3.0 BASIS FOR THE CORRIDOR MASTER PLAN

3.1 FUNCTIONAL PERFORMANCE

3.1.1 Level of Service

The mainline of I-10 in Segment 1 meets or exceeds the minimum LOS standards. As shown in Table 3-1 and the existing LOS presented in Figure 2-1 only one location does not meet those minimum standards under the existing year roadway and traffic conditions.

Table 3-1: 2001 Existing Conditions LOS

I-10 Westbound							
Element			From	To	LOS		LOS Standard
					AM	PM	
Ramp Terminal	I-10 at US 129	Off-ramp intersection with US-129	I-10 WB	US 129	**D**	**F**	C

Note : **Bold** letters indicate failing LOS
Source: HCS, PBS&J

3.1.2 Geometric Design Elements

The typical section, horizontal and vertical alignment, interchange, spacing, ramp, sight distance and elements presented in this section are based on the design parameters outlined in the following references:

- A Policy on Geometric Design of Highway and Streets, 2001 American Association of State Highway and Transportation Officials (AASHTO),
- FDOT Roadway Plan Preparation Manual, 2003 (PPM),
- FDOT Design Standards for Design, Construction, Maintenance and Utility Operations on the SHSs, 2002, and
- FDOT Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways, 2002.

Descriptions of specific design elements such as ROW limits and lane widths, as well as the applicable design standard and source is summarized in the DASR. Exceptions to and / or updated design standards applicable to Segment 1 of I-10 were reviewed and established in conjunction with FDOT.

3.2 NEED FOR IMPROVEMENTS

This section presents a summary of the findings of the data analysis for Segment 1 of the I-10 study corridor. To facilitate upcoming study activities, primarily the identification of the CMEA elements that will be combined to form study alternatives, I-10 deficiencies are summarized in relation to the following:

- Design deficiencies, in terms of FDOT design standards for physical design of facilities,
- Mobility deficiencies, in terms of satisfaction of traffic LOS standards,
- Safety deficiencies, in terms of the extent of crash experience and high crash locations, and
- Environmental deficiencies, in terms of the degree to which current environmental protection standards are not being met.

3.2.1 Design Deficiencies

Design deficiencies refers to the how well the facility complies with current FDOT and FIHS standards. As a FIHS facility, these standards are the minimum engineering and planning criteria that apply to Segment 1 of I-10.

Along the mainline of I-10 in Segment 1, 36 vertical curves do not meet the current FDOT standards. There are 14 bridges over I-10 with vertical clearances less than 16.5 feet and eight I-10 bridges over crossroads with vertical clearances less than 16.5 feet. Also, there is one area where the superelevation is not adequate for the degree of horizontal curve. Three of the 12 acceleration/deceleration lengths associated with rest areas and agricultural inspection station ramps do not meet current FDOT requirements. Eighteen of the 28 ramps at interchanges do not meet current FDOT design criteria. Deficiencies identified at interchanges located within Segment 1 are listed below.

<u>US 221 Interchange</u>

- Eastbound entrance ramp taper length does not meet current FDOT requirements.
- Westbound entrance ramp taper length does not meet current FDOT requirements.
- Insufficient vertical clearance for I-10 over US 221 bridge structure.

<u>SR 14 Interchange</u>

- Westbound entrance ramp taper length does not meet current FDOT requirements.
- Insufficient vertical clearance for I-10 over SR 53 Interchange bridge structure.
- Eastbound exit ramp taper length does not meet current FDOT requirements.
- Eastbound entrance ramp taper length does not meet current FDOT requirements.

<u>CR 255 Interchange</u>

- Eastbound entrance ramp taper length does not meet current FDOT requirements.
- Westbound entrance ramp taper length does not meet current FDOT requirements.
- Insufficient vertical clearance for I-10 over CR 255 bridge structure.

<u>US 90 Interchange</u>

- Eastbound exit ramp taper length does not meet current FDOT requirements.
- Westbound entrance ramp taper length does not meet current FDOT requirements.

US 129 Interchange

- Eastbound exit ramp taper length does not meet current FDOT requirements.
- Eastbound entrance ramp taper length does not meet current FDOT requirements.
- Westbound entrance ramp taper length does not meet current FDOT requirements.
- Westbound exit ramp taper length does not meet current FDOT requirements.
- Insufficient vertical clearance for I-10 over US 129 bridge structure.

