

# FLORIDA DEPARTMENT OF TRANSPORTATION

## STATE PARK-AND-RIDE GUIDE

Prepared for:

FLORIDA DEPARTMENT OF TRANSPORTATION TRANSIT OFFICE



Florida Department of Transportation  
Office of Freight, Logistics and Passenger Operations, Transit Office  
605 Suwannee Street, MS 26  
Tallahassee, FL 32399-0450

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FLORIDA DEPARTMENT OF TRANSPORTATION  
STATE PARK-AND-RIDE GUIDE

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Transit Office  
Tallahassee, Florida

Original by  
Frederick R. Harris, Inc.  
6300 NE First Avenue  
Fort Lauderdale, FL 33334  
December 1989

Revised by  
The Marketing Institute  
Florida State University College of Business  
324 Rovetta Business Building  
Tallahassee, FL 32306-1111  
September 1996

Revised by  
AECOM  
150 N. Orange Avenue, Suite 200  
Orlando, FL 32801  
June 2012

## EXECUTIVE SUMMARY

The purpose of this Park-and-Ride Guide is to provide a standard process and the essential information for the Florida Department of Transportation (FDOT) and other agencies in Florida to plan, implement, and manage Park-and-Ride facilities.

The Park-and-Ride Guide was originally developed in 1989 and published as the *State Park and Ride Lot Program Planning Manual* and updated in September of 1996. Subsequently, three of the chapters in the manual were updated in 2001, but were not fully integrated into the document. Since the last update, several federal and state activities have precipitated the need for an update of the manual. Statewide initiatives such as the expansion of the Tri-Rail service, the approval of the Central Florida commuter rail line (SunRail), and the initiation of the I-95 Managed Lanes, which includes implementation of express buses, has created an increased demand on commuter transit services and has necessitated an update of this guide to incorporate these recent initiatives, strategies, and legislation. The name was also changed from “manual” to “guide” with this 2012 revision. This revision endeavors to present a simplified, more user-friendly version.

**Introduction.** Park-and-Ride facilities are valuable ancillary resources supporting the transportation infrastructure. They vary in size and complexity, often being used by commuters as a means to park their vehicle and commute to work via carpool, vanpool, and bus or rail transit. Facilities can serve as multimodal hubs encouraging use of alternate forms of travel rather than the single-occupant vehicle.

**Park-and-Ride Planning Process.** Planning for Park-and-Ride facilities is vital for their successful integration into the transportation system. Long-range planning is useful for the big picture view with the goal of creating a network of strategically placed Park-and-Ride facilities across the state. When these facilities are placed in support of, and in conjunction with, new and existing transportation improvements, they will provide the most benefit to the transportation system. Short-range Park-and-Ride implementation planning provides a more detailed, closer look at what needs exist locally or regionally, what funding may be available, and allows for arrangements to be made for joint participation, where applicable. The facility development process requires a logical, organized progression of events so facilities may be planned and implemented in the most efficient and beneficial manner.

**Site Selection.** Selecting a suitable location for a Park-and-Ride facility can be a determining factor for how successfully the site will be utilized. Several factors come into play when identifying a potential location, including the type of facility being considered. Site selection should occur simultaneously with demand estimations, facility sizing, and evaluating the potential locations identified. A project viability memo is recommended to document specific locations evaluated. This will note for future reference why certain locations were removed from consideration, while others are utilized or further evaluated for Park-and-Ride facilities.

**Demand and Facility Size Estimation.** Demand and facility size estimation should be accomplished concurrently with site selection. Size estimation methods were simplified into three categories: remote, urban, and sketch planning. The formulas presented include population and employment growth factors, counts of informal parked vehicles, calculation of the number of total spaces and the size of the lot.

**Impact Assessments.** A Park-and-Ride facility can contribute to fuel conservation, reduction in vehicle emissions, and reduced travel miles traveled. Impacts are related to the number of parked vehicles removed from the roadway between the lot and destination area, resources

required for construction, maintenance and management of such facilities, and other environmental sustainability factors. Park-and-Ride lots may qualify for credits or funding grants from various programs.

**Economic Analysis and Project Justification.** When considering the construction of a new Park-and-Ride facility, it is important to take into account the associated economic impacts. This chapter provides direction on producing a justification report and performing economic analyses of Park-and-Ride improvements. Costs and benefits analyzed may be economic in nature, or they may relate to quality of life attributes for which monetary values cannot be assigned; both types contribute to a valuable analysis and project justification. All proposals for Park-and-Ride projects should include a justification report that contains sufficient explanation and data to show purpose, need, benefit and cost impacts, compatibility with state and local plans, impacts on surrounding transportation systems, and how the proposed improvement will address identified need(s).

**Conceptual Design Considerations.** Designing a new Park-and-Ride facility, or an expansion for an existing one, requires consideration of several design factors including accommodations to meet ADA requirements. External design factors include entrances and exits for the facility, transit access, traffic control devices, and guide signs. Internal design factors involve much more detail including: parking layout and vehicle circulation, transit facilities and loading areas, carpool/vanpool staging areas, pavement, drainage, signs and pavement markings, landscaping, security, user amenities, art and community integration, lighting, fencing, and sustainable green designs, where applicable. Transit services are highly recommended for incorporation whenever possible as these can greatly contribute to and support successful utilization rates.

**Project Selection, Funding, and Allocation Methods.** Financial support is essential for Park-and-Ride facilities. The funding allocation process must be considered in addition to potential alternative sources of funding. Funds may be obtained from federal, state, local, or private resources. Creative, non-traditional funding methods may also be considered for implementing Park-and-Ride facilities.

**Maintenance and Management.** Managing and maintaining Park-and-Ride facilities are essential to the success of each facility and for the Program. At minimum, a basic maintenance plan, and an executed maintenance agreement with the entity responsible for maintenance (if not the FDOT Maintenance Office) must be in place before construction of a new facility. A maintenance agreement between the FDOT and another business, organization, transit provider or municipality is to be a formal, written and executed agreement clearly stating the responsibilities of each entity to the lot and is to be included in all contractual arrangements as a special consideration. Performance of facilities must be evaluated individually and as a network of facilities supporting the transportation system. A performance evaluation for a particular facility may indicate that corrective actions may be warranted. In some cases, additional information may need to be collected to identify the best course of action in managing a facility.

**Promotion and Marketing.** Promoting and marketing of Park-and-Ride facilities makes the program known, lets people know what it has accomplished, and better informs the public about the state's multimodal transportation network. Park-and-Ride users constitute a dynamic market with mode shifts and changes in the economy, residence, and work places. Consequently, a continuing marketing program for Park-and-Ride services should be maintained to enhance usage. Promotion of new Park-and-Ride facilities can increase usage as well as accelerate the rate of growth in utilization and transit revenues where service is provided. Creating and maintaining a flexible marketing plan will provide a framework for when and how Park-and-Ride facilities are promoted.

**Inventorying, Evaluating, and Reporting on Existing Facilities.** Once Park-and-Ride facilities have been designed and constructed, the process continues with inventorying, monitoring, evaluating, and reporting on each facility throughout its life. Inventorying twice a year helps to ensure the lot is being properly maintained and that no major issues have occurred that would need to be addressed. Inventories provide information on each facility, including the rate of utilization, which is evaluated and reported annually to the FDOT Central Office by the Districts. Establishing a web tool can greatly increase the efficiency of the Park-and-Ride Program.

**Program Performance Evaluations.** Periodically, it is wise to step back and assess the Park-and-Ride Program on a state, district, and local level in order to determine how the Program has performed over time, where it stands presently, and to identify the direction it should take in the future. Categories for evaluation include: impact assessments, program assessment, management, and budgeting. Obtaining feedback from users is also beneficial for gaining insight from their point of view when analyzing the program.

**Private Participation.** There are many ways to involve the private sector in the development and operation of Park-and-Ride facilities. These techniques may help to reduce the financial burden of the FDOT in regard to Park-and-Ride facilities. Close coordination should occur between private entities and the FDOT District Park-and-Ride Coordinator to ensure that lots are located in accord with the planned network of strategically placed lots. Maintenance agreements must be negotiated up-front and in place before lots are constructed or opened for Park-and-Ride use.

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## CHAPTER 1: INTRODUCTION

### 1.0 PURPOSE

The purpose of this Park-and-Ride Guide is to provide a standard process and essential information for the Florida Department of Transportation (FDOT) and other agencies in Florida to plan, implement, and manage Park-and-Ride facilities. This Guide will also be helpful in developing and managing the state Park-and-Ride program, and for local transit agencies and private sector partners in developing their own Park-and-Ride lots. The guide established herein will facilitate locating, designing, funding, evaluating, and maintaining Park-and-Ride facilities including:

- Site location identification
- Site size estimation
- Impact assessments
- Project justification
- Conceptual design
- Funding sources
- Development of promotional programs
- Planning of ancillary services
- Performance monitoring
- Maintenance processes and procedures
- Development of improvement plans for existing facilities

### 1.1 BACKGROUND

The Park-and-Ride Program was adopted into procedure in 1987 and the original FDOT State Park-and-Ride Manual was developed in 1989. In 1996, the Manual was revised, and then subsequently, three chapters (Chapters 3, 4 and 6), along with the Park-and-Ride Procedure, were further updated in 2001. These chapters, however, were not fully integrated into the rest of the document until this revision. The update of the Manual, now a “Guide”, includes best practices developed by the Districts with relation to the Park-and-Ride program, as well as recommendations developed from observations of other states’ programs.

Rising gas prices and the implementation of statewide initiatives such as the expansion of the Tri-Rail service, the approval of the Central Florida commuter rail line (SunRail), and the initiation of the I-95 Managed Lanes, including implementation of express buses, has created an increased demand on commuter transit services and has necessitated an update of this guide. Although these new and expanded commuter rail systems have generated a greater demand for transit services, the Guide does not address the specific requirements of the Tri-Rail and SunRail stations and parking facilities, as these were guided by federal requirements.

Additionally, this update incorporates recent state and federal initiatives, strategies, and

legislation. For consistency with Department management directives, a consistent, predictable, and repeatable guide is necessary for the benefit of all Districts and to replace individual District guidance regarding commuter Park-and-Ride facilities and bus services. In line with these objectives, FDOT issued a policy statement in 2007 concerning Transportation Demand Management (TDM), which encouraged use of strategies such as carpooling, vanpooling, transit service, and other options to be considered as alternatives to the single-occupancy vehicle option in the FDOT's studies, programs, and plans.

In 2004, the American Association of State Highway and Transportation Officials (AASHTO) produced a valuable resource for the topic at hand: a Guide for Park-and-Ride Facilities. In conjunction with Florida Statute Title XXVI, Chapter 341.053(2c), Park-and-Ride facilities can assist in a cost-effective integration of multimodal transportation improvements on the interstate highway system. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Intermodal Surface Transportation Efficiency Act (ISTEA), and the Transportation Equity Act of the 21<sup>st</sup> Century (TEA 21), also placed emphasis on multimodal transportation, establishing Park-and-Ride facilities as a fundamental part of the transportation system. The processes in this guide will be reinforced further with the subsequent update of FDOT's Park-and-Ride Procedure Number 725-030-002-f.

## **1.2 PARK-AND-RIDE OBJECTIVES**

Park-and-Ride lots are valuable transportation facilities and key features of a multimodal transportation network. These facilities serve a broad range of use from being a small, simple place to park a few vehicles temporarily, to an upscale, grand multimodal hub. Park-and-Ride facilities are mainly utilized by commuters as a convenient means in the pursuit of ridesharing, carpooling, vanpooling, bus, or rail transit in order to reach their commute destination. The FDOT Park-and-Ride program offers many practical strategies which aid in reducing roadway congestion by enhancing community mobility options, including the support of public transportation. When considering the relatively low cost of implementing a Park-and-Ride facility, many communities have found it to be an attractive improvement option.

Providing multimodal options for travelers is a critical pillar in any efficient transportation system and especially beneficial in congested areas. Park-and-Ride facilities support transit usage including: Commuter Rail Transit (CRT), Light Rail Transit (LRT), and Bus Rapid Transit (BRT), as well as local, limited, and express bus operations. Park-and-Ride facilities provide travelers with a place to park their motor vehicles or bicycles, and then transfer to other modes of travel such as transit, or in some cases, join a car or vanpool. With regard to overall commuter convenience, creating a network of well-placed Park-and-Ride facilities will offer many benefits for communities and transportation systems.

“Going Green” is a popular movement toward being more environmentally conscious with one of the objectives being the reduction of greenhouse gas emissions. Park-and-Ride facilities support “Going Green” by helping to reduce the number of single occupant vehicles on the road. An important and immediate benefit is the reduction of traffic congestion, with its attendant delays. The Park-and-Ride facilities reduce the number of vehicles idling in traffic queues with their engines running. Decreasing the number of Vehicle Miles of Travel (VMT) also helps reduce demand for dwindling fossil fuel supplies, road maintenance cycles, and costly highway restorations and upgrades. Additional “green” services that may be offered in Park-and-Ride facilities include the provision of bicycle racks and lockers, as well as designated parking spaces

for energy-efficient, low-emission vehicles, and charging stations for electric vehicles.

Park-and-Ride facility design can include attractive landscaping that meets the architectural standards of a given community, while supporting local art with area-specific designs interwoven into the facility. Park-and-Ride facilities can promote non-automobile usage in several ways. Many buses are equipped with bicycle racks to transport both passengers and bicycles. Park-and-Ride lots can also be connected to trails and bike paths and have bicycle storage facilities on-site to encourage their use. All in all, appropriate choices of design can make Park-and-Ride facilities a pleasant place for people to rendezvous and encourage them to consider using transportation alternatives.

### **1.3 REPORT ORGANIZATION**

This Park-and-Ride Guide is organized to flow logically through the Park-and-Ride implementation processes from planning and design to maintenance and facility management.

Chapters are arranged in the following order:

- (1) Introduction
- (2) Park-and-Ride Planning Process
- (3) Site Selection
- (4) Demand and Facility Size Estimation
- (5) Impact Assessments
- (6) Economic Analysis and Project Justification
- (7) Conceptual Design Considerations
- (8) Project Selection, Funding, and Allocation Methods
- (9) Maintenance and Management
- (10) Promotion and Marketing
- (11) Inventorying, Evaluating, and Reporting on Existing Facilities
- (12) Program Performance Evaluations
- (13) Private Participation

Appendices are found at the end of this guide and are referenced in the main body of the document. They are arranged in the following order:

- (A) References
- (B) Bibliography
- (C) Glossary
- (D) Site Selection Evaluation Methodology
- (E) Park-and-Ride Lot User Survey
- (F) Sample Maintenance Agreement
- (G) Sample Conceptual Park-and-Ride Web-Tool

## CHAPTER 2: PARK-AND-RIDE PLANNING PROCESS

### 2.0 GENERAL

The success of a Park-and-Ride system, or even an individual facility, is dependent upon having a good plan of action. In the right situation, Park-and-Ride lots can be an attractive alternative to roadway expansion, especially when compared to the cost of Right-of-Way (ROW), as well as the possibility of lost or delayed development opportunities. The success of individual lots and a Park-and-Ride program depends on advanced planning, adequate funding, and proper implementation of the planning process. Thus, to make the most efficient and beneficial use of funds for Park-and-Ride facilities, having a strategic plan in place is crucial. Cooperation and coordination are also vital components for the success of a facility, both internally, to the Florida Department of Transportation (FDOT), and externally, with local governments, Metropolitan Planning Organizations (MPOs), Regional Planning Councils (RPCs), local transit providers and the public, through a public involvement process. The 2004 American Association of State Highway and Transportation Officials (AASHTO) Park-and-Ride Guide encourages a public involvement program be incorporated into facility planning and implementation. Planning should be in compliance with the stated goals and objectives of the current Florida Transportation Plan. To aid in their success, a system of Park-and-Ride facilities must be developed hand-in-hand with other transit and development opportunities.

Planning for new Park-and-Ride facilities includes several facets such as funding, location, environmental impacts, design, maintenance, construction, operation, and evaluation of each facility. This chapter summarizes the following three processes which identify necessary steps recommended for the design of a new Park-and-Ride facility: planning, implementation, and the overall facility development process

### 2.1 PARK-AND-RIDE PLANNING

Figure 2-1 provides a flowchart of how Park-and-Ride planning fits into FDOT’s long-range planning and project development process. Long-range planning, looking 20-30 years ahead to identify where the overall transportation system is heading and how it can potentially be improved through use of Park-and-Ride facilities, is a necessary first step. A primary objective that must be established as the focus of the Park-and-Ride Program is to create a network of strategically placed Park-and-Ride facilities both on a regional and statewide basis. These facilities are placed in support of, and in conjunction with, new and existing transportation improvements, which will provide the most benefit to the transportation system. A long-range view of

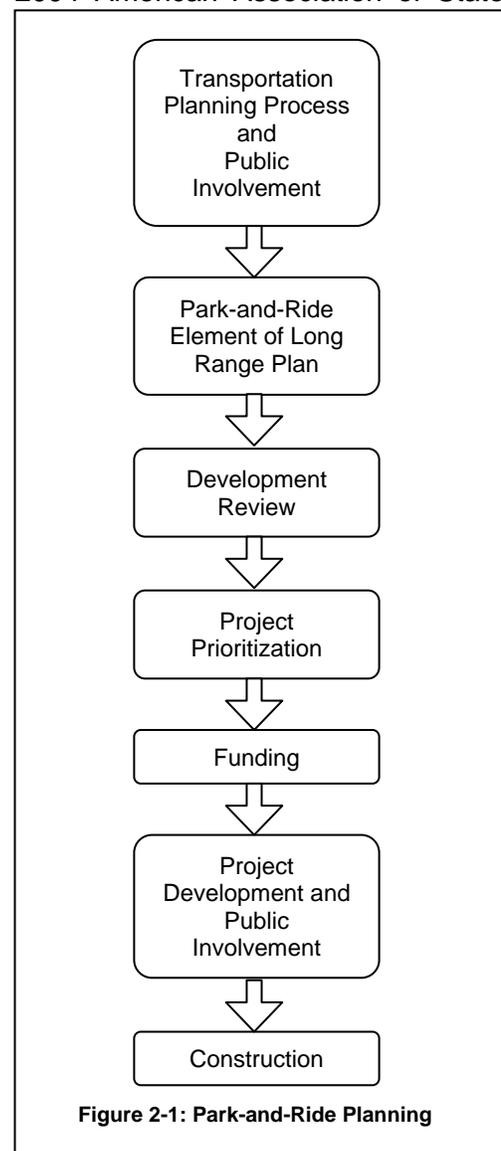


Figure 2-1: Park-and-Ride Planning

upcoming Park-and-Ride projects assists with knowing when and what grants and funding programs to apply for. Long-range Park-and-Ride planning efforts by local governments, MPOs, and Districts also help with annual planning, prioritization of projects, and other efforts that work toward the primary objective. A long-range view of Park-and-Ride facility planning must be interwoven with the Transit Office, within the Office of Freight, Logistics and Passenger Operations (FLP), Planning, Environmental Management functions, and activities that occur under the Project Development and Environment (PD&E) Manual. Opportunities for Park-and-Ride facilities should be incorporated into upcoming roadway, corridor, transit and fixed guideway projects. Roadway and PD&E projects must be reviewed and evaluated to see if Park-and-Ride facilities would be justified along a given corridor and if such a facility could be incorporated into the improvement plan in accordance with the stated objective.

A Park-and-Ride System Plan is highly recommended and encouraged to facilitate the creation and expansion of a network of strategically placed Park-and-Ride facilities. Systematic determination of needs for new lots based on practical experience and commuting patterns will provide the most benefit for a system plan. Plans may include periodically identifying locations where vehicles informally park on right-of-way (ROW) areas. Nearby surplus ROW may then be utilized for creation of official Park-and-Ride facilities. Another option may include Park-and-Ride lot studies conducted by the local MPO. These studies can be useful for the decision making process for award of discretionary grants to construct new, or upgrade existing, facilities. Transit System Plans for Park-and-Ride facilities through the MPO’s plan development process may also be considered. A system plan is may be used to feed the next Long Range Transportation Plan (LRTP) update so that facilities can be positioned to attract federal funding through the MPO processes. This would be consistent with the MPO LRTPs and benefit from the MPO prioritization process.

Working hand-in-hand with local transit agencies, MPOs, and RPCs may help facilitate implementation of a strategic network of Park-and-Ride facilities. Maintenance responsibilities must be incorporated into the early planning stages of a specific facility, as it becomes very difficult to get a maintenance funding agreement into place after a facility has been designed and installed. Incorporating local government and public involvement from the beginning in conceptual designs through to final design and construction will increase the public’s awareness of the lot. It will also produce opportunities for support for specific designs that can be incorporated for the particular style and betterment of a given community. Having public support and local government commitments will facilitate funding and implementation of facilities by providing matching local government funds to accomplish construction and maintenance of a new Park-and-Ride facility. By incorporating facilities into the long-range plan, they also become eligible to compete for funds with other projects at the local, state and federal.

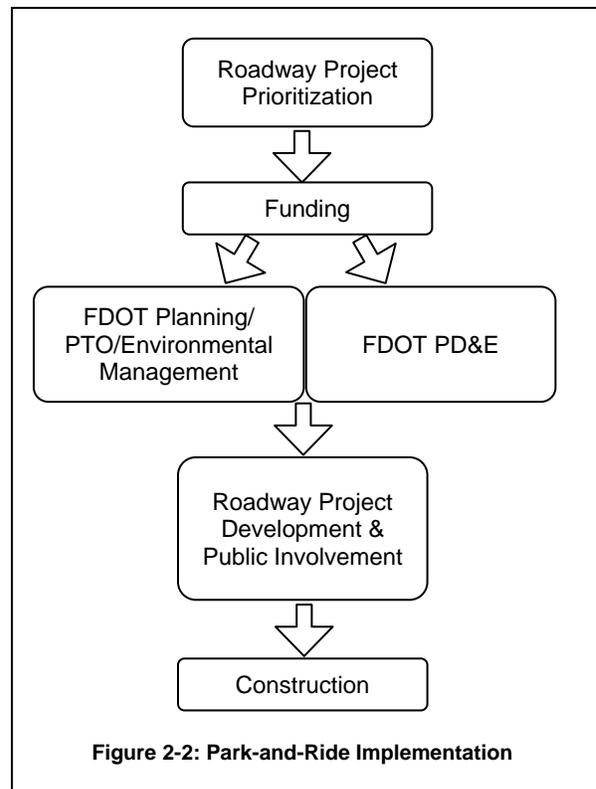


Figure 2-2: Park-and-Ride Implementation

## 2.2 PARK-AND-RIDE IMPLEMENTATION

After a Park-and-Ride facility or program is included in a Long-Range Plan, a second process begins. Figure 2-2 provides a flowchart for quick reference on the process to follow for Park-and-Ride facility approval planning. This process works best with coordination of the Environmental Management Office (EMO), Planning, and the Transit Office functions within the FDOT. From a FDOT standpoint, this coordination should occur at the early planning and PD&E (or other environmental activities) review stage of project development. Park-and-Ride facilities can also be included as part of a local government’s comprehensive plan and corresponding capital improvements program, or as part of a transit agency’s Transportation Development Plan (TDP).

When establishing the Five-Year Work Program and other capital improvement programs, a number of key factors are utilized to prioritize the projects within these programs. Typically, the factors considered include a valid purpose and need for a project, funding availability, and local joint participation arrangements.

## 2.3 FACILITY DEVELOPMENT PROCESS

The final process summarized in this chapter provides an overview of components involved in the design and implementation for an individual facility. The process presented in Figure 2-3 reflects the various stages of Park-and-Ride facility development and management presented later in this document. The first stage of the process is systems level planning, which is concerned with identifying subareas and corridors that can support Park-and-Ride facilities as part of the strategic placement of a network of facilities. Typically the focus would be on identifying corridors with a high level of commuter traffic and AM/PM directional splits. The next step would be to look for access to critical expressways or junctions and consider those corridors which also have regular bus services or have a potential for new bus

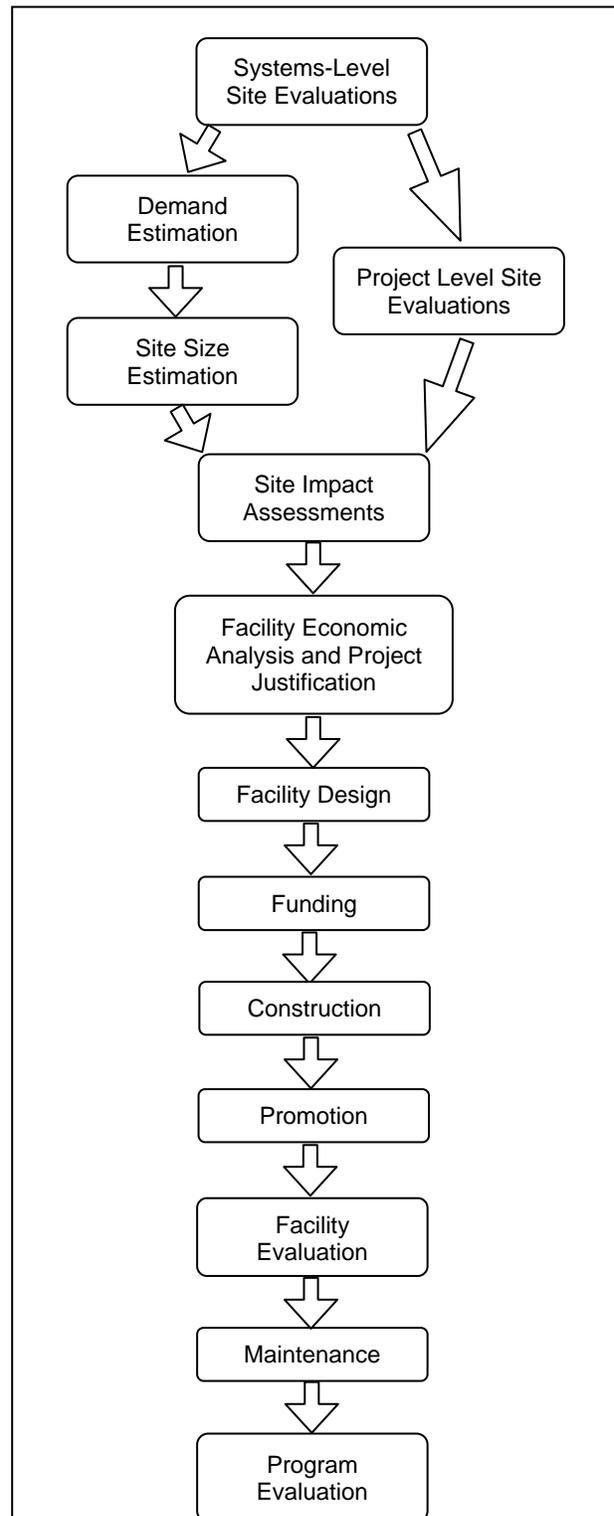


Figure 2-3: Facility Development Process

services.

The second stage of the process is project-level evaluation, which takes a deeper look within the subareas or corridors identified in systems level planning. The primary emphasis of this step is to identify specific parcels with characteristics offering the possibility of maximizing future facility usage while minimizing development costs. Demand estimation and site sizing should occur concurrently with the project level site evaluations. Forecasted demand will dictate parcel size needs, recognizing that parcel locations can affect potential usage.

Impact assessments are necessary to gain public and official acceptance of individual projects. In addition, these assessments also provide input for economic evaluations, environmental analyses, and project justification essential to achieve funding for the project under investigation. In the design stage, specific elements of the facility are developed to accommodate the eventual users in a safe, convenient, comfortable, and secure manner. It is critical that transit services be provided to the facility if at all possible. This effort will necessitate coordination with other agencies, including the local or regional transit provider.

The Park-and-Ride facility project sponsor and the local/regional transit provider should establish a mechanism to promote the facility once it is constructed. The public will need to be made adequately aware of the presence of the facility in order for it to be used.

This is particularly important for facilities located in areas not readily visible to commuters. Finally, as indicated in Figure 2-3, regular evaluation and maintenance of facilities will be most beneficial for maintaining facility utilization.

## CHAPTER 3: SITE SELECTION

### 3.0 GENERAL

Selecting a viable location for a Park-and-Ride facility is an important part of the process in creating a new facility. The process of selecting sites for Park-and-Ride facilities is two-fold. First, it is necessary to identify general areas capable of supporting one or more Park-and-Ride facilities. Candidate sites should be consistent with the overall long-term plan in an attempt to create a network of strategically placed Park-and-Ride lots that support existing and future transportation improvements. Second, specific sites within the identified areas should be selected based upon merit, which is assessed through a more comprehensive level of analysis. This chapter describes criteria for siting general areas and sets forth standards for evaluating potential locations for Park-and-Ride facilities. Utilization of the standards for lot types described in this chapter should assist in determining the viability of an identified area, as well as assist in the identification and analysis of specific sites.

### 3.1 AREA IDENTIFICATION

The first step in the site selection process is identifying areas where Park-and-Ride lots may be practical. This is largely a common-sense approach, but is also based on the long-term strategic plan and existing and projected transportation, land use and economic conditions, including, but not limited to, the following items:

- Existence of informal Park-and-Ride activity
- Served by transit
- Site visibility and accessibility
- Proximity to other major corridors or critical junctions
- Intensity, concentration and location of employment centers
- Density and location of residential areas
- Distance between major residential areas and employment or activity centers
- Current and future levels of service on sub-area and corridor level roadways
- Existing and future transportation-related improvement plans and programs
- Anticipated future development activity at both the trip origin and destination

The Florida Department of Transportation (FDOT) District Park-and-Ride Coordinator must be involved with selecting and designing the location for a new Park-and-Ride facility to ensure the site will help facilitate the network of strategically placed facilities. When major transportation construction projects are being planned, Park-and-Ride facilities are recommended to be considered for inclusion. Projects of this type would include, but are not limited to, new freeways, construction of new interchanges, modification of existing interchanges, adding highway lanes, new transit or intermodal facilities, and High Occupancy Vehicle (HOV) lanes. Park-and-Ride facilities should not be located within interchange areas unless the following conditions are met: 1) no other area is acceptable or economically justifiable, and 2) approval is received from the District Design Engineer and Traffic Operations Engineer. Park-and-Ride facilities must also be considered before establishing Right-of-Way (ROW) lines. [1].

**Table 3-1: Identifying Areas for Park-and-Ride Facilities**

Lot Type	Description	Standards	Considerations
Remote or Rural Facilities	Remote lots are located in areas with low population growth and are not expected to grow excessively. Lots are generally located outside the urban area in a rural or small town setting. Trip lengths for home-to-lot and lot-to-work tend to be longer than for other lot types.	<ul style="list-style-type: none"> <li>• Between 20-60 miles from employment centers</li> <li>• More than 20,000 employees at trip end</li> <li>• Centrally located</li> <li>• Publicly-owned Right-of-Way (ROW) available</li> <li>• Less than 1 mile from commute route</li> </ul>	The success of a remote lot is dictated by the level of employment located at the destination end and the distance traveled. Lots should be centrally located to the service area population. Usage will be greater if located near a major commute route.
Urban Fringe Facilities	Urban fringe lots are located at the edge of urban development. These lots can be, but are not generally served by transit. Trips tend to originate outside or at the outer limits of the urban area while the destinations may be concentrated or dispersed within the urban area.	<ul style="list-style-type: none"> <li>• Trip destination patterns may be concentrated or dispersed within the urban area</li> <li>• Located along arterial roadways with 4 lanes or more</li> <li>• Minimum of 10,000 employees per square mile to support the formation of car pools</li> <li>• Located in the vicinity of an urban area boundary</li> <li>• More than 3/4 mile from commute route</li> </ul>	Service area demand and concentration of employment are factors that determine the usage of an urban fringe lot. 35,000 Average Daily Traffic (ADT) is suggested as a working traffic minimum.
Peripheral Facilities	Peripheral lots are typically located at periphery or on the edge of an intensely developed, highly congested or access-restrained activity center. These lots are designed to supplement parking deficiencies and include facilities that service activity centers with limited parking and/or auto access such as auto-free zones, colleges, and universities.	<ul style="list-style-type: none"> <li>• Congested or restricted access</li> <li>• On a major access route</li> <li>• Insufficient parking facilities in the area</li> <li>• Distances from residential areas generally longer than other Park-and-Ride facilities, while distances to the activity center are usually shorter</li> </ul>	Consider: <ul style="list-style-type: none"> <li>• Parking demand/supply</li> <li>• Activity center circulation</li> <li>• Activity center access routes</li> <li>• Existing parking facilities</li> </ul>
Urban Corridor Facilities	Urban corridor lots are located along a major commute route within an urban area, typically served by express bus, urban rail, or commuter rail services. Trip origins tend to be disbursed along the corridor; destinations are usually concentrated in a Central Business District (CBD) or employment center.	<ul style="list-style-type: none"> <li>• Level-of-Service E or worse</li> <li>• 50,000 ADT</li> <li>• Traffic based on support of one 100-space lot operating at 75% capacity</li> <li>• More than 2,000 dwelling units within 2 miles of lot</li> <li>• More than 10 miles from employment center</li> </ul>	Identify areas in highly congested corridors. Prime corridors are operating at Level-of-Service (LOS) E or worse. It is better to locate a lot closer to trip origins and further from trip destinations.
High Occupancy Vehicle (HOV) Corridor Facilities	HOV corridor lots are a subset of the urban corridor, located adjacent to a major commuter highway constructed with HOV lanes. They support carpool formation and access to express buses using the HOV lanes.	<ul style="list-style-type: none"> <li>• High volumes more than 35,000 ADT</li> <li>• Confluence of feeder roads near facility</li> <li>• 5-10 miles minimum spacing between lots</li> </ul>	Take lot spacing and its effect on the utilization of individual lots into account to maximize usage. Parkers tend to use the first lot encountered. Lots too closely spaced together may become underutilized.

(D5 Park-and-Ride Implementation Manual)

Additionally, area identification is dependent upon the Park-and-Ride and roadway facility type. Table 3-1, found in the 2010 FDOT District 5 Park-and-Ride Implementation Manual [2] and inserted above, presents descriptions, standards, and considerations for identifying potential areas for Park-and-Ride facilities. More detailed information on each type of lot follows this table.

### **3.1.1 Remote or Rural Facilities**

Remote lots are generally located outside of the urban area in a rural or small town setting. Trip lengths for both home-to-lot and lot-to-work are much longer than for other types of Park-and-Ride lots. The success of a remote lot is generally dictated by the amount of employment located at the destination end and the distance traveled [3]. A facility located 60 miles from the employment center is probably the upper limit for usage; 20 miles is suggested as a lower limit. In some metropolitan areas, 20 miles may be considered an urban fringe or corridor lot instead of a remote facility.

People make housing location decisions based on costs, employment location and ease of commute. Cost impacts considered by those making location decisions include the price of housing in urban areas, as well as the cost of fuel, vehicle maintenance, and insurance. Likewise, more people will tend to travel further as the total urban area employment and size increases. The potential for carpooling increases with employer size and employment concentration [4]. For planning purposes, the working minimum employment level at the activity center(s) for facility siting, is an employment concentration of greater than 20,000 employees. This number is provided as a lower limit of employment for consideration of remote lots to service an urban area. When locations of remote lots are being identified, consideration should also be given to employment concentrations and number of large employers. Past research has shown that remote lots should be centrally located to the service area population. Most remote lots developed in Florida are located within municipal or town boundaries. Lot use will be greater if located near a major commute route oriented toward an urban area. This provides the opportunity to intercept commuters along their normal travel path. Such a location provides for better visibility and awareness of the facility.

### **3.1.2 Urban Fringe Facilities**

Urban fringe lots are located at the outer edge of urban development. Trips tend to originate outside or on the fringe of the urban area, while destinations may be concentrated or dispersed within the urban area. In the past, fringe area lots have generally not been served by transit, although the recent Florida experience indicates this is not universally true. Increasingly, urban fringe lots have become origin locations for express bus service to urban activity centers.

Service area demand and concentrations of employment are factors that determine the usage of an urban fringe lot. Service area demand is often, but not solely, reflected in the number of lanes of an adjacent roadway. Employment concentration is also an important consideration for judging the demand for a Park-and-Ride facility. Past documentation indicates that an urban area needs to have a minimum concentration of 10,000 employees per square mile to support the formation of carpools [5]. Shared-use lots and lease agreements, such as for shopping center lots, are most applicable in fringe areas [6]. As urban areas expand, the urban fringe will vary, based on the year of the study.

### **3.1.3 Peripheral Facilities**

By definition, these facilities serve activity centers having limited parking and/or auto access, such as auto-free zones and colleges. They are usually located at the outer edge of activity centers. As a result, distances to the lot from residential areas are typically longer than other Park-and-Ride facilities, while distances from the lot to the activity center are usually shorter. For the location of

peripheral lots, several factors should be considered. First, if additional parking is needed in the activity center area, then a peripheral facility may be appropriate. If parking is adequate, further evaluation is not warranted, unless other objectives are driving the investigation such as reducing noise, emissions, and vehicular travel within the activity center. Auto accessibility to an activity center may be restricted, either by design or through inadequate street capacity. Such conditions can be used to determine the potential effectiveness of peripheral parking. Peripheral Park-and-Ride facilities are a unique type of lot that can be used in conjunction with large employment centers, universities, activity centers, airports, and theme park attractions.

#### **3.1.4 Urban Corridor Facilities**

These lots are located along major commute corridors within an urban area and are often served by HOV lanes or line-haul transit consisting of express bus, urban rail, or commuter rail services. Trip origin patterns tend to be dispersed along the corridor; trip destination patterns are usually concentrated in a Central Business District (CBD) or other major activity and employment centers.

Corridors likely to support a Park-and-Ride facility must first be identified, and then suitable Park-and-Ride locations within these corridors can be analyzed. Once the corridor is identified, the premise is that it is better to locate a facility closer to trip origins (residential areas) and further from trip destinations (employment centers). Corridors operating at Level of Service (LOS) E or worse are ideal for Park-and-Ride development. Future year LOS is important since it can be used to identify corridors with the highest potential for Park-and-Ride facilities. Thus, of two corridors operating at LOS E, the one with the highest design year Average Daily Traffic (ADT) will be more attractive for Park-and-Ride development. In the past, corridor traffic of 50,000 ADT is suggested as a minimum standard (although as higher ADTs are being experienced in metropolitan areas, that standard tends to go up).

Information contained in the Long-Range Transportation Plan documentation or urban travel demand model output can assist in identifying appropriate corridors for Park-and-Ride facilities. This information is maintained by the local Metropolitan Planning Organization (MPO) and/or the FDOT District Planning Office.

#### **3.1.5 HOV Corridor Facilities**

HOV corridor lots are a subset of the urban corridor lots, and are located adjacent to major commuting highways with HOV lanes. They are located and sized to maximize usage of HOV lanes, support carpooling and provide access to line-haul transit (Express bus) using the HOV lanes. Again, trip origins tend to be dispersed along the corridor. Trip destinations are usually concentrated in a CBD or major activity and employment centers.

HOV facilities may operate more efficiently with a number of Park-and-Ride lots in the corridor. To maximize usage, lot spacing and its effect on usage must be taken into account. Commuters using the lots tend to use the first lot encountered along their travel path. If lots are too closely spaced, the lots may be underutilized. Sites should be located adjacent to the HOV facility on an access route that carries a significant number of vehicles accessing the highway containing HOV lanes. While 35,000 ADT is suggested as a working minimum traffic volume, local conditions should dictate. This minimum ADT value should increase as lot spacing decreases. If possible, a Park-and-Ride facility should be located at the confluence of a number of access routes. Such a location experiences a significant amount of traffic, thereby increasing the propensity to use the facility.

#### **3.1.6 Plan Incorporation**

Once corridors or facility locations are identified, it is critical to incorporate this information into

Long-Range Transportation Plans and/or comprehensive plans to form a network of strategically placed Park-and-Ride facilities. This assists in the following items:

- Automatic consideration of Park-and-Ride lots during preliminary phases of road improvement projects (which corresponds to FDOT's policy regarding bikeways)
- Developing priority lists in which Park-and-Ride lots compete for funding with other projects
- Assessing impact or mobility fees for lot development
- Capturing federal, state and/or local funds for facility construction
- Developing outlying parking facilities in lieu of activity or employment center parking
- Reserving land for future facilities through advanced purchase or development order conditions
- Developing public/private partnerships for parking facilities
- Encouraging Transit Oriented Development (TOD) joint use parking facilities at outlying locations

### **3.2 SITE IDENTIFICATION**

The second step in the process of site selection is to identify alternative locations with positive attributes that are conducive to future facility usage. Site selection begins with developing an inventory of candidate sites. Properties having existing paved areas that are not used during weekday working hours should be given first consideration. These may include vacant properties, churches, or civic centers. In the past, Florida has made effective use of scarce construction dollars by entering into agreements with local governments and private property owners, and developing Park-and-Ride lots on existing or excess FDOT ROW.

The goals and objectives for the Park-and-Ride facility or program should be developed with the project sponsor(s). Based upon those items, an inventory of candidate locations can be produced through contacts with local officials and groups, review of comprehensive plans, review of development site plans, review of aerial photography, and field reconnaissance. Where possible, these methods should be used in developing the list of potential sites, but at a minimum, field investigations should be performed. The field review may eliminate some of the more obvious locations, and may reveal other potential locations that can be subjected to more detailed analysis.

Potential sites must be discussed with the FDOT offices and individuals to check for possible environmental contamination, historic requirements, nature conservancy, and wetlands. Contamination may come from sites previously used by gas stations, dry cleaners, or sites which may have been polluted by farm runoff containing pesticides and fertilizers. A contamination specialist should be contacted during the site selection process (preferably one in-house with the FDOT). Sites should also be checked by the Environmental Management Office (EMO) for other environmental concerns including, but not limited to, eagle nests, endangered or protected species, storm water runoff, flooding, environmental justice, and historic site disturbance. These items may pose an inconvenience or cost such a large amount to address that a site may need to be dropped from consideration.

#### **3.2.1 Site Ranking Criteria**

The next step in the process is to analyze, rate and rank the candidate sites. A set of criteria, or measures of effectiveness (MOE), is first established based upon the project goals and objectives

for use in evaluating each site. A point score is assessed for each evaluation criterion based on a comparison of the site's features against the ideal condition associated with that criterion. All point scores are totaled, with the highest scoring site being the most desirable. The most important factors for consideration are:

Right-of-Way (ROW): The historic low level of funding for Park-and-Ride development has resulted in creative arrangements for land use or donation. ROW costs can often be more than construction costs, particularly when located in densely developed corridors. As a result, this may be the most important factor for determining feasibility. Surplus FDOT, county or local parcels should be evaluated for potential use as a Park-and-Ride facility before they are disposed of or sold.

Transit Service: Lot utilization increases dramatically with transit service. Sites are best located along existing or planned transit routes.

Traffic Circulation and Access: Park-and-Ride lots will attract additional traffic to the access roadways. Site selection should strive to minimize congestion on these roadways, particularly if located in residential districts. Likewise, access to the site should not be difficult, and, if applicable, should include a median opening or signal.

Parking Environment: The most critical factor for determining the success of a given Park-and-Ride lot may be the surrounding environment, including both perceived and real user safety, businesses, neighborhoods and other location factors. Lots located in areas deemed safe for both lot users and their vehicles are more frequently used. Lots should be located in areas that are free from user annoyances, such as visual, noise, air quality/odor and crime.

Bike and Pedestrian Access: A successful lot should provide easy access for pedestrians and must meet current Americans with Disabilities Act (ADA) Standards. Access to bicycle routes attracts additional users.

Site Size: If large enough sites are not available, a number of smaller lots may need to be developed. Sites that are too large result in an over-expenditure of funds, and inefficient use of space. A factor of 300 square feet per parking space is typical for surface lots, while 325 square feet per parking space is conservative for structures. (See Chapter 4 for further information.)

Visibility: Sites should be visible from adjacent travel routes. Visibility contributes to recognition of an available Park-and-Ride lot, and is a deterrent to crime. Landscaping should not obscure visibility.

Access: A site must be easily and directly accessible by automobiles, and by transit vehicles where transit service is planned. Lots should not divert commuters more than one-half ( $\frac{1}{2}$ ) to three-quarters ( $\frac{3}{4}$ ) of a mile out of their normal travel path. Access should be safe and adequate, with signal control, if warranted.

Access Road Congestion: Congestion between the main travel roadway and the Park-and-Ride facility can discourage lot usage by adding time to the trip. Sites are best located where time between the main commute roadways and the lot can be minimized.

Transit Design Features: Transit vehicles should be considered in the design of the lot. Inadequate turning radii, aisle widths, and pavement design can eliminate a site from further consideration if the site is to serve transit. Shelters, transit loading areas, and other

pedestrian/transit/vehicle interaction should also be considered in the design of these lots. Additionally, site design features, such as turning radii, should also accommodate emergency vehicles [7].

**Expansion Potential:** Funding constraints may dictate construction of a lot that is smaller than what is needed to meet future demand. In this case, it is important to choose a site with potential for expansion.

**Financial Commitment:** FDOT funds matched from local governments or private developers for construction of a new Park-and-Ride facility will expedite the process from design to reality if there is a solid financial commitment. Equally important are agreements regarding future facility maintenance and ownership.

**Park-and-Ride Spacing:** Park-and-Ride locations should be an adequate distance from other Park-and-Ride facilities to avoid duplication and overlap.

**Input from Other Stakeholders:** Input from the public, local transit providers, local governments and rideshare program operators will assist in identifying locations where a Park-and-Ride facility would be most useful and desired based on current and projected use.

It is important to note that in order to avoid conflicts it is beneficial to consult local planning documents such as the long-range plan, comprehensive plans, transit development plans, and any existing plan for locations of future facilities. Local transit provider master plans and local or regional transportation plans should also be reviewed. The local government land use designation and zoning category for particular locations are also factors to consider.

A procedure endorsed in the past by the American Association of State Highway and Transportation Officials (AASHTO) [8] is useful for ranking potential sites. A simplified version of this procedure is presented in Appendix D and considers both area and site identification. Point scores generated by this procedure for ranking the sites under consideration may be quite close [9]. Two adaptations are recommended to remedy this. First, criteria receiving the same score should be eliminated. These will tend to be at the area identification level. For example, it is likely that many sites under consideration will receive the same rating for transit service potential, proximity to major trip generators, user benefits, and orientation to major bottlenecks.

The second adaptation is to assign weighting factors that represent the importance of each criterion to the site selection. For example, land acquisition and land cost may be more critical than site visibility. These criteria can be assigned higher weights to reflect this importance in the final point scores. A panel of local experts should be formed to assign weighting factors and determine the value of each criterion.

District 5 developed a “Proactive Approach” for use in identifying appropriate locations for Park-and-Ride facilities. This approach encourages seizing opportunities presented during the Project Development and Environment (PD&E) process to include establishment of new Park-and-Ride lots in locations where there is a need for such facilities. A Park-and-Ride Location Suitability Matrix was created to analyze possible Park-and-Ride locations by assigning a weighted point scale to each location reviewed. Adding specific language to the PD&E scope of services was recommended to incorporate consideration of Park-and-Ride facilities.

