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Traffic Incident Management

Contraflow Best-Practice Recommendations

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Florida Department of Transportation
Traffic Engineering and Operations Office
Incident Management / Commercial Vehicle Operations Section
605 Suwannee Street, M.S. 90
Tallahassee, Florida 32399-0450
(850) 410-5600

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Created By:	John Hibbard, PBS&J	February 6, 2006
Reviewed By:	John Z. Luh, PBS&J	February 6, 2006
	Tahira Faquir, PBS&J	February 6, 2006
	John Hibbard, PBS&J	February 23, 2006
	Mike Akridge, FDOT	February 27, 2006 March 1, 2006 March 6, 2006 March 15, 2006
	Paul Clark, FDOT	
	Tahira Faquir, PBS&J	April 6, 2006
	Michael Akridge, FDOT	April 12, 2006
Modified By:	Dave Hodges, PBS&J	February 22, 2006
	Pam Hoke, PBS&J	February 26, 2006
	Dave Hodges, PBS&J	February 28, 2006
	John Luh, PBS&J	March 2, 2006
	Dave Hodges, PBS&J	March 9, 2006 March 27, 2006
Completed By:	Pam Hoke, PBS&J	April 13, 2006

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List of Acronyms

ALDOT ..... Alabama Department of Transportation
AM ..... Amplitude Modulated
ATIS ..... Advanced Traveler Information System
CB ..... Citizens Band
DMS ..... Dynamic Message Sign
DOT ..... Department of Transportation
EAS ..... Emergency Alert System
ERN ..... Everglades Radio Network
FDEP ..... Florida Department of Environmental Protection
FDOT ..... Florida Department of Transportation
FGCU ..... Florida Gulf Coast University
FM ..... Frequency Modulated
HAR ..... Highway Advisory Radio
ITS ..... Intelligent Transportation Systems
I-275 ..... Interstate 275
I-295 ..... Interstate 295
I-4 ..... Interstate 4
I-595 ..... Interstate 595
MHz ..... Megahertz
PIO ..... Public Information Office
SR ..... State Road
TiRN™ ..... Traveler Information Radio Network™
TMC ..... Transportation Management Center
TV ..... Television

1. Introduction

The review of other states' best practices identified numerous contraflow planning and operational concepts that have potential application for Florida's contraflow routes. These best practices can be categorized in several types of recommendations that appear to be appropriate:

- Best practices recommended for uniform, consistent application at a statewide level due to the issues associated with their implementation
- Specific practices recommended for or applied to specific parts (or locations) of the existing Florida evacuation plans
- Best practices that serve to confirm current Florida Department of Transportation (FDOT) contraflow plan practices and provide additional assurance that the practice used is, in fact, appropriate based on application throughout the southeastern United States.
- Practices that should be strongly discouraged based on broader consideration across the region, and multiple practitioners' experiences and opinions
- Proposed contraflow routes and suggested revisions to end points of existing plans

2. Statewide Best Practices

While the best practices included in this section were all widely utilized by various departments and agencies, their commonality does not extend beyond that broad usage. Each is being applied in various ways. The four statewide scope best practices recommended for implementation are:

- Media and press information and interaction
- Highway advisory radio (HAR)
- Adequate capacity/high-speed contraflow terminations
- Implementation and operations plan information

2.1 Media / Press Information and Interaction

This set of best practices consists of encouraging consistent involvement of print and broadcast media in providing contraflow information to area residents at the beginning of hurricane season. Several different specific initiatives are recommended for statewide use, all employed in the context of disseminating information and increasing evacuation planning awareness as it relates to the contraflow operation in a community.

While the *Contraflow Plan for the Florida Intrastate Highway System* placed considerable emphasis on the interactions recommended between emergency service providers and local media immediately prior to a hurricane's anticipated landfall, the best practices described here are intended to serve a different, but complimentary, role.[1] These best practices are intended to raise awareness and, perhaps more significantly, to provide general contraflow information to residents of areas most subject to catastrophic hurricane damage and who are likely users of the contraflow route serving their area.

Newspaper press releases – Local newspapers are a good means of distributing information that might come in two forms: press releases for general announcements and special material devoted to a particular topic, most often provided as a media kit. A press release issued by either the FDOT Secretary or the Governor is material that local newspapers will typically print, either "as received" or as impetus for an article about the announcement. Developing and distributing press releases about contraflow is a simple matter in this context. As an example, North Carolina maintains its press releases from year to year and simply updates them prior to distribution at the beginning of hurricane season.

[1] *Technical Memorandum – Contraflow Plan for the Florida Intrastate Highway System* (Version 1, June 2005), FDOT Contract No. C-7772. Available online at http://floridaits.com/Contraflow.htm.

Other agencies – Florida's Turnpike Enterprise, for one – use this opportunity to prepare a media kit with various materials on hurricane preparedness, evacuation routes, maps, contact information, and suggested story ideas with sources to call for interviews. The kits, which can be tailored to focus specifically on contraflow, are distributed to news departments at all newspapers, and to radio and television (TV) news directors. Another promotional method is to schedule a media day consisting of a press conference, interviews with top officials, distribution of media kits, and tours of emergency operations centers or similar facilities to provide opportunities for video and still photography. This helps heighten awareness by demonstrating to the press the urgency of hurricane preparedness, the reasons for contraflow activation, and the response agencies' commitment to emergency planning and public safety.

Printed materials – Several states, such as North Carolina, South Carolina, and Louisiana, develop large-format materials, printed in color, to distribute hurricane evacuation information. These materials are typically 20 inches by 32 inches and provide information addressing:

- Evacuation routes, contraflow routes, and mapping
- Preparation instructions
- Evacuation supply checklists
- Shelter locations
- Vulnerable areas
- Media coverage information
- Storm surge information
- Emergency contacts
- Detailed mapping of specific interchanges or diversion points
- Evacuation decision guidelines

These posters are distributed in Sunday newspapers, at welcome centers, in department of transportation (DOT) offices, and at home improvement stores.

Some states have developed and printed smaller, trifold brochures to provide hurricane-related information. While these are easy to produce, the typical 8½-inch by 11-inch or 8½-inch by 14-inch paper used for such brochures limits the amount of information that can be practically provided. Since it is likely that the information will be conveyed using maps or similar graphics, a bigger size may be needed.

Each DOT develops and distributes state highway maps that can be used to disseminate some evacuation and contraflow information. This is especially attractive as a dissemination method because tourists or seasonal residents that might not receive beginning-of-season information frequently use such maps. Motorists tend to keep maps in their vehicles for reference, which means the printed evacuation details will be nearby when needed.

Other outreach efforts cover a wide range of dissemination techniques. Louisiana follows a policy of providing real-time information to the media at 30-minute intervals so that the public is continuously informed prior to and during contraflow operations. North Carolina prints posters

and fliers, then uses a combination of the NCDOT Web site and the state's 511 advanced traveler information system (ATIS) to disseminate "floodgate" messages that play as soon as a caller connects to the service during contraflow operations.

Mississippi relies on its Web site, www.GoMDOT.com, which the Mississippi Department of Transportation (MDOT) encourages motorists to visit when seeking travel information on current traffic conditions, evacuation routes, roadway status, and the MDOT's own emergency plans. Contraflow information is posted as needed to keep motorists abreast of plan details, schedules, and other particulars.

Alabama, much like Florida, utilizes various means of reaching the public when a contraflow operation is declared. An emergency radio broadcast service is provided through the Alabama Emergency Management Agency. The Alabama Department of Transportation (ALDOT) Web page contains road closure information and generally posts reverse-lane information in the form of contraflow checklists, diagrams, and detour details. A HAR system is utilized for motorists en route. Alabama's plans include broadcasting more public service announcements and printing materials to be distributed at rest areas, welcome centers, and other locations.

Web sites allow the host to directly determine the content of information distributed and update it at will. With the rapid growth of Internet usage and the popularity of Web sites as news sources, posting contraflow information in this manner is a means of public outreach that should not be overlooked. Members of the public who may hear about an FDOT advisory on the radio or TV are very likely to seek additional information online, provided they know the Web site to use.