CR 137 Interchange

- Eastbound exit ramp taper length does not meet current FDOT requirements.
- Eastbound entrance ramp taper length does not meet current FDOT requirements.
- Westbound exit ramp taper length does not meet current FDOT requirements.
- Insufficient vertical clearance for bridge structures over I-10.

According to the FDOT Interchange Handbook, Technical Resource Document 1, Department Engineering Standards, the minimum desired spacing for interchanges is six miles for rural areas, three miles for urban areas, and two miles for urbanized areas. As Segment 1 is rural in character, the six-mile criterion applies. A review of interchange spacing shows that the interchange spacing criterion is met except for the spacing between SR 53 to CR 255 (3.7 miles), and from CR 137 to I-75 (4.0 miles). While below the minimum, these interchange locations are the result of the prevailing irregular road geography in the area, all but I-75 are relatively low-volume crossroads, and there is no apparent adverse impact of these spacing situations.

Two other areas of potential concern regarding interchange facilities are access management and interchange configuration. Control of access around interchange termini is essential to maintain the quality and safety of traffic operations at these junctions. Access control at some interchanges within Segment 1 may require evaluation for consistency with current best management practices, and changes may be recommended where FDOT's current practices do not comply with current standards.

According to FDOT Design Standard 450, Sheet 2 of 2, for rural interchanges, LA ROW should extend a minimum of 300 feet beyond the end of the acceleration and deceleration taper, with the taper most remote from the Interstate establishing the limits of LA R/W for both sides. For interchange quadrants having no ramp, such as in the partial cloverleaf interchanges at US 90, and CR 137, the LA ROW should extend along the crossroad to a point opposite the limit of LA ROW established by the side with the ramp. It was found that the three westerly interchanges (SR 55, SR 14 and SR 53) satisfy the requirements, CR 255 is within 10 feet of compliance in all quadrants, and the remaining three service interchanges (US 90, US 129 and CR 137) are all significantly deficient in this regard.

Interchange configuration is another potential concern in this segment. Two of the seven interchanges have a partial cloverleaf design. These interchange designs may have resulted from the need to accommodate physical constraints, such as the geometry of cross roads or the pattern of interchange turning movements, or they may have been for cost economy in land acquisition.

Partial cloverleaf interchanges are serviceable from a capacity standpoint for the lower range of traffic volumes. However, they do introduce relatively sharp ramp geometry with degree of curvature greater than 180 degrees for certain entrance and exit movements. Also at this type of interchange, exit ramps, in particular can be less compatible with desirable safety and traffic operations, given that they require significant speed reductions from the mainline. The age of the facility's design has resulted in ramp tapers and deceleration lane lengths that are insufficient by current FDOT standards. Depending on the vertical geometry, partial cloverleaf interchanges may have less than desirable decision sight distance and inadequate lateral clearance situations as well, although crash data do not indicate any particular safety issue in recent years. The geometry and operation of these partial cloverleaf interchanges will be further examined to both determine the extent of remedial treatments to improve their safety and operation, and to investigate whether potential modification of the interchange to another configuration might be warranted.

3.2.2 Mobility Deficiencies

A major concept central to understanding transportation is mobility. Mobility refers to the ability to move between different activity sites (e.g., from home to a grocery store). The range of mobility is identified as the extent to which the roadway meets the FDOT LOS standards for the given area type. Segments of the mainline of I-10 that do not meet the minimum LOS standard for the given area type are considered mobility deficient.

The FDOT maintains minimum acceptable operating LOS standards for the SHS as well as the FIHS. The statewide minimum LOS for the SHS differs according to area type. The three broad area types identified in the FDOT Quality/LOS Handbook include urbanized, transitioning and rural areas. Segment 1 is classified as a rural area.

I-10 is classified as a LA Highway (Freeway). LA highways are multilane divided highways with a minimum of two lanes for exclusive use of traffic in each direction and full control of ingress and egress. The requirements for intersecting roads also consider each county's Comprehensive Plan and the corresponding location of an interchange. The minimum LOS standards applicable to Segment 1 of I-10, based on area type and facility classification, are summarized in Table 2-6.

