



**SOUTH FLORIDA EAST COAST  
CORRIDOR TRANSIT ANALYSIS STUDY**

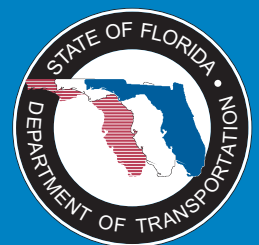
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***Phase 2 Navigable Waterway  
Analysis Technical Memorandum***

***Prepared by:***



***Gannett Fleming***



***November 2009***

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**To:** Scott Seeburger

**From:** Jim Schwarzwald

**Date:** May 7, 2009

**Subject:** South Florida East Coast Corridor Transit Analysis (SFECCTA) Study - Phase 2 Navigable Waterway Analysis Technical Memorandum

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This memorandum summarizes preliminary navigational data collected on bridge operations along the New River for the Andrews Avenue and Florida East Coast (FEC) Railway Bridges in Broward County as well as information collected during field interviews. Ultimately, this and other information collected in subsequent phases of the study will be used to establish the reasonable needs of navigation in this section of the New River. This work has been completed per scope of work item number 3.1.6.4.1, Navigable Waterway Analysis/Vessel Survey, Regional Analysis.

**Introduction:**

The New River is a major waterway that winds through Ft. Lauderdale's central business district (CBD) in Broward County. West of the CBD, the river splits into the North and South Forks. The North Fork is a shallow meandering tributary of the New River and is bordered primarily by residences with private docks. The South Fork of the River is deeper and can accommodate larger vessels. In addition to residences, the South Fork is also bordered by commercial marine industries (see attached map).

Several bridges, including a FEC Railway Bridge, cross the New River. These bridges are movable (e.g., bascule) and either open upon request or on a specified schedule. The exception to this type of operation is the FEC Railway Bridge that remains in the open position offering virtually unlimited clearance until a freight train approaches. In the down position, the FEC Railway Bridge has a vertical clearance of 4 feet (ft). The United States Coast Guard (USCG) has established a guide vertical clearance of 21 ft for movable and 55 ft for fixed bridges over the New River. West of the FEC Railway Bridge, navigational vertical clearance is limited by two features along the South Fork of the New River, overhead power cables with a height of 80 ft and Interstate 95 (I-95) with a vertical clearance of 55 ft (see attached map). Vertical clearances refer to the distance from Mean High Water to the lowest member of a bridge's underside.

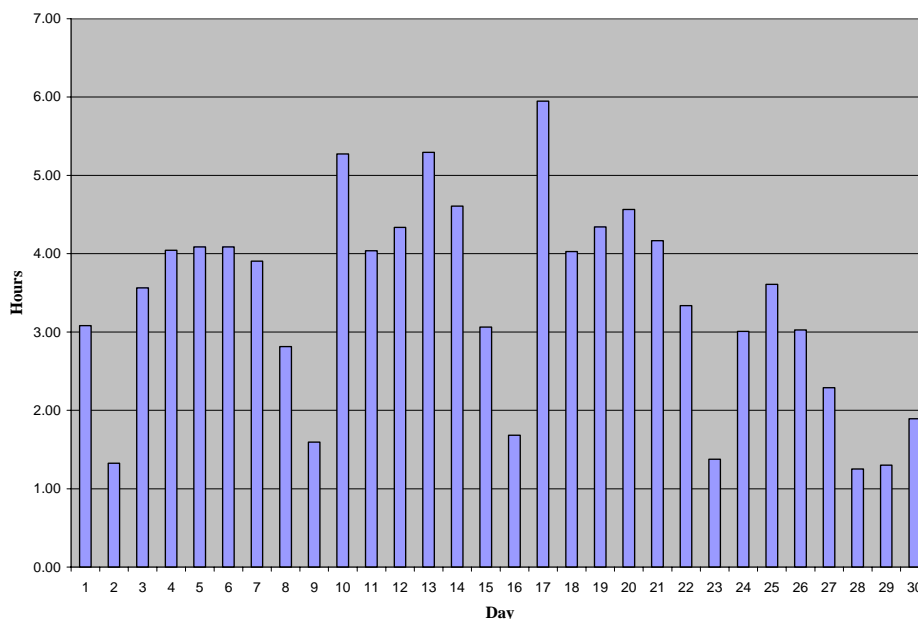
**Methodology:**

**Data Collection**

**FEC Railway Bridge Closure Log over the New River, Ft. Lauderdale:**

An FEC Railway Bridge log was obtained for November 2008 to serve as a sample of freight train activity for the New River crossing. The log served to calculate the average number of freight trains crossing the New River daily and the duration of those bridge closures. As noted above, the FEC Railway Bridge generally remains in the open or up position and closes when a train approaches. The duration of bridge closures was calculated by employing a macro<sup>1</sup> that was written specifically to calculate time differences for this study from an Excel spreadsheet. Calculations, based on the November 2008 bridge log, indicated an average of 11 freight trains crossed the New River daily, which accounts for the bridge being closed an average of 3.4 hours per day. According to the bar graph below, the FEC Railway Bridge may close from about 1.5 hours to almost 6 hours per day depending on the number of freight trains and their length.

