streetcar service is typically designed to provide stops within a few blocks of each other whereas light rail stations are typically every mile and commuter rail stations every two to four miles apart. Although the Broward MPO has not built rail stations, their role in approving funding allocations for transportation projects is one of the core functions of an MPO. Further, the Broward MPO is a party to the Memorandum of Understanding among stakeholders for The Wave modern streetcar project, and is a funding contributor through a sub-recipient agreement with the City of Fort Lauderdale.

On-site Project Elements

Most of the variation among transit activity types will occur for the on-site category. All four transit activity types will have differences in shelter/canopy size, amenities, platform capacity, drop-off/pick-up zones, and parking demand. A stop/station area can be either on-street or encompass a much larger footprint shown below for the Kansas City Max BRT station and community plaza.



KC Max Troost Avenue BRT station. Courtesy HNTB

TABLE 5: PROJECT ELEMENTS CONSIDERED FOR MOBILITY HUBS

Onsite Elements	Rail	Bus Transfer Facility	Park & Ride	Streetside Transfer
Typical Sponsor	Tri-Rail, FDOT, BCT	BCT, malls, business centers, campuses	BCT, FDOT	BCT
Public Ownership	Yes	Yes	Preferred long term; could be leased	ROW or easement
Shelter	Building or canopy	Canopy/shelters	Canopy/shelters	Shelters
Ramp access	Commuter/Light Rail	Optional	High volume/ congested area	No
Parking	Optional	Optional	Yes	No
Lighting	Yes	Yes	Yes	Yes
Elevators	Yes	No	Only multi-level	No
Customer Service	Optional	Optional	No	No
Bench Seating	Yes	Yes	Yes	Yes
Bicycle Racks	Yes	Optional	Optional	No
Bicycle Lockers	Optional	Optional	Optional	No
Ticket Vending Machines	Yes	Optional	No	No
Restrooms	Optional	Optional	Optional	No
Security Cameras	Yes	Yes	Yes	Optional
Wayfinding	Yes	Yes	Optional	Yes
Public art	Optional	Optional	Optional	Optional

Access Project Elements

Safe connections are critical to the success of a Mobility Hub regardless of the typology. The Broward MPO has made considerable progress with Complete Streets and particularly with pedestrian and bicycle facilities. Any location that is a strong candidate location for a Mobility Hub would also be a good place for access by multiple modes. That does not mean that every Complete Street will have the same features. All streets cannot be all things to all users, but area travel demand can be assessed to balance the access needs safely across multiple access paths including safe access and egress points to transit opportunities. Mobility Hubs advancing to program-ready implementation should consider an appropriate mix of these critical access features:

- Complete Streets
- ADA accessible pedestrian walkway connections
- Pedestrian-scale lighting (electric and solar)
- High-emphasis crosswalks
- Pedestrian channelization fencing
- Bicycle lanes
- Protected bicycle lanes

It is important to recognize that transit may not be the end goal of every transportation system user. Pedestrian and bicycle commuting is a growing mode of travel for the entire trip. Urban places are a big draw for those who prefer to leave the car behind and rely on human power to get where they need to go.

Systemwide Project Elements

Project elements that require a systemwide approach rather than a single site application were also considered. The service area will vary depending on the feature and not every location within a system could include these project elements, especially for privately operated services such as carshare/bikeshare or transportation network companies.



CARSHARE AND BIKESHARE are private enterprises that contract with public entities such as Broward County or municipalities. Decisions about station locations and service area are made from the standpoint of the private businesses and the market areas they serve. Public facilities or public sidewalks may include space for docking stations if desired. More recently, dockless bikeshare systems are entering the market that don't require docking stations but do require a safe place to park the bikes.

(Image: cheapestdestinationblogs.com)

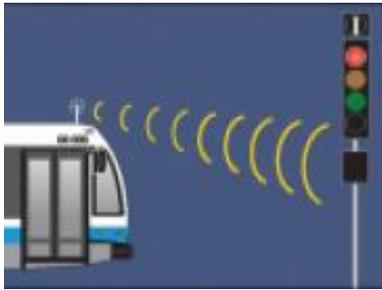


CIRCULATOR SHUTTLES are offered by Tri-Rail at many stations to provide the first mile/last mile connection. Transfer centers may connect with Community Bus service sponsored by many Broward municipalities using the same off-street facility as local or premium bus routes. Multiple routes may also serve the same streetside bus stops or serve nearby stops within a Streetside Mobility Hub. Sun Trolley is a



Transportation Management Association that operates in Fort Lauderdale and connects residents and tourists with multiple destinations including the Tri-Rail Fort Lauderdale Station and the BCT Central Terminal (Broward's first Mobility Hub) and the adjacent Brightline Station. Inclusion of these services at a Mobility Hub is a systemwide decision and may require ongoing operating and maintenance cost to be considered by the operating entity or sponsor.

(Images: <https://media-cdn.tripadvisor.com/media/photos/04/a7/b4/45/fort-lauderdale-sun-trolley.jpg>; Tri-Rail Shuttle gallery)



INTELLIGENT TRANSPORTATION SYSTEMS – Sometimes referred to as Transportation System Maintenance and Operations and most recently Smart Cities, these technologies involve an array of communications, dynamic and adaptive traffic and pedestrian signals, transit priority systems, automated vehicle locator and passenger counters, central operations control centers, sensing technologies, connected vehicles, collision avoidance systems, etc. In most cases, these improvements require ongoing operating cost. Any decisions regarding implementation of these types of improvements naturally require consideration of a systemwide design and long-term financial plan. (Image: stm.info/en/about/major_projects/bus-preferential-measures-bpm)



WiFi services are offered by many transit operators on buses, at facilities, and sometimes systemwide. BCT provides Wi-Fi on Breeze routes, Express bus service, and at the Broward Central Terminal. Tri-Rail offers free WiFi service on all trains and at stations. (Image: Metropolitan Transit Agency of the State of New York)



REAL TIME INFORMATION SYSTEMS – BCT offers displays and announces estimated arrival times and plans to introduce website information for information. Tri-Rail offers a Tri-Rail Trackers with real time information. (Image: data-display.com/chapel-hill-passenger-information)

Guidelines for Applying Project Elements

How these guidelines are applied with depend on further site-specific evaluation of service needs given the land use and transit service in place or contemplated. Many of the candidate locations are among the same prioritized in the 2035 LRTP. The project team recommends an application process for Mobility Hub funding similar with the Complete Streets and Other Local Initiatives grants. Of the top-ranked candidate locations, the Broward MPO is working with partners in the following areas to initiate master plans or to advance into implementation for Mobility Hub improvements.