The mainline of I-10 in Segment 1 meets or exceeds the minimum LOS standards. As shown in Table 3-1 and the existing LOS presented in Figure 2-1, only one location does not meet those minimum standards under the existing year roadway and traffic conditions.

3.2.2.1 2030 Future Year No-Build LOS

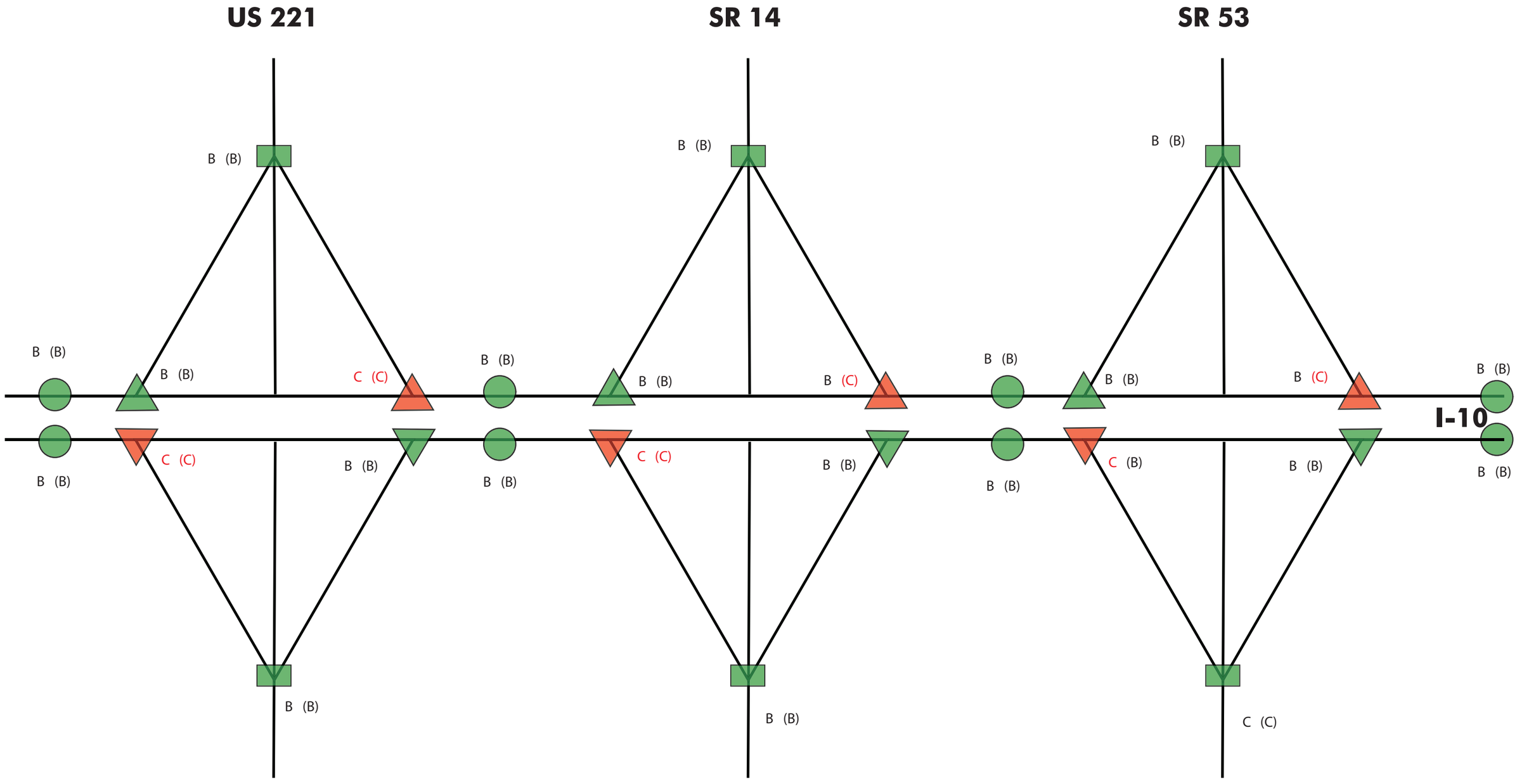
The No-Build Alternative LOS analysis assumes that the mainline of I-10 in Segment 1 remains a four-lane section. As a rural section, Segment 1 meets the FDOT minimum LOS B standard except for the eastbound and westbound mainlines between CR 255 and US 90 and between US 129 and CR 137 where LOS C occurs. Numerous off-ramp diverges, on-ramp merges and ramp intersections also fall below standard. Future year LOS conditions are illustrated on Figure 3-1 and summarized below in Table 3-2.