Incident managers should take every opportunity to promote their District Web site by providing the address with each press release or news conference. The Web site should be included on business cards, posters, leaflets, and other printed materials produced for distribution. It should be disseminated during HAR contraflow broadcasts and in 511 ATIS messages. Remember that related sites, such as those of other agencies, counties, or municipal governments, and some media outlets, may accept links to FDOT sites, which would increase the number of Web site visits and provide wider dissemination of contraflow information.

2.2 Highway Advisory Radio

Highway advisory radio has an uneven history of effectiveness as part of intelligent transportation system (ITS) deployments. While some ITS projects have made extensive use of HAR, others have not instituted such widespread application. Others have abandoned HAR subsystems due to operational unevenness and inconsistency. Nonetheless, HAR has tremendous operational flexibility that can be used to a state's advantage in evacuation or contraflow operations, as can be easily done in Florida. Highway advisory radio accommodates much longer messages and also addresses the need for alerts to be broadcast in multiple languages.

One drawback of HAR is that motorists are required to take an action, such as tuning the radio to a specific frequency, to receive broadcast information. In contraflow evacuations, however, motorists readily seek travel information and advisories, so there is a much greater likelihood that they will respond to a message alert (typically conveyed by static signage with flashing beacons) and tune in.

A similar service to HAR is the Everglades Radio Network (ERN), which broadcasts information on the history and restoration of the Everglades. The ERN consists of two low-power frequency modulated (FM) radio stations constructed by the FDOT, managed by the Florida Department of Environmental Protection (FDEP), and operated by Florida Gulf Coast University (FGCU) in Fort Myers. The stations' broadcast areas cover all of Alligator Alley on I-75 in Collier County, and allow motorists to tune in WFLP-FM at 98.7 megahertz (MHz) and WFLU-FM at 107.9 MHz to listen to the broadcast. Since the ERN is a licensed facility, each station must be tied into the Emergency Alert System (EAS) and is required to provide emergency information generated by the EAS. The ERN is set up so that the FDOT can interrupt broadcasts to provide traveler advisories and contraflow information to motorists when necessary.

The Traveler Information Radio Network™ (TiRN™) is a public-private partnership that provides tourist information in the four counties of Brevard, Orange, Osceola, and Seminole. Information is broadcast from two amplitude modulated (AM) stations, WTIR and WQBQ. The FDOT is given a total of six minutes each hour to provide traffic information on a regular basis but, during emergency events, the FDOT should utilize more time as necessary to provide contraflow information. Close coordination is necessary between TiRN staff, the local FDOT Public Information Office (PIO), and transportation management centers (TMCs) to ensure that up-to-date accurate information on current roadway conditions is broadcast in a timely manner.

2.3 Adequate Capacity / High-speed Contraflow Terminations

A best practice that is part of many hurricane evacuation plans throughout the southeast, including Florida, is the design of contraflow routes with high-capacity, high-speed plan terminations. The typical high-speed scenario — currently part of several Florida contraflow plans, including the Interstate 4 (I-4), State Road (SR) 528, and Florida's Turnpike plans — relies on the following:

- An existing freeway-to-freeway interchange
- Forced exiting of regular-flow traffic to a right-hand exit
- An exit that is preferably a two-lane ramp, or a one-lane exit ramp that can be temporarily modified to accommodate two lanes of traffic
- A paved crossover downstream of the exit, but still within the interchange, to move contraflow traffic over to the regular-flow side

- Ability to use the same interchange as a means of closing off the regular-flow traffic by forcing those vehicles off on an exit ramp at the same interchange

Another consideration is the fact that routing is needed for vehicles that desire to travel toward the area being evacuated. Florida also stages food, water, ice, generators, and other supplies prior to the storm for rapid response to the disaster area. While lowered demand is anticipated, identifying a route for regular-flow vehicles and responders is a useful and low-cost best practice.

2.4 Implementation and Operations Plan Information

A best practice used by many states is the development and maintenance of detailed setup and operational plans for contraflow routes. These plans are developed to provide instruction to several different levels of personnel involved in the operation, including managers, field supervisors, and operations staff from different agencies, such as the state DOT and state police. While some agencies develop and maintain traditional large-format evacuation plan sets, the operational plans are typically text-based and supplemented with graphics as needed. These plans typically include:

- Realistic timelines working backward from the storm's anticipated arrival
- Specific sourcing of needed resources that must be borrowed
- Portable plan information printed in notebooks or on small (index-sized) reference cards
- Contact information for all supervisory and managerial staff to be involved
- Hotels that will be used to house temporarily relocated personnel

Frequently, implementation of a contraflow plan involves the redeployment of freeway service patrols to the contraflow route to provide motorist assistance. The plan information provides details concerning the route(s) these patrols should use, including the non-contraflow roads they should take to return to the starting point of their patrol sector. Given the unfamiliarity that such patrols will likely have with either the area or their assigned routes, or both, such information needs to be present in this plan in a format appropriate for distribution to patrol personnel.

3. Plan-by-Plan Recommendations

3.1 Interstate 4 Contraflow Plan for Tampa Bay

The I-4 contraflow plan originates in Tampa at the Interstate 275 (I-275) interchange and provides Tampa Bay area residents with an evacuation route to Orlando. The route extends eastward 63 miles and ends at the SR 417 interchange. A major construction project along the I-4 corridor is widening the highway from four to six lanes.

It is recommended that the I-4 contraflow route be furnished with three HAR systems (at the beginning, in the middle, and at the end of the contraflow section) and two CB Wizard Alert Systems at locations alternating with HAR systems (at one-third and two-thirds of the contraflow section). The CB Wizard Alert System continuously broadcasts a warning message over CB radio to alert approaching commercial vehicle drivers of roadway conditions, road closures, or potential hazards.

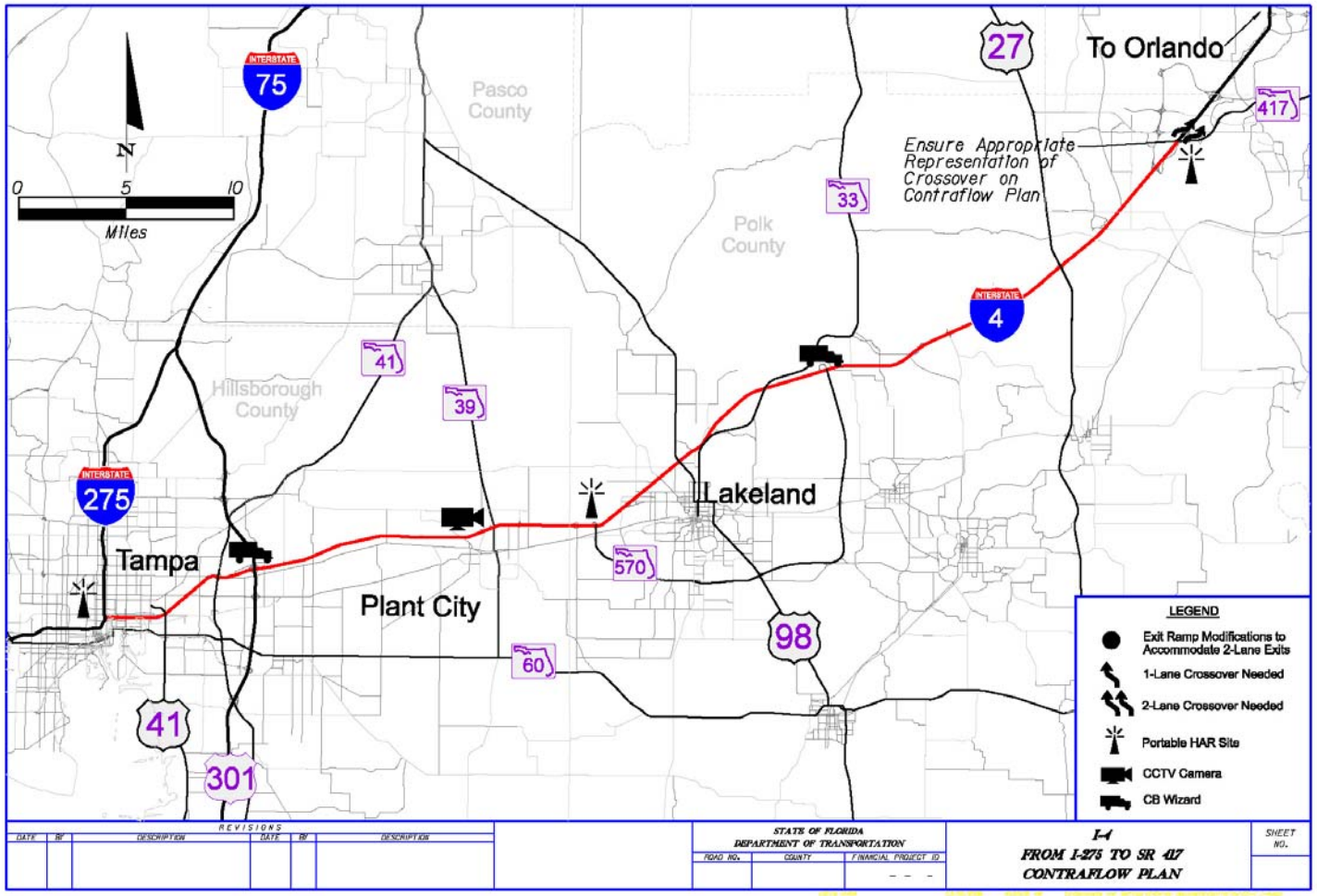
The contraflow plan documents should be corrected to show that the termination is a two-lane exit to SR 417 and that there is a crossover. As for ITS devices, the route appears to be sufficiently equipped. There is one camera at the I-275/I-4 interchange that is monitored. This unit will be replaced in an upcoming project that includes the installation of four cameras in that vicinity. District 7 expects the project to be complete by December 2006.

