Working Technical Memorandum

METHODOLOGY FOR LOCATING EXPRESS LANES INGRESS/EGRESS POINTS

1.1 GENERAL

Locating express lanes ingress/egress points is a key part of the express lanes project development process. It is an interactive and iterative process that involves various technical disciplines throughout the entire project lifecycle, including Planning, Project Development and Environment (PD&E), Design, Signing, Tolling, Operations, and Public Outreach. Preliminary ingress/egress locations are proposed during Planning and PD&E and are refined as a project moves forward in Design. If proposed ingress/egress locations cannot be accommodated at any future phase of the project due to constraints, ingress/egress points are adjusted and re-evaluated.

This ***Working Technical Memorandum*** includes the overall methodology, depicted in a flowchart, a table showing participants at each project phase, and considerations for locating express lanes ingress/egress points.

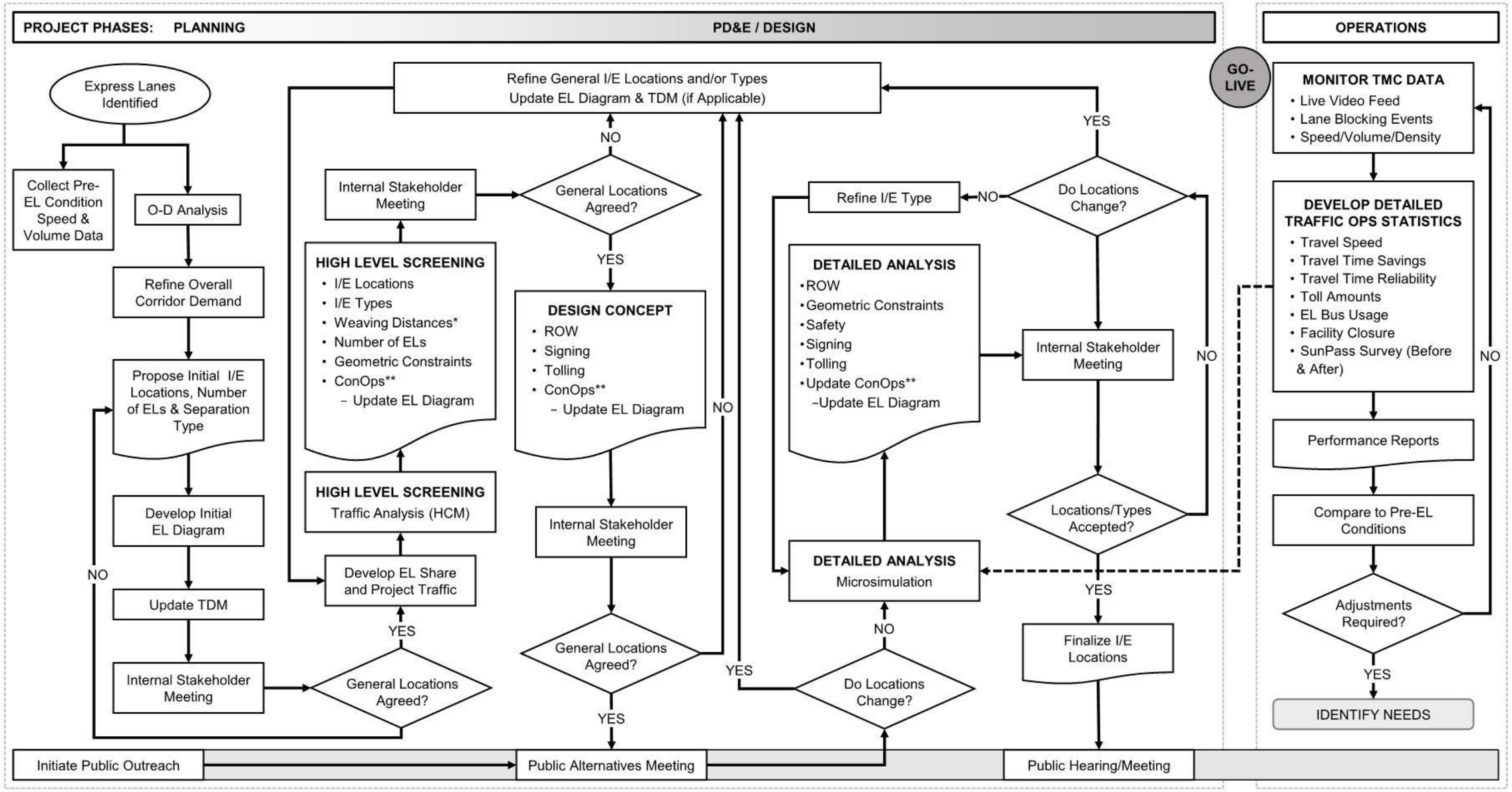
There are three (3) types of access points between general use or general toll lanes, and express lanes, including: point of ingress, intermediate point of ingress or egress, and termination of express lanes. For more information, refer to the ***Florida Department of Transportation (FDOT) Express Lanes Manual (FELM) 2.6.3.1***.