According to the District 2 Five-Year Work Program, there are no capacity improvements programmed for I-10 or to the connecting roadways in the vicinity of I-10 study area. There are ITS improvements to I-10 are identified within the FIHS 2025 Cost Feasible Plan. While the fiber optics and traveler information systems will improve freight mobility and mobility for non-exiting traffic, the lack of planned capacity improvements to these intersections will not alleviate the future LOS deficiencies noted above in Table 3-2. However, it should be noted that most of these capacity deficiencies are for rural interchanges performing at LOS C against the FDOT LOS B standard for such facilities. While below the FDOT standard, LOS C does not represent congested conditions. With a projected LOS F in both peak periods, it would appear that the facilities in most need of improvement for Segment 1 mobility would be the two I-10 westbound off-ramp intersections located at CR 137 and US 129.

Table 3-2: 2030 No-Build LOS

Element			From	To	LOS		LOS Standard
					AM	PM	
I-10 Eastbound							
Freeway Mainline			CR 255	US 90	**C**	B	B
			US 129	CR 137	**C**	B	B
Ramp Terminal	I-10 at US 221	Off-ramp diverge	I-10 EB	US 221	**C**	**C**	B
	I-10 at SR 14	Off-ramp diverge	I-10 EB	SR 14	**C**	**C**	B
	I-10 at SR 53	Off-ramp diverge	I-10 EB	SR 53	**C**	B	B
	I-10 at CR 255	Off-ramp diverge	I-10 EB	CR 255	**C**	B	B
	I-10 at US 90	Off-ramp diverge	I-10 EB	US 90	**C**	B	B
		On-ramp merge	US 90	I-10 EB	**C**	B	B
	I-10 at US 129	Off-ramp diverge	I-10 EB	US 129	**C**	B	B
	I-10 at US 129	Off-ramp intersection with US 129	I-10 EB	US 129	**D**	**D**	C
	I-10 at CR 137	Off-ramp diverge	I-10 EB	CR 137	**C**	**D**	B
I-10 Westbound							
Freeway Mainline			CR 137	US 129	B	**C**	B
			US 90	CR 255	B	**C**	B
Ramp Terminal	I-10 at CR 137	Off-ramp diverge	I-10 WB	CR 137	B	**C**	B
		Off-ramp intersection with CR-137	I-10 WB	CR 137	**F**	**F**	D
	I-10 at US 129	Off-ramp diverge	I-10 WB	US 129	**C**	**C**	B
		Off-ramp intersection with US-129	I-10 WB	US 129	**F**	**F**	C
	I-10 at CR 255	Off-ramp diverge	I-10 WB	CR 255	B	**C**	B
	I-10 at SR 53	Off-ramp diverge	I-10 WB	SR 53	B	**C**	B
	I-10 at SR 14	Off-ramp diverge	I-10 WB	SR 14	B	**C**	B
	I-10 at US 221	Off-ramp diverge	I-10 WB	US 221	**C**	**C**	B

Note 1: **Bold** letters indicate failing LOS
Note 2: Calculated following the 2000 Highway Capacity Manual methodology.
Source: FDOT Quality / LOS Handbook (2002 Edition), HCS 2000, PBS&J.