For each CCTV column in the tables presented below, it is assumed that the cost of a CCTV installation will consist of one camera with a controller, an 86-foot pole, and required communication connections. The HAR includes two signs with flashing beacons. The DMS system includes mounting the sign on a span truss. Two-lane crossovers are 36 feet wide and 500 feet long. One-lane crossovers are 20 feet wide and 500 feet long. There are four drop gates and three flip-down signs planned per interchange, following the setup that is typical on Georgia's contraflow routes. The drop gates are installed at the top and bottom of each exit and entrance ramp on the contraflow side only. The three flip-down signs are to be installed at one-mile and half-mile intervals, and at the gore of contraflow exits.

Table 3.1 – Estimated Costs for the Tampa Bay I-4 Contraflow Plan

DEVICE	UNIT COST	QUANTITY REQUIRED BY I-4 PLAN
HAR	$80,000	3
CB Wizard	$10,000	2
CCTV	$57,000	1
Two-lane Crossover	$130,000	
One-lane Crossover	$75,000	
DMS	$300,000	
Drop Gate	$5,000	96
Flip-down Sign	$1,500	72
Paint for Exit Numbers	$500	24
Guardrail End Modification	$7,000	
TOTAL	**$917,000**	

Figure 3.1 – Contraflow Plan for I-4 from I-275 to SR 417



3.2 Interstate 10 Contraflow Plan for Jacksonville

From its origin at Interstate 295 (I-295), Jacksonville's recently revised contraflow plan takes traffic west on I-10 to the I-75 interchange in Columbia County. Before this plan was revised, it was the longest in Florida – totaling 131 miles and ending at U.S. Highway 19 in Jefferson County.

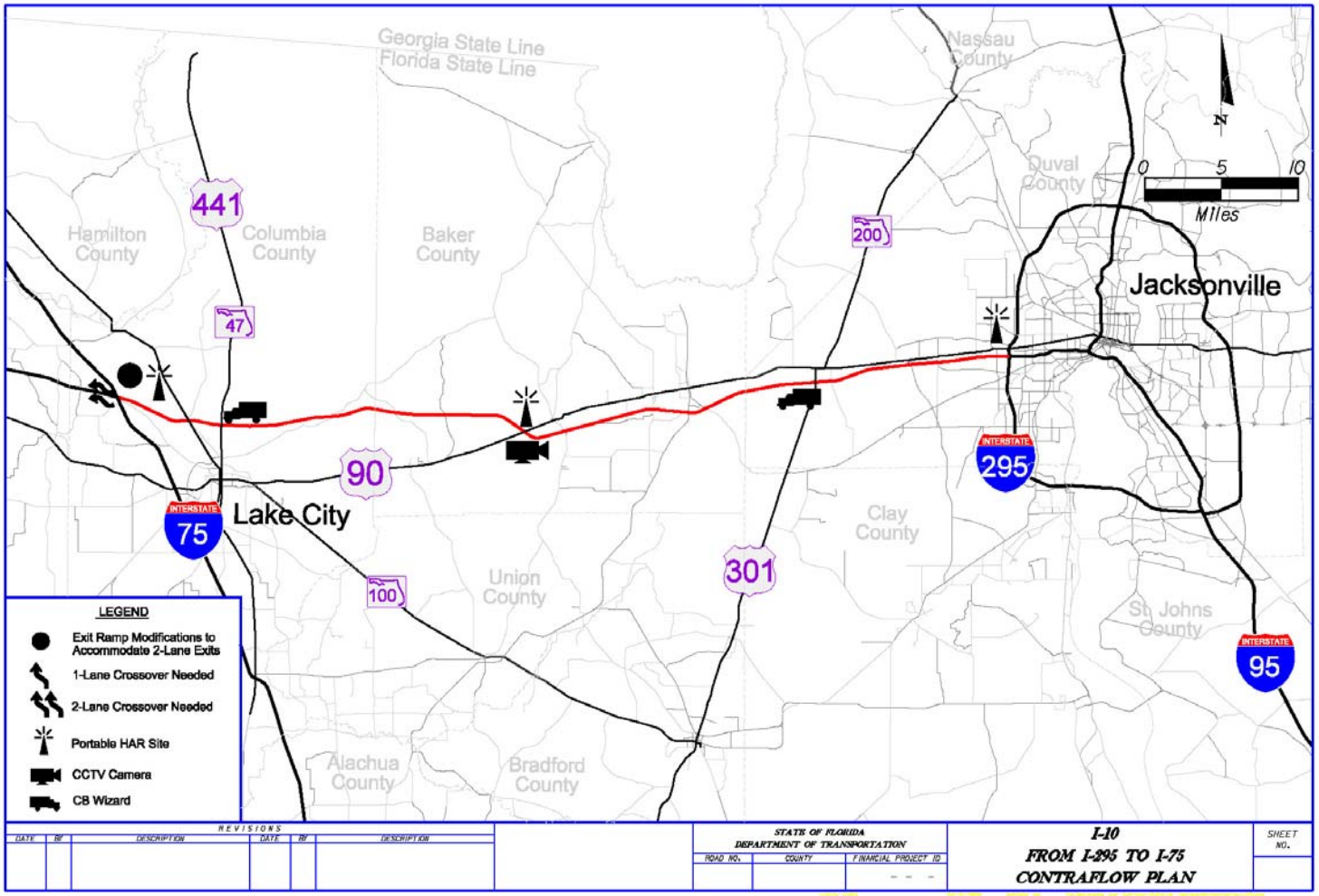
It is recommended that the I-10 contraflow plan be furnished with HAR systems and supplemented with the CB Wizard Alert System at alternating locations along the route. The plan currently transitions the two regular-flow lanes to a single lane immediately before exiting to northbound I-75. This has great potential to cause significant backups as the two lanes merge into one. There are two practices that can be implemented to mitigate this situation. The first would be through cones or other temporary traffic control devices to allow the two lanes of traffic to exit to I-75 northbound. Ramp width is adequate (i.e., one traffic lane plus the left-side shoulder plus the right-side shoulder is greater than 24 feet) to accommodate this, but a lane on I-75 northbound would need to be closed (also using cones or other temporary traffic control devices) to make room for the two lanes of merging traffic. The other practice would be to keep the exit to southbound I-75 open so that evacuating traffic can choose to exit to either north- or southbound I-75. This practice will also lessen the chance of overloading on I-75 northbound. West of the interchange, the plan uses a two-lane crossover to send contraflow traffic to the regular-flow side.