Types of express lanes access include slip ramps, weave lanes, weave zones, and direct connect ramps. Express lanes separation types include buffer separation with express lane markers, wide buffer separation, barrier separation, and grade separation. For information on express lanes access types and separation types, refer to ***FELM 4.3 and 4.6***.

1.2 INGRESS/EGRESS METHODOLOGY FLOWCHART

The ingress/egress methodology flowchart is shown in ***Figure 1-1***. This flowchart shows the project phases and major tasks to be completed within each phase

Figure 1-1: Ingress/Egress Methodology Flowchart



ConOps – Concept of Operations
EL – Express Lanes
ELToD – Express Lanes Time of Day

HCM – Highway Capacity Manual
I/E – Ingress/Egress
O-D – Origin-Destination

PD&E – Project Development and Environment
PIO – Public Information Office
TDM – Travel Demand Model

TMC – Traffic Management Center
*Weaving Distance = 1,000 feet per Lane Change
**ConOps is a living document, updated with every change

1.2.1 Overview of Methodology Flowchart

The ingress/egress methodology begins in the Planning phase, when express lanes are determined to be a feasible capacity improvement option for the facility. At the initiation of the Planning phase, origin-destination (O-D) data should be collected for the express lanes project. It is also important to collect pre-express lanes condition speed and volume data. This data collection can occur concurrently, but must occur before construction to accurately represent “before” conditions. In the Planning phase, as part of the Concept of Operations (ConOps), an initial express lanes diagram is developed using the access locations identified per the O-D analysis and corridor demand. The express lanes diagram begins as a simple stick diagram and is an important communication tool throughout the project lifecycle. It is used at internal stakeholder meetings, held at milestone points throughout the project to gain consensus on the proposed project from all disciplines of the project team. Potential key stakeholders include representatives from all the technical areas involved throughout the express lanes project lifecycle, including: Planning, PD&E, Design, Right of Way (ROW), Signing, Tolling, and Operations. Stakeholder meetings help ensure that appropriate considerations have been accounted for, in an effort to minimize re-evaluation or re-location of ingress/egress points. For more detail on express lanes diagram, refer to ***FELM 2.6.2***.

As the project moves into PD&E, project traffic and express lanes share are developed using the Express Lanes Time of Day (ELToD) model or other travel demand model (TDM) tools. High-level traffic analysis, based on the Highway Capacity Manual (HCM) analytical tools is used to screen multiple ingress/egress points and evaluate operational performance as access points are refined from preliminary to more specific locations. During Design, additional and more detailed traffic analysis is performed to demonstrate safety and operational acceptability of ingress/egress points. As the methodology flowchart details, if ingress/egress points are not agreed upon by stakeholders at any phase of the project, they must be adjusted and re-evaluated.

