Eller Drive & McIntosh Road Intersection Improvement Feasibility Study

Final Report

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Port Everglades

and

Florida Department of Transportation District IV

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TRANSYSTEMS

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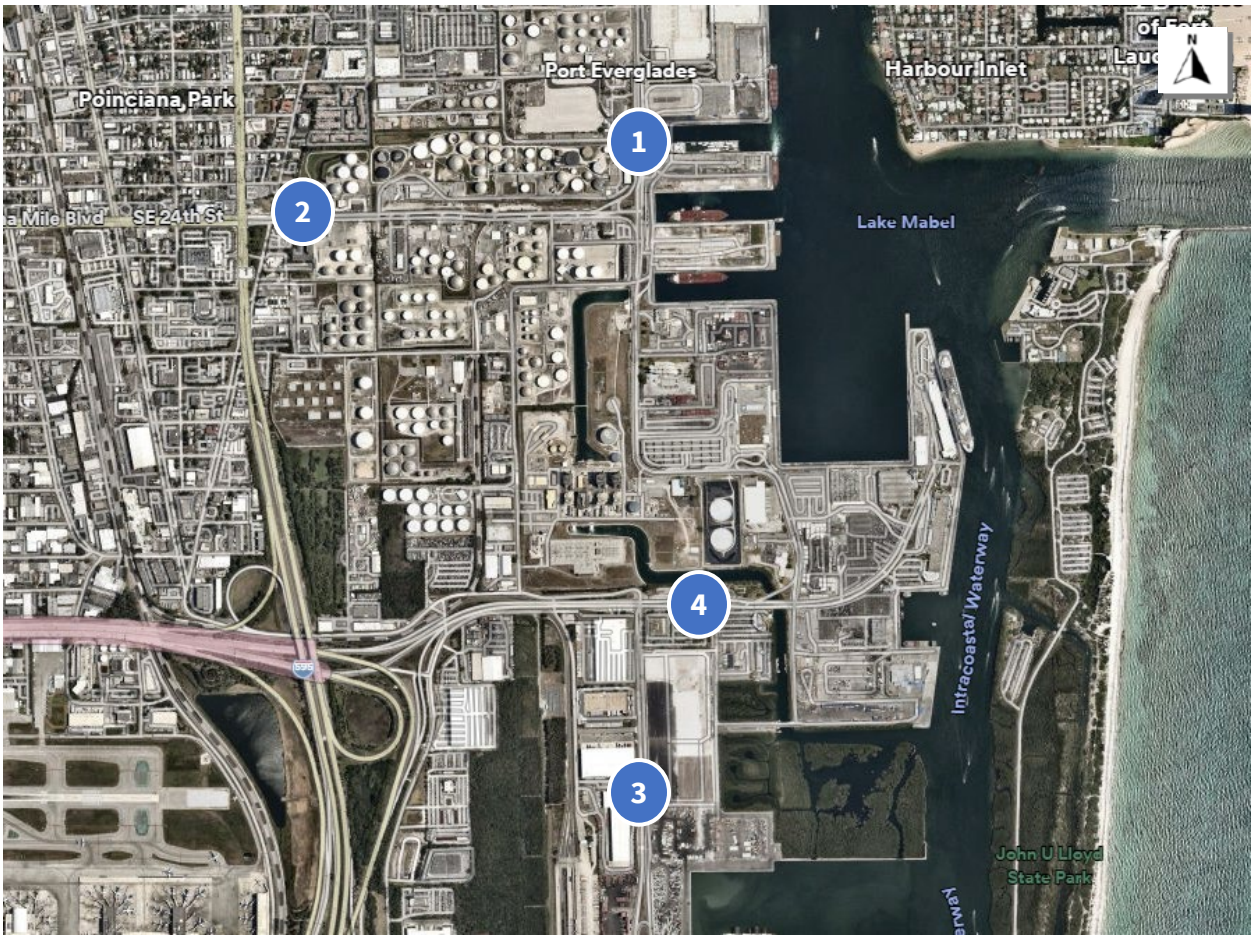
1. Introduction

Port Everglades (PEV), located in Broward County, Florida, is one of the busiest cruise ports in the world. It is also a leading container port in Florida and among the most active cargo ports in the United States. Port Everglades is South Florida's main seaport for receiving energy products including gasoline and jet fuel. Port Everglades is a highly desirable business center for world trade, driven by its Foreign-Trade Zone No. 25, office space, and nearby logistical warehouses.

Port Everglades is accessible by various modes of transportation including car, truck, taxi, ridesharing, bus, train, and ship. The seaport has four main security gates located at 1) Eisenhower Boulevard, 2) Spangler Boulevard, 3) McIntosh Road, and 4) Eller Drive, as shown in Figure 1.

Figure 1. Port Everglades Security Gates



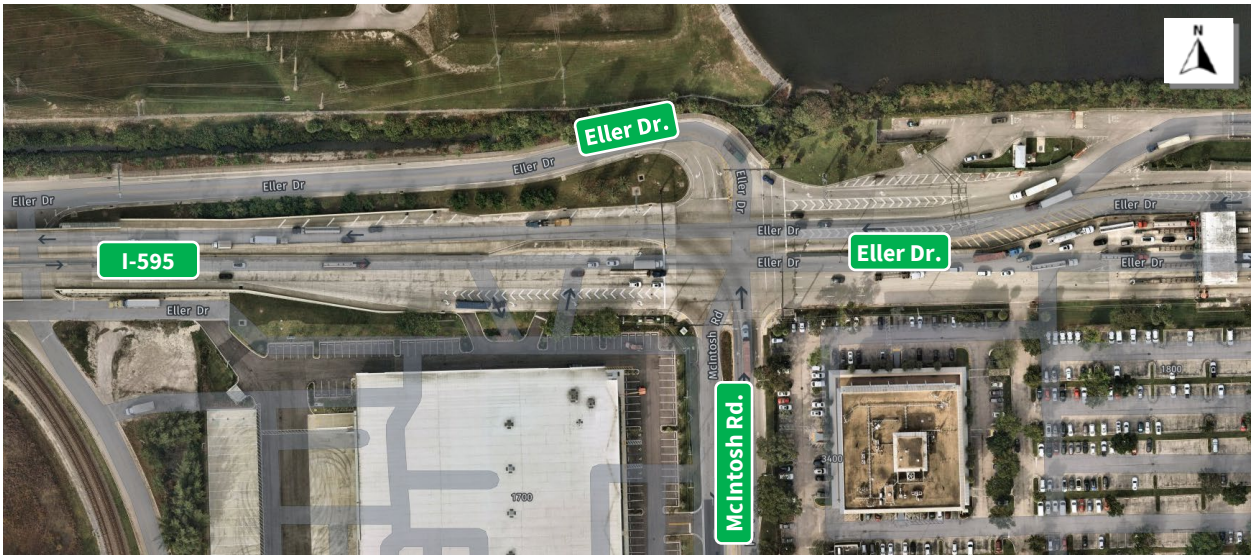
The intersection of Eller Drive and McIntosh Road provides direct connection to two of the four security gates at PEV. The Eller Drive and McIntosh Road Security Gates are used by both trucks traveling to Southport container facilities, and passenger vehicles to Midport cruise terminals. During the peak cruise season, the intersection experiences significant congestion and delays, especially in the security gate areas where both cruise passenger and cargo truck traffic converge during cruise boarding times.

PEV and the Florida Department of Transportation (FDOT) District Four (D4) have partnered to conduct this feasibility study for improving the study intersection of Eller Drive and McIntosh Road within PEV's jurisdictional area. This study aims to identify five (5) alternatives and validate a preferred option to

improve safety, mobility, and overall traffic operation at the intersection of Eller Drive at McIntosh Road. Alternatives include no-build, at-grade, and grade separation alternatives including the proposed I-595 Flyover Project as outlined in PEV's 5-Year Capital Improvement Plan (CIP).

Figure 2 shows the study area which encompasses I-595 terminus to the west, a railroad crossing below the Eller Drive Overpass and entering the Intermodal Container Transfer Facility (ICTF), and the PEV security gate located on Eller Drive to the east of McIntosh Road.

Figure 2. Project Study Area (Intersection of Eller Drive and McIntosh Road)



Study tasks include 1) field review and observations, 2) existing and future conditions, 3) crash data and analysis, 4) travel demand forecasting, 5) traffic operational analysis, 6) existing conditions report, 7) conceptual design and alternatives, 8) construction cost estimate, 9) benefit-cost analysis (BCA), 10) alternatives evaluation, and 11) final recommendations.

PEV is currently in the process of updating its 20-year Master/Vision Plan. This study will provide input to the 2024 Master/Vision Plan Update and support decision making for crucial infrastructure projects.

2. Existing Conditions

In early 2024, an Existing Conditions Report was developed for this study. This report, and its respective appendices, is included in **Appendix 1**. Findings from the Existing Conditions Report are provided below.

Field Review and Observations: The consultant team has conducted multiple field reviews and observations. Key observations include heavy truck traffic at the intersection, intersection blockages caused by traffic queues from the Eller Drive security gate, long intersection passage time for trucks, and eastbound right-turn truck traffic spilled back onto I-595, likely caused by Southport cargo terminal and/or McIntosh Road security gate operations rather than deficiencies of intersection capacity or operation.

Existing and Future Conditions: The study team reviewed and documented findings from various related projects such as the 2019 Port Everglades Traffic Analysis (PETA) study, Airport-Seaport-Convention Center Connector Project, Griffin Road Extension/ NE 7th Avenue Improvements/McIntosh Road Realignment Project, Port Everglades Bypass Road Improvements Project, Southbound US 1 to Westbound I-595 On-Ramp Project, etc.

Crash Data and Analysis: Five-year crash data from the Signal Four Analytics have been obtained and analyzed. There were 74 crashes that occurred in the study area. The study intersection and the Eller Drive segment between the study intersection and the Eller Drive security gate are identified as crash hotspots potentially due to delays and lane changes at the security gate.

Existing Conditions Traffic Operations Analysis: Intersection turning movement volumes and truck percentages were collected during weekday and weekend peak periods in late November and early December. VISSIM microsimulation models have been developed and calibrated to evaluate traffic operations at the study intersection. Operations results show that the study intersection is currently operating at acceptable Level of Service (LOS) C or D during weekday and weekend peak periods. The most extended delays occur during weekday midday peak period between 11AM and 1PM with three intersection approaches (eastbound from I-595, southbound from Eller Drive, and northbound from McIntosh Road) operating at LOS E or F.

Intersection Traffic Demand Forecasting: Future truck and passenger traffic forecasts at the intersection were developed for opening year 2028 and design year 2045. Two distinct methods were applied: 1) FDOT District 4's TM Tool, and 2) growth factors derived from 2018 market analysis as part of the 2018 PEV Master/Vision Plan Update. Trucks and passenger cars turning movement volumes have been developed separately. Difference in methodology has led to significant differences in future year volume projection results between the two analyses. The application of the 2018 Market Analysis produced higher estimated future intersection volumes compared to the TM Tool analysis. For alternative analysis, volume results from the market analysis approach were applied.

3. Intersection Traffic Demand Forecasting Update

Additional Input for Traffic Demand Forecasting

Upon completing the Existing Conditions Report, the study team incorporated additional input from various ongoing and planned projects to further refine traffic volume forecasts at the study intersection. Key projects are outlined below.

Market analysis of the 2024 Port Everglades Master/Vision Plan Update

The market analysis for the 2024 Port Everglades Master/Vision Plan Update was completed in April 2024. Cruise and cargo growth from the updated market assessment were applied to update cruise passenger traffic and truck traffic growth at the study intersection.

Figure 3. 2024 Port Everglades Master/Vision Plan Update

Source: Port Everglades

Southport Secondary Access

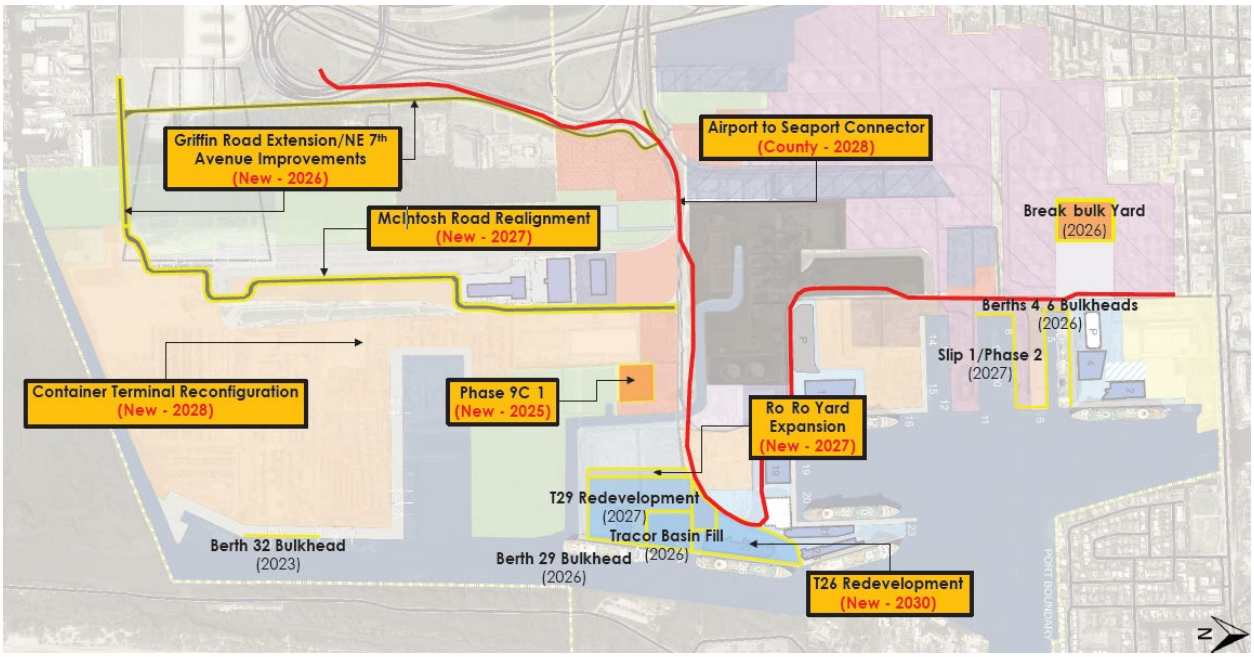
The Griffin Road Extension and NE 7th Avenue Improvement Projects aim to expand the existing two-lane NE 7th Avenue, running along the eastern perimeter of Fort Lauderdale-Hollywood International Airport, to four lanes (two lanes in each direction) and extend Griffin Road eastward from the improved NE 7th Avenue to connect with McIntosh Road. These expansions will establish a second access point to Southport, alleviating some traffic pressure at the study intersection.

The second Southport access is projected to accommodate approximately 25%[1] of truck traffic to and from the Southport area. According to PEV, the project is expected to be completed between 2028 and

[1] Source: 2018 Port Everglades Master/Vision Plan Update

2045. As a result, the intersection traffic forecast has been updated to reflect the impact of the Secondary Access Project on 2045 future conditions.

