

Minutes – Florida Greenbook Advisory Committee Meeting  
Crowne Plaza - Westshore, Tampa, March 17, 2004

1. Brian Blanchard opened the meeting by introducing himself and going over the [agenda](#).
2. Meeting [attendees](#) introduced themselves.
3. Brian discussed Committee Member changes (since last meeting): Bernie Masing (replaced Mike Peterson), Harold Desdunes (replaced Felix Blanco), and Jimmy Pitman is looking for a replacement for Fred Kyle (possibly John Pappas, or other engineer from the City of Jacksonville). New Associate Members include Amy Datz and Billy Hattaway.
4. Rob Quigley asked the committee to review their [member information](#) and provide any updates.
5. Rob briefly reviewed the [March 2003 meeting minutes](#). No comments.
6. Brian discussed Florida Greenbook ownership, DOT's role and the Committee's role. Brian also noted that active Committee participation is essential, and we may have to evaluate members who have not shown participation in recent years. Brian also mentioned that we might need to define in the Greenbook the roles of the Chapter Subcommittee Authors and Co-Authors.
7. Rob discussed the new [schedule](#) for the 2004 Florida Greenbook needed to incorporate the new Chapter 17 and the intersection sight distance changes. He also pointed out that the 2004 Florida Greenbook (and future editions) would only be available electronically. Notification of future updates will be provided to registered users via email or postcard. (Hardcopies will still be sent to Committee Members)
8. Rob gave a brief overview of the [Rulemaking Process](#).
9. William Nickas, and David O'Hagan (Central Office Structures Design) and Rick Renna (Central Office Drainage Design) discussed the new [Chapter 17](#) and the background issues that lead to the development of this chapter. The previous requirements in the Florida Greenbook were very minimal, and some of the issues discussed stemmed from lack of specific requirements in certain areas. Some of these issues stemmed from the fact that all public bridges get turned over to the DOT for inspection, and there have not been specific requirements for local bridges. The problems encountered with non-state bridges include improper or lack of pile records, scour calculations, load rating information, and traffic railings.  
  
Since this was the first opportunity the Committee had to discuss this chapter, the Committee agreed to send the chapter for review again (by 4/17/04), after the comments from the meeting are incorporated.
10. Workshop on submitted comments and other changes presented in the [Draft 2004 Florida Greenbook](#) that were new since the last meeting. One item discussed at the previous meeting that had not been completed yet was the changes in intersection sight distance based on the 2001 AASHTO Greenbook. These will be sent out for the Committee to review (by 4/17/04) prior to finalization of the 2004 Florida Greenbook.

11. Ed Rice (State Safety Office) was unable to attend, but he had wanted to discuss things that came out of a recent Florida At-Risk Driver Council meeting, specifically to find out whether any local agencies had adopted the FDOT design standards for older drivers, and whether the Committee would like to include those standards in the Florida Greenbook. Rob Quigley discussed this information and handed out a copy of the FDOT Traffic Operations web page on the DOT's [Elder Road User Program](#). Several counties had adopted some of the standards for elder road users, but not necessarily all of it. The consensus was that the local agencies are aware of the improved criteria for elder road users, but they did not want to standardize them in the Florida Greenbook.
12. Open discussion / Committee Member issues.
13. Rob briefly discussed the [Florida Greenbook web page](#), its content, and recent changes.
14. Subcommittee membership was briefly reviewed and updated as well. This included enrollment for the new Chapter 17 Subcommittee. Also, there had been some discussion in the past regarding a Product Review Subcommittee, but the Committee decided to put this on hold until the next meeting.
15. Travel Form Reminder. Contact [Felicia Bush](#) if you have any questions. Brian also mentioned that since the number of Associate Members continues to grow, his office will no longer be able to reimburse travel expenses for them.
16. Discussed improvements for the next meeting: Suggestions for a larger room with a bit more "elbow room."
17. Meeting adjourned.