### 3.3 PROJECT VIABILITY MEMORANDUM

Once a potential site has been identified, it is useful to analyze the attributes and feasibility of the site to ascertain if the location meets certain criteria that would make the site a viable Park-and-Ride location. A project viability memorandum is a useful tool that can assist in determining the issues and opportunities of the proposed Park-and-Ride location. A site can initially look as if it would be an ideal location for a Park-and-Ride facility, but once certain aspects (such as proximity to urban centers, area demographics, proximity to transit, and proximity to major regional commuter corridors) are factored in, it may prove that the site under consideration truly is a great location, or it may make it obvious that this particular location would not produce the utilization necessary to justify the cost.

The following key viability measures should be analyzed and addressed in a project viability memo:

- Proximity of the site to key local and regional activity centers
- Proximity of the site to key local and regional urban centers
- Proximity of the site to transit routes and potential service by transit providers
- Visibility of the site from major local and regional arterials
- Demographics of local residents
- Necessary improvements to the site before it can be used

Once all of these key issues have been considered, a project viability memorandum can be issued on whether or not the potential site would be a viable location for a Park-and-Ride facility [10].

## CHAPTER 4: DEMAND AND FACILITY SIZE ESTIMATION

### 4.0 GENERAL

Estimating lot demand and space needs go hand-in-hand with site selection discussed in Chapter 3. This chapter presents methods for estimating size needs for two different types of lots selected - as an example, remote and urban fringe Park-and-Ride facilities. The methodology used for urban Park-and-Ride lots can be applied to Urban Corridor, High Occupancy Vehicle (HOV) corridor, and Peripheral facilities. An alternative estimation method which may be used, known as sketch planning, is also provided in this chapter. The sample will be helpful in executing the formulas and procedures. All of the methods are easily implemented within a spreadsheet provided the necessary input databases are available. These analysis techniques can be utilized by the proposed project sponsor whether it is the Florida Department of Transportation (FDOT), a local governmental entity, a local Metropolitan Planning Organization (MPO), or some other entity.

### 4.1 ANALYSIS APPROACH

Scale, complexity, and project cost should govern the type of approach used for estimating size needs for Park-and-Ride facilities. In most cases, sketch planning techniques based on local travel and socio-economic data are preferred over sophisticated and data intensive modeling techniques. Furthermore, it was found that the results from the sketch planning tool replicated the results from the more data intensive modeling method. In cases where the capital investment is relatively large, such as facilities associated with HOV lanes and rail systems, the accuracy of sketch planning techniques can be satisfactorily improved upon with more detailed and current data.

Determining the lot size needed for a Park-and-Ride facility consists of eight steps:

1. Compute the number of motorists that will use the facility
2. Convert the number of motorists to the number of parked vehicles
3. Adjust the number of parked vehicles to account for fluctuations in demand created by seasonal factors
4. Compute the maximum accumulation of shared-ride vehicles
5. Compute the number of accessible spaces required
6. Convert the total estimated number of spaces to an area measure
7. Calculate additional space needs for bus facilities, turn radii, and other design criteria
8. Develop space allowances for landscaping, setbacks, drainage, and other design criteria

Adjustment to the number of spaces needed can be made to accommodate the quantity of existing informal parking activity observed. Additional area may need to be accounted for when sizing a Park-and-Ride facility including, but not limited to, areas for community art, vendors, security, and short-term loading and waiting areas for taxis, carpools, vanpools, and Kiss-and-Ride passenger drop off and pick up areas. These and other supplementary area needs which may be included in the design for a new Park-and-Ride facility are further discussed in Chapter 7.

The techniques presented in this chapter are based on the assumption that the facility will be optimally located and implemented in the area for which size analyses are being performed. Usage will not reach expected levels if a facility is not visible, not promoted, is located in an unsafe area, or has poor access. See Chapter 3 for other site location recommendations.

The descriptions in this chapter include the framework in which the method can be applied, data needs and sources, methods of synthesizing data (which may not be available or may be too costly

to compile), and appropriate adjustments, which may need to be considered based on the conditions of the proposed improvement. As there are several different methods for demand and facility size estimation, depending on the type of facility and scale of analysis, the user should select the method that is most appropriate for the given context.

## 4.2 REMOTE FACILITIES

Size estimation for remote lots is based on observations of parking and Right-of-Way (ROW) availability [<sup>11</sup>]. The demand observation technique is most applicable in areas where population within the lot service area and employment in the destination area are not expected to grow excessively. The further the site is from an urban area, the greater the applicability of this technique.

### Data Needed:

The data needed for the remote facilities size estimation method is minimal and easily obtained:

- Observations of actual informal parking
- Population data at the home end
- Employment data at the destination end

### Methodology:

The methodology involves counting existing informal parking and then adjusting for growth and expected error.

**STEP 1:** *Identify parking activity surrounding the candidate site.* This determines the existing parking needs and should be performed by an individual or study team familiar with the area, its commuting patterns, and employment and activity centers attracting commuters. Identifying the area in which to perform the counts may be somewhat challenging due to the highly variable roadway configurations, location of commute routes, and population.

**STEP 2:** *Select a design year and compute an appropriate growth factor.* The easiest factor to compute is based on projections of population within the service area of the lot, employment in the urban area(s) the lot serves, or a combination of population and employment projections.

Population forecast data is easiest to obtain since the University of Florida publishes this information annually in its *Florida Statistical Abstract* [<sup>12</sup>]. Projections are provided in five-year increments for each county in Florida. Unless other conditions prevail, the population growth for the county in which the lot is to be located can be used for the adjustment of base year parking.

Future year employment data can be obtained from sources such as the Florida Standard Urban Transportation Model Structure (FSUTMS) urban area data sets, the State Department of Labor and Employment Security, or workforce development offices. If the growth factor is based on employment, one should be careful not to confuse labor force with employment. Labor force is associated with the place of residence, while employment is associated with the workplace. For this method, data for employment is appropriate.

The following formula is typically used to combine population and employment growth:

$$\text{Growth Factor} = \sqrt{F_{\text{pop}} \times F_{\text{emp}}}$$

Where:

- $F_{\text{pop}}$  = Population growth factor  
 $F_{\text{emp}}$  = Employment growth factor

**STEP 3:** *Compute the design year parking demand.* Multiply the existing number of parked vehicles observed in Step 1 by the growth factor computed in Step 2. This estimate of future design year parking demand may need to be adjusted downward based on the experience that size estimates for remote lots tend to be overstated. As mentioned above, construction of a remote lot does not ensure its use by those observed to be parking at informal locations nearby, so the computed estimate of demand should account for this. This downward adjustment should be based on local knowledge of public travel behavior and perceptions, potential effectiveness of increased parking enforcement, and amount of citizen requests and complaints associated with facility provision.

**STEP 4:** *Convert total parking space needs to an area measure.* A factor of 300 square feet per space should be used for sizing calculations. This factor includes sufficient area for parking, circulation, and access, however, ROW availability often constrains or dictates the size of remote facilities. In situations where ROW is being provided at an existing facility, the estimate must also account for parking needs generated by that facility during coinciding hours of use.

#### 4.3.1 Sample Calculations: Remote Facilities

This section provides sample tables and calculations for the demand and facility size estimation of remote facilities. In this example, a design year of 5 years in the future is used. The following tables demonstrate the application of the method in a step-by-step manner similar to that provided in the description in the previous section.

##### Data Needed

**Step 1:** *Count of actual informal parking*  
*Population data at the home end and employment data at the destination end for both base (current) and forecast (design) years.*

**Step 2:** *Compute an appropriate growth factor.*

Let:

- $\text{Pop}_c$  = Population at home end in current year  
 $\text{Pop}_d$  = Population at home end in design year  
 $\text{Emp}_c$  = Employment at destination end in current year  
 $\text{Emp}_d$  = Employment at destination end in design year  
 $F_{\text{pop}}$  = Population growth factor  
 $F_{\text{emp}}$  = Employment growth factor

**Table 4-1: Step 2 - Compute an Appropriate Growth Factor**

**Current Year: 2012  
Design Year: 2017**

Pop <sub>c</sub> (1)	Pop <sub>d</sub> (2)	F <sub>pop</sub> (3) = (2) ÷ (1)	Emp <sub>c</sub> (4)	Emp <sub>d</sub> (5)	F <sub>emp</sub> (6) = (5) ÷ (4)	Growth Factor (7) = $\sqrt{(3) \times (6)}$
<b>3000</b>	<b>3200</b>	<b>1.067</b>	<b>750</b>	<b>850</b>	<b>1.133</b>	<b>1.100</b>

Step 3: *Compute the design year parking demand.*

Let:

AIP= Count of actual informal parking (number of vehicles).

**Table 4-2: Step 3 - Compute the Design Year Parking Demand**

**(Number of Vehicles)**

**Current Year: 2012  
Design Year: 2017**

AIP (1)	Growth Factor (2)	Design Year Parking Demand (3) = (1) × (2)
<b>30</b>	<b>1.100</b>	<b>33</b>

Step 4: *Convert parking space needs to an area measure.*

**Table 4-3: Step 4 - Convert Parking Space Needs to an Area Measure**

**(Square Feet)**

**Current Year: 2012  
Design Year: 2017**

Design Year Parking Demand (1)	Area per Space (2)	Design Year Area Measure (3) = (1) × (2)
<b>33</b>	<b>300 sq ft</b>	<b>9,900 sq ft</b>

#### 4.4 URBAN FACILITIES

Urban facilities require a more detailed analysis than remote lots. Spatial distribution of existing parking supply is important since parking facilities that are located too close to each other can result in underutilization, even if the activity center as a whole has parking deficiencies. Another consideration is the availability of transit service. Such service is highly recommended, because it increases the service area in which a new parking facility can be constructed and the opportunity for finding a suitable site.

It should be noted that Peripheral Park-and-Ride facilities are a unique type of urban lot for specific circumstances. They are designed to supplement parking deficiencies in highly congested or access restrained activity centers. As such, the size requirements for this type of lot can be determined from estimates of the parking deficiencies, with considerations for transit usage and the distribution of

existing parking supply. If transit service is not provided, the peripheral parking facility will need to be located within comfortable walking distance of high activity centers.

#### Data Needed

The following data is needed for computing the size of urban facilities:

- Traffic analysis zone (TAZ) map of the activity center
- Street map of the activity center
- Design year employment for the activity center
- Mode share distribution for home-based work trips to the activity center, if available
- Traffic counts for major arterials accessing the activity center
- Parking inventory

The TAZ map, design year employment, and design year population can be obtained from the urban area data sets maintained by the local MPO and/or the FDOT District Planning Office. Interpolation may be necessary if the base or planning years of these data are not consistent with those of the sizing analysis.

Traffic counts for state facilities are available from the FDOT District Offices. Counts for county and city facilities are available from the county and city governments. In some communities, the MPO or other local agency compiles and publishes traffic counts from all jurisdictions with scheduled traffic count programs.

An inventory of available parking spaces may need to be performed. Such inventories may already exist and can be obtained by contacting the local parking authority, city, county, and/or MPO. The inventory should concentrate on spaces in public and private surface lots and structures, and also include curbside parking spaces.

#### Methodology

Calculate the parking requirements for home-based work trip parking at the activity center, based on the activity center employment. Total parking deficiency within the activity center is then computed by comparing the parking demand with available parking. Estimates of parking demand that can be captured by the new facility are based on assessments of site location and distribution of existing parking supply. Finally, site size requirements are computed considering costs of construction and anticipated revenue.

**STEP 1:** *Estimate total parking demand for the activity center.* Identify the TAZs contained in the activity center. The “Total Employment” variable contained in FSUTMS ZDATA files is then accumulated for these zones. The resulting value represents work trips for the activity center. Total parking demand for work trips on a person-trip basis is computed by subtracting transit usage from the total activity center employment. The local mode split distributions from the urban area models can be used to factor out transit usage. If local data is not available, the mode split data in Table 4-4 can be used. This data was developed from data collected by the US Census Bureau “Commuting in the United States: 2009”.

**Table 4-4: Peripheral Park-and-Ride Facility  
Home-Based Work Trip Mode Share Data**

{PRIVATE }Area Type	Drive Alone	Carpools	Transit
Large Urban Area w/ Rail Transit	0.77	0.11	0.12
Large/Moderate Size Urban Area w/o Rail Transit	0.85	0.11	0.04
Small Urban Area	0.88	0.11	0.01

(Commuting in the United States: 2009)

Parking demand is then computed by dividing the number of work-purpose person trips by the vehicle occupancy. Local occupancy values should be used and can be found in the urban area model documentation and mode split model setups. Table 4-5 contains vehicle occupancy rates that can be used in lieu of local data.

**Table 4-5: Home-Based Work Trip Auto Occupancies  
(Persons per vehicle)**

{PRIVATE }Source	Rate
2010 Central Florida Regional Planning Model v45	1.114
2000 Northeast Florida Household Travel Survey	1.080
1999 Southeast Florida Household Travel Survey (AM Peak)	1.150
1996 Tampa Bay Area Household Survey (AM Peak)	1.110
2002 Volusia County Home Based Travel Survey (AM Peak)	1.440
2001 National Household Travel Survey, Florida (AM Peak)	1.130
Statewide Average	1.171

Total parking demand is computed by dividing the work trip parking demand by the ratio of work trips to total parking in the activity center.

$$\text{Total Parking Demand} = \frac{[\text{Emp} \times (1 - T_{\text{share}})]}{[\text{Occ} \times R_w]}$$

Where:

- Emp = Total activity center employment
- T<sub>share</sub> = Proportion of work trips using transit
- Occ = Average auto occupancy for activity center work trips
- R<sub>w</sub> = Proportion of total parking used for work trip parking

Table 4-6 presents distributions of activity center parking by trip purpose that can be used to obtain values for R<sub>w</sub>. The work trip factor is selected based on the population of the entire urban area in which the study is being conducted. Data in this table was based upon the following sources: Household Travel Surveys on the Florida Transportation Modeling Web Site: Northeast Florida Household Travel Survey 2002 - Non-Home Based Trip Distribution by Purpose at Destination; Southeast Florida Household Travel Survey 1999 - Trip Distribution by Purpose at Destination; Tampa Bay Area Household Travel Survey 1996 - Non-Home Based Trip Distribution by Purpose at Destination; Volusia County Home Based Travel Survey 2002 - Trip Distribution by Purpose at Destination.

**Table 4-6: Distribution of Trip Purpose (Rw)**

Urban Area Population	Work (%)	Shopping (%)	Personal Business (%)	Other (%)
Northeast Florida	23	29	24	24
Southeast Florida	31	16	23	30
Tampa Bay Area	23	34	23	20
Volusia County	28	24	28	20
Statewide Average	26.3	25.8	24.5	23.5

**STEP 2:** *Determine parking supply deficiency.* The following formula is used to determine the parking supply deficiency:

$$\text{Parking Deficiency} = \text{Total Parking Demand} - \text{Supply}$$

Where:

Supply = Existing parking supply obtained from parking inventory

The above equation defines a parking deficiency if a positive value is produced. However, a negative value does not necessarily indicate that there is sufficient parking throughout the entire activity center; subareas within the activity center may be under-supplied.

**STEP 3:** *Compute the maximum number of parking vehicles the facility can capture.* This is based on the orientation of the parking facility to important access routes. Identify the roads that provide access to the area in which the parking facility is to be located. Then, calculate the maximum number of parked vehicles that could utilize the facility:

$$\text{Maximum Parking Capture} = \text{Parking Deficiency} \times (V_{\text{adj}} / V_{\text{all}})$$

Where:

$V_{\text{adj}}$  = Traffic volume on the adjacent roadways from which those parking are expected to access the parking facility

$V_{\text{all}}$  = Total traffic volume on commuting arterials and highways accessing the activity center

**STEP 4:** *Determine parking demand.* Compare the supply of existing parking in the vicinity of the potential new facility with the maximum number of potential parkers computed in Step 3. Not all of the parking capture computed in Step 3 is going to use the new Park-and-Ride facility. Some of the parking capture computed in Step 3 will utilize other available parking in the area. Therefore, an adjustment needs to be made to compute the actual parking demand for a new facility. The location and quantity of existing parking available in the activity centers in relation to the final destinations and traffic circulation patterns must be considered. This is a subjective assessment; therefore a multi-disciplinary team approach is recommended.

**STEP 5:** *Determine the facility size needs.* The actual parking demand computed in Step 4 is used to determine the facility size needs. Both surface lots and parking garages are possible options, depending on the size of parcel, cost of land, surrounding land use and density. Parking spaces, circulation, access and transit loading areas should be considered. Compute the size needs for

surface and structural facilities as follows:

$$\text{Surface Lot: Size (acres)} = \frac{[(300 \times S) + (240 \times B)]}{43,560}$$

$$\text{Garage: Size (acres)} = \frac{[(325 \times (S \div F)) + (240 \times B)]}{43,560}$$

Where:

- S = Number of parking spaces (actual parking demand from Step 4)
- B = Number of bus bays
- F = Number of floors of parking structure/garage
- 240 = Square feet per bus bay
- 300 = Square feet per parking space for surface facilities
- 325 = Square feet per parking space for structure facilities (i.e., parking garage)
- 43,560 = Conversion factor from square feet to acres

#### 4.4.1 Sample Calculations: Urban Facilities

This section provides sample tables and calculations for the demand and facility size estimation of urban facilities. The tables demonstrate the application of the method in a step-by-step manner similar to that provided in the description in the previous section.

##### Data Needed

1. Activity center employment (such as from urban model ZDATA file)
2. Home-based work mode share data (such as from urban model mode split step)
3. Home-based work trip vehicle occupancy data (such as from urban model mode split step)
4. Activity center parking inventory from local data source or field data collection exercise

##### Step 1: Compute total parking demand.

Let:

- Emp = Total activity center employment
- T<sub>share</sub> = Proportion of work trips using transit
- Occ = Average vehicle occupancy for activity center work trips
- R<sub>w</sub> = Proportion of parking spaces used for work trip parking

**Table 4-7: Step 1 - Compute Total Parking Demand**

Emp (1)	T <sub>share</sub> (2)	1-T <sub>share</sub> (3) = 1.00 - (2)	Occ (4)	R <sub>w</sub> (5)	Total Parking Demand (6) = [(1) × (3)] ÷ [(4) × (5)]
<b>800</b>	<b>0.04</b>	<b>0.96</b>	<b>1.171</b>	<b>0.235</b>	<b>2,791</b>

##### Step 2: Compute parking deficiency.

**Table 4-8: Step 2 - Compute Parking Deficiency**

Total Parking Demand (1)	Parking Supply (2)	Parking Deficiency (PD) (3) = (1) – (2)
<b>2,791</b>	<b>1,800</b>	<b>991</b>

**Step 3:** *Compute maximum parking capture.*

Let:

- $V_{adj}$  = Traffic volume on the adjacent roadways from which those parking are expected to access the facility.
- $V_{all}$  = Total traffic volume on commuting arterials and highways accessing the activity center.

**Table 4-9: Step 3 - Compute Maximum Parking Capture**

Parking Deficiency (PD) (1)	$V_{adj}$ (2)	$V_{all}$ (3)	Max Parking Capture (4) = (1) × [(2) ÷ (3)]
<b>991</b>	<b>2,400</b>	<b>3,000</b>	<b>793</b>

**Step 4:** *Determine actual parking demand.*

This is a subjective assessment of the actual parking demand. It may be determined by comparing the supply of existing parking in the vicinity of the new facility with the maximum number of potential parkers computed in Step 3. For this example, assume the assessment yields an available parking supply in the vicinity of the new facility of 300 spaces. Thus, the actual parking demand for the new facility = 793 – 300 = 493 spaces.

**Step 5:** *Determine facility size needs.*

**Table 4-10: Step 5 - Compute Facility Size Needs**

Type of Facility (1)	Spaces (2)	Bus Bays (3)	Floors (4)	Facility Size Surface: (5) = [300×(2) + 240×(3)] ÷ 43,560 Garage: (5) = [325×{(2)÷(4)} + 240×(3)] ÷ 43,560
<b>Surface lot</b>	<b>493</b>	<b>10</b>	<b>--</b>	<b>3.45 acres</b>
<b>Garage</b>	<b>493</b>	<b>10</b>	<b>4</b>	<b>0.92 acres</b>

**4.5 SKETCH PLANNING FOR PARK-AND-RIDE FACILITIES**

An alternative strategy is presented here for use in assessing Park-and-Ride lot development. As the number of commuting roads increases, the level of accuracy for this method will decrease. This approach is best applied in areas where there are a limited number of commuting roadways.

The methodology for estimating facility sizes for Park-and-Ride lots is an adaptation of the Institute of Transportation Engineers (ITE) model [13]. This model assumes that parking demand is a function of the amount of traffic on roadways adjacent to the Park-and-Ride facility. It is a simple technique, requiring only peak period volumes on roads that would provide access to the Park-and-Ride lot. The ITE model assumes that commuters will not divert from their normal travel routes and that users come only from commute routes adjacent to the Park-and-Ride facility. These assumptions are realistic in areas with a limited number of commute routes.

Data Needed

Data needed for the model includes the following:

- AM peak hour traffic counts in 15-minute increments for roads from which the lot is expected to attract Park-and-Ride users\*

- Roadway facility type of the commute roads adjacent to the lot
- Area type of the adjacent roadways

\* If 15-minute counts are not available, total peak hour counts, as well as 24-hour traffic counts with appropriate  $K_{100}$  (peak hour percentage) and  $D_{100}$  (peak hour directional distribution) factors can be used.

### Methodology

The ITE technique for estimating Park-and-Ride lot demand is:

$$\text{Demand} = (a \times V_p) + (b \times V_s)$$

Where:

- $V_p$  = Total design period traffic on adjacent primary roadway facilities
- $V_s$  = Design period traffic on adjacent secondary roadway facilities
- a, b = Diversion factors for traffic on primary and secondary roadway facilities

This technique involves factoring peak period traffic. The *design period* is the period of time that occurs during the peak period when a facility experiences the highest traffic flows. In this application, the design period is equivalent to the peak hour only for facilities carrying over 50,000 Average Daily Traffic (ADT). The design period concept supports the theory that Park-and-Ride use is related to congestion levels, and is supported by observations showing arrivals at Park-and-Ride facilities during a well-defined time period. This postulates that motorists traveling during times of greatest congestion will have a greater propensity to utilize Park-and-Ride facilities.

The following steps are used to compute size requirements for Park-and-Ride facilities:

**STEP 1:** *Collect traffic data for affected roadways.* Identify the primary and secondary roadways that are expected to attract Park-and-Ride users. The primary roadway is considered to be the main commuting roadway in the vicinity of the Park-and-Ride lot. Secondary roadways are commuting routes of lesser importance, producing fewer numbers of Park-and-Ride users.

Ideal data consists of 15-minute peak period traffic counts by direction for the primary and secondary roadways. Hourly counts or 24-hour counts can be used if 15-minute counts are not available. Assumptions concerning peak hour percentages ( $K_{100}$  factor) and directional distribution of traffic ( $D_{100}$  factor) will be necessary if peak hour or directional counts are not available.

**STEP 2:** *Determine the design period.* The design period should represent that time in which there is a pronounced peaking of traffic on the roadway facility. The accuracy of the demand estimate is sensitive to the design period traffic. It is not necessary that the design period equal the conventional peak period or peak hour. Plots of 15-minute traffic, or observations of actual traffic flows in the field, are useful methods for determining this time period. Table 4-11 presents design period values that were developed for roadways carrying the indicated 24-hour traffic volumes. These can be used in lieu of actual 15-minute counts or traffic observations.

**Table 4-11: Suggested Design Periods**

ADT	Design Period
Above 50,000	60 minutes
35,000-49,999	45 minutes
Below 35,000	30 minutes

**STEP 3:** *Calculate the design period traffic.* If 15-minute counts are available, accumulate these counts as necessary to derive the traffic flow during the design period. With hourly count data, an assumption of an even distribution of traffic during the hour can be made. If 24-hour counts are used, K and D factors will need to be assumed. Table 4-12 presents typical values for these factors and is provided for use in situations where local data is not available. The FDOT District Offices should be consulted for the local K and D factors applicable to pertinent roadways.

When using 24-hour counts, use the following equations to determine the design period traffic:

$$V_p = ADT_p \times K_{100} \times D_{100} \times DP$$

$$V_s = ADT_s \times K_{100} \times D_{100} \times DP$$

Where:

- $V_p$  = Design period traffic on the adjacent primary roadway facility
- $ADT_p$  = Two-way average daily traffic for the primary roadway facility
- $K_{100}$  = Peak hour percentage
- $D_{100}$  = Peak hour directional distribution of traffic
- DP = Design period, the pronounced peak traffic period
- $V_s$  = Design period traffic on the adjacent secondary roadway facility
- $ADT_s$  = Two-way average daily traffic for the secondary roadway facility

**Table 4-12: Generalized Average  $K_{100}$  and  $D_{100}$  Factors**

Roadway Class	$K_{100}$	$D_{100}$
Urban Freeway/Expressway	0.092	0.52
Urban Major and Minor Arterials	0.097	0.52
Urban Multi-Lane Highways	0.094	0.52
Transitioning Freeway/Expressway	0.094	0.52
Transitioning Major and Minor Arterials	0.097	0.52
Transitioning Multi-Lane Highways	0.097	0.52
Rural Freeway/Expressway	0.103	0.52
Rural Major and Minor Arterials	0.097	0.52
Rural Multi-Lane Highways	0.097	0.52

(Procedures for Estimating Park-and-Ride Demand in Large Texas Cities)  
(FDOT Quality/Level of Service Handbook)

**STEP 4:** *Estimate the Lot Size.* Compute the parking demand for the facility as follows:

$$\text{Demand} = (a \times V_p) + (b \times V_s)$$

Where:

- $V_p$  = Design period traffic on adjacent primary roadway facilities
- $V_s$  = Design period traffic on adjacent secondary roadway facilities
- $a$  = 0.03 representing a capture of three percent on primary roadway facilities
- $b$  = 0.01 representing a capture of one percent on secondary roadway facilities

Lot size requirements can be determined by multiplying the demand by an appropriate adjustment factor, then multiplying the result by 300 square feet per parking space for surface facilities or 325 square feet divided by the number of floors for structures. It is recommended that the adjustment should provide for at least a 25 percent increase over the demand using the ITE model. This would plan for an 80 percent occupancy rate. The factor may also include adjustments for seasonal variations in traffic counts. These factors can be obtained from the local District Statistics Office. The following formulas may be used for lot size requirements:

$$\text{Surface lot: Size (sq ft)} = \text{Demand} \times 1.25 \times 300$$

$$\text{Garage: Size (sq ft)} = \text{Demand} \times 1.25 \times 325 \div F$$

Where:

- Demand = Calculated in previous formula
- 1.25 = Multiplication factor providing for a 25 percent increase over the demand
- 300 = Square feet per parking space for surface facilities
- 325 = Square feet per parking space for structure facilities (i.e., parking garage)
- F = Number of floors for a structure

#### 4.5.1 Sample Calculations: Sketch Planning for Park-and-Ride Facilities

This section provides sample tables and calculations for the demand and facility size estimation of Park-and-Ride facilities. The tables demonstrate the application of the method in a step-by-step manner similar to that provided in the description in the previous section.

##### Data Needed

1. Traffic volume counts for the adjacent primary and secondary facilities, preferably 15-minute counts so the design period can be identified (Step 1).

##### Step 2: *Determine the design period.*

In this step, the time-of-day distribution of the hourly or 15-minute traffic counts is examined to identify a design period. Table 4-12 provides default values if detailed traffic count data is not available.

##### Step 3: *Compute the design period traffic.*

Let:

- $ADT_p$  = Two-way average daily traffic for the primary roadway facility
- $ADT_s$  = Two-way average daily traffic for the secondary roadway facility
- $K_{100}$  = Peak hour percentage (refer to Table 4-12 for default values)
- $D_{100}$  = Peak hour directional distribution of traffic (refer to Table 4-12 for default)
- DP = Design period, the pronounced peak traffic period, identified from the 15 minute traffic counts or suggested value from Table 4-11 (in minutes)

**Table 4-13: Step 3 - Compute the Design Period Traffic**

Type of Facility (1)	ADT (2)	K <sub>100</sub> -factor (3)	D <sub>100</sub> -factor (4)	DP (5)	Design Period Traffic, V (6) = (2) × (3) × (4) × (5) ÷ 60
<b>Primary</b>	<b>62,710</b>	<b>0.092</b>	<b>0.52</b>	<b>60</b>	<b>3,000</b>
<b>Secondary</b>	<b>31,740</b>	<b>0.097</b>	<b>0.52</b>	<b>30</b>	<b>800</b>

Step 4: Compute the parking demand and estimate the facility size.

**Table 4-14: Step 4a - Compute the Parking Demand**

V <sub>p</sub> (1)	V <sub>s</sub> (2)	a (3)	b (4)	Parking Demand (5) = (1) × (3) + (2) × (4)
<b>3,000</b>	<b>800</b>	<b>0.03</b>	<b>0.01</b>	<b>98</b>

**Table 4-15: Step 4b - Compute Facility Size Needs**

Type of Facility (1)	Spaces (2)	Adj Factor (3)	Floors (4)	Facility Size (square feet) Surface: (5) = (2) × (3) × 300 Garage: (5) = (2) × (3) × 325 ÷ (4)
<b>Surface lot</b>	<b>98</b>	<b>1.25</b>	<b>--</b>	<b>36,750</b>
<b>Garage</b>	<b>98</b>	<b>1.25</b>	<b>2</b>	<b>19,910</b>

## CHAPTER 5: IMPACT ASSESSMENTS

### 5.0 GENERAL

This chapter presents a formula for evaluating the impacts associated with individual Park-and-Ride facilities, including the effects of Park-and-Ride lot usage on Vehicle Miles of Travel (VMT), fuel consumption, and vehicle emissions. Most state managed Park-and-Ride lot programs will be constructed with state dollars so the NEPA process will not apply. The NEPA process only applies when federal funds are used. Only minor analysis of the environmental impact would be necessary unless they are requested by a major agency such as the Army Corp of Engineers or Water Management Districts. The method presented below is based on accepted practices and principles, and models that were developed to be easily and quickly executed by using readily available data. Default values and rules-of-thumb are provided for use when local data is not available.

A Park-and-Ride facility can contribute to fuel conservation, reduction in vehicle emissions, and reduced travel times. However, while the consideration of these benefits may be valuable on a local or regional level, the impact of one Park-and-Ride lot on a state or national level of analysis is so small that it can be considered insignificant. On a local level of analysis, Park-and-Ride lots do contribute to a reduction of vehicles on the roadway network, which can produce a positive effect concerning VMT, as well as associated impacts.

Congestion levels are indirectly impacted by removing vehicles from the roadways that connect Park-and-Ride facilities with destination areas. The effects of these secondary contributions may not be appreciable in all cases and are likely short-lived. For example, assuming a fully occupied remote lot with 60 spaces (historically, a typical size for Florida) and no transit service, only 60 vehicles will be removed from commuting roadways. This reduction in vehicles will have, at most, an insignificant impact on others traveling along the commuting roadways. Consequently, it is reasonable to disregard these secondary impacts for remote lots especially since they tend to be small and are generally located in areas where traffic flows are not at saturation levels. Regardless, Park-and-Ride lots, especially when strategically planned and constructed, can prove invaluable to encouraging multi-modal forms of travel and in providing other options to commuters.

The basic approach for estimating the impact of a Park-and-Ride facility consists of the following steps:

1. Generation of basic input data necessitated by the impact estimation approaches
  - a. Average trip distances from lot to destination
  - b. Number of vehicles parked at the lot
2. Computation of reduced VMT
3. Computation of fuel consumption changes
4. Computation of vehicle emissions impacts

### 5.1 DATA REQUIREMENTS

The techniques for computing the impacts of remote, urban fringe, peripheral, and urban corridor facilities used in an earlier version of this document have been combined for this update for several reasons. Since many of these lots have similar characteristics when evaluating the impacts that a Park-and-Ride lot would have on VMT/fuel consumption and vehicle emissions, the

five categories have been combined into one for the calculation of the impacts. Data requirements are generally minimal and relatively easily obtained, needing only the number of parked vehicles and average trip length. The most important input will be the demand for the facility under investigation. The demand estimation techniques presented in Chapter 4 can be used to generate this data for home-based work trip lengths from parking lot to destination, and the urban area model or default value of 1.2 persons per vehicle. Chapter 4 contains descriptions of these techniques.

**5.2 PARK-AND-RIDE LOT IMPACTS**

Impacts associated with construction of a Park-and-Ride lot are related to the number of parked vehicles removed from the roadway between the lot and destination area. Since the majority of lots constructed are less than 250 spaces, potential impacts resulting from improved traffic flow may be considered inconsequential. Such a small number of vehicles removed from the traffic stream yields only negligible improvements in vehicle speeds.

The technique presented below consists of three steps to compute the reduction in VMT, fuel consumption, and vehicle emissions. Impacts to overall system travel time are considered insignificant, so the procedure does not include computations for this variable. It should be noted that the only time that impact on travel time may be impacted is when the Park-and-Ride facility is considered in conjunction with a High Occupancy Vehicle (HOV) lane. This potential benefit can and should be calculated and measured by utilizing the respective urban area’s transportation modeling tool.

STEP 1: *Calculate annual reduction in VMT.* The impacts on fuel consumption and vehicle emissions are related directly to the reduction in VMT produced from shifting to higher occupancy vehicles. VMT reduction is calculated by multiplying the estimated reduction in vehicle trips by the average distance from the lot to the destination area. This is then converted to a value for an annual basis. The following formula produces a positive value for VMT reduction resulting from parked vehicles at a Park-and-Ride facility.

$$VMT \text{ (annual)} = L_{avg} * Parked * 233 * 2$$

Where:

- VMT = Annual VMT reduction
- L<sub>avg</sub> = Average trip length from lot to destination
- Parked = Vehicles parked at the Park-and-Ride lot
- 233 \* 2 = Daily to annual conversion factor for Park-and-Ride lots multiplied by 2 trips per vehicle removed

STEP 2: *Calculate annual fuel savings.* Fuel savings are calculated by multiplying the VMT reduction, computed in Step 1, by an average per mile fuel consumption rate for the analysis year under study. Table 5-1 should be referenced for these consumption rates. The following formula computes a positive value for annual gallons of fuel saved.

$$\text{Fuel Savings (annual gallons)} = VMT * C_{rate}$$

Where:

- VMT = Annual VMT reduction computed in Step 1
- C<sub>rate</sub> = Average fuel consumption rate in gallons per mile for the study year under investigation (Refer to Table 5-1)

**STEP 3:** *Calculate annual emission reduction.* The computation of the reduction in vehicle emissions consists of multiplying the VMT savings computed in Step 1 by fleet average emission rates for carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) appropriate for the analysis year under study. The pollutant emission rates are found in Table 5-1.

**Table 5-1: Average Fuel Consumption and Emission Rates for Park-and-Ride Lots**

Planning Year	Fuel Consumption Combined (Cars and Trucks) (1)		Vehicle Emissions (2) (grams/mile)		
	Gallons Per Mile	Miles Per Gallon	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
2012	0.0395	25.3	364.0	0.031	0.032
2013	0.0376	26.6	364.0	0.031	0.032
2014	0.0358	27.9	364.0	0.031	0.032
2015	0.0341	29.3	364.0	0.031	0.032
2016	0.0293	34.1	364.0	0.031	0.032
2020	0.0258	38.8	364.0	0.031	0.032
2025	0.0202	49.6	364.0	0.031	0.032

(1) Source for Year 2012-2015: (2007 Corporate Average Fuel Economy (CAFE) Standard)

Source for Year 2016-2025: (2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards)

(2) Source: (Optional Emissions from Commuting, Business Travel and Product Transport)

The following formulas produce positive values for reductions in annual tons of pollutants:

$$\text{Reduction in CO}_2 \text{ (tons/year)} = (\text{VMT} * E_{\text{CO}_2}) / 907,184$$

$$\text{Reduction in CH}_4 \text{ (tons/year)} = (\text{VMT} * E_{\text{CH}_4}) / 907,184$$

$$\text{Reduction in N}_2\text{O (tons/year)} = (\text{VMT} * E_{\text{N}_2\text{O}}) / 907,184$$

Where:

VMT = Annual VMT reduction computed in Step 1

E<sub>CO2</sub> = Fleet average carbon dioxide emission rate in grams per vehicle mile (Refer to Table 5-2)

E<sub>CH4</sub> = Fleet average methane emission rate in grams per vehicle mile (Refer to Table 5-2)

E<sub>N2O</sub> = Fleet average nitrous oxide emission rate in grams per vehicle mile (Refer to Table 5-2)

907,184 = Conversion from grams to U.S. tons

### 5.3 ENVIRONMENTAL IMPACTS AND SUSTAINABILITY

The above paragraphs outline the process to assess the transportation and air quality impacts of a Park-and-Ride facility. In addition to these items, issues such as resource impact and environmental sustainability should be considered as part of the impact assessment. If the state slips back into non-attainment for the National Ambient Air Quality Standards (NAAQS) then Park-and-Ride lots may qualify for credits or funding grants from various programs, such as the Congestion Mitigation and Air Quality (CMAQ) Improvement Program, designed to assist in meeting the national (or local) ambient air quality standards. The American Association of State

Highway and Transportation Officials (AASHTO) recommends that local state environmental impact policies should be reviewed for the need to conduct a policy-level impact analysis, if applicable. In the rare cases when federal funding is used to develop Park-and-Ride lots, AASHTO recommends reviewing the federal environmental analysis requirements, such as the National Environmental Policy Act (NEPA), as well as consulting with the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the Environmental Protection Agency (EPA), and local planning agencies to ensure that the level of analysis is appropriate.

For projects involving a federal action, the Class of Action Determination is made in consultation with the lead federal agency, usually, the FHWA, or the FTA. A Class of Action determination is required for all federal actions and establishes the level of environmental documentation required to comply with the *NEPA* of 1969 as amended [<sup>14</sup>], and the regulations of the Council on Environmental Quality (CEQ), *40 Code of Federal Regulation (CFR) parts 1500 through 1508* [<sup>15</sup>]. A transportation improvement brings about a federal action and the mandatory compliance with *NEPA* when one of the following conditions exists:

1. Federal funds or assistance is used at some phase of project development or implementation;
2. Federal funding or assistance eligibility is being maintained for subsequent phases;
3. Federal permit(s) is (are) required (e.g., U.S. Coast Guard Bridge permit); or
4. Federal approval of an action is required (e.g., change in Interstate access control).

For projects not involving a federal action, a similar determination is made by the FDOT. A determination whether the proposed project is a Major or Non-Major State Action must be made to decide if a State Environmental Impact Report (SEIR) or a Non-Major State Action (NMSA) checklist for non-major transportation projects will be required. Major state-funded projects are also screened through the Efficient Transportation Decision Making (ETDM) process, however, a Federal Class of Action is not required, and a SEIR is the environmental document prepared for the transportation improvement.

There are several potential environmental processes available to the FDOT on a Park-and-Ride facility. These are briefly described below.

- **NEPA Environmental Impact Statement (EIS).** There are three classes of actions defined in *23 CFR 771.115* [<sup>16</sup>] that prescribe the level of documentation required in the NEPA process. Class I is an Environmental Impact Statement (EIS). This environmental Class of Action is prepared for actions that significantly affect the environment as defined by CEQ regulations.
- **NEPA Categorical Exclusion (CE).** This environmental Class of Action (Class II) is applied to actions that do not individually or cumulatively have a significant environmental effect. A Categorical Exclusion (CE) means a project or a category of actions based on past experience with similar actions do not individually or cumulatively have a significant environmental effect, and are excluded from the requirement to prepare an Environmental Assessment (EA) or an Environmental Impact Statement.
- **NEPA Environmental Assessment (EA).** This environmental Class of Action is prepared for actions in which the significance of the environmental impact is not clearly established. All actions that are not Class I, EISs or Class II, CEs are Class III. All actions

in this class require the preparation of an EA to determine the appropriate environmental documentation required.

- **State Environmental Impact Report (SEIR).** Once it is determined the project is a non-federal transportation project, the District must determine if a SEIR is required. Only FDOT non-federal Environmental Screening Tool (EST) screened projects meeting any of the following qualifying conditions require the preparation of a SEIR:
  1. The project (regardless of lead agency) is part of the SHS whether it is or is not on the SIS.
  2. FDOT is the lead agency for highways that are not on the SHS, but are on the SIS.
  3. FDOT is the lead agency and state funds are being used for highways that are not on the SHS or on the SIS.
  4. FDOT is the lead agency for a major transit project regardless of whether it is on or off the SIS.
  5. The project is a toll project under *Section 338.251, F.S. – Toll Facilities Revolving Trust Fund* [17].
  6. The project is a privately funded project under *Section 334.30, F.S. – Public-Private Transportation Facilities* [18].
  7. Florida’s Turnpike Projects as defined in *Section 10-2.2.1* [19].
- **Non-Major State Action (NMSA) Checklist.** Typically, project types not found in the list for SEIRs are NMSAs. Although these projects are excluded from the SEIR process, they still require an environmental evaluation. The District completes a *Non-Major State Action Checklist* and includes it in the project file to document consideration of environmental impacts. The *NMSA Checklist* is signed by the District Environmental Administrator or designee. If any item on the checklist is marked “YES”, then an explanation is provided and the District Environmental Administrator or designee determines if a SEIR is required. Consultation with the Florida Division of Historical Resources (DHR) is required on all projects to support any no adverse effects determination on historic properties by the District, except as set forth in the *Florida State Historic Preservation Officer (SHPO) and Advisory Council on Historic Preservation (ACHP) ETDM Agency Operating Agreement* (see *Part 2, Chapter 12* of the *Project Development and Environment (PD&E) Manual*) <http://www.dot.state.fl.us/emo/pubs/pdeman/pdeman1.shtm>. A NMSA does not require a Public Hearing, but may necessitate public involvement activities in accordance with *Part 1, Chapter 11* of the *PD&E Manual*. NMSAs apply only to FDOT non-major projects. The District, at its discretion, may decide to prepare a SEIR on a non-major project if the project may be deemed controversial or if any issues are marked “Yes” on the *NMSA Checklist*. [20]

The Class of Action for a major transportation project (typically Type 2 CEs, EAs or EISs) is determined during the Programming Phase that takes place as part of the ETDM process. This is described in Chapter 5 of the FDOT’s *ETDM Planning and Programming Manual* [21]. Major transportation projects within a Metropolitan Planning Organization (MPO) area should have sufficient information on the anticipated impacts to assist in determining the appropriate Class of Action. This information is located in the *Planning Summary Report* of the Environmental Screening Tool (EST), and was analyzed as part of the Planning Phase of the ETDM process. All major transportation projects must complete the Programming Phase of ETDM to determine the Class of Action.

Park-and-Ride facilities can assist in environmental sustainability. By developing transportation facilities in accordance with a plan for a comprehensive transportation network, including strategically placed Park-and-Ride lots, the overall efficiency of the transportation system can be enhanced. Incorporating bike racks and/or bike lockers into the design of the site, and connecting with easily accessible pedestrian and bicycle paths and trails will encourage use of alternative modes of transportation rather than the single occupant vehicle. Park-and-Ride facilities can utilize solar-powered lights, and other forms of non-polluting, renewable energy to reduce energy consumption and costs in operation of the lot. Recycling can be encouraged at the facility by adding areas for the collection of recyclable materials. These and many other “green” design considerations can be incorporated as good sustainability practices in support of environmental awareness and to reduce the negative impacts and enhance the quality of Park-and-Ride lots. More information on this topic is incorporated into design considerations found in Chapter 7.

## CHAPTER 6: ECONOMIC ANALYSIS AND PROJECT JUSTIFICATION

### 6.0 GENERAL

When considering the construction of a new Park-and-Ride facility, it is important to take into account the associated economic impacts. This chapter provides direction on producing a justification report and performing economic analyses of Park-and-Ride improvements. The previous versions of this Guide included this analysis and project justification. These items are typically optional, thus information included in this chapter is for guidance in case they should be necessary. An example of economic analysis is included for demonstration purposes at the end of the chapter.

### 6.1 THE JUSTIFICATION REPORT

The report should consider benefit and cost impacts, compatibility with state and local plans, impacts on surrounding transportation systems, and how the proposed improvement will address identified need(s). The findings of the analyses should be reported utilizing the following outline:

- I. Introduction  
Summarize the project in general, as well as the purpose, need, benefits, and costs of the project.
- II. Background  
Provide background information for the project. Provide a discussion of the project in relation to the impact area, existing and planned transportation systems, other measures (if any) which have been implemented in an attempt to address the stated need(s), and the response of users to similar local Park-and-Ride lots.
- III. Plans and Improvements  
Describe how the proposed improvement is compatible with state and local plans; transportation improvements and conditions that may have a bearing on the analysis, such as other commuter parking facilities, highway expansion, Transportation Demand Management (TDM), Commuter Assistance Programs, pedestrian and bicycle facilities, as well as transit services.
- IV. Location Analysis  
Present site selection information, using criteria found in Chapter 3.
- V. Demand Analysis  
Present forecasts of utilization in the construction year and the planning year. (See Chapter 4 for relevant procedures.)
- VI. Benefit/Cost Assessment  
Describe benefits and costs for proposed improvement, measurable in monetary units (see following section).
- VII. Conclusions  
Summarize the need and benefits of the proposed improvement.

## 6.2 BENEFIT, COST AND EFFECTIVENESS MEASURES

This section presents a review of the measures relevant to the analysis of Park-and-Ride improvements. All monetary values stated in this section are in 2011 prices. (Please note: adjustments for inflation can be made using Table 6-3.) Table 6-1 presents a listing of benefit, cost and effectiveness measures that should be considered for inclusion in the justification report.

**Table 6-1: Benefit, Cost, and Effectiveness Measures for Analysis of Park-and-Ride Improvements**

Benefit Measure	Cost Measure	Effectiveness Measure
Travel Time	Engineering	Auto Occupancy
Vehicle Operation	Construction	Peak-Hour Level of Service (LOS)
Accidents	Right-of-Way (ROW)	VMT Reduction
Transit Fares*	Maintenance	Air Quality
	Transit Operations and Maintenance (O&M)*	Fuel Savings
	Transit Capital*	Peak-Hour Highway LOS*
	Annual Lease*	Transit Ridership*
	Administration*	

(\* Where applicable)

### 6.2.1 Benefit Measures

Benefit measures are those things that make the improvement advantageous or useful. These measures are expressed in monetary units, typically in terms of user savings.

Accidents: The cost of accidents is the loss of income associated with fatality and injury accidents, and the value of property damage related to property damage only accidents. Accident rates by type can be calculated on a Vehicle Miles of Travel (VMT) basis.

Transit Fares: Transit fares should be added to the user cost of travel. Published fare schedules from the local transit provider should be referenced. If that information is not available, user cost estimates (in 2011 values) can be based on \$2.50 per person trip for express bus and urban rail service, \$4.00 per person trip for commuter rail service, and \$2.00 per person trip for local bus service.

Travel Time: This measure is the change in user travel time as a result of the improvement. (Note: Computation of travel time impacts is presented in Chapter 5.) Travel time is converted to a dollar value through the use of a value-of-time factor. The value of travel time for the work trip purpose is appropriate for the analysis of Park-and-Ride improvements. A value of \$20 per hour (2010 cost) is recommended for use in economic analyses of transportation improvements.

