2018 Florida Greenbook

Scenic Highway, Pensacola, Florida

Purpose of Florida Greenbook

- Section 334.044, F.S. Florida Statutes
  - Provide uniform minimum standards and criteria
  - Covers design, construction, and maintenance
  - Applies to all streets, roads, highways, bridges, sidewalks, curbs and curb ramps, crosswalks, bicycle facilities, underpasses and overpasses traveled by the public

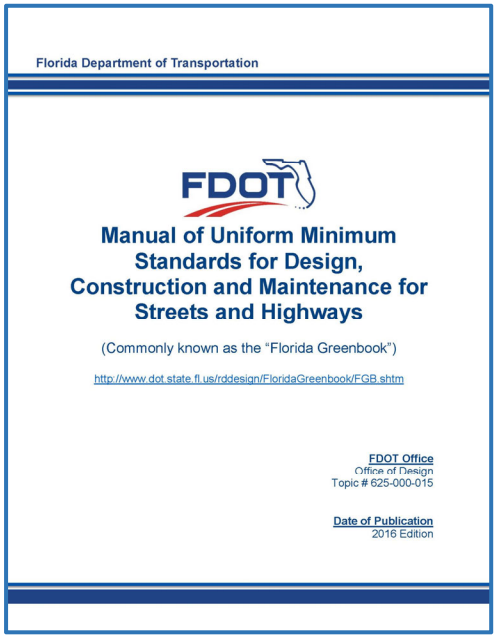
56th Street, Temple Terrace

Florida Greenbook Advisory Committee

- 4 members per FDOT District (28 total)
  - Professional engineers representing rural and urban local governments
  - Professional engineer not employed by a government agency
  - FDOT's District Design Engineer

Florida Greenbook

- 2016 Florida Greenbook is the current edition
  - Was effective **June 19, 2017**
- 2018 Florida Greenbook is drafted and has begun rulemaking
  - Expect to be adopted fall 2019
- Draft 2018 Florida Greenbook posted on FDOT's web page:
  - ✓http://www.fdot.gov/roadway/
- 2020 Florida Greenbook is being drafted now



Rulemaking Process

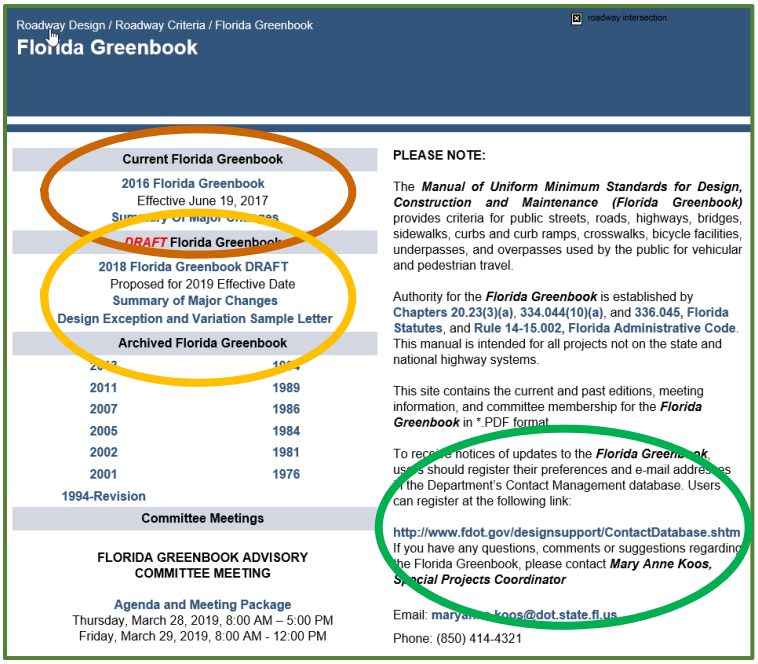
- Committee Drafts and Approves Changes
- Department Legal Review
- Publish "Notice of Rule Development"
- Prepare Statement of Estimated Regulatory Costs (SERC)
- Conduct Rule Development Workshop if Requested
- Publish Notice of Proposed Rule
- Review by Joint Administrative Procedures Committee (JAPC)
- Conduct Hearing if Requested
- Rule Filed for Adoption