# Florida Greenbook Advisory Committee Meeting

March 17, 2004

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# Florida Greenbook Advisory Committee Meeting

March 17, 2004

## Attendee Sign In - Continued

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*March 17, 2004*

*Florida Greenbook Advisory Committee Meeting*

*Crowne Plaza – Westshore  
Tampa, Florida*



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## **REVISED AGENDA**

### **FLORIDA GREENBOOK ADVISORY COMMITTEE MEETING**

**Wednesday, March 17, 2004 8:00am – 5:00pm**

**Crowne Plaza Hotel - Westshore  
700 N. Westshore Boulevard  
Tampa, FL 33609  
(813) 289-8200**

Wednesday, March 17, 2004 8:00am – 12:00pm

- Introductions
- Committee member changes
- Review March 2003 meeting minutes
- Discuss Florida Greenbook ownership
- Discuss schedule for 2004 Florida Greenbook update / Rulemaking process
- Guests: William Nickas, David O'Hagan & Rick Renna – Proposed Chapter 17 - Bridges
- Workshop for 2004 Greenbook edits

Wednesday, March 17, 2004 12:00pm – 5:00pm

- Continue Workshop for 2004 Greenbook edits
- Older Driver Design Issues
- Roundtable discussion - Committee Member issues
- Florida Greenbook Web Page Information
- Review / update Subcommittee assignments
- Schedule reminder for 2004 Florida Greenbook update
- Travel form reminder / reimbursement info
- Discuss next year's meeting (date/location)



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4. Roadside Design .....	James Harrison
5. Pavement Design and Construction .....	Dwayne Kile
6. Roadway Lighting .....	Bernie Masing
7. Rail-Highway Grade Crossings.....	Jimmy Pitman
8. Pedestrian Facilities .....	Joy Puerta
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12. Construction .....	Tanzer Kalayci
13. Public Transit.....	Annette Brennan
14. Design Exceptions.....	Ramon Gavarrete
15. Traffic Calming .....	Eugene Bechamps
16. Residential Street Design .....	James Harrison

Minutes – Florida Greenbook Advisory Committee Meeting  
Sea Turtle Inn, Jacksonville, March 5-6, 2003

1. Brian Blanchard opened the meeting by introducing himself and going over the [agenda](#).
2. Meeting [attendees](#) introduced themselves.
3. Brian discussed Committee Member changes (since last meeting): Annette Brennan (replaced Noranne Downs), David Evans (Replaced Donald Ditzenberger), Jimmy Pitman (will be replacing Robert Pearce), Dennis Scott (replaced Theo Petritsch), and Howard Webb (replaced Gerry O'Reilly). Brian also noted that several other members (Felix Blanco, Mike Peterson) would be retiring soon.
4. Committee reviewed [March 2002 meeting minutes](#). No comments.
5. Brian discussed Florida Greenbook ownership, DOT's role and the Committee's role. Brian also noted that active Committee participation is essential, and we may have to evaluate members who have not shown participation in recent years.
6. Rob Quigley asked the committee to review their [member information](#) and provide any updates. Chapter [subcommittee membership](#) was briefly reviewed and updated as well.
7. Rob discussed the [schedule](#) for the 2004 Florida Greenbook and the plans to only make the Florida Greenbook available electronically. Notification of future updates will be provided to registered users via email or postcard. Also, FDOT is working with several copy center companies statewide so that hardcopies of the manual can be purchased locally. (Hardcopies will still be sent to Committee Members)
8. Rob gave a brief overview of the [Rulemaking Process](#).
9. Duane Brautigam gave a [presentation](#) on Specifications and Products for Local Agencies. The committee needs to decide how to handle deleted specifications they still use  
*...should there be a Greenbook repository for old FDOT specs for local agency use?*  
*...should the Florida Greenbook committee have a Committee for Product Review?*  
*...should FDOT create/maintain a list of Traffic Control Devices for local roads?*  
Some of these issues will be discussed at the next FACERS Meeting, June 18-20 in Orlando).
10. Ed Rice discussed FDOT Strategic Objective on Safety. He also mentioned that the State Safety Office is developing a web site on safety practices. Look for it in the next six months on the Safety Office web page under Safety Programs: <http://www11.myflorida.com/safety/>
11. Tom Bane gave a [presentation](#) on FDOT changes to clear zone and horizontal clearance. If the committee decides to do anything with this, it would not be included in the Florida Greenbook until the 2006 edition.
12. David Kuhlman discussed [MOT drawings](#) for local roads. The Committee felt that the existing language in Chapter 11 was sufficient and the inclusion of these drawings was not necessary.
13. Jim Mills discussed the [Draft Index 546](#) (Sight Distance at Intersections) for the 2004 Design Standards. Index 546 is being revised based on the 2001 AASHTO Green Book. The Committee felt that much of the information contained in Index 546 could replace

those tables and figures dealing with intersection sight distance in Chapter 3 of the Florida Greenbook.

