



CHAPTER 1

# PURPOSE & NEED



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## Purpose and Need

This chapter describes factors in the project area that have led to the need for the St. Johns River Crossing Project.



Traffic on the existing Shands Bridge



Congestion at the SR 13 / I-295 Interchange

### 1.1 WHAT IS THE ST. JOHNS RIVER CROSSING PROJECT?

The Florida Department of Transportation (FDOT) identified the need for an improved highway corridor and bridge crossing of the St. Johns River between Clay and St. Johns Counties. The St. Johns River Crossing Project is an effort to identify the best solution to address that need, while trying to minimize the effect that solution might have on the communities and the environment in the two counties.

### 1.2 WHY ARE WE PROPOSING THE PROJECT?

FDOT established three goals to guide the development of potential solutions to existing transportation problems in the project area (further defined below):

- Provide additional capacity to improve current and future transportation network deficiencies,
- Promote and support employment and economic development, and
- Improve emergency evacuation.

They then consolidated these goals into a statement of purpose, used to evaluate alternatives and identify the one that will best serve the area's transportation needs:

To address population growth and resulting traffic by providing additional capacity that meets the area's transportation, economic, employment and safety needs while avoiding, minimizing, and/or mitigating effects on the affected communities and the environment.

### 1.3 WHERE IS THE PROJECT LOCATED?

The project area, as shown in **Exhibit 1-1**, encompasses portions of Clay and St. Johns Counties in northeast Florida, south of Duval County. The St. Johns River separates Clay and St. Johns Counties, and the Shands Bridge is the only direct connection between the two Counties within the defined project area. The Shands Bridge is a two-lane bridge that carries State Road (SR) 16 east of Green Cove Springs in Clay County across the river to St. Johns County south of Orangedale. The Buckman Bridge is also in the vicinity of the project area,



the project area, connection points for a new route that could reasonably be expected to carry additional traffic are Branam Field – Chaffee Road west of the river and I-95 east of the river.

#### 1.4 WHY IS THE PROJECT NEEDED NOW?

Rapid population growth in this area has resulted in additional traffic and congestion on local roads. When compared to recent years, growth in the area has slowed with the downturn in the economy, however, fluctuations in the market conditions are to be expected. By the year 2030, traffic congestion is still expected to worsen and there will still be a need for the project. Providing additional capacity to improve current and future transportation network deficiencies in the near term will help alleviate this congestion. In addition, providing access for residents to local employment centers will aid in promoting and supporting economic development. Perhaps most important, an improved crossing of the St. Johns River will result in more efficient emergency evacuation.

#### 1.5 WHAT FACTORS HAVE AFFECTED DEVELOPMENT IN THE PROJECT AREA?

The three major factors influencing current conditions in the project area are (1) population growth and development, (2) transportation demand, and (3) economic and employment conditions. These factors, discussed below, help to demonstrate the need for the St. Johns River Crossing Project.

##### 1.5.1 Population Growth and Development

In 1970, FDOT opened the first segment of I-295. This stretch of highway began in the southeastern portion of Duval County at I-95 and extended west to 103<sup>rd</sup> Street, north of Orange Park. Interchanges were provided at St. Augustine Road, San Jose Boulevard (SR 13), Roosevelt Boulevard (US 17), Blanding Boulevard (SR 21) and 103<sup>rd</sup> Street (SR 134). The opening of this roadway facilitated the first major change in the area's development patterns by providing improved access to northern Clay County. This resulted in large population increases in Clay County and Orange Park. In the decade following the opening of I-295, the population of Clay County more than doubled. Orange Park, located immediately south of I-295, experienced a 75 percent increase in population. The following years saw continued steady growth in most

of Clay County and the surrounding area. Orange Park, however, reached build-out in the early 1980s, forcing surrounding development farther to the south and west toward unincorporated areas of the county, near Middleburg and Fleming Island.

Following the completion of I-295 in the late 1980s, growth continued to expand, shifting south from Duval County into Clay and St. Johns Counties. The population of Clay County grew from 105,986 persons in 1990 to 140,814 in 2000, reaching an estimated population of 171,095 persons in 2005. St. Johns County experienced similar increases in population, growing from 83,829 persons in 1990 to 123,135 persons in 2000 and reaching an estimated population of 161,525 in 2005. **Exhibit 1-2** displays the changes in population experienced by Clay, St. Johns and Duval Counties.

