RESOURCE GUIDE FOR

Local Interchange Planning

Executive Summary

Executive Summary

The Florida Department of Transportation (FDOT) has developed the Resource Guide for Local Interchange Planning to support local governments with planning around interchanges along new or existing limited access or controlled access corridors. This resource can help local governments and other stakeholders to proactively ensure that growth within the vicinity of an interchange is consistent with community values as well as access management and design best practices.

Local Interchange Planning Objectives

This Resource Guide for Local Interchange Planning is intended to support local government community visions, land use policies, access management, transportation and right-of-way needs, and environmental preservation. The objectives of Local Interchange Planning are to:

- Establish how existing and future land use, development, and transportation decisions can be coordinated near the interchange;
- Identify cultural, historic, and environmental resources surrounding the interchange that need protection and minimize potential impacts to them;
- Increase the overall safety of the transportation system for all users;
- Facilitate the movement of bicycles, pedestrians, transit, and other transportation modes that interact with the interchange;
- Provide context to help inform future decisions on transportation design;
- Maximize public input into the planning process;
- Eliminate, mitigate, or minimize impacts to residents near interchanges;
- Coordinate with local governments on land use and economic development opportunities in communities served by the interchange; and
- Identify opportunities for providing aesthetically pleasing gateways to communities.

This Resource Guide is not intended to support or justify a request to add a new interchange on an existing limited access facility or address the process for justifying the location or design of interchange facilities. The justification for a new interchange must be done through FDOT's Interchange Access Request (IAR) process.

Document Contents

This Resource Guide is organized into four parts. Part 1 provides objectives and background information. Part 2 provides factors for consideration when planning around a new interchange and existing corridors. Part 3 includes takeaways and best practices from local governments in Florida. Part 4 includes a suggested outline for the development of a Local Interchange Plan.

Local Interchange Planning Strategies

There are four planning strategies associated with local interchanges that focus on Land Use, Access Management and Design, Environmental Protection, and Economic Development. The various components associated with each strategy is outlined as follows:

Land Use Policies

- Adopt zoning
- Develop small area plans
- Utilize planned unit developments
- Create and adopt revitalization plans
- Protect right-of-way near interchanges

Access Management and Design

- Consider intersection and signal spacing
- Promote alternate access roads
- Increase connectivity
- Connect parking lots and driveways
- Apply context sensitive design
- Provide access for all movements

Environmental Protection

- Direct growth to appropriate areas
- Enhance environmental systems
- Identify regional mitigation areas
- Set aside resource protection areas

Economic Development

- Align with regional economic vision
- Evaluate impacts and benefits
- Leverage local economic strengths

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PART 1

Defining Local Interchange Planning

Part 1: Defining Local Interchange Planning

Introduction

An interchange is a system of interconnecting roadways with vertical grade separations that provides for the movement of traffic between two or more roadways on different levels via a network of ramps and connectors. Interchanges are vital nodes on the transportation system as they provide access to communities through connections with surface streets. Interchanges create both opportunities and challenges for communities when it comes to land use, economic development, and environmental impact. Identifying community values when planning around a new interchange is an important aspect of the planning process.

Interchanges and transportation improvements should be consistent with growth strategies and policies in local government comprehensive plans per F.S. 163.3177 that support protection of the interchange and connecting roadway operations and protection of the community from unintended consequences including development patterns.

Areas around new interchanges may be subject to potential environmental impacts. The Florida Department of Transportation (FDOT) may work with and assist local governments in prioritizing the protection of environmental resources through the Local Interchange Planning process.

Local governments, landowners, developers of lands within the interchange area, FDOT, and other agencies and stakeholders contribute to the decision-making process of how an area can be developed. The Resource Guide for Local Interchange Planning can help decision makers meet community goals. It is intended to assist local governments to prevent uncoordinated development near the interchange that may result in land use incompatibility and affect the operational efficiency and safety of the interchange and surrounding roadway network. As such, local governments can use this resource to plan development surrounding a proposed interchange while protecting environmental resources and supporting sustainable economic development.

Relationship to Existing Procedures

This resource supplements the following FDOT manuals, procedures, and guidelines, as well as the Florida Department of Economic Opportunity (DEO) planning guidelines.

- ***FDOT Design Manual***—sets forth geometric and other design criteria and procedures for FDOT projects, including interchanges on the State Highway System.
- ***Interchange Access Request User's Guide***—provides guidance on how to prepare documents that support requests for new or modified access to limited access facilities on the State Highway System.

- ***FDOT Access Management Guidebook***—defines access management and provides guidance for application on Florida's roadways.
- ***Access Management Rules and Forms***—contains a compilation of Rule Chapters 14-96 and 14-97 of the Florida Administrative Code (F.A.C.), and Section 335.18, Florida Statutes (F.S.). Rule Chapter 14-96 F.A.C. implements the State Highway System Access Management Act of 1988 (Section 335 F.S.) for the regulation and control of vehicular access and connection points of ingress to, and egress from the State Highway System, and other transportation facilities under the Department's jurisdiction except for limited access facilities. Rule Chapter 14-97 F.A.C. sets forth an access control classification system and access management standards to implement the State Highway System Access Management Act.
- ***Manual of Uniform Minimum Standards for Design, Construction and Maintenance (Florida Greenbook)***—provides criteria for public streets, roads, highways, bridges, sidewalks, curbs and curb ramps, crosswalks, bicycle facilities, underpasses, and overpasses used by the public for vehicular and pedestrian travel.
- ***FDOT Efficient Transportation Decision Making (ETDM) Manual*** – provides guidance on reviewing qualifying projects through the ETDM planning and programming screens.
- ***FDOT Project Development and Environment (PD&E) Manual*** **-** contains federal and state environmental procedures that must be followed when developing interchanges.
- ***FDOT Context Classification Guide***—contains guidance on identifying context classifications and criteria for roadway design elements in planning, PD&E, and design phases.
- ***Florida Department of Economic Opportunity Community Planning***—provides guidelines for developing local government comprehensive plans and plan amendments, including review and amendment processing and submittal. It also provides an overview of community planning and the linkages between comprehensive planning and economic development planning.

Local Interchange Area Issues

A new interchange will create new accessibility that may attract development. There are many issues that can arise if growth in the area surrounding the interchange is not properly managed and guided.

- **Incompatible uses.** Basic land use planning tries to achieve groupings of compatible land uses. For instance, an airport that creates traffic and noise would be better matched with neighboring industrial or commercial land uses instead of residential. Land use planning can also achieve a balance of residential, commercial, and office to minimize travel distances and volume of trips on the roadway system.
- **Unaesthetic gateway.** Areas adjacent to an interchange may be aesthetically impacted by a particularly large or poorly located and designed interchange. For

instance, cluttered signs, utilities, strip development, and parking lots near interchanges can create an unattractive entryway to the surrounding community.

- **Congestion and safety issues.** Poor land planning can unnecessarily increase trip volumes and lengths, which can decrease mobility on the cross street, at the interchange, and on the mainline of the corridor involved for all users. Increased congestion and other land development issues, such as poor access management, can also contribute to an increase in crashes near interchange areas and cause additional safety concerns and impacts to pedestrians and bicyclists traveling in the area. Poor signal density or signal timing can also be a factor, which can increase delays at multiple signals at or near the interchange.
- **Negative economic impacts.** Congestion, incompatible land uses, and uncontrolled growth can increase the cost of living and doing business, and consequently decrease land values and future development potential of a community. Additionally, poorly designed interchanges may impact access to businesses.
- **Environmental Impacts.** Planning of interchanges and areas within the vicinity of the interchange should be undertaken with the goal of protecting local community character and the surrounding natural, cultural, and social resources. Environmental protection near interchanges is particularly important in less developed areas which are more susceptible to conversion into industrial, commercial, and residential uses as the result of the interchange construction. The consequences of poor planning in rural areas can affect local community character, agricultural land and operations, fish and wildlife habitat, and ecological processes. The intensity of the environmental impacts of the interchange can vary according to the environmental setting, especially the degree of naturalness in the local and regional ecosystems.

Objectives of Local Interchange Planning

Local Interchange Planning can be utilized to proactively plan for growth consistent with community values within the vicinity of an interchange. Generally, this planning helps set land use control policies and regulations to balance and manage transportation investments and land use changes while protecting the environment, community, and the operation of the roadway system. The objectives of Local Interchange Planning are to:

- Establish how existing and future land use, development, and transportation decisions will be coordinated near the interchange;
- Identify cultural, historic, and environmental resources surrounding the interchange that need protection and minimize potential impacts to them;
- Increase the overall safety of the transportation system for all users;
- Facilitate the movement of bicycles, pedestrians, transit, and other transportation modes that interact with the interchange;
- Provide context to help inform future decisions on transportation design;
- Maximize public input into the planning process;
- Eliminate, mitigate, or minimize impacts to residents near interchanges;

- Coordinate with local governments on land use and economic development opportunities in communities served by the interchange; and,
- Identify opportunities for providing aesthetically pleasing gateways to communities.

Coordination of planning processes provides support to encourage the function and form of the interchange to be supportive of the local land use development and zoning policies and vice-versa. Through coordination with the land use element of the local government comprehensive plan, Local Interchange Planning policies can guide growth decisions, infrastructure investments, redevelopment initiatives, and protection of environmental and cultural resources near interchanges.

Timing of Local Interchange Planning

Local Interchange Planning is part of the local planning process for land use and transportation. Within the framework of transportation project development (**Figure 1**), the Local Interchange Planning process should start as soon as the need and location for a new interchange is identified. As part of the planning phase, all interchange projects would go through an Efficient Transportation Decision Making (ETDM) screening. For projects involving a new transportation corridor, FDOT uses the Alternative Corridor Evaluation (ACE) process through ETDM if the anticipated class of action is an Environmental Assessment (EA), Environmental Impact Statement (EIS), or State Environmental Impact Review (SEIR) to identify, evaluate, and recommend alternatives for detailed analysis in the PD&E phase.

The outcome of the ACE process may identify multiple corridor/interchange possibilities for consideration during the PD&E phase. In addition, final approval of an interchange location and configuration is made through FDOT's Interchange Access Request (IAR) process. The IAR process is completed prior to or concurrent with the PD&E study. **Local Interchange Planning efforts completed prior to the completed PD&E study or IAR process are at-risk and subject to change.** For this reason, it is best to start the Local Interchange Planning process after the completion of the completed PD&E study and IAR process, if applicable. Before an interchange location is finalized in the PD&E study, public engagement will take place and FDOT will review local government recommendations that include consideration of appropriate land uses and natural resource protections.