TABLE 6: MOBILITY HUB WORK IN PROGRESS

ID	Candidate Location	Status	Rank
GWHUB2	Broward Blvd & NW/SW 1st Ave	In construction	1
2017B21	Las Olas Blvd & SE 3 rd Ave	Wave Streetcar Stop	2
GWHUB11	NW 136 th Ave @ BB&T Center	Sunrise Master Plan pending	5
ANHUB2	Broward Blvd & Pine Island Rd	Plantation Master Plan pending	9
GWHUB4	Cypress Creek Tri-Rail Station	Master Plan completed	10
GWHUB3	Broward Blvd & University Dr	Plantation Master Plan pending	11
GWHUB10	SR 7 & Hollywood Blvd	Implementation Pending	16

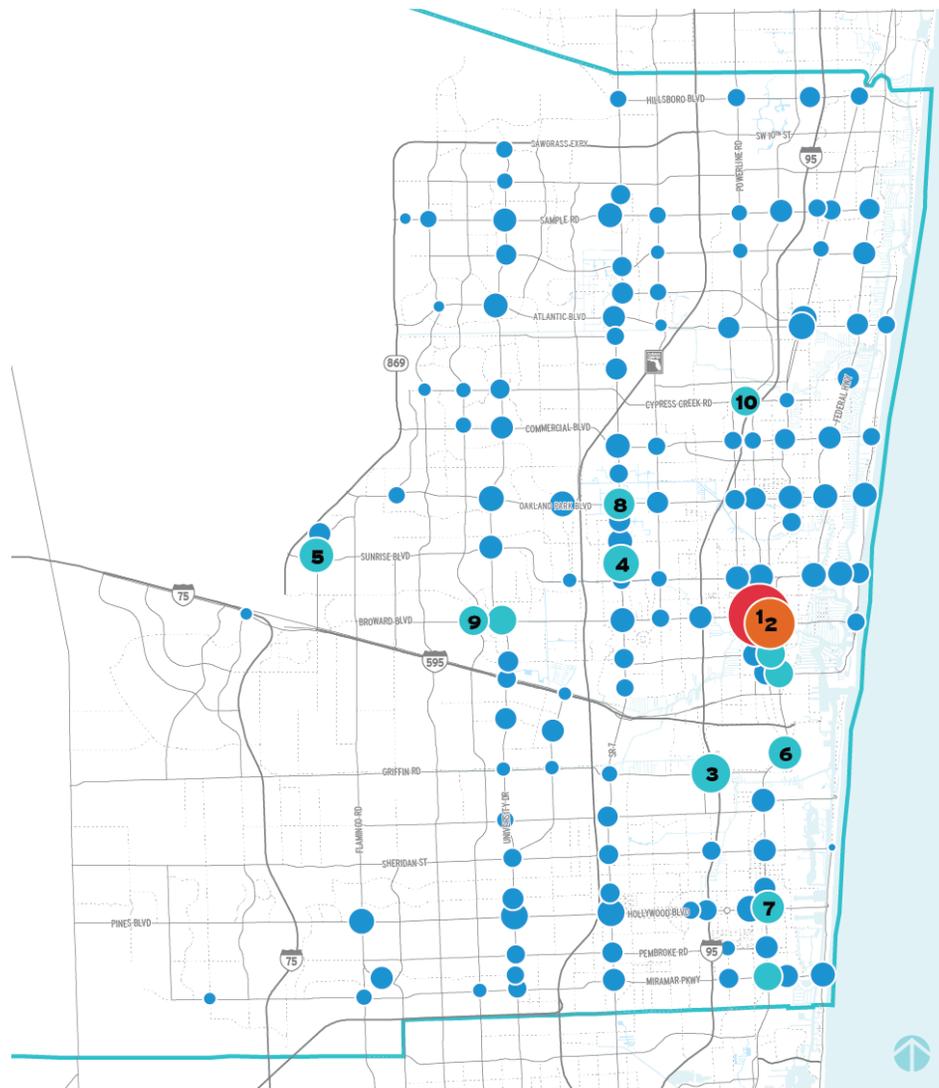
Revisit & Update Results

Results of the screening and evaluation are provided for each candidate location to include typology and raw data in Appendix A, Table A-1, Candidate Location Evaluation and Scoring. Candidate locations are sorted for those that meet minimum criteria and separately for those that do not. Results are shown side-by-side with 2035 LRTP prioritization results. These results are mapped below in Figure 4 on the following page. A snapshot of the top 20 candidate locations is shown in Table 7.

TABLE 7: COMPOSITE SCORES FOR TOP 20 CANDIDATE LOCATIONS

ID	Candidate Location	Transit Activity	Rank	Composite Score	Market Score	Network Score
GWHUB2	Broward Blvd & NW/SW 1st Ave	Rail	1	92.5	85	100
2017B21	Las Olas Blvd & SE 3 rd Ave	Streetside	2	60.3	100	20.5
GWHUB6	Griffin Rd & CSX/Tri-Rail	Rail	3	39.0	59.4	18.5
2017B7	SR 7 at Lauderhill Mall	Transfer Ctr	4	32.6	14.8	50.4
GWHUB11	NW 136 th Ave @ BB&T Center	P&R	5	29.9	52.6	7.2
GWHUB21	US 1 @ FLL Hollywood International Airport	Transfer Ctr	6	27.9	49.3	6.4
2017B17	US 1 at Young Circle Park	Streetside	7	27.2	29.8	24.5
GWHUB12	SR7 & Oakland Park Blvd	Streetside	8	26.2	20	32.5
ANHUB2	Broward Blvd & Pine Island Rd	Transfer Ctr	9	23.5	23.1	24
GWHUB4	Cypress Creek Tri-Rail Station	Rail	10	22.4	25.9	19
GWHUB3	Broward Blvd & University Dr	Streetside	11	22.4	29.9	14.9
2017B19	US 1 & SE 17 th St	Streetside	12	22.2	32.4	11.9
GWHUB7	Hallandale Beach Blvd & US 1	Streetside	13	21.1	24.8	17.5
2017B20	US 1 & Davie Blvd	Streetside	14	21.0	31	11
ANHUB13	University Dr & Pines Blvd	Streetside	15	20.0	25.8	14.2
GWHUB10	SR 7 & Hollywood Blvd	Streetside	16	19.8	20.8	18.8
GWHUB8	Hollywood Blvd & Dixie Hwy	Streetside	17	19.6	35.3	4
COHUB1	Atlantic Blvd & Dixie Hwy	Streetside	18	18.6	18.9	18.3
ANHUB4	Dixie Hwy & MLK Blvd	Transfer Ctr	19	18.4	19.9	16.9
COHUB47	Pines Blvd & Flamingo Rd	P&R	20	18.2	25.6	10.8

