



CITY OF MELBOURNE

COMPREHENSIVE PLAN
CHAPTER III
TRANSPORTATION ELEMENT

Data and Analysis

May 2009

DRAFT

Prepared For:

City of Melbourne
Department of Planning and Economic Development
900 E. Strawbridge Avenue
Melbourne, Florida 32901

Prepared By:



LAND DESIGN INNOVATIONS
Incorporated

140 North Orlando Avenue
Suite 295
Winter Park, Florida 32789
Phone: 407-975-1273
Fax: 407-975-1278
www.landbiz.com

TABLE OF CONTENTS

A. INTRODUCTION.....1

B. INVENTORY1

1. Road System1

 a. Jurisdiction and Maintenance Responsibility3

 b. Functional Classification3

 c. Existing Characteristics of Major Trip Generators and Attractors4

 d. Existing Modal Split and Vehicle Occupancy Rates4

 e. Population Characteristics5

 f. Constrained Facilities.....5

 g. Accident Locations6

 h. Signalized Intersections6

 i. Evacuation Routes6

2. Airport7

3. Rail8

4. Public Transit System.....8

5. Parking System.....9

6. Bicycle System9

7. Pedestrian System9

8. Intermodal Facilities.....9

C. TRANSPORTATION ANALYSIS.....10

1. Socio-Economic Growth.....10

2. Existing Roadway Performance11

- a. Availability of Transportation Facilities and Services to Serve Existing Land Uses..12
- b. Intermodal Facilities12
- 3. Programmed Transportation Improvements.....12**
 - a. Future Public Transit Plan13
- 4. Future Roadway Performance.....14**
- 5. Future Transportation Plan.....14**
 - a. Future Transportation Map15
 - b. Future Pedestrian/Bicycle Plan.....15
 - c. Future Parking Plan.....15
 - d. TSM/TDM Strategies.....16

LIST OF TABLES

Table III- 1: FDOT Minimum Levels of Service Standards..... 18
Table III- 2: Roadway Segments with Highest Crash Rate (Per Million VMT) 19
Table III- 3: 2007 SCAT Transit Melbourne Coverage..... 19
Table III- 4: 2007 SCAT Transit Ridership..... 20
Table III- 5: County Population and Employment Totals 21
Table III- 6: Transportation Facilities and Land Uses Served..... 21
Table III- 7: Existing Roadway Performance 2008 22
Table III- 8: Year 2025 Roadway Improvement Needs..... 25

CHAPTER III

TRANSPORTATION ELEMENT DATA AND ANALYSIS

A. INTRODUCTION

The purpose of the Transportation Element is to plan for a transportation system that emphasizes the accessibility to goods and services and supports the Future Land Use Element. Furthermore, the purpose is to encourage the development of compact, pedestrian-oriented urban areas, promote energy efficient development patterns, and protect air quality. The Transportation Element establishes Level of Service (LOS) Standards for the major roadways and supports land development policies that promote other transportation alternatives.

An essential base for planning a transportation system is the Future Land Use Element (FLUE). Within the FLUE, the Future Land Use Map can guide where new or improved transportation facilities may be needed. The Transportation Element assesses the condition and capacity of the existing transportation facilities, projects future needs, sets level of service standards for roads, and determines future system improvements.

Roadway level of service standards are established in the Transportation Element to ensure that adequate facility capacity for future development is concurrent with the issuance of development orders and development permits. These standards are established for each roadway link consistent with the facility type, and current Florida Department of Transportation (FDOT) LOS guidelines.

The Transportation Element also recognizes the need to provide transportation alternatives to increase accessibility and provide a comprehensive transportation system. Therefore, this element addresses roadway facilities, plus transit facilities, availability of public parking facilities, availability of bicycle and pedestrian facilities, airport and rail line systems, and other ancillary services and programs.

B. INVENTORY

An efficient transportation system should provide access to various land uses through alternative transportation modes. The overview of the existing multi-modal transportation system within the City of Melbourne provides the basis for analyzing existing transportation deficiencies and needs within the City. This section identifies existing roadway and transit facilities, availability of public parking facilities, availability of bicycle and pedestrian facilities, airport facilities, train facilities and other ancillary services and programs.

1. Road System

This section describes the major roadway facilities within the City and their relative function in the City's circulation system. The traffic circulation system can generally be described as a small area of gridded streets in the town center and a collection of rural roads surrounding the City. The following is a description of some of the major roadways

in the City of Melbourne.

- New Haven Avenue (US HWY 192) is under the jurisdiction of the Florida Department of Transportation (FDOT) and serves as an urban principal arterial connecting the City of Melbourne with the City of West Melbourne, the Town of Indialantic and Interstate 95. New Haven Avenue is a divided four (4) lane facility that bisects the City traveling east and west. It provides a linkage for intra-state traffic between the east and central portions of the state from Melbourne to the southern Orlando metropolitan area. New Haven Avenue is one of the primary east-west routes through the City of Melbourne, and as such serves as one of the east-west evacuation routes for residents living on the barrier islands.
- Eau Gallie Boulevard (SR 518) is a four (4) lane facility under the jurisdiction of the Florida Department of Transportation (FDOT). It serves as an urban principal arterial for the City, providing another connection from the barrier islands to Interstate 95. Eau Gallie Boulevard runs east-west through the north side of the City and is also a primary evacuation route for residents located on the barrier islands.
- Indian River Lagoon Scenic HWY/Harbor City Boulevard (US HWY 1) is a six (6) lane facility under the jurisdiction of Florida Department of Transportation (FDOT) and serves as an urban principal arterial for the City of Melbourne. US 1 runs north-south along the Indian River Lagoon. The roadway also serves as an evacuation route, providing linkage for both inter- and intra-state traffic between the north and south portions of the City. It also provides a connection for the City between the cities of Cocoa, Rockledge, and Titusville to the north and the cities of Palm Bay and Vero Beach to the south.
- Wickham Road is a four (4) lane facility under the County's jurisdiction and serves as an urban principal arterial. Wickham Road is one of the most significant north-south thoroughfares through the City. The facility connects the City with the Suntree/Viera area to the north and the cities of Palm Bay and West Melbourne to the south.
- Babcock Street (SR 507) is a four (4) lane facility under both County and City's jurisdiction and serves as an urban principal arterial. Babcock Street is a significant north-south thoroughfare running through the southern portion of the City. The facility connects Melbourne with the City of Palm Bay to the south.
- Apollo Boulevard is a four (4) lane facility under both County and City's jurisdiction and serves as an urban minor arterial. The facility runs along the east side of the Melbourne International Airport and the Florida East Coast Railway. Apollo Boulevard provides a connection between Sarno Road, Babcock Street and NASA Boulevard.
- Sarno Road is an undivided four (4) lane facility, with a two (2) lane segment, under the City's jurisdiction and serves as an urban minor arterial. The facility

runs parallel to Eau Gallie Boulevard running east-west providing connections between Eau Gallie Boulevard, Babcock Street and Harbor City Boulevard (US HWY 1).