The availability of ITS for traffic management is sufficient on the Jacksonville end, but the addition of a CCTV camera at I-75 would be beneficial. There is no other ITS equipment at the west end of the route.

Table 3.2 – Estimated Costs for the Jacksonville I-10 Contraflow Plan

DEVICE	UNIT COST	QUANTITY REQUIRED BY I-10 PLAN
HAR	$80,000	3
CB Wizard	$10,000	2
CCTV	$57,000	1
Two-lane Crossover	$130,000	1
One-lane Crossover	$75,000	
DMS	$300,000	
Drop Gate	$5,000	40
Flip-down Signs	$1,500	30
Paint for Exit Numbers	$500	10
Guardrail End Modification	$7,000	
TOTAL	**$697,000**	

Figure 3.2 – Contraflow Plan for I-10 from I-295 to I-75



3.3 Southeast Florida Contraflow Plan for Florida's Turnpike

Florida's Turnpike provides a primary northbound evacuation route for south Florida's major urban areas. The contraflow route takes advantage of the highway's swing to the west after it passes Fort Pierce. The 114-mile route ends north of Orlando at the Ocoee interchange near SR 50. Although there is benefit in starting the contraflow further south on Florida's Turnpike, below SR 70, this is not feasible due to the presence of fixed concrete barriers and, more significantly, grade differences between the north- and southbound lanes. An existing gap in the fixed concrete barrier immediately south of the SR 70 overpass should be used as the initial crossover point.

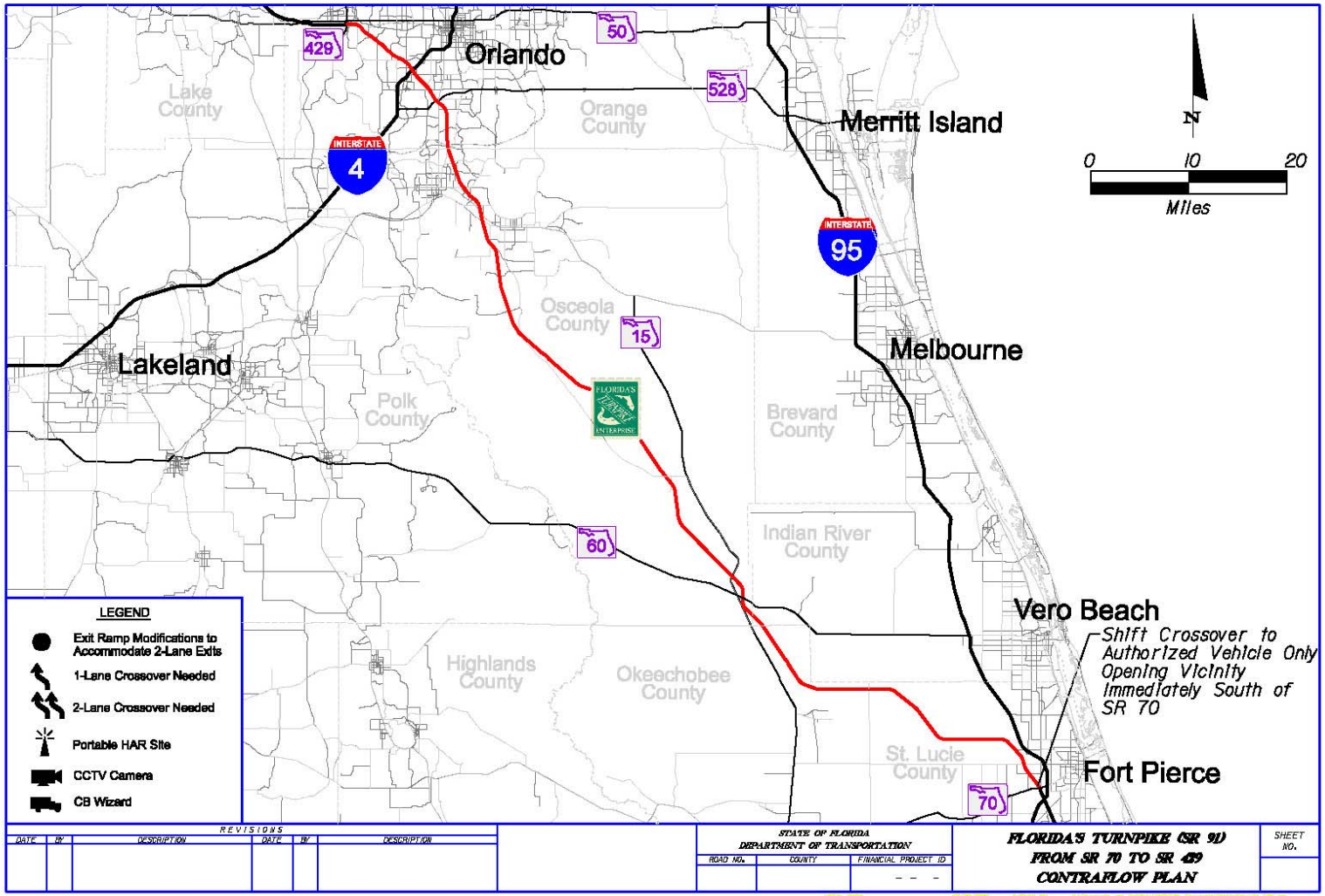
It is recommended that the static signage on Florida's Turnpike be converted to dynamic message sign (DMS) devices. The highway is already served by HAR systems and ITS availability is good. Additional cameras are being installed north of Fort Pierce in an ongoing expansion project, so traffic surveillance capability will improve.

Table 3.3 – Estimated Costs for the Southeast Florida Contraflow Plan for Florida's Turnpike

DEVICE	UNIT COST	QUANTITY REQUIRED BY FLORIDA'S TURNPIKE PLAN
HAR	$80,000	
CB Wizard	$10,000	
CCTV	$57,000	
Two-lane Crossover	$130,000	
One-lane Crossover	$75,000	
DMS	$300,000	11*
Drop Gate	$5,000	32
Flip-down Signs	$1,500	24
Paint for Exit Numbers	$500	8
Guardrail End Modification	$7,000	
TOTAL	**$200,000**	

* It is recommended that the static signage on Florida's Turnpike be replaced and converted to DMS devices; quantity is assumed for budgeting purposes.