FIGURE 4: REVISIT MOBILITY HUB COMPOSITE SCORE RESULTS



COMPOSITE SCORE

Market Readiness (50%) and Network Readiness (50%)

Showing only candidate locations meeting minimum criteria

Scores

Area of dot proportionate to score (0 to 100)

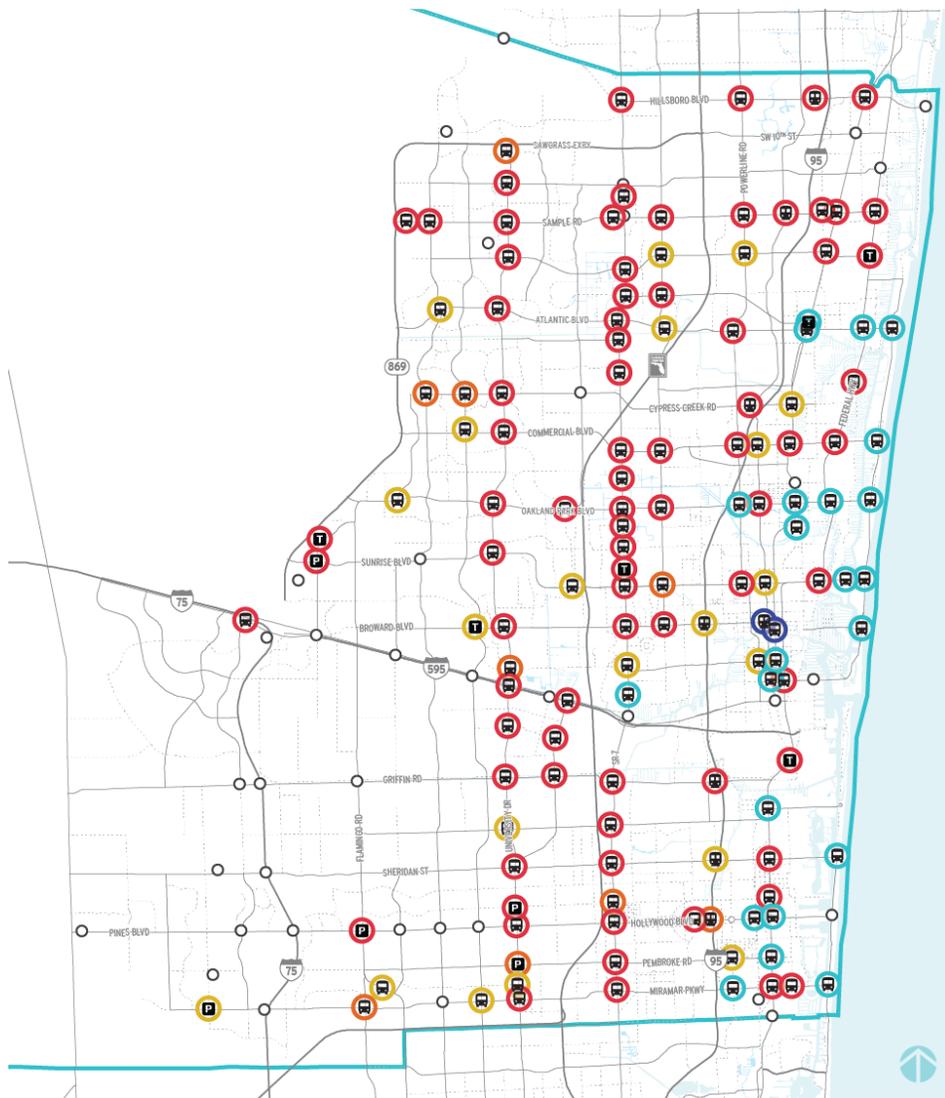
Color of dot indicates range of score



Top Scoring Candidate Locations

- 1** Broward Blvd & NW/SW 1st Ave @ Broward Central Terminal & Brightline Intercity Station (92.5)
- 2** Las Olas Blvd & SE 3rd Ave (60.3)
- 3** Griffin Rd & SFRC @ Dania Beach Tri-Rail Station (39.0)
- 4** SR 7 @ Lauderhill Mall (32.6)
- 5** NW 136th Ave @ BB&T Center (29.9)
- 6** US 1 @ Fort Lauderdale-Hollywood International Airport (27.9)
- 7** US 1 & Young Circle Park (27.2)
- 8** SR 7 & Oakland Park Blvd (26.2)
- 9** Broward Blvd & Pine Island Rd (23.5)
- 10** Cypress Creek & SFRC @ Cypress Creek Tri-Rail Station (22.4)

FIGURE 5: REVISIT MOBILITY HUB CANDIDATE LOCATION TYPOLOGIES



MOBILITY HUB CANDIDATE LOCATIONS

○ Does Not Meet Minimum Criteria

Typology - Transect

- Urban Core
- Urban General
- Suburban Commercial
- Suburban Residential
- Suburban Commercial/Residential Mix

Typology - Transit Activity

- Ⓜ Rail Station
- ⓑ Bus Transfer Center
- Ⓟ Park & Ride
- Ⓜ Streetside Transfer

General Observations

This report describes the methodology used for developing and applying evaluation criteria, typologies, and project elements. A few observations about the results are provided here for review and further discussion of ongoing planning both for near-term development, and strategic planning for the 2045 MTP and consideration of transit system planning, expansion, and new transit service.