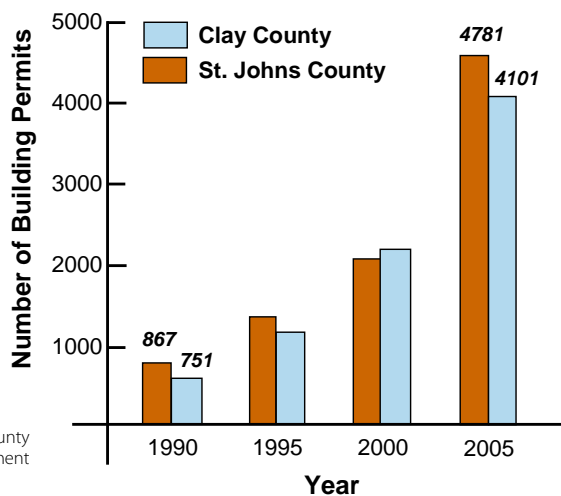
Exhibit 1-2: **Regional Population Growth**

County	1960	1970	1980	1990	2000	2005 (est.)
Clay	19,535	32,059	67,052	105,986	140,814	171,095
Duval	455,411	528,865	571,003	672,971	778,879	826,436
St. Johns	30,034	31,035	51,303	83,829	123,135	161,525
<b>Region</b>	<b>504,980</b>	<b>591,959</b>	<b>689,358</b>	<b>862,786</b>	<b>1,042,828</b>	<b>1,159,056</b>

Source: US Census Bureau

The number of building permits issued between 1990 and 2005 further illustrates the continuing growth trends in Clay and St. Johns Counties, as shown in **Exhibit 1-3**. Clay County issued 751 permits in 1990, compared to 4,101 permits in 2005, an increase of 446 percent. St. Johns County issued 867 building permits in 1990, compared to 4,781 permits in 2005, an increase of 450 percent.

Exhibit 1-3: **Building Permits Issued**



Source: St. Johns and Clay County Permitting Department

### Defining Developments of Regional Impact (DRI)

Developments of Regional Impact (DRIs) are large-scale developments that are likely to have regional effects beyond the local government jurisdiction in which they are located including schools, roadways, housing and recreation.

These increases in building activity are attributed to the number of Developments of Regional Impact (DRIs) approved since 1990 in the northern areas of Clay and St. Johns Counties. Since 1990, Clay County approved six DRIs south of Orange Park, and another DRI is currently pending approval. These developments, listed in **Exhibit 1-4**, consist primarily of residential land uses, supporting Clay County’s trend of developing as a bedroom community to the City of Jacksonville.

Exhibit 1-4: Clay County Developments of Regional Impact

Development of Regional Impact	Map No.	No. of Residential Units		Future Daily Trips at Build-out (Year)
		At Build-out	Approximate Units Built	
Argyle Forest	1	32,384	28,980	183,000 (2020)
Eagle Harbor	2	4,234	3,684	41,366 (2011)
Fleming Island Plantation	3	3,790	2,822	44,489 (2012)
Governor’s Park	4	6,000	0	84,728 (2028)
Orange Park South	5	954	954	Complete
Pace Island	6	1,214	1,214	Complete
Saratoga Springs	7	4,256	0	29,621 (2017)
<b>Total</b>		<b>52,832</b>	<b>37,654</b>	<b>383,204</b>