Many express lanes projects are being implemented as phased segments of a larger corridor project or as part of a regional network. Within interim project limits, each step of the methodology should be checked and to the greatest extent possible, access points should be located in the ultimate condition to avoid adjusting interim ingress/egress points when the project moves to the ultimate phase, and to avoid ending interim express lanes in a pre-existing traffic bottleneck or creating new traffic bottleneck. Refer to ***FELM 2.8*** for more information on interim versus ultimate project phasing.

Once a facility “goes-live” and is open to traffic, it remains important to collect detailed traffic operational data and develop performance reports periodically based on facility needs. The data can also be used to calibrate and validate a microsimulation model for detailed traffic analysis. After a facility is open, ingress/egress points can be re-evaluated and adjusted if needs are identified.

Public outreach, including three major public meetings and various communication with the public, is a continuous and consistent process that initiates at the beginning of an express lanes project and continues throughout the life of the project.

1.2.2 Interchange Access Request for Ingress/Egress Points

The need for an Interchange Access Request (IAR) is dependent on the type of access proposed for the express lanes project, and the decision of whether to prepare an IAR for an express lanes project needs to be made collaboratively between the District Interchange Review Coordinator (DIRC), State Interchange Review Coordinator (SIRC), and FHWA. The use of slip ramps, weave lanes, and weave zones does not require the preparation and approval of an IAR. The use of direct connect ramps, however, requires an IAR to be prepared and approved, following the process outlined in ***FDOT's Interchange Access Request Users Guide (IARUG).*** When an IAR is required, the IAR process should be coordinated with the express lanes project traffic development, so that projected traffic is consistent and duplicative work is avoided.

1.2.3 Change of Project Assumption(s)

Locating ingress/egress points is an iterative process and feedback is obtained throughout the project lifecycle. If project assumptions change and ingress/egress locations are no longer valid, location of ingress/egress points are re-evaluated and adjusted accordingly. Key stakeholders from various disciplines should be involved throughout project development. If major project assumptions change, these stakeholders should be consulted to review and update the ingress/egress points as needed.

1.3 PARTICIPANTS BY PROJECT DEVELOPMENT PHASE

In addition to the flowchart, Participants from each technical discipline and their roles for each step of the express lanes ingress /egress methodology are listed in ***Table 1-1***. While leading and supporting roles are identified, it is important for the entire project team to be involved throughout the project lifecycle. To reinforce this participation, internal stakeholder meetings are identified in the methodology flowchart to be held at project milestones. This will promote consensus from all disciplines of the project team before moving forward on the location of express lanes ingress/egress points.

District technical disciplines are the lead and responsible for District facilities, and Florida's Turnpike Enterprise (Turnpike) technical disciplines are the lead and responsible for Turnpike facilities. Turnpike is always available to assist on District and Turnpike facilities.

Table 1-1: Ingress/Egress Methodology Participants

Project Phase	Technical Disciplines Involved		Tasks
	Leading Role	**Supporting Role**	
Planning	Planning (Project Traffic Forecasting)	Planning (Traffic Analysis), PD&E and Operations	• Analyze O-D data • Refine overall corridor demand • Update Travel Demand Model • Collect pre-express lanes condition speed and volume data
	Planning (Traffic Analysis)	Planning (Project Traffic Forecasting) and PD&E	• Refer to initial ConOps • Propose initial ingress/egress locations, number of express lanes and express lanes separation types • Develop initial express lanes diagram
	Planning and PD&E	Design, Signing, Tolling, Operations and other relevant project stakeholders	• Conduct first Internal stakeholder meeting as a milestone meeting to gain consensus from internal stakeholders
	Public Outreach and PD&E	Planning	• Initiate public involvement process
PD&E / Design	Planning (Project Traffic Forecasting /Traffic Analysis) and PD&E	Design, ROW, Signing, Tolling and Operations	• Develop express lanes share and project traffic • Use HCM-based tools to screen ingress/egress alternatives • Update ConOps and express lanes diagram after screening
	Planning and PD&E	Design, ROW, Signing, Tolling, Operations and other relevant project stakeholders	• Conduct second Internal stakeholder meeting as a milestone meeting to gain consensus from internal stakeholders
	Public Outreach and PD&E	Planning	• Continue public involvement, conduct Public Alternative Meeting
	Planning (Traffic Analysis)	PD&E	• Detailed analysis using Microsimulation-based tools to identify operational issues
	Design, ROW, Signing, Tolling, and Operations	PD&E	• Detailed analysis for ROW, geometric constraints, safety, signing, and tolling • Update ConOps and express lanes diagram after screening
	Design, ROW, Signing, Tolling, and Operations	Planning, PD&E and other relevant project stakeholders	• Conduct third Internal stakeholder meeting as a milestone meeting to gain consensus from internal stakeholders
	PD&E and Design	Public Outreach, Planning, Design, ROW, Signing, Tolling and Operations	• Conduct Public Hearing/Meeting
Operations	Operations	Planning	• Operate facility • Monitor TMC Data • Provide detailed traffic operations statistics • If needed, collect operational data to calibrate microsimulation model • Prepare performance reports • Compare to pre-express lanes data collected prior to construction
	Operations	Planning, PD&E, Design, ROW, Signing, Tolling and other relevant project stakeholders	• Identify needs for ingress/egress points reevaluation and/or adjustments