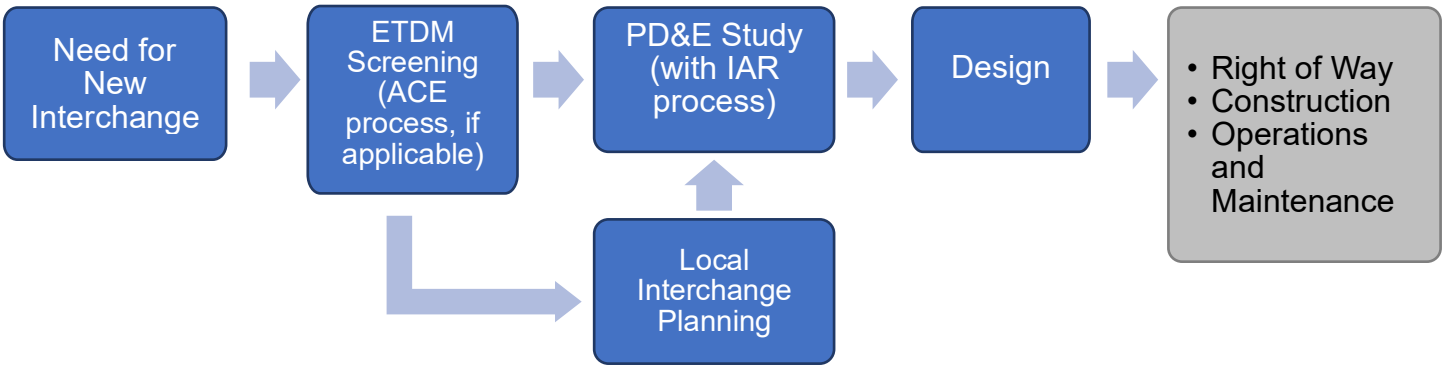


Figure 1. Local Interchange Planning Timing Flowchart

Partner Coordination and Roles

Local governments have the authority and responsibility to develop land use plans and plans for local transportation systems that include policies, controls, and standards via the requirement to develop comprehensive plans. FDOT has the authority and responsibility to plan for improvements on the State Highway System (SHS). Successful Local Interchange Planning will involve coordination and collaboration between local agencies and FDOT, given the roles and responsibilities of each.

Local government policies, plans, and land use controls and the personnel who develop and maintain such, are vital to the health of the community's environment, culture, economic development, and quality of life. Sharing these resources with FDOT throughout the process of Local Interchange Planning provides for more focus and efficiency. Coordination between FDOT and local agencies on the long-term planning for interchange areas, as well as the community's transportation network as it connects to such interchange areas, can be a beneficial approach to reducing congestion and safety concerns while providing for economic development and other benefits.

Through a collaborative process with FDOT, local governments can ensure that:

- The interchange and impacts are located appropriately;
- Timing of improvements are scheduled to support the local area to the extent possible;
- Improvements will enhance economic development opportunities;
- Environmental lands and desired land use patterns are protected;
- Community character and quality of life are enhanced or preserved; and,
- New interchanges and improvements are suitably integrated with the local transportation network.

PART 2

Aspects of Local Interchange Planning

Part 2: Aspects of Local Interchange Planning

Local Interchange Planning Considerations

Local Interchange Planning is beneficial to the development of interchanges on new and existing corridors and informs the local government comprehensive planning process. Planning for a new interchange involves the following activities:

- Evaluation or development of the community vision for the interchange;
- Inventory of natural, cultural, and scenic resources, including open space areas and identification of areas that need protection;
- Evaluation of existing and future land uses and identification of areas suitable for development;
- Evaluation of conceptual design of the interchange, and operation and safety of the transportation network within the interchange area;
- Engagement of the public and other stakeholders to obtain input; and,
- Development and documentation of policies, strategies, and measures (related to land use, transportation, economic development, environmental conservation) and implementing actions such as land use controls, zoning changes, and access controls to achieve orderly and productive development in the interchange area. Implementation can be achieved through the local land development code, local ordinances, local government comprehensive plan, or a combination of these.

Defining a Community Vision

As part of Local Interchange Planning, local communities should consider how interchange areas address and preserve the local community's vision. With a clear community vision, an interchange area can be turned into an attractive and efficient community asset that will preserve local character and promote economic development.

Community vision may already be included in master plans, economic development plans, local government comprehensive plans, long range transportation plans or regional plans.

A community affected by an interchange should incorporate realistic expectations of economic development into its vision of the interchange and the larger character of the community for future years. Such a vision may already be in place in master plans, economic development plans, local government comprehensive plans, or other related plans, and may only need updates or modifications.

For example, the City of North Port identified the desire for an activity center at Yorkshire Street and I-75 and the future need for an interchange. The potential

interchange is incorporated into North Port's Comprehensive Plan[1] and has been coordinated with the Sarasota/Manatee MPO. Other communities may need to develop a vision from the ground up.

YORKSHIRE STREET INTERCHANGE (SARASOTA COUNTY) IN THE NORTH PORT COMPREHENSIVE PLAN

- *Interchanges – As identified in back-up data found in the Activity Center Report (North Port Planning Department, 2008), the City is proposing a new Activity Center at Yorkshire Street and I-75. This location will eventually need an interchange to serve the industrial, commercial, office, residential, and park uses that are proposed. This is consistent with the 1997 Comprehensive Plan, which called for a future interchange in the vicinity of Yorkshire Street or Raintree Boulevard. Staff believes that the spacing of this interchange is appropriate as it is essentially equidistant between the interchange at Toledo Blade Boulevard in North Port and the Kings Highway interchange in Charlotte County.*
- *Policy 2.6.2: AC #6 – Widening of arterials and collectors such as Price Boulevard from Toledo Blade Blvd to Orlando Ave, Yorkshire Boulevard from I-75 to Hillsborough Boulevard will be necessary to support this new Activity Center. Therefore, the City shall prepare a master plan to define the road improvements including the new interchange, and potential funding source(s). In addition, the master plan shall address the following:*
    - *Multi-modal transportation opportunities (including autonomous transportation options);*
    - *Interconnectivity within the Activity Center to promote internal capture;*
    - *Linkages that may be appropriate to provide connectivity to areas adjoining the Activity Center;*
    - *Coordination with FDOT to establish the interchange, determine phasing for the interchange, determine interchange type and land area needed for the facility, to identify land use and infrastructure changes that may be necessary to ensure adequate operation of the interchange (land use changes will require a comprehensive plan amendment), and ensure compatibility with transportation modes that may serve the activity center as it develops;*
- *Policy 2.6.9: As part of the Master Plan process discussed in Policy 2.6.2 of this element, the City shall coordinate/consult specifically with FDOT regarding the design (including right-of-way needs), funding, timing/phasing, and construction of an interchange at Yorkshire Street and I-75.*

Local governments may also develop an interchange area-specific vision tied to land use plans and local economic development goals. For instance, the City of Apopka created the Wekiva Parkway Interchange Vision Plan to support economic development, complement the surrounding areas, and manage and protect water and wildlife resources[2].

[1] https://www.northportfl.gov/Building-Planning/Planning-Zoning/Comprehensive-Plan
[2] https://www.hugheshomesrealty.com/downloads/Wekiva-Interchange-Plan.pdf

WEKIVA PARKWAY INTERCHANGE VISION (CITY OF APOPKA) FROM THE APOPKA WEKIVA INTERCHANGE REPORT

- *The Wekiva Parkway will complete the outer beltway around the Metro Orlando area. The completion of this outer ring, along with the proposed interchange, will result in added growth and development pressure within the Wekiva Study Area.*
- *The Interchange Vision Plan can support economic development, complement the surrounding areas, and manage and protect water and wildlife resources.*

The visioning process should start early during planning when the need for a new interchange is identified, and collaboration should continue from inception through completion. A similar process may be applied to the future development around existing rural interchanges. The process should include various stakeholders, such as representatives of economic development and environmental organizations, planners, real estate developers, engineers, architects, and the public. The process should allow for public input and feedback through continuous participation opportunities. This can be accomplished by numerous outreach efforts, including public meetings, workshops, and surveys. Generally, it is advisable to form a steering committee with members representing a relevant cross section of pertinent expertise and familiarity with the community. Such a committee would be tasked with considering and optimizing economic development ideas compatible with the larger community vision. Once outreach efforts and public engagement are complete, a vision should be memorialized in a planning document to demonstrate consensus and commitment by the community.

Local Interchange Planning Area

In establishing local interchange planning areas, local governments should consider an area surrounding the interchange that is likely to be impacted by the change in transportation access conditions. The area should be extensive enough to include both developable and re-developable properties and major roadways that could substantially affect the function of an interchange over at least the next 20 years. At a minimum, the area should extend a half-mile beyond the interchange ramp terminals in each direction along the surface street or to the nearest signalized intersection (whichever distance is greater). If a large development exists or is planned near the interchange, the boundary of the local interchange planning area should be extended. The local interchange planning area should also account for any natural and cultural resources within the vicinity of the interchange.

Typically, two areas are identified—the interchange area of influence (AOI), and the land use study area. The interchange AOI is the area that is anticipated to experience significant changes in traffic operating characteristics due to implementation of the interchange. Guidelines for defining AOI are contained in the FDOT Interchange Access Request User's Guide. The land use study area encompasses all properties within at least a half-mile of the interchange that are expected to be significantly affected by the future function of the interchange. The study area limits can be expanded to include properties identified with the potential to affect the interchange, those that are expected to utilize the interchange as the primary connection to the freeway, or those that may be impacted by actions needed to improve local traffic circulation or potential development patterns.

Preserving Community Character

A new interchange can present a unique opportunity to plan and shape a community's future to fit its goals and vision. When effectively planned and implemented, a new interchange can serve as a key asset to a local community by not only providing access and mobility but offer placemaking features to highlight the community's character and foster economic growth.