Florida Department of Transportation District 2

I-10 Master Plan

The PBS&J Team

LEGEND

FREEWAY
RAMPS
UNSIGNALIZED INTERSECTION
MULTI-LANE
LOS AM (PM)

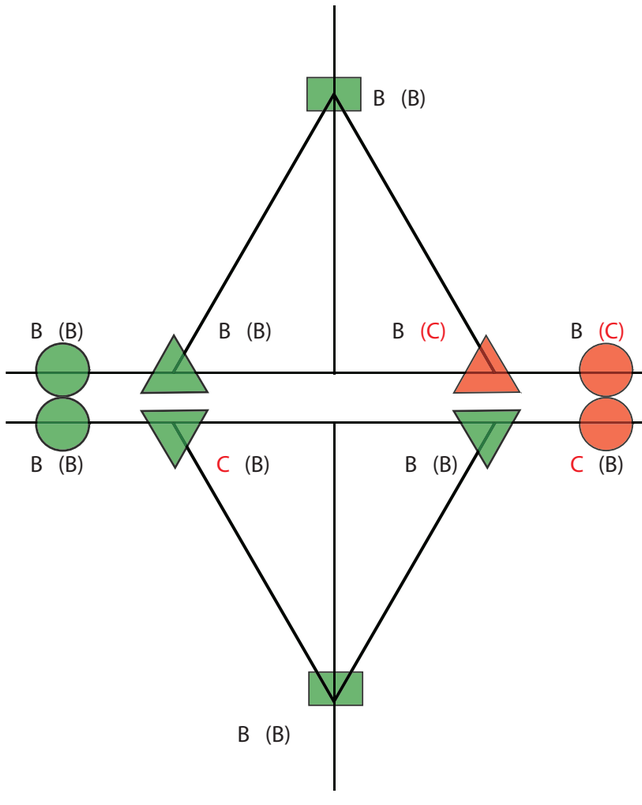
Green indicates meeting LOS
Red indicates failing LOS