Figure 3.3 – Contraflow Plan for Florida's Turnpike (SR 91) from SR 70 to SR 429



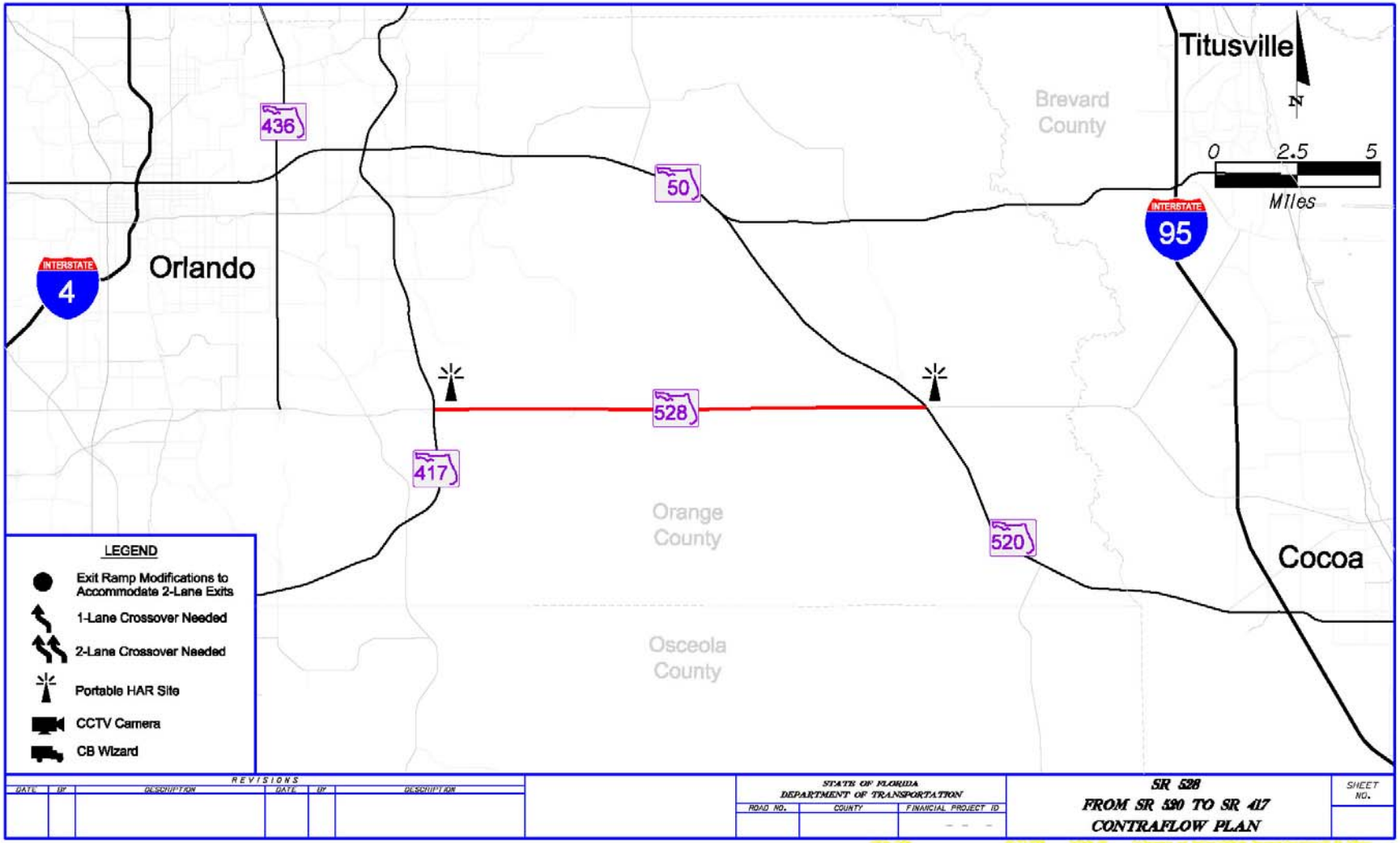
3.4 State Road 528 Contraflow Plan for the Space Coast

State Road 528 was originally built as a limited-access toll road connecting Orlando with the rapidly growing Space Coast. Since then it has become the main westerly evacuation route for Brevard County residents. The contraflow route is 11 miles long, extending from the SR 528 interchange at SR 520 to the SR 417 interchange east of Orlando. The recommendation is to install HAR equipment along the highway for motorist advisories. Other than that, the route is sufficiently equipped for contraflow.

Table 3.4 – Estimated Costs for the SR 528 Contraflow Plan for Space Coast

DEVICE	UNIT COST	QUANTITY REQUIRED BY SR 528 PLAN
HAR	$80,000	2
CB Wizard	$10,000	
CCTV	$57,000	
Two-lane Crossover	$130,000	
One-lane Crossover	$75,000	
DMS	$300,000	
Drop Gate	$5,000	8
Flip-down Signs	$1,500	6
Paint for Exit Numbers	$500	2
Guardrail End Modification	$7,000	
TOTAL	**$210,000**	

Figure 3.4 – Contraflow Plan for SR 528 from SR 520 to SR 417



3.5 Sarasota County's Interstate 75 Shoulder-use Plan

Sarasota County's shoulder-use plan extends along 21 miles of I-75 northbound and is the only evacuation plan of its kind in Florida. After traffic reaches SR 681, the four-lane interstate becomes six lanes, so vehicles traveling on the shoulder simply switch over to the newly added third travel lane. As long as FDOT District 1 and local emergency management personnel support the use of this mode of evacuation in Sarasota County, the plan is sufficient for the purposes it will serve. Flip-down signage should be installed to advise motorists of shoulder use one mile before the beginning of the shoulder-use area, and flip-down signage should be installed at an approximate two-mile spacing throughout the shoulder-use area to serve as a reminder to motorists of the appropriate use of the shoulder.

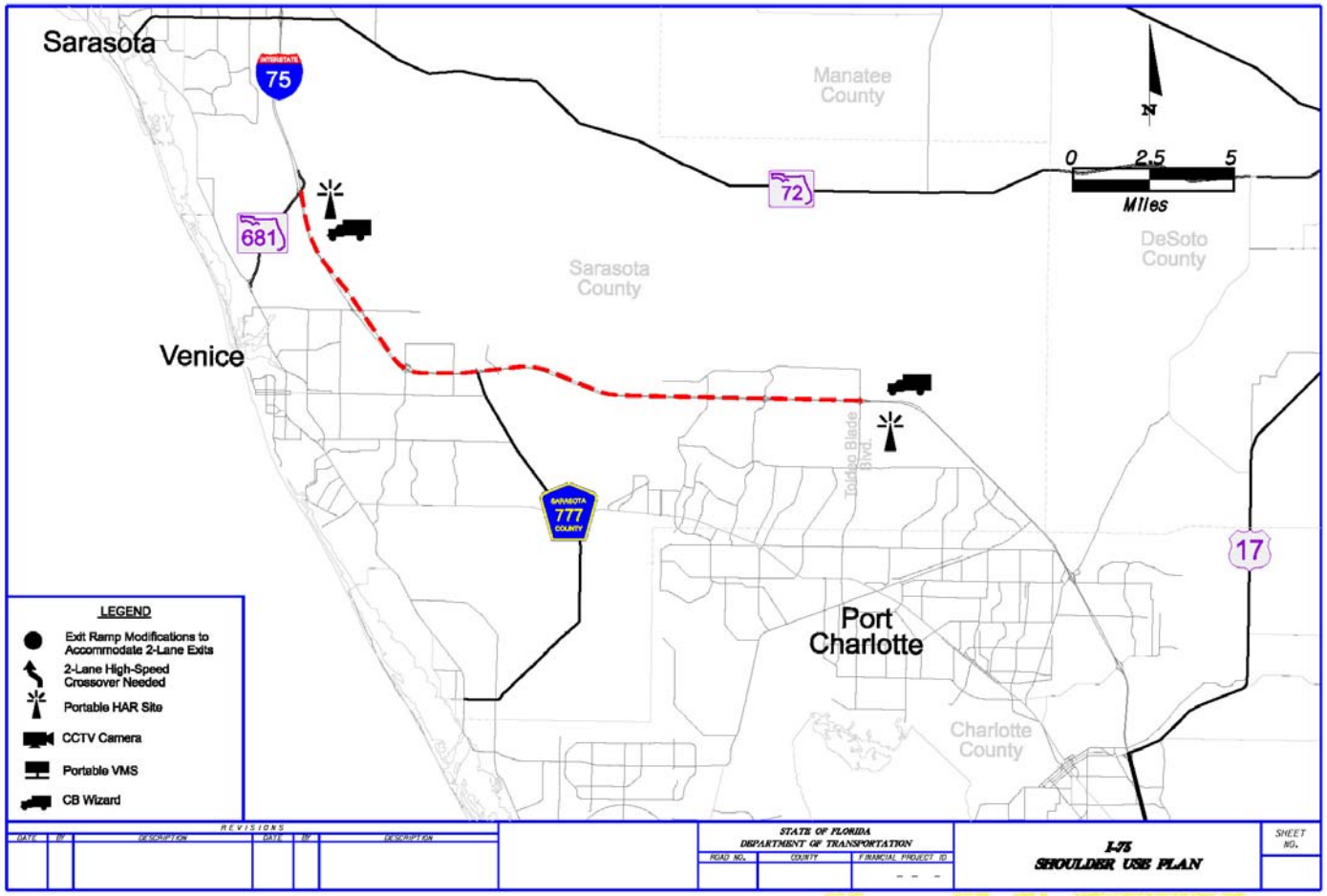
To reinforce the unusual use of the shoulder in conjunction with hurricane evacuation, HAR and CB Wizard technologies should be installed approximately one mile before the beginning of the shoulder-use section and approximately 1 mile before the SR 681 interchange. Because of the relatively short length of the shoulder-use plan, intermediate HAR or CB Wizard, intended to serve as reinforcement or confirmation of evacuation activities, is not needed.

It is the recommendation of this study team, however, that shoulder plans not be utilized. An alternative evacuation recommendation for this portion of I-75 is provided in *Section 5* of this document.