<i>Sum – Weekday Closures (hrs)</i>	<i>Average – Weekday Closures (hrs)</i>	<i>Sum – Weekend Closures (hrs)</i>	<i>Average – Weekend Closures (hrs)</i>	<i>Total Time in the Closed Position (hrs)</i>	<i>Daily Average for Month (Nov 2008) (hrs)</i>
79.5	4.0	21.5	2.0	101	3.4



**Bar Graph of FEC Railway Bridge Closures over the New River**

<sup>1</sup> “A macro is a series of commands that are stored in Microsoft Visual Basic software to be used whenever needed to perform the task.”  
<http://office.microsoft.com/en-us/excel/HP052012011033.aspx>

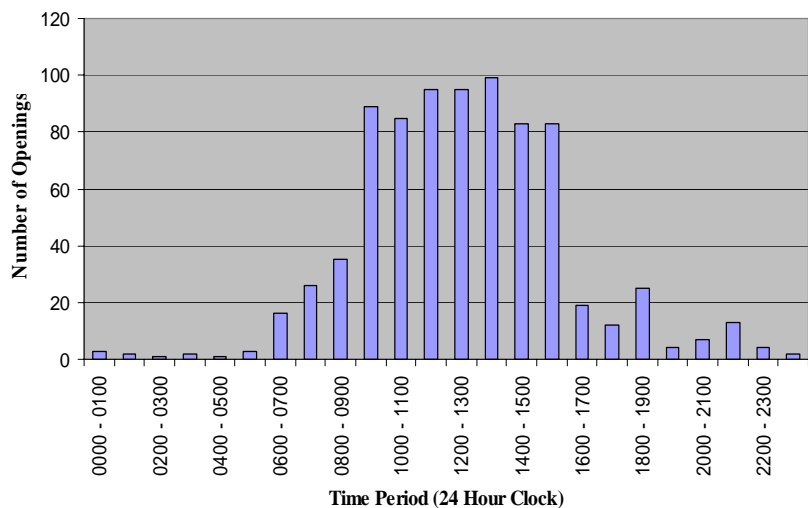
A regression analysis was performed in an effort to predict how many hours the bridge would be in the closed position for a specified period since this is when navigational traffic would be affected by the bridge. However, the correlation between the two variables ( $R^2$ ), time of closures and day of month, was too low to be of any statistical value given the limited data (i.e., 30 days). Predicting trends of how FEC Railway Bridge closures may affect navigational traffic would require a detailed study beyond the scope of this technical memorandum. Variables or factors such as the cost of fuel, availability or demand for building materials and general goods (e.g., “supply and demand”) would have an influence on freight movement and would necessitate consideration in a trend analysis.

### Andrews Avenue Bridge Log:

In order to gain a perspective on boating traffic requiring a bridge opening near the FEC Railway Bridge, the Andrews Avenue Bridge log for the month of November 2007 was obtained for evaluation. The Andrews Avenue Bascule Bridge is located approximately 240 yards east of the