SEGMENT 1: Design Traffic LOS AM (PM) 2030

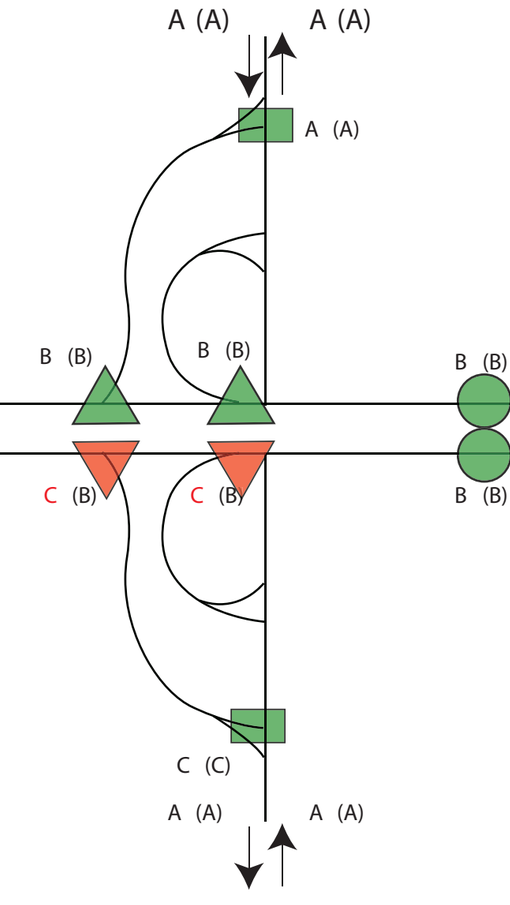
Figure 3-1

SHEET 1 of 2

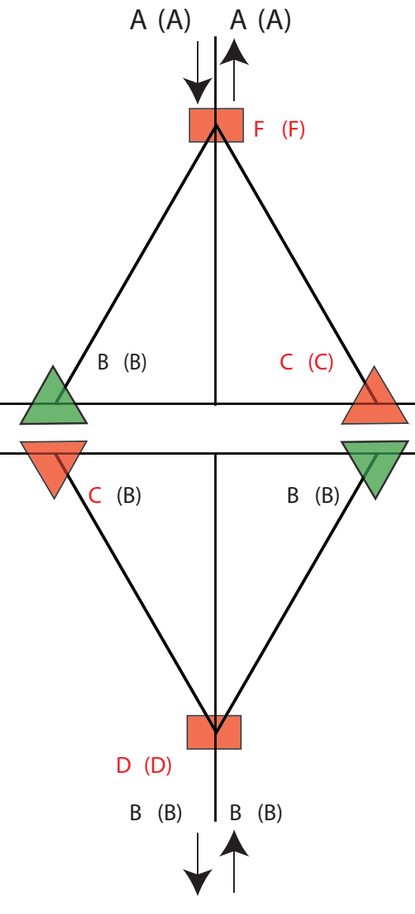
CR 255



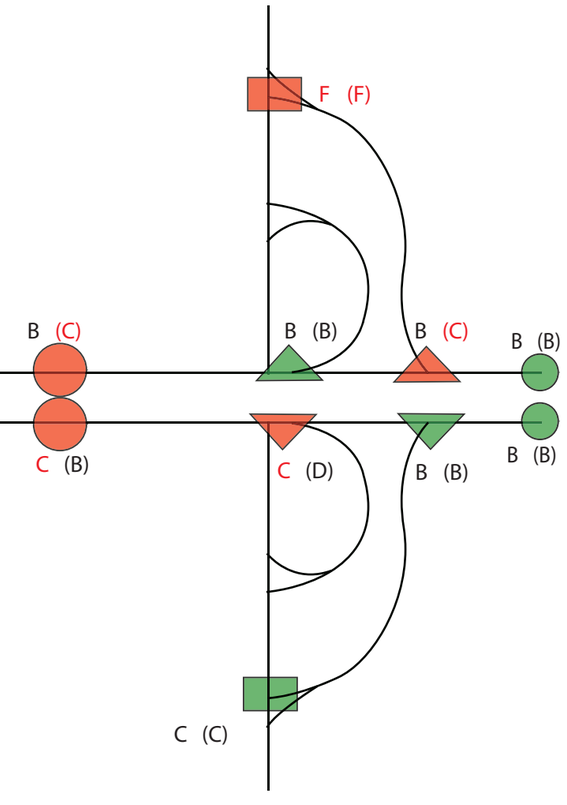
US 90



US 129



CR 137



Florida Department of Transportation District 2

I-10 Master Plan

The PBS&J Team

LEGEND

FREEWAY
RAMPS
UNSIGNALIZED INTERSECTION
MULTI-LANE
LOS AM (PM)

Green indicates meeting LOS
Red indicates failing LOS

SEGMENT 1: Design Traffic LOS AM (PM) 2030

Figure 3-1

SHEET 2 of 2

In response to these evacuation complications, FDOT in conjunction with the Florida Department of Community Affairs (DCA) and the Florida Department of Law Enforcement (FDLE) completed an operations analysis in June 2000 entitled Analysis of Florida's One Way Operations for Hurricane Evacuation: I-10 Jacksonville to Tallahassee / Monticello (US 19). The purpose of the study was to investigate the feasibility of reverse-laning I-10 from Jacksonville to Tallahassee in an effort to mitigate travel delays and the highway congestion that characterized the Hurricane Floyd evacuation in 1999.

According to this report, approximately 50,000 vehicles will attempt to use I-10 westbound from northeast Florida and southern Georgia in the event of a Category 4 or 5 storm. However, it is estimated that approximately 30 to 40 percent of these travelers will take I-75 north into Georgia and, thus, would not be traveling I-10 through the Segment 1 portion of corridor. The remaining 30,000 to 35,000 vehicles would seek to travel through Segment 1. The report also estimates in the event that the Treasure Coast and Southeastern Florida are also being evacuated, traffic coming from these areas of the state would replace the traffic lost on I-75 northbound and, thus, 50,000 vehicles could be traveling westbound through Segment 1.

The reversible-lane configuration is projected to service a travel flow of approximately 5,000 vehicles per hour. The operation was planned to end at US 19 with the two contraflow lanes taken down to one lane that would exit on the existing eastbound ramp. The lane reduction was needed because geometric and topographic features will not allow for two off-lanes; thus creating a bottleneck. To reduce the significance of this bottleneck, the report states several operational elements must be in place, including various ITS components to disseminate to the public how to proceed to their destinations in a clear and understandable manner. While most of the elements would take place outside the boundaries of Segment 1, the report implies a need for effective public dissemination of information throughout the entire corridor. One element specifically noted that would occur within Segment 1 is the effective redirecting of contraflow traffic wishing to travel northbound on I-75 to exit onto US 129. Contraflow traffic must be redirected at US 129 or it will put tremendous pressure on the ending operation at US 19.