- Appropriately so, the top site is the Broward Central Terminal and Brightline Intercity Station where a Mobility Hub under construction.
- Third ranked Dania Beach Tri-Rail Station at Griffin Road (GWHUB6) and the sixth ranked US 1 @ Fort Lauderdale-Hollywood International Airport (GWHUB6) warrant further discussion considering potential latent demand of potential trips associated with high employment land use in the area and the location of two regional hubs in the vicinity (FLL airport and Port Everglades).
- Distribution of evaluation criteria composite scores normalize below 30 percent of the top-ranked candidate locations. Of the 135 candidate locations that meet minimum criteria:
 - 101 are below 15 percent
 - 30 are between 15-30 percent
 - 4 are 30 percent or above
- Only 10 candidate locations have five or more routes meeting within one-half mile of which:
 - Five are Streetside at major intersections
 - Two are Rail (Dania Beach Tri-Rail station and Brightline station)
 - Two are Bus Transfer facilities (Lauderhill Mall and West Regional Terminal)
 - One is a Park & Ride (CB Smith Park at Pines & Flamingo)

An apparent mismatch is noted between land use and transit service. Higher market score indicates potential latent demand whereas a higher transit network score indicates lack of transit oriented or transit adjacent land use within one-half mile of a candidate location. Some of the outliers are shown in Table 8. (Scores represent normalized percentage of highest score.)

TABLE 8: SCORE DISPARITY BETWEEN MARKET AND TRANSIT READINESS

ID	Candidate Location	Composite Rank/Score	Market Score	Network Score	Disparity
2017B21	Las Olas Blvd & SE 3 rd Ave	2/60.3	100	20.5	79.5
GWHUB11	NW 136 th Ave @ BB&T Center	5/29.9	52.6	7.2	45.4
GWHUB21	US 1 @ Fort Lauderdale-Hollywood-Dania Beach Int'l Airport	6/27.9	49.3	6.4	42.9
GWHUB6	Griffin Rd & Dania Beach Tri-Rail Station	3/39.0	59.4	18.5	40.9
GWHUB8	Hollywood Blvd & Dixie Hwy	17/19.6	35.3	4.0	31.3
GWHUB12	SR 7 @ Oakland Park Blvd	8/26.2	20.0	32.5	-12.6
GWHUB2	Broward Blvd & NW/SW 1 st Ave	1/92.5	85.0	100	-15.0
2017B7	SR 7 @ Lauderhill Mall	4/32.6	14.8	50.4	-35.6

Tying It All Together

As the Revisit & Update for Mobility Hubs study for Broward concludes, the region is just beginning the 2045 long range planning cycle. Transit operators in Broward are looking to the future with a renewed focus of service expansion both real and aspirational. South Florida Regional Transit Authority is preparing for direct service to Miami Central in downtown Miami in 2018. Broward County Transit is exploring a significant 30-year expansion plan they hope will garner broad support for new revenue streams. New socio-economic data will be forthcoming and a revision to the regional travel demand activity-based model is in the works to support the tri-county area in planning for the future.

In recognition of the changes that are coming, the work in preparing this evaluation of potential candidate locations for Mobility Hubs looked first and foremost to the need for future updates as plans evolve and infill development and economic trends play out across Broward County and throughout the region. This report documents final recommendations and builds on the work documented in the following technical memoranda:

- Assess Current Methodology, January 2018
- Market Assessment, July 2017
- Integrating Ride-Hailing with Mobility Hubs, January 2018
- Methodology Results and Recommendations, February 2018

The initial findings from the assessment and critique of the original Mobility Hubs prioritization methodology and results were presented with full expectations that during further development work and coordination with agency stakeholders that additional information may come to light that would affect results. The project team appreciates the healthy exchange of perspectives shared by Broward MPO, Broward County departments, South Florida Regional Transportation Authority, and the Florida Department of Transportation professionals and colleagues. While thinking has certainly evolved over the course of this study, the initial findings provided in the technical memorandum still resonate with one exception.

Beyond Mobility Hubs that are already funded and in development, the project team presents candidate locations with the caveat that more work will be required before a candidate moves into the Mobility Hub status for prioritization and implementation. To that end, the project team has developed an action plan for the Broward MPO and the 31 cities in Broward County and agency stakeholders who provide infrastructure and services countywide

Evolution in Thinking about Mobility Hubs

When Mobility Hubs were first envisioned during the 2035 Long Range Transportation Plan (*2035 Transportation Transformation*, adopted December 2009), the term and concept for Mobility Hubs was relatively new in the US. Aside from rail stations and transit centers, the idea of hubs for multimodal connections was not articulated in terms of a multimodal function. Most park & rides were geared primarily to auto connections and ramps to/from major highways and high occupancy vehicle lanes. Transfer centers were geared to bus connections. Since then, the concept of Complete Streets has taken off across the US and certainly here in Broward in significant ways. Mobility Hub projects and planning frameworks are being implemented in many US cities. The fact that all trips begin with a pedestrian has permeated transportation and transit planning and is transforming thinking about providing infrastructure that reinforces these human-powered connections. It's making a real difference in the choices when considering how people get around. But there is more work to do.

Critical Need

Traffic congestion in the US has reached an all-time high despite sizable and continuing multi-billion-dollar capital investment in upgrades to our roadway systems. Over 3.2 trillion vehicle miles will have traveled on US highways by the end of 2017.¹ In South Florida, from Jupiter to Homestead, traffic congestion takes 10th place for the worst in the world and 5th place for the worst in the US.² According to INRIX data collection, people in South Florida spend an average of 8.7 percent of their drivetime sitting in traffic. By comparison, Los Angeles has the worst in the world and the US with a 12.7 percent congestion rate. Demand continues to fill new capacity as fast as it's offered. At a time when there is greater need for travel options, people are using existing transit even less. The national transit ridership trend for the second quarter of 2017 indicates a three percent drop for all modes from prior year. This is an improvement over the downward trend of 8.4 percent from 2012 to 2016.³

Here in Broward, bus ridership has seen significant declines. Annual ridership has dropped from 41.2 million in 2013 to 31.5 million riders in 2017, a total of 9.3 million riders or 22 percent in just two years. Tri-Rail has lost a small share of ridership. Since 2014 when Tri-Rail carried the most daily riders of 4.4 million riders, ridership

¹September 2017 Traffic Volume Trends, Federal Highways Administration

² INRIX, Global Traffic Scorecard, February 20, 2017

³2016 National Transit Summary and Trends, October 2017, National Transit Database.

for the tri-county area has dropped slightly to 4.25 million total boardings in 2017, the third highest ridership in its history.