Vehicle Operation: Vehicle operation costs are related to running speed, speed changes, and roadway gradient. Parking charges are also included in this category. Estimating these costs is only recommended for economic studies of High Occupancy Vehicle (HOV) facilities. Procedures are contained in the American Association of State Highway and Transportation Officials (AASHTO) Benefit/Cost Manual [22]. Use of per-mile unit operating costs is more appropriate for analyzing other Park-and-Ride improvements. A value of 51 cents per vehicle mile is appropriate [23]. This value does not include capital, depreciation, or insurance, since these costs would continue to be incurred by the auto owner using the facility.

### 6.2.2 Project Costs

Project costs relate to design, construction, maintenance, and operation of the proposed transportation improvement(s). For carpool only Park-and-Ride facilities, project costs are only those associated with the facility. For an HOV facility, project costs include construction and operation of the HOV facility and Park-and-Ride lot. In addition, on-site transit Operations and Maintenance (O&M) costs are included when transit services are to be provided to the facility.

Annual Lease: It is common practice for the state or local agency to enter into a lease agreement to operate a joint-use facility in which parking is shared with other land uses. These costs are minimal at approximately \$12 per space per year.

Capital Cost: Capital cost is the sum of construction, engineering, Right-of-Way (ROW), and transit capital.

Construction: Construction costs include: supervision, staking, inspection, and testing; facility elements such as earthwork, pavement, drainage, embankments, structures, and ramps; landscaping and erosion control; maintenance of traffic; and traffic control devices. The cost basis includes labor, materials, equipment, and contractor overhead and profit margin. The best source for these costs is the preliminary or final engineer's estimate. Unit construction costs can also be developed from historical experience.

The following unit construction costs in 2012 dollars can be used for preliminary estimates:

- Garage costs: \$16,400 per parking space [<sup>24</sup>]
- Surface lot costs: \$9,000 per parking space [<sup>25</sup>]
- HOV lanes: \$1,500,000 per lane mile [<sup>26</sup>]
- Direct-access ramps: \$12,000,000 per pair of ramps [<sup>27</sup>]

Engineering: Engineering costs include preliminary engineering, final design, construction plans, and preparation of specifications. There are associated costs for design concepts, preliminary layouts, land and aerial surveys, ROW appraisals, soils investigations (if required), environmental assessments (EAs), final design plan, and preparation of construction drawings, specifications, and bid documents. These costs will tend to be a higher percentage for HOV facilities and parking garages, while they will be zero for an improvement that consists solely of adding transit service. The development of these costs is best derived as a historical percentage of construction costs. This is typically twenty percent.

Maintenance: Maintenance costs include, but are not limited to: routine and periodic upkeep such as patching, striping, painting, drainage clean-out, and landscaping; replacement of pavement, traffic control devices, fences, and guardrails. The cost of maintaining Park-and-Ride facilities is approximately \$100 (2011 cost) per space per year.

Operations: Operation costs include utility charges, safety patrols, operation of signals, garbage removal, administration of lease agreements, and traffic surveillance. These costs may be lumped together with maintenance; however, they may be large enough to justify estimating them separately.

Right-of-Way (ROW): ROW costs include: purchase price; legal, title, and other fees related to transfer of ownership; administrative costs for negotiation, condemnation, or settlement;

business, family, and utility relocation; and demolition. Another cost that can be considerable relates to environmental cleanup of hazardous waste. This may be large enough to eliminate a site or project from further consideration. Cost estimates for ROW should be obtained from the District Right-of-Way Office.

Transit Capital: These costs are for investments in rolling stock (i.e., buses and maintenance/supervisor vehicles). They may also include costs associated with customer amenities, such as benches, trash cans, bike racks, bike lockers, and shelters at the Park-and-Ride facility, although it should be included as part of the construction costs.

Transit Operations and Maintenance (O&M): Transit O&M costs vary with the level, type, and speed of bus operation. They are typically related to vehicle miles generated by the system. They entail:

- Driver wages and fringe benefits
- Vehicle operation including tires, gasoline, and lubricants
- Vehicle parts and repair
- Insurance, managerial labor, and administrative labor
- Vehicle rental or depreciation
- Contribution of the transit system to roadway maintenance and operating costs

The local transit provider should have this information available. Another source for this data is the National Transit Database [<sup>28</sup>], which has capital and operations information for all of the public transit systems in the United States.

### **6.2.3 Effectiveness Measures**

Effectiveness measures are benefits for which dollar values cannot be assigned. Typically these relate to quality of life attributes such as level of transportation service and environmental impacts. These measures should be presented in the justification report to provide an accurate assessment of the full impacts of proposed improvement.

Air Quality: Impacts on air quality are measured in terms of annual tons of carbon monoxide, hydrocarbons, and nitrogen oxides. These are pollutants produced by automobiles and transit vehicles. In counties designated as nonattainment areas, improvement in air quality is usually seen as a local objective.

Auto Occupancy: Increasing average vehicle occupancy is often a local objective, and is expressed in terms of persons per automobile. Increased occupancies result from shifting person trips from single-occupant vehicles to carpools and transit. Park-and-Ride facilities will assist in meeting this goal. Other benefits from increased occupancy are decreased VMT, congestion levels, fuel consumption, and pollutant emissions. A value of 1.2 persons per vehicle is typically used in Florida.

Fuel Savings: This measure is presented in millions of gallons of fuel saved. Park-and-Ride facilities can reduce fuel consumption through a reduction in vehicles on the road. Larger facilities serving limited-access highways might actually increase fuel consumption (because fuel efficiency decreases when speeds increase over 35 mph).

Level of Service: Level of Service (LOS) is a qualitative assessment of the road user's

perception of the quality of flow. This measure is represented by letter ratings ranging from A to F, with A representing unrestrained travel and F representing system failure. Improved LOS is nearly always a local objective, since it is part of local comprehensive plans. LOS C or D is generally acceptable, but many urban facilities operate at E or F. Park-and-Ride facilities can have a measurable impact on LOS if they are relatively large and highly utilized.

Transit Ridership: This measure is presented on an annual basis. Increasing transit ridership is an objective of virtually every local transit plan, and is becoming more important as adding road capacity is becoming cost-prohibitive and often contrary to growth management. This objective is only relevant to Park-and-Ride improvements where transit exists and/or transit service expansion is planned. Public transit systems in Florida are required to provide the FDOT a Transportation Development Plan (TDP), which is periodically updated. This document has information pertaining to existing system characteristics and future plans and programs.

Vehicle Miles of Travel Reduction: Reduction of VMT is an expected benefit of Park-and-Ride improvements, including HOV facilities, parking lots, garages, and increased transit service. It is normally expressed on an annual basis in units of one million vehicle miles. Reduced VMT is often a stated objective of the local transportation plan. VMT reduction has positive benefits, including reduced congestion levels, fuel consumption, and vehicle emissions.

### **6.3 ECONOMIC ANALYSIS OF PARK-AND-RIDE IMPROVEMENTS**

The economic analysis of a Park-and-Ride improvement should follow a series of analytical steps. The process contained in the AASHTO Red Book [<sup>29</sup>] has been adopted by the FDOT as the prescribed procedure for analyzing all construction projects, including Park-and-Ride facilities.

#### Cost Updates

Unit costs associated with users, construction, and operation should be updated to maintain consistency with the FDOT's latest cost values. These unit costs should be updated whenever they change in real dollars. Adjusting these unit costs for inflation to a new time basis is a separate issue and is addressed as a study feature below.

#### Study Features

Critical features of an economic study include the discount rate, value of travel time, analysis period, study years, and the time basis in which all monetary amounts are stated.

Discount rates are used to compute present values of economic investment and user costs. A discount rate of seven percent is currently employed for transportation projects.

As mentioned above, the economic value of time spent commuting is computed through the use of a value-of-time factor. The value of time for the work trip purpose is appropriate for the analysis of Park-and-Ride improvements, since the associated impacts are realized during commuting hours. The value of commuter travel time ranges from 20 to 40 percent of the commuter's income [<sup>30</sup>]. A value of \$20 (2011 cost) per hour is typically used in economic analyses of transportation improvements [<sup>31</sup>].

The selected analysis period for the study should be consistent with the economic life of the improvement. Different components of the improvement will have differing life cycles. Standard economic life values used by the FDOT include 60 years for ROW; 40 years for earthwork, drainage systems, and structures; and 20 years for pavements and base course. Life cycle lengths for transit vehicles can be assumed to be 15 years. Table 6-2 presents appropriate

economic lives for Park-and-Ride related improvements.

**Table 6-2: Economic Life Cycles for Park-and-Ride Improvements**

Improvement	Life Cycle
HOV-Related Facility	20+ years
Fixed Guideway Facility	20+ years
Express Bus Facility	15 years
Isolated Facility	20 years
Expansion on Adjacent Right-of-Way (ROW)	20 years
Structure on Existing ROW	40 years
Modification of Existing Design	15 years
Joint-Use Development	15 years
Provision of Transit Vehicles	15 years

The selection of study years allows for the simplification of estimating the annual values of user benefits and project costs over the length of analysis period. Typically, two years are selected – the base year and some future year. Annual costs are then interpolated between the two study years. A 20-year planning horizon is a traditional future study year. The future study year should be selected based on considerations of the economic life of the project and the available years of travel forecasts.

**Table 6-3: Default Adjustment Factors for Inflation**

Number of Years	Adjustment Factor	Number of Years	Adjustment Factor
1	1.033	16	1.681
2	1.067	17	1.737
3	1.102	18	1.794
4	1.139	19	1.853
5	1.176	20	1.914
6	1.215	21	1.977
7	1.255	22	2.043
8	1.297	23	2.110
9	1.339	24	2.180
10	1.384	25	2.252
11	1.429	26	2.326
12	1.476	27	2.403
13	1.152	28	2.482
14	1.575	29	2.564
15	1.627	30	2.649

(Fiscal Year 2012 Inflation Factors)

The year chosen as the time basis to state all dollar amounts is not a substantive issue as long as one is used. However, it may be natural to use the year in which the study is done as the time basis. The recommended adjustment procedures include use of either average or commodity-specific consumer and wholesale price indices to factor the base unit rates to the new time basis. A default procedure may be used for preliminary analysis. Assuming an average rate of three percent as the inflationary factor, Table 6-3 gives the corresponding adjustment factor and the number of years between the year in which the original dollar amount is stated to the selected time basis. For example, to adjust dollar amounts in 2012 prices to dollars in 2023 prices, one would use the adjustment factor corresponding to 11 years (from 2012 to 2023), which is

1.429.

Project Description and Costs

The proposed improvement should be defined in sufficient detail to estimate project and user costs. Different analysis sections should be identified to estimate costs related to HOV facilities only. Sections should be defined by length, gradients, curvature, and speed change characteristics.

The length of the travel path between the proposed Park-and-Ride facility and the major destination areas should be identified and sectioned for areas representing congested freeway, uncongested freeway, congested arterial, and uncongested arterial roadways. Chapter 5 presents methods for determining these classifications of roadways in computing facility impacts related to travel time, fuel consumption, and vehicle emissions.

Transit Costs

Transit costs are treated in two categories: capital costs and Operations and Maintenance (O&M) costs. The level of transit service and related number of additional vehicles must be determined to derive these costs.

Capital costs relate to investments in fixed facilities such as vehicles, benches, shelters, and route signs. Costs associated with HOV lane construction or physical improvements at the Park-and-Ride facility are included in the facility project costs discussed in the preceding section.

O&M costs include driver wages, fringe benefits, vehicle operation, labor, and parts associated with bus maintenance. O&M costs may be estimated by multiplying the amount of revenue vehicle miles serving the Park-and-Ride lot by the local average O&M cost per revenue vehicle mile. The local transit provider should have this information available. Another source for this data is the National Transit Database [<sup>32</sup>], which has capital and operations information for all of the public transit systems in the United States.

User Benefits

User benefits consist of annual savings in travel time, vehicle operation, accident, parking, and transit fare costs, which users realize through the implementation of an improvement. Data needed for these computations are estimates of reduction in VMT and travel time, as well as savings in parking and transit fare costs. Chapters 4 and 5 present methods for computing this data. Total annual user benefits are developed by multiplying the appropriate cost factors by the estimated reduction in VMT and person hours of travel. Table 6-4 presents default values of the cost factors which may be used in lieu of available local data. This calculation is represented by the following formula:

$$UB = C_H * PHT + C_O * VMT + C_A * VMT + TF$$

Where:

UB	=	User Benefits
C <sub>H</sub>	=	Cost factor for person hours of travel (dollars per PHT)
C <sub>O</sub>	=	Cost factor for vehicle operations (dollars per VMT)
C <sub>A</sub>	=	Cost factor for accidents (dollars per VMT)
PHT	=	Reduction in person hours of travel (hours)
VMT	=	Reduction in vehicle miles of travel (miles)
TF	=	Savings in transit fare (dollars)

**Table 6-4: 2011 User Cost Default Values**

Cost Element	Value
Travel time [ <sup>33</sup> ]	\$20.00/hour
Vehicle operation [ <sup>34</sup> ]	\$0.51/vehicle mile
Accidents*	\$0.103/vehicle mile

(\*Calculated value based on \$299.5 billion annual cost [<sup>35</sup>] and 2,921.9 billion vehicle miles of travel [<sup>36</sup>] (\$299.5 / 2,921.9 = \$0.1025))

Residual Value

Residual value is the economic value of an improvement at the end of the analysis period. To compute residual value, take the full cost of the land, subtract the disposal costs, and add the proportion of the remaining useful life of structures and earthwork times their cost.

Present Values and Economic Evaluation

The FDOT procedure for this final step is to bring all costs to an annual basis and compute a benefit/cost ratio. A capital recovery factor (CR) based on the discount rate is used to convert the present worth of construction and equipment to an annual basis. An appropriate sinking fund factor (SF) based on the discount rate is applied to convert future residual values to an annual basis. Equations for these factors are as follows:

$$CR = i(1 + i)^n / [(1 + i)^n - 1]$$

$$SF = i / [(1 + i)^n - 1]$$

Where:

- SF = Sinking fund factor
- i = Discount rate
- n = Analysis period in years

The annual project cost is computed as follows:

$$PC = O\&M + CC * CR + RC * SF$$

Where:

- PC = Annualized total project cost
- O&M = Total annual operation and maintenance costs including transit, highway, and Park-and-Ride facility costs
- CC = Total capital costs including fixed facilities and rolling stock
- RC = Residual value for all salvageable property and rolling stock at the end of the analysis period
- CR = Capital recovery factor
- SF = Sinking fund factor

The following formula is used to compute the benefit/cost ratio for an improvement:

$$BC = UB / PC$$

Where:

- BC = Benefit/cost ratio for the improvement

- UB = Annual user benefits of the improvement
- PC = Annualized project cost of the improvement

A BC value greater than one indicates economic feasibility of a project.

## 6.4 AN EXAMPLE OF ECONOMIC ANALYSIS

### Introduction

The purpose of this example is to illustrate the method presented above with a consistent set of representative numbers. The objective is to compute the benefit-cost ratio of a single planned Park-and-Ride lot as compared to a do-nothing alternative. This example is adapted from the 1993 *Dade County Park and Ride Lot Plan* [37] (updated using 2011 dollars). The rest of the section is structured into six steps: 1) study features, 2) cost factors, 3) project description, 4) user benefits, 5) project costs, and 6) results.

### Study Features

The study features provide the boundaries within which an economic analysis of a proposed Park-and-Ride lot would be conducted. Features for the current example are summarized below in Table 6-5. For example study purposes, the year 2011 is chosen as the time basis for dollar amounts because it is the base year on which this example is based. Note that all costs are rounded to nearest dollar.

**Table 6-5: Example Study Features**

Study Feature	Value	Comments
Analysis period	2011 - 2031	
Study years		
Construction costs	2011	Beginning of the analysis period
Annual user benefits	2017	Middle of the analysis period
Year of constant dollars	2011	All monetary values must be measured in 2011 prices.
Annual rate of inflation	3.3%	Used to convert monetary values into 2011 prices.
Economic life (n)	20 years	Does not have to be the same as the analysis period length.
Discount rate (i)	7%	Used in the source.
Capital recovery factor (CR)	0.0944	$i(1+i)^n / [(1+i)^n - 1]$
Sinking fund factor (SF)	0.0244	$i / [(1+i)^n - 1]$
Annual working days	233	

### Cost Factors

There are three sets of unit costs: capital; O&M; and users. Capital costs are in 2011 dollars. For purposes of this example, O&M Costs and users costs are assumed to be in 2007 dollars. These values are then converted from 2007 to 2011 prices. Using Table 6-3, the number of years for adjustment is 4 and the corresponding adjustment factor is 1.139

#### Capital:

- Construction cost per space = \$9,000
- Signage cost per lot (arterial) = \$50,000
- Land cost per square foot = \$14.92
- Transit rolling stock = \$400,000 per bus

Operation and Maintenance:

$$\text{Park-and-Ride lot} = \$100 * 1.139 = \$\$113.90 \text{ per space}$$

Users:

$$\text{Value of time savings} = \$20.00 * 1.139 = \$22.78 \text{ per hour}$$

$$\text{Vehicle operation} = \$0.51 * 1.139 = \$0.58 \text{ per mile}$$

$$\text{Accidents} = \$0.103 * 1.139 = \$0.12 \text{ per mile}$$

$$\text{Transit fare} = \$2.00 * 1.139 = \$2.28 \text{ per ride}$$

Project Description

In addition to unit costs, the project costs and user benefits also depend on the size of the Park-and-Ride lot, associated transit services, and its impacts in terms of reduction in VMT and person hours of travel by automobile users. These are summarized in Table 6-6.

**Table 6-6: Example Project Description**

Characteristics	Values	Comments
Size		
Demand	200 spaces	Rounded from 174
Land	1.6 acres	
Transit Service		
Distance to Central Business District (CBD)	15 miles round trip	
Number of buses	2	New
Frequency	4 per hour	
Daily span	5 hours	
Average O&M cost	\$5.71 per revenue mile	In 2011 prices
Annual ridership	45,726 boardings	
Annual revenue miles	69,900 miles	$4 * 5 * 233 * 15 = 69,900$
Impacts		
Vehicle Miles of Travel (VMT)	580,590 miles	
Person hours	7,144 hours	

User Benefits

User benefits are first computed by components and then totaled to get an annual figure for the year 2011.

User benefits from time savings:

$$\begin{aligned} C_H * PHT &= \text{value of time savings} * \text{reduction in person hours of travel} \\ &= \$22.78 * 7,144 \\ &= \$162,740.00 \end{aligned}$$

User benefits from savings in vehicle operation:

$$\begin{aligned} C_O * VMT &= \text{unit cost of vehicle operation} * \text{reduction in vehicle miles of travel} \\ &= \$0.58 * 580,590 \\ &= \$336,742.00 \end{aligned}$$

User benefits from reduction in accidents:

$$\begin{aligned} C_A * VMT &= \text{unit cost of accidents} * \text{reduction in vehicle miles of travel} \\ &= \$0.12 * 580,590 \\ &= \$69,671.00 \end{aligned}$$

User benefits from savings in transit fare:

$$\begin{aligned} \text{TF} &= \text{fare per ride} * \text{annual ridership} \\ &= \$2.28 * 47,726 \\ &= \$108,815.00 \end{aligned}$$

Annual total user benefits:

$$\begin{aligned} \text{UB} &= C_H * \text{PHT} + C_O * \text{VMT} + C_A * \text{VMT} - \text{TF} \\ &= \$162,740.00 + \$336,742.00 + \$69,671.00 - \$108,815.00 \\ &= \$460,338.00 \end{aligned}$$

### Project Costs

Annualized project costs include several components: annual operation and maintenance for both the Park-and-Ride lot and related transit services, annualized capital costs for both transit rolling stock and the construction of the Park-and-Ride lot, and annualized residual value of the Park-and-Ride lot at the end of the analysis period.

#### Annual Operation and Maintenance

Park-and-Ride lot

$$\begin{aligned} \text{OM}_P &= \text{unit cost per space} * \text{number of spaces} \\ &= \$100.00 * 200 \\ &= \$20,000.00 \end{aligned}$$

Transit service

$$\begin{aligned} \text{OM}_T &= \text{unit cost per mile} * \text{number of revenue miles} \\ &= \$5.71 * 69,900 \\ &= \$399,129.00 \end{aligned}$$

#### Total Operation and Maintenance Costs

$$\begin{aligned} \text{OM} &= \text{OM}_P + \text{OM}_T \\ &= \$20,000 + \$399,129.00 \\ &= \$419,129.00 \end{aligned}$$

#### Capital Costs

Park-and-Ride lot

$$\begin{aligned} \text{Construction} &= \text{unit cost per space} * \text{number of spaces} \\ &= \$9,000.00 * 200 \\ &= \$1,800,000.00 \end{aligned}$$

$$\text{Signage} = \$50,000.00$$

$$\begin{aligned} \text{Engineering} &= 0.20 * \text{construction cost (i.e., twenty percent of construction cost)} \\ &= 0.20 * \$1,800,000.00 \\ &= \$360,000.00 \end{aligned}$$

$$\begin{aligned} \text{Land} &= \text{unit cost per square foot} * (\text{number of acres} * \text{square feet per acre}) \\ &= \$14.92 * (1.6 * 43,560) \\ &= \$1,039,864.00 \end{aligned}$$

## Transit service

$$\begin{aligned} \text{Rolling stock} &= \text{unit cost per bus} * \text{number of buses} \\ &= \$ 400,000.00 * 2 \\ &= \$800,000.00 \end{aligned}$$

## Total capital cost

$$\begin{aligned} \text{CC} &= \text{Construction cost} + \text{signage cost} + \text{engineering cost} + \text{land cost} + \text{transit rolling stock} \\ &= \$1,800,000.00 + \$50,000.00 + \$360,000.00 + \$1,039,864.00 + \$800,000.00 \\ &= \$4,049,864.00 \end{aligned}$$

## Residual Value

Since the duration of the analysis period is the same as the assumed life cycle of the Park-and-Ride lot, the residual value would be just that of the land. Assuming no appreciation, it is:

$$\begin{aligned} \text{RC} &= \text{Land cost} \\ &= \$1,039,864.00 \end{aligned}$$

## Annualized Project Cost

$$\begin{aligned} \text{PC} &= \text{Annual operation and maintenance cost} + \text{annualized capital cost} - \text{annualized residual value} \\ &= \text{Annual operation and maintenance cost} + \text{total capital cost} * \text{capital recovery factor} - \text{residual value} * \text{sinking fund factor} \\ &= \text{O\&M} + \text{CC} * \text{CR} + \text{RC} * \text{SF} \\ &= \$419,129.00 + \$4,049,864.00 * 0.0944 - \$1,039,864.00 * 0.0244 \\ &= \$776,063.00. \end{aligned}$$

Results

The benefit-cost ratio of the proposed Park-and-Ride lot is:

$$\begin{aligned} \text{BC} &= \text{UB} / \text{PC} \\ &= \text{Annual user benefits} / \text{annualized project costs} \\ &= \$460,338.00 / \$776,063.00 \\ &= 0.593 \end{aligned}$$

Implementation of this proposed Park-and-Ride lot is not economically justified.

*Note:* This example does not include cost effectiveness measures.

## CHAPTER 7: CONCEPTUAL DESIGN CONSIDERATIONS

### 7.0 GENERAL

The purpose of this chapter is to provide guidance for design of Park-and-Ride facilities. No attempt is made to provide a specific design for Park-and-Ride lot features including, but not limited to, turning radii, pavement thickness, driveways, median openings, and parking space dimensions. Accessing Transit, the Plans Preparation Manual, and the Florida Green Book contain additional design information. These references are noted in Appendix A of this report address specific design standards and criteria [<sup>38</sup>].

Park-and-Ride facility design should strive for the following objectives:

1. Safe and efficient movement of all modes using the facility, as well as on adjacent roadway facilities
2. Accommodation of transit, carpool, vanpool, taxis, pedestrians, motorized cycles, private vehicles and bicycles both on, and adjacent to the site as warranted
3. Provision of an adequate number of parking spaces
4. Provision of customer amenities to ensure user comfort and attractiveness
5. Accommodation of those with special needs Americans with Disabilities Act (ADA) Standards
6. Secure parking area for patrons and vehicles consistent with Crime Prevention Through Environmental Design (CPTED)

To assist in meeting these objectives, the following sections provide generalized design features that should be considered in the planning, conceptual and preliminary engineering, and ultimate design effort for a facility. Conceptual design for a rural Park-and-Ride lot is shown in Figure 7-1 and a concept for an urban Park-and-Ride lot is shown in Figure 7-2. Ancillary services should be considered in any Park-and-Ride lot that has the potential to be served by rail and/or bus service. A conceptual design for a Park-and-Ride lot serving a rail station is included in Figure 7-3.

### 7.1 EXTERNAL FEATURES

The design of Park-and-Ride facilities should consider a number of factors related to the interface between the internal facility operation and the adjacent street network. These external features include:

1. Adequate and safe access/egress
2. Appropriately placed on-street bus stops and pullouts
3. Traffic control devices, including signalization if warranted
4. Wayfinding signage

#### 7.1.1 Access/Egress Considerations

A number of factors relate to the proper planning and conceptual design of facility access. These access and egress factors are listed by category below:

##### Efficient and Convenient Access:

- The design should strive to minimize the time to change modes, which includes facility access time and the design should attempt to provide for direct approach and easy

entrance and exit to the facility.

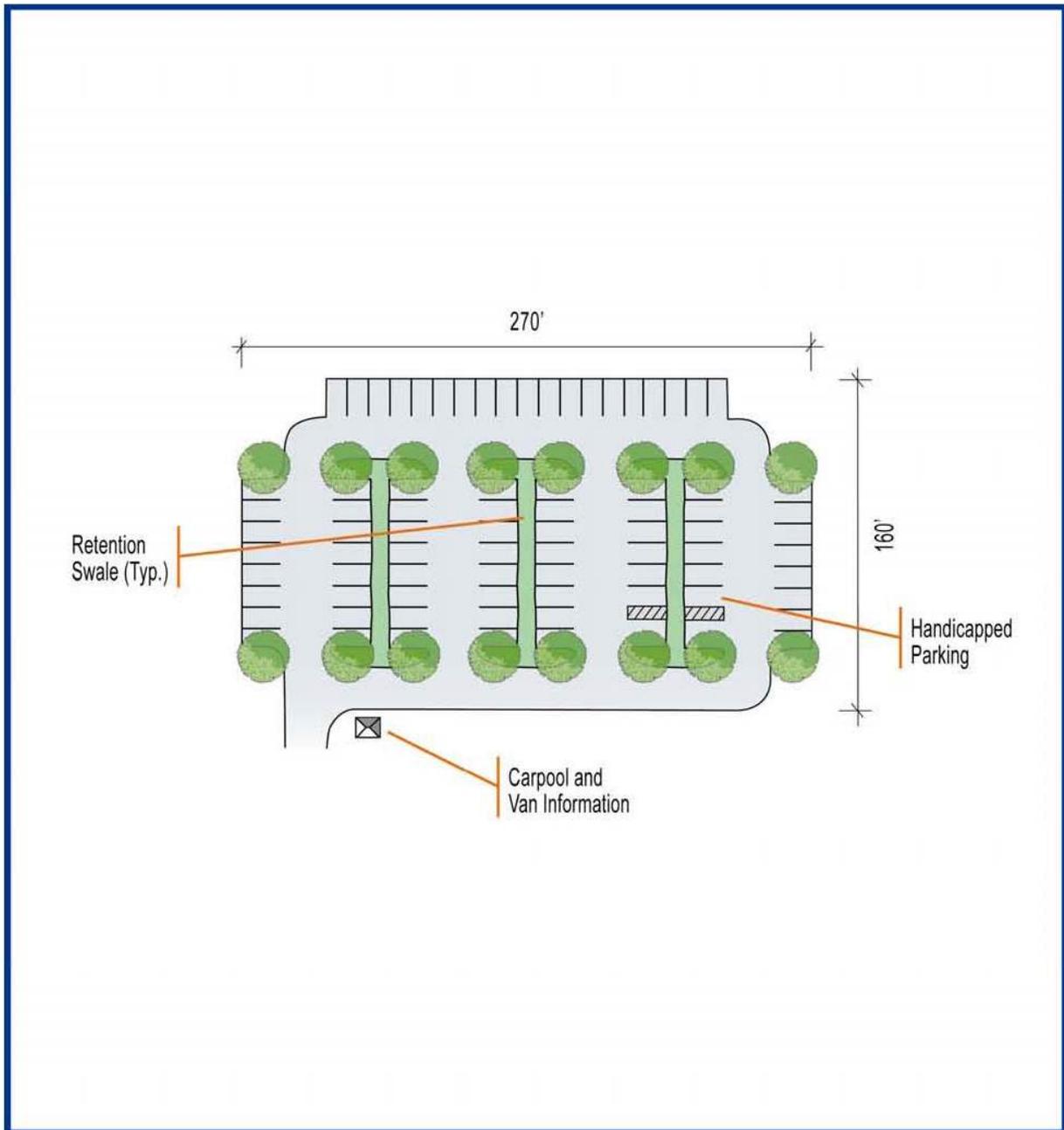


Figure 7-1: Conceptual Design for Rural Park-and-Ride Lot  
(D5 Park-and-Ride Implementation Manual)

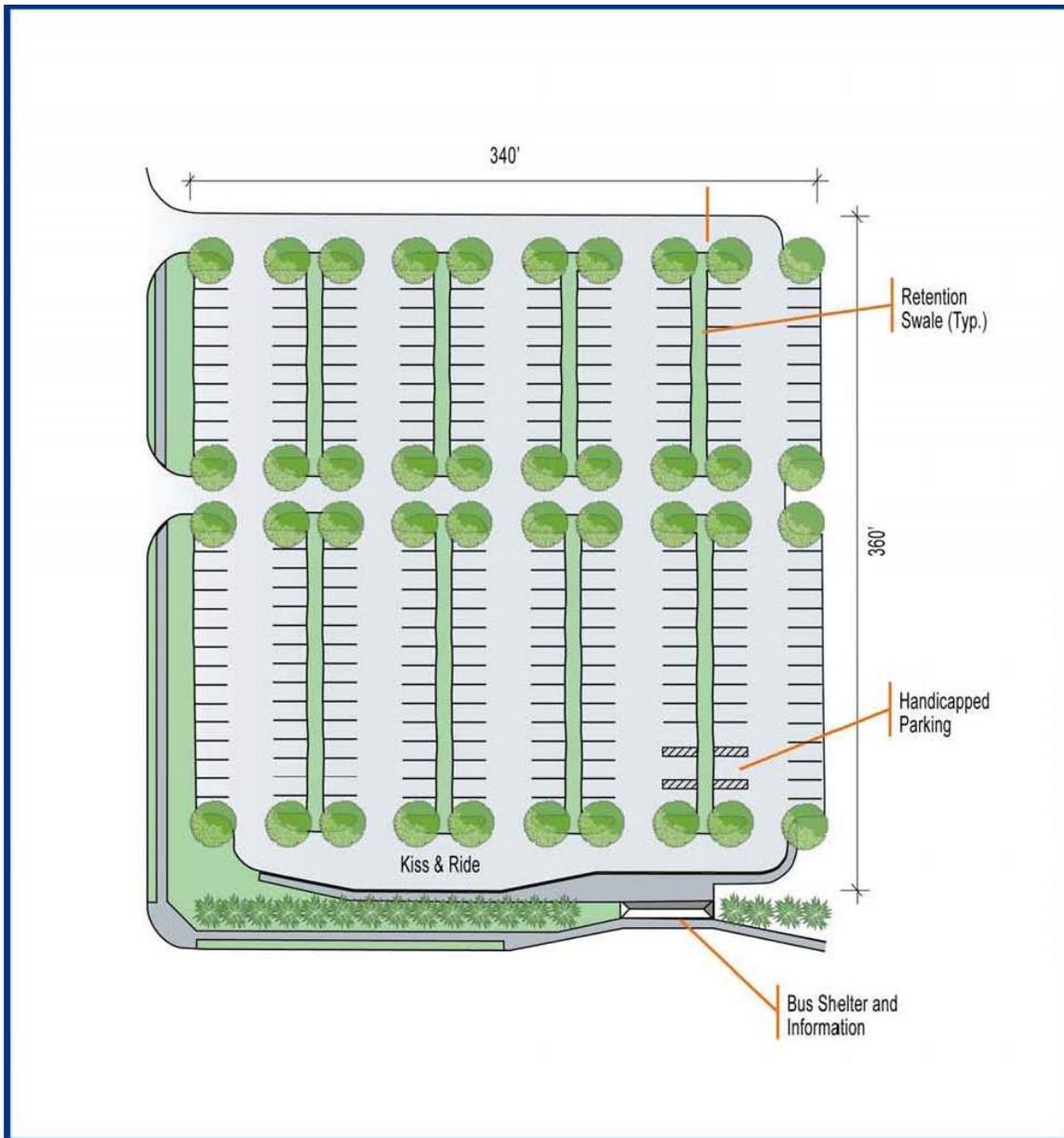
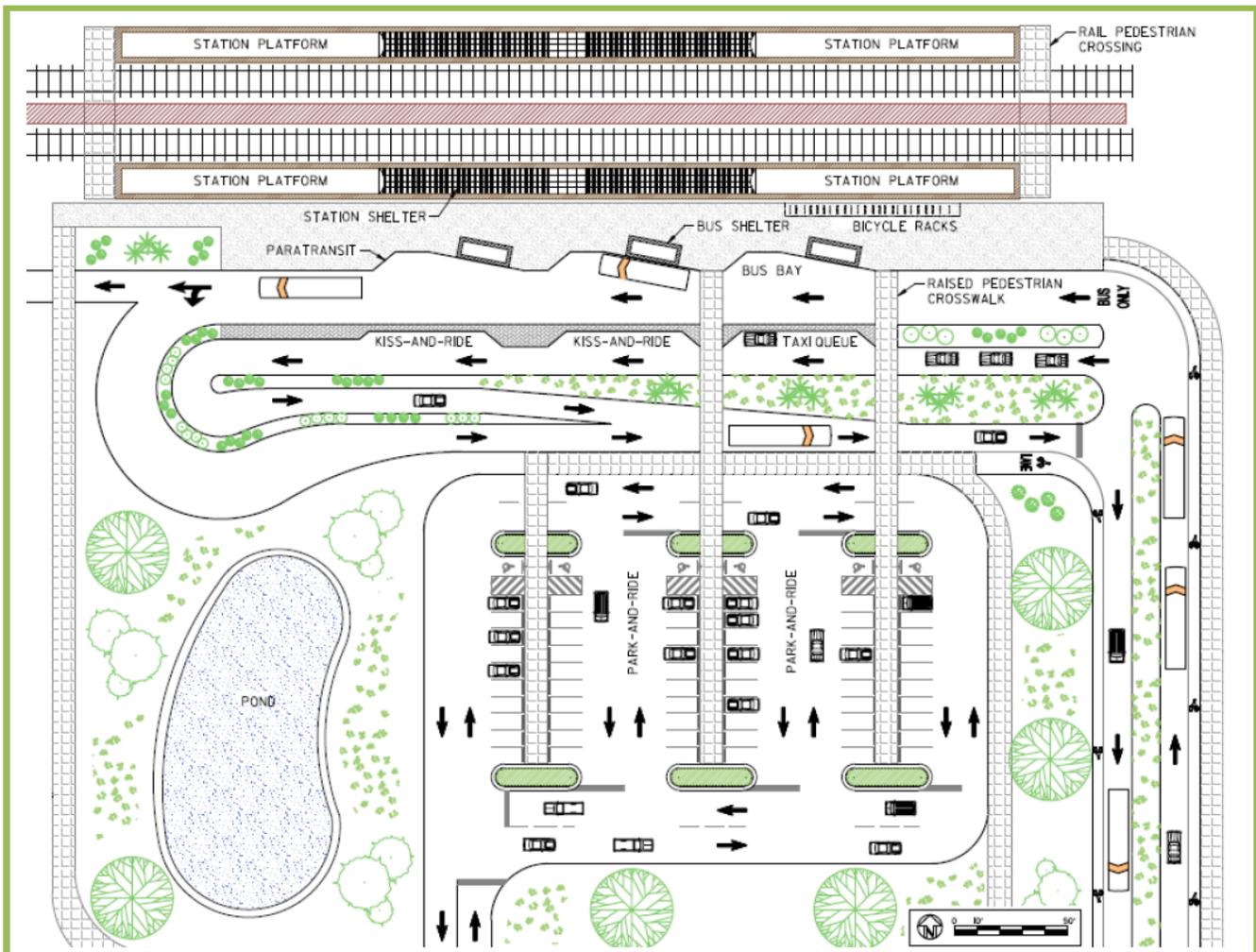


Figure 7-2: Conceptual Design for Urban Park-and-Ride Lot  
(D5 Park-and-Ride Implementation Manual)



**Figure 7-3: Conceptual Design for Park-and-Ride Lot Serving Rail Station**  
(Guidelines for Enhancing Intermodal Connections at Florida Transit Stations)

- Whenever possible, the facility entrance should be located on the right side of the highest traffic volume direction to minimize the need for a left turn across traffic. If warranted, left turn signals and adequate storage bays should be designed.
- The most efficient access to a facility is via a collector intersecting the adjacent arterial at a signalized intersection. This eliminates the need for driveways and reduces conflicts on the arterial.
- Access points should be located so as to avoid queues from nearby intersections or freeway interchanges.
- The design should accommodate all modes anticipated to access the facility, including automobiles, buses, bicycles, and pedestrians. This relates to roadway widths, turning radii and separation of non-vehicular and vehicular traffic.
- For lots over 300 spaces, a minimum of two exits and two entrances is recommended. For lots over 1,000 spaces, provision of entrances and exits on two adjacent streets is recommended to reduce traffic congestion, improve internal circulation and to provide for more efficient traffic distribution.

- Whenever possible, modes of travel should be separated to maximize safety and efficiency (i.e., buses should have their own travel lanes, entrances and exits; Kiss-and-Rides, passenger drop off and pick up areas, should have a separate area from parking areas; pedestrian and bicycle paths should be separate from automobile traffic paths as much as possible). Since safety is a primary goal, modal conflicts must be avoided as much as possible; at minimum, signage and pavement markings must be provided to assist movement.

#### Minimal Impact on Adjacent Road Operations:

- Intersection and roadway link capacity analyses should be performed to minimize the traffic impacts on the adjacent highway network.
- The location and design of access driveways should strive to minimize the increase in congestion of adjacent roads served by the lot.
- Where possible, locate access points with relation to shopping centers, theaters and other land uses with peak trip generation not occurring during peak commute times.
- The design of entrances/exits should not result in a major conflict point on access roads.
- Do not place entrances/exits near signalized intersections or other points that would cause a conflict.
- Design should provide for adequate storage for all entering and exiting movements.
- A new signal on an arterial should be considered only if warranted and if there will not be significant delays to existing traffic patterns. This should be carefully reviewed by the District Traffic Operations Office.
- Un-signalized entrances should be downstream from a signalized intersection.

#### Safety:

- The design should maximize safety by minimizing conflict points for the purposes of protecting the public and reducing liability risks.
- Entrances/exits should be located as to avoid locations near structures, decision points, and pedestrian needs.
- The design should provide for adequate sight distances for entrances, exits and crossing maneuvers.
- Entrance/exit locations should provide for adequate weaving, merging, and lane change distances.
- The location of facility exits related to adjacent intersections should be such that signal control exits can be reasonably installed at a later time should such control not be presently warranted.
- The entrances and exits should be planned to discourage “cut through” movements.
- The design should strive for separate access points for the different arrival modes anticipated to use the facility.
- Two combined entrances and exits should be considered for lots in excess of 300 spaces [39].

#### Proper Design Practice:

- Field observation of traffic operations and ADT in the vicinity of the site should be performed before deciding on access locations.

- The number and design of facility exits should be based on a maximum of 300 vehicles per lane, per hour.
- Driveway entrances should be located and designed to minimize impacts on traffic while providing safe entry and exit.
- All aspects of the design should conform to local, Florida Department of Transportation (FDOT), and American Association of State Highway and Transportation Officials (AASHTO) design criteria, and meet standards contained in the *FDOT Driveway Information Guide 2008* [<sup>40</sup>].

While adequate access was earlier suggested to be an important site selection criterion, the final selection of a site may be influenced by other factors such as the availability of Right-of-Way (ROW). In such situations, the design must consider factors that will optimize the facility access. To effectively do this, a traffic engineering study should be performed to evaluate capacity conditions at potential lot access driveways and at critical locations on adjacent access roadways. During the planning process for the site, estimates of demand and corresponding volumes by direction should be developed as part of the analysis. Additionally, it is important to involve the District Maintenance Office in the review of the preliminary design plans to minimize or alleviate costly or unsafe maintenance problems.

### 7.1.2 Off-Site Bus Access

The selection of where to locate bus stops, either off-site or on-site, should be made only after close coordination with the local transit provider and evaluation of the following:

1. Lot configuration and potential loss of parking spaces.
2. Ease of transfer, including consideration of the distance from parked vehicles to the bus stop.
3. The additional time impact to the operating schedules of those bus routes potentially serving the Park-and-Ride facility. This aspect of the site design should be closely coordinated with the local transit provider.
4. The amount of on-site space that can be used for bus bays, storage areas, bus only lanes, shelters, and benches, as well as passenger walking and waiting areas.
5. The type of off-site stop that could be developed; on-street loading/unloading versus separate bus pullout. The type of stop will be based on the design policies of the constructing authority, operating policy of the local transit provider, volume of automobile traffic, location of the stop in relation to nearby intersections, and the frequency of service.
6. The amount and cost of ROW needed and available for development of an on-street bus pullout.
7. The expected size of buses that will be accessing the site (single or articulated).

Presented below are factors that need to be considered when designing an off-site, on-street bus stop. These factors are related to vehicle maneuverability, safety, ease of bus reentering traffic stream, and design guidelines which should be considered in the conceptual design of the facility. Factors related to on-site development are presented later. Additional examples of these designs are included in the *Accessing Transit Design Handbook* [<sup>41</sup>].

#### Off-Site, On-Street Bus Stop Design Factors:

- Careful consideration of traffic volumes and the effects of stopping buses on traffic flows and roadway capacity must be given when considering having buses stop in the traveled

way of a street.

- Local transit providers generally prefer to have the stop located as close as possible to the riders' ultimate destination so the rider does not have to walk long distances or cross the street.
- Far-side bus stops, stops located immediately after an intersection along the direction of travel, are preferred from traffic operations and safety standpoints since they provide for greater pedestrian safety, reduce conflicts with right-turning vehicles, and provide for better sight distance conditions particularly at un-signalized intersections.
- Nearside bus stops, stops located immediately before an intersection along the direction of travel, are preferred from a transit operations standpoint because loading/unloading operations can coincide with the red light phase and it allows for buses to make right turns at the intersection.
- Mid-block stops may require pedestrian crosswalks and special signals.
- At least one block (600-800 feet) should be provided between the bus stop and the next left turn location.
- Bus pullouts should be considered for roads with high traffic volumes and lower speeds.
- Bus pullouts have the advantage of separating the bus from other traffic.
- Bus pullouts require a minimum and optimum ROW width of 12 and 14 feet, respectively. The entire pullout ROW is determined by the highway speed and size of the bus. Entrance and exit taper requirements are provided in Accessing Transit [<sup>42</sup>].
- Passenger amenities, including, but not limited to, benches and shelters should be installed consistent with Americans with Disabilities Act (ADA) Standards.
- Bus route signing should be incorporated into the Park-and-Ride facility signing plan. Transit schedule information signs should be considered. The placing of these signs will need coordination with the local transit provider.
- On-street bus pullouts require special signing and marking.
- On-street bus pullouts should not be located in exclusive right-turn lanes. They should also be avoided in curb lanes that carry a heavy volume of right-turning traffic.
- Drainage should be designed to avoid passengers walking through the urban structures or rural ditches to access the transit vehicle.

### 7.1.3 Traffic Control Devices

Traffic control devices relevant to Park-and-Ride facilities include signals, regulatory signs, pavement markings, and channelization. The proper control should be developed from the traffic engineering analyses of proposed facility access drives, as well as for nearby intersections that will be significantly affected by facility traffic. The design and application of traffic control devices should conform to the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) [<sup>43</sup>].

A series of considerations relevant to the design of traffic control devices external to the Park-and-Ride facility are presented below. This is a function of the size of the lots and their location. However, more elaborate traffic control devices should be considered when designing facilities with large numbers of spaces, higher expected utilization, a high level of transit service,

and for facilities placed on congested arterials. Close coordination with the District Traffic Operations Office will assist in determining the necessary and appropriate traffic control devices.

#### Facility Traffic Control Device Design Factors

- Traffic signals, traffic signs, and pavement markings, should be designed in conformance with the latest edition of the FDOT Design Standards and the MUTCD.
- The planning and design of traffic control devices should be carried out in conjunction with the overall design of the street or highway. The devices and procedures utilized for traffic control should be predicated upon developing uniformity throughout the system and compatibility with adjacent jurisdictions [<sup>44</sup>]. If there are questions on traffic control devices contact the District Traffic Operations Office for guidance.
- Signals should be considered only after a thorough traffic study in the area and should be warranted or justified in a manner prescribed in the latest edition of the MUTCD [<sup>45</sup>].
- Timing/phasing adjustments to existing signals may be required to accommodate Park-and-Ride traffic.
- Minimum control requirements for a Park-and-Ride facility are stop signs, warning signs, guide signs, facility identification signs on roadway, stop lines, double yellow centerline, and turn lane markings for exits on to public roadways.

One consideration particularly relevant to Park-and-Ride lots is the special traffic control requirements for transit operations. Most local transit providers will not allow a bus to make a left turn across a high-volume arterial into or out of a facility without a traffic signal. Close coordination with the local transit provider is recommended when accommodating transit services in a Park-and-Ride facility.

#### **7.1.4 Guide Signs**

Guide signs for Park-and-Ride facilities act not only to guide users, but also to promote the lot. The placement of wayfinding signs should intercept users on their normal paths and guide them directly to the facility. These signs should be placed on all routes providing nearby access to a Park-and-Ride facility. It is recommended that signs be placed at all decision points to lead users directly to the facility in the most efficient manner [<sup>46</sup>]. The signs should be in conformance with the latest edition of the MUTCD. Contact the FDOT Traffic Engineering and Operations Office to ensure appropriate placement distances for guide signs.

Presented below are factors that should be considered in developing wayfinding or guide signage plans for Park-and-Ride facilities.

#### Guide Sign Design Factors

- All guide signs should conform to the latest edition of the MUTCD and the FDOT Design Standards, which incorporates flexibility for signing special situations, services, and inclusion of special logos. However, standard signs should always be used for driver expectancy and for reducing maintenance costs. Consult ADA Standards to ensure consistent transit sign formats and fonts.
- Sign location should relate to the influence zone(s) from which potential users are expected to be generated. The location should intercept potential users on their normal travel path and guide them directly to the facility.

- Sign placement should assume that motorists do not know where they are going. Guide signs should be placed at all decision points, far enough in advance to allow for adequate distance to maneuver to that point.
- Continuity of guide signing is critical. Guide signs should lead the motorist through decision points to the destination.
- Guide signs should be placed on all approaches to the facility, even on approaches usually considered to service travel opposite to the predominate direction.
- Consideration of signing should include concern for the function of the lot. For example, rail stations with Park-and-Ride lots should have Park-and-Ride messages on the station guide signs.
- Consideration of signing should include nearby interstate or major arterial highways that would direct users to these facilities. Information on these lots could be included on electronic message boards.