For future evacuations, particularly those that involve only east central and northeast Florida, the report recommended the consideration of an operating plan that would end the reverse laning at I-75. In this scenario, pressure on the westbound I-10 lanes west of I-75 would be increased significantly; however, the bottleneck at US 19 would be eliminated. One of these scenarios includes converting the shoulder of the westbound lanes into a travel lane. In the event these scenarios are considered in further detail, adequate bridge support along the entire length of the roadway would be needed. This would be necessary in addition to adequate shoulder space along that westbound segment of I-10 west of I-75 to US 19 to safety accommodate travelers.

Another potential scenario considered by FDOT was an operating plan that would terminate reversible laning at the US 129 interchange. Under this scenario, the terminus treatment conceivably would be the same as that for the terminus at US 19 in that westbound contraflow traffic would exit onto US 129 via the eastbound entrance ramp from I-10. However, this scenario has not been modeled or studied in the same detail as those alternatives previously

noted. Subsequent coordination between the participants led to the tentative intent to transition the contraflow movement back to the westbound roadway just west of the I-75 interchange.

This report also cites the need to provide and / or maintain adequate communications infrastructure along I-10 in order to effectively execute these evacuation scenarios. Such infrastructure would primarily be needed to adequately accommodate the dynamic message sign network and other mechanisms to keep the public informed throughout the evacuation. In addition, some improvements related to signing and fixed object protection would be necessary to safely serve westbound traffic flow on the eastbound roadway.

3.3 CORRIDOR IMPROVEMENT GOALS AND ALTERNATIVES EVALUATION CRITERIA

The adopted master plan for the I-10 study corridor reflects the policies and goals both of the state and of the region served by this roadway. The goals and corresponding objectives focus on mobility improvements, environmental protection, economic development, creation of livable communities, and the cost effectiveness of investments. By evaluating identified CMEAs against a common set of goals and objectives, a master plan that guides future corridor improvements is developed. Policy elements, corridor goals, objectives, and corresponding Measure of Effectiveness (MOE) that guide the development and evaluation of alternatives are summarized below.

3.3.1 Improvement Goals

FDOT Interstate Highway Policy, local and regional needs, and the five I-10 Master Plan policy elements provide the framework from which improvement goals are developed. The relationship of these goals to the five policy elements is summarized below in Table 3-3.

Table 3-3: Policy Elements and Improvement Goals

Policy Element	Goal
Mobility	Enhance mobility of corridor residents and visitors.
Regional Commerce	Support regional commerce and goods movement.
Land Use	Support land use policies and livable communities.
Environment	Support environmental quality.
Affordability and Constructibility	Develop financially feasible and implementable plans.

Development and evaluation of CMEAs will occur in two steps, or tiers. In the first tier, mainline alternatives are developed to address the mobility needs of the mainline corridor. To evaluate and compare these alternatives, a set of objectives for each goal is identified, consistent with the more conceptual nature of the Tier 1 CMEAs.

The primary focus of CMEAs at the Tier 1 stage of analysis is on the identification and characterization of alternatives that address mobility options along the mainline of I-10. This will include options that relate to vehicular capacity, multimodal services, goods movement capabilities and ITS. Subsidiary elements, such as interchange improvements, remediation of various physical deficiencies and other additional features of the corridor will be addressed specifically in the Tier 2 level of analysis.

Tier 1 corridor evaluation objectives which correspond to the study goals listed above, and that are used to compare alternatives are identified on the following page in Table 3-4.