14. Discussion of submitted comments and draft language for the 2004 Florida Greenbook. Several items were discussed that required further subcommittee involvement. These items will be addressed by the appropriate subcommittees and their recommendations will be presented to the Committee Members for approval.
15. Open discussion / Committee Member issues.
16. Travel Form Reminder. Contact [Felicia Bush](#) if you have any questions.
17. Discussed improvements for the next meeting: Suggestions for holding the meeting at another location, possibly Indian Rocks Beach.
18. Meeting adjourned.

# Tentative Key Dates for 2004 Florida Greenbook

## 2004

March 17, 2004	Greenbook Committee Meeting – Workshop on changes
April 16, 2004	Deadline for addressing comments from Committee meeting and submitting corrections for 2004 Greenbook
April 30, 2004	Deadline for compiling 2004 Draft for FDOT Legal office review
May 21, 2004	Deadline for addressing comments made by FDOT Legal office
June 4, 2004	Deadline for compiling the 2004 Draft Greenbook
June 18, 2004	Deadline for publishing a Change Notice/Addendum/Rulemaking for the changes
July 9, 2004	Deadline for submitting comments on the change notice (21 days)
August 31, 2004	Deadline for addressing comments due to original change notice
September 17, 2004	Deadline for publishing new Change Notice in response to comments
October 12, 2004	File rule amendment (Rule 14-15.002) 2004 Greenbook
November 2, 2004	Tentative effective date of the 2004 Florida Greenbook / Post on website
November 5, 2004	<b>Notification</b> sent to registered holders that 2004 Greenbook has been posted on FDOT website

All dates subject to change



# CHAPTER 17

## BRIDGES & OTHER STRUCTURES

### PRELIMINARY DRAFT

#### A. INTRODUCTION

Bridges provide safe passage for traffic over various obstacles along a road or path. This chapter presents guidelines and standards for designing, constructing, inspecting and maintaining bridges and other structures. These standards and criteria are necessary due to the critical function structures serve communities throughout their lifespan. It establishes uniform minimum standards and criteria for all bridges used by the public for vehicular and pedestrian traffic as well as other structures such as walls and supports for signs, lights and traffic signals. Design exceptions or variations to these standards and criteria must be processed in accordance with the procedures described in Chapter 14.

All bridges constructed on and over the FDOT system as well as all bridges constructed that the FDOT will maintain, must comply with all FDOT policies, procedures, standards and specifications, and this manual does not apply.

#### B. OBJECTIVES

The objectives of this chapter are as follows:

- To prescribe uniform criteria with respect to bridge design loads, design methodology, and geometric layout.
- To alert owners to the various federal and state mandated considerations to be included in the design, construction, maintenance and inspection of their bridges.
- To provide practical suggestions specific to Florida on prudent bridge engineering based on past experience with these statutes, standards and criteria.

## C. DESIGN

The design of bridges and other structures shall be conducted by a team of civil engineers who are led by a licensed professional engineer who shall assume responsible charge of the work. The standards and criteria included herein are directed only toward specific considerations that shall be followed. Other considerations, not specifically addressed herein, are necessary to create a comprehensive bridge design but have not been addressed here so as to permit owners and their engineers flexibility in design.

### C.1 General

All bridges and other structures shall be designed in accordance with current specifications (including guide specifications) published by the American Association of State Highway and Transportation Officials (AASHTO). Currently, as a minimum, the AASHTO Standard Specifications for Highway Bridges shall be used. However, the AASHTO LRFD Bridge Design Specifications may be used, and effective January 1, 2007, all bridges nationwide shall be designed with AASHTO's LRFD Bridge Design Specifications.

For bridges designed with AASHTO's Standard Specifications for Highway Bridges, options exist for the engineer to select design methodology. In these instances, the owner shall specify the design methodology to be used by the engineer in his design.

For bridges designed with AASHTO's LRFD Bridge Design Specifications, options are not available regarding the design methodology and vehicular live loads used. The engineer shall not be permitted to revise these specifications because load and resistance have been calibrated achieve a uniform reliability index.

The design of all bridge facilities shall consider both economic use of materials and judicious application of aesthetic principles. According to Florida Statute 336.045,

*"In developing such standards and criteria, the (FDOT) shall consider design approaches which provide for the compatibility of such facilities with the surrounding natural and manmade environment; ...and the appropriate aesthetics based upon scale, color, and architectural style, materials used to construct the facility, and the landscape design and landscape materials around the facility..."*

## **C.2 Bridge Live Loads**

All elements of the bridge should be designed for the vehicular and pedestrian live loads specified below consistent with the design specifications.