1.4 CONSIDERATIONS FOR LOCATING EXPRESS LANES INGRESS/EGRESS POINTS

Throughout the express lanes project development process, several considerations are used to locate ingress/egress points and identify access type. These considerations include the following:

(1) Corridor Origin-Destination (O-D) Patterns;
(2) Project Traffic and Operational Characteristics of the Corridor;
(3) Design Criteria and Availability of Right of Way (ROW);
(4) Tolling Infrastructure Considerations;
(5) Signing Considerations;
(6) Public Outreach;
(7) Express Bus Services and Park-and-Ride Facilities in the Corridor;
(8) Impacts to the Environment; and
(9) Cost

1.5 CORRIDOR O-D PATTERNS

O-D data analysis defines study area travel patterns. It is a requirement for all express lanes projects, as detailed in ***FELM 2.6.1*** O-D data is collected and analyzed at the Planning stage of an express lanes project. Analysis provides existing and design horizon year traffic patterns for the express lanes corridor. Preliminary ingress/egress locations are proposed after O-D analysis is conducted and are further refined by various technical disciplines as the project progresses.

1.5.1 Approaches to Acquire O-D Data

O-D data is acquired from an existing dataset or via field data collection. Existing data sources include U.S. Census Bureau Longitudinal Employer-Household Dynamics (LEHD) data and proprietary travel pattern data, such as Big Data. Field data collection involves conducting an O-D survey to collect corridor interchange-to-interchange movements, existing traffic counts and travel speeds. Approaches to obtain O-D data include the following:

(1) Bluetooth Detectors,
(2) License Plate Identification,
(3) SunPass Tag Data, or
(4) SunPass Toll Tag Readers.
(5) Big Data – Location Based Services

O-D data collection technique and the associated methods are detailed in ***Table 1-2***, below.

Table 1-2: Approaches to Acquire O-D Data

Collection Technique	Method	Time and Cost	Sample Rates	Limitations
Bluetooth Detectors	Capture unique signals from in-vehicle mobile devices	Time and cost efficient	Low sample rates	Low sample rates
License Plate Identification	Detectors to identify vehicle license plates	Higher cost compared to Bluetooth and time consuming	High sample rates	Camera resolution
SunPass Tag Data	Track tolling point transactions	Time and cost efficient	High sample rates	Only applies to toll facilities in operation and only collects data for vehicles paying a toll
SunPass Toll Tag Readers	Similar to Bluetooth detectors, capture SunPass tag data	Higher cost compared to Bluetooth	Sample rates depend on SunPass tag penetration rate in the region and the number of readers available	Only collects data from vehicles equipped with SunPass transponders
Big Data – Location Based Services	Collect locational data from smartphone and mobile devices	Time and cost efficient	High sample rates	Geographical sampling bias

The quality and cost of O-D data is affected by data availability and/or the data collection technique used. An appropriate approach is selected based on project scope and budget.