Land Use and Transportation Planning

Transportation and land use are intrinsically interrelated; land use decisions directly impact transportation facilities, and transportation decisions impact surrounding land use and development potential. If a new interchange is added to a limited access facility, consideration should be given to the potential changes in accessibility to the surrounding properties in the area. There may be a need for land use changes to allow context-appropriate development which includes consideration of impacts to environmental, cultural, social resources and land use changes and new developments that could alter the traffic patterns along the cross streets, at interchange ramps, and on the mainline to eventually cause congestion and degrade the level of service. This then creates the need for more improvements, which ultimately restarts the transportation land use cycle. To minimize this effect, long range traffic projections should be based on models that reflect future land use changes. This planning would also allow for the acquisition of right-of-way for the long-term needs of the area.

In most land use and transportation planning circumstances, coordination between land use and transportation planning is necessary to provide optimal functionality of roadways as well as effectively planned communities.

Land Use Policies

Local governments are mainly responsible for controlling where and how development occurs. As such, effective land use planning within a local interchange plan can be performed by the local government to steer development towards the community's vision and to protect the mobility of the transportation system.

Local government growth management controls where and when development occurs, and land use planning controls the type, intensity, and layout of development. As shown in **Figure 2**, the local land development regulatory process starts with a community's comprehensive plan; next, the community adopts land development regulations; and finally, the community can issue development orders.

Figure 2. Local Land Development Regulatory Process

Per Section 163.3167, F.S., every municipality and county in the state of Florida must adopt a comprehensive plan. The comprehensive plan is a community's legally binding 'blueprint' for how it will develop or redevelop. A comprehensive plan contains several elements including future land use and transportation components. The comprehensive plan serves as an overarching framework to help a community reach its future vision. A community's regulations and policies are then enacted based on the comprehensive plan.

Consistent with the framework of the comprehensive plan, local governments may adopt land development regulations to control interchange area uses. Land development regulations are ordinances adopted to affect policies and plans. They regulate the development of land to guide growth to achieve the community's vision and goals while avoiding unmanaged growth, traffic congestion, incompatible land use patterns, and overburdened public infrastructure. The regulations can include:

- Zoning regulations (including interchange overlay districts, interchange zoning districts);
- Subdivision regulations;
- Small area plans;
- Planned Unit Developments (PUD) for interchange areas;
- Revitalization plans;
- Right-of-way protection; and,
- Other plans such as parking plans, and Capital Improvement Plans.

When a new development is proposed, it must be consistent with the comprehensive plan and land development regulations before the local government issues a development order and permit approvals. It is helpful to evaluate larger developments within or near the interchange area closely, as their impacts tend to extend far beyond the immediate location of the development site. Local governments can use a combination of land use/zoning, subdivision, site plan, or other regulations to enforce designation of land use type, density, land preservation, and access restrictions within the interchange area.

Local governments may implement smart growth strategies to reduce traffic congestion by encouraging mixed-use and compatible land uses with interconnectivity to minimize the volume and length of trips around an interchange. Local Interchange Planning is important because it limits the increase in congestion and maintains safety on the corridors that connect to the highway. For instance, providing office uses and residential uses in proximity to convenient sidewalk connections and transit provide opportunities to reduce commutes as well as encourage modes other than driving. This involves setting the desired mix of land uses within the zoning ordinances and land development regulations. Mechanisms such as small area plans, overlay districts, and PUDs could be implemented to support desirable mixed-use development. Additionally, incentives can be offered for developers to meet or exceed the desired goals through a density bonus, taxes, mitigation, or other means.

For example, **Figure 3** shows mixed-use and compatible land uses to support and control development opportunities near a proposed interchange at State Road (SR) 44.

Based on the existing land use pattern, the Suncoast Corridor Land Use Study identified this interchange area as suitable for future commercial development. The study also discusses the opportunity to rezone some of the land along SR 44 to industrial to support the County's target industries along the SR 44 corridor.

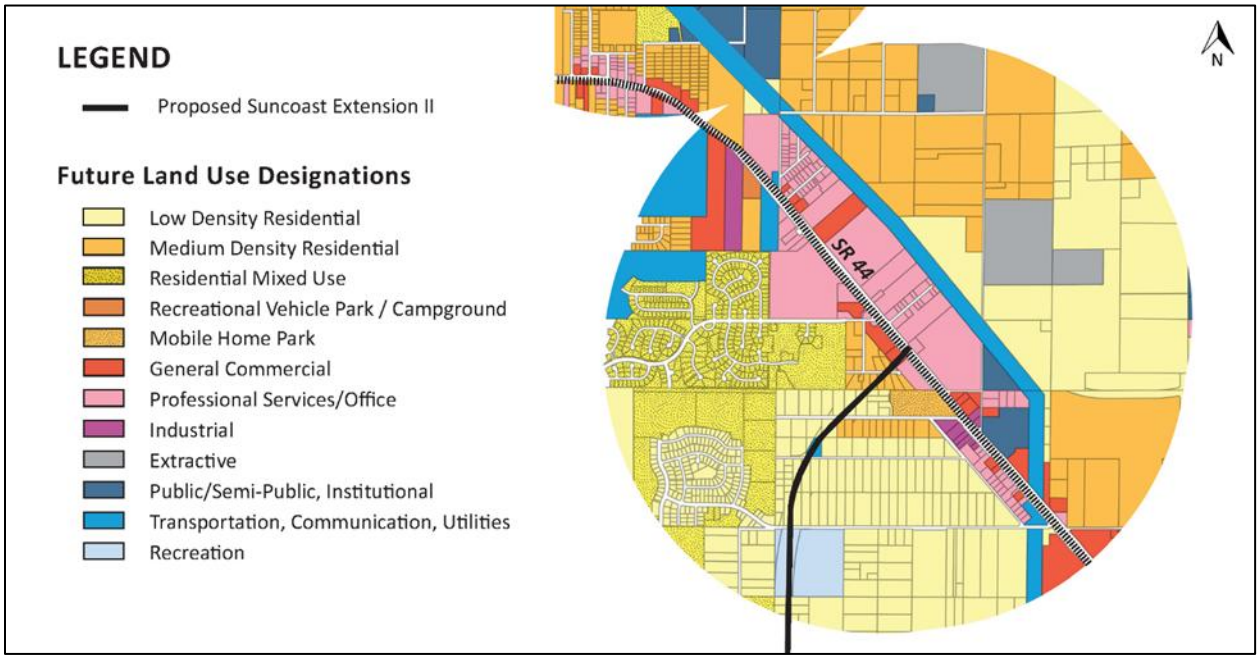


Figure 3: SR 44 Interchange: Future Land Use Map (Source: Citrus County Comprehensive Plan (GFLUM), Jan 2019

Access Management

Access management is a set of techniques used by state and local governments to control how vehicles access various roadways. Implementing access management techniques improves traffic flow, reduces the number of vehicle conflict points, and reduces crashes. Access management principles are applicable to all roadway types, from fully access-controlled facilities, such as freeways, to local streets with minimum access control. Access management near interchanges is necessary to avoid safety and operations issues due to high-speed transitions and weaving.

Access Spacing Standards

To promote safe and efficient traffic operations in the proximity of interchange ramp terminals and to encourage proper land use planning, FDOT has adopted *Rule Chapter 14-97, F.A.C.* to implement appropriate access management standards. Additionally, the *FDOT Median Opening and Access Management* procedure and the *FDOT Access Management Guidebook* further define the principles and processes for FDOT to implement the access management statute and rules.

Spacing between the interchanges is measured along the freeway between the centerlines of crossroads. *FDOT Design Manual Section 201.4* contains the minimum spacing requirements between adjacent interchanges. The minimum rural freeway interchange spacing is six miles. The minimum spacings for existing urbanized areas and areas transitioning to urbanized are two miles and three miles, respectively.

Access Management Strategies Near Interchanges

Access management in interchange areas can include the following measures or strategies:

- **Proper spacing of median openings near interchanges**. Median spacing is a critical element that impacts safety and operations at interchanges, particularly when it involves weaving traffic. Additional engineering study may be required to determine the adequacy of the median opening spacing. *F.A.C. Rule Chapter: 14-97*, the main rule on access management standards, considers interchange areas differently than other portions of a corridor. These areas may rely on spacing of median openings at greater distances than needed by the individual access management class of the arterial. *Interchange Areas 14-97.003(3)(h)(3)* "The standard distance to the first full median opening shall be at least 2,640 feet as measured from the end of the taper of the off ramp."
- **Constructing alternate access roads to limit direct access from properties to arterial roadways**. Access provided on secondary roads, frontage, and rear service roads, in addition to the main roadway, can provide travelers with multiple options to access land uses, and reduce the number of trips on the main roadway.
- **Planning for a network of streets to increase connectivity and to discourage the use of the highway for local traffic**. Local government may plan network connectivity and alternative routes to promote an interconnected street system that provides route options to the main arterial roadway connecting to the interchange. This can be achieved by creating or enhancing a collector street plan, designating future street extensions for improved connectivity, requiring smaller block lengths and perimeters in zoning codes or creating subdivision regulations. Enforcement for new developments can help developers adhere to the plan and connectivity guidelines. Local government may incentivize developers to exceed local design standards.

  For example, to effectively plan for a new interchange on the I-65 and SR 109 Bypass in Portland, Tennessee, the city conducted the North Gateway Corridor Planning Study to document the impact of the new interchange with a plan for economic growth, land development, natural resources preservation, and improved network connections. As shown in **Figure 4**, the North Gateway Corridor Planning Study identified improvements to existing roadways and construction of new roadways to provide increased route options for motorists, to disperse traffic, and to protect the mobility of the new interchange and SR 109 Bypass. The desired goals would be implemented through density bonus or taxes.