- AASHTO Standard Specifications: HS20-44 vehicle including Alternate Military Loading (see AASHTO Section 3.7.4 and Figures 3.7.6B and 3.7.7A) with appropriate impact and load intensity reduction factors. Sidewalk loadings as per Section 3.14.1.

**{ADD THESE LOADINGS HERE?}**

- AASHTO LRFD Specifications: See Section 3.6.1 and 3.6.2.
- Other Loads: In addition to the design vehicles specified in the codes, bridge engineers should also be aware that vehicles with other very different characteristics are legal on FDOT's system. These vehicles are illustrated in FDOT's "Bridge Load Rating, Permitting and Posting Manual (Figures II-3 through II-9) and may be considered.

## **C.3 Bridge Superstructure**

The superstructure of a bridge is that portion of the structure that spans between its supports or piers. Considerations that shall be incorporated into the design of all superstructures will include the following:

### **C.3.a Vertical Clearance**

All new bridges over roadways shall be designed to meet the vertical clearance standards specified in Chapter 3, Section C.7.j.4.(b).

All new bridges over water shall be designed to meet the following vertical clearance standards:

- To allow debris to pass without causing damage, the clearance between the design flood stage and the low member of bridges shall be a minimum of two feet. This standard does not apply to culverts and bridge-culverts.

- For crossings subject to boat traffic, the minimum vertical navigation clearance shall be:

<u>Tidewater bays and streams</u>	<u>6 feet above Mean High Water *</u>
<u>Freshwater rivers, streams, non-regulated/controlled canals, and lakes</u>	<u>6 feet above Normal High Water</u>
<u>Regulated/controlled Lakes and canals</u>	<u>6 feet above control elevation</u>

\* For locations subject to tidal salt / brackish water splashing, a 12" vertical clearance above Mean High Water should be considered for bridge durability reasons.

### C.3.b Railings

All traffic, pedestrian and bicycle railings shall comply with the requirements in AASHTO's LRFD Bridge Design Specifications, Chapter 13. Traffic railings shall meet the crash requirements of at least Test Level (TL)-3 for bridges with design speeds greater than 45 mph and at least TL-2 for design speeds less than or equal to 45 mph. For pedestrian/bicycle railings, aluminum two-pipe guiderails and details (similar to FDOT Structures Standard Drawings, Index 870) should not be mounted on walls or other structures where drop-off hazards exceed 2'-6". Instead, concrete, aluminum or steel picket railing & details similar to FDOT Structures Standard Drawings, Indexes 800, 850 or 860 should be used (or modified to suit environmental runoff concerns).

### C.3.c Expansion Joints

The number of joints should be minimized to reduce inspection and maintenance needs of the bridge.

### C.3.d Drainage

All bridge designs shall include a drainage design that is specific to its site. Conveyance of drainage off the bridge roadway should be designed to meet spread standards contained in the FDOT Drainage Manual, Chapter 3 and may include open systems (i.e. scuppers) or closed systems (i.e. inlets and pipes) based on environmental permitting restrictions. Drainage from the bridge should not drop onto traffic below. Longitudinal conveyance piping attached to bridges is expensive and maintenance-intensive, and should be avoided whenever possible. Conveyance of

drainage off pedestrian facilities shall meet the provisions of the Americans with Disabilities Act (ADA).

### **C.3.e ADA**

All bridges that include provisions for pedestrians shall provide pedestrian accommodations and design considerations that meet the provisions of the ADA. Significant ADA design considerations exist for all facilities with grades that exceed 5%

## **C.4 Bridge Substructure**

The substructure of a bridge consists of all elements below the superstructure including its bearings, piers and foundations. Considerations that shall be incorporated into the design of all substructures will include the following:

### **C.4.a Scour**

A hydrologic/hydraulic analysis shall be performed to quantify expected stages and flows at the bridge site. Anticipated substructure scour shall be developed for the following:

- Worst case scour condition up through the 100-year frequency flood event (Scour Design Flood Event).
- Worst case scour condition up through the 500-year frequency flood event (Scour Check Flood Event).