- NASA Boulevard is a divided four (4) lane facility under the City’s jurisdiction and serves as an urban principal arterial. This roadway runs east-west along the southern boundary of Melbourne International Airport. NASA Boulevard provides access to the airport and the major employment centers in the City. This facility also connects Wickham Road with Babcock Street and Harbor City Boulevard (US HWY 1).
- Aurora Road is an undivided four (4) lane facility, with a two (2) lane section, under the City’s jurisdiction that serves as an urban minor arterial (between Wickham Road and US HWY 1) and a major collector (between Harlock Road and Wickham Road). This facility is located north of Eau Gallie Boulevard, running east-west. Aurora Road predominantly serves residential areas within the City.

a. Jurisdiction and Maintenance Responsibility

The maintenance responsibility of each roadway in the City of Melbourne is displayed on **Map III-1**.

b. Functional Classification

The functional classification of major roads in the City of Melbourne is illustrated in **Map III-3**. The functional classification of public roads is based on FDOT criteria, which considers quantitative and qualitative factors such as jurisdiction, land access, route length, and trip lengths. A road hierarchy is used to identify relative importance of roads within the system; provide guidance for level of service and design standards; aid in establishing improvement priorities; identify maintenance responsibility; and, assist in determining funding and financing policies. The hierarchy used includes:

- *Limited Access Facilities/Freeways*: Designed to provide regional mobility via uninterrupted flow at high travel speeds for regional trips. Access spacing is generally on the order of one mile or more, and average travel speeds are above 40 miles per hour. There is no direct land access, and urban freeways are multilane, divided facilities. Lane access is always via ramps to major arterials or frontage roads. Interstate 95 traverses a portion of the City on the west side.
- *Arterials*: Provide regional mobility via both uninterrupted flow and interrupted flow segments. Arterials provide mobility around and through urban and community cores, and accommodate relatively long trip lengths as opposed to providing access to adjacent properties. Arterials are further classified as “Urban” or “Rural” depending on the road location, “Principal”, “Major”, or “Minor” depending on its function and relative

importance and as Class I, II, or III based on the number of signals per mile, access controls, geometric cross sections, and speed limits for performance purposes.

- *Collectors*: Provide for movement between local streets and the arterial network. Collectors serve residential, commercial and industrial areas and are further classified as urban or rural based on location and area served.
- *Local Roads*: Provide direct access to abutting properties. Local roads accommodate traffic originating in or traveling to properties within a neighborhood, commercial or industrial development. Local roads are not considered part of the major thoroughfare system.

c. Existing Characteristics of Major Trip Generators and Attractors

Overall, the location of major trip generators and attractors influences roadway improvement needs as well as the demand for transit. Trip production areas are those portions of the City that generate the most trips and typically consist of major residential developments.. Newer residential development is generally situated in the north/northwest and southwest portions of the City. Many of the older residential subdivisions are located in the vicinity of New Haven Avenue, Sarno Road and Eau Gallie Boulevard. Trip attraction areas are locations with shopping, recreation, medical, employment, and other facilities, generally the location of the trip ends. People are attracted to these areas because of the services or facilities available. The major traffic attractors within the City include:

- Brevard Community College (Melbourne Campus)
- Florida Institute of Technology
- Downtown, Eau Gallie and Babcock Street CRAs
- Melbourne Square Mall area
- Melbourne International Airport
- Ellis Road industrial area
- Paradise Beach Park
- Wickham Park
- Melbourne Greyhound Park area

Other facilities that are classified as minor traffic attractors include City Hall, schools, City parks, businesses in the waterfront area, and the libraries.

d. Existing Modal Split and Vehicle Occupancy Rates

Throughout the Melbourne area and Brevard County, single occupancy vehicle trips account for the vast majority of all trips. The occupancy rate for Brevard County is approximately 1.11 persons per vehicle for home to work trips. This

trend is due in part to the lack of a comprehensive mass transit system (within the County) and insufficient bicycle/pedestrian facilities prior to 2000. However, since 2000 the transit system has increasingly gained popularity and has steadily increased ridership each year. In total there are five bus routes that service the greater City of Melbourne area, the most of any city in Brevard County. Automobile travel continues to be the easiest and most convenient mode of travel. Alternative modes of transportation are less attractive because accessibility is limited and freedom of travel is restricted.

e. Population Characteristics

The City of Melbourne had a 2000 population of 71,382. According to the 2000 Census, the City's population was comprised of 84.5% white, 9.3% black and 5.5% Hispanic. The average age was 40.5 years, with an average of 2.23 persons per household. According to the Census, 43.5% of the workers living in Melbourne drove to work alone, 5.2% drove to work in a carpool, and the remaining 3.3% either walked to work or found other means of getting to and from work.

f. Constrained Facilities

Section 339.155, Florida Statutes, makes governmental police powers available to preserve and protect property necessary for transportation corridors and recommends that needed rights-of-way be acquired as far in advance of construction as possible. FDOT requests that local governments identify constrained roadways in their comprehensive plans to ensure maintenance of the operating conditions, so that significant degradation in the level of service does not occur.

A constrained roadway is one to which adding two or more through lanes to meet current or future needs is not possible due to physical, environmental or policy barriers. There are several roadways in the city which could be considered constrained based on the developed nature of the adjacent land uses and the neighborhoods that they serve.

Policy constrained roadways include: Country Club Drive, Melbourne Avenue, and Lipscomb Street north of University Boulevard which are substantially developed with mostly residential uses. Widening these roads could have a substantial adverse impact on the neighborhoods without having significant benefits to the traveling public. In most instances, widening these roads would impact a large number of old trees and result in the removal of structures located close to the roadway.