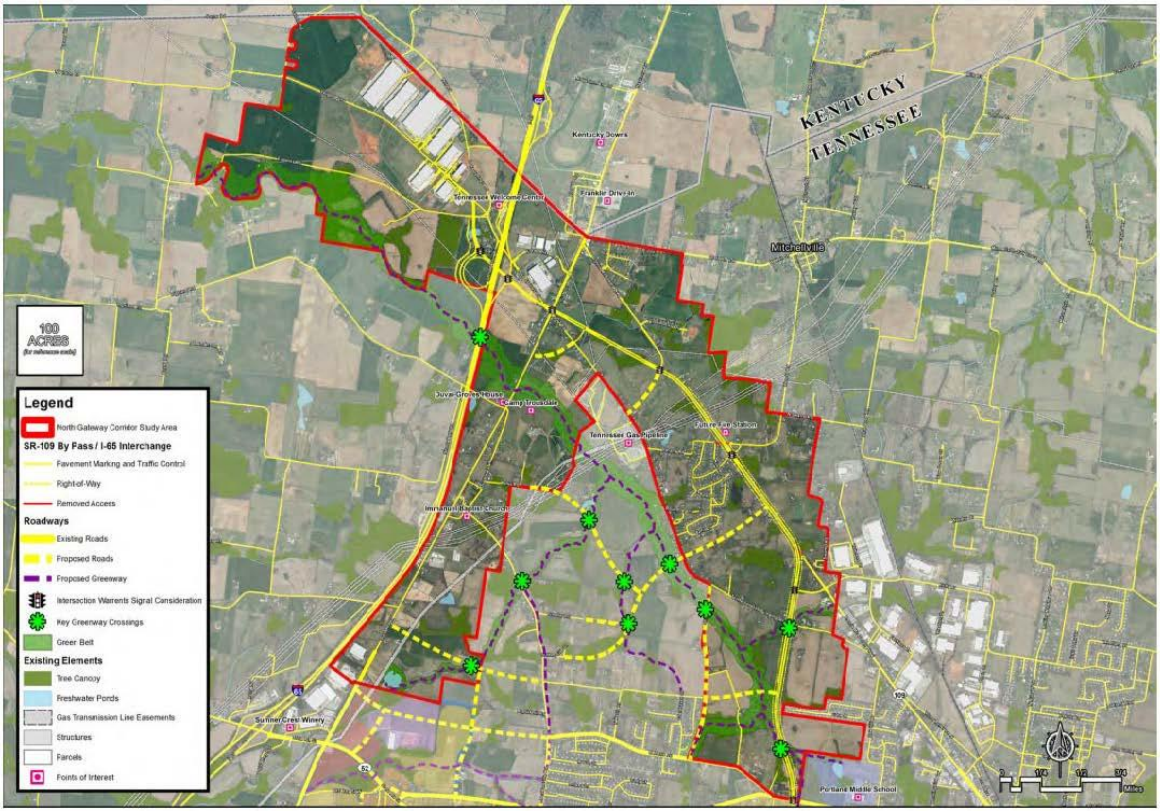


Figure 4. Proposed Transportation Network around New I-65 Interchange, Portland, TN[3]

- **Context Sensitive Design**. Context-sensitive design principles promote safe and efficient movement of prioritized modes of travel. Depending on the specific needs and characteristics of a site, potential modes include automobile, truck, transit, bicycle, and pedestrian. Design considerations include curb radius, sight distance, flare, width, pedestrian refuges, crosswalk beacons, bicycle lanes, bicycle loop detectors, transit stops and more. Local governments may add context sensitive design standards to land development codes and subdivision regulations. This can be done through an overlay zoning district, PUD, or other mechanism. The *FDOT Context Classification Guide* illustrates how to design and implement improvements that address the needs for all users.
- **Connecting parking lots and driveways with secondary roads to limit traffic on arterial roadways**. Minimizing the number of driveways can reduce the number of conflict points for all modes and improve operation of a roadway. This can be accomplished through consolidating driveways to create shared access driveways. Shared access improves traffic operation and safety and increases growth potential by opening more land for development. These consolidated driveways should be routed to secondary roads, rather than arterials, when possible.

[3] https://www.tn.gov/content/dam/tn/tdot/long-range-planning/studies/TDO%20I-65_ExecutiveSummary.pdf

- **Constructing medians**. Medians provide access management by minimizing vehicular conflicts through restricting left turning and crossing traffic. Medians have both operational and safety benefits for all roadway users.

Implementation of Access Management Strategies

Access management strategies can be implemented through:

- Comprehensive plan policies, specifically in the transportation element;
- Special area plans;
- Zoning codes;
- Creation of a local access management plan and implementing ordinance;
- Subdivision regulations; and,
- Requirements during the site plan approval process.

Local governments can require that new developments limit the number of driveways on the main roadway through shared access, cross-access agreements, reverse frontage roads, and providing access on secondary roads. Developments with a high volume of trips should also provide multiple access points.

Within the land use policies, local governments can establish minimum lot frontage requirements along the main road to prevent land being subdivided into smaller lots that would each need a driveway. Smaller lot sizes could be permitted if shared access or other access through a secondary street is agreed to instead of access to the main roadway.

For lots located near interchanges, local governments can add a requirement for providing access on the secondary road instead of the main road. Additionally, local governments can purchase access rights within a certain distance of the interchange to protect the area's access, safety, and mobility.

Environmental Considerations

Typically, the presence of environmental resources within the vicinity of an interchange affects the location and type of interchange. Areas around interchanges may be subject to potential environmental impact as a result of direct impacts from corridor development and indirect impacts from future population and economic growth. Therefore, it is important to identify the following resources that may be impacted by the interchange:

- General physical characteristics—topography, drainage/hydrology, soil types and vegetative cover;
- Cultural resources—scenic views and vistas, historic and archaeological sites, park, and recreation areas;
- Agricultural resources—farmlands, forests;
- Natural environment—fish and wildlife habitat, wetlands, floodplains;
- Major utility facilities; and,
- Hazardous materials.

The analysis and decisions developed during a stand-alone Local Interchange Plan environmental evaluation may be useful to a future PD&E process. The analysis and conclusions may be helpful if adequately documented in a planning report. The documentation should be provided to the PD&E team for their inclusion in the project file and considered during the PD&E. The recommendations should be general to allow flexibility when designing or developing recommendations during additional planning processes.

Level of Environmental Analysis

The level of environmental impact analysis performed for a Local Interchange Plan is a general analysis to identify avoidance, minimization, mitigation, and enhancement areas and to also identify known or potential risks and vulnerabilities due to extreme weather events to guide future land use and transportation. Environmental analysis done as part of Local Interchange Planning is fundamentally a "fatal flaw" evaluation and not a substitute for work that would be done in association with additional planning or PD&E work. The scale of technical and detailed analysis for a Local Interchange Plan is more general than for the PD&E phase of a project. Refer to the *PD&E Manual* for FDOT's procedure for complying with environmental review laws and regulations.

Environmental considerations for local interchange planning may include reviews of findings from evaluations local governments periodically complete as per their comprehensive plans under F.S. 163.3191 to identify the need for and support comprehensive plan updates. Such evaluations may help to identify and document any land use near or adjacent to the proposed interchange in need of protection or preservation. In addition to being critical for water, air, and habitat quality, as well as providing noise attenuation, maintaining natural areas in the vicinity of an interchange can provide a significant amenity and contribute to community character. Additionally, natural areas when well-managed may become an economic development engine for the community by attracting nature tourism.

When planning for local interchange areas, it is important to consider links between socially and culturally significant features and potential economic development with environmental protection and enhancement. There is a need to protect the environment and natural resources with the intended benefit of protection or enhancements of wildlife corridors or environmentally sensitive lands, and protection or enhancements of primary springs protection zones and farmland preservation areas that are designated within local government comprehensive plans. This purpose goes far beyond avoidance and minimization of environmental resource considerations in typical transportation projects. To attain economic development and environmental protection benefits, planning of local interchange areas should integrate natural resource consideration with land use and economic development activities. Environmental, social, and economic issues should be holistically considered to balance community growth plans, societal needs, and protection of the natural environment.

The need for protecting the environment and natural resources goes far beyond avoidance and minimization of environmental resources in typical transportation projects.

Environmental Resources

Environmental resources that can be considered for protection include watersheds, floodplains, wetlands, hydric soils, agricultural soils, farm, and forest lands, threatened and endangered species habitat, and scenic resources.

Environmentally sensitive resources that are considered for protection are typically listed in the Regional Planning Council (RPC) Strategic Regional Policy Plans and local government comprehensive plans, which include specific goals, policies, and strategies for their protection.

Additionally, an environmental resource-based evaluation through a geographic information system (GIS) analysis and other tools such as the Area of Interest tool or the Environmental Screening Tool (EST) of the ETDM process can be used to identify lands adjacent to or near the interchange that would need protection.

Sources for the GIS data layers may include the Florida Natural Areas Inventory (FNAI) and Florida Geographic Data Library (FGDL). The FNAI includes landscape connectivity models, which have considered different land management practices and habitat conservation concerns.

The environmental resource evaluation includes a high-level approach to habitat and biodiversity preservation by linking regional and statewide conservation planning with Local Interchange Planning. The evaluation can, therefore, include an inventory of lands within or near the local interchange planning area that are planned for acquisition by the Florida Forever Program, Water Management District lands, and other related programs. Identification of these lands will help to support broader regional and statewide conservation and environmental stewardship goals.

Environmental Protection Strategies

Strategies that are considered in protecting environmental resources near an interchange may include:

- Directing growth to appropriate areas:
    - Directing growth away from and encouraging limited disturbance of environmentally sensitive resources identified within or adjacent to the local interchange planning area. This could be achieved by controlling and setting policy for infrastructure, such as public sewer and water, so that the infrastructure is provided in areas considered most appropriate for future growth and avoid encroaching into sensitive areas.
    - Creating a natural resource overlay district to provide special protection controls over land development located within environmentally sensitive resources within the interchange area.

For example, the City of Orlando's Code of Ordinance includes the Wekiva Overlay District which was created to promote a pattern of development that preserves open space and protects the most effective recharge areas, karst features and sensitive natural habitats within the Wekiva Study Area, while recognizing property rights and accommodating both rural and urban land use patterns.

- Designing "with nature/the environment" to support and enhance environmental systems:
    - Identifying and protecting rivers, creeks, streams, and associated floodplains by creating setbacks and riparian buffers to enhance stormwater management and groundwater recharge.
    - Protecting watershed function and linkages to improve water quality, supply reliability, and stormwater management by identifying and developing inter-regional stormwater projects with public and private stakeholders.
    - Preserving existing non-invasive vegetation as much as possible by limiting clearing and grading and requiring re-vegetation of cleared areas.
    - Designing stormwater management facilities by placing and detailing them to enhance the interchange aesthetics.
    - Preserving scenic views and vistas, especially views seen from the freeways by placing buildings away from sight lines.
    - Connecting the interchange to activity centers with a system of trails and pathways.
    - Minimizing glare using properly installed and nonintrusive lighting.
- Identifying and securing regional mitigation areas:
    - Creating new protected areas and supporting existing protected areas and long-term conservation areas.
    - Restoring biodiversity or enhancing or creating new habitat.
- Identifying areas to be retained for threatened and endangered species habitat and watershed benefits such as groundwater recharge, stormwater management, recreation, and water quality:
    - Acquiring lands for environmental and agricultural conservation purposes utilizing a suite of tools that include the Florida Forever Program, and other conservation and land acquisition programs. Environmental review for acquisition projects that will support transportation purposes relies on coordination with the FDOT Office of Environmental Management per PD&E Manual procedures.
    - Providing landowners with incentives for protection and conservation of threatened and endangered species habitat on private lands.
    - Protecting or reserving undevelopable lands within the interchange area that are designated for agriculture and rural development from development pressures that could result from improved accessibility, visibility, and travel times associated with the new interchange.