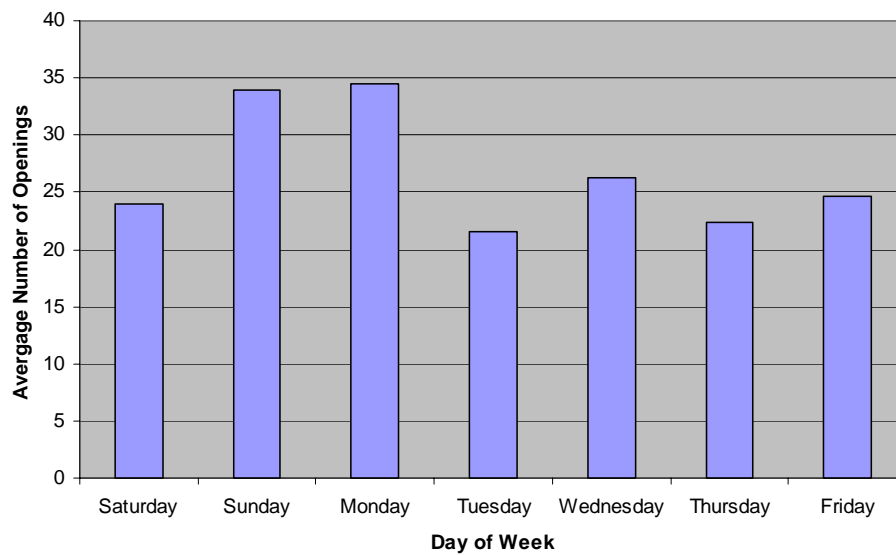
FEC Railway Bridge and has a vertical clearance of 21 ft. Twenty-one ft is the minimum guide vertical clearance established by the USCG for movable bridges over the New River and therefore establishes the minimum vertical clearance required for a movable transit bridge over the

New River. From this bridge log, the number of openings in



**Bar Graph of Total Bridge Openings for the Andrews Avenue Bascule Bridge per One-Hour Periods for Nov. 2007**

one-hour periods throughout the day as well as the average number of openings per day of the week was calculated for the month of November 2007. The bar graphs reveal the majority of navigational activity occurred from approximately 10 a.m. to 4 p.m. with the greatest number of bridge openings (34 openings) taking place on Sundays and Mondays. The hourly average was approximately one opening per hour.

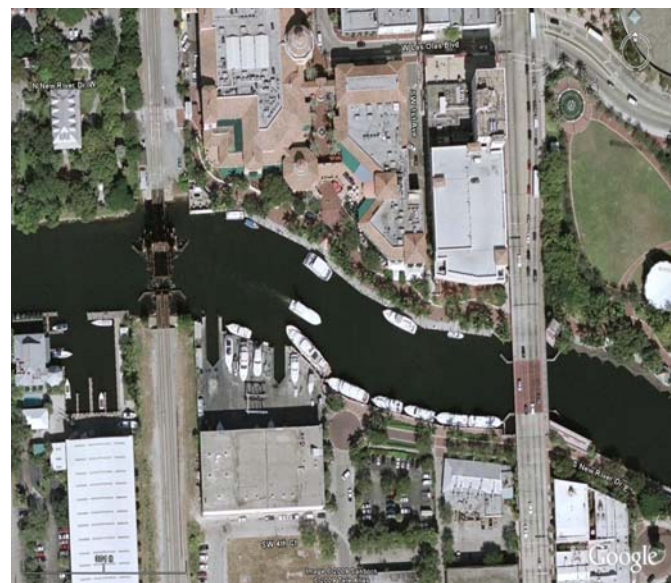


**Plot of Average Number of Bridge Openings for the Andrews Avenue Bascule Bridge**

Based on a phone interview conducted on March 10, 2009 with Mr. Sam Sohad of the Broward County Streets and Highway Division, the Andrews Avenue Bridge opens an average of 30 times per day for vessels having a vertical clearance greater than 21 ft. This average number of openings is based on 800 to 1000 bridge openings per month throughout a year.

A field visit to the New River revealed approximately 500 ft of privately owned mooring or dock space on both sides of the New River between the Andrews and FEC Railway Bridges.

Given the number of vessels requiring an opening at the Andrews Avenue Bridge and the lack of large marinas before reaching the FEC Railway Bridge, one could assume 80% - 90% of those vessels are also traveling past the FEC Railway Bridge either upstream or downstream.



**FEC Railway and Andrews Avenue Bridges**

**1999 Vessel Survey:**

A vessel survey conducted on January 14 and 17, 1999 at the CSX Railway crossing of the South Fork of the New River counted 170 boats with the tallest vessel height measured at 48 ft. The CSX Railway is an at-grade bridge approximately 2.7 miles west of the FEC Railway Bridge and remains in the open or up position similar to the FEC Railway Bridge. The CSX Railway Bridge is paralleled by a high-level Tri-Rail bridge at this point and both of these bridges are west of I-95, which restricts vertical clearance in the western reaches of the South Fork of the New River to 55 ft.