Source: Northeast Florida Regional Council, 2008

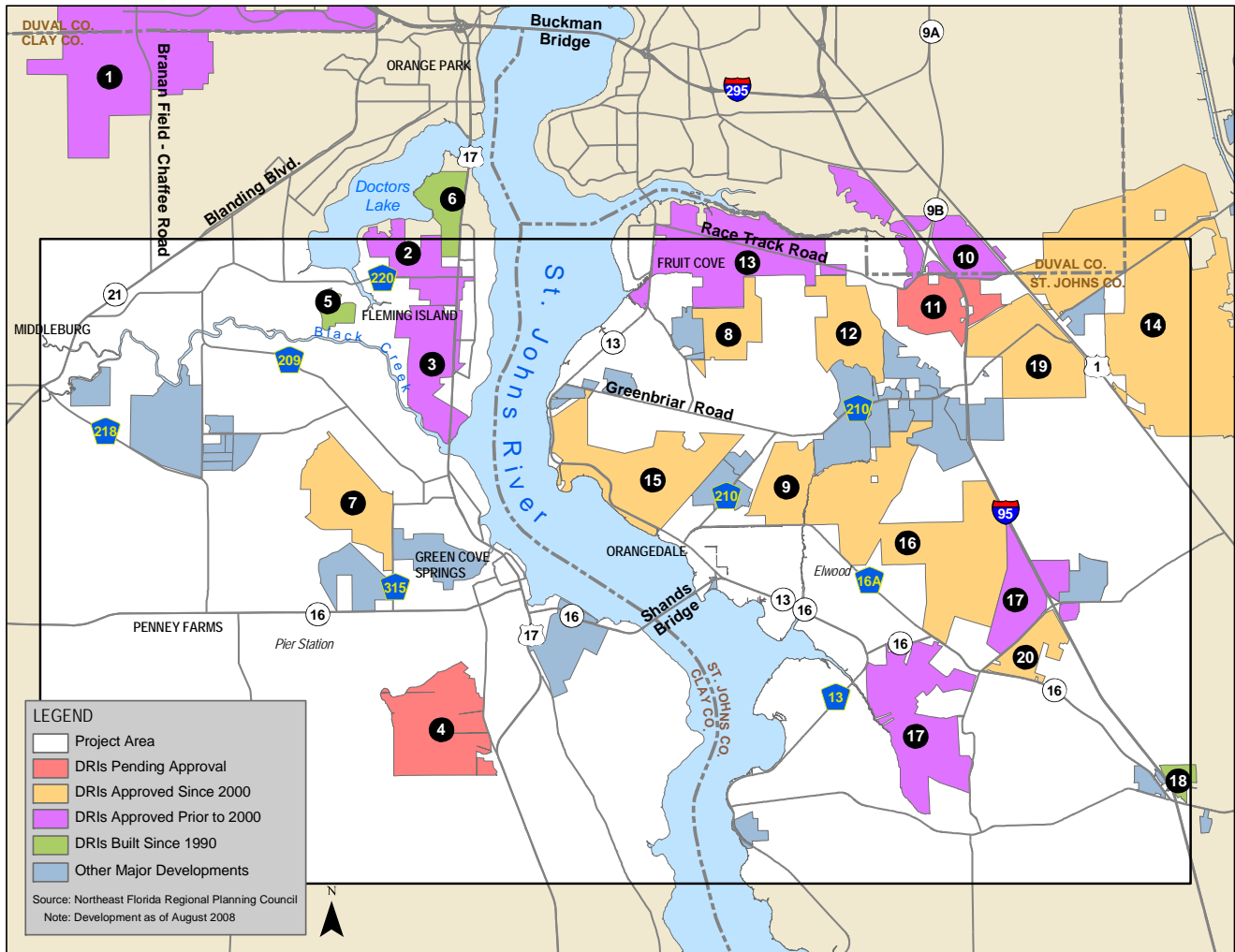
St. Johns County approved only four DRIs prior to 2000, but development patterns quickly changed. Since 2000, another eight DRIs have been approved and one is pending approval in the northern part of the County, as shown in **Exhibit 1-5**. In addition, the County approved 12 residential developments, each consisting of 300 residential units or more, for the area along County Road (CR) 210. At build-out in the year 2025, the DRIs are projected to add more than 500,000 daily trips to area roadways. **Exhibit 1-6** shows existing and pending DRIs in Clay and St. Johns Counties.

Exhibit 1-5: St. Johns County Developments of Regional Impact

Development of Regional Impact	Map No.	No. of Residential Units		Future Daily Trips at Build-out (Year)
		At Build-out	Approximate Units Built	
Aberdeen	8	2,018	0	14,227 (2010)
Ashford Mills	9	2,633	0	34,554 (2015)
Bartram Park	10	5,288	368	50,606 (2015)
Durbin	11	4,500	0	12,014 (2022)
Durbin Crossing	12	2,498	0	17,123 (2010)
Julington Creek	13	6,292	5,847	65,460 (2009)
Nocatee	14	14,920	0	114,667 (2025)
Rivertown	15	4,500	0	28,731 (2015)
Silverleaf Plantation	16	10,700	0	65,628 (2021)
Saint Johns	17	7,200	513	62,370 (2019)
St. Augustine Centre	18	817	817	Complete
Twin Creeks	19	5,000	0	34,544 (2010)
World Commerce Center	20	1,156	0	7,629 (2017)
<b>Total</b>		<b>67,522</b>	<b>7,545</b>	<b>507,553</b>