Table 3.5 – Estimated Costs for I-75 Shoulder-use Plan

DEVICE	UNIT COST	QUANTITY REQUIRED BY SR 528 PLAN
HAR	$80,000	2
CB Wizard	$10,000	2
CCTV	$57,000	
Two-lane Crossover	$130,000	
One-lane Crossover	$75,000	
DMS	$300,000	
Drop Gate	$5,000	
Flip-down Signs	$1,500	
Paint for Exit Numbers	$500	11
Guardrail End Modification	$7,000	
TOTAL	**$196,500**	

Figure 3.5 – I-75 Shoulder-use Plan



3.6 Interstate 75's Alligator Alley Contraflow Plans

The eastbound portion of I-75's Alligator Alley provides a contraflow route that begins at the SR 951 interchange and runs east 78 miles to the U.S. Highway 27 interchange in Broward County. This report recommends relocating the eastern end to Interstate 595 (I-595) to provide a higher capacity termination point. This facilitates the management of traffic flow at that location and provides alternative route choices further downstream, such as I-95 and Florida's Turnpike.

On the west end, establishing a good beginning point is a priority. A two-lane crossover is needed, and the best location may be SR 80 at Fort Myers. There is a plan underway to install ITS devices throughout the corridor. It is recommended that CB Wizard Alert System devices be installed in alternating locations with HAR equipment for the delivery of traveler advisories.

The Alligator Alley westbound contraflow route is essentially the reverse of the eastbound plan. The recommended starting point is the I-595 interchange in Broward County, with the terminus a two-lane ramp exit and two-lane crossover at SR 80 in Fort Myers. The planned expansion of ITS capabilities along this remote section of interstate will benefit evacuation operations by providing more CCTV surveillance and DMS devices along the route. The CB Wizard Alert System installed in alternating locations with HAR equipment can serve contraflow evacuees traveling in either direction.

Table 3.6 – Estimated Costs for Eastbound I-75 Alligator Alley Contraflow Plan

DEVICE	UNIT COST	QUANTITY REQUIRED BY THE I-75 ALLIGATOR ALLEY EASTBOUND PLAN
HAR	$80,000	3
CB Wizard	$10,000	2
CCTV	$57,000	
Two-lane Crossover	$130,000	2
One-lane Crossover	$75,000	
DMS	$300,000	
Drop Gate	$5,000	64
Flip-down Signs	$1,500	48
Paint for Exit Numbers	$500	16
Guardrail End Modification	$7,000	
TOTAL	**$920,000**	

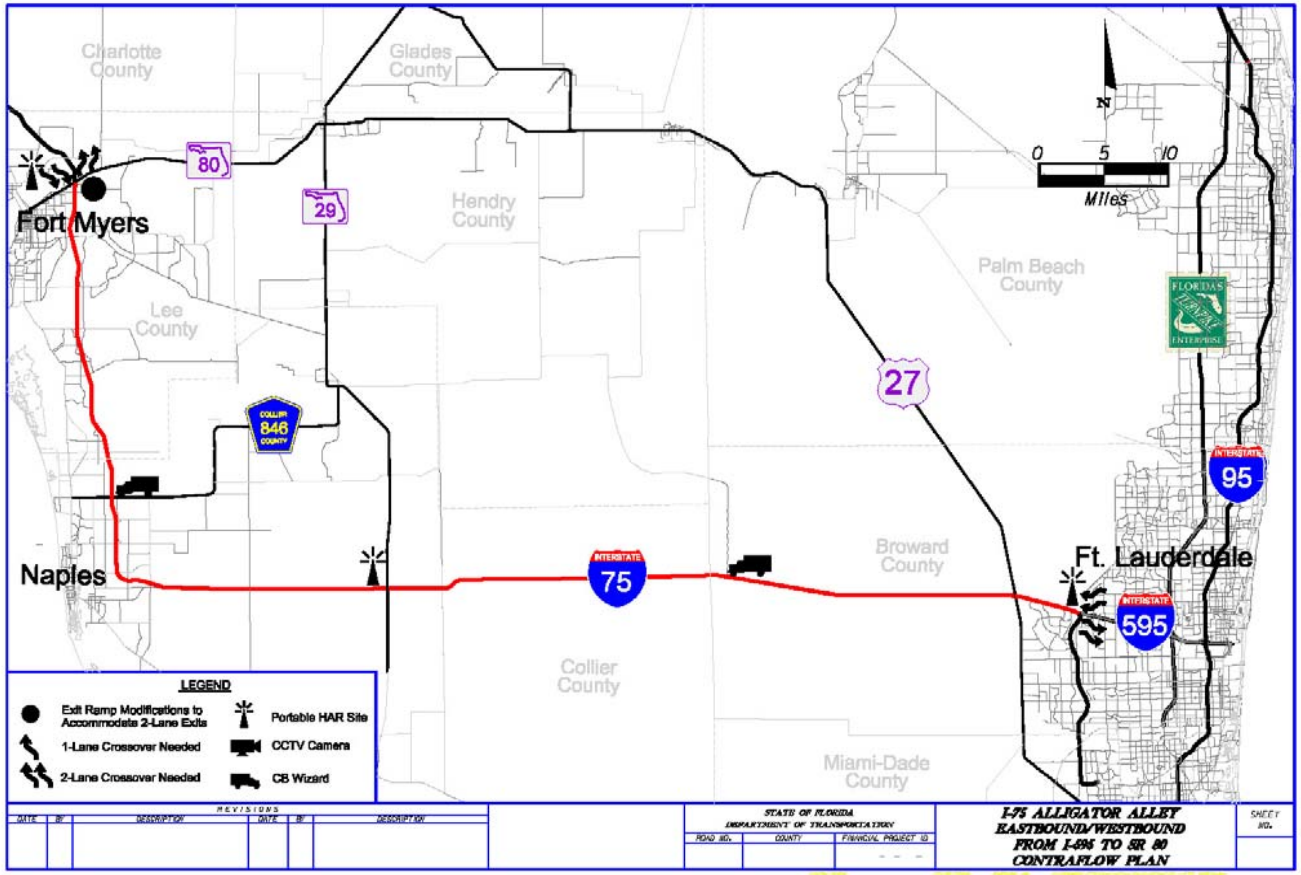
* The HAR and CB Wizard installations on Alligator Alley serve both eastbound and westbound operations.

Table 3.7 – Estimated Costs for Westbound I-75 Alligator Alley Contraflow Plan

DEVICE	UNIT COST	QUANTITY REQUIRED BY I-75 ALLIGATOR ALLEY WESTBOUND PLAN
HAR	$80,000	
CB Wizard	$10,000	
CCTV	$57,000	
Two-lane Crossover	$130,000	2
One-lane Crossover	$75,000	
DMS	$300,000	
Drop Gate	$5,000	64
Flip-down Signs	$1,500	48
Paint for Exit Numbers	$500	
Guardrail End Modification	$7,000	
TOTAL	**$652,000**	

* The HAR and CB Wizard installations on Alligator Alley serve both eastbound and westbound operations.

Figure 3.6 – I-75 Alligator Alley Eastbound / Westbound from I-595 to SR 80 Contraflow Plan



4. Plan Summary

All southeastern and Gulf coastal states were interviewed to learn more about their contraflow plans and their experiences using them. There was a variety of plan development efforts evident across these states, ranging from no previously developed procedures to comprehensive, resource-loaded contraflow plans. While all states had plans of differing developmental philosophies and appearances, only four states have had recent experience (post-Floyd) with plan deployment and operation: Texas, Louisiana, Mississippi, and Alabama. Of those states, only Louisiana and Alabama had the dubious distinction of implementing contraflow operations twice. Both states learned from their first implementations and adjusted their plans based on these lessons learned; their 2005 contraflow operations benefited from these adjustments. Texas (and in conjunction with Floyd, Georgia and South Carolina) implemented contraflow operations without having any plans previously developed. Texas is undertaking contraflow plan development at this time for routes leading away from Houston.