**Field Measurements:**

A field visit was conducted on March 13, 2009 from approximately 3:00 p.m. to 5:00 p.m. to approximate vertical clearance needs west of the FEC Railway Bridge. Vertical heights of what appeared to be the tallest sailing vessels, moored along the New River between Andrews Avenue and FEC Railway Bridges, were measured from the waterline to the top of mast using a digital, laser-equipped range finder. The instrument utilizes a built-in triangulation feature to calculate the heights or vertical clearance. These measurements are approximate values since readings had to be taken below the very top of the masts so that the instrument could obtain a reading. This site was selected for its accessibility to the New River. Additional measurements were taken at the River Bend Marine Center located on the South Fork of New River west of the FEC Railway and just east of I-95. Measurements taken from both locations are listed below (see inserts on attached map).

<b>Measured Vertical Heights (ft)</b>				<b>Average Height (ft)</b>
52	47	67	52	54.5

**Interviews:**

Two interviews were conducted during March 2009 to collect information on the range of vertical heights of vessels coming to the River Bend Marine Center. The first interview was conducted on March 13, 2009 with Mr. Ed Brown of the River Bend Marine Center. According to Mr. Brown, the average vertical height of sailing vessels coming for service was approximately 60 ft. The average field measurement calculated for this area was relatively close to Mr. Brown's observations given the inability to take readings at the very tops of masts.

A second interview was conducted on March 16, 2009 by phone with Mr. Brad Storm of Storm Rigging who operates out of the River Bend Marine Center. Mr. Storm indicated that he services about two sailing vessels a month that require a vertical clearance between 80 ft and 85 ft and “on occasion”, he receives vessels that reach 90 ft to 95 ft in height.

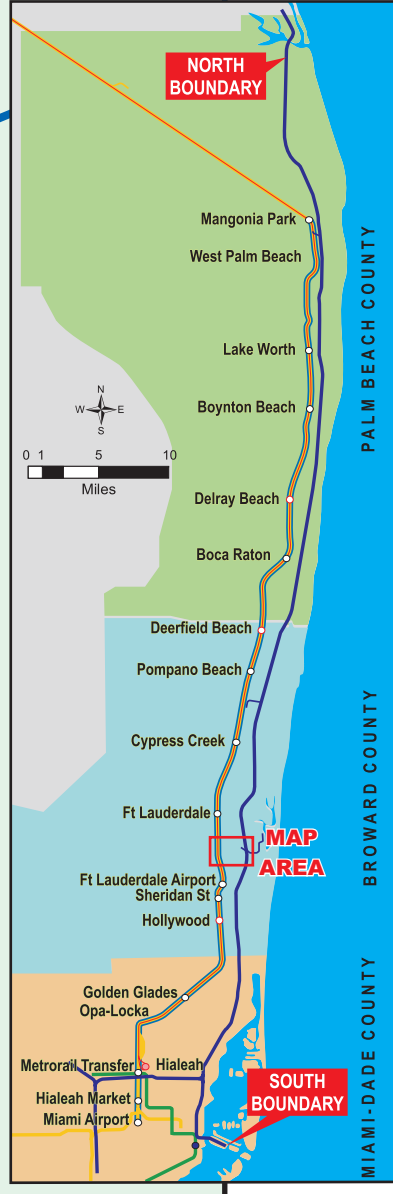
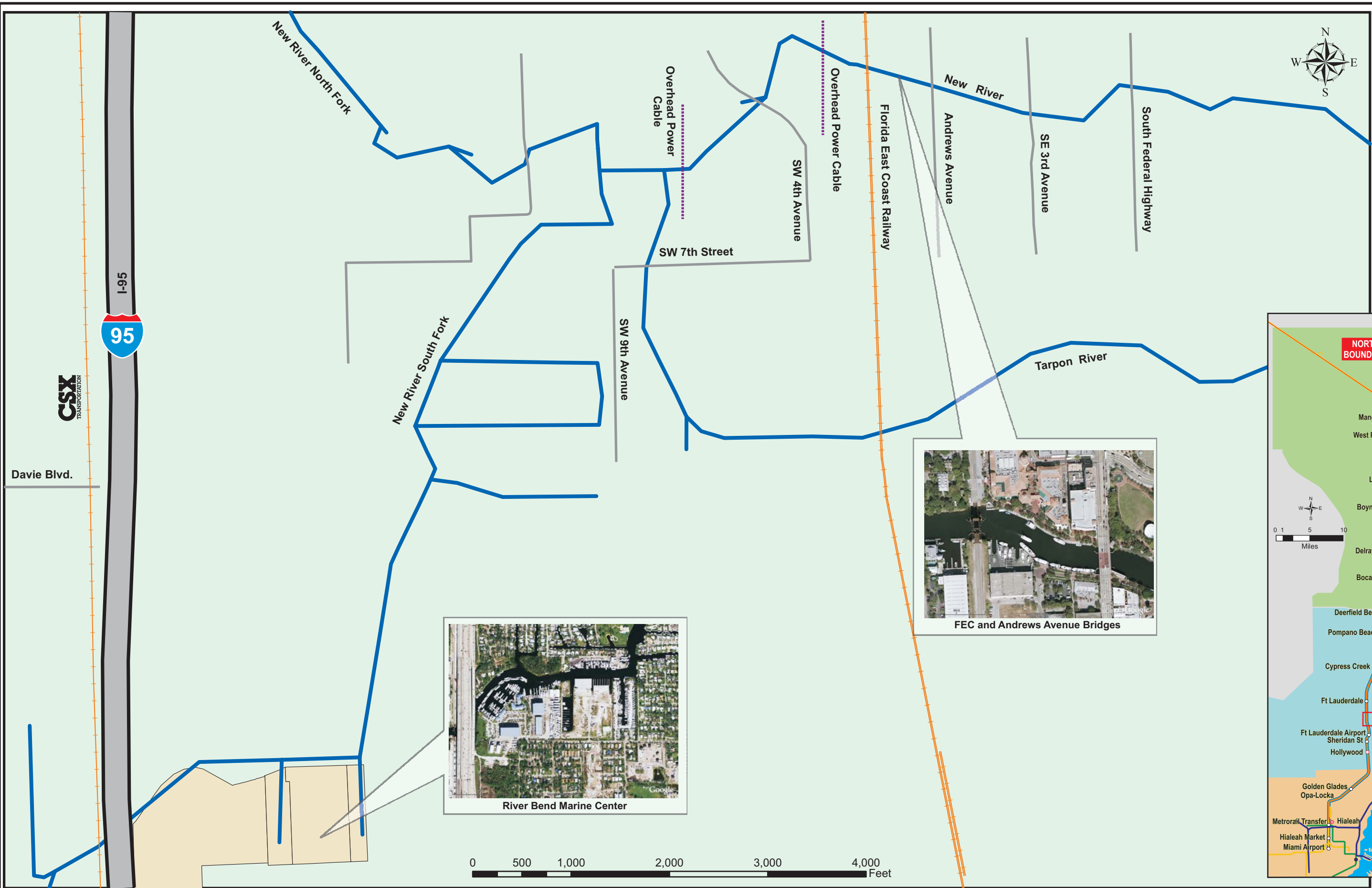
The taller vessels time their trip up the New River to arrive at the overhead power cables at low tide to increase their clearance under the wires. Although the charted clearance for the power cables is listed as 80 ft, Mr. Storm indicated the cables are actually at 105 ft. According to Mr. Storm, 63.5 ft is the most common vertical height of sailing vessels coming for service. He explained that the 63.5 ft height is an intentional design criterion for many sailboat manufactures that is driven by the 65 ft vertical clearance of fixed bridges along the Atlantic Intracoastal Waterway.