Physically constrained New Haven Avenue and Strawbridge Avenue are located in the developed downtown area. Zoning in this area permits the construction of buildings close to the right-of-way, usually with no building setbacks. Most of the existing development is constructed in this manner. Pineapple Avenue (the old

historic U.S. 1) and the adjacent land are located in a mixed-use area with residences and businesses located along both sides of the street. This street is important to the redevelopment of this old neighborhood and reserving the right-of-way for on-street parking and strengthening neighborhood cohesiveness is necessary in meeting the redevelopment and neighborhood revitalization goals for this area. SR A1A, Riverside Drive and Eau Gallie Boulevard on the barrier island should not be widened since widening these roadways would permit the ability of these roadways to carry additional traffic encouraging or supporting greater densities on the barrier island.

U.S. 1 is a policy constrained roadway in areas where the roadway already is six lanes wide. Hibiscus Boulevard is physically constrained because of existing development. This roadway does not require widening to meet future LOS requirements. Eau Gallie Boulevard/Montreal Avenue in the old downtown Eau Gallie area from U.S. 1 to Pineapple Avenue is physically constrained. Street re-striping and elimination of on-street parallel parking could provide for a six-lane facility. Babcock Street north of the FEC Railroad is constrained by existing development. This segment is now five lanes wide and is part of the Babcock Street Redevelopment Area.

g. Accident Locations

In recognition of the importance of a roadway's relative safety, the occurrence of vehicle accidents and crash rates are tracked on an annual basis (see **Table III-2**). Several segments maintained a high ranking from one year to the next. Specifically, three segments in Melbourne had among the ten highest crash rates for both 2005/06 and 2006/07:

- Eau Gallie Boulevard from the Causeway to US 1
- Aurora Road from Wickham Road to Croton Road
- Wickham Road from Eau Gallie Road to Parkway Drive.

The top recurring areas for crashes are concentrated in two primary areas of the County: Merritt Island and Melbourne. A more detailed analysis of the crash data associated with these occurrences could provide some insight into the trend and will be coordinated with the respective jurisdictions.

h. Signalized Intersections

The City of Melbourne operates and maintains 66 intersections.

i. Evacuation Routes

Evacuation routes are crucial for the City of Melbourne and most importantly to the residents on the barrier islands. In the event of a Category 1 storm all residents on the barrier islands are required to evacuate. The primary evacuation routes for the City of Melbourne's barrier island residents are SR A1A, the Eau

Gallie Causeway (CR 518) and New Haven Avenue (US HWY 192). Within City limits, the Eau Gallie and Melbourne Causeways are the two main barrier island connections to the mainland and provide the east-west connection to Interstate 95. On the mainland, Interstate 95, Babcock Street and US HWY 1 are the designated north-south evacuation routes, see **Map VI-5**.

All hurricane evacuations are programmed for completion prior the arrival of tropical storm force winds, which are greater than 39 miles per hour. The East Central Florida Regional Planning Council updated the Hurricane Evacuation Study in 2005. The study provides estimates for County clearance times derived through a transportation modeling process. The study was last updated in 2005. The estimates for the year 2005 were as follows:

Category 1 Storm Event	10 Hours
Category 2 Storm Event	12 ¼ Hours
Category 3 Storm Event	17 Hours
Category 4/5 Storm Event	18 Hours

The evacuation times noted above are based on the worst case scenario, including heavy traffic and long response time. Evacuation decisions are timed to provide the at-risk population the maximum amount of time to safely evacuate based upon the severity of the storm event.

2. Airport

Existing conditions at the airport were obtained from the Airport Master Plan, Melbourne International Airport, Melbourne, Florida, prepared by Reynolds, Smith and Hills, Inc., (RS&H) March, 2005.

The airport is located on a 2,800-acre site approximately in the center of the City. It is generally situated north of Nasa Boulevard, south of Sarno Road, east of Wickham Road and west of Apollo Boulevard. The Florida East Coast Railway skirts along the east side of the airport providing the potential for a connected intermodal system for cargo purposes see **Map III-4**. In 2001 the airport logged 330,213 pounds of cargo. The airport is located almost equidistant between Jacksonville and Miami on Florida's east coast; a distance of approximately 180 miles. The airport is within approximately 62 miles of Orlando and approximately 26 miles south of the Cape Canaveral/Kennedy Space Center complex. The placement of the airport provides access to all of the City's major roadway corridors. .

The Melbourne International Airport is the only airport in Brevard County providing commercial passenger service and is classified as a commercial service, primary airport by the Federal Aviation Administration (FAA). Originally constructed by the U.S. Navy during World War II to meet pilot training needs, the airport was declared a surplus facility after the war, and was given to the City of Melbourne by quit claim deed in 1946. Current operations include limited air carrier (passenger) service through Delta Air

Lines/Connections and general aviation activities (e.g., business/corporate transport service and professional flight training/instruction and cargo air service).

Melbourne International Airport's location in the center of the city generates a significant amount of traffic on the surrounding roadways. Primarily, the airport affects the direct traffic flow between origins and destinations north and south of the airport site. Consequently, sizeable volumes of traffic are channeled or diverted onto the main thoroughfares adjacent to the airport (i.e., Apollo Boulevard, Airport Boulevard, NASA Boulevard, Wickham Road, and to a lesser extent, U.S. 1 and North Babcock Street).

3. Rail

The main line of the Florida East Coast Railway, originally constructed by Henry Flagler in the 1890s, passes through the city generally parallel to U.S. 1 (see **Map III-4**). This mainline single track is constructed with concrete cross ties with at least 132 pound rail and centralized traffic control and is well maintained. Approximately 11 miles of main line track are located in the planning area. This does not include yard tracks and sidings. Most rail traffic is through traffic destined for south Florida (Miami) or north Florida (Jacksonville). Local operations consist of daily freight services and switching to numerous on-line and off-line shippers/receivers. Most of the freight shippers/receivers are bulk construction materials (i.e. gravel, lumber, etc.). Three sidings are available in the city for freight service transfer. All public railway crossings in the city are well marked and signaled with gates. A total of 22 crossings are located in the planning area. Railway operating speeds vary in the city but can reach up to 60 mph. Total traffic on the main line ranges from 20 to 29.99 million gross ton-miles per mile.

4. Public Transit System

Currently, Space Coast Area Transit (SCAT), operated by the Brevard County Board of County Commissioners, provides full transit services to the City of Melbourne. There are several routes that traverse through the entire length of the City. Routes 1, 21, 24, 26, 28 either move through a portion of the City or circulate around on the City's major roadways.