Some areas utilize Variable Message Signs (VMSs) to promote the lot and provide real-time information on number of parking spaces, time until next transit vehicle leaves, and/or other applicable information. This type of VMS use requires approval by FHWA and/or FDOT Traffic Operations. As technology advances sensors at the parking lots could relay information on the number of spaces available at the facility.

## **7.2 INTERNAL LOT DESIGN**

The design of the internal elements of a Park-and-Ride facility will depend upon the modes expected to use the facility, as well as the size and configuration of the site. Certain components will have varying importance depending on the function and use of the facility. The internal components of the Park-and-Ride facility that should be considered include the following:

1. Overall site layout and internal circulation
2. Specific parking layout
3. Transit terminal facilities
4. Bus loading areas
5. Carpool/Vanpool staging areas
6. Pavement and drainage
7. Signing and marking
8. Landscaping
9. Security
10. Boundary identification
11. User amenities
12. Art, architecture, and community integration
13. Lighting
14. Fencing
15. Green design
16. Kiss-and-Ride
17. Taxi drop off and pick up
18. Pedestrian considerations
19. Bicycle storage and lanes

These components are addressed in the following subsections, and should conform to current

ADA Standards.

### **7.2.1 Site Layout and Internal Circulation**

Internal circulation is one of the most critical elements determining the successful design of a Park-and-Ride facility. The site layout should provide for safe, rapid parking and related movements, minimization of conflicts between motor vehicles and pedestrians, and optimization of space. The design should also allow appropriate turning radius and emergency service access by the emergency service vehicles consistent with local codes. Presented below are the design concepts that should be considered regarding site layout and internal circulation.

#### Internal Circulation Design Concepts

- Transfer terminals should be located either in a central location on the lot with parking areas surrounding it or on the outer perimeter with the parking areas extending radially from the terminal.
- The facilities layout should strive to minimize access/egress times for transit, paratransit, and Kiss-and-Ride vehicles.
- The system of circulation produced by the arrangement of parking aisles and spaces should be designed to minimize travel distances, conflicting movements, and number of turns.
- Major circulation routes that are located at the periphery of the facility minimize vehicle/pedestrian conflicts.
- Mixing of automobile and bus traffic should be avoided if possible.
- One-way, two-lane circulation roads permit passing of stopped transit vehicles and are desirable where buses and other vehicles cannot be separated.
- The layout of parking areas in regard to closeness to a transfer terminal should be given in order of 1) bicycle parking, 2) accessible parking, 3) Kiss-and-Ride, passenger drop off and pick up areas, 4) short-term parking, and 5) long-term parking.
- The maximum reasonable walking distance is 1,000 feet. Longer walking distances may necessitate consideration of additional loading zones.
- Parking aisles should be oriented to the transfer terminal to provide for convenient pedestrian movement through the facility.
- Depending upon the size and type of facility, separate entrances and exits are preferred. Otherwise, a traffic island or pavement markings separating exiting and entering vehicles should be provided.
- Generally, no more than 30 spaces should be provided without a cross aisle to move to exits or other parking spaces or to bypass disabled vehicles.
- Vehicle storage areas that do not conflict with circulation patterns and parking maneuvers should be located near exit areas.
- Site circulation roadways should not be located close to exits/entrances to prevent congestion.
- Drivers should not be confronted with multiple decisions at the same point in the circulation system.

- A 40-foot bus with a bicycle rack that accommodates at least two bicycles on the front should be used as the design vehicle for turning radii and circulating roadways unless specifications for an articulated bus are required.
- Pedestrian paths should be interconnected with all modes of transit and waiting areas at an intermodal Park-and-Ride facility.

### 7.2.2 Automobile Parking Layout

The parking layout is another critical feature of a successful facility design. Up to four of the following types of parking areas need to be considered in the site layout:

- 1) Accessible parking
- 2) Kiss-and-Ride (passenger drop off and pick up areas)
- 3) Short-term parking
- 4) Standard Park-and-Ride parking

This list provides a hierarchy whereby preferential parking locations on the site are given in the above order. Other parking areas that may be considered in designs include:

- Temporary carpool/vanpool parking
- Supervisor parking
- Police parking spaces
- Motorcycle parking
- Reserved parking spaces
- Employee parking spaces
- Stroller permit parking

Parking space types are described below in further detail.

#### Accessible Parking:

Accessible parking spaces are provided for reasons of safety, convenience in accessing the vehicle, and providing easier access to transfer stations. The layout of accessible parking must consider the location, number of spaces, and space size as required by ADA Standards. The location of accessible parking spaces should be near transit transfer areas for facilities served by transit, balancing convenience to facility access points, ease of maneuvering the vehicle in to and out of the parking space, and the amount of traffic in aisles adjacent to the accessible spaces. ADA Standards require these accessible spaces to be located the shortest accessible route of travel to an accessible pedestrian entrance of the parking facility. This is reasonable provided a transfer terminal is not located on the site.

Other factors which must be incorporated into the layout of accessible parking include:

- No access roads should be crossed by special needs patrons in moving from their vehicle to a transfer terminal.
- Special needs patrons must never be forced to circulate behind parked vehicles.
- Wheelchair ramps and curb ramps must be provided if platforms or curbs are present.

The ADA Standards [47] contain guidelines for selecting the number of accessible parking spaces demarcated at public parking lots and transfer facilities. These are presented in Table 7-1. The designer shall conform to local, state or federal site development codes. These requirements need to be tailored to accommodate the Park-and-Ride facility patrons.

In sizing accessible parking spaces, the designer should use a lift equipped van as the design

vehicle. Parking space dimensions are contained in local code requirements which should be conformed to. Recommended parking space sizes vary and typically range from 9' x 18' to 10' x 20'. Smaller spaces should have areas with pavement markings between spaces to facilitate access of the vehicle. ADA Standards [48] recommends a width of eight feet plus a five foot clear zone between vehicles to allow for vehicle access. Another option is indicated by the Institute of Transportation Engineers (ITE) [49] which recommends a 9' x 18' parking space size with four foot strips marked between spaces.

**Table 7-1: 2010 ADA Standards for Accessible Design Parking Spaces Requirement**

Total Parking Spaces	Minimum Number of Accessible Spaces
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1,000	2%
over 1,000	20 plus 1 for each 100 over 1000

(ADA Accessibility Guidelines)

Accessible spaces should be marked with a sign at least four feet high at the head of each parking space. The handicapped symbol pavement marking may be provided, as well as specific signage as specified in the MUTCD and the FDOT Design Standards. The color of handicapped pavement markings is usually light blue to delineate accessible spaces. Light blue provides for greater delineation of accessible parking areas than does the color white.

Kiss-and-Ride Passenger Drop Off and Pick Up Areas:

Kiss-and-Ride areas should be located to provide for easy and safe access to the transit terminal or bus loading zone if these exist at the facility. Kiss-and-Ride traffic should be separated from transit and normal Park-and-Ride traffic to the greatest degree possible in order to reduce conflicts and increase safety. Consideration should be given to one-way operation in the Kiss-and-Ride area, as well as for pull through, brief parking areas for waiting vehicles, angled at 45 degrees, and facing in the direction of the transit station.

Short-Term Parking:

Short-term parking areas should be located next to Kiss-and-Ride areas, but further away from the transit terminal. The purpose for providing short-term parking at a Park-and-Ride facility is to promote the use of transit, as well as to provide joint use of the facility. Short-term parking is permitted to use the lot to access nearby establishments (i.e., a post office, a fast food restaurant, a dry cleaner, or a coffee shop); however, their use is controlled by placing a restriction on the amount of time they can park. Since Park-and-Ride facilities are typically established to promote commuter usage, the establishment of short-term parking on its own is questionable. However, provision of such parking may prove beneficial to having the facility accepted by area businesses. Specific short-term parking spaces may also be designated for taxi use, temporary carpool/vanpool parking, police parking, and transit supervisor parking. Other specifically

reserved spaces may be included in this category.

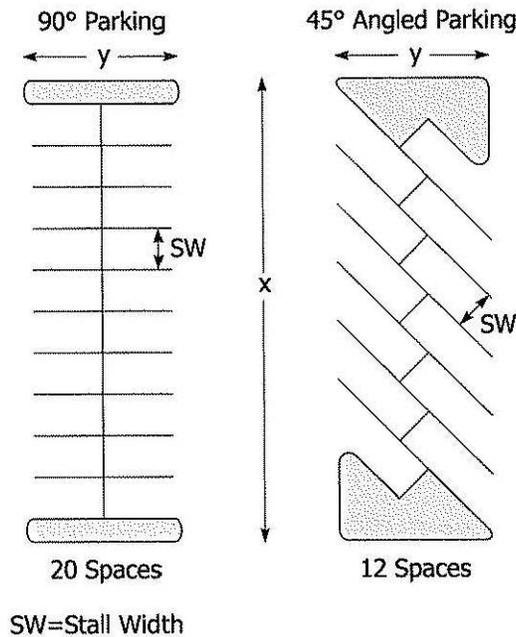
Standard Park-and-Ride Parking:

Standard parking spaces for Park-and-Rides provide spaces for private automobiles to park for the duration of the day while they commute to work and back. Specific spaces that may be included in this category that may be preferential or closer to a transit loading or waiting area may include parking for motorcycles, compact vehicles, employees, vehicles whose occupants use baby strollers, and other reserved uses.

An initiative that Miami-Dade County has implemented involves parking spaces designated for drivers with children who use a baby stroller. These parking spaces are provided in locations with more than 100 parking spaces, and require users to have a valid permit to use them. Permits can be obtained from the County Tax Collector's Office, and are only good within the County of permit. This program is designed for people to be able to park their vehicle, and get their stroller and child out and be closer to their destination in the process; this makes it easier and safer for parents or guardians of young children. People obtaining permits are required to provide photo identification, and the baby's birth certificate or other relevant documentation per the Miami-Dade County website. Permits may be purchased up to one month before the child's third birthday and are valid until the child's third birthday. While this program may be limited in application at this time, the concept may catch on in the future as more find it useful. These parking spaces may also be placed near accessible parking areas. Local codes should be referenced for specific information and placement requirements [<sup>50</sup>].

Layout of long-term parking areas can be designed in much the same manner as other parking facilities, and should consider maximization of parking spaces, circulation in the parking area, and parking dimensions. Alignment of parking rows should be in the direction of the longest dimension of the site; this results in less space being used for aisles and more for parking spaces.

Ninety-degree parking is generally the most efficient layout as measured by square feet per space. Aisles must be designed for two-way traffic for 90-degree parking, and should be aligned to facilitate convenient pedestrian movement toward the transit loading zone. Aisle lengths should not exceed 400 feet if possible.

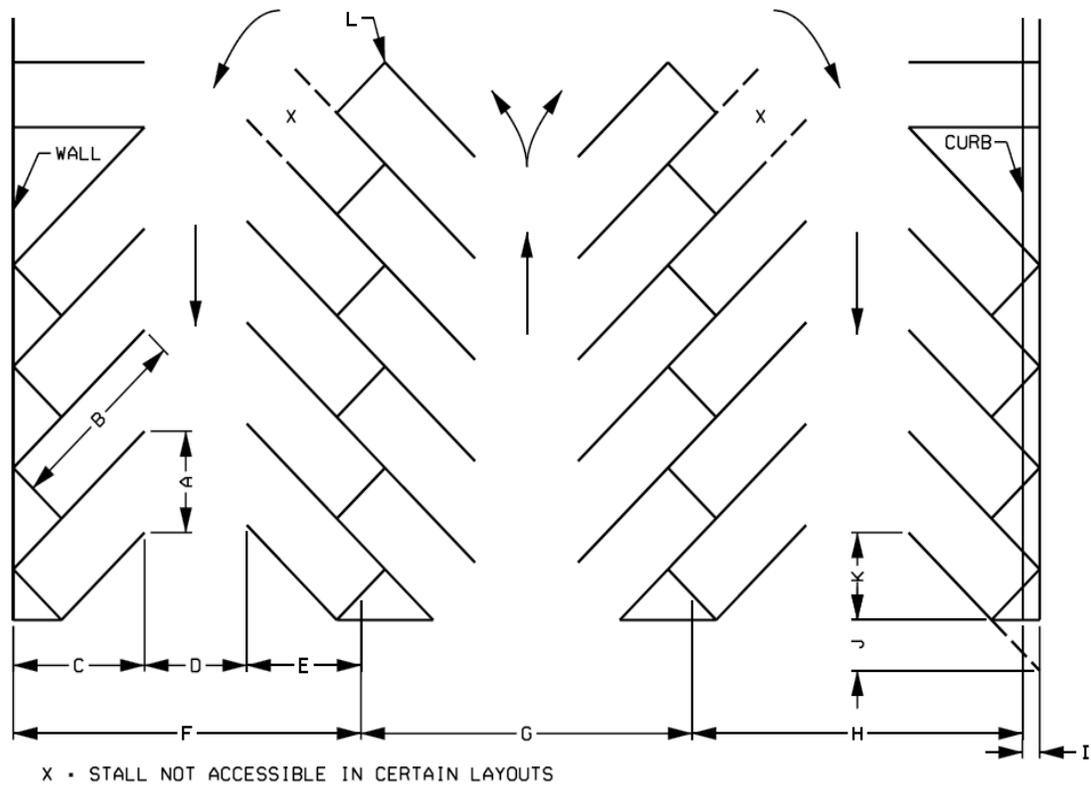


SW=Stall Width  
**Figure 7-4: Comparison of 90-Degree and 45-Degree Angled Parking**  
 (Guide for Park-and-Ride Facilities)

Parking space sizes should conform to the 9' x 18.5', 90-degree standard or 8' x 16', 90-degree compact dimensions. The smaller 8.5' x 16' size can be considered; however, experience has shown that substandard space and aisle sizes provide a false economy of space since cars will encroach on adjacent spaces making one or more unavailable for use in a given parking row.

Mixing standard vehicle and compact vehicle parking space sizes can provide for a greater number of spaces on a site. In order to realize this efficiency, however, compact parking must be given a preference and be located in areas convenient to the user. Otherwise, compact cars will be parked in standard size parking spaces, which effectively reduce the number of useful spaces. It should be noted that the trend is to provide only standard size spaces because of the difficulty of preventing parking of standard sized vehicles in compact spaces [51].

Figure 7-5 presents parking layout dimensions for eight and nine foot wide parking spaces at 45 and 90-degree angles.



**Figure 7-5: Parking Space Layout Dimensions**  
 (Guide for the Design of High Occupancy Vehicle and Public Transfer Facilities)

Figure 7-5 - (Text Addendum)  
 Parking Layout Dimensions (in feet) for 8-Foot Parking Spaces

Dimension (feet)	On Diagram	45°	90°
Space width, parallel to aisle	A	11.3	8.0
Space length of line	B	21.6	16.0
Space depth of wall	C	15.2	16.0
Aisle width between parking space lines	D	12.0	22.0
Space depth, interlock	E	13.3	16.0
Module, wall to interlock	F	40.5	54.0
Module, interlocking	G	38.6	54.0
Module, interlock to curb face	H	38.5	51.5
Bumper overhand (typical)	I	2.0	2.5
Offset	J	5.4	0.0
Setback	K	9.5	0.0
Cross aisle, one-way	L	12.0	12.0
Cross aisle, two-way	-	22.0	22.0

Parking Layout Dimensions (in feet) for 9-Foot Parking Spaces

Dimension (feet)	On Diagram	45°	90°
Space width, parallel to aisle	A	12.7	9.0
Space length of line	B	25.0	18.5
Space depth of wall	C	17.5	18.5
Aisle width between parking space lines	D	12.0	26.0
Space depth, interlock	E	15.3	18.5
Module, wall to interlock	F	44.8	63.0
Module, interlocking	G	42.6	63.0
Module, interlock to curb face	H	42.8	60.5
Bumper overhand (typical)	I	2.0	2.5
Offset	J	6.3	0.0
Setback	K	11.0	0.0
Cross aisle, one-way	L	14.0	14.0
Cross aisle, two-way	-	24.0	24.0

### 7.2.3 Transit Terminal Facilities

The design of transit transfer terminals within a Park-and-Ride facility is comprised of two components; the transit vehicle and the passenger. The terminal area should be designed to provide for safe and easy bus operations. Large turning radii should be provided for buses entering and exiting the site, avoiding acute angles. Circulation roadways in the terminal area should be two lanes and operated in one direction of travel. A saw-tooth design for the bus loading area provides for the easiest operation of buses, but is only required for larger terminals with extensive bus service. Reinforced pavement is recommended in the terminal area because of the

large wheel loads, higher temperatures, and friction from the stopping and starting buses.

At minimum, passenger amenities that should be considered for the terminal area are shelters, benches, and transit information.

#### Shelters:

Shelters should be provided where large numbers of passengers load the bus or access other forms of transit, where transit is to be promoted, where waiting is to occur, and where the site allows for such amenities [<sup>52</sup>]. Generally, the need for a shelter increases with the demand and the headway between transit vehicles [<sup>53</sup>].

The size of a shelter required at a Park-and-Ride facility is dependent on the maximum accumulation of users at the transfer terminal. For conceptual design purposes, the shelter size requirements can be assumed to be 25 square feet per 100 space facility. This is based on the following assumptions:

- Eight square feet per shelter user.
- The number of Kiss-and-Ride drop offs is equivalent to 0.20 times the parking spaces in the facility.
- The average wait time is 10 minutes.

Design decisions should be based on the number of vehicles parked at one time, the number of passengers, bus frequency, weather, and funding. Shelters should be of contemporary design, constructed of highly durable materials, highly visible, provide ample weather protection, and should minimize installation and maintenance cost. Clear zone and line of sight requirements must be kept in mind when placing shelters. They should not block the sidewalk and allow for at least the minimum width required by ADA Standards for passing on the sidewalk without interfering with the shelter. Shelter height should meet the Florida Administrative Code and local code requirements. The characteristics of shelter design should include the following:

- Visibility and Lighting: Provides for user safety. The driver must be able to see that the passenger is waiting for the bus, including during hours of darkness, and the user should be able to see an approaching bus from inside the shelter.
- Accessibility: Shelters should provide for convenient access and user safety that meet ADA Standards.
- Appearance: Shelters should be visually pleasing in relation to the surrounding environment. The logo of the local transit provider should be clearly placed on the shelter.
- Materials: Typical construction materials include steel, anodized aluminum, wood, concrete and tile block, reinforced concrete, fiber glass, plastics, and glass. Recycled materials and those with vandal resistant surfaces should be a priority. Cost, durability, availability and appearance should guide the decision on construction materials.
- Modular Construction: Modular construction facilitates capacity expansion as well as uniformity of design, and can reduce costs.
- Amenities: Protection from the weather, benches, and bicycle racks are the minimum amenities recommended. Other features can include transit route maps, transit

schedules, telephones, and trash receptacles,

#### 7.2.4 Bus Loading Areas

Bus loading areas should be considered for Park-and-Ride facilities served by transit. Formal bus loading areas are recommended for inclusion in the facility during planning and design. Retrofitting necessitates consideration of the pavement in the area where the stop is to be placed. Rigid pavement should be placed where vehicles are to stop for loading and unloading operations. Bituminous pavement is suitable for roadways, but should be designed to accommodate the wheel loadings of a transit vehicle operating at slow speed.

Shelters should be constructed in the bus stop area. Design specifications were presented earlier, and design ideas can be found in the FDOT's Accessing Transit Design Handbook [<sup>54</sup>] ([http://www.dot.state.fl.us/transit/Pages/2008\\_Transit\\_Handbook.pdf](http://www.dot.state.fl.us/transit/Pages/2008_Transit_Handbook.pdf)) and/or the AASHTO Guide for Park-and-Ride Facilities [<sup>55</sup>].

#### 7.2.5 Carpool/Vanpool Staging Areas

These staging areas consist of a shelter, benches, and adequate space for dropping off passengers. When considering vanpool/carpool staging areas, the potential for shared use of the transit stop area (including shelters and benches) and the size of the facility should be evaluated. Consideration for increasing the capacity of these areas may be necessary if it is expected that they will be heavily used by vanpool and carpool users.

Installing a vanpool/carpool staging area is most applicable to large facilities since it provides a central meeting place. However, this may be a nonessential improvement since experience has shown that users tend to meet in prearranged areas in the lot.

#### 7.2.6 Pavement and Drainage

The design of pavements for Park-and-Ride facilities should conform to AASHTO and state regulations and standards. Design standards set forth in the following documents should also be considered:

- FDOT "Flexible Pavement Design Manual" [<sup>56</sup>] referred to for design of flexible pavements.
- AASHTO "Guide for Design of Pavement Structures" [<sup>57</sup>] referred to for design of rigid pavements.
- Publications by the Asphalt Institute, Portland Cement Association and the American Concrete Pavement Association for other design standards as determined applicable by the design professional.

The following considerations must be taken into account when designing Park-and-Ride facility pavement:

- **Drainage:** Must conform to state, water management district and local design standards. Standing and flowing water should be avoided in areas where pedestrians walk or stand. Local codes related to on-site retention of storm runoff should be conformed to. Biofiltration swales may be another option for stormwater capture and treatment and may be investigated for use at Park-and-Ride facilities. They can be designed within landscape planting islands, water gardens, or around the perimeter of Park-and-Ride facilities [<sup>58</sup>].
- **Drainage structures:** Structures should be designed to withstand the maximum expected wheel loadings (transit or maintenance vehicles), be maintenance free, vandal-proof, and have short, narrow openings placed perpendicular to traffic to minimize the hazard to

pedestrians and bicyclists.

- **Pavement Types:** Up to three different types of pavement may be needed for a facility. The heaviest load carrying pavement is needed for bus drives lanes, loops, and loading areas. Rigid pavements are recommended for bus layover and loading areas because of the high static wheel loads and high temperatures. Light load carrying pavement is needed for internal circulation roadways, aisles, and Kiss-and-Ride areas. The lightest load carrying pavement would be used for car parking areas and bike paths. Permeable pavement and porous concrete pavement are options that designers are encouraged to investigate depending on the location, funding, and other requirements of a facility [<sup>59</sup>].
- **Widths:** Minimum widths on a tangent and curve for roadways carrying transit vehicles are shown in AASHTO Guide for Park-and-Ride Facility Chapter 5.5: Providing for the Transit Vehicle [<sup>60</sup>]. Minimum widths for bike paths are five feet for one-way paths and eight feet for two-way paths. The maximum design speed for bike paths in a Park-and-Ride facility is 10 mph. Refer to the FDOT “Bicycle Facilities Planning and Design Manual” [<sup>61</sup>] for proper design standards.

### 7.2.7 Signing and Marking

Within the Park-and-Ride facility, different types of signing may be required including:

- Guide signs to direct vehicles to Kiss-and-Ride temporary parking for waiting vehicles and drop-off and pick up areas, accessible parking, bicycle paths, and other parking areas.
- Guide signs to direct traffic to facility exits (particularly applicable to large lots).
- Regulatory and warning signs to control traffic on roadways particularly at locations where vehicular/pedestrian/bicycle conflicts are anticipated.
- Regulatory signs should be in place to prohibit unauthorized use.
- Parking restriction signs including, but not limited to, handicapped parking, no parking zones, short-term parking durations, bus stop, tow-away zones, and overnight parking prohibition.
- Information signs describing transit information, proper use of the facility, declarations of liability responsibility, or construction funding information particularly if federal funds were used.
- Information signs indicating the responsible administrating agency which helps to reduce unauthorized use of the facility.
- Information signs identifying specific sections, by name or number, of a large lot to facilitate vehicle retrieval.
- Bicycle signs directing users to where bicycle storage or parking is located, as well as where bike lanes or routes are designated.

It is recommended that a sign should be placed at the entrance of the facility identifying the Park-and-Ride facility, including the name of the facility, address, services available, phone number and web address for information and cost of parking. Recommended practice on all signage is conformance to the latest edition of the MUTCD standards to the degree possible. Where particular signs applicable to Park-and-Ride facilities are not contained in the MUTCD, consistency and conformity to local applications should be practiced. (Also refer to Executive

Order 13166, Title 6, Limited English Proficiency (LEP) [62].)

Pavement markings within the facility are used to control traffic and provide for orderly parking of vehicles. Except for those markings associated with parking, all markings should be reflectorized and conform to the latest edition of the MUTCD [63] and the FDOT Design Standards. The types of pavement markings applicable to the Park-and-Ride facility include the following:

- Centerlines, lane separation lines and channelizing lines
- Stop bars
- Symbol arrows
- Pedestrian crosswalks
- Parking space demarcation lines
- Handicapped parking symbol markings
- Bike lanes or sharrows

Pedestrian crosswalks will require a higher degree of demarcation than at typical urban intersections. One reason is pedestrians may be crossing roadways at unexpected locations. Another is that a motorist's attention may be diverted away from the traveled way while attempting to locate suitable parking spaces or fellow car-poolers. In addition, more clearly demarcated crosswalks near transit transfer stations help to better define the station, making it a safer facility.

### 7.2.8 Landscaping

Landscaping is important for aesthetic, as well as ecological reasons, and helps to better balance the facility in its surrounding environment. A lot with well maintained landscaping can increase the perception of security, while poorly maintained landscaping will certainly have the opposite effect.

Plantings used at Park-and-Ride facilities should be clean, long lasting, reasonably decorative, and most of all, hardy. These plants must be able to tolerate shade, wind, pollution, poor water and soil conditions, and exhaust fumes. Plants with wide spreading thorns or branches that may snag clothing, as well as plants that drop berries or sap that can damage car finishes should not be used. Roots from some types of trees can damage sidewalk and create trip hazards. The results of a considerable research effort regarding landscaping of transit transfer facilities has been published in "Transit Planting: A Manual" [64] and should be utilized in the landscape design for a Park-and-Ride facility. Crime Prevention Through Environmental Design (CPTED) [65] should be considered in the landscaping design. Native plants or Xeriscape for low maintenance are recommended. All landscaping must comply with ADA Standards regarding height and protrusion into the sidewalk. The Environmental Management Office Website has the latest information on the FDOT Highway Landscape Guide and Permit application for Landscaping on State Road right-of-way and the most current information regarding FDOT landscaping policies and procedures. Where the lot is to be owned and maintained by the FDOT, the District Maintenance Office should be consulted on landscaping plans. In other cases, the maintaining agency should be identified and coordinated with on scope and design of landscaping.

- Landscaping should not obscure visibility between the lot and adjacent roadways in order to maximize perceptions of security.
- Landscaping should be compatible with the site's surroundings.
- Plantings and their placement should not interfere with lighting of the facility, the proper placement of traffic control devices, the ability of pedestrians to use the facility, and the safe line-of-sight of motorists.

- Trees provide shade and visual interest, reduce glare, and are less costly to maintain than shrubs and ground cover.
- The design should minimize places where vandals can hide.
- Landscaping is effective for establishing walking patterns within the site.
- Sufficient set back must be provided so vehicle overhang does not injure or kill the plants or block sprinklers, and maintenance can take place while cars are parked.
- Extreme care should be exercised in placing plantings near entrances/exits such that sight distances are not restricted. Plants with limited growth patterns should be used in such areas so sight distance issues do not arise as the plant matures.
- Swales, berms, and mounds provide a low-cost means for providing screening, delineation, visual interest, and drainage.

### **7.2.9 Security**

Security is one of the most critical factors considered in the decision to use a Park-and-Ride facility. Security at Park-and-Ride facilities is best maximized through the site selection, and locating lots in areas considered to be safe from crime. Arrangements must be made to ensure that security measures are in place and operating at the time of facility opening. Such measures can include closed circuit television (CCTV) cameras, emergency call towers, police and security patrols, guards or attendants, and fences. Emergency call towers may be supplemented by solar power to reduce cost of running lines for electrical connection, and the ongoing cost of paying for the power. Call towers, however, should not be solely reliant on solar power. Coordination must occur with the local police or other statutory jurisdiction responsible for security matters. CPTED design considerations should be included. It should not be assumed that the local police department will take on security responsibilities at the necessary levels for a Park-and-Ride facility. However, there are a number of design features that provide increased security including:

- Adequate illumination
- Fencing
- Number and location of access points
- Visibility from adjacent roadways
- Selection of construction materials
- Careful design of landscaping
- Minimizing places for vandals to hide on the site
- Selection of the types of amenities located at the site
- Control over unauthorized use of the facility (i.e., parking trucks, abandoned vehicles, and dumping trash)
- Emergency call towers
- Surveillance cameras and signage stating the site is under 24-hour surveillance
- Proper signage as recommended by state, local, or transit agency requirements
- Signage with a phone number to call for maintenance concerns. If there is suspicious activity, patrons should be advised to call 911 immediately.

### **7.2.10 Boundary Identification**

Boundary identification is important primarily from the standpoint of minimizing unauthorized use of the facility. This is more likely a larger issue for joint use lots than free-standing facilities. Materials that have been used to delineate Park-and-Ride spaces from adjacent areas include,

but are not limited to, fencing, plantings (such as hedges), delineator posts, concrete or bituminous curbs, and concrete bumpers.

### 7.2.11 User Amenities

Amenities can improve facility operation and encourage transit patronage [<sup>66</sup>]. Amenities must comply with the Florida Building Code (for minimum structural requirements), and should also meet ADA Standards and local codes for design and construction specifications. Wind-borne Debris Zone requirements must be considered in design due to hurricanes and tornadoes that periodically affect Florida. Amenities are to be installed per codes to prevent them from becoming a source of flying debris. Design elements included in the amenities category may include:

- Audio/Video Surveillance
- Benches
- Bike racks
- Bike lockers
- Bulletin boards
- Donation drop boxes
- Electric Vehicle Charging Stations
- Emergency call towers
- Food/beverage vending machines
- Mailbox
- Manned ticket purchase counters
- Newspaper racks
- Real-time passenger information signs
- Recycling receptacles
- Pay phones
- Security
- Shelters
- Shopping cart storage (for joint use facilities)
- Ticket vending machines
- Transit agency maps and route schedules
- Trash receptacles
- Water fountains
- Wi-Fi (Wireless Internet/Internet Access)

Trash and recycling receptacles, while being an inexpensive means of litter control, can also be abused. A trash removal and recycling pickup schedule would need to be established with the associated cost included in the annual operating budget for the facility. Solar powered trash compactors, which look like large trash cans, are recommended to reduce the number of times trash is collected per week. Posting regulatory signs indicating penalties/fines for littering have been found to be generally ineffective [<sup>67</sup>].

Shelters may be considered at facilities where use of the Kiss-and-Ride area or transit services is expected to be significant. These structures provide shelter during inclement weather for carpoolers, vanpoolers, or transit passengers who must wait for transportation to arrive. They can also serve as a central meeting place for a carpool group.

Where a large concentration of bicycle or motorcycle traffic is expected, the facility design should include storage areas for these types of vehicles. At minimum, a bicycle storage rack should be included with the initial design for any Park-and-Ride facility. The design of bicycle and motorcycle parking areas should consider identification, accessibility, type of storage racks, lot boundary screening, protection, and provision of locking devices to prevent casual or professional theft. While there are various types of racks on the market, durability, versatility related to placement, and ease of maintenance should be considered in making the final specification. Space needs should be based on 2' x 5' parking spaces for bicycles and 3' x 6' parking spaces for motorcycles. Bicycle and motorcycle parking areas should be close to transfer locations. Racks should be separated from roadways by curbs or barriers to prevent accidental damage from

automobiles. The use of lockers in lieu of or to supplement racks has been thought to encourage bicycle access since they provide a higher level of security [68]. This could be an important design feature in highly used facilities since lockers could potentially make more space available for auto parking.

Newspaper racks should be considered from the standpoint of controlling where these devices are placed. The best location is where people will congregate; bus transfer locations and carpool shelters. The design of these areas must account for enough space to accommodate the number of racks to be permitted. Maintenance and vandalism should be a consideration.

### **7.2.12 Art, Architecture, and Community Integration**

The purpose of art and architecture in a Park-and-Ride facility is to assist in integrating the facility into the surrounding community by providing visual appeal. Park-and-Ride facilities integrated into the surrounding community can provide a focal point for the suburban area, and potentially a place around which future joint development can occur. Coordination with local artists to provide art may create an inherent sense of community pride in a Park-and-Ride facility. The local jurisdiction may wish to have input on styles, colors, or amenities, which would make them more receptive to having the facility in their locale if they have such input during the design of the facility. Given that these facilities will exist for some time, it is best to incorporate such art or styles into the facility as much as possible in order to please the community. This, in turn, may also assist with obtaining funding commitments and maintenance agreements as necessary to construct and maintain the facilities. If a federal grant is utilized for facility funding, Art in Transit obligations should be considered.

The 2004 AASHTO Park-and-Ride Guide [69] provides an entire chapter indicating reasons why integration into the community is recommended and how to incorporate such attributes. Green designs or environmentally conscious attributes may be considered to gain further approval from the local area. Clothing and donation drop-off containers may be provided, as well as recycling stations to provide further appeal and convenient, useful services. Day care services, coffee shops, vendor services, and retail shops, can also provide support to the function of Park-and-Ride facilities. It is recommended that any art or architecture should be of weather-resistant materials, and if at all possible should be coated with anti-graffiti coating to assist in cleaning and maintenance as necessary. Low-maintenance designs are preferable when related to cost and time needed for such maintenance to occur. Sound Transit (Seattle) has a public art program which they incorporate into their transit centers, stations, and High Occupancy Vehicle (HOV) ramps to make these areas inviting, memorable and safe for transit users. They encourage art for landmarks, discretely incorporated art, art integrated into the facilities, and environmental art among other things [70]. Such attributes promote a positive image to the community of the services offered by Park-and-Ride facilities.

Incorporating pedestrian friendly access and bicycle paths provides additional community connections and encourages multimodal travel. Park-and-Ride facilities integrated with the local area can potentially augment the monetary income for transit agencies due to an increase in transit riders, as well as the tax base if population density and development proliferates around the facility allowing local residents additional transportation options.

### **7.2.13 Lighting**

Lighting elements must be provided for illumination for motorists as well as pedestrians [71]. Illumination creates a safer environment for those utilizing the lot. Whenever possible, lighting for facilities is to be solar-powered to save on operational costs. Lighting is required at entrances, exits, Kiss-and-Rides, in the parking lot, in shelters and waiting areas, and along pedestrian

paths. Motion sensor lighting is recommended as it will reduce costs and can serve as a safety device to alert people using the lot that there may be others lurking there. Having lit sidewalks and pedestrian paths encourages their use, especially during hours of darkness. Standard light fixture heights for roadways are not appropriate in scale for pedestrian areas. When lit, light fixtures must not cast a shadow on waiting areas so they will be plainly lit and passengers will be visible to transit operators [72]. It is recommended that significant conflict points between vehicles and pedestrians be well-lit. Lighting levels should be based upon the need for adequate safety and security.

#### **7.2.14 Fencing**

The applicability of fencing must be determined on a case-by-case basis, and the details of such fencing may be dictated by local codes and requirements.

#### **7.2.15 Bollards**

When bus bays using the saw-tooth design, bollards are used to block vehicles from jumping the curb and endangering waiting passengers. Bollards should be considered to separate vehicles from pedestrian and bicycle areas.

#### **7.2.16 Green Design**

Sustainable development, which also promotes environmental awareness through use of renewable sources and environmentally friendly strategies, should be incorporated into designs whenever possible. In the long run, green engineering and sustainable design will reduce costs.

### **7.3 TRANSIT SERVICE**

Transit service is often the primary reason for establishing a Park-and-Ride facility. These services include those which are directly related to the facility operation, such as feeder bus service, express or limited stop bus service, transit loading areas, vanpool/carpool staging areas, and security provisions. In the past, many facilities were established to increase system ridership levels. Observation has shown that lots served by transit are the most used facilities in the state [73]. These findings furnish strong support for establishing transit service at Park-and-Ride lots not currently being served by transit. However, transit service does not automatically guarantee facility usage or corresponding success. It is critical that conditions supporting transit are in place for increased Park-and-Ride utilization to be realized. The evidence indicates that lot usage can increase by 100 percent or more with the provision of transit service between the facility and major employment centers.

Three types of transit services are relevant to Park-and-Ride facilities: feeder bus service between the home and lot, express or limited stop service between the lot and work destinations, and shuttle service from activity center peripheral lots to various destinations within the activity center. Feeder service is typically provided to facilities served by line-haul modes such as express bus, urban rail, and commuter rail. These types of facilities are typically located in urban corridors. Express bus service has been found to be implemented at both urban fringe and urban corridor lots in Florida. Shuttle service pertains to activity center peripheral parking facilities.

Past studies have shown that feeder bus service to a Park-and-Ride facility served by line-haul transit service accounts for ten percent of the access trips to such facilities. This suggests that up to a ten percent increase in line-haul transit utilization can be expected from the institution of such service. This marginal increase may not be large enough to institute new service, but may be worth considering limited changes to established routes in the area of the Park-and-Ride facility.

Increased utilization cannot be considered an automatic result of establishing line-haul service from the Park-and-Ride facility. This type of increase can only occur when conditions supporting transit utilization exist. Conditions that should prevail when considering line-haul service at a facility are presented in Table 3-1 under the urban corridor and HOV corridor lot types. These conditions include a market size supportive of transit, significant employment concentrations, and significant levels of congestion and amounts of traffic.

Shuttle transit services provide access to an activity center from a peripheral parking facility. Shuttle service should be provided when average walking distances are larger than a certain threshold value; typically a few city blocks or less. Generally, people are willing to walk approximately 1/4 mile, or bicycle up to three miles, to access transit or reach their destination. For an existing peripheral facility, shuttle service should be considered if utilization is low. For a new facility, shuttles should be included in plans if it is to serve a geographically large activity center where walking distances are anticipated to be longer than 1/4 mile. The LYNX LYMMO service serves a peripheral parking facility and the Orlando Central Business District (CBD) with 5 minute headways during peak hours and 10 minute service in off peak hours.

Coordination with the local transit provider is essential in establishing service to a facility. There are examples in Florida where lots have been built without such coordination. The results have been no transit service provision, no lot usage, and the ultimate closure of these facilities. It is strongly recommended that coordination take place as early as possible in the planning stages of a facility. This should be done to determine if service can in fact be accommodated by the transit provider and what site requirements must be met. Transit use can be encouraged by publishing schedules and, if possible, by utilizing Automatic Vehicle Locators (AVL) for the next bus arrival to help make the site WiFi accessible for transit agency connections.

Access to the facility may be more important than design features in determining if transit can be provided on the site. The ideal site will be located on an existing or planned route. It should be recognized that the local transit provider will need to revise route schedules to accommodate the new stop. Rerouting a bus route into a facility will add to the scheduled run time because of the time required to access, stop at, and load and unload passengers at the site. This added time can affect transfer coordination and interlining in other parts of the transit system.

In some cases, an existing stop can be eliminated and replaced at the Park-and-Ride site. The closer the facility is to an existing route, the easier it will be to make these types of adjustments. Providing a stop on the existing route and adjacent to the site, possibly with a bus bay, rather than inside the facility, can eliminate or greatly reduce the access time to the lot. This option requires the site to be located on the side of the road that carries the morning inbound traffic.

Another consideration related to direct access of transit to the site is the provision of traffic signals. Signals should be provided for vehicles required to make a left turn across a multilane arterial into the site. Coordination will need to be made with the jurisdiction responsible for erecting signal controls in order to achieve this objective.

## **CHAPTER 8: PROJECT SELECTION, FUNDING, AND ALLOCATION METHODS**

### **8.0 GENERAL**

This chapter contains a discussion of the Florida Department of Transportation's (FDOT) current Park-and-Ride funding allocation process, provides a summary of the current revenue sources, and identifies potential alternative revenue sources for future Park-and-Ride facilities. This chapter includes documentation of the FDOT Central Office allocation process and award of Park-and-Ride funding to projects at the District level. The documentation contained in this task defines current practices in accordance with the Park-and-Ride Guide and Procedure and includes recommendations to improve those practices.

### **8.1 CURRENT PARK-AND-RIDE FUNDING ALLOCATION PROCESS**

The specific program guidelines are provided in FDOT Procedure Topic Park-and-Ride Number 725-030-002-f [74]. These program guidelines include purpose, authority, scope, background, definitions, program management and implementation, program planning, implementation and evaluation. While management of the program is housed in the FDOT's Central Transit Office within the Office of Freight, Logistics and Passenger Operations (FLP), all Park-and-Ride facilities planned, funded and/or constructed by the FDOT must be coordinated with the District offices of modal development or public transportation. The Central Office maintains continuing communication with the District Offices of Modal Development and Public Transportation on matters regarding the Park-and-Ride program.

#### **8.1.1 Roles and Responsibilities**

The Central Office is responsible for developing and maintaining program policies and procedures, monitoring compliance with established procedures, developing, maintaining the *FDOT State Park-and-Ride Guide*, providing technical assistance to Districts, and maintaining the State Park-and-Ride Facilities Inventory. From a planning and coordination standpoint, the individual Districts are responsible for coordination with the Central Office on program status and implementation; communication with local transit systems, Transportation Management Associations (TMAs) and others interested in developing Park-and-Ride facilities; development and documentation of Park-and-Ride facilities in accordance with the established procedure; development of regional or district-wide Park-and-Ride plans or lists; assisting Metropolitan Planning Organizations (MPOs), and transit systems in the development of Park-and-Ride plans, and coordination with the District Commuter Assistance Program.

The District is responsible for implementation of the state funded program. This includes coordinating with those responsible for design, construction, Right-of-Way (ROW) acquisition, promotion and maintenance of facilities; assisting transit systems and local governments in the planning and implementation of locally initiated Park-and-Ride lots; providing funds to contract with local agencies for planning, design and construction of Park-and-Ride lots; preparing plans; advertising, selecting and contracting with construction companies for design and construction; managing, and monitoring of Park-and-Ride facility development by other public agencies under the terms of a Joint Participation Agreement (JPA); monitoring and evaluation of all Park-and-Ride lots in which state funds were utilized; reporting annually on occupancy levels; providing grants to local governments for the project phases of Park-and-Ride facilities, including those associated with the promotion of the lot; providing technical assistance to local governments; aiding the coordination of all Park-and-Ride lot construction by the FDOT within the District, and ensuring coordination with corridor and special lane planning if applicable.

### 8.1.2 Park-and-Ride Program Planning, Implementation and Evaluation

The Park-and-Ride Program is divided into three phases: Planning, Implementation, and Evaluation. In order to program funds for Park-and-Ride facilities, the facilities must be a part of a District Park-and-Ride project list. This plan may either be regional or district-wide in scope, or part of a Transit Corridor Plan, Transportation Development Plan (TDP), a major highway construction justification plan or other locally published plans. According to the listed procedures, the project list is reviewed annually and submitted to the Central Office by May 31 of each year. All locally developed projects from locally adopted plans are reviewed for eligibility by the District. Project selection is made on the basis of a project selection process established by federal and state law in conjunction with MPOs, local transit agencies and local governments.

With regard to funding and implementation, the FDOT may provide funds for the planning, design, ROW acquisition, engineering, construction, inspection and marketing of Park-and-Ride lots that are part of an approved Park-and-Ride project list or other locally adopted plan. State participation must be in accordance with *Chapter 341, F.S.* [75]. The FDOT may fund 100% of a Park-and-Ride project when it is totally carried out by the FDOT, when title to such facilities shall be retained by the FDOT, or when approved for the Local Advance Program. The FDOT or grantee must comply with all applicable federal, state, and local requirements for the construction of a Park-and-Ride facility (such as the National Environmental Policy Act (NEPA) if federal funds are used in the development of the PNR lot. If a grant to a public agency in conjunction with a local project is in the best interest of the FDOT, then the local share may be provided in cash, donated land value or in-kind services. If federal funds are involved, federal match guidelines shall prevail. The District follows standard JPA procedures for a grant to a public agency for the planning, ROW acquisition, engineering, inspection, marketing, design and/or construction of a Park-and-Ride facility. All lots, with few exceptions, must be in accordance with the *State Park-and-Ride Lot Planning Handbook*.

## 8.2 SUMMARY OF CURRENT REVENUE SOURCES

Park-and-Ride facilities constructed by the FDOT or funded in whole or in part by the FDOT, must be sited, sized, and promoted in such a way that there is a reasonable expectation of at least an average 60 percent occupancy. Local agencies may request the use of Park-and-Ride Lot Program funds by filing a project proposal with the FDOT District office, which sends a project priority list to the FDOT Central Office. The FDOT Central Office determines which projects will be funded. FDOT will fund up to one-half the non-federal share of Park-and-Ride lot capital projects. If a local project is in the best interest of FDOT, then the local share may be provided in cash, donated land value or in-kind services. If federal funds are involved, federal match guidelines shall be used [76].

Nationwide, funds for implementing Park-and-Ride facilities are available from the federal government. Title 23, U.S. Code, provides for funding of Park-and-Ride programs through the federal-aid highway program administered by the Federal Highway Administration (FHWA). Programs administered by the Federal Transit Administration (FTA) provide funding for Park-and-Ride facilities associated with transit and certain rideshare activities. Department of Energy (DOE) funds are also available for Park-and-Ride activities included in the State Energy Plan.

In recent years, more agencies are relying on non-federal funding for transportation improvements and are using innovative approaches to minimize the extent of their capital investment. These strategies may involve special taxes or the use of general revenues. Allowing developers to provide fewer on-site parking spaces who would then contribute their associated

cost savings to a fund for Park-and-Ride development is a possible approach. More and more communities are shifting a share of the cost of development from government to developers and large employers. Some areas have required developer involvement in ridesharing programs as a condition for approval of building permits and subdivision applications.

The following paragraphs outline the federal, State of Florida and local funding sources for Park-and-Ride facilities:

### **8.2.1 Federal Funding Sources**

Federal sources include most highway and transit capital infrastructure programs. Federal highway funds can be used in conjunction with highway congestion mitigation strategies, such as along interstates. Some specific highway funding programs, such as Surface Transportation Program (STP), National Highway System (NHS), and Congestion Mitigation and Air Quality (CMAQ) Improvement Program funding, allow Park-and-Ride lot development as a specifically eligible type of project as long as the project meets the goals of the program (i.e., CMAQ is for reducing emissions and NHS is for improving capacity).

Some FHWA funding is “flexible” and can be transferred to the FTA for implementation by transit systems. FTA funding is reserved primarily for transit capital expenditures while funding for operational expenses is limited. Many MPOs also program an off-the-top amount of federal STP/NHS funding that is set aside for congestion management projects. Many of these projects are identified through the Congestion Management Process (CMP) while some may be proposed by local entities as problems arise.

FTA funding in Sections 5307 (Urbanized Area Formula Grants Program), 5309 (Bus and Bus Facilities), 5311 (Capital Grant Program) and possibly other sections could be used to develop Park-and-Ride lots. Most transit capital programs have Park-and-Ride lots as an eligible expense category, as long as they meet the purpose of the program. Table 8.1 outlines the potential major federal funding sources for Park-and-Ride, with a description of the funding source, associated issues and revenue potential/applicability.

### **8.2.2 State Funding Sources**

FDOT has a Park-and-Ride Lot program providing funding for the purchase and/or lease of private land for construction, promotion, and monitoring of the lots. FDOT will fund up to one-half of the non-federal share of the capital costs. Land value can be used to help match state funding when federal or state funds were not used to acquire the land. This benefits a joint-use arrangement with private property being committed to the Park-and-Ride lot through interlocal agreement or deed, especially for developing areas. This program is an integral part of the Commuter Assistance Program efforts to encourage the use of transit, carpools, vanpools and other high occupancy modes. It is essential in efforts to meet federal, state, regional and local goals for reducing single occupant vehicle travel.