Any exceptions to the standards above hydrologic/hydraulic and scour analysis requirements shall be approved in writing by the local FDOT District Structures and Facilities Engineer. Methodology for computing bridge hydrology/hydraulics and bridge scour should follow the guidelines set forth in the most recent versions of FDOT's "Drainage Manual" and "Bridge Hydraulics Handbook." Further guidance and training may be obtained through FHWA Hydraulic Engineering Circulars (HEC) "HEC-18" and "HEC-20" and the FDOT's training courses on these topics. Additionally, for larger bridges (>120,000 sq. ft.), hydraulic designers may wish to consult with the local FDOT District Drainage Engineer for case-specific guidance. Scour load combinations with other loads shall be as per FDOT's "Structures Design Guidelines" (SDG), Section 2.12.

#### C.4.b Vessel Impact

All bridges over navigable waterways shall include consideration for potential vessel collision. Such collisions generally occur from barges or oceangoing ships. The engineer shall conduct a vessel risk analysis to determine the most economical method for protecting the bridge. This shall include either designing the bridge to withstand the vessel collision, or protecting it with dolphin cells. Fender systems should only be used to designate the channel width and not for pier protection. The risk analysis may be conducted utilizing the FDOT's computer program "Vessel Impact Risk Analysis." For load combinations, use Load Combination "Extreme Event II" as follows:

(Permanent Loads) + WA+FR+CV

With all load factors equal to 1.0. Nonlinear structural effects must be included and can be significant. It is anticipated that the entire substructure (including piles) may have to be replaced and the superstructure repaired if a bridge is subjected to this design impact load; however, the superstructure must not collapse.

Note: Further refinement or complication of this load case is unwarranted.

Further guidance and training may be obtained from the SDG, Section 2.11 and AASHTO's LRFD Bridge Design Specifications, Section 3.14.

#### C.4.c Pier Locations

All bridges over roadways shall have substructure supports set back from vehicular traffic lanes in accordance with Chapter 3, Section C.7.j.4.(a).

All bridges over water shall have substructure supports located with horizontal clearance requirements as listed below. In this case, horizontal clearance is defined as the clear distance between piers, fender systems, culvert walls, etc. projected by the bridge normal to the flow.

- For crossings subject to boat traffic a minimum horizontal clearance of 10 feet shall be provided.
- Where no boat traffic is anticipated, horizontal clearance shall be provided consistent with debris conveyance needs and structure economy.

#### C.4.d Bearings

The bridge superstructure and substructure should be designed for the complete replacement of the interfacing bearings.

### D. CONSTRUCTION

During the construction of a bridge or any structure at, over or near a public facility, safety awareness and precautions shall be taken to protect the public. Generally, the public should be protected using the MUTCD's work zone traffic control procedures. Worker safety is the responsibility of the contractor. Temporary Barriers shall be installed on all bridges being widened or whose new construction is phased.

During the construction of a bridge or any structure, records to be kept and maintained throughout its life shall include foundation construction records (pile driving records, shaft tip elevations, borings) and as-built plans. These records provide engineers with critical information necessary for future inspection, maintenance, emergency management, enhancement, reconstruction and/or demolition of these structures. These records shall be delivered to the FDOT's local District Structures and Facilities Engineer.

Any proposed changes to the construction details or specifications shall be signed, sealed and dated by a professional engineer licensed in the State of Florida.

### E. ROUTINE INSPECTION & MAINTENANCE

Title 23, Code of Federal Regulations, Part 650, Subpart C sets forth the National Bridge Inspection Standards (NBIS) for bridges on all public roads. Section 650.3 defines bridges, specifies inspection procedures and frequencies, and indicates minimum qualifications for personnel. Each state is permitted to modify its bridge inspection standards to deviate from the NBIS standards but only following approval from the FHWA.

Section 335.074, Florida Statutes mandates safety inspection of bridges as follows:

*“At regular intervals not to exceed 2 years, each bridge on a public transportation facility shall be inspected for structural soundness and safety for the passage of traffic on such bridge. The thoroughness with which bridges are to be inspected shall depend on such factors as age, traffic characteristics, state of maintenance, and known deficiencies. The governmental entity having maintenance responsibility for any such bridge shall be responsible for having inspections performed and reports prepared in accordance with the provisions contained herein.”*

This statute also defines the minimum dimensions of bridge structures that must be inspected as follows:

*“Those bridges having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or spring lines of arches or extreme ends of openings for multiple boxes and those bridges consisting of multiple pipes where the clear distance between openings is less than half of the smaller contiguous opening...”*

Bridge inspectors shall either be:

- Licensed professional engineer (with expertise in civil engineering), or
- Someone having at least 5 years experience in bridge construction or maintenance inspection assignments (in a responsible capacity) and has completed a comprehensive training course approved by the FDOT.