Source: Northeast Florida Regional Council, 2008

Exhibit 1-6: Developments of Regional Impact (DRIs) and Other Major Developments



**Key: Clay County**

- 1 Argyle Forest
- 2 Eagle Harbor
- 3 Fleming Island Plantation
- 4 Governor's Park
- 5 Orange Park South
- 6 Pace Island
- 7 Saratoga Springs

**St. Johns County**

- 8 Aberdeen
- 9 Ashford Mills
- 10 Bartram Park
- 11 Durbin
- 12 Durbin Crossing
- 13 Julington Creek
- 14 Nocatee
- 15 Rivertown
- 16 Silverleaf Plantation
- 17 Saint Johns
- 18 St. Augustine Centre
- 19 Twin Creeks
- 20 World Commerce Center

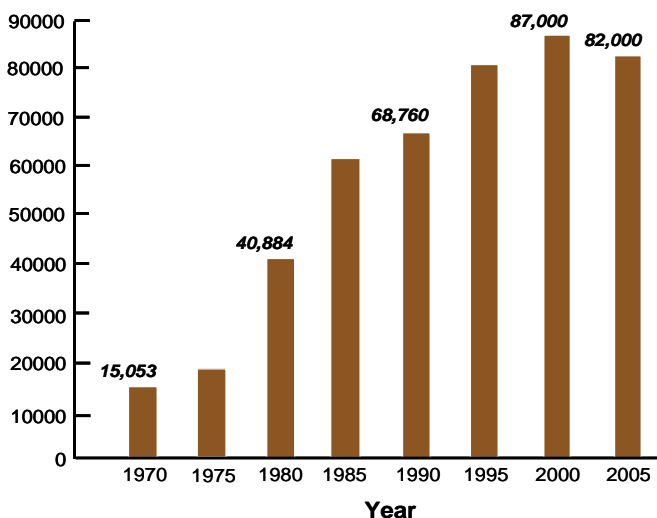
### Defining Average Annual Daily Traffic (AADT)

Average Annual Daily Traffic (AADT) is a simple measure of how much traffic is traveling a facility --- the higher the AADT, the more traffic on the roadway. It is calculated by taking the total volume of vehicle traffic in both directions for a year and dividing by 365 days.

### 1.5.2 Transportation Demand

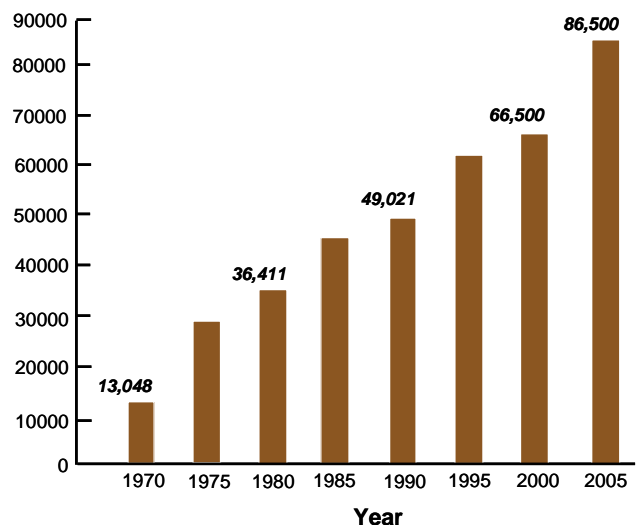
As a result of population growth in Clay and St. Johns Counties since the 1970s, traffic congestion on the area’s road network is getting worse. Other than localized improvements, the transportation network within these Counties has remained relatively unchanged over the years. In Clay County, growth has had the greatest impact on SR 21 and US 17, the County’s major north-south roadways. These are both six-lane facilities providing the County’s only access to I-295. Many County residents rely heavily upon SR 21 and US 17 to reach one of several major employment centers in the region. As shown in **Exhibit 1-7**, the Average Annual Daily Traffic (AADT) on SR 21 increased from 15,053 vehicles in 1970 to 82,000 vehicles in 2005, an average increase of 13 percent per year. As shown in **Exhibit 1-8**, the AADT on US 17 has increased from 13,048 vehicles in 1970 to 86,500 vehicles in 2005, an average increase of 16 percent per year. In an attempt to add more north-south capacity, in 2001 FDOT constructed and opened the Branan Field-Chaffee Road segment between Argyle Forest Boulevard and SR 21 (refer to **Exhibit 1-1**). The AADT on Branan Field-Chaffee Road has increased from 6,500 vehicles in 2001 to 18,400 vehicles in 2005, an average increase of 46 percent per year.