The *Resource Guide for Transit and Transit Related Programs* [77] provides an excellent primer on other potential federal and state funding sources. A review of Florida statutes, as well as state planning documents, indicate several methods by which the state can support a Park-and-Ride facility or program. A summary of these are listed in Table 8.2 with a description of the funding source, associated issues and revenue potential/applicability.

**Table 8-1: Assessment of Federal Funding Sources**

Funding Source	Agency	Description	Associated Issues
5309 Bus and Bus Facilities (Transit Project Earmarks)	FTA	The Capital Investment Grants and Loans Program (formerly Discretionary Grants) provides transit capital assistance for new fixed guideway systems and extensions to existing fixed guideway systems (New Starts), fixed guideway modernization, and bus and bus-related facilities.	Project must be consistent with the Metropolitan Planning Organization (MPO) plan, and typically matched on 80/20 basis.
Small Starts	FTA	A new initiative by FTA, intended to follow a simplified process for projects seeking less than \$75 million in federal discretionary “Small Starts” funds and with a total project cost not exceeding \$250 million.	Has many requirements that are still in process. Exclusivity of corridor, model, and ridership may be issues.
Very Small Starts	FTA	FTA has defined a class of projects that are very simple, low-cost and demonstrably effective called Very Small Starts projects within the Small Starts Program. FTA’s intent is that Very Small Starts will qualify for an even simpler and expedited evaluation and rating process.	Designed for the Bus Rapid Transit (BRT) Services. Can be as high as 80/20 funding.
5307 Formula Funds	FTA	The Urbanized Area Formula Grants Program provides transit capital and operating assistance to urbanized areas with populations of more than 50,000. Approximately \$18 billion is provided to transit agencies for bus and rail vehicle replacements and facility recapitalization.	Project must be consistent with MPO plan and TIP. Typically used by transit agencies for non-project specific funding.
5311 Capital Grant Program	FTA	This program provides grants for transportation projects that are included in a state program of mass transportation service projects (including service agreements with private providers of mass transportation service) for areas other than urbanized areas. Each state receives an apportioned amount based on its amount of non-urban area. This program is often utilized for operating assistance.	Eligible activities include planning and marketing for intercity bus transportation; capital grants for intercity bus shelters; joint-use stops and depots; operating grants through purchase-of-service agreements, user-side subsidies, and demonstration projects.
CMAQ Funds	FTA	A modification to the law during Transportation Equity Act of the 21st Century (TEA-21) provides states that receive the minimum apportionment of half a percent (½%) with some flexibility to use CMAQ funds for STP-eligible purposes.	Project must be consistent with the local comprehensive plan, and be included in MPO plan and TIP.
STP Funds	FTA	These funds are excess highway funds or those chosen to be flexed to transit projects. Federal and state funds that are flexed are permanently removed from a highway project, or from potential highway project funding.	Project must be consistent with the local comprehensive plan, and be included in MPO plan and TIP.

**Table 8-2: Assessment of State Funding Sources**

Funding Source	Agency	Description	Associated Issues
Transit/Rail Service Development	FDOT	Discretionary funding allocated to specific projects by FDOT policy makers to assist in initiating new transit or rail service. Assistance can be either capital or operating grants, although operating assistance is limited to a defined timeframe – typically three years.	Project must be consistent with the local comprehensive plan, and be included in MPO plan and TIP.
Strategic Intermodal System (SIS)	FDOT	An initiative by FDOT to provide funding for statewide and regionally significant transportation facilities and services.	Initial focus is on improving intercity transportation corridors, rather than local services.
Park-and-Ride; Commuter Assistance Programs	FDOT	Programs to facilitate the use of car pools/vanpools by providing funding for planning, marketing, and capital projects.	Historically, focus has been on commuter assistance.
Intermodal Development	FDOT	Program designed to provide funding for improved access, connections to other modes (i.e. airports, seaports, and rail), and to facilitate intermodal or multi-modal movement of people and goods.	Project must be consistent with the local comprehensive plan, and be included in MPO plan and TIP.
Public Transit Block Grants	FDOT	Formula grants to established transit providers for use on capital projects or operating assistance.	Project must be consistent with the local comprehensive plan and be included in MPO plan and TIP.
State Infrastructure Bank (SIB) Loans	FDOT	Provides low interest loans for transportation projects – all modes. Repayment terms are flexible and are negotiated on a case-by-case basis. This is a financing tool, not a grant.	Project must be consistent with the local comprehensive plan, and be included in MPO plan and TIP. Not a grant, requires repayment.
TRIPS	FDOT	Program to improve travel on regionally significant facilities, or benefit regional travel or commerce; 50% of project cost or 50% of non-federal share.	Project must be consistent with the local comprehensive plan, and be included in MPO plan and TIP.
CIGP	FDOT	Up to 50% for improvements to relieve congestion on State Highway System.	Project must be consistent with the local comprehensive plan, and be included in MPO plan and TIP.
New Starts	FDOT	Dollar for dollar match of local funds for New Starts projects.	Project must be consistent with the local comprehensive plan, and be included in MPO plan and TIP.

### 8.2.3 Local Funding Sources

Local funds are often necessary to provide the local match share of federal or state capital grants, as well as the operating and maintenance costs not covered by federal or state assistance. Local funds for Park-and-Ride can come from any available local funding source. Most municipalities fund the local share from the general fund or with special taxes dedicated to highways or public transportation. For example, some communities fund transportation improvements by dedicating a portion of gas taxes, sales taxes, hotel/motel taxes, property tax revenues or vehicle registration fees.

There are other types of local funding sources that are used throughout the country for local share of transportation. These include, but are not limited to, fuel tax, property tax, income tax, sales tax, real-estate transfer tax, emission fees, auto registration fees, utility excise tax, payroll/"head" tax, rental vehicle tax, parking tax, hotel/motel room tax, business licenses and fees, ad valorem tax, special-benefit assessment districts, local/business improvement districts, utility/service districts, impact fees, in-kind contributions, land transfer fees, and tax increment assessments.

Finally, there is potential for private sector participation. Typically, private financial participation in the provision of transportation facilities such as Park-and-Ride is primarily limited to specific projects such as the joint development of a tract of real estate. Potential private fund sources typically include advertising, joint development, concession agreements, Park-and-Ride agreements, grant anticipation notes, revenue anticipation notes, and infrastructure banking.

## 8.3 POTENTIAL ALTERNATIVE REVENUE SOURCES

The purpose of this section is to outline several non-tradition methods to fund Park-and-Ride. This section focuses on public processes that encourage private initiatives. According to the research document, *Commuter Choice Managers and Parking Managers Coordination: Public Transportation Synthesis Series* [78], there are two methods that can be used to obtain transit accommodations on private property; regulatory and non-regulatory. Regulatory methods *require* certain actions while non-regulatory methods *encourage* desired actions.

As indicated in the *Commuter Choice* report, the regulatory approach utilizes several methods to secure transit accommodations on private property. In the first, transit service areas are shown on a map and those properties within the service areas are subject to transit related policies or regulations. Another is to require transit accommodations as part of the zoning district regulations. This can also be accommodated by requiring transit as part of other land development regulations, specifying how and when transit accessibility standards would be applied. The document further indicates that non-regulatory methods rely upon good communication and negotiation skills, including incentives such as granting increased density or greater floor area ratio; lower parking requirements, decreasing impact fees, reducing trip generation rates, reducing taxes, and allowing greater flexibility in mitigation. Obviously, there are also disincentives such as increasing design standards or fees if accommodations for transit access are not made. A review of the *Commuter Choice* document indicates that in addition to the regulatory approaches listed above, the non-regulatory approach of achieving concessions such as maintenance agreements for Park-and-Ride and bus stops in shopping centers, customer amenities agreements and hold harmless agreements appear to be the most applicable.

This report also outlines an off-site parking substitute process that may become more applicable with the advent of the *Framework for Transit Oriented Development (TOD) in Florida* design guidelines, as the state's fixed guideway systems are initiated or as the existing ones mature. Unlike the developer contributing land through a development ordinance mandates approach, the

off-site parking substitution process allows the developer to receive site approval and reduced parking requirements. In this type of arrangement, parking requirements for new developments are reduced in lieu of the developer providing or funding parking off-site. It entails no responsibilities for the FDOT or local government, but developers are responsible for contributing to a parking trust fund or building offsite parking. In some instances, the developers are required to provide or contribute to shuttle service for off-site parking facilities located farther away than walking distances. A Florida example of this is the parking garage/LYMMO system in downtown Orlando.

According to *Transit Oriented Development Design Guidelines* [<sup>79</sup>], TODs can serve as a funding mechanism for transit/transportation plans and multi-modal transportation improvements by allowing local governments to leverage public-private partnerships. TODs facilitate the implementation of transit, especially rail transit by optimizing transit ridership through appropriate land use strategies. TOD reduces the incentive for sprawling development patterns resulting in less land consumption and preservation of natural resources. Public transit combined with reduced private automobile usage reduces the consumption of fossil fuels and emission of greenhouse gases. This TOD approach is not necessarily in conflict with Park-and-Ride facility implementation. Transportation system related parking can be shared with the TOD project. Inversely, some of the parking required of TOD projects could be accommodated at offsite Park-and-Ride or transit station parking facilities. In addition, requiring commercially or employment-based TOD projects to have parking at off site locations can assist in Park-and-Ride facility development at remote locations.

Mobility fees or fair share formulas could be used to assist in the implementation of transportation infrastructure, including, but not limited to, transit services and Park-and-Ride facilities. Research was conducted on Concurrency Management and Proportional Share information concerning the inclusion of transit and transit-related facilities such as Park-and-Ride. Based upon this review, the following five alternatives were developed for future consideration. Below is a brief description of the potential growth management related alternatives to allow for the inclusion of transit and Park-and-Ride facilities.

- **Modify Existing Concurrency Management System (CMS) Ordinances.** Although not currently required as part of state law, local governments can still implement CMS at their discretion. This alternative consists of modifying the existing local government CMS ordinances to allow for transit as a mitigating improvement and allows capacity provision and proportional fair share to be based on transit related improvements.
- **Calculate Cost of Roadway Improvements/Transfer to Transit.** This alternative consists of calculating the cost of roadway improvements under the existing CMS ordinances, but making an allowance in the ordinances to transfer those funds to transit as a mitigating capacity increasing improvement. This alternative has several options for implementation.
- **Standardized Transit Fees.** This alternative consists of calculating a standard, generalized set of transit fees, based upon an approved set of transit mitigation improvements or an adopted transit plan. This alternative would be utilized either in instances where there are no mitigating roadway improvements due to physical, financial or policy constraints, due to the small size of the proposed development, in areas where there has been a policy decision to invest in transit improvements instead of roadway capacity (i.e., MMTDs, transit priority corridors), or in addition to roadway proportionate fair share to accommodate transit capacity increasing improvements.

- **Proportionate Fair Share by Zone/Sectors.** This alternative consists of calculating proportionate fair share, based upon an approved set of transit mitigation improvements, an adopted transit development plan or an adopted mobility plan in a specific zone or sector. This alternative can be implemented by several methods, ranging from simple to more complex methods, and can be implemented independently or in conjunction with the above listed alternatives.
- **Transit Corridor Focus.** This alternative consists of calculating proportionate fair share, based upon an approved set of transit mitigation improvements, an adopted transit plan or an adopted mobility plan in a specific corridor. As the title implies, this alternative focuses on the provision of capacity in major corridors within the local jurisdiction, with the goal of increasing throughput on the major travel corridors.

#### **8.4 FUTURE ALLOCATION PROCESS AND REVENUE SOURCES**

The Park-and-Ride program for the State of Florida is at a crucial point in its timeline. This program has survived a recent history of limited resources and limited policy exposure. Park-and-Ride stakeholders, primarily District personnel, local transit providers, and local governments, have continued to push for implementation of Park-and-Ride facilities in a difficult economic environment. For the most part, recent Park-and-Ride lots have been constructed using limited funding from the state program, or from federal and local funding.

## CHAPTER 9: MAINTENANCE AND MANAGEMENT

### 9.0 GENERAL

Managing and maintaining a Park-and-Ride facility are essential to the success of the facility and for the Program as a whole. This chapter will provide direction on maintenance, maintenance agreements, how to manage individual lots and the District Park-and-Ride Program.

### 9.1 MAINTENANCE

Maintenance is an ongoing responsibility with associated expenses for the life of the lot. If an agreement cannot be formed for a Park-and-Ride lot, a decision should be made about whether to proceed with its construction. How Park-and-Ride facilities are maintained will reflect the security, real or imagined, as perceived by the users. Lots operate most efficiently when maintenance is done proactively. This ensures safety for those individuals utilizing the lot, keeps things running smoothly, and extends the life of the lot before expensive reconstruction, repair, or replacements occur, thereby making the most of the public funds invested in the Park-and-Ride facility. Agencies that are typically responsible for maintenance of Park-and-Ride lots include the District Maintenance Office, or its subcontractor, the local transit agency, or a private sector contractor.

To assist with maintenance of Park-and-Ride facilities, the California Department of Transportation (Caltrans) utilizes the Adopt-A-Highway program to include Park-and-Ride facilities for litter removal and landscaping maintenance. The FDOT may choose to incorporate Park-and-Ride lots into the Adopt-A-Highway program, or establish a similar program for “Adopt-A-Park-&-Ride” to assist with maintenance of the facilities.

At minimum, a basic maintenance plan, and an executed maintenance agreement with the entity responsible for maintenance (if not the FDOT Maintenance Office) must be in place before construction of a new facility. The 2004 Park-and-Ride Guide by the American Association of State Highway and Transportation Officials (AASHTO) states that a thoroughly detailed site maintenance manual should be developed to adequately address all maintenance responsibilities for each site. Categories of maintenance involve roadway, traffic services, and drainage. The following items should be discussed in the maintenance plan [<sup>80</sup>]:

- Yearly maintenance cost estimate
- Mowing
- Landscaping
- Traffic control devices (signs, pavement markings, traffic signals)
- Pavement and sidewalk repairs
- Funding source for maintenance and legal responsibilities if maintenance is not performed by FDOT
- How often periodic inspection shall occur
- Litter control, trash pick-up, and sweeping
- Amenity maintenance and cleaning
- Cleaning of drainage structures and clean-out pipes
- Lighting

Maintenance activities include routine care for:

- Filling potholes
- Pavement distress
- Traffic control devices
- Lighting
- Pavement markings
- Guardrails
- Sidewalks
- Handrail
- Irrigation
- Drain clean outs
- Inlets
- Mowing
- Graffiti removal
- Trash removal
- Pavement joints
- Signs
- Signal operations
- Striping
- Painting
- Attenuators
- Fences
- Storm drains
- Ditches
- Pavement sweeping
- Landscaping and aesthetics
- Litter removal
- Tree trimming

Lighting maintenance will be the responsibility of the FDOT, the local municipality, or the energy provider. The responsible party must be identified before a new facility is constructed. Once lighting is installed, it should periodically be checked to ensure that the lights are being properly maintained. This will require visits to the facility during hours of darkness to ensure lights are in proper working order. Routine maintenance activities are to be scheduled during off-peak times such as during the middle of the day or in the evenings.

Periodic assessments will be necessary to assure that maintenance of the facilities is being properly handled. Any deficiencies are to be reported to the maintaining agency for correction. Documented regular maintenance and inspections keep the facility running properly, and provides supporting evidence should legal issues arise [<sup>81</sup>].

### **9.1.1 Maintenance Agreements**

A maintenance agreement between the FDOT and another business, organization, local transit provider or municipality is to be a formal, written and executed agreement clearly stating the responsibilities of each entity to the lot and is to be included in all contractual arrangements as a special consideration. Maintenance agreements are to include, at minimum, the name of the entity responsible for the facility; contact information, including name and telephone number; a schedule for cleaning, repair and restriping of the lot; and the term, or timeframe, for the agreement. Where ownership is an entity other than the FDOT, the agreement shall be in effect until the facility is closed or ownership is transferred to another entity. The initial term of agreement is to be a minimum of 10 years to prevent premature removal of the lot. Amenities and their upkeep must be incorporated into a maintenance agreement as well. Trash pickup should occur weekly and be stated in the maintenance agreement.

For state owned Park-and-Ride lots, maintenance must be coordinated between the FDOT District public transportation office and the District maintenance office. For shared use lots or lots owned or operated by others, the FDOT is required to negotiate and execute a maintenance agreement with the entity or entities sharing or solely operating the lot. As another option,

maintenance responsibilities for a Park-and-Ride facility may be included with, or amended to, a maintenance agreement for the roadway corridor it is located on or given to the local transit provider servicing the lot. The Texas Department of Transportation (TXDOT) assigns maintenance responsibilities to the local transit provider, local government or agencies by agreement. Several other states with Park-and-Ride programs have also found it useful to have the local transit provider take responsibility for routine maintenance of the lots. Any maintenance agreement to be executed must be reviewed by the FDOT Legal Department.

A sample maintenance agreement that is a compilation from various Districts agreements is contained in Appendix F. These may be modified as necessary on a case-by-case basis. Maintenance agreements, or modifications to existing agreements, require a legal review by the FDOT legal staff before being used by Districts or other entities. This will ensure that the language in the agreement is inclusive and legally appropriate such that the maintaining agency will perform their designated maintenance responsibilities appropriately. Once an agreement is executed, it must be communicated to the District Park-and-Ride Coordinator and project manager. Thereafter, a copy should be added to the file, both electronic and hardcopy, for the Park-and-Ride lot.

If a decision is made to proceed with a new Park-and-Ride facility, and the maintenance agreements are in place, several offices must be notified including: District Director of Transportation Development, Design Engineer, Project Development and Environment (PD&E) or Design Project Manager, Consultant Project Management Engineer, Production Support Engineer, Director of Transportation Operations, Maintenance Engineer, Right-of-Way Office, and Environmental Management Officer [82]. Prior to this decision being made, coordination with the FDOT District maintenance yard that handles maintenance in the area of the facility must be established. If the local jurisdiction handles the maintenance, and an expansion is being considered, discuss the expansion with the local jurisdiction to ensure that the expansion can be amended into the existing maintenance agreement. If an agreement is not in place, a new agreement may be executed to cover maintenance of the entire lot. The Legal Department must review any new agreement or changes to an existing agreement to ensure the language is inclusive and appropriate. Effective communication is an essential component for the success of every Park-and-Ride facility.

## 9.2 ANALYSIS OF CORRECTIVE MEASURES FOR UNDER UTILIZED LOTS

Following the Park-and-Ride facility performance evaluations discussed in Chapter 11, additional information will be necessary to determine the feasibility of implementing corrective actions as necessary. This information will be site and problem specific, and will generally be developed by professional staff. Figure 9-1 provides a reference diagram for the corrective actions process.

Table 9-1 presents the data required for review which includes:

- Projections of facility demand
- Projections of future land use in the market area(s) of the facility
- Costs of Right-of-Way (ROW) in the area
- Site design plans
- Transit schedules and system maps
- Level of service (LOS) conditions on access roads
- Inventory of traffic control devices in vicinity of the site

**Table 9-1: Review Data for Site Evaluations**

Data Element	Corrective Action	Evaluation
<b>Demand projections</b>	Expansion Closure Disposal	Capacity needs
<b>Land use projections in market areas</b>	Expansion Closure Disposal	Capacity needs
<b>Planned/programmed improvements</b>	Disposal	Coordination of improvements
<b>Right-of-Way (ROW) costs</b>	Expansion Disposal	Expansion cost Value capture
<b>Site design plans</b>	Service modification Facility modification	Circulation adequacy Transit amenities Traffic control
<b>Transit schedules and system maps</b>	Transit service modification	Added usage generated by new/improved service
<b>Traffic operations on access roads</b>	Access modification Safety modification	Road capacity expansion Safety improvements
<b>Traffic control device inventory</b>	Access modification Safety modification Signing improvements	Adequacy of traffic control

Not all of the information shown in Table 9-1 will need to be collected in all situations because only data necessary to determine the feasibility of implementing specific measures at a particular Park-and-Ride facility will be needed. Some of the information, such as facility design plans and inventories of traffic control devices, should already be on file for each Park-and-Ride facility.

Demand and Land Use Projections: Projections of future facility demand and/or land use in the service area of the facility will be useful in determining future capacity needs. The same concepts and procedures for estimating demand as presented in Chapter 4 can be used. A simple trend computation can add valuable insight into the potential capacity needs. However, this must be tempered with conditions at the site which may deter use.

Planned Improvements: An inventory of planned and programmed transportation improvements is needed to determine the future need of the facility under investigation. Such improvements may make an otherwise useless facility valuable in future years and can aid in the decision to maintain it. Sources of this information include the area’s Transportation Improvement Program (TIP), Long-Range Transportation Plan, and work programs for those jurisdictions that are not included in the local TIP.

Right-of-Way (ROW) Costs: ROW cost data will be needed only in circumstances where facility expansion or disposal is being considered. These figures will aid in making assessments related to expanding the existing facility on adjacent property, constructing a new facility at a different location, the potential value return, and the feasibility of a more efficient use of the land.

Site Design Plans: Site design plans are needed to assess the feasibility of geometric and circulation improvements. Final plans or as-built plans should be available and on file.

**Transit Schedules and System Maps:** Transit schedule and coverage information is used to determine the level of transit service and the access provided by transit from the Park-and-Ride facility to major destination areas.

**Traffic Operations on Access Roads:** Congestion on access roads to a Park-and-Ride facility can be a significant deterrent to utilization. Traffic operations data, including traffic counts, intersection layouts, road section and intersection capacities, and signal timing information will be needed to assess congestion levels and their impact on lot usage.

**Traffic Control Device Inventory:** Accident data and traffic control device inventories will be important in developing solutions to safety and traffic operations problems adjacent to Park-and-Ride facilities assessed as having operating deficiencies. The required data

includes accident information of sufficient detail to produce accident diagrams, including placement and condition of traffic control devices, and assessments of visibility and legibility.

Once corrective actions have been analyzed and feasible solutions have been identified, a plan of action may be implemented to rectify the operating problems at each site. Possible solutions range from doing nothing to increased promotion or even new construction. The fact finding effort concentrated at the facility under investigation will most often lead to conclusions concerning the operation of the facility which otherwise would not be understood. Access, security, traffic operations, and safety problems can be better defined through field investigation.

### 9.3 CONDITIONS FOR CORRECTIVE ACTIONS

The tables in this section were developed to aid in the identification of existing conditions that should prevail in order for effective actions to be executed. These would be in response to site-specific operating problems found during the performance evaluation.

#### 9.3.1 Unsatisfactory Operation

Table 9-2 shows the prevailing conditions for actions appropriate for facilities so under-utilized that there is no positive course of action to execute. The listed conditions should exist in order to consider closure of a facility. Closing and vacating a facility are significant acts, as any existing

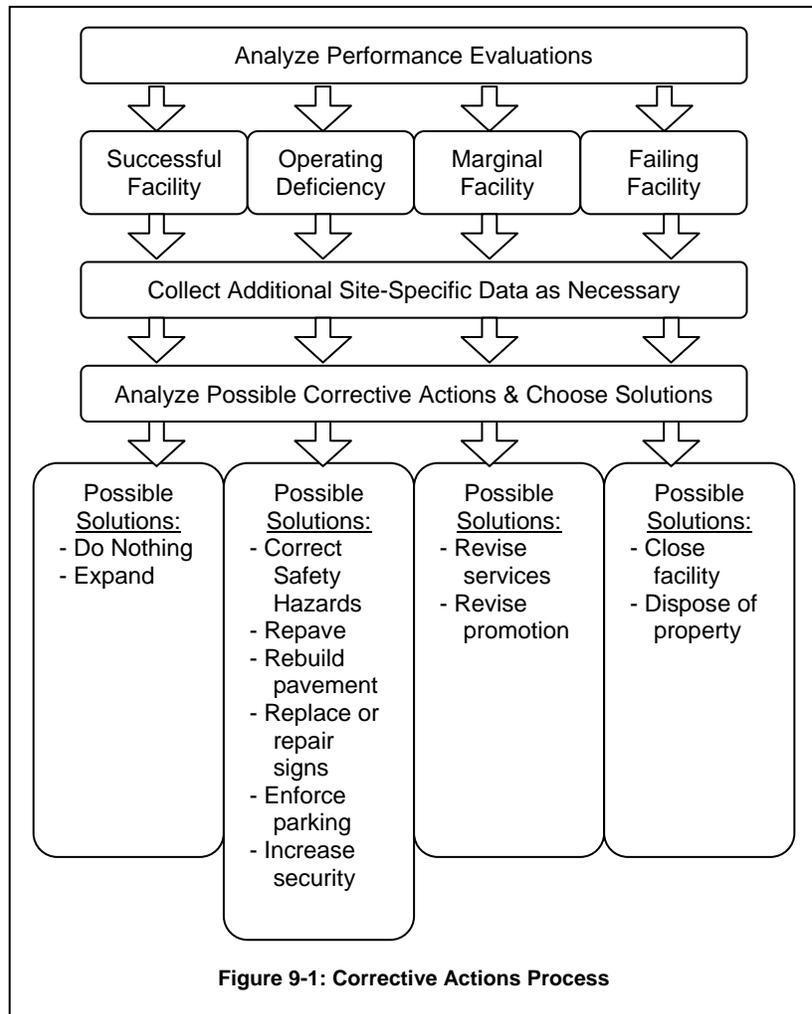


Figure 9-1: Corrective Actions Process

users will be negatively, and possibly significantly, impacted. Site vacation means it cannot be used in the future without repurchase at possibly a much higher price. It is a rare occurrence when agencies around the country close and dispose of a site when the preceding considerations (of this document) were considered [83].

**Table 9-2: Conditions for Lot Closure and Disposal**

Action	Conditions
<b>Close site and hold for future use</b>	A) Feasible to relocate existing users to a more cost-effective location. B) Demand not expected to increase in the near future. C) Other corrective actions will not produce significant usage increases. D) Alternative uses are implementable. E) ROW required for future improvement project. F) Soft real estate market G) Site size/configuration not suitable for resale.
<b>Dispose of property</b>	A) Low probability of future growth in usage through development or increased congestion. B) ROW not required for future improvements. C) Alternative uses not attractive. D) Commercial/industrial zoning. E) Site size/configuration appropriate for development F) Vandalism/assault problems not correctable. G) Future transit service highly unlikely.

The decision to close a facility should be based on two factors: 1) inability to implement corrective actions which could improve usage and 2) ability to provide alternative parking for any existing users. Once the decision is made to close a facility, the next decision consists of whether to hold the facility in public ownership or to dispose of it. If demand is expected to increase in the future or if the property is needed for future transportation improvements, the lot should be held. Use of the facility for other purposes should be considered. For larger lots, partial closure may be an attractive option to full closure. This may allow use by the local transit agency or ambulance services for driver training, among other potential uses.

**9.3.2 Marginal Operation**

Table 9-3 shows the appropriate actions and related conditions for sites assessed as having low usage that can be improved. Actions suggested to have a positive impact on usage include:

- New or increased transit service
- Access improvements
- Increased security
- Improved promotion
- Construction of transit amenities such as stops and shelters

**Table 9-3: Conditions for Corrective Actions**

Action	Potential Usage Increase	Conditions
<b>Added Transit Service</b>	1/2 to 1% increase for each 1% improvement of frequency Potentially 100% increase with new service	Market area supportive of transit. Area planned for express service. Congested access to major destination area. Existing travel headway is greater than 15 minutes.
<b>Access Improvement</b>	50% increase per 5 minute improvement in access times.	Congested access roads to Park-and-Ride facility. Heavily traveled corridor with major destination area. Site is visible and otherwise appears attractive. Market area not serviced by other Park-and-Ride facilities.
<b>Transit Amenities</b>	Indeterminable, probably slight	Other improvements planned for facility.
<b>Improved Security</b>	Slight unless full-time security is provided	Security problem exists Peripheral facility adjacent to area with under supply of parking
<b>Promotion</b>	Less than 10%	In conjunction with special transit promotion programs. Characteristics of origin market influence area supportive of Park-and-Ride. Congested commuting corridor.

The effects of transit amenities alone may not considerably raise utilization. However, it is suggested that the best approach is to implement such improvements in conjunction with other actions such as new transit services, promotional events, or lot beautification.

The conditions shown in Table 9-3 should exist in order to consider the associated corrective actions for improving usage of a marginally operating facility. Past studies indicate that a facility with a security problem will most likely never be used to its full potential unless full-time security is provided. It was found that crime only temporarily decreases with added patrolling. The best course of action to take in resolving security issues is to have the facility placed on the normal patrol route of the local enforcement agency so it receives frequent patrolling every day. It must be assumed that crime will approach the previous levels once patrolling has been curtailed or discontinued.

**9.3.3 Critical Operating Deficiency**

Operating deficiencies at otherwise satisfactory Park-and-Ride facilities include security, pavement and traffic control device maintenance, accidents, poor traffic circulation, and illegal parking. Some of these problems are associated with increased liability exposure and should be corrected at the earliest opportunity. Identification of these problems will come from analysis of the field data as well as from complaints from users and neighbors.

**9.3.4 Over-Utilization**

Over-utilization can discourage usage because of the uncertainty of finding a parking space. Except in very limited situations, the motoring public will not significantly increase vehicle occupancies to access a lot in response to over-use. Table 9-4 defines the actions related to providing additional capacity to an over-used facility. Some actions will not add significantly to capacity, but may be acceptable as a result of low additional capacity needs and cost

considerations.

Actions related to revising parking fees require that fees can be legally adjusted. Facilities constructed with bond money may not have this option available. These actions should be implemented as a means to shift those using the facility to other nearby, under-utilized facilities. For example, it is better to reduce fees at the nearby facility in concert with promoting the lower fees as compared to simply raising fees at the over-used lot.

An important consideration for constructing a new facility is the feasibility of providing transit service. Coordination with the local transit provider will be necessary to determine if such services are possible. Similar transit services provided at the overcrowded facility should also be provided at the new facility.

**Table 9-4: Over-Utilization Solution Evaluation Matrix**

<b>Solution Alternative</b>	<b>Cost</b>	<b>Added Capacity</b>	<b>Lot Size</b>	<b>Existing Design Features</b>	<b>Right-of-way Conditions</b>	<b>Other Conditions</b>
<b>Eliminate Illegal Parking</b>	Low	< 5%	Small	NA	NA	Illegal Parking exists
<b>Reduce Parking Space Widths</b>	Low	< 5%	Small	>=9' wide spaces	NA	Adequate aisle widths (28' optimal)
<b>Standard-Size To Compact-Size Parking Space Conversion</b>	Low	Up to 10% w/ 50% converted	Moderate to large	No compact-size parking spaces	NA	Large percentage of compacts
<b>Reorient Parking Spaces From Angle To 90-Degrees</b>	Low	< 8%	Large	Angle parking exists	NA	
<b>Replace Design Features With Parking Spaces</b>	Low	5 to 20%	Moderate to large	Berms, aisle end islands adequate for conversion	NA	
<b>Reduce Parking Charges at Competing Facilities</b>	Low	Large	Moderate to large	NA	NA	Adjustment of charges legal
<b>Increase Parking Charge</b>	Low	Large	Moderate to large	NA	NA	Adjustment of charges legal
<b>Reorient Aisles to Long Dimension of Lot</b>	Low	10 to 20%	Moderate to large	NA	NA	Length/width ratio > 1.5
<b>Reduced Parking Charge for Arriving Carpools</b>	Low	Moderate	Large	NA	NA	Adjustment of charges legal
<b>Preferential Parking for Carpools</b>	Low capital High operating	Low	Large	NA	NA	Best used where attendant fee collection exists
<b>Satellite Parking with Shuttle Service</b>	Capital low to high, operating moderate	Large	NA	NA	Affordable ROW available	Rail service at site New site near home end of trip
<b>Expand on Adjacent Land</b>	High	10+%	NA	NA	Affordable ROW available	Acceptable soil conditions
<b>Expand Within Existing ROW</b>	High	10+%	NA	NA	ROW Available	Acceptable drainage conditions
<b>New Site</b>	Low to high	10+%	NA	NA	Affordable ROW available	Near existing facility Good access and visibility
<b>Structure on Existing Site</b>	Very High	50+%	Large	NA	NA	Site size and configuration

## 9.4 OTHER MANAGEMENT CONSIDERATIONS

Park-and-Ride lots are to be considered when land use decisions and Transportation Demand Management (TDM) are discussed to ensure that the transportation system is efficiently equipped and improved. Opportunities to expand or incorporate Park-and-Ride projects into upcoming transportation improvements must be identified and acted upon. A long-range plan must be established and updated yearly to track necessary upgrades, funding, and upcoming projects. These projects must be managed from conceptual design through the completion of construction. From that point, management responsibilities for the completed facility requires ensuring that maintenance is performed, inventories are conducted, and reports are prepared. Performance of facilities must be evaluated individually and as a network of facilities supporting the transportation system. Management decisions incorporate corrective actions, promotion, expansion, and closing of a facility when necessary. FDOT District 5, in their 2010 Park-and-Ride Implementation Manual [<sup>84</sup>] provides detailed checklists and FDOT management, maintenance, and agency responsibilities for constructing new Park-and-Ride facilities, whether they are FDOT owned, leased, or privately owned, as well as for expansion of existing lots. This document may be referenced for further guidance.

Other concerns that have arisen over the course of the Park and Ride program are issues related to the closing of unsuccessful PNR lots. There is no set course of action on how to address this issue and further clarification or discussion may be warranted which should consider:

## CHAPTER 10: PROMOTION AND MARKETING

### 10.0 GENERAL

Promoting and marketing of Park-and-Ride lots makes the program and its accomplishments known, and better informs the public about the state's transportation network. Park-and-Ride users cannot be considered a static market due to mode shifts and changes in the economy, residence, and work places. Consequently, a continuing marketing program for Park-and-Ride services should be maintained by each District to enhance usage. Promotion of new Park-and-Ride facilities can increase usage as well as accelerate the rate of growth in utilization and transit revenues where service is provided.

### 10.1 THE MARKETING PLAN

Creating a marketing plan will provide a framework for when and how Park-and-Ride facilities are promoted. This plan should be flexible enough to allow changes in future goals or services. A plan should have a description of marketing goals and outline attainable objectives for reaching these goals. The primary purpose of promotion is to give the public information and educate them about the availability of Park-and-Ride lots, to provide information about accessing and using public transit services, to maintain and build the loyalty of lot users, and to increase ridership and demand for public transit routes that serve Park-and-Ride facilities. Potential markets for promotion include those who currently drive single-occupant vehicles to work, those who carpool or vanpool, and large employers [<sup>85</sup>]. The primary limiting factor on marketing and promotion is the funds to do so.

Marketing strategy for example could consist of the following [<sup>86</sup>]:

- Create and maintain a statewide Park-and-Ride website with Geographic Information System (GIS) capabilities
- Ensure signage and wayfinding exists for the lots (especially on highways and major arterials)
- Create information brochures about the Park-and-Ride lots
- Enhance the Park-and-Ride customer service program
- Implement real-time information signs for large Park-and-Ride facilities
- Provide incentives for Park-and-Ride and transit service usage

Marketing and promotion can be considered a trial-and-error process. Some techniques may work better than others within a given market area. Many of these strategies can be accomplished in combination with the Commuter Assistance Programs and funding. The marketing strategy should be periodically evaluated to ensure goals are being met and if not, adjustments should be made. Strategies implemented should be evaluated and documented as to their failures or successes so future promotion can be coordinated appropriately. New Park-and-Ride lots may wish to be marketed beginning two months prior to the opening of the lot, and continue on for the first year after its opening. Park-and-Ride facilities being expanded should also be promoted to make the public aware that more spaces are available after construction [<sup>87</sup>].

Good customer service will also help facilitate use of the Park-and-Ride facilities. On a Park-and-Ride website, a customer service area can be designated, having contact information for the District Park-and-Ride coordinators, administrative staff, public information specialist, or a

toll-free customer call number directing callers to regional transit agencies. An automated phone system can be applied to provide information on locations, real-time updates (if possible), and other useful information. A “Contact us” program can be used to send emails with comments, concerns, and compliments to the applicable personnel. Some programs have found that when talking to customers on the phone, if they obtain an email address and send them relevant information that has already been prepared for public distribution, they seldom receive follow-up phone calls. Customer comment cards can be provided on transit vehicles for customer opinion surveys and include a place for additional comments. [<sup>88</sup>].

## 10.2 PROMOTIONAL TECHNIQUES

Promotional activities can be categorized into four areas:

- 1) Promotional campaigns to inform the public of a new service or facility
- 2) Continuing programs of information distribution
- 3) Advertising campaigns conducted to increase the public awareness of social and personal benefits of a service or facility
- 4) Special transit pass programs to foster fare prepayment and increase transit usage

An effective promotion program needs to identify the market and determine the most effective mechanism for communicating the desired information. Relevant promotional techniques for Park-and-Ride facilities include the following marketing procedures:

- A. Internet information
- B. Roadside signs
- C. 511 Call System
- D. Transit routes and schedules
- E. Multi-trip transit pass programs
- F. Multi-agency program collaboration
- G. Telephone information services
- H. Employer-coordinated activities
- I. Brochures distributed to large employers
- J. Public outreach
- K. Public service announcements on radio and TV
- L. Adopt-A-Park-and-Ride
- M. Newspaper advertisements
- N. Private Sponsorship
- O. Posters/Billboards
- P. Transit Incentives
- Q. News releases
- R. Brochures delivered door-to-door to residents within the service area
- S. Posters, flyers, handbills, bumper stickers, and maps showing the location of lots
- T. Direct mail using employee databases

Table 10-1 presents a summary of the above techniques, including when they are best applied. The table presents applicable lot size, location of the lot, and transit service requirements. The lot

size requirements identified in Table 10-1 indicate that some techniques are best considered in relation to promoting “large” lots. This measure is difficult to quantify and is best determined on a case-by-case basis by the agency conducting the marketing effort.

**Table 10-1: Application of Park-and-Ride Promotional Techniques**

<b>Technique</b>	<b>Lot Size</b>	<b>Setting</b>	<b>Transit Service</b>	<b>Time Scope</b>
<b>Internet</b>	All sizes	All	Not required	Long term
<b>Roadside Signs</b>	All sizes	All	Not required	Long term
<b>511 Call System</b>	Large	Urban	Required	Long term
<b>Transit routes guides and schedules</b>	Large	Urban	Required	Long term
<b>Multi-trip transit pass programs</b>	All sizes	Urban	Required	Long term
<b>Multi-agency program collaboration</b>	All sizes	All	Required	Long term
<b>Telephone information services</b>	NA	Urban	Not required	Long term
<b>Employer-coordinated activities</b>	Large	All	Vanpool program and/or transit established	Long term
<b>Brochures distributed to large employers</b>	Large	All	Best if provided, but not required	Long term
<b>Public outreach</b>	All Sizes	All	Not required	Long term
<b>Public service announcements on radio</b>	All sizes	All	Best if provided, but not required	Long term
<b>Adopt-A-Park-&amp;-Ride</b>	All sizes	All	Not required	Long term
<b>Newspaper ads</b>	All sizes	All	Not required	Short and Long Term
<b>Private Sponsorship</b>	All sizes	All	Not required	Short and Long Term
<b>Public service announcements on TV</b>	Large	Urban	Required	Short term
<b>Posters and billboards</b>	NA	Urban	NA	Short term
<b>Transit Incentives</b>	All sizes	All	Required	Short term
<b>News releases</b>	Large	All	Not required	Short term
<b>Brochures delivered door-to-door to residents within the service area</b>	Large	Urban	Best if provided, but not required	Short term
<b>Promotional posters, bumper stickers, and maps showing the location of lots</b>	Large	Urban	Required	Short term
<b>Direct mail</b>	All sizes	All	Not required	Short term

Techniques tend to be most effective when used for promoting larger Park-and-Ride facilities and/or those served by transit service. Some techniques are not effective in rural locations due to factors such as population densities, service area size, and transit service availability. Lot size is

not applicable for techniques used to promote programs that can incorporate Park-and-Ride facilities into their marketing campaigns, such as Commuter Assistance Programs, ridesharing, or transit services.

Some principles to keep in mind when marketing and promoting Park-and-Ride facilities are as follows:

- It should not be assumed that the public knows where Park-and-Ride facilities are located no matter how visible.
- Coordinate promotional efforts with other programs to benefit all programs involved. Efforts should be made to coordinate with agencies providing complementary services such as transit agencies, carpool matching programs, Transportation Management Associations (TMAs), and ridesharing programs.
- Focus the marketing effort on the travel characteristics of the target audience. Employer-directed marketing programs and roadside information signs are based on this strategy.
- Focus the promotion effort on the demographic, socioeconomic, and cultural characteristics of the target audience with door-to-door marketing campaigns and public service announcements on television.
- Utilize public information channels established by such organizations as Metropolitan Planning Organizations (MPOs), transit and transportation authorities, city councils and support committees, and Commuter Assistance Programs, as well as the Department of Transportation. Such organizations may publish periodic newsletters for public distribution and will probably include articles/information related to Park-and-Ride facilities, if requested. Providing information in multiple languages will attract a larger audience.
- Promotion efforts should be consistent with the scale of the facility or service. Effectiveness is directly related to facility size, visibility, and transit services.
- Promotional campaigns that incorporate both short and long-term efforts in order to have the most effect. Short-term efforts are associated with the initial communications which inform the public of a new facility. Long-term promotion consists of information broadcasting directed at continually making the public aware of existing facilities and programs.
- Signage, promotional publications, and notices should meet the civil rights protection requirements under Executive Order 13166, Title VI for Limited English Proficiency (LEP) [<sup>89</sup>]. Printed materials should also be provided in minority languages to enlarge the marketing potential.

The following sections describe the Park-and-Ride promotion techniques presented in Table 10-1.

### **10.2.1 Internet Information on Commuter Assistance, Transit Agency, and MPO Websites**

The internet is the location destination of many searching for information. Regional Commuter Assistance Programs (RCAPs), TMAs, transit operators, and other transportation entities in the Park-and-Ride service area can use their websites to promote Park-and-Ride usage. Sites can post maps and detailed information about the Park-and-Ride program and individual sites. Maps should contain enough information to allow users to identify where they are, where they would like to travel to, where roads and county lines are, and should also include cities and major landmarks. Links to maps for specific lots could also include pictures, amenities, the location/address, driving directions from major roads, number of parking spaces, and links to transit operators whose

transit routes connect with or near the Park-and-Ride lot. Websites can contain testimonials from those who use Park-and-Ride lots and transit services, as this can also help build and maintain loyalty of lot users [90].

If a real-time information system exists for the current status of the lot, such as the number of available parking spaces, a link or information on this can be provided on the website as well. An existing program that may be able to be used in this regard may be Open Source Mapping or Google. Information on websites should be linked (i.e., Park-and-Ride facilities should be linked to transit websites and vice versa). Alert systems can be provided to send emails or text messages to subscribers about their selected preference areas to alert them to weather or traffic conditions, as well as whether a Park-and-Ride lot is full. This can help an individual's decision making process on which routes to use for commuting and which Park-and-Ride facilities to utilize.

### **10.2.2 Roadside Signs**

This technique consists of providing signage along commute routes to provide the public with information on location of Park-and-Ride lots and services associated with the lots such as transit or ridesharing. Phone numbers for carpool matching, ridesharing, and transit agencies on Park-and-Ride lot guide signs can be very helpful and may stimulate use of the facilities. Agency/program logos should also be included on the signs. Signage that indicates any fees associated with the lot, whether the lot is free, and/or if a permit is necessary may also be beneficial. Providing a name for the lot may also be useful [91]. This can be considered as an effective long-term, low-cost promotional technique which has definite application to Florida. Signs that serve multiple functions as described above may be preferred over single function signs. The latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) [92] should be referenced for official roadway signage and placement.

Another option proving effective is the use of changeable message signs that can provide real-time updates along major commuting roadways. These signs could provide information on number of available spaces at the Park-and-Ride lot, traffic conditions ahead, and number of minutes until the next bus/train departs from the Park-and-Ride lot or frequency of bus or rail service [93].

### **10.2.3 511 Call System**

The 511 Call System is a bilingual system covering statewide roadways that can be updated to provide accurate real-time information to travelers concerning specific roadway conditions, alternate routes during incidents, construction information, and weather-related problems. Public transportation options and information can also be broadcasted through this means, potentially including real-time updates of Park-and-Ride lots. Users can request customized phone calls or text messages to inform them of incidents or information in areas of interest to them [94].

### **10.2.4 Transit Route Guides and Schedules**

This technique consists of including Park-and-Ride facility depiction and identification on the route guides and schedules for the local transit system. Park-and-Ride facilities should be shown on both the individual route guides, as well as system maps, both in print and online.

### **10.2.5 Multi-trip Transit Pass Programs**

This promotional technique is primarily directed at increasing transit ridership and fare prepayment. Most, if not all transit properties in Florida already operate and advertise such a program. Park-and-Ride facilities served by transit services can benefit from these programs through the increases resulting from such a program. A variation of this technique is to institute multi-trip passes offering added discounts for users of those transit routes serving Park-and-Ride

facilities.

### **10.2.6 Multi-agency Program Collaboration**

Collaboration between agencies to devise a statewide plan for carpool/High Occupancy Vehicle (HOV) lane promotion, carpool/vanpool/rideshare promotion, and transit promotion is the focus of this technique. Programs should focus on user benefits such as cost savings, time savings, safety, and convenience. Cost savings can include savings on fuel, parking costs, wear and tear and insurance on personal vehicles. Education and awareness programs can also incorporate Park-and-Ride facility use into their program and training.

Trip passes such as the U-PASS, described on page 62 of the Mitigating Traffic Congestion document [<sup>95</sup>], were developed with cooperation across multiple agencies. With this program, an individual can purchase a U-PASS and be able to use it for full fare coverage on rail and bus services, free carpool and vanpool parking, discounts on occasional parking permits, and evening neighborhood shuttle services, among other things, useful in commuting to work or school. With this pass, holders also receive community discounts at various local businesses. This program found great success in the area implemented.

### **10.2.7 Telephone Information Services**

This consists of providing location information and customer service in conjunction with transit route and schedule information services. Telephone promotion can also be an effective way to reach people and increase awareness of the Park-and-Ride Program.

### **10.2.8 Employer Programs**

Employers can be a great source for encouraging transit and Park-and-Ride use. Incentives to use these services may include limited on-site parking areas, reduced stress for people who commute long distances to work, availability of tax incentives for employers who offer transit grants or pre-tax options to employees. Employers can also provide information about where employees commute from, and can also be used to distribute information to employees on available transit services [<sup>96</sup>]. The use of this technique will be more effective if coordinated with other agencies such as ridesharing promotional programs. Some employers have found it useful to offer special incentives like better/closer parking spaces designated for carpools, or having drawings for employees participating in a transit related programs. The experience with this method is extensive and well documented. The most effective strategy is to target large employers and employers in concentrated employment areas such as business parks and Central Business Districts (CBDs).