Contact Mailer

- How can I find out when its effective?
- "Self Service" web page where you can register to receive information from FDOT
- Options include information on design criteria and standard changes, specifications and estimates updates, training opportunities, and Greenbook!
- http://www.dot.state.fl.us/projectmanagementoffice/ContactDatabase.shtm

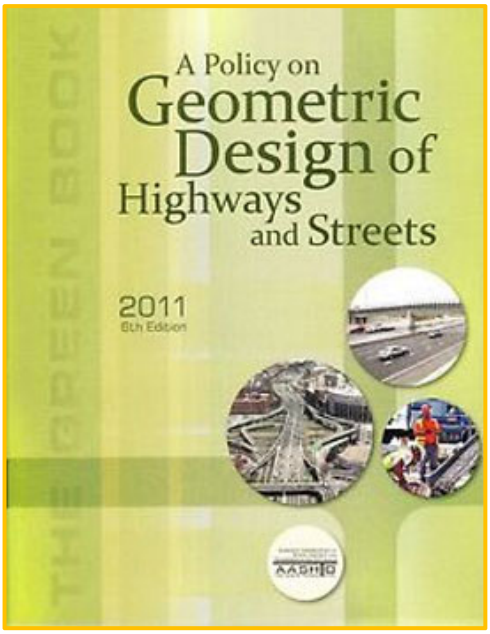
Draft 2018 Florida Greenbook

- https://www.fdot.gov/roadway/floridagreenbook/fgb.shtm



2011 AASHTO Greenbook

- Effective November 12, 2015
- FHWA published the Final Rule to Title 23, Code of Federal Regulations Part 625
- The rule modifies regulations governing new construction, reconstruction, resurfacing (except for maintenance resurfacing), restoration, and rehabilitation projects on the NHS



On or Off the State Highway System (SHS)?

- Intended for use on all streets and highways OFF the SHS
- Unless using federal funds and project is:
  - On the National Highway System (NHS),
  - Has a construction value ≥ $10 million, or
  - Includes a vehicular bridge, pedestrian bridge over a roadway, certain box culverts.
- Then use FDOT's Design Manual (FDM) and Standard Plans

Fort George/Talbot Island Bridge, FL

What Criteria To Use?

✓Check Table 1: Project Classifications in Chapter 19 of Local Agency Program(LAP) Manual http://www.fdot.gov/programmanagement/LAP/LAP_TOC.shtm

Project Classifications	Design Criteria and Standards[1]*	Specifications*	Materials Testing*	Qualifications
Class A On the State or National Highway Systems	*FDOT Design Manual* and *FDOT Standard Plans*	FDOT Standard Specifications for Road & Bridge Construction	Samples Testing and Reporting Guide and ***FDOT Materials Manual***	FDOT Prequalified Consultants and Contractors
Class B Off the State and National Highway Systems with an estimated construction value of $10 million or greater.	*FDOT Design Manual* and *FDOT Standard Plans*	FDOT Standard Specifications for Road & Bridge Construction	Samples Testing and Reporting Guide and ***FDOT Materials Manual***	FDOT Prequalified Consultants and Contractors
Class C Off the State and National Highway Systems and includes structural components: • a vehicular bridge • pedestrian bridge over a roadway • box culvert meeting the definition of a bridge as stated in 23 CFR 305	1) For structures components, use the *FDOT Design Manual* and *FDOT Standard Plans* 2) For all other components, use the *Florida Greenbook*	1) For the structures components, FDOT Standard Specifications 2) For all other components, LAP Big 4 or approved Local Agency Specs	1) For structures components, use the Samples Testing and Reporting Guide and ***FDOT Materials Manual*** 2) For all other components, use Local Agency materials testing process	FDOT Prequalified Consultants and Contractors
Class D Off the State and National Highway Systems, may include structural components: • pedestrian bridges not over a roadway • bridges on shared use path not over a roadway • box culverts that do not meet the definition of a bridge as stated in 23 CFR 305	*Florida Greenbook* -Or- Approved Minimum Design Standards chosen by local agency which conform to the minimum criteria provided in *Florida Greenbook*	LAP Big 4 or approved Local Agency Specs	Local Agency materials testing process	Local Agency qualified consultants and contractors

2018 Florida Greenbook Summary of Changes, August 2019

Slide 10

New Construction or RRR?