1.5.2 Steps to Analyze O-D data

When identifying potential ingress/egress locations, consideration is given to both existing year and design horizon year O-D patterns. O-D data can only be collected for the existing year. Collected O-D data, traffic counts, and travel speed data, is used as an input to calibrate a TDM, which provides O-D patterns for both the existing and design horizon year.

There are three (3) steps to analyze O-D data:

(1) Process and expand the O-D data to match the daily and peak period traffic counts.

(2) Review capacity improvements, new facilities, or existing facilities that may have an impact on the demand for the express lanes facility and include in the TDM study area for the design horizon year.

(3) With inputs from step (1) and (2), use the TDM to develop O-D patterns for design horizon year.

After O-D analysis, preliminary ingress/egress points are proposed at preliminary general locations based on high frequency O-D pairs, high volume interchanges, and long-distance eligible trips. Eligible trips are defined in ***FELM 2.6.3.3,*** as trips that have the ability to enter and exit the express lanes based on their origin and destination. It is recommended that estimated eligible trips be greater than forty percent (40%) of total corridor trips for each segment.

1.6 PROJECT TRAFFIC AND OPERATIONAL CHARACTERISTICS OF THE CORRIDOR

Project traffic is developed during the Planning and PD&E phases. The express lanes project traffic includes both the corridor demand, and the split between the general use or general toll lanes and express lanes traffic. Unlike revenue traffic, project traffic is used to determine the number of express lanes needed in each direction. It is recommended that at least two (2) express lanes per direction are implemented, where feasible.

The traffic analysis uses the express lanes project traffic results to provide operational characteristics of the project corridor and identify any potential operational and safety issues related to ingress/egress locations.

During the traffic analysis, multiple ingress/egress points are evaluated, and the points are refined from preliminary to more specific locations. The refined access locations are used to perform additional and more detailed traffic analysis for demonstration of safety and operational acceptability during Design.

1.6.1 Project Traffic Development

There are three (3) approaches to forecast project traffic for express lanes:

(1) *Manual Estimation*
This method uses a manual estimation of the express lanes volume by applying a fixed percentage of the express lanes share of traffic to future year peak hour O-D volumes. Express lanes shares can be derived from observed data on operating express lanes facilities or other factors, including configuration of roadway network, travel demand, and traveler's value of travel time savings.

(2) *Travel Demand Model*
(a) Regional Travel Demand Model with Dynamic Toll Function or Willingness to Pay (WTP) Curve
TDMs can have embedded highway assignment scripting that can estimate express lanes traffic. TDMs with dynamic toll functions or WTP curves can be used to develop express lanes project traffic.
(b) Express Lanes Time of Day (ELToD) Model
ELToD is a traffic assignment tool used in conjunction with a regional travel demand model to split traffic between express lanes and general use or general toll lanes. ELToD is the Florida Department of Transportation's (Department's) preferred tool for forecasting traffic demand and developing

express lanes project traffic. When used to develop project traffic forecasts, appropriate inputs are required to ensure that the forecasts reflect the highest level of traffic that can be accommodated by the facility. For more information refer to ***FELM 3.6.3***.

(3) *Microsimulation Model with Toll Choice Model*
A microsimulation model with a dynamic traffic assignment module and toll choice model can be used to develop project traffic. However, the default toll choice model needs to be modified by the actual model developer to be consistent with the ELToD toll choice model.

Among the three methods, TDMs are the most widely used and recommended tool. Manual estimation is only used for preliminary estimation of project traffic, if the project team has good knowledge of local O-D patterns. Project traffic developed from manual estimation can only serve as a reference and should not be used as the basis for locating ingress/egress points. A microsimulation model can be used on projects where geometrical configuration may have significant impact on project traffic.