The Wekiva Parkway Interchange Plan contained recommendations of appropriate standards for vegetation protection, water resources conservation, and conservation/open space preservation to protect the character of sensitive natural habitats, and water resources within the Wekiva Interchange Area.

- Preserving the character of rural areas:
    - Adopting guidelines that define the conditions under which land in the rural area may be rezoned to higher development zoning districts or preserved,

in conjunction with amendments to the Comprehensive Plan and the Future Land Use Map.

- Applying land conservation and easements as a tool to preserve agricultural lands and other environmentally sensitive lands.
- Acquiring valuable cultural resources, rural open space, scenic assets, farmlands, and contiguous forests as special agricultural and cultural districts.
- Using setbacks to protect adjacent roadside areas.
- Directing commercial and industrial uses to appropriate locations and providing necessary infrastructure.
- Requiring underground utilities, as appropriate.
- Retaining the rural scenic values and scenic areas by blending development with natural and rural settings.
- Controlling outdoor advertising by promoting small directional signs to provide information on services near interchanges.

*The design strategies in the infrastructure plan for the Southern Grove Development of Regional Impact (DRI) along I-95 in the City of Port St. Lucie included identification and protection of stormwater retention and wetland sites in the project area (**Figure 5**). A master interconnected stormwater lake system is recommended as part of the Master Plan to mitigate the impacts of stormwater on the site.*

Figure 5. Southern Grove DRI (Port St. Lucie) Stormwater Sub-Basin Diagram

Citrus County utilized the future land use map as illustrated in **Figure 6** to manage the intensity of the development along CR 486. The plan identified rural development inside the County's Planning Service Area and shows residential, commercial, and industrial development surrounding the interchange. The plan recognizes that most of the currently vacant lots will likely be developed by 2050 and addresses how future residential development can be supported by County water and sewer connections by following existing Duke Energy right-of-way or re-designating for light industrial use.

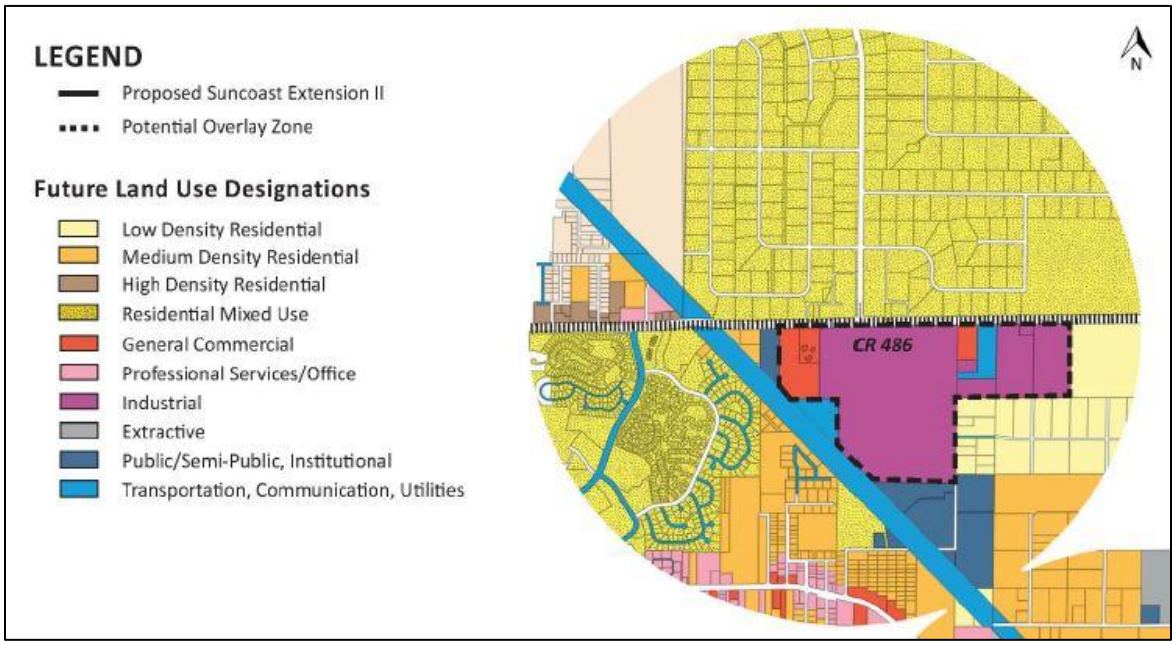


Figure 6. CR 486 Interchange: Future Land Use Map[4]

Economic Development

Economic development related to interchanges depends on several factors, including the nature of the communities surrounding the interchange and the interchange itself. Economic development is commonly described as jobs and wealth creation and improving economic growth and overall quality of life in a community. As such, there is no single policy or strategy that covers all aspects of economic development related to interchanges or other infrastructure improvements.

To achieve economic development benefits, the planning of an interchange area should be strategically envisioned, planned, implemented, and monitored throughout its long-term life cycle. Local governments should reference state, regional and local comprehensive economic development strategies and plans when planning for interchanges.

Evaluation of economic development opportunities and challenges of an interchange should generally involve:

[4] Citrus County Comprehensive Plan (GFLUM), Jan. 2019

- Formation of economic development goals. These goals could also come from the local comprehensive and economic development plans;
- Identification of existing local and regional assets that can benefit communities within the interchange area;
- Identification and evaluation of the area's land use, regulatory restrictions, and suitable physical conditions, including undevelopable or protected areas with natural constraints such as floodplains and wetlands;
- Planning and visioning workshops with the public and stakeholders to capture opportunities and ideas for the interchange area in alignment with the community's values and vision.
- Assessment of new opportunities in the interchange area as a result of economic changes created by the interchange;
- Development of strategies that serve as guiding principles in implementation of future action items. These strategies are used by both local officials and potential developers to understand community expectations for delivering positive economic benefits; and,
- Discussion with local planning agencies and organizations to review findings and prioritize implementation strategies regarding economic development initiatives and improvement options.

Strategic Alignment

The community vision would benefit from an alignment with the larger six-pillars framework for economic development that is found in the Florida Strategic Plan for Economic Development. Transportation improvements such as interchanges are included in the Infrastructure and Growth Leadership pillar. This framework is also recognized and applied by the Florida Chamber Foundation, as well as RPCs and local governments when preparing economic development plans and strategies.

Regional economic development strategies contained in the RPC Strategic Regional Policy Plans address issues that are greater than the scope of local economic development plans. These strategies also contain goals that support programs for retention and expansion of existing businesses and attraction of new businesses and markets. It is important to review these strategies to fully understand regional economic needs and goals when planning interchange areas. The Comprehensive Economic Development Strategy documents that RPCs prepare can also be consulted.

Additionally, local land use and transportation plans, land development regulations, and ongoing capital improvement projects throughout the vicinity of the interchange should be reviewed to understand their alignment with potential economic benefits from the construction of the interchange. RPCs and local Economic Development Councils (EDCs) offer various support and guidelines on economic development efforts, specific to their jurisdictions, that local governments can utilize to strengthen planning of interchange management areas.

Factors for Consideration

Several factors influence economic development and evolution of transportation systems. In addition to the community vision, they largely evolve around the existing

and anticipated future characteristics of the interchange area, and larger economic and societal trends.

Area Characteristics. Gathering data and analyzing trends in socioeconomic variables such as population, population density, households, employment, unemployment rate, income/earnings, poverty rate, educational attainment, and applicable distributions by age and industry help to understand community characteristics. Other factors affecting community characteristics include but are not limited to commuting and tourism volumes and patterns, residential and commercial real estate ownership and vacancy rates, cost of living, assessed property value, property taxes, lodging units and occupancy rates, retail sales and tax collections, industry clusters, crime rates, energy costs, vehicle registrations, number of licensed drivers, and passenger and commercial truck traffic volumes.

Area infrastructure such as roadways, transit, railroads, marine ports, airports, water, power, and telecommunications (including broadband) networks, along with land use, and environmental factors help to define community characteristics. It is important to also review economic development assets such as tourist attractions, healthcare facilities, fire stations, educational institutions, parks, and entertainment facilities.

The service area of the interchange may be measured in different sizes to cover a primary area (e.g., five-mile radius around the interchange), a secondary area (10 to 15-mile radius), and a tertiary area (up to 30-mile radius). Economic impacts can be measured at the county, metro, or larger geographic levels, depending on input data and model availability. These radii could be adjusted depending on the location and community context.

Macro and Micro Scales. A new interchange serves different business purposes such as larger/macro and vicinity/micro scales. At a macro scale, an interchange can function as a gateway for externally oriented businesses to facilitate access to markets through reduced transportation/business costs and could also make a community more appealing for tourism purposes. Most of the characteristics listed above are important to developers and various businesses that engage in locational decisions related to whether to stay (if existing) or move into the community with the interchange.

At a micro scale, an interchange can be planned to enhance the local economy of an area in its immediate vicinity. Factors such as signage/wayfinding, parking and carpooling availability, dining options, refueling options (gasoline, diesel, and electric/alternative fuels), lighting, security, noise walls, parcel size, zoning, and ease of access/maneuvering in and out of the interchange area should be considered in a micro level analysis.

SWOT Analysis. A strengths, weaknesses, opportunities, and threats (SWOT) analysis is conducted during planning of an interchange which examines and identifies attainability of the potential economic benefits for the interchange. The analysis is conducted from the perspective of both local governments (public agencies) and developers (private entities).

The resulting community strengths can be enhanced and marketed. For example, a community with a local asset such as a springs park could widely market improved access and visibility to tourists that may also stay at a hotel and dine at restaurants in the interchange's vicinity. Weaknesses could be identified and minimized or eliminated. For instance, a lack of commerce opportunity could be addressed by establishing businesses in the area by collaborating with agencies such as the DEO and the U.S. Department of Housing and Urban Development; or a new anchor/landmark could be created to entice tourists to visit or revisit the community. External opportunities such as digitization of commerce may provide the required demand for a warehousing/distribution facility suitable for a location near the new interchange.