Fixed route ridership has grown over the last eight years, while demand response and vanpool ridership has remained relatively stable. This suggests that SCAT has been successful in shifting demand from costly demand response service to more cost-effective fixed route service. Trend data suggests that the marginal increase in fixed route ridership is beginning to slow, indicating that existing service is optimized and new/enhanced service may be needed to meet future demand.

SCAT recently provided service to its one millionth fixed route passenger in 2007. The 2006 ridership figures marked the highest total passengers at 1,486,000 riders. Fixed route passenger trips accounted for 61% of the total, approximately 913,000 passengers.

5. Parking System

The City maintains several surface public parking lots in the downtown Melbourne and Eau Gallie Parking districts. Several of the lots in downtown Melbourne were constructed with revenue from the Downtown Redevelopment District. No charge is made for parking. Most parking facilities in the City are private surface lots.

The City has recently conducted two parking studies, one for the Eau Gallie Downtown area and one for the Historic Downtown area. These studies provided inventories of parking facilities and recommendations for future implementation. It was determined that the Historic Downtown area would benefit from structured parking along New Haven Avenue near City Hall, to accommodate employee and long term parking. Accordingly, a parking garage will be constructed in conjunction with a new City Hall facility. More effective parking enforcement, parking fees (metered parking) and funding sources were determined in both areas as strategies to optimize on-street parking.

There is one park and ride lot located near the City of Melbourne. The lot is located west of I-95 on Eau Gallie Boulevard. It was constructed in 1996 and serves an increasing number of long distance commuters using I-95 for work trips. The use of this lot and other informal lots will be monitored to determine where other park and ride lots should be located.

6. Bicycle System

The City of Melbourne recognizes the need to provide transportation alternatives to increase accessibility and provide a comprehensive transportation system. Bicycle facilities are available along some of the roadway system. The Space Coast Transportation Planning Organization (TPO) is in the process of developing a pedestrian and bicycle facilities inventory to help identify potential opportunities. The City will consider utilizing this plan for future improvements.

7. Pedestrian System

Most arterial and collector roadways contain sidewalks on one or both sides of the roadway. In many areas, gaps exist in the sidewalk system creating non-continuous routes. All new developments are required to provide sidewalk facilities. The Space Coast TPO is in the process of developing a pedestrian and bicycle facilities inventory to help identify potential opportunities.

8. Intermodal Facilities

Intermodal facilities consist of areas where passengers or freight are transferred from one mode of travel to another. In the context of this description, intermodal facilities include rail/truck transfer, including Trailer-on-flat-car (TOFC) and Container-on-Flat-Car (COFC) terminals, air/roadway/or rail terminals, passenger terminals and motor freight operations/terminals. There are no TOFC/COFC or motor freight terminals in the City. The Melbourne Airport Authority has constructed cargo facilities at the airport to provide storage of domestic and international airfreight that could be loaded to other aircraft or to

a variety of surface modes, including truck or rail. The Melbourne International Airport also handles freight and goods. Two passenger terminals within the City include the Melbourne International Airport terminal and the joint Greyhound station /SCAT terminal and garage on U.S. 1. Several bus routes originate and terminate at the Melbourne Square Mall allowing convenient transfers to other routes from this central location. SCAT bus transfers may occur anywhere on the SCAT system routes. There are no current terminal deficiencies.

C. TRANSPORTATION ANALYSIS

Transportation can have a major role shaping the spatial and functional organization of a community, as it can determine the size, scale, status and identity of a community. However, there are other contributing factors such as the personal, social, physical, environmental, economic and cultural attributes of the community, that need to be considered,. This section analyzes existing and projected future conditions of the transportation system and provides a comprehensive assessment of the various transportation facilities and services, and their relationship with existing land uses.

This section also addresses growth trends, travel patterns, and interactions between land use and transportation, including the compatibility between future land uses and transportation systems. Travel patterns are established with a strong emphasis on maximizing energy efficiency, which is best achieved through land use compatibility and compact development. Included in this section are the socio-economic growth trends based on traffic analysis zones. The analysis provides an examination of the current and future performance of the roadway system, as well as, transit performance. Other modes of transportation are also examined for their viability as an alternative to the automobile.

Future travel demand estimates are based on the population growth rate and the employment-to-population ratio. The following analysis includes a comprehensive approach to the future transportation demand. Included within the analysis are future plans for bicycle, pedestrian, transit and roadway facilities. Also included are potential strategies to help alleviate future demand on constrained and overcapacity facilities.

1. Socio-Economic Growth

The population figures are based on the University of Florida, Bureau of Economic and Business Research (BEBR) and the U.S. Census Bureau current estimates. The figures represent the best available population data for the City. The 2000 U. S. Census reported a City population of 71,382 residents. BEBR estimated the City's 2008 population at 78,308 residents.

The 2025 socioeconomic data projections used in the travel demand forecasting model were based on the City's future land use map. Using the map as a control, single and multi family dwelling units, hotel/motel units, school enrollment, and employment were projected for 2025 by traffic analysis zones. The summary of the socio-economic data is shown in **Table III-5**.

2. Existing Roadway Performance

The 1985 Growth Management Act established two important responsibilities for local governments. The first was to set level of service (LOS) standards for public facilities within the jurisdiction as part of the comprehensive plan. The second was to ensure that the public facilities and services proposed in the Capital Improvements Element of the local comprehensive plan were available concurrent with the impacts of development. The Department of Community Affairs (DCA) requires that adopted level of service standards be achievable and financially feasible. The standards set a minimum service level that the City must maintain for each of the public facilities, including roadways.

The roadway LOS concept is defined in the Florida Department of Transportation (FDOT) 2002 Quality/ Level of Service Handbook as a qualitative assessment of the road user's perception of the quality of flow, and is measured by a scale of driver satisfaction. The scale ranges from "A" to "F", with "A" representing the most favorable driving conditions and "F" representing the least favorable.

FDOT established statewide minimum level of service standards for the State highway system. The minimum level of service standards are used for planning applications, including the review of local government plans. The generalized maximum volume tables provided by FDOT are guidelines recommended for broad planning applications. They are to be used as a general guide to determine highway level of service and through-lane requirements.