**Conclusion:**

Several navigable waterways have been identified along the project corridor including the River, Hillsboro Canal, Cypress Creek, New River, and Dania Cut-off Canal. Of these navigable waterways, the New River is the only one that is crossed by a movable FEC Railway Bridge. Currently the FEC Railway Bridge remains in the open position until a train approaches. However, this approach would not likely be an option for passenger transit given the greater number and frequency of passenger trains crossing the New River compared to freight trains.

The USCG has provided a guide vertical clearance of 55 ft for a fixed bridge over the New River but the preliminary survey conducted for this technical memorandum indicates that sailing vessels with a vertical clearance of 63.5 ft, and occasionally taller, routinely travel past the FEC Railway Bridge to reach the River Bend Marine Center for service. An alternative to a high-level fixed bridge could include a bascule bridge designed with the necessary vertical clearance to accommodate a satisfactory percentage of the boating traffic, and open for taller vessels on an established schedule, while meeting the operational needs of future passenger and freight trains along this section of the New River. Bridge operations could be managed to accommodate passenger transit and vehicular traffic by scheduling times when the bridge would not open during morning and evening commuter “rush hours” for boating traffic.

Additional information will be collected in Phase 3 of the SFECCTA study to build upon this preliminary assessment. It is anticipated that a detailed vessel survey will be conducted in Phase 3 of the study to represent navigational activity at the FEC Railway Bridge crossing. In addition, detailed freight train information will be obtained and a more defined service plan for passenger transit will be developed. Combined, this information will allow for the development of a crossing solution that meets the reasonable needs of navigational traffic, freight trains, and passenger transit for the New River crossing.



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