Figure 4. Griffin Road Extension/NE 7th Avenue Improvements/McIntosh Road Realignment Project



Source: Port Everglades

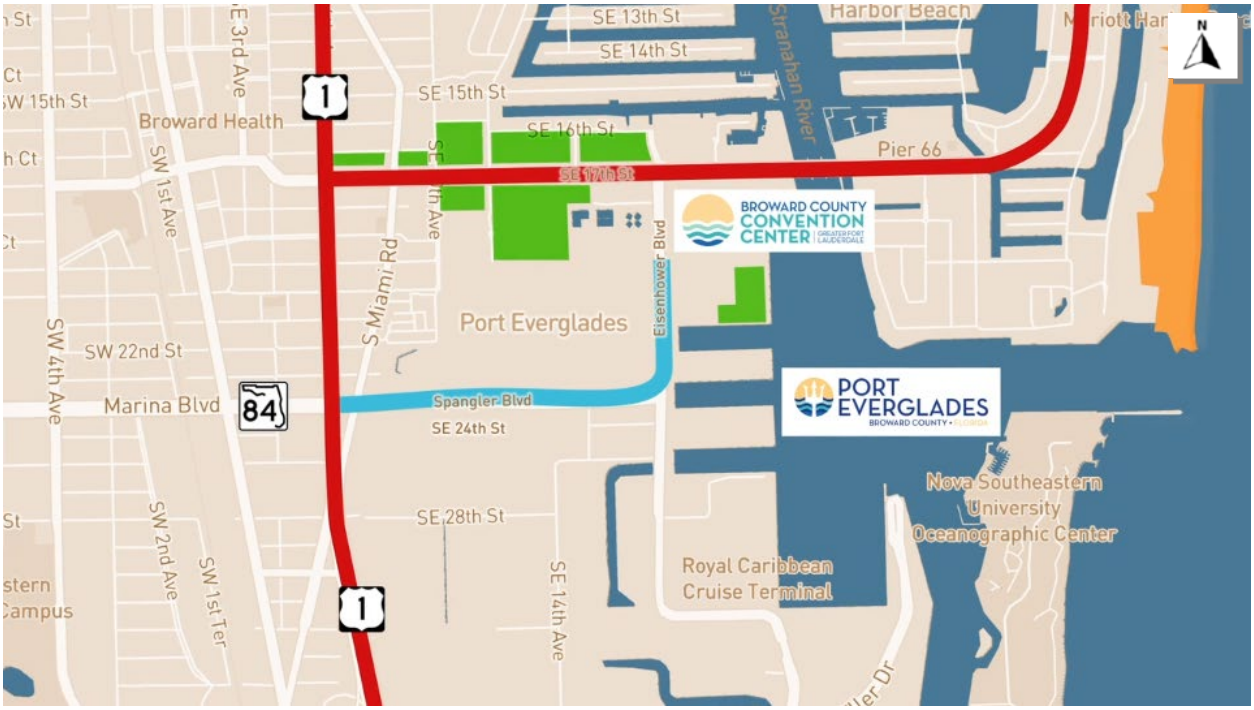
Port Bypass Road

The Port Bypass Road project will separate eastbound traffic on SR 84/Marina Mile Boulevard by providing future truck traffic with a direct route to the security access gate at Spangler Boulevard. Additionally, it will provide direct access to the Broward County Convention Center and PEV terminals 2 and 4 for other types of traffic, thereby eliminating unnecessary travel for cruise passengers and convention attendees passing through the Northport security access gate at Spangler Boulevard. This is expected to reduce traffic queues at the Northport security gate. Similarly, the roadway will bypass the security gate at Eisenhower Boulevard, effectively separating southbound traffic on Eisenhower Boulevard by providing direct access to other PEV terminals and US 1.

The project includes a new two-lane road with security fencing, a bridge with barrier wall, a roundabout to facilitate port traffic movement, security check points, lighting, traffic signals, intelligent transportation systems, and signage and pavement markings.

The project is currently under construction. Moderate short-term impacts to the study intersection and the Eller Drive security gate are anticipated due to lane closures during the Maintenance-of-Traffic (MOT) phase. However, the project is unlikely to provide direct benefits to the Eller Drive and McIntosh Road intersection.

Figure 5. Port Bypass Road Project



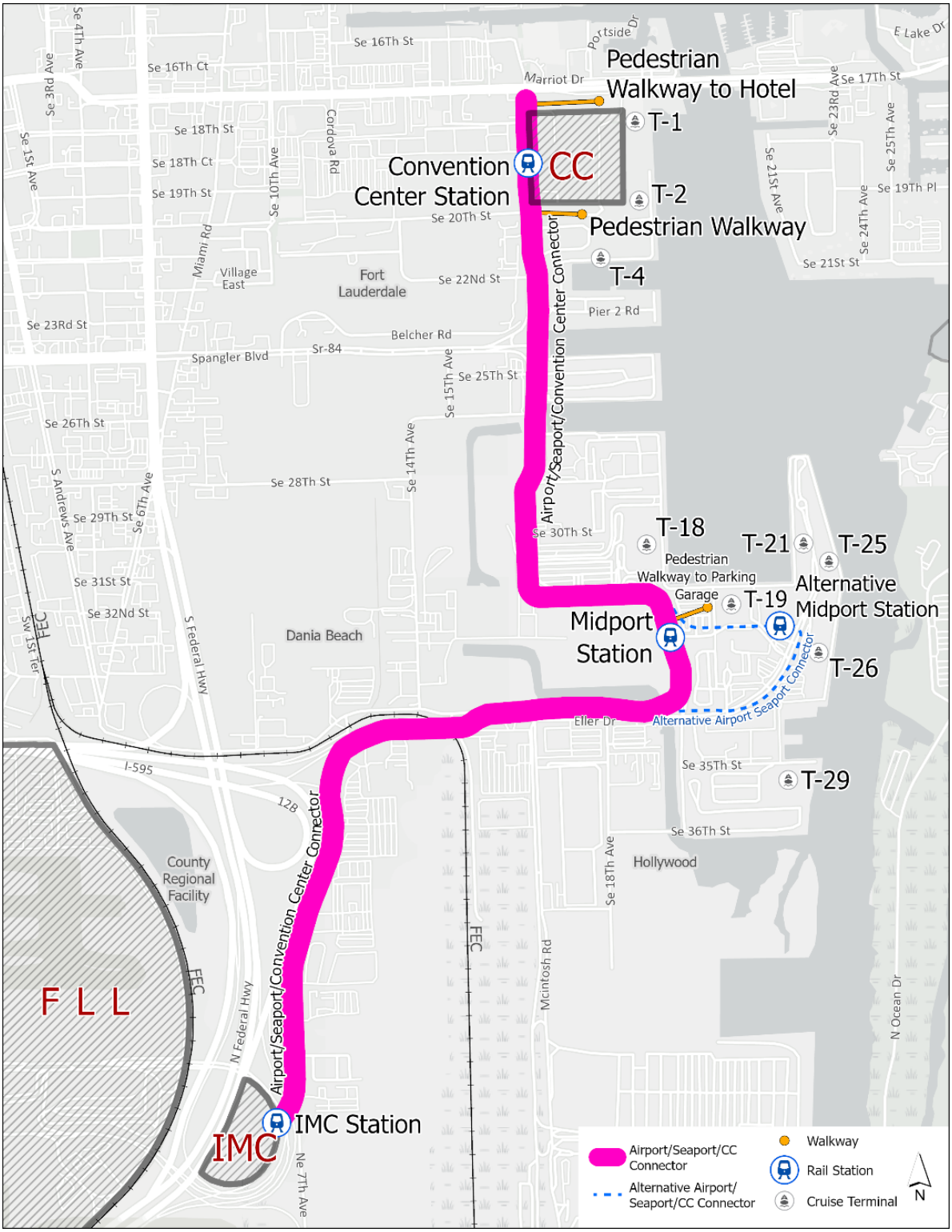
Source: Broward County

Broward County Airport-Seaport-Convention Center Connector

As part of the Premium Mobility Plan (PREMO), Broward County Transit (BCT) is studying a rail system connecting Fort Lauderdale-Hollywood International Airport (FLL), Port Everglades, and the Broward County Convention Center. The Airport-Seaport-Convention Center Connector is planned to be 3.5 miles with 3 stations: Intermodal Center at FLL, Midport Cruise Terminals at PEV, and the Convention Center. The project is designed to provide a direct transit link between FLL, PEV's cruise terminals, and the Convention Center. This project aims to efficiently carry cruise passengers, convention goers, and flight travelers between the airport, seaport, and Convention Center.

The study team has reached out to Broward County Transit for additional information about the Airport-Seaport-Convention Center Connector project. As of October 2024, no data has been provided to reflect a potential mode shift from vehicular traffic to mass transit. The study team will continue monitoring the progress of the transit project to assess its potential impact on the study intersection.

Figure 6. Airport-Seaport-Convention Center Connector Project



Source: Broward County Transit PREMO

Updated Intersection Traffic Projection

Future truck and cruise traffic projections were updated using the 2024 PEV Master/Vision Plan Update Market Analysis which considered factors including future site locations, operational strategies, expected activity levels at container facilities and cruise terminals, traffic projections for petroleum shipments, diverse cargo operations, and the operation of perimeter security gates. The detailed market analysis is included as part of **Appendix 2**.

Truck and passenger traffic were estimated separately. Table 1 presents the volume ratios between future truck traffic and the existing truck traffic. Truck volumes for both 2028 and 2045 at the McIntosh Road PEV Access Gate have been estimated using a Compound Annual Growth Rate (CAGR) of 3.41%. Truck volumes at the Eller Drive Gate were estimated by a CAGR of 1.04%. The development of the respective truck traffic growth rate is included in **Appendix 2.**

Table 1. Truck Traffic Forecast

Gates	Truck Traffic Ratio vs. 2023		CAGR
	2028	2045	
McIntosh Road Gate	1.183	2.091	3.41%
Eller Drive Gate	1.053	1.256	1.04%

Table 2 shows the volume ratios between future passenger traffic and the existing passenger traffic. According to PEV, four million cruise passengers embarked and disembarked during Fiscal Year 2024. The market analysis indicates that the Market Capture 2 scenario is more realistic, with low, mid, and high forecasts of 0.3%, 1.4%, and 2.4%, respectively. For a more conservative estimate, the deployment scenario, a systematic approach, is used in this study. The number of cruise passengers is projected to reach 6.9 million revenue passengers in 2044 with a high forecast CAGR of 3.2% under the deployment scenario.

Table 2. Passenger Vehicle Traffic Forecast

Passenger Vehicle Traffic Ratio vs. 2023		CAGR
2028	2045	
1.171	2.000	3.20%

Table 3 shows the growth factor used to estimate future turning movements for both trucks and passenger vehicles. While the cruise traffic growth rate is based on the 2024 Market Analysis for the Multiday Revenue Passenger Projections under the deployment scenario, the commuter traffic to and from the Southport area, including the U.S. Customs and Border Protection building and Foreign Trade Zone #25, is assumed to grow at a CAGR of 1.0%.

Table 3. Truck and Passenger Growth Factors

Vehicle Type	Gate	2028	2045
Truck Growth Factor	McIntosh Road Gate	1.183	2.091
	Eller Drive Gate	1.053	1.256
Passenger Vehicle Growth Factor		1.171	2.000
Commuter Traffic Growth Factor		1.051	1.245

Future intersection peak hour traffic (trucks and passenger vehicles) volumes are shown in Figure 7 through Figure 18. It is assumed that auto traffic going to and coming from the Midport area and off-site parking lot are mostly cruise passengers, while those going to and coming from the Southport area are commuters.