1.6.2 Tiered Traffic Analysis

After project traffic is developed, traffic analysis is performed to evaluate the operational performance of ingress/egress locations, mainlines, and ramp junctions. There are two (2) types of traffic analysis tools used:

(1) Deterministic: HCM and HCM-based tools
(2) Stochastic: Microsimulation-based tools

HCM-based tools take less time and cost less compared to microsimulation-based tools but provide less detail and have limitations when analyzing oversaturated conditions and time-varying demand. For more information refer to ***FDOT Traffic Analysis Handbook Chapter 6 and Highway Capacity Manual Volumes 2 and 3***. It is recommended HCM-based tools be used in the Planning phase for high-level screening of ingress/egress locations and microsimulation-based tools be used for detailed operational analysis of preferred ingress/egress locations.

1.7 DESIGN CRITERIA AND AVAILABILITY OF RIGHT OF WAY

Design criteria, spacing and geometry of existing interchanges, length of express lanes segment(s), separation type, geometric characteristics of the corridor, operational characteristics of the corridor, and availability of ROW are considered when choosing the most appropriate access locations and types.

Proposed ingress/egress locations are evaluated using established design criteria detailed in the ***FDOT Design Manual (FDM) 211***.

1.7.1 Selection of Express Lanes Access and Lane Separation

Selection of express lanes ingress/egress access type is driven by the express lanes separation technique, traffic volume, safety, operational characteristics, available ROW,

construction cost, and the interchange being served. A range of access types from the general use or general toll lanes to the express lanes are provided; direct connects provide the highest level of separation, followed by slip ramps, weave lanes, and weave zones. As the level of separation increases, the access type can serve higher traffic volumes and provide increased safety; however, with increased level of separation there are potential increased ROW, environmental impacts, and construction costs.

1.7.2 Design Considerations for Locating Ingress/Egress Points

There are five (5) key design considerations in locating ingress/egress points:

(1) *Maintain minimum length of weave*
The length of weave refers to the minimum distance needed per lane change required to move to/from an express lanes ingress/egress to/from an existing interchange ramp. A minimum of one-thousand (1,000) feet per lane change (as specified in ***FDM 211.14.1***) is needed for ingress and egress locations to/from the surrounding roadway network. However, consideration should also be given to traffic volume and lane separation technique. Minimum length of weave is analyzed using microsimulation. With inputs of traffic volume and lane separation technique, microsimulation demonstrates if the operation of express lanes and general use or general toll lanes are acceptable based on the minimum length of weave. If microsimulation shows the deterioration of operations, length of weave must be increased. A sensitivity analysis can be performed to determine the optimal length of weave. If deterioration of operations persists, access points need to be re-evaluated.

(2) *Recommended segment lengths*
Recommended segment lengths vary based on the number of express lanes in each direction, which is determined by project traffic. It is recommended that a segment should at least:
(a) Serve three (3) to seven (7) miles for express lanes corridors with one (1) express lane in each direction
(b) Serve four (4) to ten (10) miles for corridors with two (2) express lanes in each direction; and
(c) Bypass at least two (2) interchanges.

(3) *Avoid congestion points*
Express lanes weaving maneuvers increase friction in the general use or general toll lanes, which can lead to operational issues. If ingress/egress points are proposed at an existing congested interchange experiencing issues with operational performance, express lanes access cannot be provided until interchange issues are addressed. In general, ingress/egress points must bypass congestion areas before they can open for weaving movements.

(4) *Avoid high-incident locations*
A safety analysis, as detailed in ***FELM 2.6.5***, is performed to examine the effects of express lanes on the performance of the facility. Express lanes access weaving movements should avoid areas with a high crash frequency.

(5) *Avoid queue backup at express lanes termination points*
Express lanes serve highly congested areas and are typically implemented in phases, so it is common for the location of interim termination points to be in a pre-existing traffic bottleneck. Merging express lanes traffic should not deteriorate traffic in adjacent general use or general toll lanes. There are several options for terminating express lanes, including merging express lanes back into general use lanes, terminating an express lane at a major traffic attraction, or continuing an express lane as a general use lane, before merging with general use lanes. Traffic flow in the area should be analyzed to determine the recommended merge treatment at express lanes termination.