- New construction and reconstruction projects
  - Introduction and Definition of Terms, Planning, Geometric Design, Roadside Design, Lighting, Rail Highway Crossings, Pedestrian and Bicycle Facilities, Transit, Drainage
- Maintenance and resurfacing projects
  - Maintenance and Resurfacing, Pedestrian and Bicycle Facilities
- All projects
  - Design Exceptions…and Variations

Coastal Highway/US 98, Apalachicola, FL

Introduction

- Context-based planning and design policies and objectives
- Statutory Authority
- Florida Greenbook Committee
- Intended Use (new, reconstruction, resurfacing, maintenance)
- When exceptions and variations are required
- Definitions
- Adoption of 2009 MUTCD and Revisions 1 and 2

SR 100, Putnam County

Introduction – Policies and Objectives for Context Based Design

- Specifies all users
- Applies to all projects
- Procedure for exceptions and variations
- Creates a network
- Adoptable by all agencies
- Latest and best design criteria
- Context-sensitive
- Establishes performance measures
- Includes specific next steps for implementation

Introduction - Definitions

- New definitions for –
  - Border Area
  - Bridge
  - Clear Zone
  - Context Classification System
  - Cross Slope
  - Design User
  - Lateral Offset
  - Low Speed
  - Reconstruction
  - Shared Street
  - Shared Use Path/Multi-Use Trail
  - Traveled Way

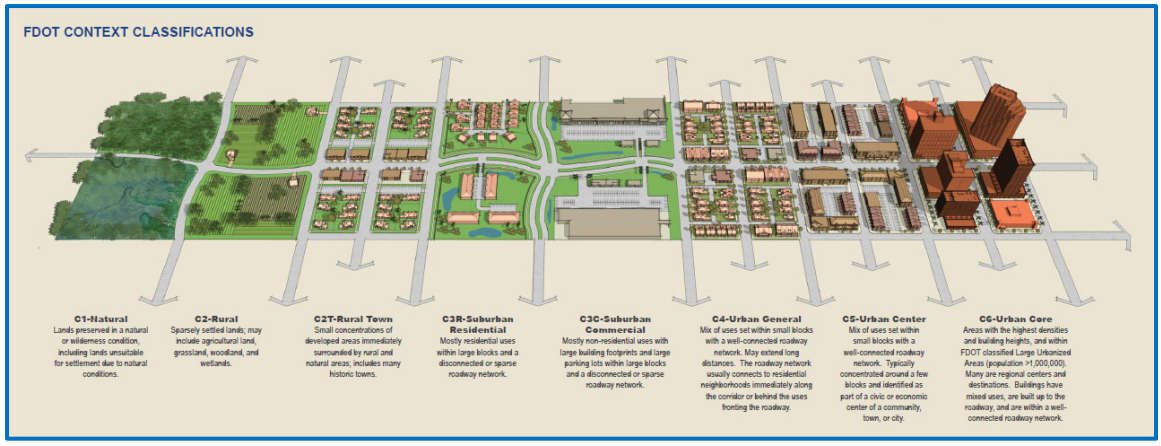
SR 24, Waldo Road, Waldo, FL

Chapter 1 – Planning

- The Florida Greenbook's Context-Based Design policy captures three core concepts:
  - Serve the needs of transportation system users of all ages and abilities, including pedestrians, bicyclists, transit riders, motorists, and freight handlers.
  - Design streets and highways based on local and regional land development patterns and reflect existing and future context.
  - Promote safety, quality of life, and economic development.