Figure 7. Opening Year 2028 Total Turning Movement Volumes-Weekday

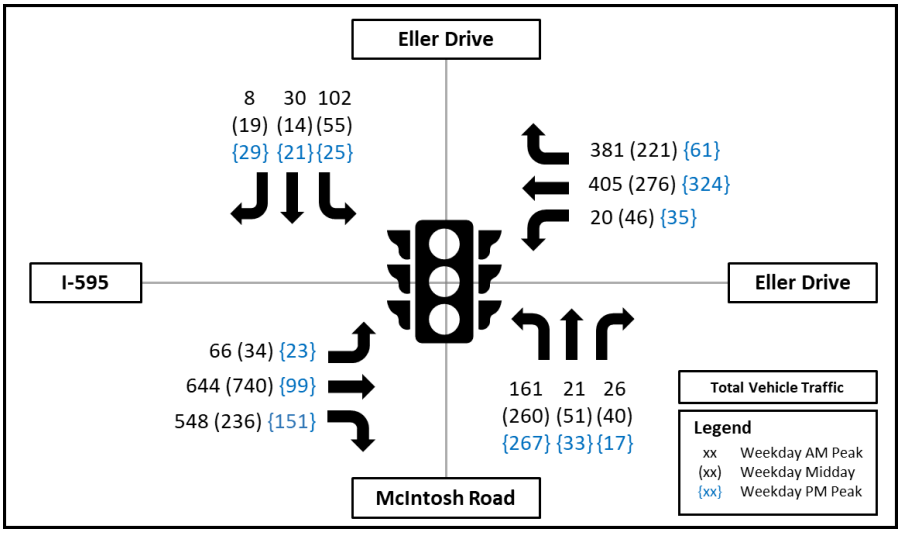


Figure 8. Opening Year 2028 Truck Turning Movement Volumes-Weekday

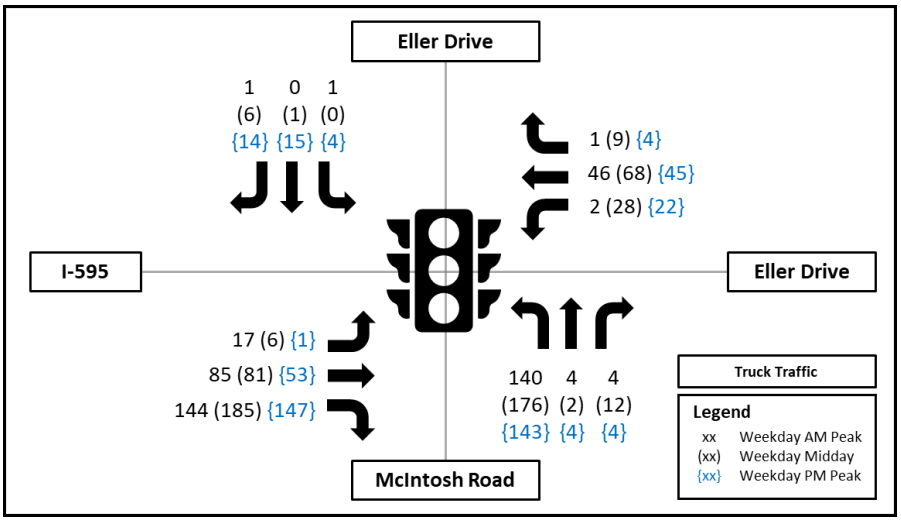


Figure 9. Opening Year 2028 Passenger Vehicle Turning Movement Volumes-Weekday

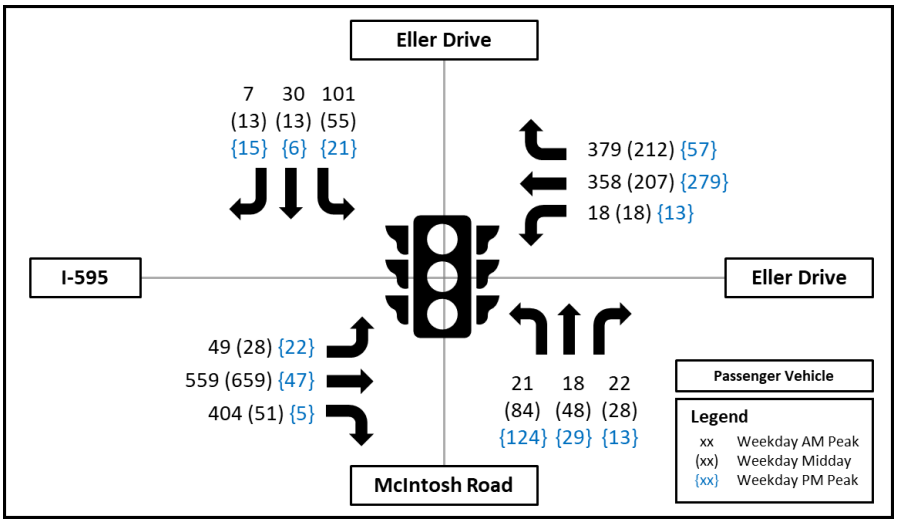


Figure 10. Opening Year 2028 Total Turning Movement Volumes-Weekend

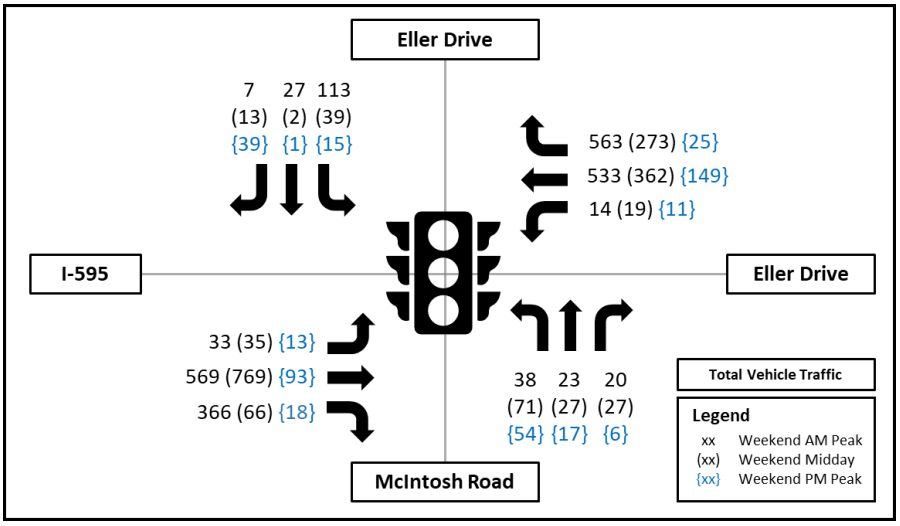


Figure 11. Opening Year 2028 Truck Turning Movement Volumes-Weekend

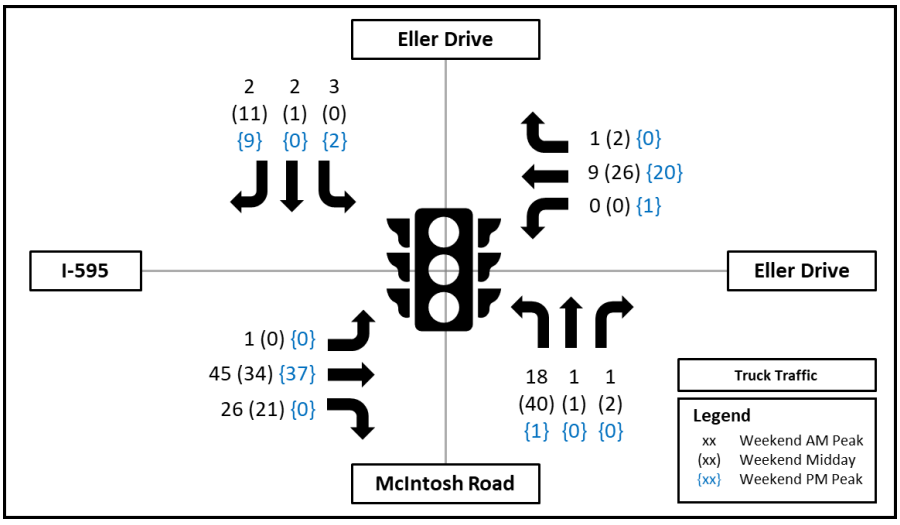


Figure 12. Opening Year 2028 Passenger Vehicle Turning Movement Volumes-Weekend

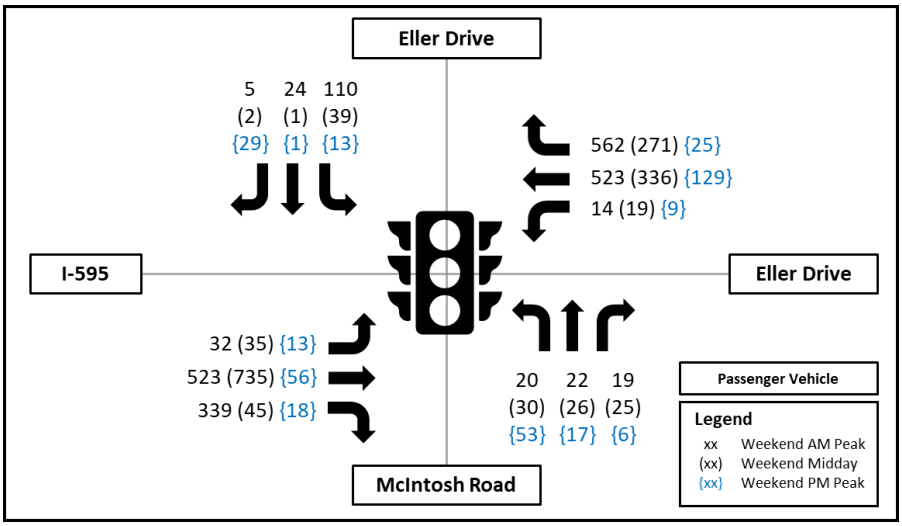


Figure 13. Design Year 2045 Total Turning Movement Volumes-Weekday

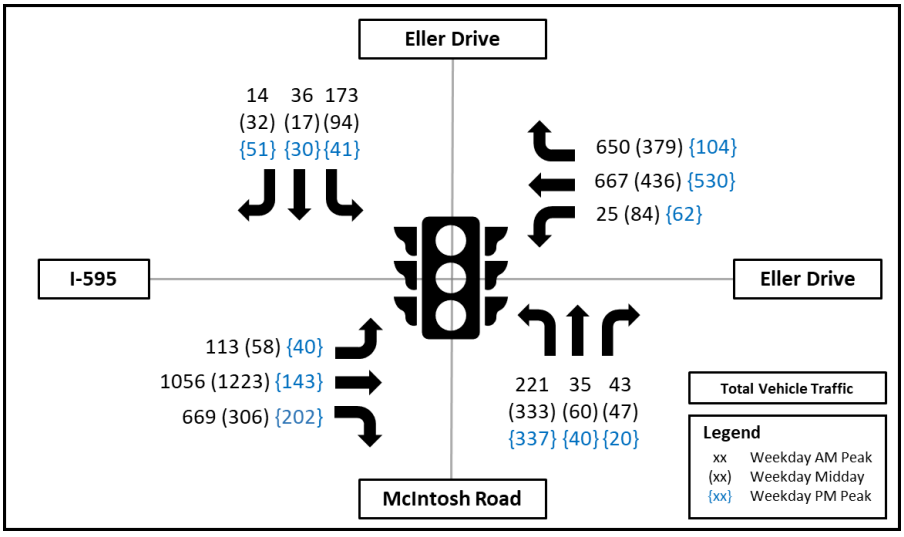


Figure 14. Design Year 2045 Truck Turning Movement Volumes-Weekday

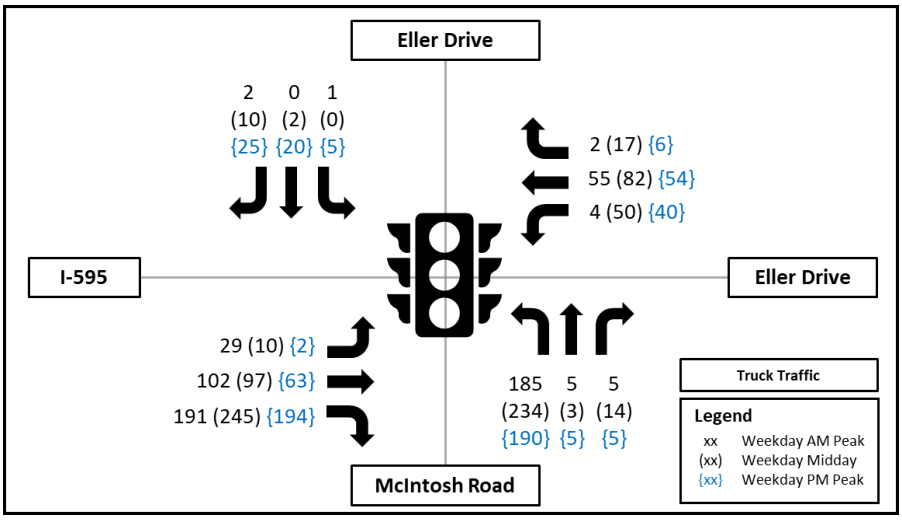


Figure 15. Design Year 2045 Passenger Vehicle Turning Movement Volumes-Weekday

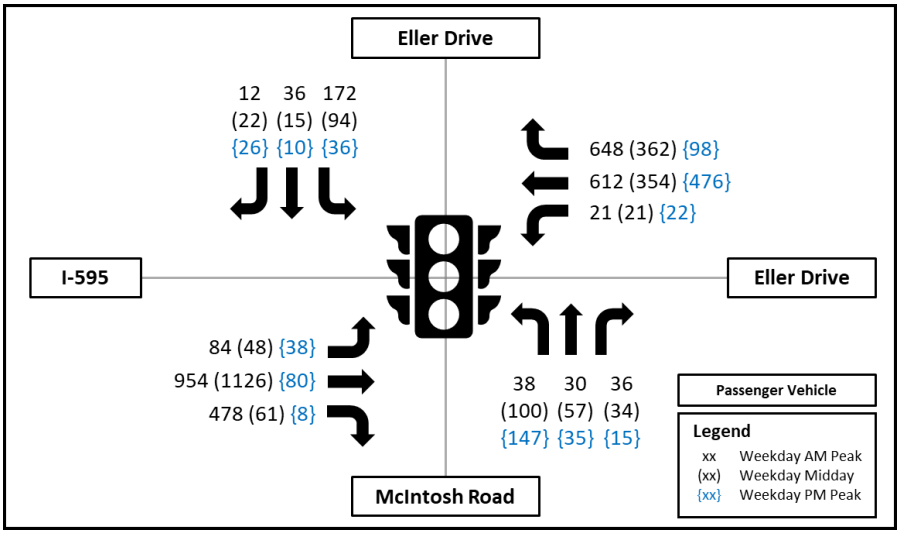


Figure 16. Design Year 2045 Total Turning Movement Volumes-Weekend

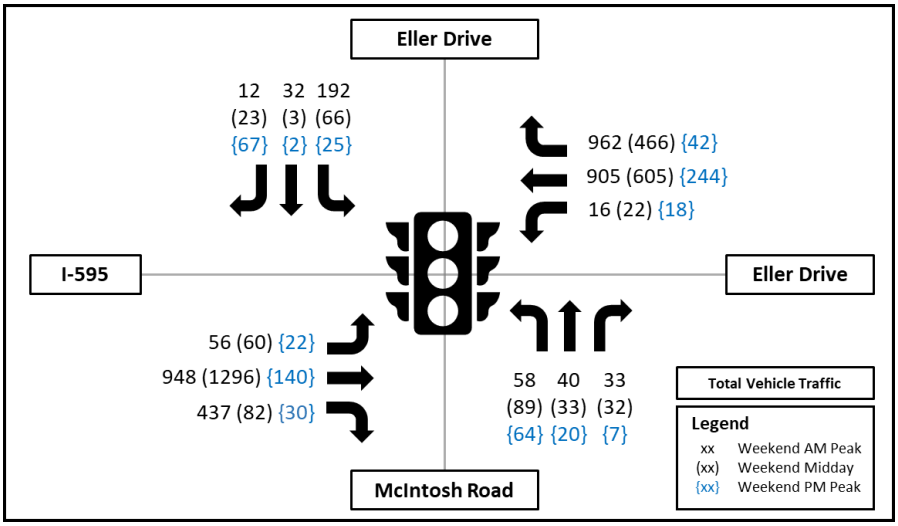


Figure 17. Design Year 2045 Truck Turning Movement Volumes-Weekend

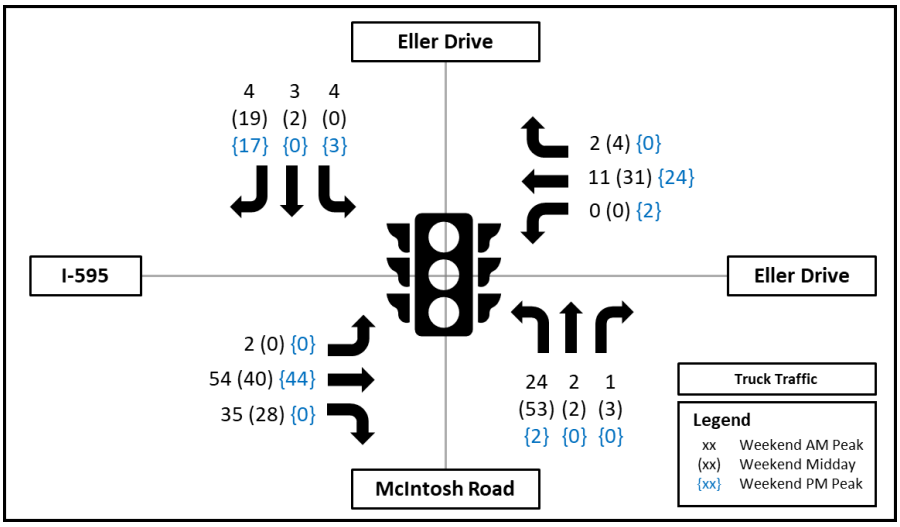
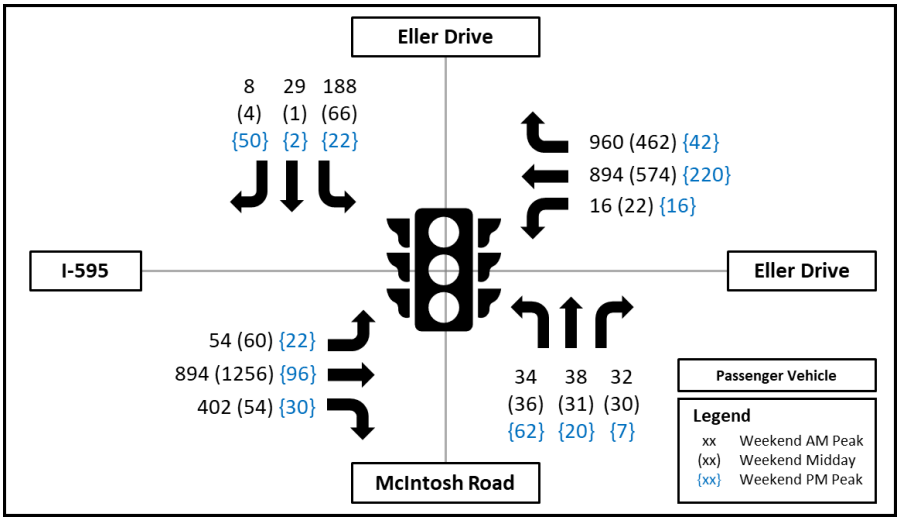