### **10.2.9 Public Outreach**

Conduct paper surveys, phone surveys, on-board surveys, focus groups, and executive interviews to encourage public involvement. Work with Regional Transportation Planning Agencies (RTPAs), MPOs, and rideshare program managers to develop a statewide plan. Include Park-and-Ride lot input opportunities at public involvement hearings, citizen's advisory committee meetings, and other public involvement processes for the Project Development and Environment (PD&E) and the Transportation Development Plan (TDP). The National Environmental Policy Act (NEPA) process requirements and public involvement/input required could also be used to promote usage. Outreach should include information on where Park-and-Ride facilities are located, which have transit access, and how to use Park-and-Ride facilities and transit services. Wayfinding signs and other access information should provide direction to those accessing a lot. Testimonials and word of mouth are also good sources of positive promotion [<sup>97</sup>].

### **10.2.10 Public Service Announcements**

Public service announcements are generally applicable to the promotion of urban Park-and-Ride facilities because of the transmission areas of television and radio stations. Research conducted in Lincoln, Nebraska found that television advertising is more effective and better remembered than any other form of media campaign, even personal contact at the home [<sup>98</sup>]. The announcements should address the positive aspects of Park-and-Ride, carpooling/ridesharing, and transit usage. The target audience needs to be made favorably aware of the benefits, both personal and societal, to attract new users.

Air time is generally very expensive on commercial networks. Such networks may have public information programs provided free or at a nominal cost to public and not-for-profit organizations. Public television and radio also provide air time for public service announcements and should be utilized to the extent possible. Another cost related to this promotion technique is the cost of making video and audio recordings which are to be played over television or radio. The broadcasting network may provide this free if requested; however, this should not be assumed without investigation.

Transit organizations may be able to form a deal with radio, newspaper, television or other media sources for a “media trade” where newspapers, radio, and television can run advertisements for transit services and Park-and-Ride lots in exchange for advertisements run by the transit organization in or on the transit vehicles, in their pamphlets, brochures, or other forms of media [<sup>99</sup>].

### **10.2.11 Adopt-A-Park-&-Ride**

A long-term program can be implemented much like the existing Adopt-A-Highway program. In this twist, businesses, people, or organizations can adopt a Park-and-Ride facility in return for having their name or logo displayed on a sign near or inside a Park-and-Ride facility. Adopters would be responsible for periodic litter removal from the facility, for a set amount of time. The Florida Department of Transportation (FDOT) Adopt-A-Highway program requires a two year dedication to the program and litter removal at least four times each year. This would help spread awareness of the Park-and-Ride facility, assist with its upkeep, and also allow recognition or advertisement for the adopter. Larger lots consisting of multiple smaller lots could offer each individual lot an adopting opportunity.

### **10.2.12 Newspaper Ads**

This technique consists of placing periodic advertisements in syndicated and community newspapers. Costs associated with this technique include ad space and production of art work. The ad should consist of promotional verbiage regarding the Park-and-Ride program along with other services provided by the advertising agency (i.e., rideshare programs and transit service), as well as the information phone number and website. An alternative would be to place an ad with information regarding the location of a newly opened facility. This can be performed on either a short or long-term basis depending on the marketing budget.

### **10.2.13 Private Sponsorship**

Allow advertising or community recognition in return for Park-and-Ride amenities like landscaping and benches by private (for profit or non-profit) organizations.

### **10.2.14 Posters/Billboards**

Posters can be printed and placed in public places such as libraries, government office buildings, and parks. Billboard advertising is considered to be a short-term technique because of the cost involved for the art work and billboard rental. Placement of posters and billboards should be in the

vicinity of existing Park-and-Ride facilities. Another option to consider would be to have buses advertise Park-and-Ride facilities and the convenience of using them both inside and on the outside/side of the transit vehicle.

#### **10.2.15 Transit Incentives**

Having contests as incentives/rewards for using transit may also encourage some to choose to utilize Park-and-Rides and transit services. Ideas may include daily give-away contests, or drawings for riders wishing to participate. Purchased ticket discounts can be provided to frequent users, which may also increase loyalty to using transit. Having a transit passenger rewards program, such as a frequent rider program, where points can be earned and redeemed at local businesses or in exchange for free ride passes, may also encourage use of Park-and-Ride facilities. On-board contests and rewards programs may be great incentives, but they also necessitate additional staff hours to coordinate and handle such incentives. This type of program may be best as a short-term special promotion. For some, simply having a free newspaper available onboard in the mornings may be a great incentive. Other incentives may be upgrades at Park-and-Ride facilities such as restrooms, waiting areas, telephone, and ticket vending machines. A pilot program would be recommended to determine how effective a low-cost incentive program would be for a given market area [<sup>100</sup>].

#### **10.2.16 News Releases**

This is a short-term technique intended to inform the public of the opening of a new facility. The size of the facility should be sufficient to be newsworthy. The public information office for the agency involved in the promotion should be consulted on the procedures for involving the press, television, and radio news services. A ribbon-cutting ceremony may be advertised to make the public aware of a new facility [<sup>101</sup>].

#### **10.2.17 Door-To-Door Campaigns**

Promotion through direct mail and hand delivery of brochures should be targeted to the service area of the facility. It can be used as a one-time promotion of a new facility or on a periodic basis to promote existing facilities. This technique is best applied to promoting corridor and urban fringe lots because the service areas are usually well defined, limited in size, and tend to provide a greater number of users. The campaign should be limited to this area. This technique is less effective in rural locations since the service area is generally much larger than for urban area lots. In addition, the population base is typically smaller for rural lots than for urban lots. The technique can be more effective if incorporated with the promotion of new or existing transit service. Having an identifiable “brand” name and logo associated with the Park-and-Ride program may also help individuals to recognize the lots more readily – especially if they have seen them previously through campaigns, advertising, promotion and marketing efforts. Having a logo or insignia, specific simple colors, and having a slogan associated with the program will assist in promoting an image for the service [<sup>102</sup>]. Public information campaigns can be sponsored by the local transit agency, local government, or the PD&E process.

#### **10.2.18 Promotional Materials**

These can consist of almost anything imaginable including, but not limited to, posters, maps, bumper stickers, caps, tee shirts, pens and pencils, cups, rulers, oversize paper clips, balloons, and key rings. Promotional materials are best used in conjunction with special promotional events or employer programs. This technique is normally used on a short-term basis. Unauthorized placement of bumper stickers on private automobiles should not be practiced since it will result in bad public relations. However, coordinating with local governments and transit agencies to place bumper stickers on their vehicles can be effective. Good locations for distribution of promotional materials and promotion of Park-and-Ride facilities include job fairs, county fairs, conferences,

and other community events or large gatherings.

**10.2.19 Direct Mail to Employees**

Using resources from RCAP or TMA employee databases, specific audiences can be targeted as potential Park-and-Ride users so that information can be provided to them directly through mail or email. This can be facilitated through the use of a Geographic Information System (GIS) [<sup>103</sup>].

## **CHAPTER 11: INVENTORYING, EVALUATING, AND REPORTING ON EXISTING FACILITIES**

### **11.0 GENERAL**

Once Park-and-Ride facilities have been designed and constructed, the process continues with inventorying, monitoring, evaluating, and reporting on the results throughout the life of each lot. This chapter describes these processes, why they are necessary, and how they are to be accomplished effectively. The current Park-and-Ride Procedure should be referenced and followed with regard to inventorying, evaluating, and reporting. The 2001 Procedure requires:

The first inspection of a new lot is to occur within 90 days of being opened. The District Transit Office is required to conduct the first inspection of the facility and provide a report to the Central Office on location, size, cost, owner, operator, ancillary facilities and what transit services are available to the lot. Thereafter, all lots are to be physically inspected two times a year; ensure that maintenance is adequate, appropriate safety factors exist, and no improvements or repairs are necessary. If any aspects are deficient, the District must notify the appropriate entity and request that action be taken to correct any deficiencies. Documentation of inspections and corrective measures must be maintained on file in the District Office per current record retention criteria. Annual inventory reports must be submitted by end of October each year to the Central Office. The report must include dates inspected and average utilization for each lot. Lots greater than or equal to 95% utilization should be considered for expansion.

### **11.1 INVENTORYING AND MONITORING**

Twice a year, the District Park-and-Ride Coordinator, or their delegate who is capable of performing technical analysis, is required to inventory each Park-and-Ride lot within their district that has been funded in part or in whole by FDOT, regardless of who owns the lot. Inventorying twice a year ensures that the lot is being properly maintained and that no major issues have occurred that would need to be addressed. During each inventory, the number of vehicles using the lot, including bicycles, is counted to determine the facility's rate of utilization. This rate is compared with past rates of utilization and with the rates of other lots in the area to evaluate the performance of the lot. Inventory of the lot also assists in identifying needs, such as for trash cans, benches, shelters, bicycle storage, repainting, signage, repaving, light fixture repairs or replacements, landscaping, and drainage repairs as necessary to keep the facility in proper working order to ensure the safety and convenience of the Park-and-Ride users. Persons inventorying the lot may also observe or identify particular needs and make recommendations based on their observations.

Results from each inventory are collected, summarized, evaluated, and provided by each FDOT District Office to the Central Office by the yearly deadline provided in the current Procedure. Reports may be provided to other agencies by the Central Office, such as, the Federal Transit Administration (FTA), based on District inventory reports. These reports may, in turn, affect the levels of funding received for these facilities.

#### **11.1.1 How to Inventory Park-and-Ride Facilities**

The suggested frequency for collecting utilization data as shown in Table 11-1 is recommended to determine the fluctuations in usage over the year and to gain an accurate assessment of actual usage. The inventory should be scheduled during non-holiday weeks preferably between

Tuesday and Thursday, but Monday is also acceptable. Counts should not be scheduled for Fridays because utilization has been observed to drop dramatically on this day of the week. One suggestion is to coordinate parking counts with the Transportation Statistics Office so temporary traffic counters can be placed at entrances and exits of Park-and-Ride facilities from one week to a month to capture accurate counts of vehicle traffic to and from the facility. This tactic would work best at Park-and-Rides that are not joint use facilities or otherwise shared. CCTV cameras installed at Park-and-Ride facilities may help with security at these locations in addition to assisting with live documentation of utilization and facility lighting. Written reports, and where possible, augmented by pictures, greatly assist the formulation of well-documented data, as well as aiding in addressing particular site issues.

When inventories are being conducted, it is best to create and follow a plan that will allow the most efficient use of staff hours. With forethought, to save time and energy, one can identify the most efficient routes and sequence for visiting the Park-and-Ride facilities. It is recommended that a survey form for each individual Park-and-Ride facility be prepared ahead of time. This would allow the person conducting the inventory to simply print out the evaluation forms for the lots they will visit on a given day and fill in the necessary information. If an electronic form of media is being utilized, having a data collection web tool, such as described in Section 11.4, will prove even more efficient by reducing additional staff hours and paperwork required. It may take some time to create the customized forms for Park-and-Ride lots; however, once they are created they can be continually used from that point forward with only minor changes or corrections needing to be implemented with time. It is recommended that a master evaluation format be established for all Districts to utilize and customize for their area. This would keep the collection of information and reporting format relatively standard across the state. A sample survey form used for obtaining feedback from local users of a Park-and-Ride facility can be found in Appendix E.

Results of the facility inventory work performed in the past indicated that all spaces at joint use lots tend to be included in the space counts, even though not all spaces are eligible for use by Park-and-Ride vehicles. This has the effect of understating utilization and can give a false reading regarding the level of success of a facility. The field survey technicians will need to be given special instructions to obtain the correct number of spaces for these types of facilities. Possible options to make inventorying or evaluation easier for joint or shared use lots may include having specific areas designated for Park-and-Ride use clearly marked with signage, or inversely, spaces not eligible for Park-and-Ride vehicles marked with signage. Stickers, decals, or permits could be assigned specifically for those using facilities for Park-and-Ride use (especially in parking garages).

Another option for limited access facilities with a gate or kiosk can be to program a request to identify Park-and-Ride user of the facility when obtaining entrance. A peak hour visual survey could be periodically completed that would assist in determining the percentage of patrons walking to adjoining development, as well as the percentage utilizing mobility services. In addition, local transit service providers keep ridership records which can be requested to determine how many people are utilizing transit from Park-and-Ride locations. This information should assist in determining joint use parking utilization.

Inventories should include the following items summarized in Table 11-1:

- Number of short-term, long-term, accessible, motorcycle, and bicycle parking spaces (Note that bicycle parking should be counted by number of spaces available rather than by number of racks)
- Number of parked vehicles in short-term, long-term, accessible, motorcycle, and bicycle

- parking spaces
- Number of illegally parked vehicles
- Pavement condition inventory
- Traffic control device inventory
- Number and types of complaints
- Number and types of accidents related to the Park-and-Ride facility
- Land use on property adjacent to the site
- Accessibility of the facility to transit

**Table 11-1: Performance Evaluation Input Data Specification**

Data Element	Evaluation Type	Collection Frequency	Unit of Measurement
<b>Spaces by type<sup>1</sup></b>	Capacity	On file	Number
<b>Parked vehicles by space type<sup>1</sup></b>	Usage	2 times per year	Number of vehicles
<b>Illegally parked vehicles</b>	Capacity	2 times per year	Number of vehicles
<b>Pavement condition</b>	Maintenance	2 times per year	Extent/severity of issue (i.e. cracking, potholes, raveling, patching, rutting, or spelling)
<b>Traffic control device inventory</b>	Safety	2 times per year	Type and condition both on and off site
<b>Complaints</b>	Capacity, safety, maintenance, illegal parking	Continually (or at least 2 times per year), Summarized annually	Number by type
<b>Accidents related to the facility</b>	Safety	1 time per year	Accidents by type
<b>Adjacent property inventory</b>	Expandability	1 time per year	Land use type and amount
<b>Accessible transit service</b>	Service adequacy	Once per year or as required	Type(s) of service, stop locations

<sup>1</sup> Space types include long-term, short-term, accessible, motorcycle, and bicycle parking

**Illegal Parking:** Counts of illegal parking is a subjective assessment. Telltale indications include posted for sale signs, commercial vehicles, junk autos, and single vehicles that are conspicuously parked in vacant areas of the Park-and-Ride facility. Interviews with the maintenance office responsible for the facility can also assist in identifying the incidence of illegal parking.

**Pavement Condition:** Pavement condition should be analyzed by trained and experienced evaluators. Assessments will need to be made on the extent and severity of the various factors which can determine maintenance needs of the base and pavement structures.

**Traffic Control Devices:** The inventory of traffic control devices will be used to assess the

adequacy of access and internal circulation control and safety. The inventory should include off-site devices which affect vehicles accessing the Park-and-Ride facility.

**Complaints:** A log of complaints for each Park-and-Ride facility should be kept and summarized on an annual basis. Such a log can be an effective means of identifying problems at a facility which would otherwise go unaccounted. A number of different departments in the locality should be coordinated with to obtain an accurate assessment of possible problems, as these agencies and offices may also receive complaints. Agencies to coordinate with include:

- County public works
- County traffic engineer
- City traffic engineer
- FDOT Maintenance Office
- FDOT Traffic Operations Office
- FDOT Planning Office

It is recommended that facilities post a sign with a phone number for people to call if they note any maintenance issues, or for any comments, complaints, or suggestions. Periodic user surveys, including surveys of transit operators, will also assist in keeping up with comments from the public, including problems and recommendations in regard to a facility.

**Accident Data:** Information on accidents that may occur in or near the facility should be collected on an annual basis. This data is used to assess safety problems related to facility access and egress. Low value property damage only accidents may not be contained in the police reports, but other reports should be available. Complaints received by the FDOT may help to isolate safety problems. Interviews with the police department having jurisdiction in the area where a Park-and-Ride facility is located can aid in assessing traffic safety problems.

Information related to the types of land use adjacent to the facility will not be needed until after the performance evaluation stage of the process. However, this information should be collected at the time the utilization counts are performed for the sake of efficiency. The inventory should extend up to 1,000 feet away from the facility with the actual distance dependent upon the location and size of the existing facility. An accompanying sketch is recommended.

**Transit Services:** It should be noted during the inventory whether transit services are provided to the Park-and-Ride facility being evaluated. The local transit providers should be able to provide accurate information regarding stop locations, types of services provided, headways, and counts of passengers getting on and off at the particular transit service locations. Bus stop amenities available to passengers must be documented during each inventory. Transit service stop locations both in, and adjacent to, the facility should be noted, and whether they are accessible as required by the Americans with Disabilities Act (ADA).

## 11.2 EVALUATING PERFORMANCE

A yearly effort by the District Park-and-Ride Coordinator is to gather, evaluate, and analyze the results of the inventories. Evaluating the performance of each facility in comparison to past utilization rates may provide a pattern or trend for use which may be projected forward. Depending upon how a facility is performing, several actions may be taken, such as closing the lot, combining nearby Park-and-Ride lots, promoting the lot, expanding facilities, or simply taking the “do nothing” option. Evaluating performance allows the Coordinator to keep track of how lots

are performing in order to address items such as maintenance issues, comments, concerns, lot improvements, and expansion.

### **11.2.1 How to Evaluate Performance of a Park-and-Ride Facility:**

Performance evaluations conducted on an annual basis are recommended to assess the level of success of each facility in the system. The results will include the determination that the facility is:

- Under-utilized and should possibly be closed or disposed of
- Operating marginally well, but could possibly experience higher usage with some modification in supporting facilities or services
- Is operating well, but experiences an important deficiency in operation which should be corrected
- Operating adequately with no further actions required
- Over utilized and needs corrective action

Table 11-2 presents performance measures and associated operating standards which are useful in making the above determinations. The intent of this evaluation is to determine if corrective actions are warranted and if further investigations are necessary.

The performance measures suggested at this level of analysis are relatively straightforward since they are used to trigger additional studies. In spite of this, those measures shown in Table 11-2 must not be used solely at face value. Percent utilization has been found to not always reflect actual conditions, particularly at joint use lots. Low utilization percentages can result from including parking spaces not specifically designated for Park-and-Ride users in the space counts. High utilization percentages can be derived from counting illegally parked vehicles or vehicles associated with use of other services located at the joint use lot. Every effort must be taken to accurately collect meaningful data at the site.

**Table 11-2: Performance Evaluation Criteria**

<b>Assessment</b>	<b>Performance Measure</b>	<b>Suggested Operating Standard</b>	<b>Potential Corrective Actions</b>
<b>Unsatisfactory operation</b>	Parked vehicles Percent utilization	<10 vehicles <10%	Close Dispose
<b>Marginal operation</b>	Parked vehicles Percent utilization	10-20 vehicles 10-60%	Added transit service Transit amenities Added promotion Improve access Improve security
<b>Operating deficiency</b>	Complaints Accidents/traffic safety Pavement conditions Signing conditions Illegal parkers Security	Number based on nature of complaints >1 per year Unsatisfactory Unsatisfactory >3 per month >1 incident per year	Based on nature of complaints Traffic engineering measures Patch, repave or reconstruct Replace, add new signs Increase enforcement Increase enforcement
<b>Satisfactory operation</b>	Parked vehicles Percent utilization	>20 vehicles 60-80%	NA
<b>Over utilized</b>	Percent utilization Facility size	>80% >30 spaces	Modify geometrics, striping Expand Construct on new site

(Note: 1. See text regarding the use of utilization for facilities which have been intentionally over-designed. 2. Performance evaluation criteria are dependent on lot type.)

Two performance measures, number of vehicles and percent of utilization, are suggested for evaluation. Percent utilization alone does not accurately reflect actual operations. For example, low utilization values can be produced at a large facility even though a large number of vehicles are parking there. Consequently, the number of vehicles parked, combined with percent of utilization provides a more realistic assessment of operational performance. These values must be reviewed in the light of agency development policies. Low utilization may be a designed feature of a facility where future demand is expected to increase.

The suggested operating standards shown in Table 11-2 serve as threshold values for determining the operating status of a Park-and-Ride facility. The District Park-and-Ride Coordinator must use discretion in using these standards. Conditions at the site, as well as the policies of the operating agency, must be considered. For example, some jurisdictions consider utilization of only one vehicle enough to keep a facility open and operating. Others believe that only 10 to 20 vehicles using a facility does not warrant corrective actions.

**11.3 REPORTING**

Each October, the District Park-and-Ride Coordinator is required to provide a report, including a summary of inventory results, to the Central Office Grants Manager regarding the performance of Park-and-Ride lots in their District. This keeps the Central Office aware, and able to report on the performance of the Park-and-Ride program. This enables the Central Office to address any issues or trends they may be observing in regards to the Park-and-Ride Program at a macroscopic level.

## 11.4 USING A WEB TOOL

Establishing a web tool can greatly increase the efficiency of the Park-and-Ride Program. An electronic web-based program can provide a convenient location to enter, store and analyze the Park-and-Ride data to assist in asset management, inventory, and reporting. Appendix G contains a sample of what a web tool could look like and the possible functions it could handle to more efficiently collect, analyze, and report on existing Park-and-Ride lots. Having such a web tool linked with a Geographic Information System (GIS) would further increase the usefulness and efficiency of communications and information sharing. The following are features that would be beneficial to include in a well-rounded web tool to streamline information collection and sharing between the FDOT District Offices and the Central Office, and for other reporting needs.

1. Ability to upload pictures and a description of each picture to help set the viewer's perspective.
2. Ability to create a variety of graphs derived from information inputted into the system.
3. Ability to locate Park-and-Ride lots on an aerial with some form of commercial mapping program.
4. An overall interactive map with ability to search for the nearest Park-and-Ride lots by District or from a particular city or zip code. Clicking on a Park-and-Ride lot would take you to that lot's information page. This web-based system could be developed similar to the Florida's Public Airports map with detailed data for each site when it is clicked on. An example of this is shown in Figures 11-1 and 11-2.
5. A master data input form so a complete summary page can be produced for each Park-and-Ride lot to include: name, location, driving directions (including the best way to access the lot), address, GIS coordinates, parcel number, owner, type of lot, maintaining entity, aerial view, pictures, maintenance and safety needs, parking capacity, types of transit services, current amenities and their quantities, signage, drainage, fencing, security, lighting and any other category of useful information. Park-and-Ride lot user comments worthy of note, a wish list of future amenities, available spaces, data from inventory reports on utilization, condition of existing elements, and a place to add inventory review comments would also be beneficial. Additionally, intermodal services should be indicated, preferably with specific route information servicing that lot, if applicable.
6. Ability to access archives and past inventory report information.
7. Ability to produce basic summaries or full detailed reports on the Park-and-Ride lots by District, by selection of only certain Park-and-Ride lots, or by all Park-and-Ride lots.
8. A report generator with the ability to select information desired for comparison within a given summary of certain Park-and-Ride lots.
9. Ability to print out evaluation forms with some information pre-filled for use during inventory.
10. Once information is entered or updated for each inventory, the ability to edit at a later date, if needed. (Perhaps with limited editing permissions to certain authorized employees.)
11. Automatic generation of an email to maintenance personnel once maintenance requests are entered. This feature would need to be coordinated not only with the District Maintenance Office, but also with other entities with a valid Maintenance Agreement.
12. Other important information, such as when contracts or agreements regarding shared use or ownership by another entity are about to expire so necessary actions may be taken to either renew or make other arrangements and handle the Park-and-Ride lot accordingly.

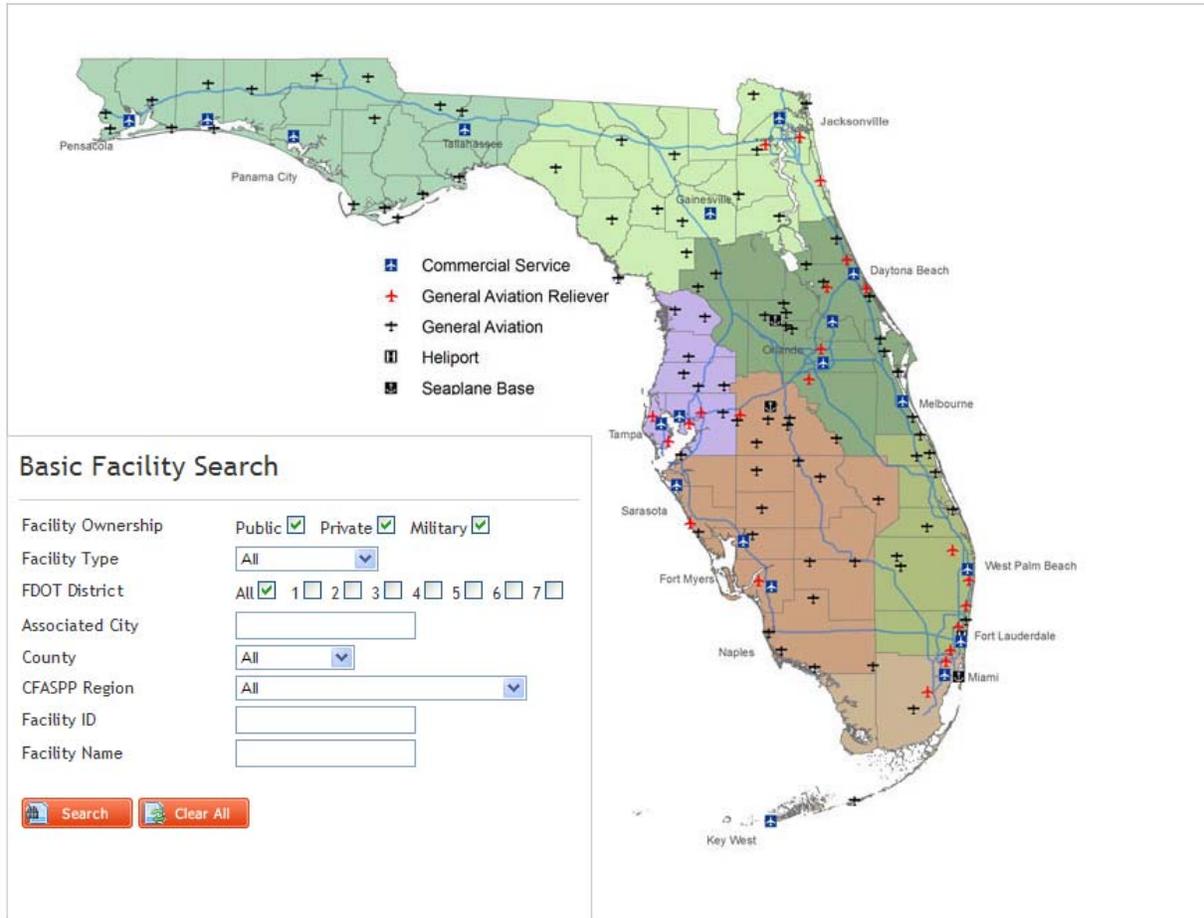
13. Automatically generate an email to reviewing personnel in the Central Office once Districts have inserted and uploaded new data for review.
14. If review is necessary, email reminders should be generated periodically until the review has been completed with some kind of electronic sign-off.
15. Ability to contact technical support personnel, Central Office and District personnel – both in transportation and maintenance offices. Contact information provided should include name, title, email address, phone number, and other pertinent information.
16. Include contact information of those who have shared use or sole ownership agreements with regard to the Park-and-Ride lots in each District. This may be valuable information on the particular lot's webpage.
17. Ability to print to softcopy or hardcopy, and a method to easily transfer data to an Excel spreadsheet.
18. A place for personnel to recommend areas or ideas to improve or build new Park-and-Ride lots.
19. Easily identify lots that are experiencing poor utilization so marketing measures can be employed to promote ride-sharing and increase public awareness.
20. Ability to collect information based on most recent reports to identify lots that need major maintenance such as resurfacing so appropriate funding can be set aside to address such needs.
21. Line graphs for gas price comparisons over the time period the lot has been operational.
22. A web tool page with an introduction to Park-and-Ride resources, procedures, and guidance for new personnel becoming involved with the Park-and-Ride program.

Inventory results could be immediately added to the database directly from the field by using smart phones, laptops, or tablets to connect to an internet-based web tool. This would reduce the amount of paperwork necessary for inventorying, the amount of time involved in the collection process, and the number of copying errors; thus overall increasing the efficiency and accuracy of data collection, while decreasing the amount of staff hours needed to accomplish these tasks.

Not only would this tool simplify the inventorying process, it would also increase the ease and efficiency of evaluating performance of Park-and-Ride lots from a site specific, district, or state-wide basis. Park-and-Ride lots in need of attention, maintenance, improvements, or upgrades can be made to stand out by prompting alerts when needs are reported. Facilities in need of major repairs or maintenance, such as repaving, can be automatically added to a list generated for tracking projects in need of funding. Maintenance needs can be more readily addressed by automatically sending emails to proper recipients to facilitate maintenance. Finally, the web tool could also be used to generate reports to submit to the Central Office. The Central Office contact, in turn, could use the web tool to generate a report to provide to the FTA, or any other agency requiring such a report or documentation on performance. This will also assist with periodically conducting an overall Park-and-Ride Program evaluation. See Chapter 12 of this document for more information on the Program Evaluation.

## Florida's Public Airports

Select an airport below for facility information or click anywhere on the map to ZOOM IN for a closer view :



**Figure 11-1: Example of Florida’s Public Airport Map as Possible Use for Park-and-Ride Lots**  
(FDOT Aviation - Airport Facility Map)

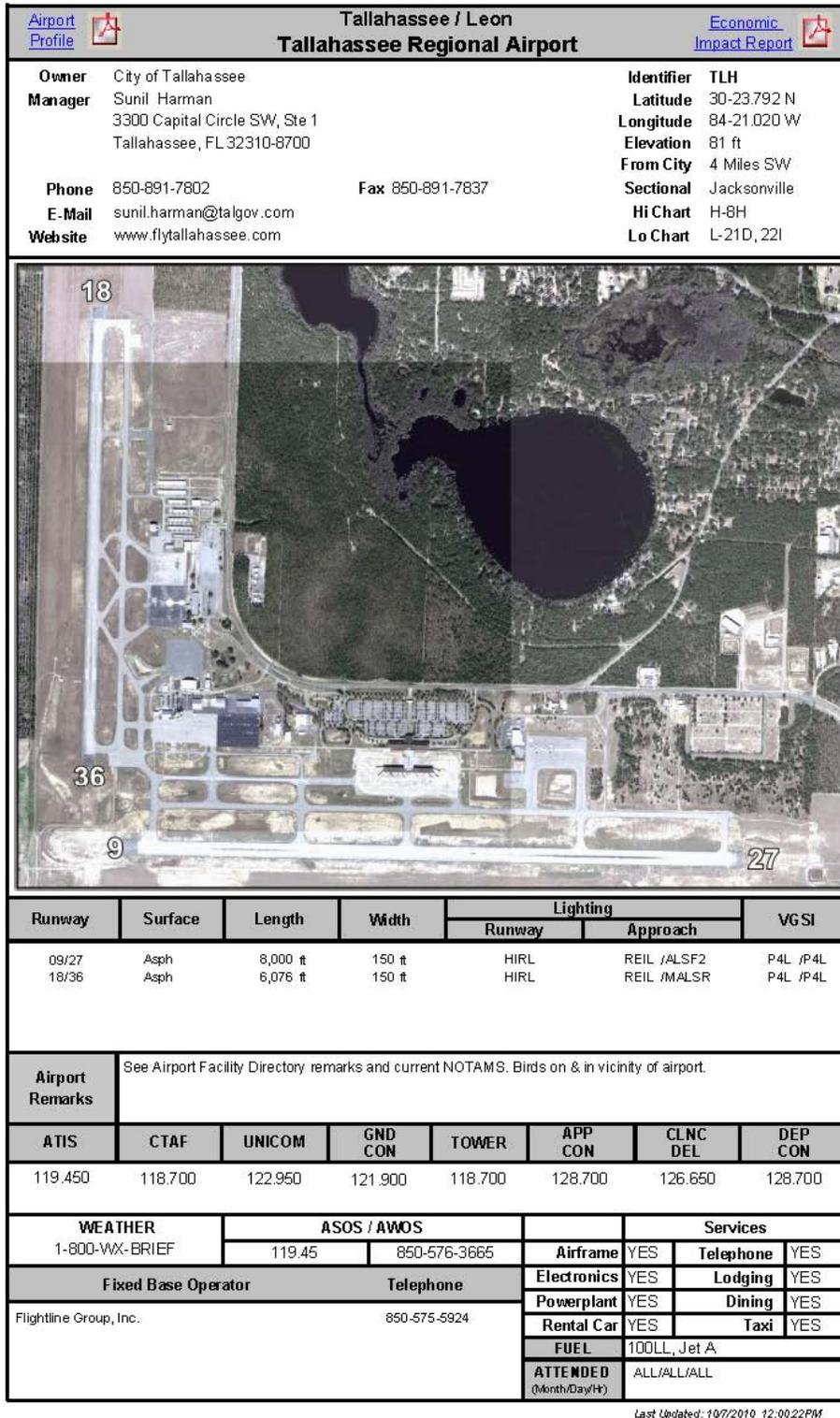


Figure 11-2: Example of Florida's Public Airport Detailed Site Map for Potential Park-and-Ride Lot Usage (FDOT Aviation - Airport Facility Map)

## CHAPTER 12: PROGRAM PERFORMANCE EVALUATIONS

### 12.0 GENERAL

A periodic assessment of the Park-and-Ride Program on a state, district, and local level will determine how the Program has performed over time, where it stands presently, and to identify the direction it should take in the future. This chapter presents assessment measures for use in analyzing the Program. The performance measures presented herein are useful for:

- Assessing impacts and user benefits produced by the program
- Assessing program effectiveness
- Assessing program management capabilities and concerns
- Preparing annual budget requests

A performance matrix presented in Tables 12-1 and 12-2 considers the program level and the area of application. Once the program has been assessed, further actions may be taken for course correction in any specific areas which need attention, or new goals may be set for future achievement. By comparing current evaluations with the past, performance patterns may be identified which assist with decision making processes.

Summaries from the Districts are to be provided to the Florida Department of Transportation (FDOT) Central Office annually with a report on inventories, the current long-range plan, and should also address management and budgeting as discussed in this chapter. Every three to five years, the Central Office will collect the provided information and do a more elaborate evaluation based on information contained in this chapter and that which was provided by the Districts. This information, in turn, will be provided back to the Districts.

### 12.1 APPLICATION AREA DESCRIPTIONS

Application areas vary by the level of government in which the evaluation is being considered (i.e., state, district, or local government). The Statewide Park-and-Ride Program is primarily concerned with funding, statewide impacts and benefits, improving coordination within the FDOT, management, and technical support. The FDOT District offices tend to be concerned with facility development and management. Local transit providers are concerned with issues related to enhancing ridership and productivity of the transit system. The following descriptions address the issues that are typically considered during program evaluations. These issues relate to four categories of application including:

- Impact Assessments
- Program Assessment
- Management
- Budgeting

#### 12.1.1 Impact Assessments

Impact assessments, as they apply to the Park-and-Ride Program, measure the effects facilities exert on transportation operations, economic factors, and the environment. Objectives of impact assessments are to identify the increase in transit usage, auto occupancies, carpool formation, Park-and-Ride lot utilization and/or the decrease in Vehicle Miles of Travel (VMT), delay, fuel consumption, and its contribution in meeting air quality standards, to name a few. Typical questions that might be addressed by impact assessments at the program level include:

- What direct benefits are Park-and-Ride users, the state, districts, and local Metropolitan Planning Organizations (MPOs) or local transit agencies receiving from the program?
- What percentage of commuters are benefiting from facilities provided by the program statewide?
- Have increases in auto occupancy or transit usage been realized as a result of the program?
- What air quality impacts have been produced?
- Have savings in fuel consumption has been realized in the state?
- Do the impacts indicate that program targets and goals were met successfully as determined by the previous analysis? If not, how can this be improved? Are the expectations realistic?

### **12.1.2 Program Assessment**

Program assessments evaluate the effectiveness of the Park-and-Ride Program, particularly in regard to monetary expenditures compared with the benefits and results produced. Typical questions that are addressed include:

- What rate of new lot production has the Park-and-Ride Program realized?
- Are the realized benefits from the current level of funding effective, adequate, or inadequate?
- What significant benefits have accrued from the existing Park-and-Ride facilities?
- What are the benefits of a given implementation or remedial action over another?
- Does the effectiveness of the program meet program assessment expectations as determined by the last analysis? If not, how can improvements be implemented? Are the expectations realistic?

### **12.1.3 Management**

Program management evaluations should reflect management related concerns and objectives such as productivity, maintenance, risks, coordination, liability, security, and monitoring of the various operating components of the program. Performance measures are identified in Table 12-1. Typical management aspects and questions needing consideration include:

- Are there any comments, suggestions, or complaints that have been received since the last analysis that still need to be addressed?
- Is maintenance of the facilities being properly followed through on to maintain an expected level of lot safety and utilization?
- Have the rates of accidents, police-related incidents, and illegal parking decreased since the last analysis? If not, what can be done to increase security, safety, and reduce liability?
- Have reports, data collection, and coordination between FDOT and other agencies (as well as within the FDOT itself) been effectively received and communicated?
- Can management resources such as time and money be more efficiently utilized on the state, district, and/or local levels?
- Has a Long-Range Plan been established to prioritize, organize, and track construction of new lots, major maintenance, and upgrades? Is it on track? If not, how can course correction be implemented?

#### **12.1.4 Budgeting**

Quantifying the benefits of a Park-and-Ride lot justifies the expense of constructing, maintaining, and improving these facilities. Typically, budget justification consists of defining related labor costs of the existing positions required to facilitate the program by coordinating offices, evaluations, and maintenance of the lots in a given district. This type of budgeting process will possibly change in the future, either as the result of additional funds becoming available or as a result of funding constraints. Additional funding creates the need for evaluating current position levels and then determining the need for additional managerial support. Adding staff would also require new position descriptions and identification of the qualifications required to perform given duties. As a result, the budget would then be modified to accommodate these additional needs. Funding cutbacks logically require additional justification to maintain current staffing levels. In addition to supporting staff, budgeting should include consideration of lot operating costs, maintenance, and periodic improvements or upgrades. The possible development of a web-based data collection database would be beneficial as described in Section 12.2. Performance measures are identified in Table 12-2.

### **12.2 PROGRAM PERFORMANCE EVALUATION MEASURES**

Tables 12-1 and 12-2 present a set of performance measures relevant to program level analyses. These tables show the application area, level of evaluation, information/data necessary for analysis, and data sources for each performance measure. These measures can be utilized on any given level of evaluation. For example, computation of VMT for assessing the impacts associated with a program could be computed based on all facilities in the State of Florida, the District, or in the local area depending on whether the statewide, District or local Park-and-Ride agency is performing the evaluation. The identified measures for impact assessments could be applied at a facility level of analysis; however, site level analyses should be performed in a much greater degree of detail than proposed here for program level evaluations. A properly designed web-based data collection tool would greatly increase efficiency, accuracy, and control of the program. With a web-based tool, program management would have immediate access to ongoing data and statistics, which would aid in determining Park-and-Ride Program health. The data specified in Tables 12-1 and 12-2 reflects the macroscopic view at which program evaluations are performed.

**Table 12-1: Program Performance Evaluation Measures: Management**

Measure	Level	Information/Data for Analysis	Information/Data Source	Specific Application Area
Per Space Cost of Facility Development	District	Construction costs	Construction management office	Production Management
	Local	Lease costs	Operations/budget/fiscal office	
Project Development and Environment (PD&E) Roadway Projects Reviewed by Transit Office	Statewide	Number of projects reviewed and not reviewed at PD&E stage	Programming	Production Coordination Management
	District		Internal records	
Percent of Total PD&E Projects Reviewed by Transit Office	Statewide	Number of PD&E projects reviewed and not reviewed	Programming	Production Coordination Management
	District		Internal records	
Number of Joint Participation Agreements (JPAs) Signed Versus Those That Were Planned	Statewide		Contracts office	Implementation Management
	District	Number of signed JPAs		
	Local			
Total and Per Space Value of Claims	District	Value of paid claims	Budgets/fiscal office	Risk Management
	Local	Number of spaces	Inventory	
Total and Per Space Tons of Mix Used in Facility Rehabilitation	District	Maintenance records	Maintenance office	Maintenance Management
	Local	Number of spaces in system	Inventory	
Distribution of Spaces by Pavement Condition Index	District	Condition indices	Maintenance office	Maintenance Management
	Local	Number of spaces	Inventory	
Number of Unauthorized Parkers on Existing Facilities	District	Counts	Office responsible for counts	Maintenance Management
	Local			
Maintenance Cost of Illegal Parking in Unauthorized Locations	District	Maintenance costs	Maintenance office	Maintenance Management
	Local			
Number of Police Reports by Incident Type	District	Police reports	Police department	Security Management
	Local			

**Table 12-2: Program Performance Evaluation Measures: Budgeting**

Measure	Level	Information/Data for Analysis	Information/Data Source
Dollar Value of Programmed Park-and-Ride Projects	District	Work program	Agency programming office
	Local	TIP	MPO
Lease Administration Man-Hours	District	Internal estimates	Responsible agency
	Local		
Number of Congested Corridors With Park-and-Ride Application	District	Adopted planning documents	MPO, Regional Planning Council (RPC) or other local planning agency
Areas Considered for Express Bus Implementation	Local	Internal assessments	Responsible agency
Programmed Spaces Per Program Dollar	District	Work program	Internal records
	Local	Past production history vs. program budgets	Internal records
Programmed Facilities Per Program Dollar	District	Work program	Internal records
	Local	Past production history vs. program budgets	Internal records

NOTE:

- JPA = Joint Participation Agreement
- MPO = Metropolitan Planning Organization
- PD&E = Project Development and Environment
- RPC = Regional Planning Council
- TIP = Transportation Improvement Program

**12.3 OTHER FEEDBACK**

In addition to the review of the qualitative questions and performance measures in Sections 12.1 and 12.2, it is beneficial to periodically conduct a survey of Park-and-Ride users across the state to identify other quantitative measures such as:

- Average automobile occupancy of cars entering the Park-and-Ride lot
- Average automobile occupancy of cars leaving the Park-and-Ride lot
- Average travel distance to the Park-and-Ride lot
- Average travel distance from the Park-and-Ride lot to destination
- Average total commute distance
- Average trip time to the Park-and-Ride lot
- Average trip time from Park-and-Ride lot to destination
- Percentage of each travel mode being utilized from Park-and-Ride lots
- Percentage using carpool/ High Occupancy Vehicle (HOV) lanes as part of the commute

Receiving public feedback about Park-and-Ride facilities provides valuable information in analyzing the Program. Other data can be collected from District inventories to identify, among other things, the overall annual utilization rate across the state, number of new lots implemented, number of total parking spaces, maintenance conditions, and patterns which emerge over time. Sample survey flyers can be found in Appendix E.

## CHAPTER 13: PRIVATE PARTICIPATION

### 13.0 GENERAL

There are many ways to involve the private sector in the development and operation of Park-and-Ride facilities. Extra care and precautionary measures, however, should be taken into consideration when dealing with private participation due to liability, maintenance, and inventory issues for these lots. Developers tend to construct Park-and-Ride lots where they may have excess land, which may not be the best location for utilization purposes. Close coordination should occur between private entities and the Florida Department of Transportation (FDOT) District Park-and-Ride Coordinator to ensure that lots are located in accord with the planned efficient network of strategically placed lots. Maintenance agreements must be negotiated up-front and in place before lots are constructed or opened for Park-and-Ride use. Regardless of whether the private participant or the FDOT will handle maintenance responsibilities, this must be agreed upon in writing before further actions occur. Shared use or joint development facility opportunities may be present at locations with retail, video rental, grocery or convenience stores, dry cleaners, banks, post offices, public services offices, pharmacies, child or pet day care centers, or gas stations.

The catalog contained in this chapter provides a description of several techniques. Information on each method includes:

- The purpose of the action (i.e., facility development, provision of ancillary services, funding)
- Responsibilities of the FDOT in using the technique
- Description of participant responsibilities
- Types of facilities to which the technique is applicable
- Potential benefits that can result from the action
- Barriers to utilizing the technique
- Identification of agencies, if any, that have experience in the use of the technique

The catalog is presented from the perspective that the techniques are applied to reduce the financial burden of the FDOT. Local agencies may make use of the catalog with the caveat that their perspective will most likely differ from that of the FDOT and will necessitate some changes to the descriptions to represent that perspective.

The majority of techniques presented in the following pages are applicable to development of new facilities. A few are presented that are more applicable to other purposes such as generating construction revenues and providing ancillary services that can promote usage of existing facilities. Some of the techniques have formidable barriers to their effective use in Florida. Such barriers include gaining organized labor endorsement and passing amended development ordinances. In addition, certain conditions may need to exist for effective use of the technique; these conditions are described, where applicable. Not all techniques are appropriate for all types of facilities. For example, formation of a parking authority can only work in areas where parking fees can be assessed, which implies application to a Central Business District (CBD) or similar peripheral facilities.

Table 13-1 summarizes the most important information concerning the implementation of each of the techniques presented in this chapter. The table shows the purpose of application,

assessments of the implementation potential resulting from legal and institutional barriers, and qualitative appraisals of the potential cost savings in utilizing each of the techniques presented.