Transit service in Broward remains underfunded. Broward County Transit (BCT) reports in their most recent Transit Development Plan (TDP) it can no longer support current levels of bus service (\$7.7 million shortfall) and capital spending need shows a funding deficit of \$28.9 million in 2018 alone.⁴ For the ten-year period of 2018-2027, BCT's Status Quo scenario (defined as existing level of service), reports an operating deficit of \$362 million and a capital shortfall of \$. The operating deficit is higher than the last TDP projection by \$114 million. Operating deficit for 2019 is projected to be \$19.5 million. Tri-Rail's most recent TDP update reports a balanced budget for operating expenses through 2027 and has a funded capital program for the next five years after which new funding would be required.⁵

A major update will be prepared for the Transit Development Plans for BCT and Tri-Rail in 2018 for adoption late in the calendar year.

What's Already Funded?

Funding was identified for planning and implementation of 2035 LRTP top ranked Mobility Hubs. In some cases, multiple candidate locations are within the areas identified for funding. The Broward MPO is working closely with municipalities and agency stakeholders to advance those projects through planning and implementation. The current 2018-22 Transportation Improvement Program identifies funding for central downtown Fort Lauderdale, Hollywood/Pines, Sunrise and Plantation. All are included in the top 20 ranked mobility hubs under the revised evaluation criteria and represent a broad typology mix with urban/suburban commercial transects and all transit activity types with one exception – Pines Boulevard and Palm Avenue. The Broward MPO is cognizant of the low transit use, but had discussed high potential with the City of Pembroke Pines who is interested in looking at ways to improve travel options for their growing city. Table 9 shows funding, typology and the raw basis for the scores along with peak vehicle, number of routes, overall score and rank.

⁴ *BCT Connected, Annual Update 2018 – 2027, 11/16/17*

⁵ *SFRTA Forward Plan, 2018 – 2027 Annual Update*

TABLE 9: MOBILITY HUBS IN THE 2018-22 TIP

TIP/Mobility Hub ⁶	Year/ \$M	Typology (Land Use/Transit)	2014 Riders	Travel Market	Peak Vehicle	No. of Routes	Overall Score	Rank
4279872: Broward/Andrews	WIP/ \$3.5	Urban Core/Rail	18,071	231,236	37	15	92.5	1 st
<i>4334282: Plantation/Sunrise:</i>								
Sunrise BB&T		Suburban Commercial/ P&R	172	144,609	8	3	29.9	5 th
Broward/ Pine Island	2019/ \$3	Suburban Commercial/ Bus	3,184	65,745	14	6	23.5	9 th
Broward/ University		Suburban Commercial/ Streetside	1,367	83,957	12	4	22.4	11 th
4334292: Hollywood/SR7	2019/ \$1	Suburban Commercial/ Streetside	2,687	59,620	10	4	19.8	16 th
4334293: Palm/Pines	2019/ \$2.6	Suburban Commercial	174	50,270	2	1	9.9	141 st

The Broward/Andrews Mobility Hub is a true mobility hub at the soon-to-open Brightline Station and the Broward Central Terminal in downtown Fort Lauderdale, the urban core of Broward. The ridership results for this location far exceed any other location for ridership with over 18 thousand daily weekday riders served by 15 routes with 37 peak hour trips. Implementation for the Broward/Andrews Mobility Hub is being managed by the City of Fort Lauderdale, one of the partners in The Wave Modern Streetcar project.

The Cypress Creek Mobility Hub is located at a Tri-Rail Station and has benefit of a master plan developed in 2015. Envision Uptown, Inc. has developed plans for the Uptown Urban Village while the agencies, the City, County and Florida Department of Transportation are moving forward with needed zoning updates, utility upgrades and transportation improvements that will foster mixed use growth.

Master Plans are currently in discussion with the cities of Sunrise, Plantation and Pembroke Pines for planning work to be initiated in early 2018. Both areas have seen transit supportive development and more planned development is anticipated.

⁶ 2018-22 Transportation Improvement Plan (TIP), Revised 8/22/17

Where Do We Go from Here?

The results of the 2017 Revisit & Update provide a data-driven framework for an action plan. True, there are limitations in the data in that it is neither as recent nor as accurate as preferred; however, the information is valid data and represents activity that is based on historical riders, today's service and recent development activity. Data will never be perfect in any case. Inputs for the screening tool can readily be updated as new information becomes available. The project team tested early methods and results with stakeholders to gain feedback and adjust criteria and their application during development of the methodology to ensure the results were sound, repeatable and reliable. As such, the conclusions presented in this study provide the following key benefits to agency partners and municipalities within Broward:

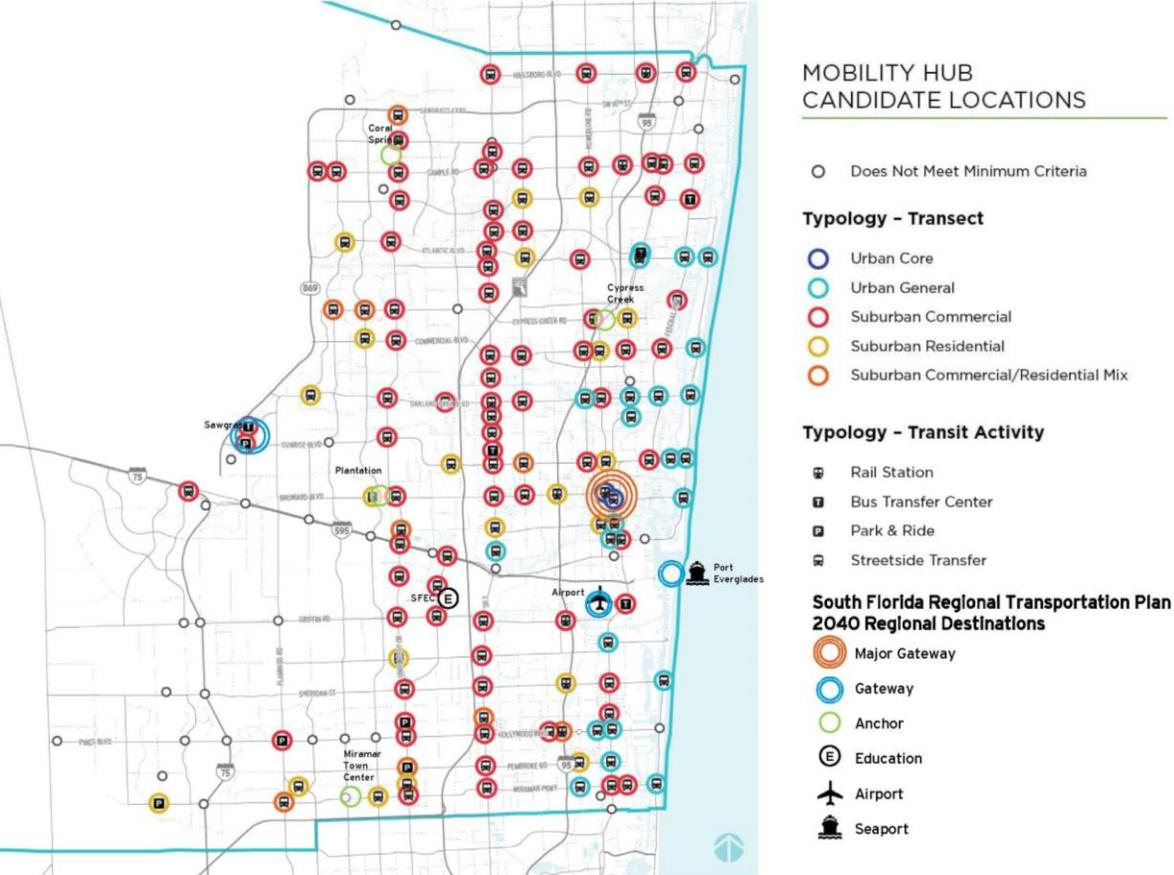
1. Provides an updatable Screening Tool for 2045 MTP data, future system plans, or additional evaluation criteria.
2. Provides a reasonable basis for prioritizing candidate locations for implementation as Mobility Hubs under the 2045 MTP project prioritization process.
3. Provides typologies that characterize land use and transit function. These multi-faceted typologies define opportunities for connectivity within the context of systemwide origins and destinations.
4. Serves as a basis for updating and supporting regional connectivity defined within the South Florida 2045 Regional Transportation Plan.
5. Organizes land use within the context of transit activity.
6. Identifies latent demand for emerging travel markets.

Mobility Hub candidate locations are mapped with typologies in Figure 6, which illustrates some organizing principles relative to the interplay between transit and land use. The 2040 Regional Transportation Plan (RTP) Hubs are shown on the same map for comparison. The current results indicate the need to adjust some of these locations for 2045 RTP.

There is one Urban Core transect identified in downtown Fort Lauderdale at two candidate locations within three blocks of each other along the future Wave modern streetcar route. All other Urban General typologies are east of I-95 from Atlantic Blvd in Pompano Beach to the southern border with Miami-Dade County, and one outlier at SR7 just north of I-595. Figure 6 highlights the effect of urban sprawl that

began in earnest by the 1960s in Broward County. Most of Broward’s land use is suburban, either commercial or residential in nature. Many municipalities (Sunrise, Hollywood, Plantation, Miramar, Pembroke Pines and Coral Springs). These and other communities are beginning to embrace population density. Future development patterns could shift with more emerging Urban General town centers as development begins to reshape the western communities with more mixed use areas and multimodal projects that support transit and walkable communities.

FIGURE 6: MOBILITY HUB TYPOLOGIES AND SOUTH FLORIDA REGIONAL DESTINATIONS



Recommended Action Plan

Recommendations are outlined in the form of an action plan that focuses on two levels, one for countywide or systemwide considerations and another with next steps for specific candidate locations or areas.

Countywide or Systemwide

A. 2045 LRTP Mobility Hub Screening Tool update:

- A.1 Incorporate results of the Mobility Hubs Revisit in the prioritization process for the Broward 2045 MTP to develop a cost-feasible plan that incorporates results of the Revisit results and possible update of the underlying data driving the results.
- A.2 Work closely with Southeast Florida RTP plans to incorporate Mobility Hubs in the systemwide context.

B. Transportation Vision Strategy support:

- B.1 Work closely with BCT to support and supplement transit system planning.
 - B.1.1 Review potential growth areas identified in the Market Assessment to ensure future transit vision includes all development trends such as those noted for Plantation and Cypress Creek among others.
 - B.1.2 Include travel market assessment in Mobility Hub planning stage.
- B.2 Work closely with SFRTA to support and supplement the Transit Oriented Development pilot studies for South Florida Rail Corridor stations and possible future Coastal Link stations.

C. Systemwide initiatives:

- C.1 Review Carshare and Bikeshare use and latent demand with private sector providers, Broward MPO planning partners.
- C.2 Review effect of Ride-Hailing on transit ridership and make recommendations as to how to integrate mutual goals and objectives into an approach that benefits from transit and first/last mile providers in a way that supports connectivity for both.

Candidate Locations/Areas

A. Master Plans

A.1 Continue implementation of funded Mobility Hubs to develop master plans and expedite implementation plans.

A.2 Typologies provide a combination of existing and future land use in relation to transit activity. This multi-layered approach provides the context for application of site-specific project elements at a particular location and planning area typology. The application of transects provides the development form and setting for integration of Mobility Hubs.

B. Complete Streets and other Local Initiatives Program (CSLIP)

B.1 Review approach for a potential funding call for applications for Mobility Hubs in addition or in combination to CSLIP.

C. Public Stakeholder Plans

C.1 Identify improvements or future plans for stakeholder-sponsored Mobility Hub priorities.