Economic Impacts and Benefits

While economic development goals will vary by community, it is important to understand and distinguish between the economic impacts and economic benefits of a new interchange.

Economic Impacts

Economic impacts represent changes in economic activity to an area economy and are typically expressed as effects on employment, Gross Regional Product (GRP) or "value added," income, retail sales, and tax revenues. The effects through which these impacts are measured can be classified into direct and multipliers (i.e., indirect and induced).

Direct effect refers to the economic activity occurring as a result of direct spending by businesses or agencies located in the study area. Indirect effect refers to the economic activity resulting from purchases by local suppliers to the directly affected businesses or agencies. Induced effect refers to the increase in economic activity associated with increased labor income that accrues to workers and is spent on household goods and services purchased from businesses within the study area. The sum of direct, indirect, and induced effects yields total economic impacts of a project.

An interchange's economic impact can be short-term resulting from the construction activity and can also be long-term resulting from transformation of the economy.

Economic impacts can be estimated prior to construction of an interchange through either benchmarking or application of economic impact models. Benchmarking can utilize the EconWorks database which includes case studies that are used for comparative impact analysis. Economic impact analysis could be performed using specialized models such as IMPLAN or REMI, to estimate potential direct and total impacts specific to an interchange.

Economic Benefits

Estimation of economic benefits and impacts are not only beneficial to decision makers in preparation for an interchange but also aid in obtaining project funding through discretionary grant programs dedicated to assisting local and state government agencies fund worthwhile transportation projects in areas of need.

Typical benefits of a transportation infrastructure improvement, such as a new interchange, include travel time savings and reduction of vehicle operating costs, crashes, and emissions. The benefits are forecasted for typically 20 or more years after the interchange is constructed. Such benefits can also be compared to the capital and

operating and maintenance costs of an interchange investment to form a full benefit-cost analysis (BCA). A BCA helps to determine whether the net benefits of a project outweigh its costs on a discounted basis and address the question whether society is better off with the project. Three key measures are typically used to evaluate a project's economic feasibility and to formulate recommendations: 1) Benefit-Cost Ratio (BCR); 2) Net Present Value (NPV); and 3) Internal Rate of Return (IRR).

Marketing Plans

Marketing plans are an effective tool for implementing the economic development strategies of a Local Interchange Plan. Local governments and community organizations may consider developing interchange-specific marketing or branding plans to promote and inform businesses of the potential benefits of an interchange. The interchange-specific marketing or branding plans should be continuously monitored and dynamically adjusted as justified by local and broader external needs.

Various organizations can contribute to a community's marketing activities. These may include local, regional, and state agencies, community development councils, chambers of commerce, visitor bureaus, colleges and universities, utility companies, medical facilities, and property developers. The degree to which these organizations coordinate their activities around a common vision is a critical determinant of marketing success for an interchange project. Since there may be many organizations involved, it is important for a local government to establish a marketing program that will coordinate the marketing effort aimed at promoting the interchange. The marketing program will also assist in the identification of targeted markets and formation of related public policies for the interchange economic development strategies to be implemented successfully.

Basic Steps for creating an effective marketing plan:

- Identify and define target audiences.
- Conduct market research.
- Write a concise mission statement.
- Develop a strategy.
- Set a budget.
- Determine how to evaluate success.

Design Considerations

Design considerations of an interchange benefit from including an analysis of all interchange elements, such as freeways, surface roads (crossroads), ramps, speed change lanes, and ramp terminal intersections. Design considerations also include planning and analysis of the transportation network that serves traffic circulation within the interchange area and includes other modes such as freight, public transportation, and pedestrian and bicycle facilities. Local governments can use the Local Interchange Planning process to address architectural and site design elements such as landscaping, stormwater, grading, building, viewsheds, utility location, signs, parking and service area, lighting, building design including color and materials, and building orientation including access roads, driveways, parking areas and parcel boundaries in areas as consistent with CS/CS/HB 401 — Florida Building Code - 2021. Local

governments can apply regulatory tools such as design reviews to enforce standards related to site layout and building design were identified in the legislation.

The interchange configuration or form is typically determined by project traffic volumes, travel patterns (origin-destination pairs), design controls, availability of right-of-way, and environmental and cost considerations. Determination and final approval of the interchange configuration is conducted through FDOT's IAR process. The IAR process confirms the need for a new interchange or modifications to an existing interchange and establishes the appropriate type (e.g., diamond, single point, cloverleaf, diverging diamond, etc.) based on safety, operational, and engineering criteria. ***Planning decisions sensitive to the interchange configuration and established prior to the completion of an IAR may need to be reconsidered if the interchange configuration changes.***

Roadway Functional Classification and Context Classification

Roads with access to the interchange area should serve regional travel and provide access to regional destinations. Roads that have interchange connections to freeways are typically principal arterials or major collectors that are designed to accommodate higher speeds than local streets. Connection of private roadways to a freeway is not allowed.

Geometric Design and Signing Considerations

Interchange types are characterized by the basic shapes of ramps. The interchange design process must conform to the design controls and criteria published in the *FDOT Design Manual*. It is important to make the pattern of ramps along the freeway more consistent in order to improve driver expectancy.

A basic rule of thumb is to provide access for all movements at interchanges. However, due to existing and future travel demand, some access (ramps) may be provided in a future year when the traffic volumes warrant. In this case, the planning of the interchange should still show the locations of all planned future ramps.

Rolling topography presents opportunities to blend the design of the interchange and roadway network into the landscape and optimize the location of the ramps to reduce cost while improving the visual acuity of the interchange area.

The local roadway network should be designed following standards and criteria published in the *Florida Greenbook*. The design of the local roadway network should consider the traffic flow patterns to various land uses while discouraging through traffic from using local streets. Traffic flow and circulation should be designed to connect neighborhoods and businesses by applying proper access management strategies.

Roadway signs are an integral part of the design process. Roadway signs should be placed according to the *FDOT Design Manual* and the *Manual on Uniform Traffic Control Devices (MUTCD)* guidelines.

Commercial or business signs should be minimized to prevent visual clutter which can be dangerous to roadway users. To avoid sign clutter, local governments should consider limiting the number, placement, height, and size of business signs by utilizing strategies such as placing signs in locations that are invisible from freeways,

limiting the number of free-standing signs, limiting the height and size of the sign, and avoiding use of internally lighted signs.

Traffic Operations and Safety

From a traffic operations perspective, safety and operations efficiency of the freeway and connecting road network depend on the roadway design, access control and land use characteristics of the surrounding area. **Traffic movements in the interchange area are evaluated and appropriate level of service determined.** Attention should be given to the circulation of traffic exiting the limited access facility to destinations within the interchange area and entering back onto the limited access facility.

A future year traffic analysis is recommended to assess how the proposed interchange may work going forward. This relies on projections of the future travel demand. Future year traffic should meet FDOT guidance for developing project traffic contained in the *Project Traffic Forecasting Handbook*, *Traffic Analysis Handbook*, *Interchange Access Request User's Guide*, and *Quality/Level of Service Handbook*. The traffic analysis is conducted and documented in the IAR process or PD&E project traffic analysis report (PTAR), as appropriate.

Traffic circulation review within the interchange area is performed as part of the traffic impact analysis. Typically, local governments have documented procedures for conducting traffic impact studies related to development impact. The *Transportation Site Impact Handbook* contains FDOT guidance for conducting transportation impact analysis.

Multimodal Considerations

Local Interchange Planning and design considers the context of the surrounding land and applicable needs of all modes (cars, trucks, transit, bicycle, pedestrian, etc.) and users of all ages and abilities. Truck parking, loading and delivery areas are also key considerations, and should be discouraged on a cross street within a local interchange area.

The accommodation of pedestrians and bicycles, including pedestrians with disabilities, should be considered during the planning of interchanges. Non-motorized traffic is prohibited on freeways—consideration should be given to pedestrian and bicycle accommodation on the surface street to provide comfortable and safe pedestrian and bicycle access and mobility. Increased safety is found at interchange configurations with design features that cause drivers to slow down before turning into the freeway ramp or exiting from the ramp to the surface street. Slowing down vehicle movements increases the driver's chance to see a pedestrian crossing and lessens the severity if a crash occurs.

Addressing public transportation in interchange areas benefits from an integrated approach to incorporate current and future public transportation needs. Some considerations include:

- Location of park-and-ride facilities and connection to the freeways or surface arterials;
- Bus lanes on the freeways, ramps, or surface arterials;

- Bus stop locations;
- Intermodal interchange within or adjacent to the interchange to serve public transportation;
- Traffic signal priority measures; and,
- Queue jump at ramp terminal intersections.

Image 1. Diverging Diamond Interchange in Sarasota, Florida (Google Earth)

The area around the Diverging Diamond Interchange, located along I-75 at University Parkway in Sarasota, features electric vehicle charging stations, expanded sidewalks and bicycle lanes, and numerous aesthetic enhancements.

Interchange area multimodal accommodation strategies can be implemented through an overlay zoning district, PUD, or other mechanisms to specify the standards for the interchange area. Additionally, local government comprehensive plan transportation element policies (and future transportation network), as well as other transportation related plans like trails masterplans, transit plans, and Complete Street plans can and should address multimodal strategies, as well as design features that would improve the pedestrian level of service, include separation of the sidewalk from the roadway by a buffer, providing safe and convenient crossings, and other items. Additionally, local governments may provide incentives to developers to meet or exceed the desired multimodal goals. To encourage walking and biking and promote FDOT's Vision Zero traffic safety initiative goal of providing safe commutes for vulnerable users, it is important to provide continuous connections across the interchange to access either side of the interchange area.

Image 2. Melbourne Interchange Aerial (Google Earth)

The design of the I-95/Viera Boulevard in Melbourne DDI includes several multi-use trail improvements and connections to a park and aesthetic treatments.

Emerging Transportation Technologies

A location and siting analysis for electric vehicle charging infrastructure helps to determine the number of suitable areas for charging infrastructure adjacent to the interchange. Other emerging technologies that should be considered in Local Interchange Planning include but are not limited to:

- Communication infrastructure that supports future vehicle-to-infrastructure integration, or provides real-time travel information; and
- Technology that supports and enables autonomous vehicles/connected vehicles; and,
- Smart parking infrastructure systems.