**Table 13-1: Private Participation Techniques Summary**

<b>Technique</b>	<b>Application</b>	<b>Implementation Potential</b>	<b>Legal Barriers</b>	<b>Institutional Barrier</b>	<b>Potential Public Cost Reduction</b>
<b>Joint use of local agency facility</b>	Facility development	High	Minimal	Moderate	Significant
<b>Joint use on non-profit land</b>	Facility development	High	Minimal	Moderate	Significant
<b>Joint use with compatible private use</b>	Facility development	High	Minimal	Moderate	Significant
<b>Joint use of shopping center lot</b>	Facility development	High	Minimal	Moderate	Significant
<b>Preferential High Occupancy Vehicle (HOV) parking credits</b>	Provision of amenities	High	Moderate	Moderate	No reduction
<b>Vendors permits</b>	Provision of amenities	High	Moderate	Moderate	Slightly negative
<b>Sale of surplus Right-of-Way (ROW)</b>	Facility development	Moderate to high	Minimal	Moderate	Significant
<b>Impact fees</b>	Facility financing	Moderate to high	Moderate	Moderate	Moderate to significant
<b>Off-site parking substitution</b>	Facility development, financing	Moderate to high	Moderate	Moderate	Moderate
<b>General partnership</b>	Facility development, financing, operation	Low to moderate	Moderate	Considerable	Moderate to significant
<b>Transportation Management Association (TMA)</b>	Facility development, financing, operation	Low to moderate	Moderate	Considerable	Moderate to significant
<b>Developer land contribution</b>	Facility development	Low to moderate	Considerable	Moderate	Moderate to significant
<b>Parking authority</b>	Facility development, financing, operation	Low	Moderate	Considerable	Significant
<b>Parking condos</b>	Facility development, financing	Low	Moderate	Considerable	Significant
<b>Contract with private transit provider</b>	Provision of services	Low	Considerable	Considerable	Moderate

Technique	<b>JOINT USE OF LOCAL AGENCY FACILITY</b>
<b>Concept</b>	Local government provides land to construct parking of which part is agreed to be used for Park-and-Ride. Alternately, local government agrees to allow use of existing facility. Local government provides maintenance while the FDOT constructs or improves.
<b>Purpose</b>	Facility development.
<b>FDOT Responsibilities</b>	Design, construction, physical improvements.
<b>Participating Agency Responsibilities</b>	Land and maintenance provided by government agency including, but not limited to, city/county offices, city halls, courthouses, community colleges, parks, schools, and libraries.
<b>Benefits</b>	Low FDOT cost since ROW purchase is not necessary. Community receives improvement to public facility at nominal cost.
<b>Applicable Facilities</b>	No restriction. Technique appears to be most often used in rural areas. Public facilities needing paved parking are likely located in rural areas.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Design must include enough spaces to accommodate the needs of both the public facility and the Park-and-Ride operation.</li> <li>2) Needs Joint Participation Agreement (JPA).</li> <li>3) Urban area sites will probably not need significant improvements. Effort will be largely related to negotiating use of existing, improved facilities.</li> <li>4) Types of applicable public facilities include city halls, courthouses, government offices, parks, schools, libraries, community colleges.</li> <li>5) Potential for parking conflicts if public facility has high daytime use.</li> </ol>
<b>Barriers to Effective Implementation</b>	None, other than the limited number of opportunities.
<b>Agency Contacts</b>	Metro-Dade Transit Hillsborough Area Regional Transit Authority District 3 Public Transportation Office (PTO) District 7 PTO West Florida Regional Planning Council

<b>Technique</b>	<b>JOINT USE ON LAND PROVIDED BY NONPROFIT ORGANIZATION</b>
<b>Concept</b>	Nonprofit organization is approached to negotiate use of part of parking area for Park-and-Ride. Implementing agency provides improvements and pays nominal lease amount.
<b>Purpose</b>	Facility development.
<b>FDOT Responsibilities</b>	Design, construction, physical improvements.
<b>Participant Responsibilities</b>	Land and maintenance provided by fraternal organization, private college/university, or similar nonprofit organization with adequate daytime parking supply.
<b>Benefits</b>	Low implementation cost for FDOT. Slight monetary benefit to nonprofit through lease value with greater benefit if improvements are made by the FDOT. Most significant benefit related to providing public service.
<b>Applicable Facilities</b>	No restriction.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Types of organizations include private colleges/universities, fraternal organizations.</li> <li>2) Lease or use agreement is necessary.</li> <li>3) Sites may not be adequately located or sized.</li> <li>4) Lease terms may obligate the FDOT to pay a premium for added liability coverage.</li> </ol>
<b>Barriers to Effective Implementation</b>	Lease terms must be consistent with state legislation and/or local laws.
<b>Agency Contacts</b>	Southeast Michigan Area Regional Transit Michigan Department of Transportation

Technique	<b>JOINT USE WITH COMPATIBLE PRIVATE DEVELOPMENT</b>
<b>Concept</b>	Existing development is approached to negotiate use of a portion of the parking area for Park-and-Ride. Implementing agency provides improvements and pays nominal lease amount. Development is of type which has adequate parking during daytime hours.
<b>Purpose</b>	Facility development.
<b>FDOT Responsibilities</b>	Design, construction, physical improvements.
<b>Participant Responsibilities</b>	Provides land and maintenance.
<b>Benefits</b>	Very low implementation cost for FDOT. Slight Operation cost related to nominal lease amount. Slight monetary benefit for development through lease. Most significant developer benefit related to public service provision.
<b>Applicable Facilities</b>	No restriction.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Types of compatible land uses include movie theaters, bowling alleys, dinner restaurants or other uses with predominantly night-time business patterns.</li> <li>2) Bars have been used, but may not be the best affiliation from an appearance standpoint. Restaurants may fall into this category as well.</li> <li>3) Lease agreement is required. Lease terms may require Department to pay for added liability premium.</li> </ol>
<b>Barriers to Effective Implementation</b>	Short-term leases cannot be entered in to if improvements are made such as a regulatory sign or vehicle stops. Developers tend to not want to sign long-term leases.
<b>Agency Contacts</b>	Michigan Department of Transportation

Technique	<b>JOINT USE OF SHOPPING CENTER PARKING LOT</b>
<b>Concept</b>	Existing shopping center is approached to negotiate use of a portion of the parking area for Park-and-Ride. Implementing agency provides improvements and pays nominal lease amount.
<b>Purpose</b>	Facility development.
<b>FDOT Responsibilities</b>	Design, physical improvements.
<b>Shopping Center Responsibilities</b>	Maintenance of public parking area may or may not be negotiated.
<b>Benefits</b>	Very low cost of implementation for FDOT. Questionable monetary benefit for shopping center. Most significant benefit for shopping center related to providing public service.
<b>Applicable Facilities</b>	Urban fringe facilities are most applicable. Urban corridor is an appropriate setting, but more difficult to implement.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Needs lease agreement and possible payment of added premium to shopping center liability policy.</li> <li>2) Shopping centers that are best located for reducing congestion are generally successful and do not wish to cooperate.</li> <li>3) Shopping centers that are typically the easiest to deal with are those with low patronage or newly developed. These facilities tend to be located in urban fringe areas.</li> </ol>
<b>Barriers to Effective Implementation</b>	<ol style="list-style-type: none"> <li>1) Shopping centers are generally difficult to deal with, and are uncooperative.</li> <li>2) Shopping centers may not have been originally designed for transit, which would preclude transit access to the site.</li> </ol>
<b>Agency Contacts</b>	Miami-Dade Transit Jacksonville Transportation Authority Hillsborough Area Regional Transit Authority LYNX (Orlando) LeeTran (Fort Myers) West Florida Regional Planning Council District VII PTO

<b>Technique</b>	<b>REDUCTION IN REQUIRED SPACES FOR PROVISION OF HOV PARKING AT DESTINATION</b>
<b>Concept</b>	Create demand for carpools by giving preferential parking at destination.
<b>Purpose</b>	Increase usage of existing facilities.
<b>FDOT Responsibilities</b>	None.
<b>Participant Responsibilities</b>	Local government provides space allowances through development review process. Developer designates carpool only parking- spaces in a preferred location.
<b>Benefits</b>	Developer benefits from reduced parking requirement. Provides impetus to form carpools which may result in higher usage of facilities.
<b>Applicable Facilities</b>	Facilities in major travel corridor.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Necessitates extraordinary conditions to produce significant increases in lot usage.</li> <li>2) Should be packaged with other initiatives such as ridesharing promotion to gain significant impact.</li> <li>3) Needs to be applied over a significant area to produce noticeable impacts.</li> </ol>
<b>Barriers to Effective Implementation</b>	Amendments/adoption of development ordinances and zoning codes will need to be made.
<b>Agency Contacts</b>	City of Sacramento Planning Department Sacramento County Planning Department Village of Schaumburg, Illinois City of Seattle Department of Construction and Land Use City of Roseville (California) Planning Department

Technique	<b>USER PERMITS TO VENDORS AT PARK-AND-RIDE LOTS</b>
<b>Concept</b>	Increase facility usage through provision of ancillary support services (i.e. catering trucks and florists)
<b>Purpose</b>	Provision of amenities to increase usage.
<b>FDOT Responsibilities</b>	Grants use permits to vendors wishing to do business at parking facilities.
<b>Participant Responsibilities</b>	Licensed vendors provide services at facilities during commuting hours. Needs coordination with local government issuing business licenses.
<b>Benefits</b>	Improves facility amenities at little cost. May create problems with local retail establishments near the site.
<b>Applicable Facilities</b>	No restrictions other than large facilities will be the most attractive to the vendors.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Special permission needed for joint use lots.</li> <li>2) Facilities large enough to provide sufficient business to vendor.</li> <li>3) Consideration for local businesses that may already be providing services to be dispensed by vendors.</li> </ol>
<b>Barriers to Effective Implementation</b>	Enabling legislation needs to allow for use of state property for private gain. Local establishments may contest competition from vendors.

<b>Technique</b>	<b>SALE OF SURPLUS RIGHT-OF-WAY</b>
<b>Concept</b>	Government unit negotiates Park-and-Ride lot construction in terms of sale of surplus ROW.
<b>Purpose</b>	Facility development.
<b>FDOT Responsibilities</b>	Sells surplus ROW of interest to developers, and negotiates Park-and-Ride facility as sale terms for reduced sale price.
<b>Participant Responsibilities</b>	Purchases land and constructs parking facility in conjunction with new development.
<b>Benefits</b>	Liquidation of surplus property and construction of facility at no cost since land has already been purchased. Developer acquires value property at reduced price.
<b>Applicable Facilities</b>	No restrictions, but most applicable to urban corridor lots in attracting development.
<b>Special Considerations</b>	1) Parcel size must be large enough to support development. 2) Access will likely be a problem and will need to be resolved.
<b>Barriers to Effective Implementation</b>	Availability of parcels of sufficient size and location to attract development. Concurrency in congested corridors.
<b>Agency Contacts</b>	Michigan Department of Transportation

Technique	<b>DEVELOPER IMPACT FEE ASSESSMENTS</b>
<b>Concept</b>	New development supports Park-and-Ride through payment of impact fee assessments. Basis of assessment can include cost of Park-and-Ride facilities or may only be based on roadway improvement costs.
<b>Purpose</b>	Facility financing.
<b>FDOT Responsibilities</b>	Potentially none, but depends on situation. Collection and use of impact fees responsibility of local government. JPA will be needed to involve the FDOT.
<b>Participants Responsibilities</b>	Local government collects impact fee from developer. Fee calculation may include cost of the Park-and-Ride facility if stipulated in impact fee ordinance. Local government may likely need to provide transit service to support the justification of the impact fee.
<b>Benefits</b>	Funding provided by private development. Time for accrual of total fees will be long, which suggests that expedited construction might not occur. Government will still need to capitalize the construction.
<b>Applicable Facilities</b>	Normally urban fringe facilities, since most development occurs in that area; however, may apply to any facility where development is still occurring.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Government may still need to capitalize construction due to the “pay out” schedule dictated by the pace of development in the community.</li> <li>2) Must develop a formally adopted Park-and-Ride facilities plan. At a minimum, Park-and-Ride facility costs must be included in Long-Range Plan road costs upon which impact fees are assessed.</li> <li>3) Technical justification required to support the market area around the facility where the fees will be assessed.</li> <li>4) Must technically support the relationship between the fee and benefit from Park-and-Ride.</li> <li>5) Planned facilities should be located where a reasonable cost can be assessed.</li> </ol>
<b>Barriers to Effective Implementation</b>	Must amend/adopt impact fee ordinance. Must technically justify relationship between assessment and benefit to the payee. May need to formerly adopt Park-and-Ride facilities plan as part of Long-Range Plan depending on the ordinance provisions.
<b>Agency Contacts</b>	Hillsborough County Planning and Zoning Broward County Office of Planning Palm Beach County

Technique	<b>OFF-SITE PARKING SUBSTITUTION</b>
<b>Concept</b>	Parking requirements for new development are reduced in lieu of developer providing or funding parking off-site.
<b>Purpose</b>	Facility development, financing.
<b>FDOT Responsibilities</b>	Potentially none, depending on situation. Collection and use of impact fees responsibility of local government. JPA will be needed to involve the FDOT in construction.
<b>Developer Responsibilities</b>	Local review agency reduces site parking requirement. Developer contributes to parking trust fund or builds off-site parking. Some areas require developer provided shuttle service for off-site parking facilities located further away than walking distance.
<b>Benefits</b>	Lower cost development of facility. Developer receives site approval. Reduced parking requirement means more feasible area for site. Potential concurrency benefits for the developer through reduction of traffic on congested roadway.
<b>Applicable Facilities</b>	Typically peripheral parking for major activity center.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Only applicable to growth areas of the community since development is supporting the effort.</li> <li>2) Potential delayed construction due to time needed to collect funds from all developments.</li> <li>3) Best applied where development will consist of one very large employer with enough employees to support a facility on its own.</li> </ol>
<b>Barriers to Effective Implementation</b>	Local government must amend/adopt development review ordinance.
<b>Agency Contacts</b>	City of Orlando Bureau of Planning and Zoning City of Orlando Traffic Engineering City of Sacramento Planning Department Sacramento County Planning Department Atlantic County (New Jersey) Transportation Authority City of Los Angeles Zoning Department

<b>Technique</b>	<b>GENERAL PARTNERSHIP</b>
<b>Concept</b>	Public/private partnership utilizing the best attributes of each partner to establish parking facilities with maximum benefit to all parties.
<b>Purpose</b>	Facility development, financing, operation.
<b>FDOT Responsibilities</b>	Land acquisition and possibly capitalization of facilities.
<b>Participant Responsibilities</b>	Developer group buys facilities back from the state as development comes on line.
<b>Benefits</b>	FDOT costs related only to land costs. Developers benefit from depreciation and equity of structures.
<b>Applicable Facilities</b>	Structured peripheral parking to a major activity center.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Needs to be located near growth area where developer can be expected to contribute.</li> <li>2) Developer cooperation must exist to form the management committee.</li> <li>3) Congested activity center with parking problems.</li> </ol>
<b>Barriers to Effective Implementation</b>	Formation of the partnership must be accomplished. Florida law does not allow the FDOT to be “paid back” in the manner suggested here. Will probably necessitate local government involvement to gain full benefit of possible financing arrangements.

Technique	<b>TRANSPORTATION MANAGEMENT ASSOCIATION (TMA)</b>
<b>Concept</b>	Nonprofit group of employers, property owners, developers, and government established to pool resources to address community transportation problems, including parking.
<b>Purpose</b>	Facility development, financing, operation.
<b>FDOT Responsibilities</b>	Ex-officio member of management board providing technical guidance and possible funding contributions to construction.
<b>Participant Responsibilities</b>	Supports solution initiatives, finances improvements, provides transit services if any, and provides funding for operation of the technical staff.
<b>Benefits</b>	Takes advantage of strengths of both the public and private agencies involved to implement transportation improvements.
<b>Applicable Facilities</b>	Peripheral facilities to major activity centers.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Well defined area with significant congestion and parking problems.</li> <li>2) Growth area.</li> </ol>
<b>Barriers to Effective Implementation</b>	Area transportation problems need to be perceived as being significant enough to form the association.
<b>Agency Contacts</b>	Westshore Transportation Management Association (Tampa) Orlando Transportation Management Association District 5 PTO District 7 Planning

<b>Technique</b>	<b>DEVELOPER CONTRIBUTES LAND THROUGH DEVELOPMENT ORDINANCE MANDATES</b>
<b>Concept</b>	Large development dedicates land for Park-and-Ride facility through local development review requirement. Construction is negotiated or is responsibility of local regulatory government.
<b>Purpose</b>	Facility development.
<b>FDOT Responsibilities</b>	Will depend on development ordinance. Can range from no involvement to design and construct depending on the situation. Land will be in local government control and will require JPA for FDOT involvement.
<b>Participant Responsibilities</b>	Dedicates land specifically for Park-and-Ride facility through plat/site plan review process. Development of scale to support the future facility.
<b>Benefits</b>	At a minimum, price of land eliminated from public development cost. Potential to have entire cost of project supported by the developer, but is contingent on the development ordinance and negotiations. Developer receives site approval. Other potential benefits include reduced road improvement assessments, satisfaction of concurrency requirement, or impact fee credits depending on the situation and ordinance.
<b>Applicable Facilities</b>	Normally urban fringe facilities, since most development occurs in that area. Any area where the development is of a scale to necessitate the dedication.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Must be able to technically support relationship between development size and ability to support the Park-and-Ride facility.</li> <li>2) May need to include transit service expansion as justification for requiring land dedication for Park-and-Ride. This will provide an incompatibility between when the development has been built out enough to support transit and when the developer demands service that he has provided land for.</li> <li>3) Most applicable to the larger urban areas with a major activity center, significant development occurring or anticipated, and significant roadway congestion, i.e., Miami, Orlando, Jacksonville.</li> </ol>
<b>Barriers to Effective Implementation</b>	Development ordinance will need to be amended and adopted. Parking facility becomes responsibility of the local government where the development is located. Potential conflict with FDOT's implementation goals.
<b>Agency Contacts</b>	Hillsborough Area Regional Transit Authority

<b>Technique</b>	<b>ESTABLISH PARKING AUTHORITY TO DEVELOP PARKING FACILITIES</b>
<b>Concept</b>	A public agency with bonding authority is established with powers to bond, condemn, construct and manage parking facilities in a defined area.
<b>Purpose</b>	Facility development, financing, operation.
<b>FDOT Responsibilities</b>	None.
<b>Participant Responsibilities</b>	Local unit of government establishes separate authority to administer parking in a defined area.
<b>Benefits</b>	Bonding to capitalize development of facilities.
<b>Applicable Facilities</b>	Peripheral facilities adjacent to major activity center.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Requires situation where parking fees can be set at a level to support the bonding.</li> <li>2) Applicable to situations where the parking supply is particularly acute and requires a dedicated staff outside the normal government operation to alleviate the supply problem.</li> <li>3) Large activity centers.</li> </ol>
<b>Barriers to Effective Implementation</b>	Requires establishing another unit of government with bonding capacity.
<b>Agency Contacts</b>	Downtown Tampa Parking Authority

Technique	<b>PARKING CONDOMINIUMS</b>
<b>Concept</b>	Parking spaces at transit terminals are reserved through joint public/private development of parking with individual spaces being sold.
<b>Purpose</b>	Facility development, financing.
<b>FDOT Responsibilities</b>	Similar to other joint development projects. Combines with private investors/developers to plan, design, condemn, and construct parking at transit terminals.
<b>Participant Responsibilities</b>	Depends on arrangement, but can include all functions as specified above for the FDOT, plus financing, management, and sales.
<b>Benefits</b>	Most of the entire parking facility cost is paid by the ultimate users of the provided improvement through payment of the true cost of construction. Reduces the required number of “public” parking spaces, resulting in lower public cost.
<b>Applicable Facilities</b>	Rail stations with large parking shortage. Peripheral parking garages to CBDs with parking shortage.
<b>Special Considerations</b>	<ol style="list-style-type: none"> <li>1) Limited experience in the application of this technique. Public may not be supportive of the concept if prices are not competitive.</li> <li>2) Has been identified with rail systems in the Northeast. Miami appears to be the only location where this approach can be applied to rail.</li> <li>3) Downtowns with severe parking shortages are attractive.</li> <li>4) Federal Transit Administration (FTA) Suburban Mobility Parking Initiative grants available for technical and capital assistance.</li> </ol>
<b>Barriers to Effective Implementation</b>	Investor acceptance may be low since this is a new and largely untested approach to joint development initiatives. Will need to institute parking restrictions in areas to make the approach more attractive.
<b>Agency Contacts</b>	Federal Transit Administration (FTA)

<b>Technique</b>	<b>CONTRACT WITH PRIVATE PROVIDER FOR TRANSIT SERVICES</b>
<b>Concept</b>	Private transit provider supplies service to commuter lot at a reduced cost compared to locally supplied service.
<b>Purpose</b>	Enhance services to parking facility.
<b>FDOT Responsibilities</b>	Provision of operating and capital funds in support of local transit operators.
<b>Participant Responsibilities</b>	Contracts with private provider and provides financing. Contractor provides express bus or shuttle service.
<b>Benefits</b>	Reduced cost to transit operator in providing service to facility.
<b>Applicable Facilities</b>	Urban corridor lots where commuter transit services are applicable.
<b>Special Considerations</b>	1) Corridor not presently served by transit. 2) Larger urban area where charter commute providers can operate profitably.
<b>Barriers to Effective Implementation</b>	Conflicts with transit union and Federal Section 13 requirements.
<b>Agency Contacts</b>	Miami Dade Transit Dallas Area Regional Transit Authority Southern California Rapid Transit District

## TECHNICAL APPENDICES

The following technical appendices present technical information referred to in the main body of this guide or the working papers. These appendices are organized as follows:

- Appendix A References
- Appendix B Bibliography
- Appendix C Glossary
- Appendix D Site Selection Evaluation Methodology
- Appendix E Park-and-Ride Lot User Survey
- Appendix F Sample Maintenance Agreement
- Appendix G Sample Conceptual Park-and-Ride Web-Tool
- Appendix H District 5 Proactive Approach
- Appendix I District 5 Park-and-Ride Implementation Manual

## APPENDIX A: REFERENCES

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- <sup>1</sup> "Park and Ride Program Resource Guide." Caltrans, 2010.
  - <sup>2</sup> TranSystems. "Florida Department of Transportation, District 5, Park-and-Ride Implementation Manual." June 2010.
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## APPENDIX C: GLOSSARY

### A

**AASHTO** - American Association of State Highway and Transportation Officials

**Access** - the street system providing access to a parking facility, sometimes involving several streets, particularly if one-way.

**ACHP** - Advisory Council on Historic Preservation.

**ADA** - Americans with Disabilities Act.

**ADA Standards** – 2010 ADA Standards for Accessible Design.

**Adequate rate covenant** - often required in revenue bond financed projects; guarantees the operator will charge adequate rates to produce revenue necessary to cover principal and interest payments.

**ADT** - Average Daily Traffic.

**Aisle, driving** - the traveled path through a parking facility between one or two rows of parked vehicles.

**Allocation model** - a mathematical model used to determine the percentage of parking space to be used by all-day, short-term, and other parkers.

**Angle, parking** - the angle at which the parking space extends from the edge of the parking bay, usually ranging from 45 to 90 degrees.

**Angle, stall** - see *Angle, parking*.

**Approach traffic** - using approach streets to a parking facility.

**Auto-free zone** - an area, usually in or near downtown, where vehicular traffic is severely limited or completely restricted.

**Automated parking facility** - a facility operated by automatic parking equipment rather than by employees.

**Automatic controls** - equipment such as ticket dispensers, card readers, and parking gates used in an automated facility.

**Automatic pre-cashiering** - automatic prepayment machines located in or near a parking facility for the purpose of permitting the prepayment of parking fees before the patron retrieves his vehicle from the parking stall.

**Average length of stay** - average length of time vehicles are parked in a particular facility.

**AVL** - Automatic Vehicle Locators

### B

**Back-in stalls** - parking spaces into which the vehicle is backed from the driving aisle.

**Bay** - a parking facility unit that has two rows of parking stalls and a central aisle.

**BRT** - Bus Rapid Transit.

**Building area** - that portion of a lot or land parcel on which a building can be constructed.

**Building code** - local ordinances controlling the building methods and component requirements for construction of various types.

**Bumper** - a wheel stop placed at the front of a parking stall to keep the vehicle from striking walls or extending beyond the specified parking area.

**Bus and carpool lanes, preferential lanes, or HOV lanes** - a form of preferential treatment in which lanes on streets and highways are reserved for the exclusive use of high occupancy vehicles.

**Busway** - a roadway designed for exclusive or predominant use by buses in order to improve bus movement and travel times.

### C

**Capacity, facility** - the number of vehicles that can be accommodated in any given parking facility under a particular type of operation.

**Capacity, roadway** - the capacity, in terms of vehicles that can be accommodated per day or per hour on any given street or roadway.

**Capture rate** - the percentage of vehicles passing a transfer facility that would be induced to use the facility.

**Car size classifications** - designation of vehicles by size: subcompacts, compacts, intermediate, standard, and luxury.

**Car width** - in relation to a parking stall; most U.S. cars range from 60 to 80 inches in width.

**Carbon monoxide (CO)** - a colorless, odorless, poisonous gas emitted from vehicle exhausts.

**Carbon monoxide detectors** - devices used to measure the concentration of CO and emit warnings if harmful levels are reached.

**Carpool** - any vehicle, usually an automobile, that carries two or more occupants including the driver, or a group of people, sharing automobile transportation.

**Catchment zone** - a term used to define the market area for a specific site or corridor.

**CBD** - Central Business Districts; the central business district or downtown area of a community.

**CBD fringe** - that portion of a municipality immediately outside the CBD in which there is a wide range in type of business activity, generally including small commercial, light industrial, warehousing, automobile service activities, and intermediate strip development, as well as some concentrated residential areas.

**CCTV** - see *Closed-circuit television*.

**CE** - Categorical Exclusion.

**CFR** - Code of Federal Regulation.

**Change of mode** - the transfer from one form of transportation to another.

**Channelization** - construction of islands or barriers, usually on roadways, to assist in control of traffic flow patterns.

**Circular ramp** - a ramp between floors of a parking facility whose center line is circular.

**Circulation** - traffic flow pattern, such as two-way or one-way, for an on-street system or off-street parking facility.

**Clear height** - clear vertical height inside a parking structure; usually 7 feet is a desirable minimum.

**Clear-span facility** - a parking structure with vertical columns on the outside edge of the structure and a clear span between columns, making it unnecessary for vehicles to maneuver between columns.

**Closed circuit television (CCTV)** - a system providing security in parking facilities by the use of TV cameras that cover portions of the facility.

**CMAQ** - Congestion Mitigation and Air Quality.

**CMP** - Congestion Management Process.

**CMS** - Concurrency Management System.

**Code requirements** - the parking facility requirements contained in a community's codes that affect zoning and construction, as well as plumbing, electrical, and similar specialties.

- Commuter parking** - parking areas, usually specially designated, for users of mass transportation or carpool operations.
- Commuter shed** - a term used to define the market area for a particular Park-and-Ride facility or travel corridor.
- Compact car** - a small car, usually less than 15 feet in overall length and 72 inches in width.
- Construction cost data** - information which includes current cost for individual construction components and that forms the basis for preparation of project cost estimates.
- Contract documents** - the design plans and specifications for construction of a facility.
- Contract parking** - long-term or specified-term parking arranged in advance, usually on a fixed fee basis.
- Cordon count** - the simultaneous counting of all traffic at strategic points entering and leaving a given area such as a CBD.
- Corridor** - a broad geographical band that identifies a general directional flow of traffic. It may encompass a number of streets and highways and transit route alignment.
- Cost, operation and maintenance** - the cost of operating and maintaining a facility, including staff charges, utilities, insurance, supplies, and repairs. Such costs are deducted from gross revenue.
- Cost per square foot** - the cost of a facility divided by the number of square feet in the facility.
- Cost per stall** - the costs of a facility divided by the number of parking stalls.
- Cost, project** - the total cost of a facility, including land, construction, engineering fees, contingency costs, and any unusual charges.
- Coverage, debt service** - the ration of revenue less all facility operating and maintenance costs, divided by the necessary annual payments for principal and interest; usually expressed as a percentage.
- CPR** - Consistency, Predictability, and Repeatability.
- CPTED** - Crime Prevention Through Environmental Design.
- CR** - Capital Recovery.
- CRT** - Commuter Rail Transit.
- Curb distance** - the straight-line distance necessary along a curb for a parking stall and varying in length depending upon the stall angle.

## D

- D factor** - directional distribution of peak-hour traffic on a two-way roadway. Usually stated as the proportion or percentage of two-way traffic operating in the dominant direction.
- Delay** - the time lost by a person in a vehicle during travel, and due to circumstances which impede the desirable movement of traffic. It is the travel time difference between congested and free-flow travel times.
- Demand** - the number of potential customers for a parking facility or parking system.
- Demand/Supply** - a ratio of parking demand (vehicles) and parking supply (spaces) that indicates an excess or shortage of available space.
- Depreciation** - a percentage of the value of an improvement deducted each year for wear and tear.
- Design/build system** - a system in which a single entity is responsible for both the design and construction of a facility, often involving the fast-track method of construction; also referred to as “design/construct.”

**Design standards** - a set of criteria established to define the design characteristics of a parking facility.

**Destination** - the end point of a single trip such as home, school, work, or church.

**DHV** - design hour volume; a volume of traffic selected as the basis for design criteria of a facility.

**Diameter, ramp** - the measurement from outside wall to outside wall across a circular ramp.

**Dimension, stall** - the length and width of a parking stall.

**Discharge time** - the time needed to empty a parking facility of parked vehicles.

**DOE** - Department of Energy.

**Duration** - the length of time a vehicle is parked; average length of time all vehicles are parked in a particular facility.

## **E**

**EA** - Environmental Assessment.

**Emissions** - gases and particulate matter that pass through the exhaust system of a vehicle.

**Environmental impact** - measurement of the environmental consequences of a parking facility in terms of air, noise, and water pollution levels that are generated by the facility.

**EPA** - the Environmental Protection Agency, charged by the Congress with developing and enforcing environmental regulations.

**EST** - Environmental Screening Tool.

**ETDM** - Efficient Transportation Decision Making.

**Express bus** - a conventional bus which minimizes stops between origin and destination using an HOV facility or in mixed traffic on freeways or arterials.

## **E**

**FDOT** - Florida Department of Transportation.

**FHWA** - Federal Highway Administration.

**Financial feasibility** - determination of a project's potential economic success.

**Financing** - means of providing funds for a parking facility through private capital, public sale of general obligation or revenue bonds, special assessment or tax district funds, leases, not-for-profit associations, or a combination of these various sources.

**FLAPO** - Office of Freight, Logistics and Passenger Operations

**Flat rate fee** - a set amount charged for parking for a specific period of time such as an hour, a day, or a month.

**Floor area** - the area of a floor, measured by length times width; in some cases, the total floor area of a facility.

**Flow system** - the traffic flow pattern in a parking facility such as one-way, two-way, or reverse flow.

**Fringe parking** - any parking facility located outside of an activity center such as a central business district.

**FSUTMS** - Florida Standard Urban Transportation Model Structure.

**FTA** - Federal Transit Administration.

**Functional design** - the design of a structure or facility which increases its overall efficiency and provides maximum user acceptance; a parking concept plan showing traffic flow, stall geometry, and other features that determine the interior design of parking facilities.

**G**

**General obligation bonds** - bonds sold by a public agency to finance public improvements and which guarantee the full faith and credit of the agency regarding repayment.

**GIS** - Geographic Information System.

**Grade** - the degree of incline or slope in a ramp or floor of a parking structure.

**Gross area** - the entire area of a building, usually measured in square feet or square meters.

**H**

**Half bay** - a parking facility unit that has one row of car stalls and a central aisle.

**Head-in** - parking system where vehicles park front first in the parking stall.

**Headroom** - the vertical clearance in a parking structure, usually about 7 feet.

**Headway** - this is the time interval between successive vehicles crossing a point on the roadway.

**Helical ramp** - a spiral or circular ramp.

**Herringbone** - a pattern for the layout of parking spaces with alternate rows set at oblique angles to one another.

**High occupancy vehicle (HOV)** - motor vehicles carrying more people in addition to the driver. It could be a bus, car or van used for pooling, or any other motor vehicle that meets the minimum occupancy requirements, generally two, three, four or more, specified for a particular location or area.

**High turnover** - a parking facility with a high rate of turnover or high number of vehicles per space per day.

**HOV** - see *High occupancy vehicle*.

**Hydrocarbons** - compounds containing hydrogen and carbon that result from the operation of an internal combustion engine.

**I**

**Intermediate** - a mid-sized car, between a compact and a full-sized car.

**Inventory spaces** - total number of parking spaces available in a facility or in a parking system.

**Island** - a raised area in a roadway, driveway, or parking facility, used to control or direct traffic flow.

**ISTEA** - Intermodal Surface Transportation Efficiency Act.

**ITE** - Institute of Transportation Engineers.

**J**

**JPA** - Joint Participation Agreement.

**K**

**K factor** - percentage of 24-hour traffic on a roadway traveling during the peak-hour.

**Kiss-and-Ride (passenger load and unload)** - the transfer mode whereby a transit or commuter passenger is driven to or picked up from his or her first transit terminal point in a private vehicle driven by another person who does not originate or terminate the trip at the terminal.

**L**

**Lane control signal (red/green)** - illuminated signal lights positioned over exit lanes to indicate when the lane is open (green) or closed (red) to traffic.

**Lane width** - width of a lane, expressed in feet.

**LEP** - Limited English Proficiency.

**Level of service** - a descriptive measure of the quality and quantity of transportation service provided which incorporates finite measures of quantifiable characteristics including, but not limited to, characteristics such as travel time, travel cost, and number of transfers.

**License plate inventory** - periodic recording of all vehicle license plate numbers in a parking facility in order to determine length of stay and prevent fraud by patrons claiming lost tickets.

**Life safety code** - a code aimed at guaranteeing adequate requirements for new construction.

**Line-Haul** - A transit system or service which travels back and forth along a corridor and with limited station stops. The service operates runs on a regular schedule and passengers wait in stations for their train or bus to arrive. This can include, Express Bus, Bus Rapid Transit, and both heavy rail and light rail and commuter rail service

**Locator, parking space** - signs or other means of helping motorists locate their vehicles when they return to a parking facility.

**Long-term parking** - vehicles parked for at least half a day or longer.

**LOS** - see *Level of service*.

**Lot design** - the layout of a parking lot in terms of physical features.

**LRT** - Light Rail Transit.

### **M**

**Market area or target market area** - this is the imaginary irregular fan shaped area radiating away from the CBD with the apex of the fan located slightly closer to the CBD than the Park-and-Ride parking lot. It is from this area that patrons for a Park-and-Ride facility originate.

**Metered parking** - parking controlled as to time and fee by meters or numbers at each space.

**Mode of access** - the form of transportation used to access a transfer facility. Modes typically used in transportation planning studies include walk, drive-alone auto, shared-ride auto, Kiss-and-Ride, Park-and-Ride, bus transit, and rail transit.

**Mode of travel** - means of reaching a destination including, but not limited to, walking, bicycling, riding transit, driving a car, or being a car passenger.

**Mode share** - percentage of person-types using particular mode of travel.

**Mode split analysis** - estimation of the amount of travel by travel mode.

**Modular width** - the unit width, in feet, of a module.

**Module** - a portion of a parking facility, usually a bay containing a central aisle and two rows of parking spaces.

**MPO** - Metropolitan Planning Organization.

**MUTCD** - Manual on Uniform Traffic Control Devices.

### **N**

**NAAQS** - National Ambient Air Quality Standards.

**NEPA** - National Environmental Policy Act.

**NFPA** - the National Fire Protection Association, a professional association involved in the promotion of fire safety.

**NHS** - National Highway System.

**NMSA** - Non-Major State Action.

**NPA** - the National Parking Association, a professional association representing the parking industry.

**O**

**O&M** - Operations and Maintenance.

**O&M Costs** - operations and maintenance costs; the costs, usually expressed in terms of annual amounts, to operate, staff, and maintain a parking facility.

**Occupancy rate** - the rate at which a given parking facility or a parking system is occupied, on an hourly, daily, or annual basis.

**P**

**Parallel parking spaces** - spaces designed parallel to the curb of a street, a parking lot, or a parking structure wall.

**Park-and-Ride** - A facility designed to intercept commuters and encourage mode change from a single-occupant vehicle to a high occupancy vehicle mode (i.e. carpool, vanpool, or transit.)

**Parking angle** - the angle formed by a parking stall and the wall or center line of the facility, ranging from 90 degrees (perpendicular) to 45 degrees.

**Parking bay** - the section of a parking facility containing an aisle and one or two rows of parking spaces.

**Parking inventory** - a tabulation of the number of parking spaces available in a given area categorized by curb or off-street spaces, public or private use, or by other classifications.

**Parking load** - the total number of space hours used during a given period of time. Its peak is reached at peak accumulation, when capacity is used to its fullest extent.

**PD&E** - Project Development and Environment.

**Peak period** - period of maximum parking activity; can be by the hour, day of week, or season.

**Peripheral lot** - Facilities typically located at the periphery or fringe of a major activity center. Access distances to the lot are typically longer while egress distances from the lot to the final trip destination are usually shorter than other facility types.

**PHT** - person hours of travel.

**PTO** - Public Transportation Office.

**Q**

**Queue** - a waiting line of vehicles, e.g. traffic at a signal or buses at a Park-and-Ride facility.

**R**

**Ramp** - an inclined portion of a parking structure; can be for travel purposes only, or can also provide parking spaces on one or both sides.

**Ramp, express** - a ramp, usually extending several floors or levels, for direct exit from the facility.

**Ramp, garage** - a garage or deck composed entirely of ramped floors connected at various levels.

**RCAP** - Regional Commuter Assistance Programs.

**Remote lot** - Lots generally located outside the urban area in a rural or small town setting. Trip lengths for both home-to-lot and lot-to-work legs of the commute trips are much longer than lots of other types.

**Reservoir space** - storage space within a parking facility for vehicles entering or exiting (also called queue area).

**Revenue projection** - a projection of revenue anticipated from a parking facility or system.

**Ridesharing** - any form of group travel in autos, vans or special service buses.

**ROW** - Right-of-Way.

**RPC** - Regional Planning Council.

**RTPA** - Regional Transportation Planning Agency.

### S

**SAFETEA-LU** - The Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users.

**Scissors design** - a design format in which ramped floors are situated opposite one another like the blades of scissors; also called “double leaf.”

**Search pattern** - the flow pattern through a parking facility of vehicles in search of available parking spaces.

**Search time** - the time needed to find an available space.

**SEIR** - State Environmental Impact Report.

**SHPO** - State Historic Preservation Officer.

**Sharrows** – A pavement marking for bike lane that has the bicycle symbol with double arrows above it.

**Short-term parking** - parking for a short period of time, usually less than four hours.

**Shuttle bus** - local bus used to transport passengers between parking facilities or other terminals and major generators.

**Simulation model** - a mathematical model developed to simulate the use of a given improvement, in this case, a parking facility.

**Site** - the area on which a parking facility or other improvement is constructed.

**Site characteristics** - the physical features of a site such as shape, area, topography, soil conditions, and access.

**Site location analysis** - an investigation of a given site and the determination of its usability for particular purposes.

**Space count** - total number of spaces in a facility or system.

**Special tax district** - an area defined by ordinance where special taxes can be imposed to fund improvements such as parking.

**Stall** - the area, usually marked with distinguishing lines, in which one vehicle is to be parked; a parking space.

**Stall depth** - length of the stall.

**Stall width** - width of the stall.

**Storage capacity** - see *Reservoir space*.

**STP** - Surface Transportation Program.

**Striping** - painted lines delineating stalls and circulation patterns.

**Study period** - the time during which the study is being conducted which could be one or more portions of a day or all day.

**Subcompact** - a very small vehicle, smaller than a compact.

**Subscription commuter service** - a service in which routes and schedules are prearranged for riders who sign up for service in advance.

**Superelevation** - the banking of a curved roadway or ramp to improve vehicle handling.

### T

**TAZ** - Traffic Analysis Zone.

**TDM** - Transportation Demand Management.

**TDP** - Transportation Development Plan.

**TEA 21** - Transportation Equity Act of the 21<sup>st</sup> Century.

**TMA** - Transportation Management Association.

**TOD**- Transit Oriented Development.

**Transportation system management (TSM)** - the operation and coordination of all phases of the transportation system to provide more efficient and effective use of existing transportation services and facilities.

**Trip purpose** - the primary purpose of a person making a trip. Typical purposes include shopping, work, and business.

**Turning radius** - the pavement or ramp width necessary to permit a vehicle to complete a turning maneuver.

**Turnover** - the number of vehicles using a given space or facility each day.

**TXDOT** - Texas Department of Transportation.

### U

**Unsatisfied demand** - the number of vehicles that cannot be accommodated in a parking facility or system.

**Urban Fringe** - Lots located at the fringe of urban development. Trips tend to originate outside the urban area while destinations tend to be dispersed within the urban area. Fringe area lots are generally not served by transit, although they may be.

**Urban Transit Corridor** - Lots located along a major commute corridor within an urban area which are served by line-haul transit such as express bus, urban rail, and commuter rail services. Trip origin patterns tend to be dispersed along the corridor. Trip destination patterns may be dispersed along or concentrated at one end of the corridor.

**Utilization** - the percentage of a parking facility's capacity that is occupied under average conditions. Usually implied as the maximum percentage of capacity used under average conditions. Sometimes expressed as a percentage greater than 100 percent when lots are saturated and illegal space use is occurring.

**Utilization counts** - counts of parked vehicles at a facility.

### V

**Vehicle counter** - a device used to count vehicles entering and leaving a facility.

**Vehicle detector** - a device intended to sense the presence of a vehicle in a traffic lane.

**VHT** – vehicle hours of travel.

**VMT** - vehicle miles of travel; the total vehicle miles of travel within any parking facility.

### W

**Walking distance** - the approximate distance patrons will walk between a parking facility and traffic generators.

**Walk-ins** - People using a Park-and-Ride lot that walk in to use public transportation.

**Wearing surface** - the topmost layer of any pavement.

**Wheel load** - the added load in a parking structure created by the parked vehicle (live load).

**Wheel stop** - a bumper or block placed at the head of a parking stall to restrain the vehicle from moving forward.

**Work trip** - a trip from home to work or from work to home.

**Z**

**Zoning** - the regulation of land use, on a parcel or area basis, by local ordinance.

## **APPENDIX D: SITE SELECTION EVALUATION METHODOLOGY**

This appendix contains technical material related to the evaluation and rank ordering of a number of Park-and-Ride sites. This material was taken from the American Association of State Highway and Transportation Officials (AASHTO) Design Guide for High Occupancy Vehicle (HOV) and Public Transfer Facilities.

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### **PRIORITY RATING OF POTENTIAL PARK-AND-RIDE SITES**

It is important to recognize that the methodology presented is offered for assistance to those agencies or individuals having the responsibility for selecting transfer facilities. The specific factors used, as well as values assigned to the rating system, may vary, depending on local conditions or other situations that arise in the site selection process. Those using the rating system should feel free to use other factors or rating values as desired. A point rating system for each factor from zero to ten is used for simplicity with the higher rating being desirable. It may also be desirable that the user apply a weight multiplier to the factors selected for consideration.

There are many factors influencing the decision to implement a Park-and-Ride facility, including geographic, economic, as well as the people moving capability of transportation facilities. Each of the factors should be reviewed for applicability to the local area.

The rating chart provided in Table D-1 covers the major criteria and factors which are used to develop the priority ratings of sites to determine, from best available data, which sites in a given corridor or zone appear to offer the best chance for success and investment of funds to implement Park-and-Ride facilities.

The primary categories of factors may be classified as follows:

1. Location Criteria
2. Site Considerations
3. Economic Considerations

**Table D-1: Park-and-Ride Site Comparison**

		Site 1	Site 2	Site 3
<b>Location Criteria</b>	Within Dense Corridor			
	Transit Service Potential			
	Proximity to Freeway Bottleneck			
	Visibility of Site			
	Distance to CBD or Activity Center			
	Access Convenience			
	Local Traffic Circulation			
	Commuter Driving Distance			
	Congestion - Site to Freeway			
	Bike Route Access			
	<b>Total Points</b>			
<b>Site Considerations</b>	Impact on Local Community (Adjacent)			
	Number of Parking Spaces			
	Expansion Potential			
	Parking Capacity - Adjacent Streets			
	Parking Security			
	<b>Total Points</b>			
<b>Economic Considerations</b>	Land Cost			
	Ease of Land Acquisition			
	Development Cost			
	<b>Total Points</b>			
<b>Grand Total</b>				

The following guidelines address each factor in Table D-1 that should be considered. The list of factors may be reduced or increased, depending on the availability of data and local conditions.

**1. Location Criteria**

These factors relate to desirable or undesirable location features of a site based on the experience of Park-and-Ride sites that have already been implemented in various locations.

A. *Within a Dense Corridor.* If the potential site is within a dense corridor, the distance from the major artery or freeway is the measuring value, with closeness to the artery the most desirable feature. Use the following guide for reference in your rating:

*Along  
Major Artery  
10 Points*

*Within 1/4 Mile  
of Major Artery  
8 Points*

*Within 1/2 Mile  
of Major Artery  
6 Points*

B. *Transit Service Potential.* If the site is near an existing transit line, this is a desirable feature and only minor transit route changes may be necessary. Use the following guide for reference in your rating:

*Along  
Transit Line*  
10 Points

*Within 1/4 Mile  
of Transit Line*  
8 Points

*Within 1/2 Mile  
of Transit Line*  
6 Points

C. *Outside Major Artery Bottleneck.* Desirable sites should be located immediately upstream from a bottleneck, to reduce vehicular traffic inbound through the bottleneck. Use the following guide for reference in your rating (distance relates to proximity upstream from arterial congestion).

*Within 1/2 Mile*  
10 Points

*Within One Mile*  
8 Points

*Within Two Miles*  
6 Points

D. *Visibility of Site.* In order to attract users to a Park-and-Ride facility, the site should be visible from the freeway or major arterial used by the commuter. Use the following guide for reference in your rating:

*Clearly Visible*  
10 Points

*Partially Visible*  
8 Points

*Not Visible*  
0 Points

E. *Distance to CBD or Activity Center.* Sites should be located more than one mile from the Central Business District (CBD) or activity center, as commuters will normally accept walking distances less than one mile. However, if sites are too remote from the CBD or activity center, they also will not generate sufficient users, and transit service will not be economically feasible. Use the following guide for reference in your rating: (Keep in mind those metropolitan population areas over 1.5 million may have acceptable sites greater than 10 miles removed).

*1-3 Miles*  
10 Points

*5 Miles*  
8 Points

*10 Miles*  
5 Points

F. *Site Access Convenience.* A potential site should have good access (ingress and egress) from the roadway adjacent to the site in order to encourage use of the facility. In the case of new potential sites, it may be possible to design for good access; whereas existing sites under consideration have more limited options. Use the following guide for reference in your rating:

*Excellent*  
10 Points

*Good*  
8 Points

*Fair*  
6 Points

G. *Other Park-and-Ride Competition.* If a site is too close to another *existing* Park-and-Ride facility, it will either attract commuters from that site, or not generate sufficient users to make the site a worthwhile investment. Use the following guide for reference in your rating:

*No Competition*  
10 Points

*Possible Competition*  
7 Points

*Definite Competition*  
4 Points

H. *Local Traffic Circulation.* A brief traffic engineering study should be performed to assure that the additional traffic generated can be accommodated with minimum disruption to the present traffic condition during anticipated peak-hour usage. Use the following guide for reference in your rating of local traffic circulation:

*Excellent*  
10 Points

*Good*  
8 Points

*Fair*  
6 Points

I. *Commuter Driving Distance.* Previous experience indicates that 50 percent of Park-and-Ride commuters drive less than five miles from their home to the site and approximately 90 percent drive less than ten miles. Use the following guide for reference in your rating:

<i>1-3 Miles</i> 10 Points	<i>4- 5 Miles</i> 8 Points	<i>7-10 Miles</i> 6 Points
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J. *Traffic Congestion – Site to Major Arterial or Freeway.* Ability of the commuter to reach the site from the freeway (or the return trip) is a measure of the attractiveness of any potential site. Traffic signals on the route to the site are the normal cause of delay that can be measured, but other congestion causing factors may also be used. Use the following guide for reference in your rating:

<i>No Traffic Signals</i> 10 Points	<i>1-2 Traffic Signals</i> 8 Points	<i>3 Traffic Signals</i> 6 Points
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K. *Bike Route Access.* Bicycle commuters may play a significant role in site selection. If so, the proximity of a bicycle route to the site should be considered. Use the following guide for reference in your rating:

<i>Bike Route at Site</i> 10 Points	<i>Bike Route Within 1 Mile</i> 8 Points	<i>Bike Route Within 3 Miles</i> 6 Points
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**2. Site Considerations**

A number of site consideration factors must be reviewed that are pertinent to selecting the best sites suited to Park-and-Ride, including: the impact on the local community, the size of the site and possible need for expansion, the extent of parking on adjacent streets, and security.