Figure 18. Design Year 2045 Passenger Vehicle Turning Movement Volumes-Weekend

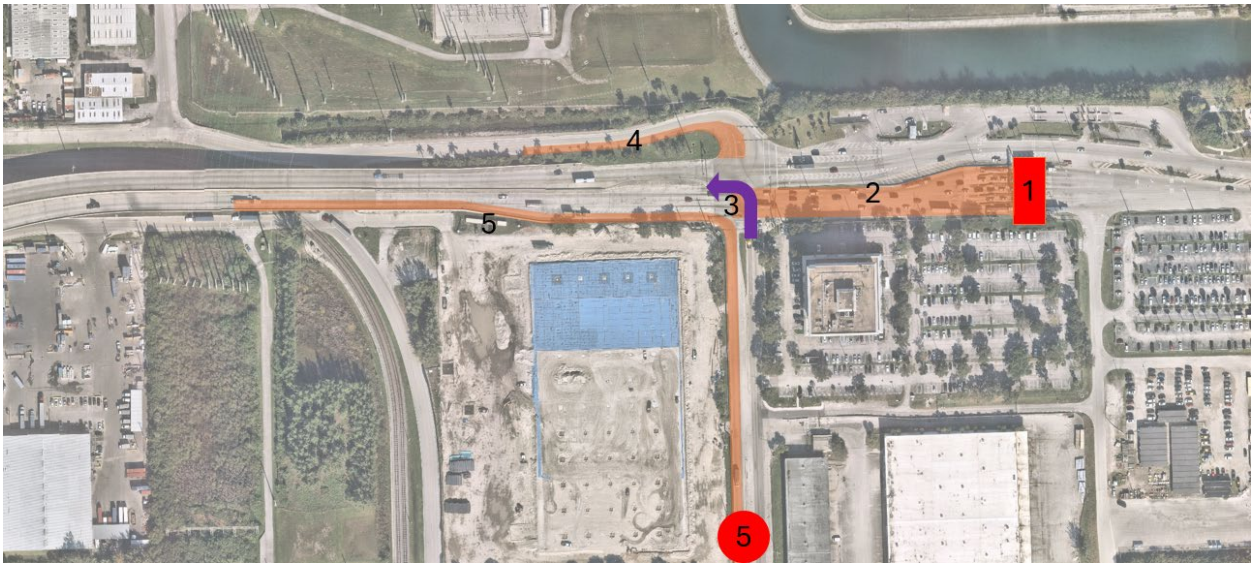


4. Development of Improvement Concepts

Key Challenges in Intersection Operations and Safety

Through multiple field observations and interviews with PEV staff and adjacent stakeholders, five (5) challenges regarding intersection operations and safety were identified and are depicted in Figure 19.

Figure 19. Key Intersection Challenges



Challenge 1: The Eller Drive security gate is unable to process high inbound traffic demand under peak conditions, especially during weekday mid-day periods when multiple cruises are scheduled. This problem causes traffic queues build up along Eller Drive.

Figure 20. Traffic Queue from Eller Drive Gate

Source: TranSystems

Challenge 2: Queue storage distance (about 500 ft) between the study intersection and the Eller Drive security gate is insufficient. This problem results in Eller Drive gate traffic queue spillback to the study intersection, which causes intersection and I-595 blockage.

Figure 21. Insufficient Storage between Study Intersection and Eller Drive Gate (View from E)

Source: TranSystems

Challenge 3: As a result of the above issues, northbound traffic exiting the Southport area can be blocked by eastbound queue spillback, which causes traffic queues to build up along McIntosh Road.

Figure 22. Observed Intersection Blockage (View from SE)

Source: TranSystems

Challenge 4: The current turn radius for southbound right turn traffic is tight, causing traffic, especially truck traffic, to slow down significantly. Southbound right-turn trucks often must take the center lane or even the left turn lane to make wide turn onto I-595.

Figure 23. Southbound Right Turn Truck Maneuver (View from NW)

Source: TranSystems

Challenge 5: Southport truck queues spill back along southbound McIntosh Road. Truck queues can extend over one mile long to I-595 at US-1 interchange during mid-day peak hours from 11:00 AM to 1:00 PM. This is likely caused by issues related to Southport operations.

Figure 24. Southport Truck Queue Spill Back (View from PEV Admin Building)

Source: PEV

Intersection Improvement Concepts

The concept development process involved analyzing current traffic conditions, identifying locations with safety concerns, and exploring potential traffic control and intersection configuration modifications to accommodate growth, reduce congestion, and enhance safety. The following five (5) intersection improvement concepts were discussed and approved for further evaluation. Detailed concept design plans are provided in **Appendix 3**.

Alternative 1: Flyover with Gate Relocation

In 2019, PEV completed a Port Everglades Traffic Analysis (PETA) to evaluate the impacts of proposed PEV projects, developed as part of the 2018 Master/Vision Plan Update, on the on-port and surrounding roadway network. The 2019 PETA study provided recommendations for the roadway infrastructure improvements and alternatives to facilitate passenger and goods movements in and around PEV. The I-595 flyover to and from McIntosh Road includes the flyover from I-595 eastbound to the McIntosh Road southbound, as well as the flyover from McIntosh Road northbound to I-595 westbound, with direct access for trucks to and from I-595 and McIntosh Road, as shown in Figure 25.

Figure 25. PETA Flyover Concept

Source: 2019 PETA study

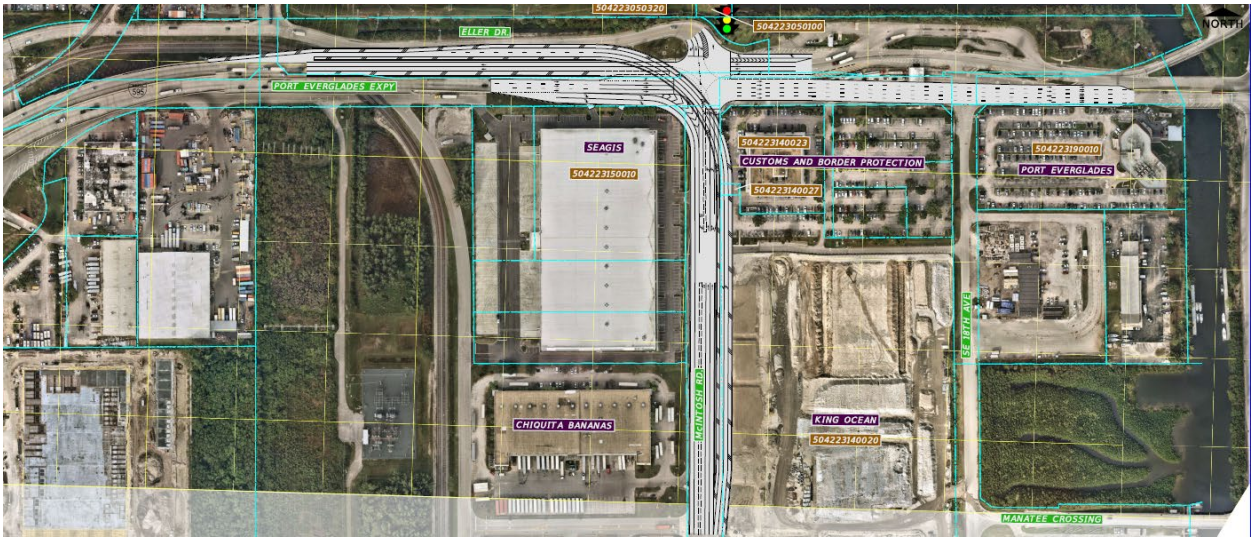
The revised flyover concept shown in Figure 26 removed the eastbound to southbound flyover component and replaced it with an at-grade connection consisting of two right-turn lanes. The two-lane northbound to westbound flyover remains. The revised flyover concept reduced access and right-of-way (R/W) impacts, especially in the southwest quadrant of the intersection.

Additionally, the Eller Drive security gate is moved about 500 feet east of its current location to better accommodate traffic queue from the Eller Drive gate by providing more storage distance between the intersection and the gate.

With the direct flyover ramp to I-595, it is assumed that all northbound truck traffic exiting the Southport

area will use the flyover instead of the signalized intersection.

Figure 26. I-595 Flyover with Eller Drive Gate Relocation Concept



Source: TranSystems

The flyover concept still has R/W impact to the parcel in the southwest quadrant of the intersection. Currently, the property is privately owned. Significant R/W impact is observed on the east side of McIntosh Road. Additional vertical clearance concerns may arise for maintaining access to the businesses and services on the east side of McIntosh Road. The new Eller Drive gate location is set to the east of SE 18th Avenue, near the main access to the Port Administration building, which imposes needs of addressing security requirement for traffic entering SE 18th Avenue and providing alternative circulation plan for the Port Administration building. In addition, the programmed Airport-Seaport-Convention Center Connector project is likely elevated over the study intersection. Close coordination with Broward County Transit, FDOT, and other stakeholders, is recommended to move this concept forward.

Alternative 2: Northbound Truck Rerouting

This truck rerouting concept aims to redirect a portion of northbound truck traffic to the FEC Road, bringing rerouted trucks back to the study intersection from north of the intersection. This approach provides additional exit capacity for the Southport area, reducing congestion caused by northbound traffic blocked by Eller Drive traffic queues.

To facilitate left turns onto Chute Road, a traffic signal is proposed for McIntosh Road, just south of the Chiquita building. Additionally, the southbound approach of the study intersection will feature an expanded turn radius to better accommodate trucks turning onto I-595. Due to space constraints and the need for a sufficient turning radius, the southbound approach will be narrowed to two lanes: one dedicated right-turn lane and one shared through-left turn lane. Signal timing at the study intersection will be adjusted to a split-phase operation for northbound and southbound traffic. This truck rerouting concept, shown in Figure 27, is estimated to serve about 25% of outbound trucks on McIntosh Road.

Figure 27. Northbound Truck Rerouting

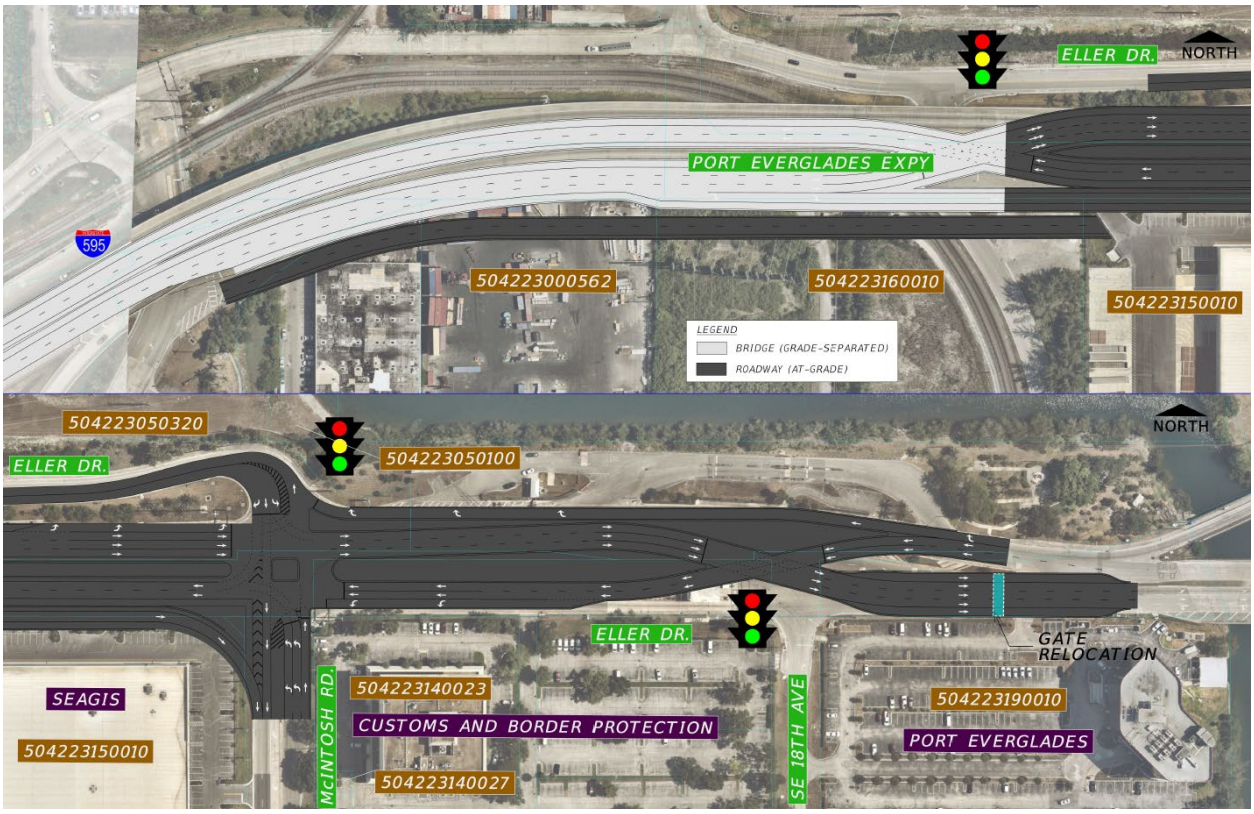
Source: TranSystems

Close coordination with adjacent stakeholders, such as Chiquita Bananas and Caribbean Procurement Inc., is crucial as stakeholders are currently responsible for maintaining Chute Road. The land north of Eller Drive is occupied by FP&L. There is a small drainage canal to the north running parallel to Eller Drive, between Eller Drive and FP&L. Reconfiguring the southbound approach from Eller Drive is expected to impact the canal and FP&L's R/W. Local business support and coordination are necessary to carry the concept forward.

Alternative 3: Diverged E/W with Gate Relocation

This diverged concept (Figure 28) temporarily shifts eastbound traffic along I-595 to the north side and westbound traffic to the south side at the study intersection. This concept is designed to better accommodate the Eller Drive traffic queue, eliminate conflicts between eastbound traffic and northbound traffic at the study intersection, and provide better services to northbound left turn traffic.

Figure 28. Diverging East/West with Eller Drive Gate Relocation



Source: TranSystems

Eastbound and westbound through and left-turn traffic shifts at the two crossover locations, one to the east and one to the west of the study intersection. Signals are required at the two crossovers. The study intersection will need to be redesigned for new traffic patterns from all approaches. Eastbound right-turn traffic will be served by a direct ramp to bypass the west crossover intersection. Similarly, westbound right-turn traffic will be provided with a direct connection to bypass the east crossover.