Additionally, information was furnished that allowed a review of the Tidal Flow System in Hanover, Germany. This review provided a unique opportunity to establish an extreme point for contraflow operations. The unique traffic demand and operational circumstances present in Hanover are addressed well through the highly automated Tidal Flow System. This technique, employing in-pavement traffic control, gates, lane control signage, and pneumatic barricades, as well as DMS devices and CCTV surveillance, defines the extent to which a contraflow operation could be automated. The investment made in the Tidal Flow System is justified by the short length of the roadway (approximately 10 miles) and the relatively frequent use of the plan (multiple times per year) in conjunction with athletic tournaments, trade shows, and conventions.

By comparison, Florida's contraflow plans have not been implemented since their initial development. While subject to considerable conjecture, implementation of even two of Florida's plans in a single hurricane season would be regarded as remarkable. Consequently, deploying a Tidal Flow-level of technology is not reasonable or recommended.

Based on the information gathered in the assessment of other state plans, the following major points emerged as practices that are key to successful contraflow operation.

1) *Plan Beginning and Ending* – The ability to load the contraflow route is important from the perspective of moving evacuating traffic – and to visually show evacuating motorists that the two streams of traffic are of similar density. Even more significant is the need to have sufficient capacity at the end of the contraflow plan to minimize queues that could form and become excessive. *All Florida plans, with the exception of the westbound I-75 Alligator Alley concept, have (or can easily have) high-capacity plan terminations.*

2) *Limit Choices for Motorists* – It is generally agreed that evacuating motorists do not typically have a specific destination chosen as they evacuate. While it is likely that evacuees would state a desire for choices, accommodating choices would markedly increase the risk of excessive queues as evacuees weave to exercise their options. However, allowing evacuees to exit on the contraflow side (in addition to the regular-flow side) is a reasonable way to provide choice without significantly impacting evacuating traffic flow. *All Florida plans can allow (if they do not currently do so) contraflow exits and provide limited choices otherwise.*

3) *Communications with Evacuees throughout Contraflow Operations* – Much of the anxiety experienced by evacuees can be mitigated through effective communication during an evacuation. Given the chance, motorists will stop and question law enforcement or other public officials, potentially causing queuing and congestion. The use of HAR equipment, coupled with effective signage and appropriate 511 system messages, can effectively respond to the evacuees' need for relevant information. The CB Wizard devices would be useful on those routes having significant truck traffic. *Florida's statewide 511 is an effective start in providing these communications, but should be augmented by HAR on all contraflow routes.*

4) *Need for Media Outreach* – The media can be an effective tool in distributing information concerning contraflow operations that are associated with hurricane evacuation. Their engagement, both at the beginning of the hurricane season and in conjunction with a specific storm threat, can be a useful means to provide visual, print, and audio information to residents in threatened areas concerning the unique traffic operations that occur in conjunction with contraflow implementation. *A comprehensive, statewide media outreach program would ensure a high level of public awareness.*

5) *Need for Comprehensive Plans* – In the context of contraflow during evacuations, the term "plans" takes on a different meaning than is typically associated with FDOT projects. Contraflow plans must address not only placement of devices, such as barrels, cones, barricades, portable VMS, etc., but also the sources for those devices (if not immediately available). The plans must also define the timelines for contraflow implementation decision-making; identify personnel sources and assignments; and produce motorist information scripts (for HAR, CB Wizard, and 511 services). *Plan templates have been created as a means to guide the development of comprehensive contraflow plans.*

6) *Shoulder-use Plans* – Shoulder-use plans should be discouraged due to concerns about reaching disabled vehicles or the inability to move disabled vehicles out of the traveled way. Experiences by other states, which included mistaken assumptions by motorists that shoulder use had been terminated, add additional justification for this recommendation. *Only the I-75 plan in Southwest Florida is a shoulder-use plan; plan recommendations provide a contraflow alternative in Section 5.*

Table 4.1 summarizes the estimated costs for the various contraflow plans and improvements as presented in the previous section.

Table 4.1 – Estimated Costs for Existing Contraflow Plan Improvements

PLAN	TOTAL
I-4 Contraflow Plan for Tampa Bay	$917,000
I-10 Contraflow Plan for Jacksonville	$697,000
Southeast Florida Contraflow Plan for Florida's Turnpike	$200,000
SR 528 Contraflow Plan for the Space Coast	$210,000
I-75 Shoulder Use Plan	$196,500
Eastbound I-75 Alligator Alley Contraflow Plan	$920,000
Westbound I-75 Alligator Alley Contraflow Plan	$652,000
TOTAL	**$3,792,500**

5. Additional Recommendations

While Florida's existing contraflow plans will be valuable tools in safely evacuating residents from threatened coastal areas, this study of the state's evacuation needs and suggested enhancements to FDOT contraflow routes also produced some new thinking in certain areas. The recommendations described in this section call for brand new routes in areas not currently served by a reverse-lane operation. These recommendations are provided as a basis for further review by decision-makers and stakeholders as they assess Florida's preparedness for future evacuation demand.

1) *Interstate 75 Northbound from Southwest Florida to the Tampa Area* – As an alternative or replacement for the I-75 shoulder-use plan, development of a northbound I-75 contraflow plan that would begin at either SR 681 or at U.S. Highway 17 would be a useful evacuation route. It could provide additional evacuating capacity from southwest Florida or create an alternate route to Alligator Alley.

2) *Interstate 75 Northbound from Tampa* – Concern that the Tampa area needs an additional evacuation route would be addressed through the development of a contraflow plan on I-75 starting at I-275 and heading north to the I-10 interchange at Lake City. Contraflow traffic would continue north on I-75; regular-flow traffic would be forced to exit on I-10 eastbound. This plan, in conjunction with the I-4 plan, provides considerable evacuating capacity for the Tampa area.

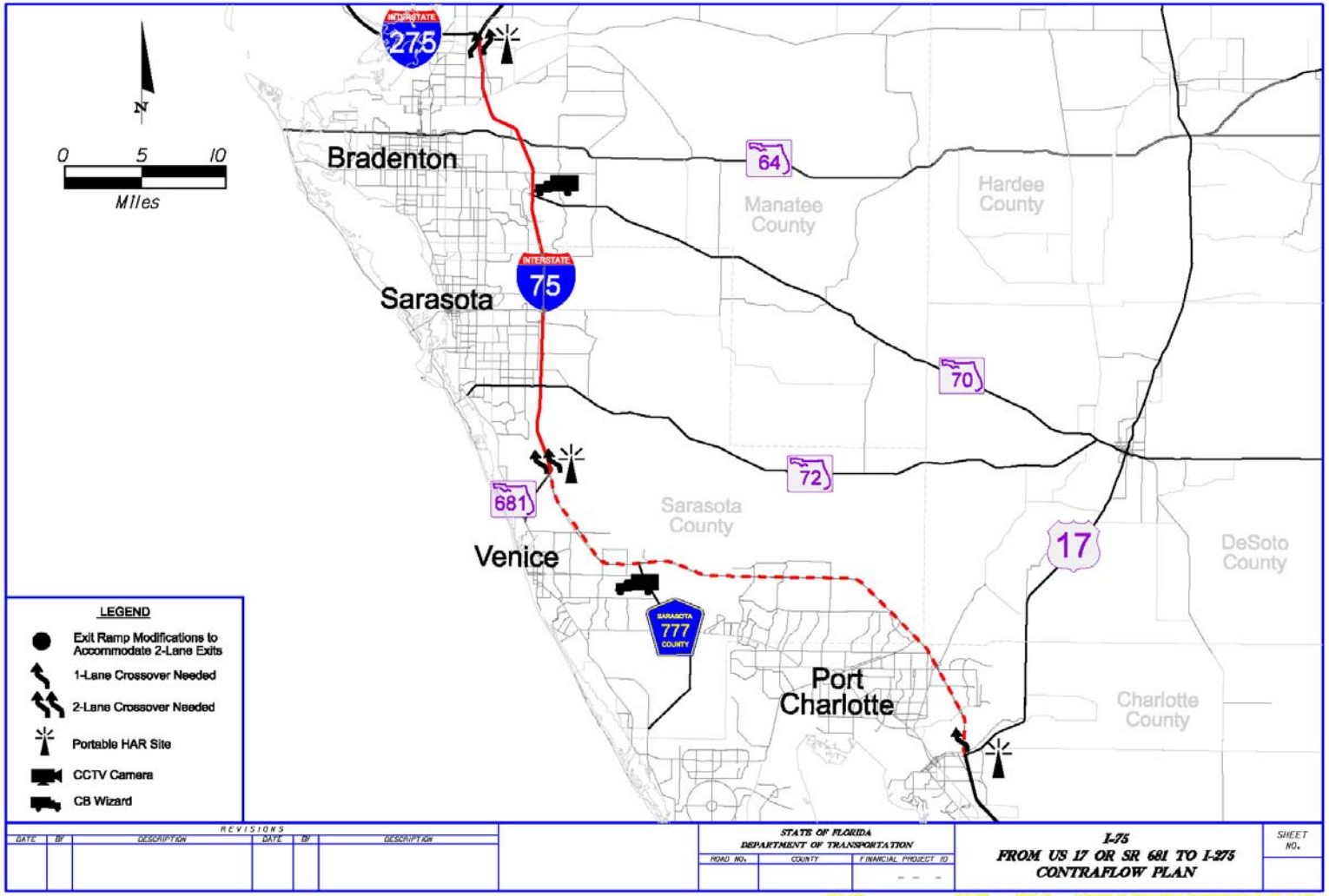
5.1 I-75 Contraflow Plan from U.S. Highway 17 / SR 681 to I-275