A. *Adverse Impact on Local Community.* Certain local communities are very sensitive to additional traffic generators being placed in their environment, while others tend to be enthusiastic toward energy/fuel conservation or traffic congestion relief measures. Use the following guide for reference in your rating:

<i>Minimal</i> 10 Points	<i>Some</i> 8 Points	<i>Serious</i> 3 Points
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B. *Land Area – Number Parking Spaces.* This factor may or may not be necessary as a pertinent measure of the site selection evaluation process. However, if the number of site options is limited, there may be a considerable variation in the amount of land area available for possible use at each site. Use the following guide for reference in your rating:

<i>Sufficient To Meet Demand</i> 10 Points	<i>50 or Less Parking Spaces</i> 5 Points
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C. *Site Expansion Potential.* In certain Park-and-Ride programs, a successful facility will cause the parking demand or usage to exceed the original site parking capacity. When this is a factor worthy of consideration in comparing sites, the expansion capability should be investigated. Use the following guide for reference in your rating:

*Excellent*  
10 Points

*Good*  
8 Points

*Fair*  
6 Points

*D. Parking Capacity – Adjacent Streets.* A survey of daytime parking capacity on adjacent and nearby streets should be made to determine whether potential users might prefer to park on existing streets and walk to a transit stop, rather than use a Park-and-Ride facility. Available parking is therefore a detriment to Park-and-Ride. Use the following guide for reference in your rating:

*No Parking Available*  
10 Points

*Some Parking Available*  
7 Points

*Considerable Available*  
4 Points

*E. Parking Security.* If a driver must risk the chance of vandalism or car theft, a site with this potential problem either will not be desirable, or will necessitate fencing and gates or possibly an attendant. Use the following guide for reference in your rating:

*No Need For  
Added Security*  
10 Points

*Fence and  
Gate Needed*  
7 Points

*Attendant  
Needed*  
4 Points

**3. Economic Considerations**

These factors may be the most critical in your choice of Park-and-Ride sites, depending on available source of capital funding for construction of a new site, or possibly the time necessary to acquire land for a new site.

*A. Land Cost.* It is relatively simple to compare site cost when an opportunity to use publicly owned land is compared with the purchase of private land. When comparing several sites that necessitate land purchase, the value of land in each area will vary. It is left to the individual or agency to make this determination. Use the following guide for reference in your rating:

*Lease or No Cost*  
10 Points

*Medium Cost*  
8 Points

*High Cost*  
5 Points

*B. Ease of Land Acquisition.* Time to acquire and develop a site may also be an important factor when considering the need for Park-and-Ride implementation. Use the following guide for reference in your rating:

*Less Than 3 Months*  
10 Points

*Six Months*  
7 Points

*12 Months*  
4 Points

*C. Development Cost.* A comparison of development costs for each site should be made. Use the following guide for reference in your rating.

*Existing Developed Site*  
10 Points

*Minimal Cost*  
7 points

*Substantial Cost*  
4 points

**Procedure**

The above factors can be rated and summarized to make a direct comparison of potential Park-and-Ride sites. You will note that several factors have been weighted to a limited extent, and assigned lower point values because of the general degree of importance.

However, no attempt is made within this rating system to weigh all the various factors according to importance because in some metropolitan areas certain factors may have more significance than the same factors in other areas. The rater should feel free to apply weighted values if in his opinion one factor should carry more importance than another.

**Summary**

The methodology presented herein offers many subjective measures. It, therefore, is intended primarily as a guide and quick reference to those factors believed to be essential to the site selection process with a reasonable degree of assurance of implementing a successful Park-and-Ride facility. It is also recognized that more advanced knowledge and experience will produce better methods of site comparison. However, in the meantime, the priority rating method can be used and modified as necessary to satisfy local conditions.

Also, it should be recognized that these factors are most useful when comparing sites which have a similar ridership potential. Given that the modal split for each of the sites being considered is close, the site selection process should identify those sites which will attract the greatest number of riders, have a reasonable cost, and at the same time have a favorable impact on the community.

## **APPENDIX E: PARK-AND-RIDE LOT USER SURVEY**

The information provided in this appendix contains some key points for consideration when it comes to surveys. Surveys can provide useful, qualitative information on travel and commute patterns as well as demographic information of those utilizing a particular Park-and-Ride facility. Surveys can provide data for analysis that may not otherwise exist, including user opinions on possible improvements or where a new facility would be most useful and valuable to the community. Interviews can be conducted with key transit operators to produce more information on how a Park-and-Ride lot is being used, and how it could be improved to better serve the public. Having survey forms in other languages that many in the locality may speak would be beneficial to gather more data from across cultures and language barriers. For instance, having survey forms in English on one side and Spanish on the back may provide more feedback than having a survey form only in English. By utilizing multiple forms of surveys at the same time, more data can be collected. For example, interviews can be conducted with patrons who have time, or survey forms can be handed out and returned as they are leaving the facility. At the same time, windshield surveys could be left on vehicles whose owners were not contacted in person during the survey hours. It is recommended that surveys be conducted from 5:30 AM until 8:30 AM in the morning, and from 3:30 PM until 6:30 PM in the afternoon. Conducting surveys on two occasions may prove valuable, preferably during the weekdays of Tuesday through Thursday in weeks when there are no holidays or other major events.

### Information that surveys could collect:

- Who is currently using a Park-and-Ride lot
- Why people are using a Park-and-Ride lot
- Where people are traveling to and from
- What modes of transportation are being used in traveling to and from the lot
- How satisfied users are with the Park-and-Ride lot, amenities, and transit services
- What would motivate more people to use the Park-and-Ride lot
- What types of improvements would be most effective to increase utilization

### Types of Surveys:

#### In-person Interview Survey

Patrons can be interviewed on-location as they depart from the lot to, or return to the lot from, their destinations by means of in-person surveys. Interviews should be conducted with those arriving at the Park-and-Ride facility by using only a few key questions so that it will not take much time. Sending out the least expensive representative from the consulting team or Florida Department of Transportation (FDOT) staff to a Park-and-Ride lot can be cost effective. It may be beneficial to use windshield surveys, postage prepaid mail-in surveys, and/or internet or phone surveys if you cannot catch patrons at the lot in the morning or afternoon.

#### Hand-back survey

This method involves handing out survey forms for the patrons to complete and return to the surveyor before they leave. Alternately with paper surveys, there can be a drop box set up for surveys to be submitted.

### Windshield Survey

Windshield surveys can be left under a windshield wiper on a parked car for the patron to fill out and then, on a noted day, place the completed survey on their windshield for FDOT or survey staff to collect. It has been noted that some patrons may not appreciate having papers placed under their windshield wiper.

# Park-and-Ride: Lot User Survey

Official Use Only
Lot Name: _____
Location: _____



The Florida Department of Transportation (FDOT) needs your input. FDOT is conducting a survey of Park-and-Ride lot users to gain information on how to improve the facilities. Your responses will be strictly confidential. Please leave your completed survey on your windshield when you return to this lot tomorrow or the next day for FDOT staff to collect and to be entered into a **prize drawing** (see reverse side for details). If you have questions or comments about this survey, please email [SurveyQuestions@gmail.com](mailto:SurveyQuestions@gmail.com).

## COMPLETE THIS SURVEY FOR A CHANCE TO WIN A \$25 GIFT CARD!

**1. Where did you begin your trip today?**

1 Home  4 School/College  
 2 Work  5 Other (Specify): \_\_\_\_\_  
 3 Shopping \_\_\_\_\_

**2. What intersection or landmark is nearest to where you began your trip today?**

\_\_\_\_\_ Intersection (i.e., Park St & 2nd St)  
 \_\_\_\_\_ City  
 \_\_\_\_\_ Zip Code

**3. How many miles and minutes did you travel to reach the Park-and-Ride lot?**

\_\_\_\_\_ Mile(s) \_\_\_\_\_ Minute(s)

**4. I use this Park-and-Ride lot to (check one):**

1 Ride Bus Route # \_\_\_\_\_  4 Walk to my destination  
 2 Meet my carpool  5 Other (Specify): \_\_\_\_\_  
 3 Meet my vanpool \_\_\_\_\_

**5. What is your destination today?**

1 Home  4 School/College  
 2 Work  5 Other (Specify): \_\_\_\_\_  
 3 Shopping \_\_\_\_\_

**6. What is the nearest intersection or landmark near your destination today?**

\_\_\_\_\_ Intersection (i.e., Park St & 2nd St)  
 \_\_\_\_\_ City  
 \_\_\_\_\_ Zip Code

**7. How many miles and minutes does it take you to travel to your final destination from this Park-and-Ride lot?**

\_\_\_\_\_ Mile(s) \_\_\_\_\_ Minute(s)

**8. How did you travel to this Park-and-Ride lot?**

1 Auto  4 Bicycle  
 2 Bus  5 Other (Specify): \_\_\_\_\_  
 3 Walk \_\_\_\_\_

**9. If you arrived by auto, did you:**

1 Drive alone  3 Get dropped off  
 2 Share a ride \_\_\_\_\_

**10. If you shared a ride, how many were in the vehicle with you?**

\_\_\_\_\_ Individual(s)

**11. If you take the bus to your final destination, how satisfied are you with the convenience and service?**

1 Very satisfied Why? \_\_\_\_\_  
 2 Moderately satisfied Why? \_\_\_\_\_  
 3 Not satisfied Why? \_\_\_\_\_

**12. If you take the bus from this Park-and-Ride lot, or have in the past, how could this bus service be improved?**

1 More frequent pick-ups  
 2 More frequent drop-offs  
 3 Improved buses (seating, comfort, cleanliness, etc.)  
 4 Improved waiting areas/bus stops  
 5 Lower fares  
 6 Make schedule & route information more readily available  
 7 Other (Specify): \_\_\_\_\_

**13. If you don't take the bus from this lot to your final destination, please tell us why. (Check all that apply.)**

1 My destination is close enough to walk to.  
 2 The bus does not drop-off near my destination.  
 3 The bus takes too long to get to my destination.  
 4 The bus costs too much.  
 5 There is no where to wait for the bus.  
 6 I don't feel safe waiting for the bus.  
 7 No bus route is connected with this Park-and-Ride lot.  
 8 Other (Specify): \_\_\_\_\_

**14. If you carpool or vanpool to your destination, how many others ride with you?**

\_\_\_\_\_ Individual(s)

**15. How did you learn about this Park-and-Ride lot?**

1 Employer  6 Radio Advertisement  
 2 Friend  7 TV Advertisement  
 3 Internet  8 Flyer/Mail  
 4 Transit Operator  9 Other (Specify): \_\_\_\_\_  
 5 Bus schedule \_\_\_\_\_

**16. How did you make this trip before you found out about this Park-and-Ride lot?**

1 Didn't make this trip  4 Carooled/Vanpooled  
 2 Used \_\_\_\_\_  5 \_\_\_\_\_  
 3 Drove alone \_\_\_\_\_

**17. How often do you use this Park-and-Ride lot?**

1 Daily (weekdays only)  4 2 times per week needed  
 2 3 times per week \_\_\_\_\_

**18. If you use this lot less than 3 times per week on average, why do you not use it more frequently?**

\_\_\_\_\_

**19. How long have you been using this Park-and-Ride lot?**

1 Less than 6 months  4 2 to 3 years  
 2 6 to 12 months  5 3 or more years  
 3 1 to 2 years \_\_\_\_\_

**20. What is your occupation?**

\_\_\_\_\_

**21. What type of home do you live in?**

1 Single Family Home  4 Duplex  
 2 Condo/Apartment  5 Townhome  
 3 Manufactured/Mobile Home  6 Other (Specify): \_\_\_\_\_

**22. How many people of driving age are in your household?**

\_\_\_\_\_ Individual(s)

**23. How many vehicles in running condition are kept at your home?**

\_\_\_\_\_ Vehicle(s)

**24. What do you think about this lot?**

\_\_\_\_\_

**25. How could this lot be improved?**

\_\_\_\_\_

**26. Do you have any other comments?**

\_\_\_\_\_

**COMPLETE THIS SURVEY FOR A CHANCE TO WIN A \$25 GIFT CARD! (if agency allows it)**

PLEASE RETURN THIS COMPLETED SURVEY FOR A CHANCE TO WIN!

**By mail:**

Mail the completed survey form to the following address:

**Florida Department of Transportation  
Office of Freight, Logistics and Passenger Operations, Transit Office  
605 Suwannee Street, MS 26  
Tallahassee, FL 32399-0450**

**Online:**

Go to (insert website address i.e., [www.PNRSurveyFormFDOT.com](http://www.PNRSurveyFormFDOT.com)) to submit this survey online.

**By Phone:**

Call (insert phone # i.e., 1-800-555-PNR-FDOT), and follow the automated prompts to enter your responses.

**Windshield Return:**

You may place the completed survey form on the windshield of your vehicle for pick-up by survey staff on (date of next day and day after).

**In person:**

You may return the completed survey to the person who provided the form to you.

**PRIZE DRAWING**

The prize drawing for the \$25 gift card will take place on (date). The winner will receive the gift card in the mail within two to four weeks following the date of drawing. To be entered into the prize drawing, you must: 1. Completely fill out the survey form, and 2. Provide the information below. You may only enter once, or your entries will be disqualified from this survey drawing.

Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Thank you!**

**SAMPLE**

**APPENDIX F: SAMPLE MAINTENANCE AGREEMENT**

**CITY / COUNTY / AGENCY OF \_\_\_\_\_ AND  
SAMPLE FLORIDA DEPARTMENT OF TRANSPORTATION**

**PARK-AND-RIDE FACILITY MAINTENANCE**

**MEMORANDUM OF AGREEMENT**

Work Program Item Number: \_\_\_\_\_

Contract Number: \_\_\_\_\_

\_\_\_\_\_ (Name) \_\_\_\_\_ Park-and-Ride Facility

Parcel #: \_\_\_\_\_

Address: \_\_\_\_\_

THIS AGREEMENT, entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between the STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION, an agency of the State of Florida, hereinafter called the “DEPARTMENT” and the CITY/COUNTY/AGENCY of \_\_\_\_\_, a political subdivision of the State of Florida, existing under the laws of the State of Florida, a municipality incorporated under the laws of the State of Florida, hereinafter called the “LOCAL GOVERNMENT”.

WITNESSETH:

WHEREAS, the DEPARTMENT and the LOCAL GOVERNMENT have developed a Park-and-Ride Facility at \_\_\_\_\_ (Address/Location/Parcel ID) \_\_\_\_\_, hereinafter called the “FACILITY”, to promote efficient alternative transportation by encouraging carpooling, vanpooling and the use of public transportation; and

WHEREAS, the parties hereto recognize the need for entering into an Agreement designating and setting forth the responsibilities of each party associated with the maintenance of the FACILITY; and

WHEREAS, the LOCAL GOVERNMENT by resolution Number \_\_\_\_\_, dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, attached hereto as Attachment “A”, which by reference hereto will become a part thereof, desires to enter into this Agreement and authorizes its officers to do so.

NOW, THEREFORE, for and in consideration of the mutual benefits to flow each to the other, the parties covenant and agree as follows:

1. The LOCAL GOVERNMENT shall be responsible to maintain this FACILITY described in Attachment “B” hereto which by reference will become a part thereof. DEPARTMENT may modify or add additional features to the FACILITY pursuant to DEPARTMENT’S procedures and requirements. The LOCAL GOVERNMENT’S area of maintenance responsibility shall be for all of the area within the boundaries of the FACILITY including the fence (if applicable). To include any subsequent amended limits mutually agreed to in writing by both parties. Maintenance shall be undertaken on an as-needed basis, but in no event less than quarterly.
  
2. The contact person for the DEPARTMENT and LOCAL GOVERNMENT with respect to all matters concerning the implementation of this Agreement and the operation of the FACILITY shall be as follows:

For LOCAL GOVERNMENT:

Name: \_\_\_\_\_

Title/Office: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Tel. No. \_\_\_\_\_

Fax No. \_\_\_\_\_

Email: \_\_\_\_\_

For DEPARTMENT:

Name: \_\_\_\_\_

Title/Office: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Tel. No. \_\_\_\_\_

Fax No. \_\_\_\_\_

Email: \_\_\_\_\_

The parties may change their contact persons upon prior written notice of fifteen (15) days.

3. The LOCAL GOVERNMENT shall be responsible for causing the cleanup, removal and disposal of all debris from the FACILITY limits (or subsequent amended limits mutually agreed to in writing by both parties) following a natural disaster (i.e. hurricane, tornado, etc.) or from other normal occurrences such as vehicle accidents and spills.
  
4. The LOCAL GOVERNMENT shall pay all costs associated with the operation of the FACILITY including without limitation, maintenance and utilities, and shall maintain the FACILITY in accordance with the standards that meet or exceed DEPARTMENT’S requirements including without limitation a schedule for cleaning, re-striping, and repair of the facility. For the purpose of this Agreement, the routine maintenance to be provided by the LOCAL GOVERNMENT shall include items defined as follows:
  - a) Mowing, landscape, tree trimming, and irrigation maintenance: The LOCAL GOVERNMENT shall be responsible for management, care, and water for entire landscape within the limits of the FACILITY, including any trees, turf, shrubs, groundcovers, and irrigation system. Turf shall be maintained in an attractive condition, at a height not to exceed nine (9) inches, with no invasive exotic species,

- and no bare areas subject to erosion. The clippings shall be raked from the mowed area or mulching mowers may be used in lieu of raking mowed areas. All paved areas shall be free of grass cuttings. These activities shall be conducted on an as-needed basis, but in no event less than quarterly. Landscape maintenance to include replacement of dead, diseased, or severely damaged plants and trees, and irrigation equipment. Trees and plants should be maintained at a height and size necessary to eliminate hiding places and preserve sight distance for those using or intending to use the facility. Landscaping must meet Americans with Disabilities Act (ADA) Standards.
- b) Litter pickup and disposal: FACILITY shall be kept clean, removing any litter, and emptying trash bins on an as-needed basis, but no less than quarterly. Prior to the beginning of any mowing, all litter shall be picked up to preclude cutting them up. Litter pickup and disposal shall include the regular cleaning and emptying of trash bins within the FACILITY, dead animal removal and removal of sediment from swales.
  - c) Edging and sweeping: All curbs, sidewalks, and landscaped areas shall be edged during a mowing cycle. The LOCAL GOVERNMENT shall preclude any activity that will damage a parked vehicle. Sidewalks shall be kept free of debris and trimmings.
  - d) Lighting: This will include routine maintenance, repair and replacement for knock downs, lightning damage and other outages as well as covering the costs of the lighting utility bills. Solar powered lighting shall be used when possible to reduce operating costs.
  - e) Maintenance of bus shelters, bike racks, bike lockers and benches, including washing, painting, cleaning out and repair.
  - f) Maintenance of traffic control devices, including striping, retroreflective pavement markers (RPMs), signs and delineators.
  - g) Maintenance of FACILITY pavement, curbs, sidewalks, and stormwater inlets. Pavement shall be free of potholes and depressions greater than one square foot and deeper than two inches. Sidewalks shall remain clean and functional with no trip hazard greater than  $\frac{3}{4}$ " deep.
  - h) Maintenance of fencing.
  - i) Removal of abandoned, severely vandalized, or burned vehicles, trailers, or equipment.
  - j) Spiders, insects, pests, rodents, etcetera shall be exterminated/eliminated on an as-needed basis.

Routine maintenance activities are to be undertaken on an as-needed basis, but no less than quarterly (unless otherwise noted). The maintenance includes mowing, litter pickup and disposal, weeding, edging and trimming, sign cleaning, irrigation and lighting maintenance. The below listed activity numbers represents the numbers associated with Maintenance Management System Routine Maintenance Activities performed by the FDOT maintenance crews. These activities shall be performed in accordance with the DEPARTMENT’S performance standards.

ACTIVITY	DESCRIPTION	REPORTING UNITS
433	Sodding	Square Yard
485	Small Machine Mowing	Acres
487	Weed Control (Manual)	Acres
490	Fertilizing	Tons
492	Tree Trimming and Removal	Man-Hour
493	Landscaped Area Maintenance	Square Yard
522	Sign Cleaning	Each
541	Litter Removal	Acres
543	Road Sweeping (Mechanical)	Miles
545	Edging and Sweeping	Miles
787	Highway Lighting Maintenance	Hours

The work included under this Memorandum of Agreement consists of providing all labor, equipment, materials, and incidentals necessary to maintain the FACILITY.

5. The DEPARTMENT, or their delegates, shall conduct regular inspections of the FACILITY to determine whether maintenance is adequate, appropriate safety factors are in place and whether improvements or repairs are needed. If, at any time while the terms of this Agreement are in effect, it comes to the attention of the DEPARTMENT’S District Director of Transportation Operations, District \_\_\_\_\_ ( ), that the LOCAL GOVERNMENT’S responsibility as established herein or a part thereof is not being properly accomplished pursuant to the terms of this Agreement, said District Director of Operations, District \_\_\_\_\_ ( ), may at his/her option, issue a written notice in care of the LOCAL GOVERNMENT to place the LOCAL GOVERNMENT on notice thereof. Thereafter any deficiencies identified shall be promptly corrected by the LOCAL GOVERNMENT to ensure no further recurrences of such deficiencies. The LOCAL GOVERNMENT shall have a period of twenty (20) calendar days within which to correct the cited deficiencies. If the said deficiencies are not corrected within this time period, the DEPARTMENT may at its option proceed as follows:

- a) If maintenance is not in compliance, the DEPARTMENT may but is not obligated to take maintenance action with regard to all or part of the FACILITY, with

DEPARTMENT or contractor's personnel and invoice the LOCAL GOVERNMENT for expenses incurred; and/or

- b) The DEPARTMENT may terminate the Agreement.; and/or
  - c) As to any landscaping that may have been added to the FACILITY, the DEPARTMENT may elect to remove the same and to restore affected areas to their preexisting condition and invoice the LOCAL GOVERNMENT for the reasonable cost of such removal and restoration, all of which shall be immediately paid by the LOCAL GOVERNMENT.
6. This Agreement or any part thereof is subject to termination only upon mutual agreement of the parties hereto with a thirty (30) day written notice.
  7. The term of this Agreement commences on the date of the DEPARTMENT'S acceptance of completion of the FACILITY and will continue in perpetuity for the useful life of the FACILITY. In no event shall this Agreement be in effect for less than ten (10) years. In the event that the LOCAL GOVERNMENT cancels this Agreement prior to the tenth (10<sup>th</sup>) year of the term, or if the LOCAL GOVERNMENT defaults under this Agreement by failing to abide by the terms and conditions set forth herein, the LOCAL GOVERNMENT shall reimburse to the DEPARTMENT the amount paid by the DEPARTMENT for the improvements to the facility on a pro rated basis of 10% of the full cost for each unexpired year of the ten (10) year term. Such reimbursement shall be made in one lump sum payment at the end of the calendar year in which the LOCAL GOVERNMENT cancels the Agreement or defaults in its performance of this Agreement. The DEPARTMENT shall provide the LOCAL GOVERNMENT with a statement of improvement costs, and no portion of the improvement cost shall be due or payable by the LOCAL GOVERNMENT after this Agreement has been in force for ten (10) years.
  8. This writing embodies the entire Agreement and understanding between the parties hereto and there are no other Agreements and understandings, oral or written, with reference to the subject matter hereof that are not merged herein and superseded hereby.
  9. This Agreement shall be modified only in writing and signed by both parties.
  10. The LOCAL GOVERNMENT may install additional landscaping within the limits of the FACILITY identified as a result of this document, subject to the condition that all landscaping installed will be developed and implemented in accordance with the appropriate DEPARTMENT safety and road design standards. Landscaping must also meet Americans with Disabilities Act (ADA) Standards, and be maintained in accord with Section 4 of this agreement.

11. All work done within the FACILITY limits will be accomplished in accordance with the *Department of Transportation Manual on Uniform Traffic Control Devices (MUTCD)* and safe practices for streets and highway construction, which documents are hereby incorporated by reference.
12. To the extent permitted by Florida law, the LOCAL GOVERNMENT agrees that it will indemnify and hold harmless the DEPARTMENT and all of the DEPARTMENT'S officers, agents, and employees from any claim, loss, damage, cost, charge or expense arising out of any act, action, neglect or omission by the LOCAL GOVERNMENT during the performance of this Agreement, whether direct or indirect, and whether to any person or property to which the DEPARTMENT or said parties may be subject, except that neither the LOCAL GOVERNMENT nor any of its subcontractors will be liable under this section for damages arising out of injury or damage to persons or property directly caused or resulting from the sole negligence of the DEPARTMENT or any of its officers, agents, or employees.
13. The DEPARTMENT, during any State fiscal year, shall not expend money, incur any liability, or enter into any contract which by its terms involves the expenditure of money in excess of the amounts budgeted as available for expenditure during such fiscal year. Any contract, verbal or written, made in violation of this subsection is null and void, and no money may be paid on such contract. The DEPARTMENT shall require a statement from the comptroller of the DEPARTMENT that funds are available prior to entering into any such contract or other binding commitment of funds. Nothing herein contained shall prevent the making of contracts for periods exceeding one (1) year, but any contract so made shall be executory only for the value of the services to be rendered or agreed to be paid for in succeeding fiscal years; and this paragraph shall be incorporated verbatim in all contracts of the DEPARTMENT which are for an amount in excess of \$25,000,000 and which have a term for a period for more than one (1) year.
14. This Agreement is non-transferable and non-assignable in whole or in part without the written consent of the DEPARTMENT. However, both parties agree that the property owner(s) may perform maintenance on the FACILITY in conjunction with normal maintenance, mowing, and landscaping operations.
15. Nothing contained in this Agreement shall be construed to limit or modify the provisions of law for the sovereign immunity of the DEPARTMENT or LOCAL GOVERNMENT, including, but not limited to, Chapter 768, Florida Statutes, as it applies to the LOCAL GOVERNMENT and to the DEPARTMENT.
16. Each party represents to the other that the individual signing below on its behalf is fully authorized to execute this Agreement, and no further action by any board, council, employee or officer is required for the due execution and effectiveness of this Agreement.

IN WITNESS WHEREOF the parties hereto have executed this Agreement on the day and year first above written.

**STATE OF FLORIDA**  
**DEPARTMENT OF TRANSPORTATION**  
Address:

**LOCAL GOVERNMENT**  
Address:

By: \_\_\_\_\_

By: \_\_\_\_\_

Title/Office: Director of Operations

Title/Office: \_\_\_\_\_

Date: \_\_\_\_\_

Date \_\_\_\_\_

ATTEST: (SEAL)

ATTEST: (SEAL)

By: \_\_\_\_\_

By: \_\_\_\_\_

Title/Office: \_\_\_\_\_

Title/Office: \_\_\_\_\_

Legal Review:

Legal Review:

By: \_\_\_\_\_

By: \_\_\_\_\_

Copy: Strategic Intermodal Office

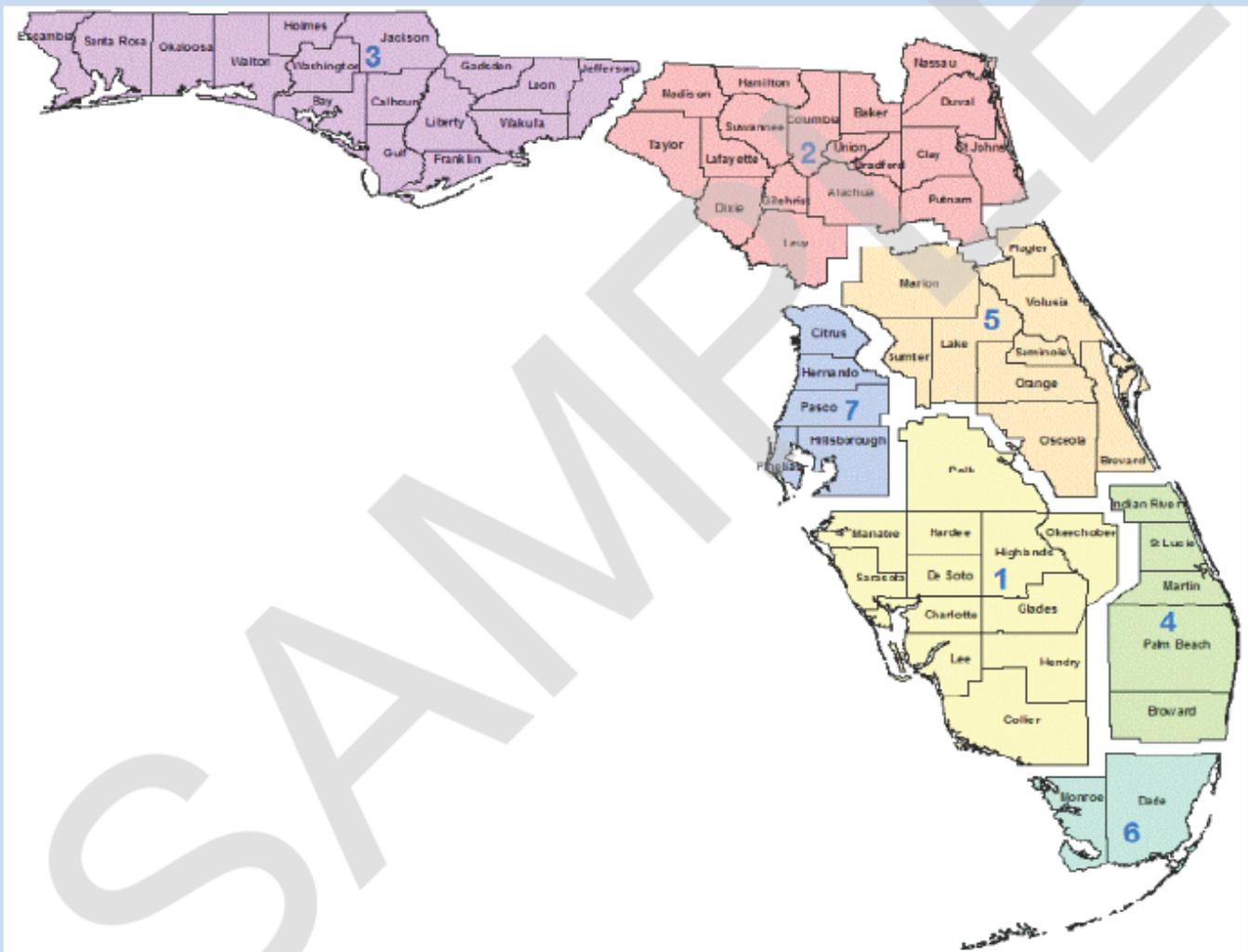
### APPENDIX G: SAMPLE CONCEPTUAL PARK-AND-RIDE WEB-TOOL

## FDOT STATE PARK-AND-RIDE LOTS

[Log In](#) [Park-And-Ride Lots](#) [Forms](#) [Input Inventory Data](#) [Reports](#) [Pictures](#) [Archives](#) [Contacts](#) [Technical Support](#)



Click on the interactive map below to find more information about the District Park-And-Ride lots.



OR search by [City](#) or [Zipcode](#) by clicking here.

## FDOT STATE PARK-AND-RIDE LOTS

INVENTORY RESULTS DATA INPUT FORM FOR EXISTING PARK-AND-RIDE LOTS



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### General Information

District: <input type="text"/> County: <input type="text"/> City: <input type="text"/> Park-And-Ride Lot: <input type="text"/> Description of Lot: <input type="text"/> Date of Inspection: <input type="text"/> Time of Inspection: <input type="text"/> <input type="radio"/> AM <input type="radio"/> PM Inspected By: <input type="text"/> Lot Type: <input type="text"/> Average Fuel Prices: <input type="text"/> Adjacent Land Use(s): (Check all that apply) <input type="checkbox"/> Shopping Centers <input type="checkbox"/> Day Cares/Schools <input type="checkbox"/> Medical Center <input type="checkbox"/> Attractions/Events <input type="checkbox"/> Other: <input type="text"/> Expansion Potential: <input type="text"/> Transit Service(s): (Check all that apply) <input type="checkbox"/> Bus <input type="checkbox"/> Express      # of Providers: <input type="text"/> Provider: <input type="text"/> Route ID(s): <input type="text"/> <input type="checkbox"/> Local            # of Providers: <input type="text"/> Provider: <input type="text"/> Route ID(s): <input type="text"/> <input type="checkbox"/> Train            # of Providers: <input type="text"/> Provider: <input type="text"/> Route ID(s): <input type="text"/> <input type="checkbox"/> Vanpool <input type="checkbox"/> Other	GIS Coordinates: <input type="text"/> Address: <input type="text"/> Significant Problems: <input type="text"/> Recommendations: <input type="text"/> Comments: <input type="text"/>
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### Utilization

<input type="text"/> Total Spaces <input type="text"/> Available Spaces <input type="text"/> Spaces Used <input type="text"/> Number of ADA/Disabled/Handicapped Spaces <input type="text"/> ADA/Disabled/Handicapped Spaces Used	<input type="text"/> Number of Spaces Used by Illegally Parked Cars <input type="text"/> Number of Illegally Parked Cars <input type="text"/> Number of Bicycles Parked <input type="text"/> Number of Strollers Parked
---	--

Number of Designated Parking Spaces: <input type="text"/> Amtrak <input type="text"/> Taxi <input type="text"/> Employee	<input type="text"/> Law Enforcement / Security <input type="text"/> Short-Term Parking <input type="text"/> Stroller Parking	<input type="text"/> Carpool/Vanpool <input type="text"/> Motorcycle <input type="text"/> Other
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### Amenities Available

Type:	Quantity:	Condition:	Type:	Quantity:	Condition:
Benches:	<input type="text"/>	<input type="text"/>	Phones:	<input type="text"/>	<input type="text"/>
Bike Racks:	<input type="text"/>	<input type="text"/>	Restrooms:	<input type="text"/>	<input type="text"/>
Bike Lockers:	<input type="text"/>	<input type="text"/>	Security:	<input type="text"/>	<input type="text"/>
Bulletin Boards:	<input type="text"/>	<input type="text"/>	Shelter:	<input type="text"/>	<input type="text"/>
Kiss & Ride Designated Areas:	<input type="text"/>	<input type="text"/>	Ticket - Automated:	<input type="text"/>	<input type="text"/>
Mail Boxes:	<input type="text"/>	<input type="text"/>	Ticket - Manned:	<input type="text"/>	<input type="text"/>
Newspaper Boxes:	<input type="text"/>	<input type="text"/>	Trash Cans:	<input type="text"/>	<input type="text"/>
Recycling:	<input type="text"/>	<input type="text"/>	Water Fountains:	<input type="text"/>	<input type="text"/>
Refreshment Vending Machines:	<input type="text"/>	<input type="text"/>	Video / Audio:	<input type="text"/>	<input type="text"/>
			Surveillance:	<input type="text"/>	<input type="text"/>
			Other:	<input type="text"/>	<input type="text"/>

Quality Assessments

<p>Overall Site Condition: <input type="text"/></p> <p>Type of Pavement: <input type="text"/></p> <p>Pavement Condition: <input type="text"/></p> <p style="padding-left: 20px;">Potholes: <input type="text"/></p> <p style="padding-left: 20px;">Rutting: <input type="text"/></p> <p style="padding-left: 20px;">Cracking: <input type="text"/></p> <p style="padding-left: 20px;">Other: <input type="text"/></p> <p>Fencing: <input type="text"/></p> <p style="padding-left: 20px;"><input type="checkbox"/> Secured</p> <p style="padding-left: 20px;"><input type="checkbox"/> Unsecured</p> <p style="padding-left: 20px;"><input type="checkbox"/> Partial</p> <p style="padding-left: 20px;"><input type="checkbox"/> Other <input type="text"/></p> <p>Drainage Conditions: <input type="text"/></p> <p>Way-Finding/Directional Signage: <input type="text"/></p> <p style="padding-left: 20px;">North of Lot: <input type="text"/></p> <p style="padding-left: 20px;">South of Lot: <input type="text"/></p> <p style="padding-left: 20px;">East of Lot: <input type="text"/></p> <p style="padding-left: 20px;">West of Lot: <input type="text"/></p> <p>Signs Needed: <input type="text"/></p> <p>Types of Signs At The Lot:</p> <p><u>Quantity:</u> <u>Type:</u></p> <p><input type="text"/> Lot Address Sign</p> <p><input type="text"/> Bus Stop Sign</p> <p><input type="text"/> FDOT is Not Responsible for Stolen Articles or Damage to Automobiles While At This Facility Park at Your Own Risk</p> <p><input type="text"/> Overnight Camping, Commercial Use, And/Or Parking in Excess of 24 Hours Is Prohibited</p> <p><input type="text"/> Overnight Trailer Parking and Camping Prohibited</p> <p><input type="text"/> Park and Ride Lot Facility Florida Department of Transportation</p> <p><input type="text"/> Park and Ride Sign</p> <p><input type="text"/> Parking by Disabled Permit Only</p> <p><input type="text"/> Parking Provided Courtesy of Florida Department of Transportation Park at Your Own Risk</p> <p><input type="text"/> Share-A-Ride Sign</p> <p><input type="text"/> Other: <input type="text"/></p>	<p>Pavement Striping/Markings: <input type="text"/></p> <p>Debris: <input type="text"/></p> <p>Curb Condition: <input type="text"/></p> <p>Sidewalk Condition: <input type="text"/></p> <p>Bike Lane Condition: <input type="text"/></p> <p>Transit Access Condition: <input type="text"/></p> <p>Maintenance Conditions: <input type="text"/></p> <p>Site Visibility: <input type="text"/></p> <p>Ease of Access: <input type="text"/></p> <p>Natural Shade: <input type="text"/></p> <p>Landscaping Condition: <input type="text"/></p> <p>Overall Pedestrian Access Condition: <input type="text"/></p> <p style="padding-left: 20px;">To Lot From Cross Streets: <input type="text"/></p> <p style="padding-left: 20px;">Within Lot; Parking to Transit Area: <input type="text"/></p> <p>Lighting Type: <input type="text"/></p> <p>Lighting Quantity: <input type="text"/></p> <p>Lighting Condition: <input type="text"/></p>
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Pictures

Please downsize pictures if necessary to be 1 MB or less for upload.

Upload pictures of the lot. Include general pictures as well as pictures of items for maintenance to address. Add/Upload Pictures by dragging and dropping them into the box below. When finished, click the upload button.

IF FDOT decides to use this type of web-based tool the link to <http://www.ftis.org/atSIM.html> could be added

Once uploaded, you may click on the thumbnail below to view the picture and add a description.

Important! Your information will not be submitted until you click on the button below.

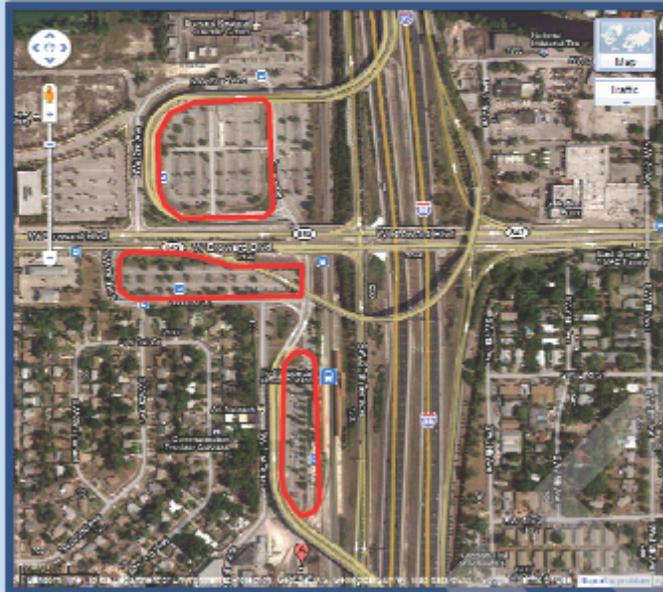
## FDOT STATE PARK-AND-RIDE LOTS

### BROWARD BLVD. TRI-RAIL STATION (FT. LAUDERDALE STATION)

**District:** 4  
**County:** Broward  
**City:** Fort Lauderdale  
**Address:** 200 SW 21st Terr., Ft. Lauderdale, FL 33312  
**GIS Coordinates:** N 26.117497 W 80.17017

[Create A Graph](#)  
[Generate A Report](#)  
[View Archived Inventory Information](#)

Reviewed by: TBA  
 Date of Review: TBA



Most Recent Utilization Rate:

**48%**

**Maintenance & Safety Needs:**

**High Priority**

**Medium Priority**

- > General/handicapped striping in the lots needs to be re-striped.
- > A curb and pavement needs to be replaced in the north lot.
- > Damaged parking blocks should be replaced.

**Low Priority**

- > All three lots need to be landscaped.
- > Repaint/refurbish the interior roof.

[See Pictures of Maintenance Needs](#)

Maintaining Entity: FDOT/Amtrak  
 Maintenance Agreement: Yes  
 Maintenance Agreement Expires: Never

[Get Driving Directions](#)

**Type of Lot:** Tri-Rail  
**Total Spaces:** 756  
**Description of Lot:** At the intersection of I-95 and Broward Blvd. Composed of 3 separate lots: 2 south of Broward Blvd. (including one connected with the Tri-Rail Station), and 1 north of Broward Blvd.  
**Parcel Owner:** Florida Dept of Transportation Office of Right of Way  
**Parcel ID(s):** 504205380010, 504208000390, 504205000245, 504205000246, 504205000240, 504205000262, 504205000252, 504205000254, 504205000253, 504208032930, 504208032930, 504208031940, 504208031930, 504208030060, 504208030080, 504208030040, 504208040030, 504208000390

**Adjacent Land Use:** Other - Juvenile Detention Center, Interstate Highway, Tri-Rail Train Station, Residential Area  
**Expansion Potential:** Yes

**Transit Services:**

Type: Express Bus	Type: Train - Tri-Rail	Type: Carpool/Vanpool
Provider: Broward County Transit	Provider: Amtrak	
Route ID(s): 95 Express	Route ID(s): FLA 1	

General Information from the Most Recent Inspection

**Date of Inspection:** 3/8/2011  
**Time of Inspection:** 12:21  AM  PM  
**Inspected By:** KC  
**Average Fuel Prices:** \$3.57 per gallon

**Comments:**

- > The lots are somewhat difficult to find. More signage is needed to guide users to all lots from Broward Blvd. Signs should be placed at the entrances of the two park-and-ride lots.
- > General/handicapped striping in the lots needs to be re-striped. A curb and pavement needs to be replaced in the north lot. Damaged parking blocks should be replaced.
- > Witnessed drop-off; however, the area is not identified.
- > All three lots need to be landscaped. The second and third lots look abandoned because they lack signs that identify their use. Painting and landscaping improvements are needed.
- > Pedestrians were seen walking from Broward Blvd. via SW 1st St. to the Tri-Rail station. It is a long distance from Broward Blvd. Consider looking at the routes along Broward Blvd. to decide if better access is possible.
- > Pedestrian activity was minimum at this station, but connectivity was fine.

**Significant Problems:**

- > Restripe pavement markings

**Recommendations:**

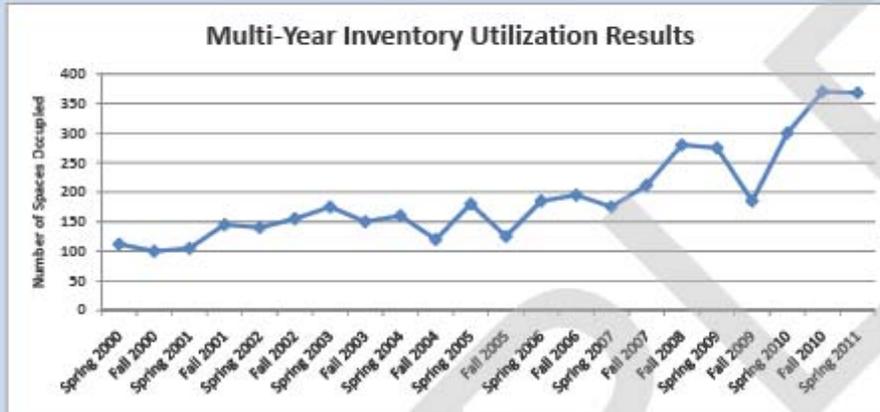
- > Additional signage for locating the lots.
- > Consider adding a bus route to accommodate pedestrians from Broward Blvd.

Most Recent Utilization

Available Spaces	Spaces Used	Type		
756	368	Total Parking	0	Number of Spaces Used by Illegally Parked Cars
40	8	ADA/Disabled/Handicapped	0	Number of Illegally Parked Cars
			5	Number of Bicycles Parked
			0	Number of Strollers Parked

Number of Designated Parking Spaces:

Available Spaces	Spaces used	Type:	Available Spaces	Spaces used	Type:
35	27	Amtrak	0	0	Stroller Parking
10	0	Taxi	0	0	Carpool/Vanpool
0	0	Employee	0	0	Motorcycle
0	0	Law Enforcement / Security	0	0	Other
0	0	Short-Term Parking			



Amenities Available

Quantity:	Condition:	Type:	Quantity:	Condition:	Type:
1	Good	Benches	1	Fair	Phones
2	Good	Bike Racks	0	N/A	Restrooms
1	Good	Bike Lockers	0	N/A	Security Patrol
0	N/A	Bulletin Boards	2	NM	Sheltered Areas
0	N/A	Bus Shelter	1	Good	Ticket - Automated
0	N/A	Emergency Call Box	1	Good	Ticket - Manned
0	N/A	Kiss & Ride Designated Areas	1	Fair	Trash Cans
0	N/A	Mail Boxes	1	Good	Water Fountains
1	NM	Newspaper Boxes	0	N/A	Video / Audio Surveillance
0	N/A	Recycling	0	N/A	Other
2	Good	Refreshment Vending Machines			

Amenity Wish List:

- > Designated Kiss & Ride Area
- > Emergency Call Boxes

\* NM = Needs Maintenance

Most Recent Quality Assessments

Overall Site Condition:	Fair	Pavement Striping/Markings:	Needs Maintenance
Type of Pavement:	Asphalt	Debris:	No
Pavement Condition:	Fair	Curb Condition:	Needs Maintenance
Potholes:	No	Sidewalk Condition:	Good
Rutting:	No	Bike Lane Condition:	N/A
Cracking:	No	Transit Access Condition:	N/A
Other:	No	Site Visibility:	Fair
Fencing:		Ease of Access:	Fair
<input checked="" type="checkbox"/> Secured	Good	Natural Shade:	Fair
<input type="checkbox"/> Unsecured		Landscaping Condition:	Needs Maintenance
<input type="checkbox"/> Partial		Overall Pedestrian Access Condition:	Fair
<input type="checkbox"/> Other		To Lot From Cross Streets:	Needs Maintenance
Drainage Conditions:	Good	Within Lot; Parking to Transit Area:	Good
Way-Finding/Directional Signage:		Lighting Type:	Light poles
North of Lot:	Yes, I-95	Lighting Quantity:	55
South of Lot:	Yes, I-95	Lighting Condition:	Good
East of Lot:	Yes, Broward		
West of Lot:	Yes, Broward		
Signs Needed:	Signage directing users to all PNR lots from Broward Blvd.		
Types of Signs At The Lot:			

Quantity: Type:

- 0 Lot Address Sign
- 3 Bus Stop Sign
- 0 FDOT is Not Responsible for Stolen Articles or Damage to Automobiles While At This Facility Park at Your Own Risk
- 0 Overnight Camping, Commercial Use, And/Or Parking in Excess of 24 Hours Is Prohibited
- 0 Overnight Trailer Parking and Camping Prohibited
- 0 Park and Ride Lot Facility Florida Department of Transportation
- 10 Park and Ride Sign
- 40 Parking by Disabled Permit Only
- 0 Parking Provided Courtesy of Florida Department of Transportation Park at Your Own Risk
- 0 Share-A-Ride Sign
- 5 Other: Tri-Rail Station Sign

Pictures

Click on a picture below to enlarge it and scroll through the pictures.



Note-worthy User Comments

-> None at this time.

Florida Department of Transportation - Last Updated 8/5/11

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