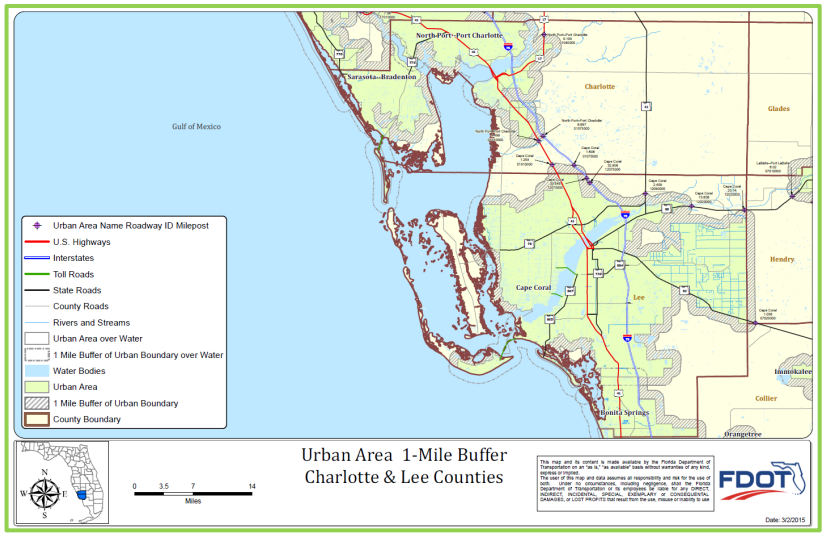
Functional Classification	Primary Characteristics
Limited Access Facilities	• Limited access • Through traffic movements • Primary freight routes • Guided by FHWA Design Standards for Highways (NHS)
Principal Arterial	• Through traffic movements • Longer distance traffic movements • Primary freight routes • Access to public transit • Pedestrian and bicycle travel
Minor Arterial	• Connections between local areas and network principal arterials • Connections for through traffic between arterial streets or highways • Access to public transit and through movements • Pedestrian and bicycle travel
Collector	• Carry traffic with trips ending in a specific area • Access to commercial and residential centers • Access to public transit • Pedestrian and bicycle travel
Local Roads	• Direct property access—residential and commercial • Pedestrian and bicycle travel

Context Based Design



Chapter 1 – Planning

- Design should be based upon existing and proposed land uses and development patterns
- Terms rural and urban are based upon population density
- Urban Area 1-Mile Buffer Maps
  - http://www.fdot.gov/roadway/BufferMaps/Default.shtm



Chapter 2 – Land Development

- Defines road users as pedestrians, bicyclists, transit and motor vehicle operators and passengers
- Provide desirable geometry that supports appropriate cross sections and sight distance
- Provide sufficient right of way for stormwater, utilities, pedestrian features
- Design for target speed

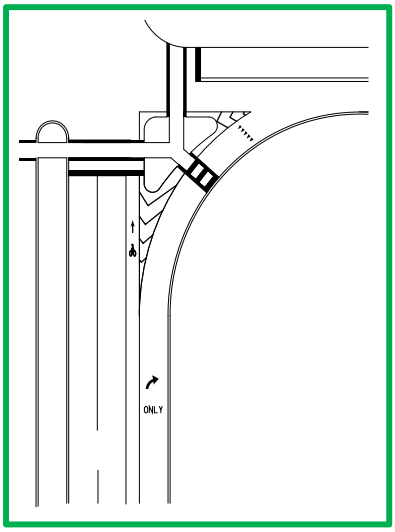
Lakeland, Florida

Chapter 3 – Geometric Design

- Revised table for stopping sight distance to include grades
- New tables for:
  - Decision sight distance
  - Deflections thru intersections
  - Min. length of horizontal curves
  - Length of compound curves in turning roadways
- Superelevation criteria revised
  - Two types – a) rural highways, urban freeways, and high speed urban highways
    b) low speed urban arterials and collectors
  - New tables for superelevation rates, minimum radii, and transition slope rates
- Values for traveled way widening revised to reflect a WB-62 as base vehicle.