Minimum level-of-service standards recommended for the state system are shown on **Table III-1**. The standardized descriptions of service levels used in transportation planning are as follows:

- **LOS A** - A condition of road performance where traffic density is very low, with little or no restrictions in maneuverability. Drivers can maintain their desired speed with little resistance or no delay.
- **LOS B** - A condition of road performance where traffic density is low and vehicles travel with operating speeds somewhat restricted by other vehicles. Drivers still have reasonable freedom to travel at their desired speeds.
- **LOS C** - A performance condition where operating speeds are determined by other vehicles, permitting a stable traffic flow. Drivers might have limitations to maneuver and to increase speeds.
- **LOS D** - A condition of road performance where traffic density is high but tolerable. Fluctuations in traffic volumes may cause reductions in operating speeds. Drivers have little freedom to maneuver. In some instances, traffic flows approach unstable conditions.
- **LOS E** - Represents traffic operation near the roadway capacity or maximum service volume. Vehicles flow at unstable conditions. Stop-and-go situations may happen. In freeways or limited access roads, speeds are generally thirty (30) miles per hour and traffic density is high.

- **LOS F** - This condition usually results from long lines of vehicles backing up because the traffic volume exceeds the roadway capacity. The vehicles are forced to operate at very low speeds. Stop-and-go situations are frequent and in extreme cases, vehicles stop for long periods of time.

The existing performance of the roadway system represents the operating level of the facilities and identifies current deficiencies, if any exist. **Table III-7** and **Map III-4** show the existing levels of service for each major thoroughfare in the City of Melbourne.

The 2008 Space Coast TPO State of the System Report indicated that there is one roadway within the City that does not meet the adopted level of service (LOS) standard (see **Table III-7**). US 1 from Ballard to Eau Gallie is the only roadway within the City limits that is currently over capacity. US 1 represents one of the predominant north-south thoroughfares providing access to the City from other jurisdictions. The majority of the trips on this roadway carry residential-to-work, or residential-to-commercial trips.

The City of Melbourne is largely built-out and there are limited opportunities for infill development. Also, as mentioned previously, there are several constrained facilities that cannot be widened to accommodate increased capacity. Thus, the City has focused primarily on redevelopment in its Community Redevelopment Areas for the last several years. Alternative measures will have to be considered, in lieu of transportation concurrency, in order for redevelopment to occur in those areas in the future.

a. Availability of Transportation Facilities and Services to Serve Existing Land Uses

Current and future land use patterns have a substantial influence on the characteristics of the transportation system. **Table III-6** illustrates the primary land uses served by each transportation facility, including the functional classification on the facility. **Maps III-6** and **III-7** depict service areas of and pedestrian/bicycle facilities and transit facilities, respectively.

b. Intermodal Facilities

There are no terminal deficiencies. There is a need for at least one centrally located transit terminal where transfers from one or more transit routes may occur. Currently, the Melbourne Square Mall serves as transit station/terminal. The current SCAT Terminal is a garage facility and is not located on any fixed route line served by SCAT, as shown on **Map III-7**.

3. **Programmed Transportation Improvements**

The Space Coast TPO 2025 Long Range Transportation Plan, Transportation Improvement Program (TIP), indicates the following roadway improvement and construction projects will be completed through 2015 include:

- Widening of Palm Bay Road NE from four (4) lanes divided to six (6) lanes divided between Minton Road to Robert J. Conlan Boulevard at an estimated

cost of \$32,109,000. This project is currently under construction, anticipated completion in fiscal year 2009.

- New road construction for Wickham Road between NASA Boulevard and Ellis Road at an estimated cost of \$16,566,304. Construction is anticipated to commence in fiscal year 2009.
- Major intersection improvements for Babcock Street from Melbourne Avenue to Fee Avenue at an estimated coat of \$16,946,229. Construction is anticipated to commence in fiscal year 2013.
- Extension of Apollo Boulevard from Sarno Road to Eau Gallie Boulevard at an estimated cost of \$9,273,724. Construction is anticipated to commence in fiscal year 2013.

The 2025 Cost Feasible Plan shows the following roadway improvements and construction projects being completed by 2025:

- Widening Babcock Street from four (4) lanes divided to six (6) lanes divided between Malabar Road and Melbourne Avenue at an estimated cost of \$73,900,000.
- Major intersection improvements and Intelligent Transportation System (ITS) for Wichham Road between US 192 and Interstate 95 at an estimated cost of \$27,000,000. The ITS improvements have already been completed on Wickham Road from Sarno Road to Pineda Causeway.

The Florida Department of Transportation (FDOT) has one roadway improvement or construction project scheduled within the City of Melbourne, see **Map III - 2**.

- Interstate 95: Under construction from SR 519 to Palm Bay Road. The improvements include widening from four (4) lanes to six (6) lanes at an estimated cost of \$196 million. Construction is anticipated to be completed by fiscal year 2012.

a. Future Public Transit Plan

The City of Melbourne works closely with the SCAT transit system. The transit system currently services most of the City. There has been a concerted effort to make the transit system more efficient and user-friendly. Recently, the City has partnered with SCAT to provide benches in the Downtown and Babcock CRAs. The City also works closely with the Space Coast TPO, which has several planned projects and studies for the expansion of the SCAT system. SCAT has looked into an Intelligent Transportation System (ITS) to be incorporated into the existing transit system to create more efficient headways. SCAT has also looked into Bus Rapid Transit (BRT) for Hollywood Boulevard, SR A1A and SR 520.

4. Future Roadway Performance

This subsection provides an analysis of the projected traffic circulation system needs. These needs are based on the anticipated travel demand and operating characteristics of the major roadways. Projected travel demand was assessed through the use of the Central Florida Regional Planning Model (CFRPM) 2025 based on socio-economic data and validation for year 2025 traffic forecast by the Space Coast TPO. **Table III-8** and **Map III-5** show the 2025 expected traffic conditions.

The long-range 2025 model projects portions of seven facilities to be over capacity. The roadways with failing LOS segments include: Dairy Road, Babcock Street, Eau Gallie Boulevard, US 192, Wickham Road, US 1 and Palm Bay Road (see **Table III-8**). Palm Bay Road is projected to be over capacity by 2025, which is after the widening of the roadway to six lanes.

5. Future Transportation Plan

This section provides recommendations for creating a safe, convenient, and energy efficient transportation system, coordinated with future land uses, plans and programs of the Space Coast TPO, County and FDOT.