Exhibit 1-7: SR 21 AADT



Source: FDOT, Transportation Statistics Office

Exhibit 1-8: US 17 AADT



Source: FDOT, Transportation Statistics Office

St. Johns County has experienced similar travel demand increases due to growth that has occurred along CR 210. This corridor is the only east-west road in the northern part of the County. As a result, it has absorbed the majority of trips generated by new development in the area. AADT on CR 210 has increased from fewer than 11,000 vehicles in 2002 to over 19,000 vehicles by 2007. In 2005, the county widened this road from two to four lanes.

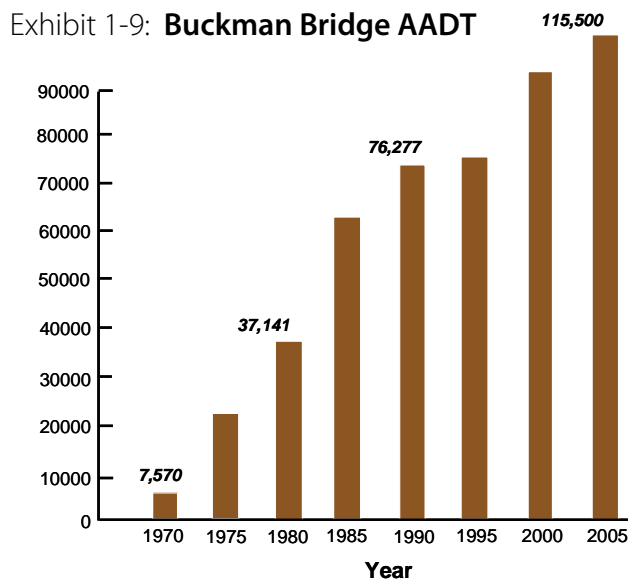
In addition to impacting the local road network, growth has also affected bridges in the project area. The Buckman Bridge and Shands Bridge are the greater area’s two crossings of the St. Johns River. Growth that occurred since the opening of I-295 has had the most impact on the Buckman Bridge to date. As shown in **Exhibit 1-9**, AADT on the Buckman Bridge has increased from 7,570 vehicles in 1970 to 115,500 vehicles in 2005, an average annual increase of 40 percent. In 2005, the Buckman Bridge operated at 89 percent of its capacity during peak traffic hours and is expected to operate at 107 percent of its intended capacity by 2030. In 2005, 15 percent of the total traffic on this bridge was truck traffic; this is one of the highest percentages for any road segment in north Florida.