D. Municipality Engagement

D.1 Request input from municipalities for sponsor readiness and willingness to support specific hub locations or areas of hubs.

APPENDIX A

Screening Results

The results of the candidate location screening are shown on the summary Table A-1 in this appendix to include the following information.

- Hub Identification number – the original ID from the 2035 LRTP was maintained. The ID includes the hub type (Gateway, Anchor, or Community) along with a numerical reference number. New locations are coded as 2017 to time stamp the addition along with the planning rationale for the addition. A description of each type of addition is described below. The reason for including a location does not mean the location will meet minimum criteria, rather it is one factor in the evaluation. This broad approach was recommended to ensure a more extensive list to identify areas that may emerge as potential Mobility Hubs in future should circumstances emerge for the full range of criteria.
 - E# - Express Routes
 - B# - Breeze Routes
 - CC1 – only one for the Fort Lauderdale Convention Center
 - CL# - three candidate locations for Coastal Link proposed stations that were not identified previously
 - FTN# - High Frequency with 2-3 routes
 - M# - Market Assessment identified recent development activity
 - T# - Existing land use with high potential trip generation
- Candidate Location
- Revisit and 2035 LRTP rank and scores are shown for comparison
- Typologies – three-pronged characterization of Transect based on existing land use, Future Land Use as described in the 2017 BrowardNext update, and Transit Activity
- Market Readiness – Category for multiple criterium for existing trip generation (producers or origins, zero-car households, and attractors or destinations)
- Network Readiness – Category for multiple criterium for transit ridership for bus stops or rail stations within one-half mile of a candidate location, peak period transit frequency or number of vehicles for those same stops/stations.

- Minimum Criteria – Shows number of routes – two or more are required, type of fixed facility (rail, park & ride terminus, or off-ROW transfer facility, and determination as to whether the candidate location meets (Y) or does not meet (N) the minimum criteria.

Evaluation Criteria Development

The initial screening tool consisted of 12 individual scoring criteria, each of which were combined into one composite score. This evaluation criteria were tested and refined using the screening tool in consultation with stakeholders during the working session on April 5, 2017. Stakeholders expressed concern with so many separate scores, and favored a simpler method for evaluating candidate hubs which could be more easily explained and duplicated. As a result, the screening tool was reduced to three scoring criteria to measure Mobility Hub readiness (Market, Network, and Sponsor). After the second stakeholder working session on October 5, 2017, the Sponsor readiness criteria was removed because not enough quantifiable and comparable data was available to objectively measure a jurisdiction's capacity/support for implemented a Mobility Hub. It was agreed that case-by-case information would be reviewed in context with the data-driven evaluation scores and rankings to determine planning priorities.

Throughout refinement of the screening tool, other changes to the evaluation criteria were explored. Trips generated by existing land uses and trips expected to be generated by future development were originally separated as two different scores. While this gave more weight to areas experiencing high development activity, it disadvantaged areas that were already built-up. As a result, trips generated by both existing land uses and future development were combined into one Market readiness score. Stakeholders wanted to explore giving premium transit options (such as Tri-Rail and Breeze) a higher weight than traditional fixed-route bus service in the Network readiness score. Before settling on transit frequency as a measure of Network readiness, vehicle capacity was used. This resulted in Tri-Rail stations being given a significant advantage over other bus transfer facilities throughout the County (many of which had higher ridership than the Tri-Rail stations). Because it was reasoned that frequency was a superior indicator over the number of seats on the vehicle, the most recent stop-level ridership was used to measure Network readiness.

The screening tool was developed with the expectation that future updates would be required to maintain relevance of the ranking and candidate locations.

APPENDIX B

Screening Tool

A Screening Tool was created to standardize and compile data for relative comparison of individual candidate locations one to the other in a spreadsheet format. A description of the criteria developed and guide to the information contained in the Land Use evaluation is described in this Appendix along with the list of land use and trip generation associated with the type of land use.

Market Readiness

Based on existing land use and the Market Assessment results, two measures of potential trip generation were developed based on existing land use and planned development of development under construction. An additional weighting factor of two was added for each land use that the US Census reported for zero-car households to capture the need for multimodal options and serve as a surrogate for environmental justice considerations. These measures capture the opportunity for multimodal trips today and for high-value growth areas that have developed under current and anticipated market conditions and balanced by need evidenced with zero-car households. Both are needed to prioritize high-return candidate locations.

Existing Trip Generation

The number of daily trips generated within one-half mile of a candidate hub location was estimated through a land use analysis. This analysis was based on land use data from the Broward County Assessor's Office⁷. Trip generation rates from the Institute of Transportation Engineers (ITE)⁸ were applied to the quantity of land use to estimate the daily number of trips generated. Table B-1, ITE Trip Generation Assignments shows how Broward Land Use Code was tied to ITE Codes and how they are treated in these assignments.

Daily trips generated were estimated through the following process:

1. Each land use category within Broward County was assigned a corresponding ITE land use code to estimate the number of daily trips created by each use. Some land use categories were excluded from the analysis, such as vacant properties, right-of-way, agricultural lands, and

⁷ Received 2/2/2017

⁸ Institute of Transportation Engineers. Trip Generation Manual, 9th Edition, 2012.

special uses which do not generate consistent daily trips (i.e. 31 "Drive-in Theaters, Open Stadiums")

2. In some cases, the manual provides rates by multiple units of measurements (such as parking spaces, employees, or gross floor area). Only trip rates with units of measure which could be derived from the property appraiser information provided were used. These units of measure include gross floor area (TOTLVGAREA), gross leasable area (80% of TOTLVGAREA), acreage (ACRES), and units/rooms (NOREULTS). For some land uses, additional Florida-specific trip generation rates were provided⁹. These Florida-specific rates were used where possible, and ITE rates were used for all other land uses.
3. Sum quantities of land use (square footage and number of units) by land use category for all parcels which are all or partially within a half-mile of a candidate hub location. Because some candidate locations are within a half-mile of one another, parcels may be assigned to more than one candidate location.
4. The Broward County Assessor's Office associates a single building located on multiple parcels with each parcel. This creates multiple records of the same building or improvement. These duplicate records are filtered out to avoid double counting.
5. Daily trips were calculated at the parcel level by multiplying the appropriate land use units by the ITE trip generation rate.
6. Daily trips were summed for each candidate location. Origin trips and destination trips were calculated separately. The daily trips of all parcels partially or completely within a half-mile of each mobility hub were summed. In cases where a parcel fell within a half-mile of multiple mobility hubs, daily trips associated with that parcel were fully assigned to each mobility hub.
7. Residential households that were identified in the US Census as zero-car households were given an added weight of two times the number of units to indicate need and incorporate environmental justice consideration.