The scope and procedures of the inspection shall meet the requirements of Section 650.3 of the Title 23, Code of Federal Regulations.

The individual who executes the inspection reports shall be a licensed professional engineer.

Bridges should be inspected in accordance with procedures provided in FDOT’s “Bridge and Other Structures Inspection and Reporting Procedures Manual.” Bridges should be maintained in accordance with procedures provided in FDOT’s “Bridge Maintenance and Repair Manual.”

The FDOT inspects all bridges in the State of Florida both on-system and off-system. FDOT provides each local government with copies of their inspection reports. The local governments should maintain these reports to be responsive to Metropolitan Planning Organization (MPO) requests for bridge rehabilitation, replacement or enhancement designations.

All on- and off-system bridges are assigned a Bridge Number by the FDOT. Local agencies should contact the local FDOT’s District Structures and Facilities Engineer to have a number assigned.

## **F. RECONSTRUCTION**

Any reconstruction (i.e. lengthening, widening, and/or component replacement) should be designed using current AASHTO design specifications. Record of such reconstruction shall be maintained as specified in Section D above.

## **G. BRIDGE LOAD RATING, PERMITTING & POSTING**

Section 335.07, Florida Statutes mandates a sufficiency rating system for roads on the State Highway system. By inference, this statute also applies to bridges. This rating system considers the structural adequacy, safety and serviceability of the road/bridge. FDOT provides the posting information, if required, to the local agency owner and requires the owner to provide the appropriate signage, in accordance with the Manual for Uniform Traffic Control Devices (MUTCD), that is to be promptly installed. In particular for bridges, the determination of this rating should be accomplished using procedures in FDOT's "Bridge Load Rating, Permitting and Posting Manual." The FDOT shall post all bridges in the National Bridge Inventory (NBI) within 90 and 180 days of opening or a change in load rating for on- and off-system bridges, respectively.

## H. OTHER STRUCTURES

### H.1 Walls (Retaining & Sound)

The design of conventional, anchored, mechanically stabilized and prefabricated modular retaining wall structures shall meet the requirements of either AASHTO's Standard Specifications for Highway Bridges, Section 5 (or LRFD Bridge Design Specifications, Section 11). Local agencies should consider using only wall types approved by FDOT. These are described in Section 3.12 of the SDG. Local agencies should also follow the design criteria for retaining walls found in Section 3.13 of the SDG.

The design of sound walls shall meet the requirements of AASHTO's Guide Specifications for Structural Design of Sound Barriers. For sound walls within the clear zone, their design and/or protection shall comply with the following:

- Do not attach sound barriers to the top of traffic railings unless the system has been crash tested and meets TL-4 acceptability requirements of NCHRP Report 350.
- Non-crash tested sound barriers may be attached to structures if located behind an approved traffic railing and mounted at least five feet from the face of the traffic railing at deck level.

Additional considerations for the design of sound barrier walls may be found in Volume 1, Chapter 32 of the FDOT's Plans Preparation Manual (PPM).

### H.2 Sign, Lighting and Traffic Signal Supports

The design of these structures shall meet the requirements of AASHTO's Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 1994. The FDOT maintains a list of vendors, the Qualified Products List (QPL), it has prequalified to supply these supports (light poles, strain poles, monotube assemblies and mast arm assemblies) on the State Highway System.