Local Interchange Planning may include consideration of how emerging technologies could affect land use management, mobility, and transportation options within or near interchange areas.

Federal Provisions

New or modified interchanges on the Interstate System have requirements that local governments should be familiar with as they plan for new or revised access to the Interstate System. The Federal Highway Administration's (FHWA) *Policy on Access to*

the Interstate System requires that interchanges meet the highest level of service for safety and mobility.

FHWA's decision to approve new or revised access points to the Interstate System under Title 23, United States Code (U.S.C.), Section 111, must be supported by substantiated information justifying and documenting that decision.

Other Considerations
Design standards and approaches are evolving to incorporate the need to address resilience and adaptation of the transportation system in areas vulnerable to/at risk from extreme weather and climate change impacts. Compounding of impacts (i.e., some combination of sea level rise, enhanced storm surge, rising groundwater, increasing rainfall and temperatures, wildfire, etc.) may be a factor.

Image 3. Sarasota Interchange EV Station

The I-75/University Interchange in Sarasota provides multiple electric vehicle charging stations near the interchange.

Interchanges as Community Gateways

An interchange can be planned as a gateway that presents a positive image of the community and reinforces its identity. A gateway is a landmark, streetscape, or other feature that a visitor or resident sees when entering the community, a neighborhood, a cultural district, downtown, or other attraction or destination.

Local governments can plan and design interchanges to enhance entryways that promote their local communities by adding features that improve aesthetics of the interchange bridges and surrounding areas. Community Aesthetic Features (CAF) that

are installed within the FDOT right-of-way or attached to an FDOT structure must be approved by FDOT using the *Community Aesthetic Feature Agreement* (Form Number 625-010-10). Requirements for CAF are identified in *Chapter 127 of the FDOT Design Manual*.

Local governments may perform a gateway study as part of the interchange visioning process to address the following considerations:

- Landscape design and site grading;
- Materials for bridges and walls;
- Signage conveying useful travel information;
- Location, size, height, spacing, and lighting of outdoor advertising signs;
- Lighting;
- Mix of uses, open space and architectural consideration;
- Public artwork;
- Underground utilities; and,
- Local themes focused on the unique character of the community.

Community gateway planning could include an analysis of opportunities to improve the visual image and experience of the interchange user. Strategies that could be employed include:

- Consistency in wayfinding features;
- Legibility of visual hierarchy (designed to be viewed in order of importance); and,
- Reduction of visual chaos such as limiting placement of outdoor advertising signs.

Community gateway planning objectives can be achieved with implementation of local ordinances, aesthetics controls, and design standards.

Image 4. Ormond Beach I-95/Granada Blvd. Interchange

Architectural finish and landscape at the I-95/Granada interchange in the City of Ormond Beach, Florida, acts as a gateway to the city.

Intergovernmental Coordination and Public Participation

Local governments generally have the largest stake in planning when developing corridors, including when decisions about interchanges and access are required. As such, local governments are responsible for a Local Interchange Plan.

To preserve and improve the character and quality of communities in proposed interchange locations, it is imperative that local governments coordinate with regional planning councils, metropolitan planning organizations, landowners, developers, and other partners. They should coordinate early and work together to clearly delineate roles and responsibilities associated with a Local Interchange Plan. The responsibility of FDOT is to provide technical support and review the plans.

Coordination with local, regional, and state stakeholders is key for all parties to understand the community's vision and goals for the interchange management area, and then collaborating to achieve those goals.

Additionally, the public outreach process should engage residents, businesses, interest groups, and other stakeholders that might be affected by an interchange area project. The public outreach process should help to identify, address, and document public issues during the local interchange planning. These issues typically inform the development of future phases of the interchange area.

A Local Interchange Plan may include planning and visioning workshops with stakeholders and the public to solicit local input on the visions for the community or interchange. Other ways to engage the public during planning of interchange areas include opinion surveys, informational meetings and materials, design charrettes, and public forums. Local governments should consult the *FDOT Public Involvement Handbook*, which provides techniques and methods to encourage meaningful public participation throughout the transportation decision-making process.

Section 163.3184(11), F.S. requires a public hearing before a complete proposed comprehensive plan or plan amendment is transmitted to DEO. Another public hearing for the adopted plan is required within 180 days after the local government receives DEO comments. Local governments may request technical support from DEO regarding preparation and adoption of their comprehensive plans. Additionally, local governments may seek help from RPCs to prepare their comprehensive plan amendments.

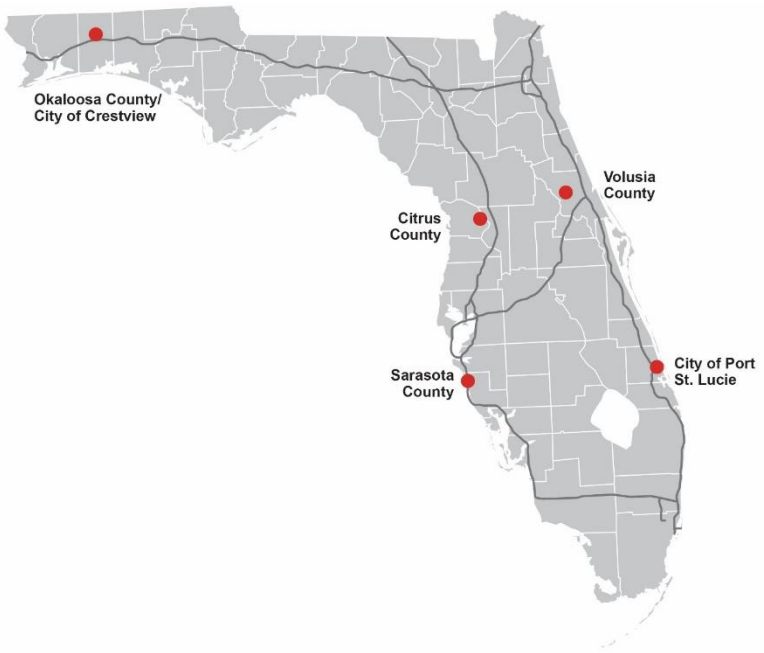
PART 3

Lessons Learned

Part 3: Lessons Learned

Five local agencies were consulted during the development of this Resource Guide in order to determine what information would be most useful for local agencies throughout the State to use when planning for a new interchange. The information shared by these agencies also included examples of best practices for ensuring that the growth around a proposed interchange is consistent with community values.

Particular attention was paid to making sure that the agencies selected reflected a diversity of geographic perspectives statewide: rural communities, urban communities, and developing communities. A list and map of agencies interviewed is included below. These agencies shared their community values for consideration when planning an interchange, experiences related to Local Interchange Planning, and a wealth of information related to different aspects of planning considerations from future land use planning to public input. Some of these meetings included representatives from the FDOT District in which the local agency was located. Local agency staff that participated in the discussions include Development Services staff, Planning Department staff, Transportation Planning and Engineering staff, Public Works staff, Community Redevelopment Agency staff, and Growth Management staff.



Local Agencies interviewed included:

- Citrus County
- City of Port St Lucie
- Okaloosa County/City of Crestview
- Sarasota County
- Volusia County

There was a range of perspectives and expertise shared from these different agencies, from those who are experienced with Local Interchange Planning to those starting to plan for development around future interchange areas. The community values ranged from economic development to environmental protection and revitalization. One community discussed maintaining a high quality of life as an important community value.

Key Themes

1) **Access management and distance from intersections**: these two aspects of Local Interchange Planning are important for the functioning of the transportation network. This subject came up in every conversation with a local agency. Sarasota County has codified direction on access management in their Unified

Development Code (UDC), which is consistent with FDOT guidelines for access management. Sarasota also identified an example of "what not to do," which included a "Town Center" development, business accesses, and signalized intersections that were placed too close to an interchange and did not allow additional space for both the interchange to expand and for development to expand as that area continued to grow. Sarasota County recommended that the primary access for major traffic generators should be placed as far away from the interchange as possible.

The City of Port St Lucie described how land uses and access management were part of the planning process for the Southern Grove Masterplan. Access management planning was done early in the process for the Becker interchange: placement of intersections, which segments would be limited access, separate corridors for residential and other land uses, and limiting traffic on the residential corridors.

Volusia County also expressed the importance of access management and signal spacing. At the interchange of I-95 and Pioneer Trail, the spacing of intersections close to the ramps has largely dictated the shape of the interchange. In the northern part of the county, many intersections include signal spacing that limit the footprint of the interchange as the spacing of intersections would be close to the ramp, which also limits the type of development that can occur in the area. Volusia said it is important to adhere to Florida Administrative Code spacing requirements regardless of the existing land uses because of the potential that these parcels may rezone to a different use.

2) **Multimodal and safety considerations**: how do people using alternative modes of transportation navigate interchange areas safely, especially when adjacent land uses and development are conducive to walking or biking or trails? This came up in every interview. The City of Port St. Lucie considered the citywide multimodal planning in the development of the conceptual masterplan for Southern Grove, which was challenging because of traffic volume anticipated at the interchanges. The City is looking to implement bicycle and pedestrian safety measures on several of the main corridors (Village Parkway, Tradition Parkway, and Becker Road), such as pedestrian refuges, wider medians, and curb extensions. Additionally, the City is implementing an autonomous shuttle throughout the Southern Grove Parkway area, connecting the residential areas with the activity centers, which will travel both on and off-street, using a dedicated path. Sarasota County has plans for Park & Ride locations connected with the transit system at county interchange areas. A new interchange is planned in Sarasota County at State Road (SR) 681 and I-75, which is in the vicinity of an important multi-use trail (Legacy Trail) that passes under SR 681, and connectivity to other trails in the area is important.
3) **Interchange as community gateway**: the aesthetics of the interchange area are important, as the interchange area is the gateway to the community. For example, Citrus County is planning for three new interchanges, each with a different character and land use code that is being finalized. The Cardinal Road

Land Use Code has an emphasis on a mix of uses that will include residential. As a developing area, there are still significant agricultural activities surrounding the interchange area, and these uses are allowed to remain. The City of Port St Lucie's Southern Grove Masterplan focused on the opportunity for the interchange as a community gateway when marketing the sites adjacent to the interchange for redevelopment. In particular, the agency discussed the importance of view corridors, and how having a water body within the area of the interchange which allows certain land-uses to have a more desirable viewshed.