This concept has significant impact to adjacent R/W, FEC crossing, existing structures on I-595, and the traffic signal. The entire segment of Eller Drive south of I-595 will shift south, which impacts all adjacent parcels. FEC crossing under I-595 will also be impacted. The I-595 bridges over Eller Drive and FEC Road are required to be widened. The three signals in this concept should be operated by one controller if possible. Additionally, this concept would cause trucks to stop at a red light, then start going uphill when the light turns green, which could cause more slowdowns and congestion in the westbound direction.

The location of the east crossover needs to consider the spacing need between the crossover and the intersection at SE 19th Avenue to balance the need of handling traffic queues at the gate and the need of providing sufficient weaving distance before the SE 19th Avenue traffic signal.

Alternative 4: Eller Drive Gate Removal

This concept focuses exclusively on removing or relocating the Eller Drive security gate, as shown in Figure 29. The primary goal is to eliminate traffic queuing caused by the gate and, as a result, prevent conflicts between eastbound traffic queue spillback and northbound traffic flow.

Furthermore, this concept is expected to enhance safety at the study intersection by addressing bumper-to-bumper conditions during peak congestion periods and reducing excessive weaving maneuvers currently observed as vehicles approach the gate booths.

Figure 29. Eller Drive Gate Removal

Source: TranSystems

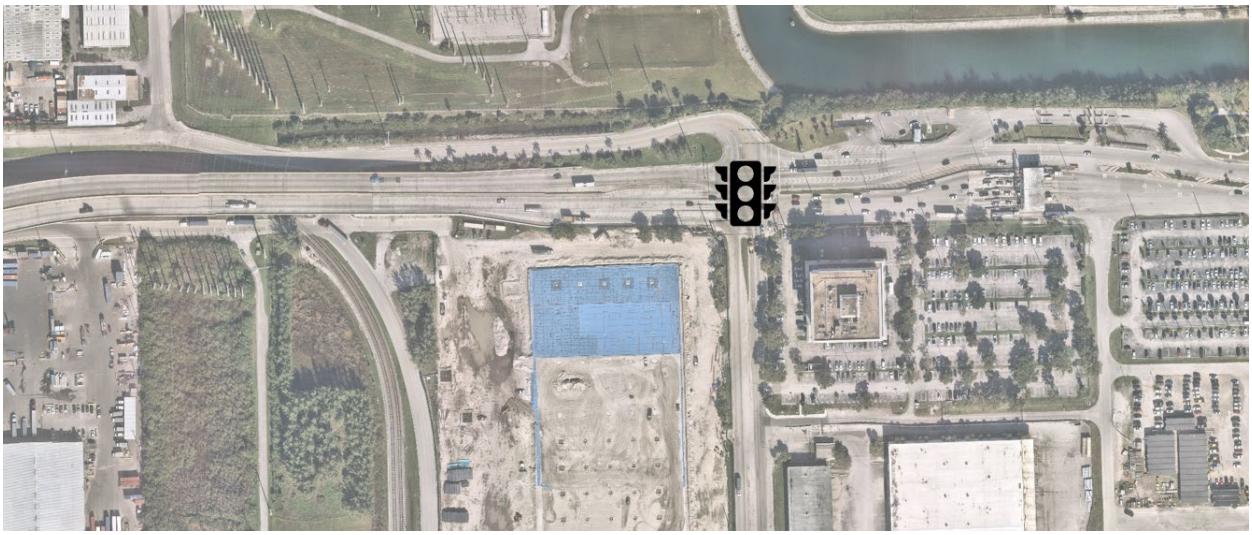
Assessing the impact of removing or relocating the Eller Drive security gate requires a comprehensive evaluation of a range of factors, including security, operations, engineering, environmental, and construction considerations. This process will also involve input from key stakeholders such as petroleum, freight, and cruise terminals, Broward County Transit, and others. The analysis of potential new gate locations will be conducted separately from the scope of this feasibility study.

Alternative 5: Do-Nothing (No Build)

The no-build alternative (Figure 30) serves as the future baseline conditions against which build alternatives (Alternative 1 through Alternative 4) are evaluated.

The no-build alternative represents future conditions without doing any significant physical improvements at the intersection. The no-build alternative assumes regular maintenance and traffic signal optimization.

Figure 30. No-Build: (Signal Optimization Only)



Source: TranSystems

Other Concepts Explored

Other improvement opportunities, including two more flyover concepts, one additional truck rerouting concept, and one additional gate relocation concept, were explored during the concept development stage. Although they were eliminated from further evaluation, it is beneficial to document discussion throughout the concept development process, and the potential benefit and constraints of each eliminated concept.

Eastbound Flyover with Eller Drive Gate Relocation (Eliminated)

This Eller Drive Flyover concept, as shown in Figure 31, was discussed during the concept development meeting with PEV. The concept intends to provide grade separation for eastbound traffic and minimize the likelihood of northbound traffic being blocked by Eller Drive queue spillback. The Eller Drive gate is required to be relocated downstream to provide footing space required for the flyover.

This concept was eliminated during the concept development meeting due to the following considerations:

- Limited benefit to Southport traffic,
- High cost,
- Constrained space for new gate location,
- Deviation from stakeholder expectation, and
- Potential safety issues on the elevated segment.

Figure 31. Eastbound Flyover with Eller Drive Gate Relocation (Eliminated)

Source: TranSystems

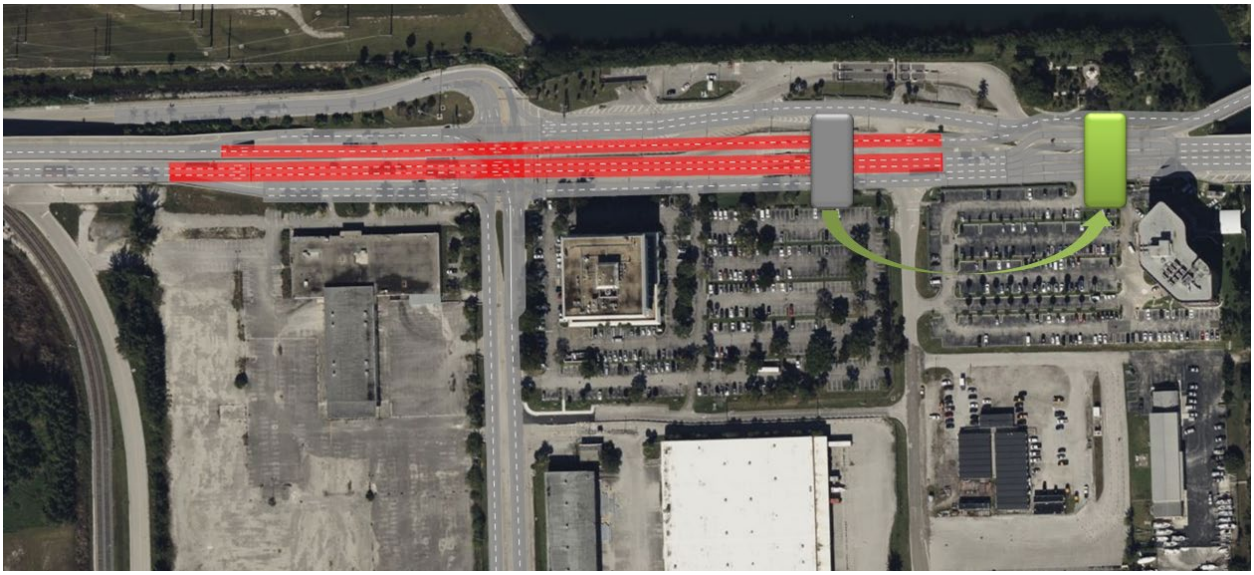
Eastbound and Westbound Flyover with Eller Drive Gate Relocation (Eliminated)

Another Eller Drive flyover concept was discussed during the concept development meeting with PEV. Similarly, this concept, shown in Figure 32, intends to mitigate eastbound traffic queue spillback to the study intersection and minimize the likelihood of northbound traffic being blocked by Eller Drive queue spillback. Also, the Eller Drive gate is required to be relocated downstream to provide footing space required for the flyover. Additionally, this concept provides direct access to I-595 over the study intersection for westbound through traffic on Eller Drive.

This concept was eliminated during the meeting due to the following considerations:

- Limited benefit to Southport traffic,
- High cost,
- Constrained space for new gate location
- Deviation from stakeholder expectation,
- Potential safety issues on the elevated segment, and
- Low benefit since westbound traffic is currently not a major contributing factor to the congestion at the study intersection.

Figure 32. Eastbound and Westbound Flyover with Eller Drive Gate Relocation (Eliminated)



Source: TranSystems

Northbound Truck Rerouting 2 (Eliminated)

During a Stakeholder Meeting in February 2024, a second Truck Rerouting concept, shown in Figure 33, was discussed. The second rerouting concept intends to route northbound trucks to FEC Road and Eller Drive to the west, then onto I-595 via the interchange on NE 7th Avenue. Similar to the rerouting concept described previously, this concept provides additional capacity for outbound truck traffic from the Southport area.

The study team conducted field visit and qualitative assessment. During the Stakeholder Meeting in June 2024, this concept was further discussed and eliminated from detailed evaluation due to the following constraints and flaws observed:

- Two FEC crossings on the route,
- Potential impact to FEC R/W,
- Very limited space between multiple traffic signals and rail crossings,
- Safety concerns at rail crossings,
- Lack of storage at NE 7th Avenue interchange, and
- Low capacity for truck traffic since trucks are required to stop at rail crossings.

Figure 33. Northbound Truck Rerouting 2 (Eliminated)

Source: TranSystems

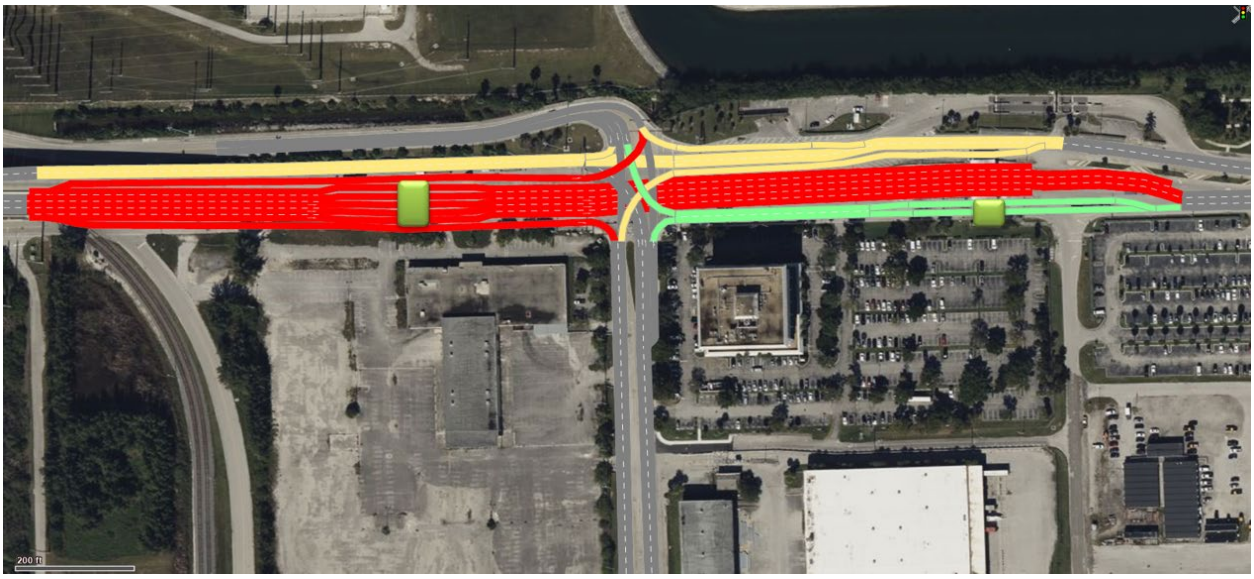
Eller Drive Gate Relocation 2 (Eliminated)

A second concept of Eller Drive Gate Relocation, presented in Figure 34, was discussed during the initial concept development meeting with PEV. The concept aims to resolve intersection blockage caused by the traffic queue spillback from the existing Eller Drive gate. This concept proposes relocating the Eller Drive gate to upstream of the intersection onto I-595, while providing separate turn lanes for eastbound left-turn traffic and eastbound right-turn traffic into the Southport area. A new and smaller security gate is required to control southbound left-turn and northbound right-turn traffic into the Midport area.

This concept was eliminated during the meeting due to the following constraints:

- Need of avoiding impact to eastbound right turn and left turn traffic, especially right turn traffic to Southport,
- Potential impact to I-595,
- Limited space for the new I-595 security gate,
- The need of a new gate on Eller Drive,
- Lack of queue storage between new I-595 gate and the study intersection,
- Safety concerns on I-595, and
- Safety concerns at the new gate and the study intersection.

Figure 34. Eller Drive Gate Relocation 2 (Eliminated)



Source: TranSystems

5. Future Conditions Analysis

Future Conditions VISSIM Models

Consistent with the Existing Conditions analysis, PTV VISSIM 2023 was applied to simulate traffic movements and analyze future no-build and build alternatives. Calibrated VISSIM microsimulation models and parameters from the Existing Conditions analysis were used. Future traffic volumes and network geometries from design concepts were coded into the VISSIM model. Figure 35 through Figure 39 show screenshots of VISSIM networks and simulations for future conditions.