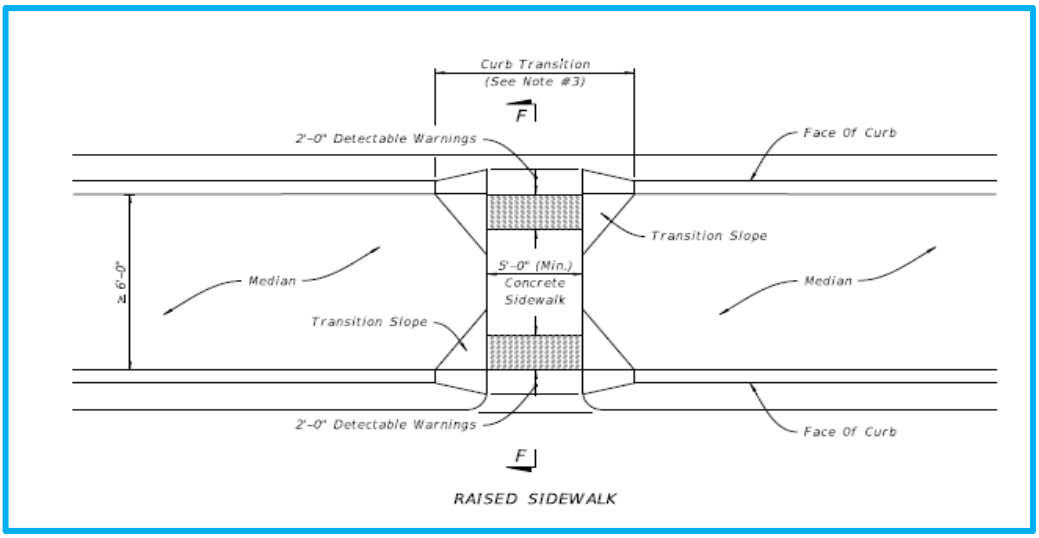
Chapter 3 – Geometric Design (con.)

- Revised notes for maximum grade table
- Revised notes in lane widths table to allow 11-14' lanes on 3- and 5-lane typical sections
- Reduced the min. shoulder widths for multi-lane divided highways
- New table for median widths which allows for narrower medians in constrained sections
- New section for islands for channelization, division, and refuge (painted and raised)
- Roadside slopes, clear zone, and lateral offset moved to Chapter 4



Chapter 3 – Geometric Design (con.)

Chapter 3 – Geometric Design (con.)



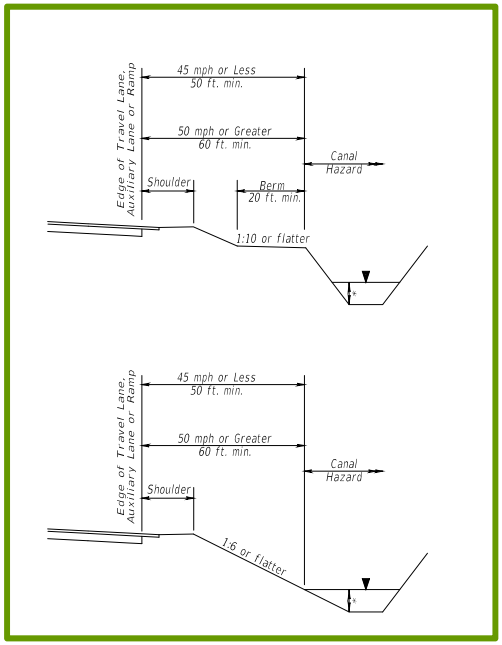
Chapter 3 – Geometric Design (con.)

- Revised section for auxiliary lanes at intersections (turn lanes)
- New table for pavement widths for turning roadways
- Clarified that accessibility requirements apply to sidewalks, shared use paths, transit boarding and alighting areas

Union Station, Denver, CO

Chapter 4 – Roadside Design

- New chapter - 33% of all crashes are lane departures, but 50% of fatalities
- Added definitions for recoverable, non-recoverable and traversable slopes
- New table for clear zone widths
  - Considers cost, terrain, right-of-way, social and environmental impacts
- New section for lateral offset, requirements for above ground objects, drop offs, drainage features
- New section for barriers, crash test criteria, safety hardware upgrades

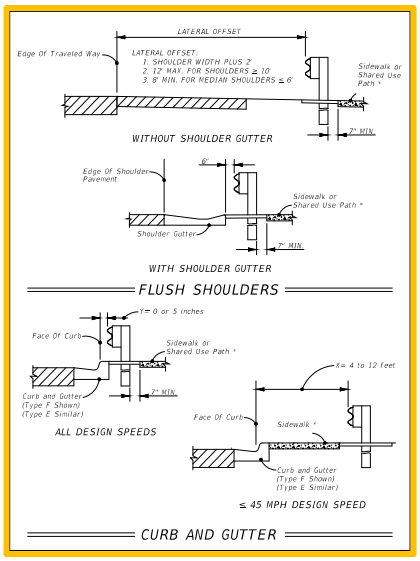


Chapter 4 – Roadside Design (con.)