Congestion at US 17 / I-295 interchange



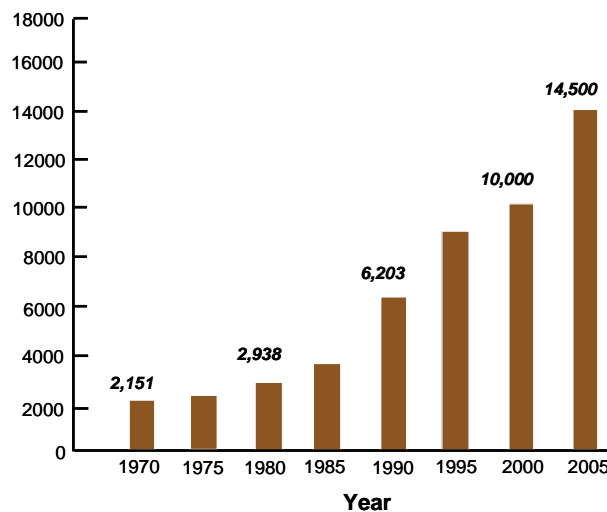
Congestion at SR 21 / I-295 interchange



Source: FDOT, Transportation Statistics Office

Although the Shands Bridge has not carried the traffic volumes experienced by the Buckman Bridge to date, it is expected to experience a similar trend as growth moves farther south. As shown in **Exhibit 1-10**, traffic on this two-lane bridge has gradually increased from 2,151 vehicles in 1970 to 14,500 vehicles in 2005, an average annual increase of 16 percent. The bridge operated at 107 percent of its capacity during peak traffic hours in 2005, and peak traffic volumes in 2030 are projected to be 286 percent of the bridge’s intended capacity, rendering this river crossing option virtually inoperable during peak hours. When built in 1961, the Shands Bridge was never intended to carry these projected volumes of traffic.

Exhibit 1-10: **Shands Bridge AADT**



Source: FDOT, Transportation Statistics Office

### 1.5.3 Economic and Employment Conditions

Clay County has developed as a bedroom community to Jacksonville, and so relies heavily on neighboring Duval County to provide employment. According to the 2000 United States Census, 60 percent of Clay County’s residents who are employed full-time work outside the County. Nearly all of these residents work in Duval County, and their average one-way commute time is over 33 minutes, the highest in the State, exceeding the national average by over eight minutes (USCB, 2006).

This traveling of the labor force out of Clay County is likely due, in part, to the lack of transportation infrastructure needed to provide and support in-County jobs. Many of the County's residents travel the north-south roads each day to the region's employment centers, including downtown Jacksonville, Jacksonville Naval Air Station, Cecil Commerce Center and the Southside Business District, located east of the St. Johns River. In 2005, 187,000 vehicles traveled each day on US 17, SR 21 and Branan Field-Chaffee Road combined, more than the County population itself (FDOT, Transportation Statistics Office). Clay County is the largest populated county in Florida without an Interstate facility and has the largest out-of-county commuting population in the state (Clay County Economic Development Council). These conditions have prompted Clay County's Board of County Commissioners to identify and promote future employment centers in Clay County (See Chapter 3, Sections 3.6 and 3.7 for more details).

In contrast to Clay County, St. Johns County has several major employment Centers located within its boundaries that serve approximately 60 percent of its resident labor force (St. Johns Chamber of Commerce). The largest facility in the area is the World Commerce Center, located along the I-95 corridor near International Golf Parkway. It houses the corporate headquarters for Ring Power and Rulon, and has development rights for more than 3.5 million square feet (MSF) of office, retail and light industrial. Other existing major facilities in the area include the St. Augustine Centre (2.5 MSF), St. Johns Place (2.1 MSF of office), and the St. Augustine Industrial Park (1.7 MSF of industrial). Commerce facilities are also planned as part of several approved DRIs (refer to **Exhibit 1-6**). Silverleaf Plantation, located between International Golf Parkway and CR 210, and Twin Creeks, located just north of CR 210, include the development rights for more than 4.3 MSF of commercial and light industrial use. Rivertown and Ashford Mills, located in the vicinity of CR 16A, include the development rights for approximately 800,000 square feet of office and light industrial. Improving access to these employment centers, thereby facilitating the efficient movement of goods and services, will continue to support and enhance the economic opportunities within St. Johns County.

## 1.6 HOW DOES THE AREA'S GROWTH AFFECT RESIDENTS' SAFETY?

As the population in the project area continues to rise, more and more people will need to use the roadways for emergency evacuation in the case of a hurricane or other disaster. Peak hour traffic already exceeds the design capacity of the Shands Bridge and will continue to increase in the future. FDOT has serious concerns about the levels of traffic that will result from a coastal evacuation scenario. During Hurricane Floyd in 1999, 80 percent of those in northeast Florida living in Category 1 evacuation zones complied with evacuation orders (NEFRC, 2005 Hurricane Evacuation Study Technical Report). A majority of evacuees left their counties, with the percentages increasing south to north along the eastern coast. This evacuation, in itself, caused high traffic volumes on local and regional road networks. But, in addition, a significant number of residents in non-surge areas, coastal and inland counties also perceived that they heard a directive from local officials that they should or must leave. Thus, for most evacuees, regardless of region, the actual time to reach their intended destinations exceeded their expected travel time.