The study team recommends that shoulder plans not be utilized. Instead, the team recommends developing a new contraflow plan for northbound I-75 traffic south of Tampa. The south end of the route would be either the SR 681 interchange (between Sarasota and Port Charlotte) or farther south at the U.S. Highway 17 interchange at Port Charlotte. The north end of the route would be the I-75/I-275 interchange at the southern side of Tampa Bay. This plan would require HAR installations at each end.

Table 5.1 – Estimated Costs for the I-75 Contraflow Plan from U.S. Highway 17 / SR 681 to I-275

DEVICE	UNIT COST	QUANTITY REQUIRED BY I-75 PLAN
HAR	$80,000	3
CB Wizard	$10,000	2
CCTV	$57,000	
Two-lane Crossover	$130,000	2
One-lane Crossover	$75,000	1*
DMS	$300,000	
Drop Gate	$5,000	60*
Flip-down Signs	$1,500	45*
Paint for Exit Numbers	$500	15
Guardrail End Modification	$7,000	
TOTAL	**$970,000**	

Figure 5.1 – Contraflow Plan for I-75 from U.S. Highway 17 / SR 681 to I-275



5.2 New Contraflow Plan for I-75 from Tampa to Lake City

It is recommended that a new contraflow plan be developed for I-75 to evacuate Tampa area and Gulf Coast residents north to I-10 in Lake City. To provide this route, there needs to be a crossover at the I-75/I-275 interchange to move incoming regular-flow traffic to the contraflow side. At the terminus, the plan will require a crossover at the I-10 interchange in Lake City to move incoming contraflow traffic back to the regular-flow lanes. The plan must also take into account the fact that it may begin at Florida's Turnpike, if the Turnpike is to be contraflowed to its end at Wildwood.

The availability of ITS equipment should be sufficient at the Tampa end of the route, while a CCTV camera at the I-10 interchange would provide surveillance capability for traffic at the route's end.

Table 5.2 – Estimated Costs for the I-75 Contraflow Plan from I-275 to I-10

DEVICE	UNIT COST	QUANTITY REQUIRED BY I-75 PLAN FROM I-275 TO I-10
HAR	$80,000	2
CB Wizard	$10,000	3
CCTV	$57,000	2
Two-lane Crossover	$130,000	2
One-lane Crossover	$75,000	
DMS	$300,000	
Drop Gate	$5,000	104
Flip-down Signs	$1,500	78
Paint for Exit Numbers	$500	26
Guardrail End Modification	$7,000	
TOTAL	**$1,214,000**	

Figure 5.2 – Contraflow Plan for I-75 from I-275 to I-10

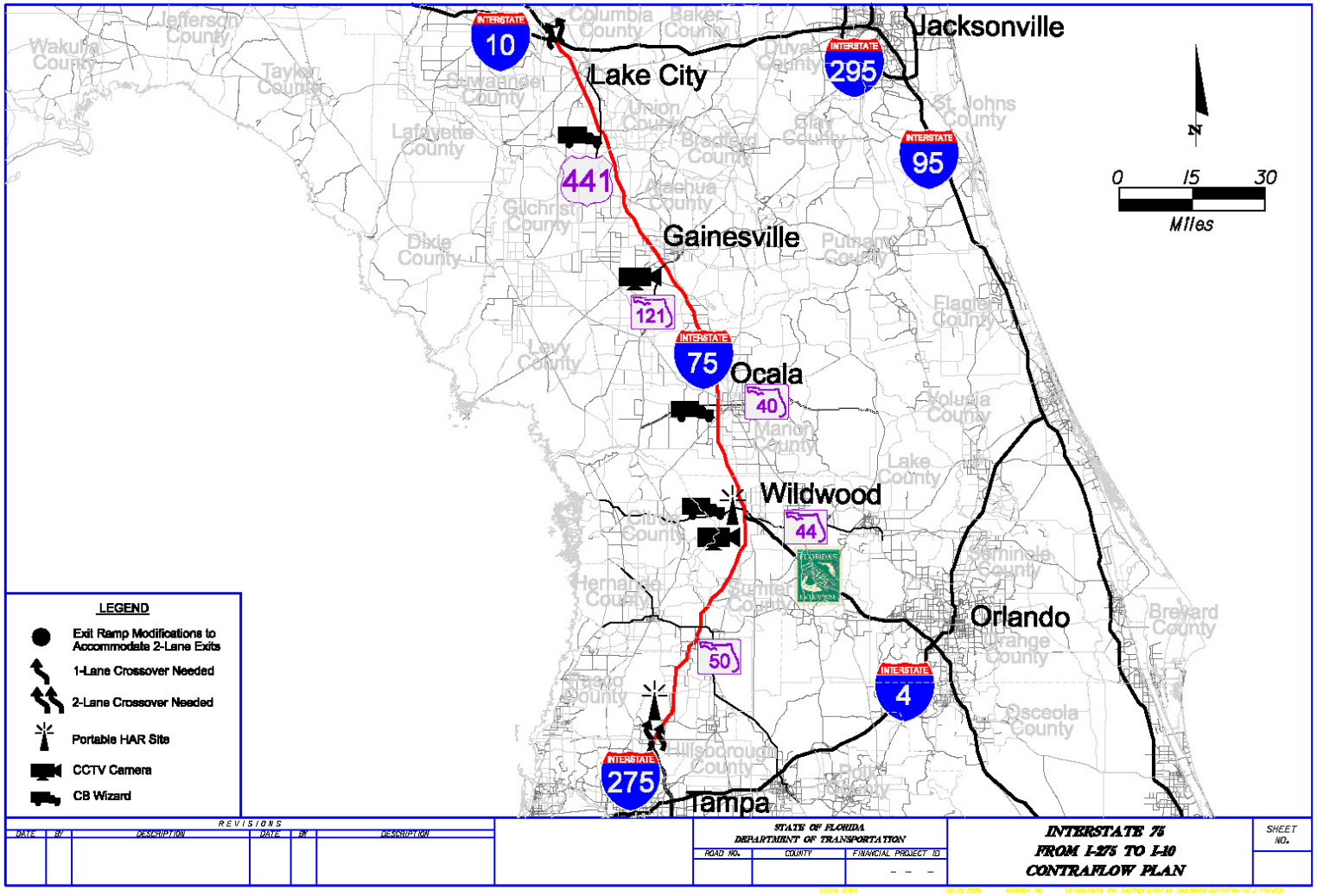


Table 5.3 summarizes the estimated costs for the new contraflow plans proposed in this section.

Table 5.3 – Estimated Costs for Proposed New Contraflow Plans

PLAN	TOTAL
I-75 Contraflow Plan from U.S. 17 / SR 681 to I-275	$970,000
I-75 Contraflow Plan from I-275 to I-10	$1,214,000
TOTAL	**$2,184,000**