⁹ Florida Studies Trip Characteristics Database. Tindale-Oliver & Associates, Inc. City of Sarasota Mobility Plan - Multi-Modal Fee Calculation Technical Report (Appendix A). November 2012. Accessed at http://www.sarasotagov.org/PDF/LGMS/Multi-ModalFeeCalculationTechnicalReport_112112.pdf.

Trip Generation Adjustments

Certain land use categories from the Broward County Assessor are ambiguous and did not fully describe the activities occurring on a parcel. For example, casinos are assigned a land use of “OTHER FEDERAL”. These broad land use categories required a closer examination to ensure appropriate trip generation estimates. Land use categories flagged for further review are shown in Table B-2.

TABLE B-2: LAND USES FLAGGED FOR FURTHER EXAMINATION

LUCODE	Land Use Category
20	AIRPORTS, MARINAS, BUS TERMINALS, AND PIERS
98	CENTRALLY ASSESSED
90	GOV. OWNED LEASED BY NON-GOV. LESSEE
86	OTHER COUNTIES
88	OTHER FEDERAL
87	OTHER STATE

Due to the high number of total parcels in Broward County, only parcels within these flagged land uses which comprised more than 10 percent of a candidate locations total estimated trips were examined. These identified parcels (Table B-3) were then individually examined and assigned appropriate trip generation rates.

TABLE B-3: PARCELS IDENTIFIED FOR TRIP GENERATION ADJUSTMENTS

Name	Address	City
Broward Sheriff's Office FLL District Office	1410 Lee Wagener Blvd	Unincorporated
Fort Lauderdale-Hollywood International Airport	100 Terminal Dr	Unincorporated
Port Everglades	1950 Eisenhower Blvd	Fort Lauderdale
BB&T Center	1 Panther Pkwy	Sunrise
Hard Rock Hotel & Casino	1 Seminole Way	Unincorporated
Ron Cochran Public Safety Complex	2601 W Broward Blvd	Unincorporated
North Perry Airport	7600 Hollywood Blvd	Pembroke Pines
US Post Office Processing Facility	16000 Pines Blvd	Pembroke Pines
Broward County Water & Wastewater Services	2555 W Copans Rd	Pompano Beach
SW Regional Library	16835 Sheridan St	Pembroke Pines
Miramar Town Offices and Cultural Center	2300 Civic Center Pl	Miramar
FDOT Office Building & Turnpike Truck Stop	Mm 65 Florida Turnpike	Unincorporated
Broward County Judicial Complex	201 SE 6 St	Fort Lauderdale
Lockhart Stadium	1350 NW 55 St	Fort Lauderdale
North Regional Courthouse	1600 W Hillsboro Blvd	Deerfield Beach
County Judicial Complex	201 SE 6 St	Fort Lauderdale
Hollywood City Hall, City Offices, and Library	2600 Hollywood Blvd	Hollywood
West Regional Courthouse	100 N Pine Island Rd	Plantation

Potential Trip Generation

The potential number of daily trips generated by planned or ongoing development projects within one-half mile of a candidate hub location were estimated through the same land use analysis as Existing Trip Generation. Planned and ongoing development projects were identified through a market assessment of Broward County¹⁰. Trip generation rates from the Institute of Transportation Engineers (ITE)¹¹ were applied to the quantity of land use to estimate the potential daily number of trips generated by future development projects. Table B-4 lists planned development identified in the Market Assessment completed for this study based on information gathered as of July 2017.

Potential daily trips were estimated through the following process:

1. Assigned planned development projects and projects under construction within one-half mile of candidate locations.
2. Assigned assessor land use categories to Institute of ITE land use categories.
3. Summed quantities of land use (square footage and number of units) by land use category for all parcels within (all or partially) a half-mile of a candidate hub location. Because some candidate locations are within a half-mile of one another, parcels may be assigned to more than one candidate location.
4. Apply ITE trip generation rates to land use quantities to estimate the number of potential daily trips generated at a candidate location.
5. Apply development probability assumption to each development according to their implementation status as shown in Table B-5.

TABLE B-5: DEVELOPMENT PROBABILITY ASSUMPTIONS

Status	Probability	Opening
Completed	1.00	2017
Construction	0.90	2018
Permitted	0.80	2019
Approved	0.70	2020
Planning Review	0.60	2021
Proposed	0.50	2022

¹⁰ Score1b: Potential Trip Generation may not account for all planned or ongoing development projects in Broward County. Score1b only accounts for planned development provided by local municipalities during the market analysis. There may be other planned developments in Broward County for which information has not been provided.

¹¹ Institute of Transportation Engineers. Trip Generation Manual, 9th Edition, 2012.

Network Readiness

Transit Network

The transit network score was calculated by summing the average stop-level daily ridership of all transit routes that stop within a half-mile of a candidate location. Limited-stop services, such as Breeze, 95-Express, and Tri-Rail were only added to a location's score if an existing stop/station is present at that candidate location. All BCT local routes were included for any stops within a half-mile of the candidate location.

BCT ridership was provided by BCT's 2014 Origins & Destinations Survey results provided by the Broward MPO. Tri-Rail ridership was taken from the 2013 Origins & Destination Survey augmented by specific information provided by SFRTA staff and the 2015 National Transit Database (NTD).

Transit Availability

The Transit availability score was calculated by summing the number of vehicles per hour serving a candidate location in the peak period. Peak Frequency was determined through GIS information provided by Broward MPO and current schedule tables from SFRTA. For each route serving a candidate location, the number of vehicles per hour serving that location was calculated as follows:

$$\text{Buses per hour} = \frac{60 \text{ minutes}}{\text{Peak frequency (minutes per bus)}}$$