Figure 35. Future Conditions for Alternative 1: Flyover with Gate Relocation

Figure 36. Future Conditions for Alternative 2: Truck Rerouting

Figure 37. Future Conditions for Alternative 3: Diverged East/West with Gate Relocation

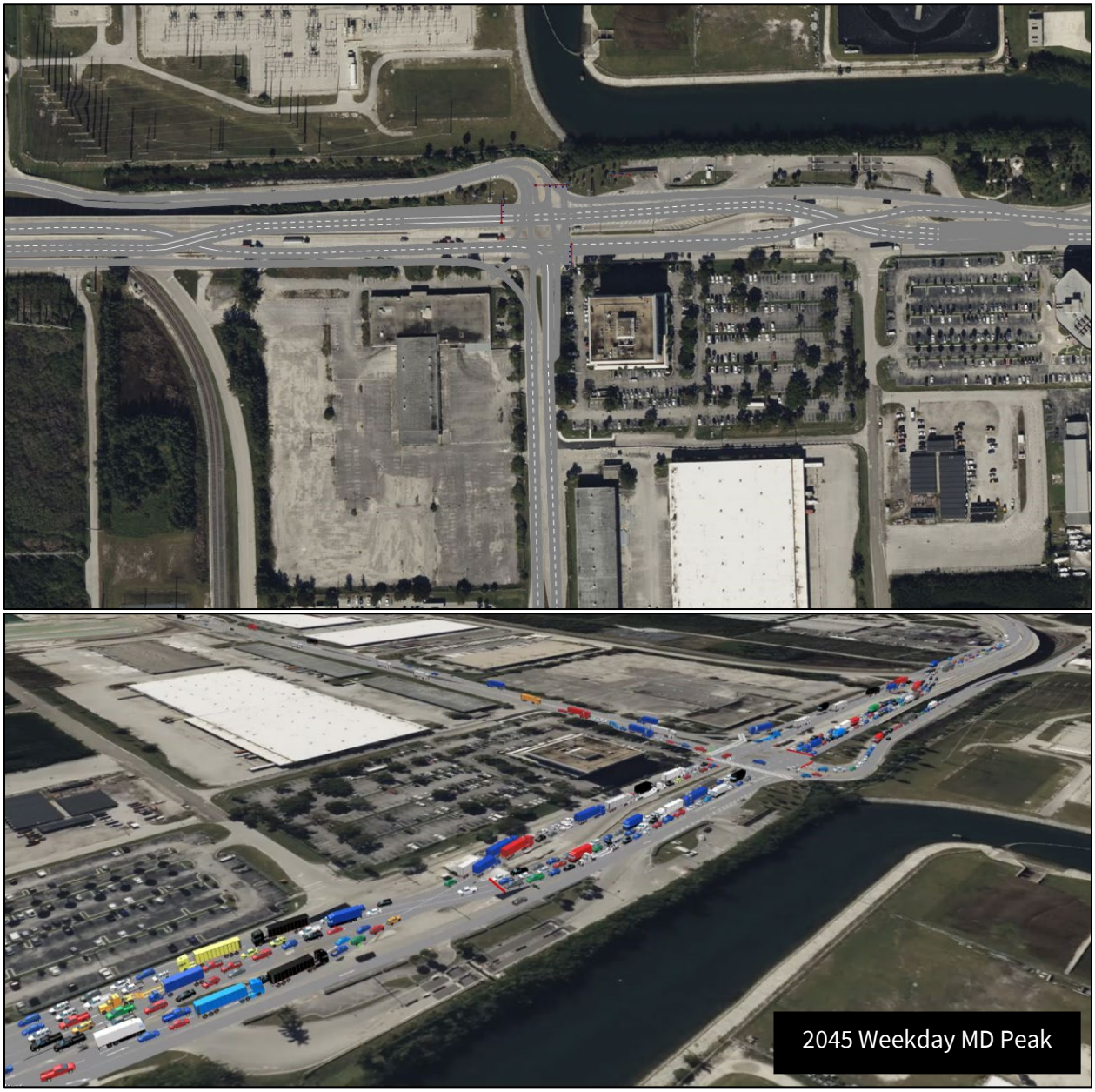


Figure 38. Future Conditions for Alternative 4: Eller Drive Gate Removal

Figure 39. Future No Build Conditions (Alternative 5)

There are six (6) VISSIM models developed for this project including AM, MD, and PM peak periods for both weekdays and weekends. Each model has a simulation period of 9,000 seconds, with a 900-second warm-up period in the beginning, and a 900-second cool-down period at the end.

Simulation resolution was set as ten (10) time steps per simulation second. Ten (10) runs with different random seeds were performed for each model. Average results from the ten runs were used for both model calibration and evaluation.

Future conditions results are shown in the following sections.

Future Conditions Operations Analysis

Intersection Conditions Summary

Opening Year 2028 Summary

Opening year 2028 intersection LOS and delay of each alternative are summarized in Table 4 below.

Table 4. Opening Year 2028 Intersection Operations Conditions Summary

Alternatives	Weekday Peak LOS/Delay (sec)			Weekend Peak LOS/Delay (sec)		
	AM	MD	PM	AM	MD	PM
Alternative 1: Flyover	B/13.82	B/15.72	B/15.59	B/13.69	B/10.34	B/14.39
Alternative 2: Truck Rerouting	C/25.23	E/61.21	C/28.74	B/17.30	C/32.12	B/18.45
Alternative 3: Diverged E/W	B/16.25	C/23.86	D/37.99	B/13.18	B/18.67	C/22.50
Alternative 4: Eller Gate Removal	C/21.97	C/25.32	C/31.65	B/15.75	B/12.78	B/18.79
Alternative 5: No Build	C/22.11	D/49.29	C/31.70	B/16.11	C/25.01	B/18.90

Alternative 1 Flyover offers the best LOS across all periods, with the lowest delays of all options. This alternative provides the most efficient traffic flow during both weekdays and weekends of 2028.

Alternative 2 Truck Rerouting shows mixed results in 2028, with delays varying significantly. On weekends, delays are low, with LOS generally ranging between B and C. On weekdays, LOS is C in morning and afternoon peaks but drops to E in the midday with the highest delay. This is largely due to the split phasing required for the southbound shared through-left configuration in order to accommodate the wide right-turn radius.

Alternative 3 Diverged East/West shows acceptable performance, with LOS spanning from B to D in 2028. No significant operational improvement was observed comparing with the No Build scenario. This is due to extra delay introduced by the two crossover intersections, especially when there is no significant intersection blockage caused by Eller Drive gate traffic queue.

Alternative 4 Eller Gate Removal has consistent performance with LOS grades mostly in the C range on weekdays and B on weekend days of the opening year. This alternative offers consistent benefit over the No Build conditions as delays from the Eller Drive gate are eliminated.

The opening year No Build alternative has LOS varying between C and D on weekdays with weekend LOS ranging from B to C.

Detail opening year 2028 intersection operations results are provided in **Appendix 4**.

Design Year 2045 Summary

Design year 2045 intersection LOS and delay of each alternative are summarized in Table 5 below.

Table 5. Design Year 2045 Intersection Operations Conditions Summary

Alternatives	Weekday Peak LOS/Delay (sec)			Weekend Peak LOS/Delay (sec)		
	AM	MD	PM	AM	MD	PM
Alternative 1: Flyover	F/129.28	F/158.46	B/17.44	F/140.92	F/157.00	B/14.51
Alternative 2: Truck Rerouting	F/175.29	F/175.74	C/33.85	F/175.51	F/185.66	B/17.65
Alternative 3: Diverged E/W	F/103.03	F/110.84	D/40.19	F/104.79	F/102.73	C/23.14
Alternative 4: Eller Gate Removal	D/48.24	C/31.50	D/37.71	D/35.33	B/15.21	B/17.58
Alternative 5: No Build	F/166.98	F/184.53	D/38.08	F/175.43	F/189.73	B/17.78

Overall, most alternatives struggle with LOS F during certain morning and midday periods on both weekdays and weekends. The only alternative that offers acceptable LOS is Alternative 4 Eller Gate Removal. This is due to traffic queue spillback from the Eller Drive gate causing intersection blockage. The blockage quickly expanded throughout the network as shown in simulation screenshots provided in Figure 35 through Figure 39 previously, with the only exception of Eller Gate Removal alternative. However, afternoon conditions for all alternatives appear acceptable due to low eastbound traffic demand during the afternoon peak.

Detail design year 2045 intersection operations results are available in **Appendix 4**.

Network Performance

The influence of alternative concepts extends beyond the study intersection. To conduct a meaningful comparison between alternatives, it is important to evaluate their impacts and benefits from a system-wide perspective. The microsimulation model for all alternatives has been expanded to include the following locations, as shown in Figure 40:

- To the west: I-595 at the NE 7th Avenue overpass,
- To the south: Mcintosh Road north of the security gate,
- To the east: Eller Drive west of SE 19th Avenue, and
- To the north: Eller Drive east of the FEC crossing.

Figure 40. VISSIM Future Conditions Model Extent

VISSIM's network performance results consider both vehicles that have reached their destinations and those still within the network. Selected network performance measures are:

- **Average Speed**: Defined as total distance traveled divided by total travel time. This is a weighted average travel speed of all vehicles, and the weight is the respective travel time of the vehicles. This means that vehicles with a short travel time have less influence on this measure than those traveled for a long time. In this study, the average speed is an indicator of how fast alternatives can move traffic in-and-out of the study area.
- **Vehicle-Miles Traveled (VMT)**: Total distance of vehicles traveling within the network and those that have already completed their travels and left the network. The VMT is a proven measure for evaluating system throughput, in vehicle-miles.
- **Vehicle-Hours Traveled (VHT)**: Total travel time of vehicles traveling within the network and those that have already completed their travels and left the network, in vehicle-hours. The VHT is an effective metric for measuring total time spent in travel between origins and destinations.
- **Latent Demand**: Number of vehicles that could not enter the model network by the end of the evaluation period. Due to heavy congestion, traffic queues extend to entry points, preventing a number of vehicles from entering the network. Latent demand and latent delay, defined below, provide a means to capture impact to “unserved” traffic demand.
- **Latent Delay**: Total wait time of vehicles that could not enter the model network during the evaluation period, in vehicle-hours.

Network performance measures of all alternatives are summarized in Table 6 through Table 9 below.

Table 6. Opening Year 2028 Weekday Peak Network Performance

Peak	Alternative	Avg Spd (mph)	Veh-Miles Traveled	Veh-Hrs Traveled	Latent Delay (hrs)	Latent Demand (veh)
2028 Weekday AM	Alt 1: Flyover	17.2	3,488	204	0.1	0.2
	Alt 2: Reroute	15.6	3,560	229	0.1	0.1
	Alt 3: Diverged	16.7	4,344	260	0.1	0.1
	Alt 4: Gate Removal	24.7	3,545	144	0.1	0.1
	Alt 5: No Build	16.5	3,497	212	0.1	0.2
2028 Weekday MD	Alt 1: Flyover	12.3	2,898	242	0.1	0.1
	Alt 2: Reroute	9.7	2,871	323	11.2	33.2
	Alt 3: Diverged	13.9	3,646	266	0.0	-
	Alt 4: Gate Removal	23.8	2,951	124	0.1	-
	Alt 5: No Build	10.8	2,838	278	19.0	41.6
2028 Weekday PM	Alt 1: Flyover	24.0	1,669	69	0.0	-
	Alt 2: Reroute	20.8	1,717	82	0.0	-
	Alt 3: Diverged	18.5	2,079	113	0.0	-
	Alt 4: Gate Removal	22.1	1,696	77	0.0	-
	Alt 5: No Build	20.9	1,675	80	0.0	-

Table 7. Opening Year 2028 Weekend Peak Network Performance

Peak	Alternative	Avg Spd (mph)	Veh-Miles Traveled	Veh-Hrs Traveled	Latent Delay (hrs)	Latent Demand (veh)
2028 Weekend AM	Alt 1: Flyover	18.3	3,217	176	0.1	-
	Alt 2: Reroute	17.8	3,255	183	0.1	0.2
	Alt 3: Diverged	17.4	3,920	225	0.1	0.2
	Alt 4: Gate Removal	26.4	3,253	123	0.1	0.2
	Alt 5: No Build	18.3	3,224	177	0.1	-
2028 Weekend MD	Alt 1: Flyover	11.9	2,344	204	0.0	-
	Alt 2: Reroute	10.7	2,381	231	0.0	-
	Alt 3: Diverged	12.3	2,969	247	0.0	-
	Alt 4: Gate Removal	28.1	2,397	85	0.0	-
	Alt 5: No Build	11.8	2,341	206	0.0	-
2028 Weekend PM	Alt 1: Flyover	24.4	640	26	0.0	-
	Alt 2: Reroute	23.4	646	28	0.0	-
	Alt 3: Diverged	19.1	801	42	0.0	-
	Alt 4: Gate Removal	26.0	647	25	0.0	-
	Alt 5: No Build	23.5	641	27	0.0	-

Table 8. Design Year 2045 Weekday Peak Network Performance

Peak	Alternative	Avg Spd (mph)	Veh-Miles Traveled	Veh-Hrs Traveled	Latent Delay (hrs)	Latent Demand (veh)
2045 Weekday AM	Alt 1: Flyover	5.1	4,402	858	711.2	977.5
	Alt 2: Reroute	4.3	4,044	932	1,019.9	1,396.3
	Alt 3: Diverged	5.7	5,269	926	977.5	1,240.5
	Alt 4: Gate Removal	14.3	5,031	370	222.3	392.0
	Alt 5: No Build	4.6	3,997	865	1,183.5	1,500.9
2045 Weekday MD	Alt 1: Flyover	4.2	3,341	798	814.2	1,171.1
	Alt 2: Reroute	4.3	3,243	753	1,143.7	1,392.7
	Alt 3: Diverged	5.6	4,467	804	773.1	955.2
	Alt 4: Gate Removal	22.5	4,439	198	0.3	-
	Alt 5: No Build	4.3	2,907	682	1,192.0	1,443.6
2045 Weekday PM	Alt 1: Flyover	23.5	2,420	103	0.0	-
	Alt 2: Reroute	19.9	2,483	125	0.0	-
	Alt 3: Diverged	17.3	3,015	174	0.1	-
	Alt 4: Gate Removal	21.1	2,455	116	0.0	-
	Alt 5: No Build	19.7	2,433	123	0.0	-

Table 9. Design Year 2045 Weekend Peak Network Performance

Peak	Alternative	Avg Spd (mph)	Veh-Miles Traveled	Veh-Hrs Traveled	Latent Delay (hrs)	Latent Demand (veh)
2045 Weekend AM	Alt 1: Flyover	4.5	3,904	871	1,130.4	1,477.8
	Alt 2: Reroute	4.3	3,662	859	1,621.1	1,907.9
	Alt 3: Diverged	5.3	4,570	867	1,500.8	1,814.8
	Alt 4: Gate Removal	15.1	4,424	294	972.7	1,046.7
	Alt 5: No Build	4.3	3,665	859	1,514.2	1,814.5
2045 Weekend MD	Alt 1: Flyover	4.0	3,056	757	654.4	890.0
	Alt 2: Reroute	4.1	2,988	730	761.3	949.0
	Alt 3: Diverged	4.7	3,805	816	659.3	913.4
	Alt 4: Gate Removal	27.3	3,858	142	0.1	-
	Alt 5: No Build	4.2	2,984	714	771.9	965.2
2045 Weekend PM	Alt 1: Flyover	24.2	986	41	0.0	-
	Alt 2: Reroute	23.3	999	43	0.0	-
	Alt 3: Diverged	18.8	1,240	66	0.0	-
	Alt 4: Gate Removal	26.3	999	38	0.0	-
	Alt 5: No Build	23.5	987	42	0.0	-

In opening year 2028, the Alternative 4 – Eller Drive Gate Removal consistently outperforms other alternatives. The Gate Removal alternative offers the highest average speed and the lowest VHT across all scenarios, indicating reduced congestion. Compared with the Gate Removal alternative, the Flyover alternative and the Diverged alternative provide moderate performance, better speed and less latent demand than the No Build alternative. The Reroute alternative is the least desirable alternative without noticeable benefit over the No Build.

By the design year 2045, the performance gap amongst the alternatives further widens due to increased traffic demand. The Gate Removal alternative remains the best for morning and midday peaks with the highest average speed, the lowest VHT, and the lowest latent demand/delay. Although marginally better than the No Build, performance of the Flyover alternative and the Diverged alternative significant deteriorated due to intersection blockage caused by traffic queue from the Eller Drive gate. The Reroute alternative remains the least desirable alternative without noticeable benefit over the No Build.

It is noted that due to the substantial increase in passenger vehicle volumes projected between now and 2045, the demands for eastbound and westbound right turns during both weekday and weekend morning peak periods are approaching or exceeding the right-turn capacities at the study intersection. Consequently, eastbound and westbound right-turn queues are likely to become significant challenges.

Future Conditions Crash Prediction Analysis

The No-Build and Build alternatives were compared using quantitative safety evaluation methodology as presented in the Highway Safety Manual (HSM) and utilizing the Interactive Highway Safety Design Model (IHSDM) software developed and provided by the Federal Highway Administration (FHWA).