1.7.3 Design Considerations for Emergency Access

Emergency access is vital to express lanes operations. Emergency access is designed to give first responders access to incidents within the express lanes without the limitation of express lanes ingress/egress points. Emergency access design is dependent on the express lanes separation type utilized. Generally, buffer separation allows more flexibility for first responders access. Barrier separated express lanes require special considerations to accommodate emergency access.

1.7.4 Design Considerations for System-to-System Direct Connections

As the number of express lanes in operation and under construction increases, express lanes are transitioning from independent corridors to regional networks. Therefore, system-to-system direct connect ramps between express lanes are considered and implemented to serve regional needs. There are four (4) types of system-to-system direct connections:

(1) *Express Lanes-to-Arterial (EL-to-Arterial)*
EL-to-Arterial direct connect ramps provide access between express lanes and local arterials.

(2) *Express Lanes-to-Express Bus Park-and-Ride (EL-to-Express Bus PnR)*
EL-to-Express Bus PnR lot direct connect ramps provide access between express lanes and Express Bus Park-and-Ride Lots.

(3) *Express Lanes-to-General Use Lanes or General Toll Lanes(EL-to-GUL/GTL)*
EL-to-GUL/GTL direct connect ramps provide direct access between express lanes and adjacent facility general use or general toll lanes.

(4) *Express Lanes-to-Express Lanes (EL-to-EL)*
EL-to-EL direct connect ramps provide access between express lanes facilities using dedicated ramps. Directly connecting two (2) or more express lanes facilities requires unique considerations when locating ingress/egress points. More considerations for EL-to-EL direct connects are detailed in ***FELM 2.7***. When two (2) different express lanes facilities are directly connected, efficient and timely coordination between the two (2) facilities is required.

System-to-system direct connections are special cases that are more complex than the typical process for locating ingress/egress points. With direct connections, it is even more important to involve all disciplines early in the process, including local government partners, when applicable. Additional guidance will be developed as more experiences are gathered.

1.8 SIGNING CONSIDERATIONS

An express lanes diagram, paired with a conceptual master signing plan, ensures express lanes signage is clear, consistent, and appropriately located. Conceptual signing plans developed by the Districts during the Design phase must be reviewed by Turnpike. The Districts and Turnpike work collaboratively to confirm ingress/egress points and signage are properly located. During the PD&E and Design phases, if identified ingress/egress points cannot accommodate required signage, feedback must be provided to the project team and technical disciplines including Planning, Tolling, Design, ROW, and Operations to possibly revise the ingress/egress point.

For information regarding express lanes sign types and ingress/egress signing sequences, refer to ***Chapter 2, Signs, Section 2.42 Guidelines for Express Lanes Signing, Traffic Engineering Manual (TEM) 2018***.

There are three (3) key signing considerations in locating ingress/egress points:

(1) *Ingress/egress points are adequately spaced*
If ingress/egress points are spaced too closely, it can be difficult to adhere to required signing sequence.

(2) *Ingress/egress points are located with consideration of future signing needs*
It is preferred that current project signing support the regional express lanes network plan and accommodate planned future projects.

(3) *Signing and toll collection system are evaluated simultaneously*
Signing and tolling work collectively on express lanes projects and should be evaluated simultaneously.

1.9 TOLLING CONSIDERATIONS

Tolling refers to the overall operations of the toll collection system, which includes Turnpike Toll System Back Office and roadside toll equipment. For more information on the toll collection system, refer to ***FELM 5.2***.

A toll gantry must be placed near an express lanes ingress point. The roadside toll equipment site must be considered early in the Design Phase for site requirements during the process of locating ingress/egress points. In areas of limited right-of-way or sensitive environmental resources it is recommended that toll equipment sites be evaluated in the PD&E Phase.