Table 3-4: Tier 1 Evaluation Goals and Objectives Matrix

Policy Elements	**Tier Corridor Evaluation Objectives**	
Policy Goals	Tier 1	Tier 2
Mobility		
Enhance Mobility Of Corridor Residents And Visitors	Provide Acceptable LOS	Provide Acceptable LOS
	Provide For Safe Roadway Environment	Provide for Efficient Traffic Operations
	Facilitate Corridor Transit Plans	Provide for Safe Roadway Environment
		Facilitate Corridor Transit Plans
		Support Hurricane Evacuation
Regional Commerce		
Support Regional Commerce And Goods Movement	Facilitate Freight Movements	Facilitate Freight Movements
	Provide Access To Intermodal Facilities	Provide Access to Intermodal Facilities
Land Use		
Support Land Use Policies And Livable Communities	Promote Compatibility With Land Uses And Growth Management	Promote Compatibility With Land Uses And Growth Management
	Minimize Relocations And ROW Acquisition	Minimize Relocations And ROW Acquisition
		Minimize Cultural Resource Impacts
		Minimize Utility Impacts
Environment		
Support Environmental Quality	Minimize Wetland Impacts	Minimize Wetland Impacts
	Enhance Air Quality	Enhance Air Quality
		Minimize Contamination Site Conflicts
		Minimize Drainage Impacts
Affordability & Constructability		
Develop Financially Feasible And Implementable Plan	Minimize Capital Cost	Minimize Capital Cost
	Facilitate Constructability	Minimize Operating and Maintenance Costs
		Facilitate Constructability

3.3.2 Measures of Effectiveness and Evaluation Criteria

The degree to which CMEAs achieve study goals and objectives is determined through application of a series of MOEs. The MOEs utilize data generated to evaluate defined objectives and range from stand-alone quantitative results, comparison against a baseline condition, and qualitative assessments tempered by study team experience and public input.

The relationship between the Tier 1 corridor evaluation objectives, MOEs and rating scale is summarized on the following page in Table 3-5.

Table 3-5: Tier 1 Corridor Evaluation Objectives and Measures of Effectiveness

STUDY OBJECTIVE	MOE TIER 1	RATING SCALE (SEE NOTE)		
		O	⊙	●
MOBILITY				
Provide Acceptable LOS	LOS	Below Required LOS Standard	At LOS Standard	Exceeds LOS Standard
Provide For Safe Roadway Environment	Remediation Of Geometrics Deficiencies	Bridges Over I-10 And Other Bridges That Have Safety Issues Remediated	Brides Over I-10, Other Bridges That Have Safety Issues, And All Other Deficiencies Remediated	All Deficiencies Remediated
Facilitate Corridor Transit Plans	Extent Of Non-SOV Travel	<2% Reduction	2% - 5% Reduction	>5% Reduction
REGIONAL COMMERCE				
Facilitate Freight Movements	Traffic Service And Access For Trucks	Poor Truck Access And LOS	Some Improvements To Truck Access And LOS	Quality Truck Access And LOS
	Minimize Conflicts Between Truck And Autos	No Actions To Minimize Conflicts	Minimal Actions To Minimize Conflicts	Significant Actions To Minimize Conflicts
Provide Access To Intermodal Facilities	Adequacy Of Access To Intermodal Facilities	Poor Access Provided	No Change In Access Provided	Adequate Access Provided
LAND USE				
Promote Compatibility With Land Uses & Growth Mgmt.	Quality Of Access To Approved Land Use	Significant Incompatibility		Significant Compatibility
Minimize Relocations And ROW Acquisitions	Number Of Residential Relocations And Acres Of ROW Required	Significant Takings And Relocations		Limited Or No Takings And Relocations
	Number Of Business Relocations And Acres Of ROW Required	Significant Takings And Relocations		Limited Or No Takings And Relocations
ENVIRONMENT				
Minimize Wetland Impacts	Extend Of Wetland Encroachments	Significant Encroachments		Minimal Encroachments
Enhance Air Quality	Effect On Vehicle Miles And/Or VHT	<2% Reductions	2% - 5% Reduction	>5% Reduction
AFFORDABILITY & CONSTRUCTABILITY				
Minimize Capital Cost	Conceptual Construction Cost	Highest Cost Option	Middle Cost Option	Lowest Cost Option
Facilitate Constructability	Complexity Of Maintenance Of Traffic And Constructability	Relatively Complicated; Large Scope, Numerous Phase Or Long Duration; Requires New Temporary Facilities	Moderately Complicated, Moderate In Scope, Phase Or Duration; Requires Construction Of New Permanent Facilities	Relatively Simple; Limited Scope, Phase Or Duration; Uses Existing Facilities

Rating Scale
O Minimally Satisfies Criterion
⊙ Moderately Satisfies Criterion
● Highly Satisfies Criterion