Individual site elements for the study area immediately surrounding the study intersection within the footprint of proposed Build alternative impacts were segmented and input into the software to best model the geometrics and operations of the site. It is noted that the IHSDM software, as well as the HSM methodology in general, have limitations on what can be modeled and analyzed quantitatively, based on available research. As more research progresses, additional roadway types and safety countermeasures will become available for analysis. The current limitations of the IHSDM software and the HSM methodology required that some of the quantitative analysis be modeled using approximations of the effects of certain Build alternatives or required that some countermeasures not be modeled at all due to lack of available research support. The remainder of this section describes methods used to model each Build alternative, the limitations of the modeling process for each alternative, and the comparative results of the crash prediction analysis.

No Build (Alternative 5)

The No Build alternative was modeled as a baseline for the comparison of the effects of the Build alternatives. This condition was modeled from the point of tangency on I-595 east to the intersection of Eller Drive with SE 19th Avenue, and from the study intersection south to the intersection of McIntosh Road with the Chute Road just south of the Chiquita Bananas warehouse. While I-595 is a freeway to the west of the project location, due to the lower speeds through the study area and the presence of the intersection with Eller Drive, it was modeled as an 8-lane divided arterial, per HSM methodology.

Build Alternative 1: Flyover with Gate Relocation

Build Alternative 1 was modeled using the No Build alternative as a base model, with the addition of a collector-distributor (C-D) road to represent the flyover ramp, and the addition of a three-leg intersection of two one-way street under stop control to model the merge condition that would be introduced in the Build alternative. Although this alternative would reroute some truck movements from the Eller Drive intersection and thereby reduce the number of northbound left-turn conflicts at the intersection, the IHSDM software and HSM methodology do not have a means of modeling the effects of the turn movement reductions. Without accounting for the crash reduction from fewer turning movements, the expected crash rates in the model are more conservative. Average Annual Daily Traffic (AADT) is used in the modeling process as a measure of applicability for the modeling process and certain countermeasures, but individual movements are not analyzed in the HSM methodology. Therefore, the safety performance of the study intersection is considered to be equal in the HSM methodology between the No Build condition and Build Alternative 1. In addition, the proposed flyover alternative introduces a merging area where northbound traffic via flyover converges with westbound traffic on I-595, which increases the potential for crashes. In IHSDM model, given the new merging area on I-595 and the lack of respective crash reduction factor by reduced turning movement at the study intersection for the existing site elements, the overall crash rates for this alternative are shown to be higher than that of the No Build alternative.

Build Alternative 2: Northbound Truck Rerouting

Build Alternative 2 was modeled using the No Build alternative as a base model and converts the existing three-leg stop-controlled intersection of McIntosh Road and Chute Road immediately south of

the Chiquita Bananas warehouse to a signalized intersection. In this alternative, some trucks are rerouted along the west side of the warehouse and north to Eller Drive so that they enter the Eller Drive and McIntosh Road intersection from the north to make a southbound right turn onto I-595 instead of making a northbound left turn. While this alternative would eliminate some northbound left turn conflicts at the intersection, it cannot be modeled using HSM methodology or the IHSDM software, as explained above for Build Alternative 1. Therefore, the primary changes to the safety model for this alternative are converting the intersection of McIntosh Road and Chute Road from stop-controlled to signal control. The crash rate was developed by applying corresponding crash modification factor for the conversions from unsignalized intersection.

Build Alternative 3: Diverged E/W with Gate Relocation

Build Alternative 3 modifies the east-west approaches of the study intersection to function similarly to a Diverging Diamond Interchange (DDI) or a Continuous Flow Intersection (CFI). While the proposed layout is more similar to the geometry of a DDI, the intersection was modeled as a CFI because it is an intersection and not an interchange. Therefore, the safety impacts of conversion to a CFI were deemed more closely fit the expected impacts of this alternative than the impacts of converting an existing interchange to a DDI. The CFI was modeled in the IHSDM software by applying a crash modification factor (CMF). The CMF was selected from the FHWA CMF clearinghouse, which rates all CMFs from the available research on a five-star scale, with five (5) stars being the highest possible quality rating. The CMF selected to represent the CFI is titled "Convert a conventional signalized intersection to a continuous flow intersection (CFI)" and has a rating of three (3) stars. The CMF has a value of 0.877 applicable to all crash types and all severities, which correlates to a 22.3% reduction in crashes. This CMF was applied to the study intersection to represent Build Alternative 3.

Build Alternative 4: Eller Drive Gate Removal

Build Alternative 4 could not be directly modeled in the IHSDM software due to the lack of research surrounding the impacts of the presence or non-presence of security gates on arterial streets. However, a CMF titled "Convert existing barrier tollbooths to open road tolling (ORT) facility," with a four-star rating, was applied to mimic the impacts of removing the existing security gate from Eller Drive. Similar to the existing security gate on Eller Drive, traditional barrier toll facilities create processing time when tolls are manually collected, increasing traffic delays. Converting traditional toll booths into electronic tolling allows traffic to pass without stopping. Therefore, this CMF was applied to the segment of Eller Drive east of the study intersection and west of SE 18th Avenue to mimic the scenario of free-flow eastbound traffic on this segment. However, the results of this analysis should be considered with some caution, as the CMF was intended for use on freeways at higher speeds and away from intersections, so is not completely compatible with the study site. This CMF was used as a way to approximate the effects of the gate removal.

Analysis Results

Shown in Table 10 is a comparison of the 20-year expected crash rates for the study area by alternative. Also shown are the average annual expected crash rates and present-day crash cost for each alternative.

It is noted that these crash rates are estimates only and are based on the approximate models representing each alternative. Additionally, operational improvements at the study intersection may be realized in each of the Build alternatives, which are not able to be represented in the model. Improvements in traffic operations, though not always able to be represented in HSM methodology,

generally have safety impacts resulting from reduced congestion.

Detailed crash prediction reports are assembled in **Appendix 5.**

Table 10. Crash Prediction Analysis Results

	No Build			Build Alt 1 Flyover			Build Alt 2 Truck Rerouting			Build Alt 3 Diverged E/W			Build Alt 4 Gate Removal		
	Injury	PDO	Total	Injury	PDO	Total	Injury	PDO	Total	Injury	PDO	Total	Injury	PDO	Total
4D	14.6	82.8	97.4	14.6	82.8	97.4	14.6	82.8	97.4	14.6	82.8	97.4	14.6	82.8	97.4
8D	10.2	44.9	55.1	10.2	44.9	55.1	10.2	44.9	55.1	10.2	44.9	55.1	4.9	21.8	26.8
3ST	4.5	15.4	19.9	4.5	15.4	19.9	3.2	10.9	14.0	4.5	15.4	19.9	4.5	15.4	19.9
3ST_1WA			0.0	1.8	2.9	4.7			0.0			0.0			0.0
4SG	35.5	175.1	210.6	35.5	175.1	210.6	35.5	175.1	210.6	31.2	153.5	184.7	35.5	175.1	210.6
CD Road			0.0	2.2	3.4	5.6			0.0			0.0			0.0
Total 20 Year Crash Rate	64.8	318.3	383.0	68.8	324.5	393.3	63.5	313.7	377.2	60.4	296.7	357.1	59.6	295.2	354.7
Annual Crash Rate	3.2	15.9	19.2	3.4	16.2	19.7	3.2	15.7	18.9	3.0	14.8	17.9	3.0	14.8	17.7
Crash Cost*	$25,116,958			$26,460,353			$24,741,938			$23,780,887			$22,778,457		
20-Year Cost Savings*	N/A			($1,343,400)			$375,000			$1,336,100			$2,338,500		

*Values in 2024 dollars

6. Benefit-Cost Analysis (BCA)

The benefit-cost analysis (BCA) for this project evaluates the economic feasibility and efficiency of improvement alternatives by comparing anticipated benefits to associated costs. Major costs items include construction costs and right-of-way (R/W) acquisition expenses. On the benefits side, traffic analysis usually considers operations benefits from travel time savings and vehicle operating cost savings, and safety benefits from crash reduction. Cost and benefits of improvement alternatives are presented below.

Cost Estimates

Cost estimates were developed for all build alternatives. Construction costs were developed using concept design plans and FDOT's Long Range Estimating (LRE) system. R/W cost estimates were developed by FDOT Right-Of-Way office based on square footage and parcels needed for each alternative.

Table 11 provides a summary of cost estimates for build alternatives in net present values (NPV). Detailed cost estimates are included in **Appendix 6**.

Table 11. Build Alternative Cost Estimates (in 2024)

Alternatives	Construction Cost[1]	R/W Cost[2]	Total Cost
1. I-595 Flyover with Gate Relocation	$30,712,000	$6,533,000	$37,245,000
2. Northbound Truck Rerouting	$1,546,000	$1,321,000	$2,867,000
3. Diverged East/West with Gate Relocation	$30,831,000	$11,146,000	$41,977,000
4. Eller Drive Gate Removal	$5,965,000	-[3]	$5,965,000
5. No Build	-	-	-

1. Construction cost includes design, mobilization, MOT, and contingency.
2. R/W cost from FDOT.
3. Assume no R/W impact from removing/relocating the Eller Drive security gate.

Benefits

Anticipated benefits from the Build alternatives are categorized into two main types: traffic operations benefits and safety benefits, as outlined below.

Traffic Operations Benefits

Traffic operations benefits encompass travel time savings, which represent reductions in travel time, and vehicle operating cost savings, estimated as a function of vehicle miles traveled (VMT) and typically expressed as a cost per mile. However, in this study, heavy congestion projected under future conditions causes peak period VMT to reflect throughput rather than actual travel demand. Additionally, since total travel distances for all alternatives are similar due to the absence of major diversion routes in the model network. Therefore, the evaluation of traffic operations benefits focuses primarily on travel time savings.

Peak period total travel times are measured in vehicle-hours traveled (VHT) plus latent delay. Per-

vehicle per hour travel time values is derived from the FDOT D4 Southeast Florida Road and Transit User Cost Study, with CPI-adjusted travel time value per hour per person estimated at $20.27 in 2024 dollars. Additional inputs and assumptions for travel time value savings estimation include:

- Average vehicle occupancy (AVO): 1.5 persons per vehicle.
- Time period per day considered: 11 hours (7 AM to 6 PM).
- Number of high-cruise-activity (>=4) weekdays per year: 44 days.
- Number of high-cruise-activity (>=4) weekend days per year: 53 days.
- Years considered: 20 years, starting from the opening year (2028).

Morning off-peak period (9-11 AM, two hours) and afternoon off-peak period (1-4 PM, three hours) travel times are estimated by interpolating between AM peak and midday (MD) peak travel times, and between MD peak and PM peak travel times, respectively. Similarly, yearly travel times between the opening year (2028) and the design year (2045) are also developed through interpolation. For years beyond 2045, travel times are assumed to remain constant at 2045 levels. Travel time value savings, provided in Table 12, represent the differences in travel times values between the Build alternatives and the No Build scenario, and their associated values. Detailed travel time value calculations are included in Appendix 7.

Table 12. Traffic Operations Benefits (in 2024)

Alternatives	Travel Time Values	Savings
1. I-595 Flyover with Gate Relocation	$224,298,720	$34,628,000
2. Northbound Truck Rerouting	$263,014,715	-$4,088,000
3. Diverged East/West with Gate Relocation	$250,874,503	$8,052,000
4. Eller Drive Gate Removal	$76,827,700	$182,099,000
5. No Build	$258,926,500	-

Safety Benefits

Safety benefits are quantified based on crash reduction associated with different types of improvements. A crash prediction analysis, discussed in Chapter 5, was conducted to estimate crash numbers and costs by each alternative. Crash costs and safety benefits for each alternative are shown in Table 13.

Table 13. Safety Benefits (20 Years, in 2024)

Alternatives	Crash Costs	Safety Benefits
1. I-595 Flyover with Gate Relocation	$26,460,400	($1,343,400)
2. Northbound Truck Rerouting	$24,741,900	$375,000
3. Diverged East/West with Gate Relocation	$23,780,900	$1,336,100
4. Eller Drive Gate Removal	$22,778,500	$2,338,500
5. No Build	$25,117,000	-

Total Benefits

Total benefits of each alternative are the sum of traffic operations benefits and safety benefits, as provided in Table 14.

Table 14. Total Benefits (in 2024)

Alternatives	Traffic Operations Benefits	Safety Benefits	Total Benefits
1. I-595 Flyover with Gate Relocation	$34,628,000	($1,343,400)	$33,284,600
2. Northbound Truck Rerouting	($4,088,000)	$375,000	($3,713,000)
3. Diverged East/West with Gate Relocation	$8,052,000	$1,336,100	$9,388,100
4. Eller Drive Gate Removal	$182,099,000	$2,338,500	$184,437,500
5. No Build	-	-	-

Benefit-Cost Ratio

The Benefit-Cost Ratio (BCR) is a key indicator for assessing the overall value of a project. It is calculated by dividing the total benefits of a project by its total costs.

[BCR] = [Total Benefits] / [Total Costs]

If BCR > 1, the project is considered economically feasible, as the benefits exceed the costs. However, when BCR ≤ 1, the project is generally not favorable due to the costs close to or exceeding the benefits. BCR, together with total benefits and costs, of each improvement alternatives are shown in Table 15.

Table 15. Benefit-Cost Ratio

Alternatives	Benefits	Costs	BCR
1. I-595 Flyover with Gate Relocation	$33,284,600	$37,245,000	0.89
2. Northbound Truck Rerouting	($3,713,000)	$2,867,000	(1.30)
3. Diverged East/West with Gate Relocation	$9,388,100	$41,977,000	0.22
4. Eller Drive Gate Removal	$184,437,500	$5,965,000	30.92
5. No Build	-	-	-

For Alternative 1: I-595 Flyover with Gate Relocation, the BCR is 0.89, indicating that the benefits are slightly below costs. This alternative may not be economically justified without further adjustments. For Alternative 2: Northbound Truck Rerouting, this alternative has a negative total benefit, resulting in a negative BCR. This alternative is unfavorable. For Alternative 3: Diverged East/West with Gate Relocation, the BCR is 0.22, which is a very low return of investment. This alternative is economically weak. For Alternative 4: Eller Drive Gate Removal, this alternative has a high BCR of 30.92, showing very significant benefits over its costs. This alternative is the most economically favorable option.

7. Alternatives Evaluation

The chapter provides a comprehensive assessment of improvement alternatives considering engineering, safety, economic, and environmental criteria which were selected for reaching project goals of improving operations, enhancing safety, minimizing impact, ensuring economic feasibility, and obtaining stakeholder support.

Evaluation Criteria

Engineering Evaluation Criteria

Engineering evaluation focus on improving intersection and system operations and reliability, factoring in traffic operations, R/W impact, railroad crossing, driveway access, and impact to other transportation modes. Selected engineering criteria are presented in Table 16.