Since World War II, roadways have been designed primarily for automobiles. Very little attention has been given to accommodating other modes of transportation such as bicycles, pedestrians, and transit. The goal of the Transportation Element is to look at roads as multi-modal transportation corridors, and to start to plan for future growth accordingly.

Intergovernmental coordination is essential for the most cost-effective provision of transportation system improvements. Clearly, the City of Melbourne does not possess the resources nor is it fiscally responsible for the entire transportation system within the City. For example, both Brevard County and FDOT have financial responsibility for county roads and state highway system roads, respectively. Therefore, it is necessary for the City to review the transportation improvement plans and programs prepared by the Space Coast TPO, County and FDOT. In this way, the effort and dollars expended by the City to improve its transportation system may be complemented and perhaps enhanced by the activities of the County and FDOT.

One area of coordination should be for the preservation and protection of rights-of-way for identified future roadway improvements and construction. With the escalating value of land and costs entailed in right-of-way acquisition it is essential that the City protect roadway corridors in advance from building encroachment. Increased right-of-way costs reduce the funds available for actual construction. The City should utilize techniques such as setback requirements, zoning restrictions, right-of-way protection regulations and official transportation maps to preserve and protect existing and future rights-of-way. Other measures are discussed in the policy section. The Space Coast Transportation Planning Organization has identified the St. Johns Heritage Parkway as a needed transportation improvement. The St. Johns Heritage Parkway is located in an area identified by the City as a future Municipal Service Area and a future community activity

center. This future roadway will require coordination between the City, County and TPO regarding right-of-way preservation.

a. Future Transportation Map

The purpose of a Future Transportation Map series is to graphically depict the location of all roadways, airports, rail lines, and other related facilities. **Map III-5** represents the proposed Future 2025 Transportation Map for the City of Melbourne. **Map III-2** shows the roadway functional classifications, which are expected to remain the same in 2025. Roadway capacity is based on the functional classification and number of lanes. The level of service standard selected for each roadway was based on the FDOT minimum level of service standards shown in **Table III-1**.

Future roadway design should incorporate bicycle, pedestrian and, transit features to achieve a true multi-modal system. In addition to incorporating roadway design standards, the City should consider requiring that new developments be interconnected to enhance the transportation network. Development design should provide connectivity and access between adjacent residential developments and nearby land uses. Traffic calming techniques could be used to reduce the impacts of through-traffic in residential neighborhoods.

b. Future Pedestrian/Bicycle Plan

The Space Coast TPO is currently creating a pedestrian and bicycle facilities inventory. This inventory will be included in the City's Greenway, Blueways and Trails Plan. The City will amend the Greenway, Blueways and Trails Plan to identify future opportunities for sidewalk and trail improvements.

Appropriate land use and careful urban design would encourage walking for short trips and for accessing transit facilities and services. The City's land development regulations should encourage increased pedestrian mobility by requiring sidewalks for all new development.

The City of Melbourne recognizes the need to provide transportation alternatives to increase accessibility and provide a comprehensive transportation system. Adopting the TPO's Bicycle Facilities Needs Plan is recommended to identify potential future bikeways.

c. Future Parking Plan

Parking is an essential component of the overall transportation system. The decision of a commuter to drive alone or to use alternative transportation modes, such as ride-sharing or public transit depends to a large extent on the cost, accessibility and availability of public parking. The City recognizes the importance of providing balanced parking and multimodal system.

The City conducted two parking studies within the two most congested business districts in the City, Eau Gallie Downtown and Historic Downtown. These studies developed strategies to more effectively utilize the existing parking inventory and developed strategies to help accommodate future parking demand. The City should continue to implement the strategies outlined in these two studies. There are no other areas experiencing parking problems. Accordingly, no additional parking studies are necessary at this time.

d. TSM/TDM Strategies

In order to discourage urban sprawl, encourage infill development, reduce greenhouse gases and reduce traffic congestion, there are several strategies that can be used as alternatives to transportation concurrency. The strategies include, but are not limited to, Transportation Concurrency Management Area's (TCMA), Multi-modal Transportation District's (MTD), Transportation Concurrency Exception Area's (TCEA) and Long Term Transportation Concurrency Management System's (LTCMS) These strategies could be considered along several roadway are within the City's three Community Redevelopment Areas (CRA).

Transportation Concurrency System Management (TCSM) and Transportation Demand Management (TDM) are options for communities trying to add roadway capacity without having to construct costly new facilities. The ultimate goal of the TDM program is to influence people to shift to more efficient modes of transportation and to travel during off-peak hours. TSM strategies, on the other hand, aim to affect the actual supply of transportation services. The most effective programs integrate supply and demand strategies to create a transportation network that promotes efficient choices.

APPENDIX A – TRANSPORTATION ELEMENT TABLES AND FIGURES

Table III- 1: FDOT Minimum Levels of Service Standards

	Rural Areas	Transitioning Urbanized Areas, Urban Areas, or Communities	Urbanized Areas Under 500,000	Urbanized Areas Over 500,000	Roadways Parallel to Exclusive Transit Facilities	Constrained and Backlogged Roadways
INTRASTATE						
Limited Access Highway (Freeway)	B	C	C(D)	D(E)	D(E)	Maintain
Controlled Access Highways	B	C	C	D	E	Maintain
OTHER STATE ROADS						
Two-Lane	B	C	D	D	E	Maintain
Multilane	C	C	D	D	E	Maintain

Note: Level of service standards inside of parentheses apply to general use lanes only when exclusive through lanes exist.

Source: FDOT Level of Service Standards, 2002.