Congestion related to development could place the residents in St. Johns County at risk. Approximately 106,000 persons, or two-thirds of the County's population, will be required to evacuate during a Category 4 hurricane (NEFRC, 2005 Hurricane Evacuation Study Technical Report). These residents currently have three choices to move inland: the four-lane US 17 bridge in Palatka, the two-lane Shands Bridge at Green Cove Springs, or the eight-lane Buckman Bridge on I-295. Although the Buckman Bridge has an eight-lane capacity, it must also provide for evacuation of Duval County residents as well as vehicles from other southern coastal areas traveling north on I-95. The Shands Bridge has two lanes, accessed from St. Johns County by two-lane roads, and it disperses westward via SR 16, another two-lane road. The US 17 bridge connects to SR 20 and SR 100 in Palatka, both of which are two-lane roads leading inland. As population increases in St. Johns County and other coastal areas, relying on these existing routes to move a large number of people inland will jeopardize public safety by failing to provide safe and efficient evacuation during hurricanes or other times of emergency.

## 1.7 WHAT OTHER PROJECTS ARE BEING IMPLEMENTED AS PART OF THE REGION'S TRANSPORTATION PLANS?

FDOT is currently constructing improvements to Branan Field-Chaffee Road, although some segments remain unfunded. They also plan to make improvements to the CR 210/I-95 interchange in 2009. St. Johns County is planning three new north-south County roads (CR 2209, CR 244 and CR 223) as part of several approved DRIs, and Clay County is planning an extension of CR 218. While these projects will help local traffic, they will do little to relieve existing and projected congestion on the bridges and roadways addressed in this analysis.

## 1.8 WHAT HAPPENS IF THE ST. JOHNS RIVER CROSSING PROJECT IS NOT BUILT?

Regardless of whether the St. Johns River Crossing Project is built, population growth is expected to continue in Clay and St. Johns Counties. As of May 2008, one DRI is still pending approval in the St. Johns County portion of the study area (**Exhibit 1-6**). This DRI, in combination with other developments already approved, will add over 100,000 more residential units to northern Clay and St. Johns Counties and generate over 800,000 additional daily vehicle trips at build-out in 2025 (NEFRC). Other developments are expected to be approved as well, adding even more population and trips. Forecasts show that the combined populations of Clay and St. Johns Counties will nearly double, from a 2005 estimate of 333,000 persons to approximately 605,000 persons by 2025 (NEFRC).

This continued population growth will result in increased traffic congestion on the regional network. As noted earlier, area roads have experienced annual rises in AADT ranging from 13 percent (SR 21) to 46 percent (Branan Field-Chaffee Road). FDOT expects these increases to continue at a similar rate in the future, and expects the Level of Service (LOS) on area bridges to deteriorate. The Buckman Bridge currently operates at a LOS C, but is projected to drop to LOS F by 2030. In 2005, the Shands Bridge operated at a LOS D; this is projected to drop to LOS F by 2030 (FDOT, Transportation Statistics Office). As noted earlier, by 2030, traffic is expected to be nearly triple the bridge's design capacity. Congestion of that magnitude may make the bridge impassible during peak hours.

### Defining Level of Service (LOS)

Roadway level of service (LOS) is a measure used to determine the quality of service a transportation facility provides. Much like a student's report card, LOS is represented by the letters "A" through "F", with "A" generally representing the most favorable driving conditions and "F" representing the least favorable.

As residential development progresses, it is likely that Clay County residents will still commute outside of their County to seek employment. Economic development is expected to continue in St. Johns County, but mainly along the I-95 corridor. The availability of jobs either outside these Counties or focused along I-95 will encourage long commutes for county residents, further adding to traffic congestion and commute time. As congestion on the roadway network continues to increase, the inefficient movement of goods and employees may cause developers to seek locations outside of the project area for creation of new employment centers. Residents may try to avoid this congestion by moving nearer these new jobs, thus reducing the available workforce, which will in turn further discourage economic development.

Emergency evacuation from St. Johns County in the event of a hurricane will remain a serious concern without improvements to the river crossing. The two-lane road system leading to and across the Shands Bridge is not capable of carrying the number of residents that will need to evacuate from coastal areas. The resulting congestion could result in death or injury both to those trapped east of the St. Johns River as well as drivers caught in accidents along the roadway in their efforts to evacuate.