Table 16. Engineering Criteria

Engineering Criteria	Description
Intersection LOS	Reflecting quality of intersection operations
Intersection Delay	Measuring time vehicles spend waiting at an intersection
Latent Demand (Queue)	Comparing unserved traffic demand caused by long queues
Travel Time	Measuring time spend traveling through the intersection by all vehicles
R/W Impact	Showing the potential need to acquire additional land for the project
Railroad Impact	Showing the potential need of FEC right of way or significant impact to crossings
Access Impact	Assessing potential need of changing or removing access points to adjacent properties and business
Impact to Other Modes	Considering impact on facility and service to pedestrians, bicycles, and transit

Safety Evaluation Criteria

Safety evaluation prioritizes reducing crash frequency and severity. It considers number of crashes and the benefits of each improvement alternatives. Selected safety criteria are shown in Table 17.

Table 17. Safety Criteria

Safety Criteria	Description
Predicted Crashes	Measuring the number of crashes based on design alternatives
Safety Benefits	Evaluating the expected reduction in crashes and crash costs

Economic Evaluation Criteria

Economic analysis evaluates the cost-effectiveness and long-term benefits of alternatives, ensuring financial feasibility. Selected economic criteria are presented in Table 18.

Table 18. Economic Criteria

Economic Criteria	Description
Total Benefit	Represents the aggregate monetary value of operational, safety, and environmental improvements
Total Cost	Includes capital, operational, and maintenance costs of the project
Benefit-Cost Ratio	Compares the total benefits to the costs of the project

Environmental Evaluation Criteria

Environmental evaluation aims to minimize impacts on natural, cultural, and physical resources while promoting sustainability and resilience. Selected criteria are included in Table 19.

Table 19. Environmental Criteria

Environmental Criteria	Description
Natural Resource	Assessing impacts on natural resources like wetlands, vegetation, and wildlife
Cultural Resources	Evaluating impacts to historic, archaeological, and cultural sites
Physical Resources	Considering impacts to soil, water, and geology resources
Resiliency	Measuring the project's ability of withstanding and recovering from future challenges, such as severe weather and climate change

Other Evaluation Criteria

Other evaluation includes stakeholder and contextual considerations, including public support and compatibility to ensure practicality and acceptance. Selected criteria are shown in Table 20.

Table 20. Other Criteria

Other Criteria	Description
Security	Preventing unauthorized entry to the port and safeguarding port assets
Stakeholder Support	Considering public and stakeholder acceptance of the project
Potential Conflict with Other Major Projects	Identifying overlapping resources and locations from other major projects

Evaluation Matrix and Ranking

Alternative Evaluation

Each alternative is evaluated against individual criterion described above. Input supporting evaluation are from previous chapters including concept development, intersection operations analysis, network performance, crash prediction analysis, and benefit-cost analysis. Desktop reviews were conducted to support environmental and access impact evaluation.

This evaluation process focuses on comparing the relative impact and benefits of different alternatives, emphasizing overall performance of each alternative across multiple analysis periods and years. It is designed to provide a qualitative but clear comparison, avoiding the use of numerical values, to support high-level decision-making without requiring detailed terms and performance measures.

The multi-criteria evaluation of each alternative is provided in Table 21 through Table 25 .

Table 21. Alternative 1 Evaluation

Evaluation Measures		Alternative 1: Flyover with Gate Relocation
Engineering	Intersection LOS	Strongest initial performance but declines over time
	Intersection Delay	Great performance initially but declines later
	Latent Demand (Queue)	Minimal initially but increases significantly later
	Travel Time	Low initially but rises significantly later
	R/W Impact	Large R/W impact, affecting multiple businesses
	Railroad Impact	Potential impact from flyover ramp
	Access Impact	Large impact to business on east side of McIntosh
	Impact to Other Modes	Small impact from longer crossing distance on south leg
Safety	Predicted Crashes	Highest number of crashes predicted
	Safety Benefits	Negative safety benefits in monetary values
Economic	Total Benefit	High total benefit
	Cost	High construction and R/W cost
	Benefit-Cost Ratio	Second best BCR
Environmental	Natural Resource	No impact
	Cultural Resources	No impact
	Physical Resources	Impact to drainage swale along McIntosh and trees NW of intersection
	Resiliency	Possible negative impact due to drainage during severe weather
Others	Security	No impact as security gate remains
	Stakeholder Support	Less favorable
	Potential Conflict	Probable conflict with Airport-Seaport Connector project

Table 22. Alternative 2 Evaluation

Evaluation Measures		Alternative 2: Northbound Truck Rerouting
Engineering	Intersection LOS	Moderate performance initially but poor in long term
	Intersection Delay	Overall worse performance than no build conditions
	Latent Demand (Queue)	Moderate in near term but the worst longer term
	Travel Time	Moderate initially but increases significantly in longer term
	R/W Impact	Relatively small R/W impact affecting FP&L
	Railroad Impact	No impact
	Access Impact	No impact
	Impact to Other Modes	No impact
Safety	Predicted Crashes	Moderate performance in predicted crash numbers
	Safety Benefits	Limited safety benefits in monetary values
Economic	Total Benefit	Negative total benefit
	Cost	Relatively low construction and R/W cost
	Benefit-Cost Ratio	Worst BCR
Environmental	Natural Resource	No impact
	Cultural Resources	No impact
	Physical Resources	Small impact to drainage canal by FP&L
	Resiliency	Small impact due to drainage
Others	Security	No impact as security gate remains
	Stakeholder Support	The least favorable
	Potential Conflict	None identified

Table 23. Alternative 3 Evaluation

Evaluation Measures		Alternative 3: Diverged E/W with Gate Relocation
Engineering	Intersection LOS	Moderate initial performance but declines over time
	Intersection Delay	Tolerable delays but declines later
	Latent Demand (Queue)	Low initially but increases significantly later
	Travel Time	Moderate initially but increases significantly in the future
	R/W Impact	Largest R/W impact, affecting many businesses and roadways
	Railroad Impact	Largest impact to both FEC R/W and crossings
	Access Impact	Significant impact to businesses and port admin building
	Impact to Other Modes	Largest impact to crossing distance and location
Safety	Predicted Crashes	Less number of crashes predicted
	Safety Benefits	High safety benefits in monetary value
Economic	Total Benefit	Moderate total benefit
	Cost	Highest construction and R/W cost
	Benefit-Cost Ratio	Low BCR
Environmental	Natural Resource	High impact to vegetation south of Eller Drive west of FEC, also Marnelli Park
	Cultural Resources	No impact
	Physical Resources	Moderate impact to soil and drainage due to Eller Dr shifting
	Resiliency	Highest impact due to complex traffic control and pattern, rebuild or relocating inspection station north of Eller Dr
Others	Security	No impact as security gate remains
	Stakeholder Support	Less favorable
	Potential Conflict	Possible conflict with Airport-Seaport Connector project

Table 24. Alternative 4 Evaluation

Evaluation Measures		Alternative 4: Eller Drive Gate Removal
Engineering	Intersection LOS	Good overall performance, slightly decline in long term
	Intersection Delay	Good performance initially and remains steady long term
	Latent Demand (Queue)	Minimal throughout all scenarios short term and long term
	Travel Time	Consistently low, steady performance
	R/W Impact	No identified impact, possible when considering other gate locations
	Railroad Impact	No impact
	Access Impact	No impact, Midport and 18th Avenue security concern may rise
	Impact to Other Modes	No impact
Safety	Predicted Crashes	Lowest of all
	Safety Benefits	Highest safety benefits in monetary value
Economic	Total Benefit	Highest total benefit
	Cost	Lowest construction and R/W cost
	Benefit-Cost Ratio	Best BCR by far
Environmental	Natural Resource	No impact
	Cultural Resources	No impact
	Physical Resources	No impact
	Resiliency	No impact
Others	Security	Negative impact from removal of the security gate
	Stakeholder Support	Favorable
	Potential Conflict	Possible conflict with Airport-Seaport Connector project when considering new gate location

Table 25. Alternative 5 Evaluation

Evaluation Measures		Alternative 5: Do-Nothing (No Build)
Engineering	Intersection LOS	Acceptable initially but declines significantly over time
	Intersection Delay	High initially and significantly worsen long term
	Latent Demand (Queue)	Very high especially long term
	Travel Time	High initially and rises significantly long term
	R/W Impact	No change
	Railroad Impact	No change
	Access Impact	No change
	Impact to Other Modes	No change
Safety	Predicted Crashes	Second worst among all alternatives
	Safety Benefits	Benchmark, not applicable
Economic	Total Benefit	Benchmark, not applicable
	Cost	None
	Benefit-Cost Ratio	Benchmark, not applicable
Environmental	Natural Resource	No impact
	Cultural Resources	No impact
	Physical Resources	No impact
	Resiliency	No impact
Others	Security	No impact
	Stakeholder Support	Benchmark, not applicable
	Potential Conflict	None

Alternative Ranking

Based on the multi-criteria evaluation, a decision support system was developed to provide a comprehensive ranking of alternatives. A ranking scale number was assigned for each evaluation criteria for all alternatives. The numerical ranking scale applied is shown in Table 26.

Table 26. Ranking Scale

Ranking Scale Number	Description
1	Significantly negative effect or worst alternative
2	Generally negative effect or inferior alternative
3	No effect or moderate alternative
4	Generally positive effect or good alternative
5	Significantly positive effect or best alternative

Table 27. Alternative Ranking

Evaluation Measures		Alt 1: Flyover	Alt 2: Reroute	Alt 3: Diverged	Alt 4: GateRmv	Alt 5: NoBuild
Engineering	Intersection LOS	4	1	3	5	2
	Intersection Delay	4	1	3	5	2
	Latent Demand (Queue)	4	2	3	5	1
	Travel Time	4	1	3	5	2
	R/W Impact	1	2	1	3	3
	Railroad Impact	2	3	1	3	3
	Access Impact	2	3	1	3	3
	Impact to Other Modes	2	3	1	3	3
Safety	Predicted Crashes	1	3	4	5	2
	Safety Benefits	1	3	4	5	2
Economic	Total Benefit	4	1	4	5	3
	Cost	2	5	1	5	3
	Benefit-Cost Ratio	2	1	2	5	3
Environmental	Natural Resource	3	3	2	3	3
	Cultural Resources	3	3	3	3	3
	Physical Resources	2	2	1	3	3
	Resiliency	2	2	1	3	3
Others	Security	3	3	3	1	3
	Stakeholder Support	2	1	2	4	3
	Potential Conflict	1	3	2	2	3
Sum		49	46	45	76	53
Ranking		**3**	**4**	**5**	**1**	**2**

The **Alternative 4 – Eller Drive Gate Removal** is the highest ranked alternative and is recommended for implementation.

8. Conclusion and Recommendations

Conclusion

This feasibility study assessed multiple alternatives to improve traffic flow, safety, and operational efficiency at the Eller Drive and McIntosh Road intersection. Key issues addressed include congestion due to security gate queuing, impacts on nearby infrastructure, and safety concerns related to the current traffic patterns around the study intersection.

The evaluation included five alternatives: No-Build, I-595 Flyover with Gate Relocation, Northbound Truck Rerouting, Diverged East/West with Gate Relocation, and Eller Drive Gate Removal. Through a comprehensive benefit-cost analysis and alternative evaluation, each alternative was analyzed for its effectiveness in meeting the project's objectives.

The Eller Drive Gate Removal alternative appears the most effective in improving intersection operations and safety. This alternative offers a high benefit-cost ratio due to reduced congestion and addressing queue spillbacks from the security gate without major infrastructure investments.

Recommendations

Recommended Build Alternative

Alternative 4 – Eller Drive Gate Removal is recommended for further evaluation through a Project Development and Environment (PD&E) study. This alternative proposes removing or relocating (to outside of Eller Drive) the security gate. The primary benefit of this alternative is the elimination of traffic queuing caused by the current Eller Drive security gate, which would significantly reduce the likelihood of intersection blockages. Consequently, this would also prevent conflicts between eastbound traffic queue spillback and northbound traffic flow.

Eller Drive Gate Removal

Assessing the impact of removing or relocating the Eller Drive security gate requires a comprehensive evaluation of various factors, including security, operations, engineering, environmental, and

construction considerations. This process will also involve input from key stakeholders such as petroleum, cruise, and cargo terminals, and Broward County Transit.

Other Recommendations

Throughout this feasibility study, valuable discussions emerged from meetings and coordination with stakeholders and PEV staff. While these efforts could not be addressed within this study, the ideas raised are significant for further exploration.

One of the primary challenges identified at the study intersection is the blockage caused by traffic queues from the Eller Drive security gate. One potential solution is to deploy law enforcement to reduce the number of eastbound vehicles entering the blocked intersection, especially during days with high number of cruises scheduled. Additionally, implementing advanced traffic controllers and queue detection technology could help manage traffic flow by dynamically adjusting signal phases based on real-time queue conditions, reducing the likelihood of intersection blockage.

Another significant issue at the intersection is the Southport truck queue, which spills back along southbound McIntosh Road and extends onto I-595, particularly during midday peak hours. Possible solutions include coordination with cargo terminal operators to improve terminal operations, especially operations during midday peak, enforcing truck driver compliance with terminal appointment systems, upgrading container processing capacity at Southport, and collaborating with neighboring ports to manage demand surges due to trucks diverted from other seaports. A viable approach to mitigate midday truck queue at Southport is to identify potential truck staging areas, such as widening McIntosh Road between the study intersection and the McIntosh Road security gate, utilizing the Southport "football field" (currently used for drainage), and exploring opportunities along NE 7th Avenue (which has a direct connection from I-595).

Additionally, it is observed that due to the substantial increase in passenger vehicle volumes projected between now and 2045, the demands for eastbound and westbound right turns during both weekday and weekend morning peak periods are approaching or exceeding the right-turn capacities at the study intersection. Consequently, eastbound and westbound right-turn queues are likely to become significant challenges. It is recommended that additional capacity for eastbound right turn and westbound right turn at the study intersection be considered.

Furthermore, impact to SE 19th Avenue and Eisenhower Avenue was not addressed. Future studies should assess these roadways, as they are likely to be directly affected by changes in traffic patterns along Eller Drive.

Finally, it's worth noting that the microsimulation models developed for this feasibility study, with the addition of modules and emission data, can calculate vehicle emissions and conducting environmental impact assessments.

Additional Analysis

During the last stakeholder meeting in December 2024, questions were raised regarding the performance and implications of two hybrid concepts: (1) Flyover with Eller Drive Gate Removal (Alternative 1 + 4) and (2) Diverged E/W with Eller Drive Gate Removal (Alternative 3 + 4). In response, the study team conducted additional VISSIM modeling and benefit-cost analyses to evaluate these alternatives.

Hybrid Concept 1 – Flyover with Eller Drive Gate Removal

This concept showed consistent improvements in traffic operations across all peak periods for the future years 2028 and 2045. No system gridlock was observed. Hybrid Concept 1 provided the highest overall benefits among all alternatives. However, the net Benefit-Cost Ratio (BCR) was calculated at 0.44, indicating that the additional benefits from this concept were outweighed by the associated implementation costs. As a result, Hybrid Concept 1 is not recommended.

Hybrid Concept 2 – Diverged E/W with Eller Drive Gate Removal

The performance of this concept was generally inferior to that of Alternative 4 (Gate Removal). This was likely due to the increased travel distance caused by two crossover intersections and additional delays from traffic signals at these locations. While no system gridlock was observed, Hybrid Concept 2 received lower overall benefits compared to Alternative 4. The net BCR was negative, indicating that no additional traffic operations benefits were observed. Therefore, Hybrid Concept 2 is not recommended.