There are two (2) key tolling considerations in locating ingress/egress points:

(1) *Locate the toll gantry as close as possible to the ingress point*
If traffic flow is not interrupted, toll gantries should be located within one (1) mile downstream from the last express lane entrance sign, with lane status, at the ingress. This minimizes travel time from the Toll Amount Sign (TAS) to the toll site, so that toll amounts more accurately reflect travel conditions.

(2) *Develop toll plans symmetrically by direction*
A balanced toll plan, with the same number of ingress/egress points in each direction, is preferred.

1.10 PUBLIC OUTREACH

It is important to obtain public support regarding the locations of proposed ingress/egress points. Public outreach introduces express lanes access and usage. It is a continuous and consistent process initiated at the beginning of an express lanes project and continues throughout the project lifecycle. For more information refer to ***FELM Chapter 8.***

1.10.1 Communication with Stakeholders and the Public

It is important to communicate to stakeholders and the public how ingress/egress locations are determined. There are many types of public meetings that may be held during project development to facilitate communication with the public. Ingress/egress locations should be presented to the public during the following three meetings: kick-off meeting, public alternatives meeting, and public hearing. Informal meetings and small groups or committee meetings may be convened to discuss specific ingress/egress locations. For more information about these meetings refer to ***PD&E Manual Part 1 Chapter 11, Topic No. 650-000-001.***

1.10.2 Addressing Comments

The District Public Information Officer (PIO) is the express lanes project representative for all technical disciplines. The PIO presents the express lanes ingress/egress point selection, focusing on how communities benefit, even without direct access to the express lanes. Also, as express lanes are typically implemented in phases, it is important to address interim access points along with future express lanes segments during public outreach. Public input regarding locations and types of access points should be considered and appropriately documented.

Below are potential messages to address questions and complaints from the public regarding access:

(1) Access points were selected based on traffic patterns (O-D data) and interchange spacing to achieve optimal traffic benefits.

(2) Express lanes benefit every user of a roadway. Express lanes provide an alternative to congested general use or general toll lanes. As more vehicles utilize

express lanes, there is less traffic in general use or general toll lanes, which improves travel times for all users of the facility.

(3) Express lanes are not the best option for every trip. Express lanes cover longer distances with limited access; therefore, access may not be provided for short distance trips.

Even after an express lanes system is open to traffic, public outreach continues. Continuous public input allows the Department to better understand the user's experience. This input provides valuable information for making decisions to revise or relocate access points based on operational and safety needs.

1.11 EXPRESS BUS SERVICES AND PARK-AND-RIDE FACILITIES IN THE CORRIDOR

Express bus services in express lanes increases person throughput and helps provide more reliable travel times in express lanes. Reasonably located park-and-ride lots are important to encourage passenger use of express bus service. Lots should be located in alignment with the corridor's major origins and destinations. An express bus ridership forecast helps ensure adequate demand for the express bus services. The forecast is usually based on service area population and employment, park-and-ride lots, express bus stations, frequency of express bus services, and other relevant factors. For more guidance on the planning and design of express bus services, refer to ***FDOT Bus/Express Lane System Planning Guidelines***. If express bus services and/or Park-and-Ride facilities already exist in a corridor, it is important to consider locating ingress/egress points to serve these facilities in an effort to enhance multimodal connectivity. EL-to-Express Bus PnR lot or bus terminal direct connect ramps should be considered if possible.

1.11 IMPACTS TO THE ENVIRONMENT

Potential impacts of express lanes access should be identified early in the project development process. Location of ingress and egress points should be evaluated with respect to potential benefits and impacts to social, natural, cultural and physical environments to satisfy PD&E requirements, including the National Environmental Policy Act (NEPA). Refer to the ***PD&E Manual, Topic No. 650-000-001*** for more detail***.***

1.12 COST

Cost including Construction cost and Operation and Maintenance (O&M) cost varies depending on the type of access and lane separation technique provided. While cost is an important consideration in the process of locating ingress and egress points, previously discussed considerations should be considered before cost when selecting the appropriate access type.