## I REFERENCES

- AASHTO, all publications may be ordered from  
[www.transportation.org/publications/bookstore.nsf](http://www.transportation.org/publications/bookstore.nsf)
- FDOT "Bridge Hydraulics Handbook" to be published and on-line in late 2004.
- FDOT "Bridge Load Rating, Permitting and Posting Manual" may be ordered from:  
[www.caistore.com/mapspubs/detail.asp?ItemID=M218](http://www.caistore.com/mapspubs/detail.asp?ItemID=M218)
- FDOT "Bridge Maintenance and Repair Manual" contact the State Maintenance Office - 2740 Centerview Drive, Tallahassee, Florida 32399; 850-410-5757.
- FDOT "Bridge and Other Structures Inspection and Reporting Procedures Manual" may be ordered from:  
[www.caistore.com/mapspubs/detail.asp?ItemID=M223](http://www.caistore.com/mapspubs/detail.asp?ItemID=M223)
- FDOT "Design Standards":  
[www.dot.state.fl.us/rddesign/Design%20Standards/designstds.htm](http://www.dot.state.fl.us/rddesign/Design%20Standards/designstds.htm)
- FDOT "Drainage Manual": [www.dot.state.fl.us/rddesign/dr/files/DM.pdf](http://www.dot.state.fl.us/rddesign/dr/files/DM.pdf)
- FDOT "Plans Preparation Manual":  
[www.dot.state.fl.us/rddesign/PPM%20Manual/PPM.htm](http://www.dot.state.fl.us/rddesign/PPM%20Manual/PPM.htm)
- FDOT "Qualified Products List":  
[www.dot.state.fl.us/specificationoffice/QPLindex.htm](http://www.dot.state.fl.us/specificationoffice/QPLindex.htm)
- FDOT "Standard Specifications for Road and Bridge Construction"  
[www.dot.state.fl.us/specificationoffice/2004BK/toc.htm](http://www.dot.state.fl.us/specificationoffice/2004BK/toc.htm)
- FDOT "Structures Design Guidelines":  
[www.dot.state.fl.us/structures/StructuresManual/CurrentRelease/Structures\\_Manual.htm](http://www.dot.state.fl.us/structures/StructuresManual/CurrentRelease/Structures_Manual.htm)
- FDOT "Structures Standard Drawings":  
[www.dot.state.fl.us/structures/CADD/Standards/CurrentStandards/standardspreface.htm](http://www.dot.state.fl.us/structures/CADD/Standards/CurrentStandards/standardspreface.htm)
- FHWA "HEC-18" and "HEC-20" may be ordered from:  
[www.fhwa.dot.gov/bridge/hydpub.htm](http://www.fhwa.dot.gov/bridge/hydpub.htm)

## J RECOMMENDED DO'S AND DON'TS

- Do involve the public in determining “*the appropriate aesthetics based upon scale, color, and architectural style, materials used to construct the facility, and the landscape design and landscape materials around the facility...*” (Florida Statute 336.045).
- Do resist the temptation to enhance the aesthetics of a bridge with non-structural appurtenances and features that are novel and therefore may have safety challenges (otherwise, consult with FDOT on these safety issues).
- Do consider the potential for future expansion of a bridge’s capacity (vehicular and pedestrian) in its layout and bridge-type selection.
- Do use the FDOT’s objective construction unit prices (contained in the Structures Design Guidelines, Sections 9.2 and 9.3) to select bridge type(s) to consider for final design.
- Do not permit economics to drive all decisions on a bridge’s basic design and its discretionary features.
- Do consider the constructability, inspectability and maintainability of all bridge components before they are incorporated into the project’s final design.
- Do invest in a comprehensive subsurface investigation of the site during design to help avoid unforeseen conditions during construction.
- Do consider the use of alternative designs (i.e. steel superstructures vs. concrete superstructures) to increase bidding competition on very large bridge construction projects.
- Do provide qualified construction inspection personnel for all phases of bridge construction.
- Do maintain all design and construction records in a safe, protected and secure location throughout the life of the bridge.
- Do consider using FDOT’s Standard Specifications for Road and Bridge Construction with notes on the plans referencing the Owner as the local governmental agency and the Engineer as the owner’s engineer.
- Do not allow contractors without company or individual bridge experience to bid on a bridge construction project.
- Do consult with other local officials on experiences relating to construction of other bridges in the area.
- Do obtain a geotechnical report and recommendations before any significant design of the bridge occurs.



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## TRAFFIC OPERATIONS OFFICE Elder Roadway User Program

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### **Making Roads Safer for Elder Drivers**

As we age, we experience a steady decline in certain skills that are very important for safe driving. Although not everyone ages at the same rate, beginning around age 55, we begin a gradual decrease in our ability to process information, remember and make judgements in traffic situations. A good example is determining the distance and approach time of oncoming traffic.

Visual losses are the most significant, however. We need more light to distinguish features along the roadway, must be closer to read signs and follow other traffic cues. Older eyes also need more time to recover from the glare of bright headlights at night. And these visual losses begin very early in life - around age 20. Medical studies have shown that the average 60-year old requires eight times more light than the average 20-year old, which explains why elder drivers have particular difficulty driving at night.

Driving abilities of older drivers are sometimes impacted by the medication they are required to take and reaction times for older drivers may be up to 30% greater than younger drivers.