Table III- 2: Roadway Segments with Highest Crash Rate (Per Million VMT)

2006/07 Rank	2005/06 Rank	Roadway	From	To	Rate
2	7	Eau Gallie (Eastbound)	US 1	Causeway	19.27
4	11	Eau Gallie (Westbound)	Causeway	US 1	14.03
5	3	Aurora	Wickham	Croton	14.00
7	267	New Haven	Strawbridge	US 1	13.39
9	44	Hibiscus	Babcock	US 1	12.02
10	6	Wickham	Eau Gallie	(SR 518) Parkway	11.97

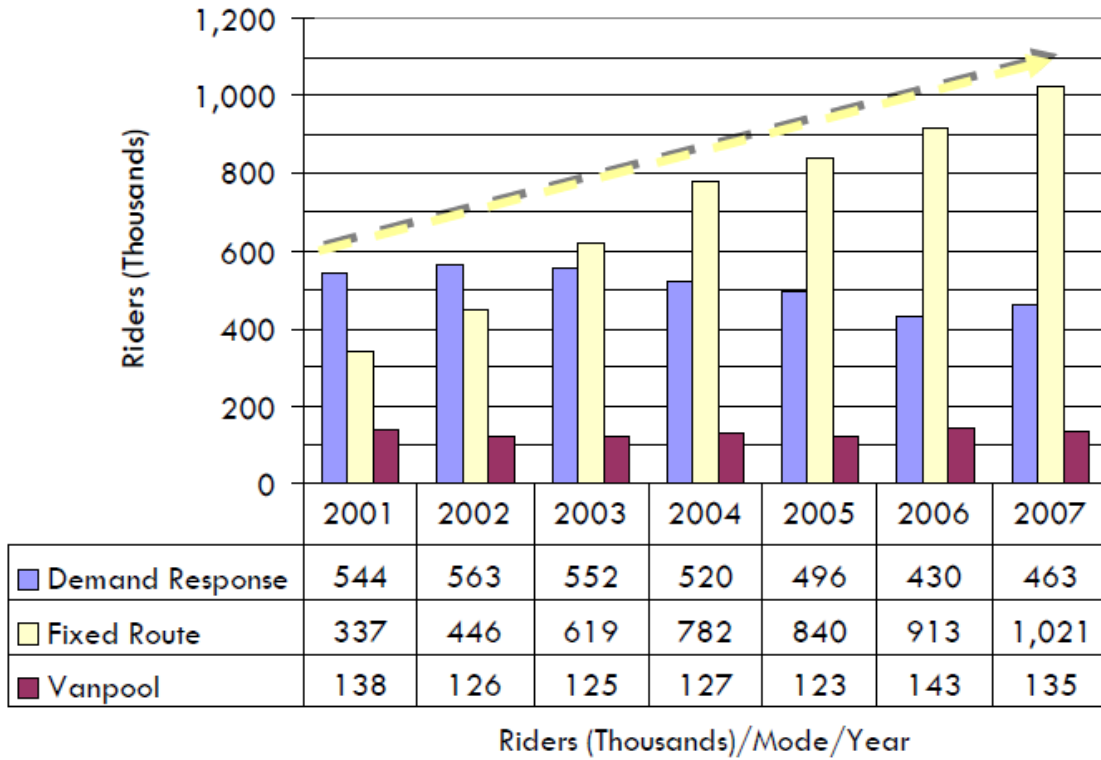
Source: Brevard MPO, State of the System Report 2006/2007

Table III- 3: 2007 SCAT Transit Melbourne Coverage

	Percent Area Served	Percent Population Served	Percent Jobs Served
Melbourne	49.8%	52.7%	65.9%
Total Transit Supported Area	59.1%	55.4%	70.3%

Source: SCAT (route data); CFRPM (socioeconomic data)

Table III- 4: 2007 SCAT Transit Ridership



Source: Space Coast TPO, 2008.

Table III- 5: County Population and Employment Totals

Land Use Category	Brevard
Single Family Population	353,936
Multi-Family Population	121,671
Total Population	475,607
Total Hotel Rooms	8,465
Industrial Employment	59,246
Commercial Employment	53,979
Service Employment	142,308
Total Employment	255,533

Source: Central Florida Regional Planning Model Calibration Validation Report, 2005.

Table III- 6: Transportation Facilities and Land Uses Served

Roadways	Lanes	Category	Primary Land Uses
New Haven Avenue	4	Principal Arterial	Central Business District, Commercial, Institutional, Office, Residential Medium High Density and Multi Family Residential
Wickham Road	4	Principal Arterial	Commercial, Industrial, Institutional and Residential Medium Density
Eau Gallie Boulevard	2 & 4	Principal Arterial	Commercial, Institutional, Office, Residential Medium and High Density and Multi Family Residential
Indian River Lagoon Scenic HWY (US HSY 1)	4 & 6	Principal Arterial	Office, Industrial, Residential Medium Density, Central Business District, Institutional, Marina
Babcock Street	4	Principal Arterial	Office, Commercial, Industrial, Residential Medium Density and Airport
Apollo Boulevard	2 & 4	Minor Arterial	Office, Commercial, Industrial, Institutional and Airport
Sarno Road	2 & 4	Minor Arterial	Residential Medium Density, Commercial, Institutional and Industrial
NASA Boulevard	4	Principal Arterial	Office, Commercial, Industrial, Institutional and Airport
Aurora Road	2 & 4	Minor Arterial	Residential Low Density, Commercial, Institutional and Industrial
Palm Bay Road	2 & 4	Principal Arterial	Residential Low Density, Commercial and Institutional

Source: City of Melbourne & LDI, Inc., 2008.

Table III- 7: Existing Roadway Performance 2008

Roadway	From	To	LOS Standard	Existing Volume	Max. Volume	Volume/Max.	>85%	FDOT 5-Year Work Program
Airport	US 192	Hibiscus	E	11,170	31,255	0.36		
Airport	Hibiscus	NASA	E	10,670	32,900	0.32		
Airport	NASA	Apollo	E	13,490	32,900	0.41		
Apollo	Babcock	Sarno	E	21,430	34,500	0.62		
Aurora	John Rodes	Wickham	E	9,420	15,600	0.60		
Aurora	Wickham	Croton	E	12,250	32,775	0.37		
Aurora	Croton	US 1	E	11,590	33,915	0.34		
Babcock	Palm Bay	University	E	33,780	35,700	0.95	Congested	
Babcock	University	US 192	E	30,900	35,000	0.88	Congested	
Babcock	US 192	Fee	E	26,310	32,800	0.80		
Babcock	Fee	NASA	E	26,500	34,500	0.77		
Babcock	NASA	Apollo	E	22,590	34,500	0.65		
Croton	Sarno	Eau Gallie	E	15,490	31,255	0.50		
Croton	Eau Gallie	Aurora	E	15,140	31,255	0.48		
Croton	Aurora	Lake Washington	E	12,690	31,255	0.41		
Croton	Lake Washington	Post	E	8,190	15,600	0.53		
Dairy (South)	Palm Bay	Florida	E	20,030	32,900	0.61		
Dairy (South)	Florida	US 192	E	22,190	31,255	0.71		
Dairy (Woody Burke)	US 192	NASA	E	7,763	15,600	0.50		
Eau Gallie (SR 518)	I-95	Wickham	E	21,410	35,700	0.60		Widen to 6L with turn lane (partial), Future
Eau Gallie (SR 518)	Wickham	Croton	E	22,500	35,700	0.63		
Eau Gallie (SR 518)	Croton	US 1	E	20,340	33,915	0.60		Widen to 4L or 6L (partial), Future
Eau Gallie (Eastbound)	US 1	Causeway	E	17,280	20,700	0.83		
Eau Gallie (Westbound)	Causeway	US 1	E	16,420	19,680	0.83		
Eau Gallie Causeway	West End	SR 513	E	37,200	70,200	0.53		
Eau Gallie (SR 518)	SR 513	SR A1A	E	26,540	35,000	0.76		
Ellis	Wickham	John Rodes	E	9,370	16,000	0.59		