4) **Community outreach and engagement**: in order to develop the vision for the Local Interchange Plan, community engagement is important. An open, transparent process with extensive public input was described by several agencies. Okaloosa County/City of Crestview shared their success story, describing how once the vision for the interchange area was adopted, elected officials were behind it and it allowed the community to move forward with a unified voice and common goal. Other communities relied more on the FDOT's public involvement process for gathering community feedback regarding new interchanges.
5) **Coordination with the Department and neighboring jurisdictions**: in many cases, one jurisdiction controls the land-use decision making while another jurisdiction maintains the transportation facilities that connect to the interchange, while the FDOT maintains the interstate. Coordination among these different government agencies when planning for an interchange area is important. This discussion came up in every meeting and was of particular interest in Volusia County. At one location in particular, there were different municipal jurisdictions developing independently on either side of a corridor that intersected with the interchange, creating a complicated dynamic for transportation planning, land use planning and interchange planning. Volusia County felt that more general coordination better serves the stakeholders and development, and specific coordination between the FDOT, County, and local agencies and their neighboring jurisdictions when large comprehensive plan amendments are considered for traffic impact analysis.
6) **Working with the private sector**: often the need for a new interchange is being driven by growth and development. Working with local developers to understand their plans and needs, and how those overlap with the community vision, is an important aspect of successful Local Interchange Plans. Sarasota County staff shared that they maintain continued discussions with local developers prior to and during the planning of the interchange area at I-75 and SR 681.

Some additional themes that arose were the importance of protecting natural resources around the interchange area, ensuring a mix of land uses, inclusion of natural buffers like trees and vegetation around the interchange area rather than sound walls or barriers, and the importance of wayfinding and signage. Some additional resources that agencies mentioned wanting to see were a tool to help with corridor preservation prior to the development of a corridor. In summary, these considerations, as well as the six key themes, are important factors for local agencies that were considered when developing this guide to local interchange planning.

PART 4

Local Interchange Plan

Part 4: Local Interchange Plan

A Local Interchange Plan can be prepared to document recommendations for land use, economic development strategies, and environmental protection measures. A Local Interchange Plan may be developed by the local government amending its comprehensive plan to include a specific policy recommendation into the transportation, conservation, future land use, and recreation elements of the comprehensive plan. The local government may update the future land use element of the comprehensive plan and the land development code to include appropriate land uses and natural resource protection measures described in the Local Interchange Plan. The Local Interchange Plan is not intended to support or justify a request to add a new interchange on an existing limited access facility or address the process for justifying the location or design of interchange facilities. The justification for a new interchange must be done through FDOT's IAR process. A suggested outline and composition of the Local Interchange Plan is provided below. This outline is intended to be a guide to assist local agencies with planning around interchange areas and is scalable depending on the size and context of the agency's jurisdiction. Rural communities, for example, might focus on implementing certain aspects of a Local Interchange Plan (such as Community Vision, Existing Conditions, and Public Involvement) and seek assistance from the FDOT on implementation of other aspects (such as Future Conditions).

Introduction

Describe background and purpose for preparing the Local Interchange Plan.

- The background section should include a discussion of previous planning history related to the interchange.
- The purpose section should include goals and objectives of the Local Interchange Plan, which should relate to the purposes of the project and meet the interests of local government and other stakeholders.
- The goals and objectives should be tied to the purpose and need for the interchange, which will form a basis for alternatives evaluation in later phases of project development.
- The goals for the Local Interchange Plan may include economic development, future land use and preservation of community character, transportation and utility planning, and preservation of environmental resources and open space areas.

Community Vision

- Describe the community character.
- Discuss the existing community vision, including its economic development component, if applicable.
- Describe components of a Local Interchange Planning Area specific vision plan.
- Summarize the process that was followed to develop the local interchange planning area vision.

Local Interchange Planning Area

- Describe the limits of the Local Interchange Planning Area. Include a local interchange planning area map showing boundaries of the land uses that would affect or be affected by the interchange function over the planning horizon (20 or more years).
- Include or discuss the AOI, if it was already developed.

Existing Conditions

Document and map the existing conditions including roadway characteristics, various uses, utilities, community facilities, emergency services, and environmental resources in the local interchange planning area

- Local and Regional Plans
  - Discuss existing policies and goals in local and regional plans that may affect development of the interchange.
  - Include a discussion of transportation plans such as long-range transportation plans, transit development plans, bicycle and pedestrian plans, and freight plans that are available and relevant to the local interchange planning area.
  - Identify any conflicts that may arise with implementation of the interchange and updates needed for plan consistency.
- Existing Land Use and Zoning
  - Describe existing land uses within the local interchange planning area. Include major trip generators and attractors such as schools, retail, and other non-residential major points of interest.
  - Discuss any Urban Growth Boundaries and note any undeveloped properties.
  - Identify parcels within the local interchange planning area that do not conform to the existing future land use map designation.
- Future Land Use
  - Describe future land uses including land development that is already planned to occur within or near the local interchange planning area.
  - Identify parcels or sites that would need a future land use map amendment as the result of interchange implementation.
- Public Facilities and Services
  - Provide a summary of public facilities and services that are within or planned in the local interchange planning area.
- Utilities
  - Describe existing utilities and services areas.
  - Include a discussion of planned utility service areas where central water and wastewater systems are not currently available.
- Natural, Cultural and Human Environment
  - Summarize environmental resources within or adjacent to the local interchange planning area.
  - Identify potential risks/vulnerabilities to impacts from extreme weather and changing climate, including compounded impacts.

  - Explain generally how the impact to environmentally sensitive resources (identified in the local government comprehensive plans or other sources) will be avoided, minimized, or mitigated by the planned interchange.
  - Identify lands that would be needed to protect or expand conservation areas, recreation and open space areas, or agricultural lands.
  - Discuss any scenic areas or historic areas near the interchange area that are potential recreation or tourist attractions.
- Transportation
  - Describe existing transportation facilities (roadway, bicycle lanes, sidewalks, and bus stops) that will affect the operation of the interchange. Include discussion of arterials, collectors and local roads, and major traffic generators.
  - Determine and describe the existing context classification(s) in and around the local interchange planning area.
  - Explain traffic (including pedestrian, bicycle, freight, and public transportation) circulation issues and opportunities within the interchange planning area.
  - Summarize the existing traffic operations and safety performance for existing segments and intersections.
- Access Management
  - Describe access management measures currently applied in the interchange planning area.
  - Discuss any access management issues that may need to be retrofitted.
- Economic Development
  - Provide a summary of employment/labor force, industry/business, tourism attractions, population/demographics, income, educational attainment, real estate ownership and occupancy rates within the interchange planning area, and the larger influence/market area.
  - Discuss trends in these different variables showing historical change and, if possible, forecasted long-term future change.
  - Discuss local economic development goals and how the interchange will facilitate their achievement.
  - Consider conducting an economic impact, and economic feasibility (Benefit-Cost Analysis) studies of the proposed interchange investment to gauge the magnitude of the expected economic development impacts, and if society is likely to be better off with the interchange in place.

Future Conditions

This section documents the results of the future conditions analysis.

- Future Traffic
  - Summarize design year traffic volumes and traffic operating characteristics from available traffic reports.
  - Compare with the existing traffic operations analysis document which shows problems will worsen in the future if no interchange is constructed (no build condition). Reference appropriate traffic analysis report (e.g., Interchange Justification Report or Project Traffic Analysis Report).

  - Discuss need for local roadway network improvement as the result of interchange construction.
- Interchange Design and Location
  - Discuss general design of the planned interchange and other transportation facilities, including public transportation, bicycle, and pedestrian facilities.
  - Discuss alternative interchange location and interchange configuration options, if applicable.
  - Document any potential impact to identified environmental resources that would need further evaluation in the PD&E study.
- Infrastructure
  - Discuss conceptual infrastructure improvements that will be needed to serve existing uses and potential growth areas within the interchange area.
  - Identify proposed median openings and driveways consistent with guidance provided in F.A.C. Rule Chapter: 14-97.
  - Establish a future design year
- Future Land Use
  - Discuss impacts of changes to distribution of existing and future land uses and impacts of the interchange location.
  - Determine and describe the future context classification(s) in and around the interchange planning area, if different from the existing context classification(s).
- Access Management
  - Describe traffic circulation within the interchange area.
- Economic Development
  - Discuss strategies to retain and expand existing businesses and attract new businesses within the Local Interchange Planning Area.
  - Coordinate with area agencies such as the Economic Development Council and Regional Planning Council.
  - Discuss any need for a marketing plan and outreach efforts and the most suitable leadership for such efforts.
- Potential Environmental Enhancement
  - Identify potential risks/vulnerabilities to impacts from extreme weather and changing climate.
  - Discuss opportunities to protect, preserve, and enhance the environment within or adjacent to the Local Interchange Planning Area.

Local Interchange Planning Management Strategies

This section provides the recommendations and strategies needed to manage the Local Interchange Planning Area.

- Land Use Control
  - Outline and discuss land use strategies and tools that the local government will use to preserve community character within and near the interchange area, including the designation of areas to accommodate

different types and densities or intensities of development (land use/zoning districts), as well as related development and open space protection policies.
    - If land use controls are already in place in the local government comprehensive plan and land development regulations, reference the plan and policy.
    - Discuss changes to the local government comprehensive plan including the future land use map, and land development regulations that are needed to implement the Local Interchange Plan.
    - Discuss environmental protection measures that are to be included in the local government comprehensive plan.
- Access Management Measures
    - Summarize access management measures that are needed to protect the safety, mobility, and function of the interchange and the roadway network.
    - Discuss any site and design standards and principles that will be needed to implement the Local Interchange Plan.
    - Consider the safety needs of the local interchange area, including countermeasures to address and avoid safety issues.

Public Involvement

- Summarize the public participation process and how it informed development of the Local Interchange Plan.
- Discuss intergovernmental coordination that occurred when developing the Local Interchange Plan.

Adoption and Implementation

- Summarize local government implementing actions and steps needed to implement the plan.
- Discuss any new language that will be added to the local government comprehensive plan—this includes interchange land use vision, utilities, transportation, and environmental protection. Include recommended language for local plan policy and ordinance amendments in an Appendix.
- Summarize steps that were taken or will be taken to adopt the Local Interchange Plan.
- Discuss steps that will be taken to monitor the performance of the interchange planning area over the planning horizon.