### **Elder Drivers in Florida**

Florida leads the nation with 18% of its population 65 and older. By the year 2020, one in four Florida residents will be 65 and older. Of these almost one half will be 75 or older. For seniors, driving is the preferred method of travel - over 80 percent of trips made by those 65 and older are made in cars.

While elder drivers are involved in fewer total crashes than other age groups, there are more crashes compared to the number of miles driven. This also applies to injuries, where the number of injuries is less, but the severity is dramatically higher. Older drivers are less likely to survive a serious crash than younger drivers. Drivers 70 and older are more than twice as likely to be involved in a fatal crash than middle aged drivers.

### **The Elder Roadway User Program**

The Department of Transportation began Florida's Elder Roadway User Program in 1992 to help seniors maintain their mobility and provide a safer system in which they can travel. The primary emphasis was to make roadway improvements that compensate for the natural effects of aging that apply to driving - especially visual and decision making. The improvements would provide better guidance along roadways, provide more legible signs and provide increased advance warning of upcoming traffic and roadway conditions.

The Department began implementing the program immediately with routine maintenance activities responding to revised design standards. The first improvements were termed "Short Term Improvements" and consisted of adopting statewide standards for:

1. Six inch pavement markings.
2. Forty foot spacing for reflective pavement markings.

3. Use of large overhead street name signs at significant intersections.
4. Use of advance street name signs.
5. Improvements to pedestrian features at intersections.
6. Increased emphases on effective traffic control through work zones.

The improvements selected had been identified through national research as being effective and were tested in Florida when the Department participated in the Federal Highway Administration's Older Driver Pilot Program, two years earlier.

The short term roadway delineation improvements have been completed throughout the state, but the signing and other improvements will continue to be made where ever appropriate as we transition into the Long Term Improvement phase of the program.

Long Term Improvements are those that will continue as the Department strives to re-define the design driver in Florida as the Elder Roadway User. These improvements are implemented through new standards for the design, construction and re-construction of the State's Highway System. The Long Term Improvements enhance traffic control device visibility, provide advance notice and visibility along roadway corridors by specifying:

1. New lettering and sign sizes for stop, yield and all standard warning signs throughout the state.
2. Installing more advance notice signs, for stop signs and lane assignment signs for freeway entrance ramps.
3. Increased letter sizes for destination and guide signs.
4. Revised standards for stopping sight and reaction sight distances.
5. Enhanced pavement markings and sign sheeting to provide better visibility.
6. Improved intersection design elements.

The Department's goal of providing a safer transportation system for Florida motorists is being enhanced by the implementation of this program. While these improvements are tailored to meet the needs of Elder Drivers, an added benefit is a safer system for all.

The Elder Roadway program represents a continuing program to update Florida DOT design standards as research identifies effective countermeasures and technology improves.

**Additional information on this program is available from [Mark Wilson](#).**



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## Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (commonly referred to as the *Florida Greenbook*) (Topic # 625-000-015)

### FLORIDA GREENBOOK

#### Select Update Year:

May 2002

2001

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### PLEASE NOTE:

This page contains the Manual of Uniform Minimum Standard for Design, Construction and Maintenance for Streets and Highways (Florida Greenbook). Authority for this manual given under Sections [334.044\(10\)\(a\)](#) and [336.045](#), Florida Statutes, and Rule [14-15.002](#), Florida Administrative Code. This manual is intended for use on all public roads that are not part of the State Highway System.

This site contains all available electronic files (in \*.PDF format) for the Florida Greenbook. This includes meeting information, Committee and Subcommittee membership, and the complete manual.

Hardcopies of the complete Florida Greenbook may be purchased from the FDOT Maps and Publications Sales Office by telephone at (850) 414-4050, or on their web site (listed as "*Uniform Minimum Standards (Greenbook)*") at:

<http://www.dot.state.fl.us/MapsAndPublications/>

The price for the manual is \$7.00. It is recommended that new Florida Greenbook owners **IMMEDIATELY REGISTER** the manuals in order to receive e-mail notification of future updates:

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#### Committee Meeting:

March 2003

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#### Committee Members

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#### Chapter Subcommittees

- The .PDF files are formatted for two-sided printing
- Roadway Design Office - For details on files, please call (850) 414-4356 or e-mail [Rob Quigley](#).

If you should have any questions, comments or suggestions regarding the Florida Greenbook, you can contact any of the following individuals:

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Archived Specifications for  
Local Agency Use

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FDOT Homepage

Roadway Design Homepage

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