Roadway	From	To	LOS Standard	Existing Volume	Max. Volume	Volume/Max.	>85%	FDOT 5-Year Work Program
Evans	US 192	NASA	E	17,780	33,900	0.52		
Hibiscus	Evans	Airport	E	14,670	31,255	0.47		
Hibiscus	Airport	Babcock	E	14,933	31,255	0.48		
Hibiscus	Babcock	US 1	E	13,421	31,255	0.43		
I-95	US 192	Eau Gallie (SR 518)	C	74,000	52,000	1.42	Congested	Widen to 6L DES(08-10), ROW(08-11), CST(08-12)
I-95	Eau Gallie (SR 518)	Wickham	C	86,000	52,000	1.65	Congested	Widen to 6L DES(08-10), ROW(08-11), CST(08-12)
John Rodes	US 192	Eau Gallie (SR 518)	E	11,630	15,600	0.75		
John Rodes	Eau Gallie (SR 518)	Aurora	E	13,990	15,600	0.90	Congested	
Lake Washington	Turtlemound	Wickham	E	8,980	15,600	0.58		
Lake Washington	Wickham	Croton	E	12,380	32,900	0.38		
Lake Washington	Croton	US 1	E	10,030	32,900	0.30		
NASA	Wickham	Eddie Allen	E	23,410	35,700	0.66		
NASA	Eddie Allen	Babcock	E	15,110	34,500	0.44		Realign & straighten, PARTIAL, ETDM proposed
NASA	Babcock	US 1	E	14,100	34,500	0.41		
New Haven	Strawbridge	US 1	E	6,011	12,600	0.48		
Palm Bay	Minton	I-95	E	32,340	51,800	0.62		Widen to 6L, CST(07)
Palm Bay	I-95	Babcock	E	38,970	51,800	0.75		Widen to 6L, CST(07)
Post	Pinecone	Wickham	E	10,790	15,600	0.69		
Post	Wickham	US 1	E	8,989	32,900	0.27		
Sarno	Eau Gallie	Wickham	E	17,320	26,629	0.65		Widen to 4L or 5L, Future
Sarno	Wickham	Croton	E	23,130	33,915	0.68		
Sarno	Croton	Apollo	E	26,400	32,775	0.81		
Sarno	Apollo	US 1	E	16,900	32,775	0.52		
US 1	RJ Conlan	University	D	32,170	53,500	0.60		
US 1	University	US 192	D	36,550	49,200	0.74		
US 1	US 192	NASA	D	38,420	53,500	0.72		

Roadway	From	To	LOS Standard	Existing Volume	Max. Volume	Volume/Max.	>85%	FDOT 5-Year Work Program
US 1	NASA	Ballard	D	36,750	53,500	0.69		
US 1	Ballard	Eau Gallie (SR 518)	D	52,960	49,200	1.08	Congested	
US 1	Eau Gallie (SR 518)	Aurora	D	44,670	49,200	0.91	Congested	
US 1	Aurora	Post	D	37,990	53,500	0.71		
US 192	Wickham	Babcock	E	35,510	35,700	0.99	Congested	Widen to 6L Future, EDTM Planning
US 192	Babcock	US 1	E	18,710	31,160	0.60		
US 192 Causeway	US 1	Riverside	D	23,380	50,200	0.47		
US 192	Riverside	SR A1A	D	24,030	35,700	0.67		
Wickham	Ellis	Eau Gallie (SR 518)	E	39,490	42,600	0.93	Congested	
Wickham	Eau Gallie (SR 518)	Parkway	E	36,020	43,300	0.83		
Wickham	Parkway	Pineda Causeway	E	36,450	43,200	0.84		

Source: Space Coast Transportation Planning Organization, State of the System, 2008

Table III- 8: Year 2025 Roadway Improvement Needs

Facility	From/To	Lanes	2025 Volume*	2025 Max. Service Volume	2025 LOS	Improvement Need	LOS with Improvement †	Consistent with GOPs
<i>State Roadways</i>								
Eau Gallie Blvd.	Causeway to U.S. 1	2	22,245	19,680	F	TSM	-	Yes
Babcock St.	US 192 to University	4	38,778	35,000	F	TSM	-	Yes
	University to Palm Bay Rd.	4	40,216	35,700	F	TSM	-	Yes
U.S. 192	Riverside to US 1	4	50,800	50,200	F	TSM	-	Yes
U.S. 1	Aurora Rd. to Eau Gallie Blvd.	6	58,522	49,200	F	TSM	-	Yes
	Eau Gallie Blvd. to Ballard Rd.	6	56,196	49,200	F	TSM	-	Yes
	US 192 to University	6	49,996	49,200	F	TSM	-	Yes
New Haven Ave	Strawbridge to US 1	2	20,432	12,600	F	TSM	-	Yes
<i>County Roadways</i>								
Babcock St.	Fee to US 192	4	32,968	32,800	F	TSM	-	Yes
Palm Bay Rd.	I-95 to Babcock St.	4	57,786	53,500	F	6-Lane Divided/ TSM	F	Yes
Wickham Rd.	Ellis to Eau Gallie Blvd.	4	45,816	42,600	F	TSM/ITS	-	Yes
<i>City Roadways</i>								
Dairy Rd.	US 192 to Florida Ave.	4	58,116	31,255	F	TSM	-	Yes
	Florida Ave. to Palm Bay Rd.	4	55,250	32,900	F	TSM	-	Yes

*E + C 2025 FSUTMS Projected Volumes.

Source: Space Coast Transportation Planning Organization and City of Melbourne, 2008.