- New section for offset requirements for signs, signals, lighting supports, utility poles, trees and similar features
  - Performance requirements for breakaway devices
  - Miscellaneous section for fire hydrants, railroad warning devices, mailbox supports, bus benches and shelters
- New section for barriers, end treatments and crash cushions
  - Performance requirements
  - Warrants (including median barriers)
  - Work Zones

Chapter 4 – Roadside Design (con.)

- Barrier Types (guardrail, concrete barrier, high tension cable barrier, and temporary barrier)
  - Selection guidelines
  - Placement
  - Location relevant to other features (e.g. shared use paths and guardrails)
  - Deflection space and zone of intrusion
  - Grading
  - Curbs
  - Flare rate
  - Length of need
- End treatments and crash cushions
- Bridge Rails



2018 Florida Greenbook Summary of Changes, August 2019

Slide 27

Chapter 6 – Lighting

- New definitions for LED, HPS, and MH luminaires
- Explanation of the lighting methods
  - Luminance – straight roadways, based upon surface type
  - Horizontal and vertical illuminance – pedestrian areas
  - Horizontal illuminance – intersections and interchanges, includes variable for surface type
- New requirements for underpasses
  - Use wall mounted luminaire attached to pier, pier cap or wall copings
  - Daytime and nighttime requirements
- Requirements for decorative and architectural lighting

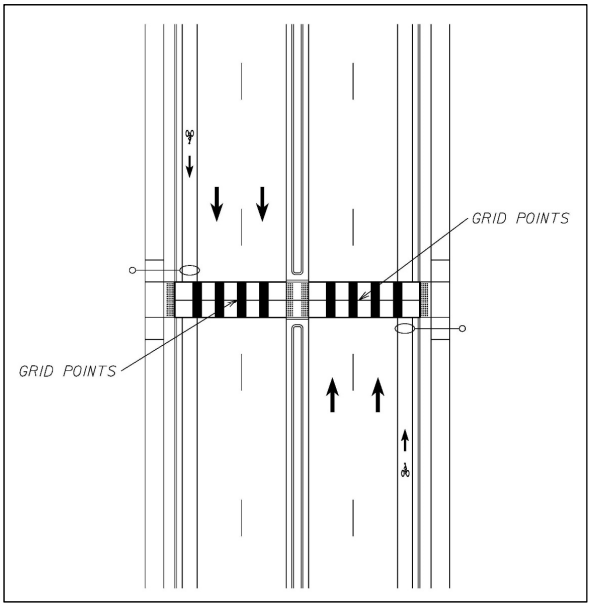
Pinellas County, FL

2018 Florida Greenbook Summary of Changes, August 2019

Slide 28

Chapter 6 – Lighting

- Midblock Crosswalks
  - Provide 2.0 foot candles of maintained vertical illumination
  - Measured at 5 feet from the road surface
  - Calculate the vertical illuminance on each near side approach.



Chapter 7 – Rail-Highway Crossings

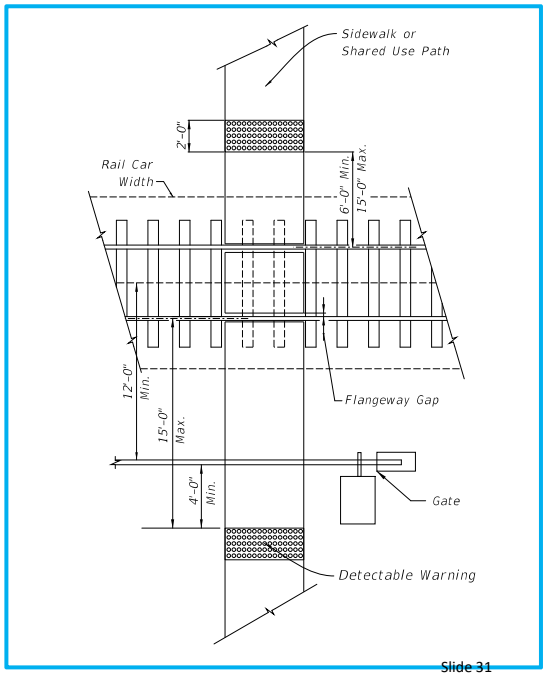
- Requires sidewalks and shared use paths be continued through at grade street crossings

Jacksonville – Baldwin Trail

Myers Park Drive, Tallahassee

Chapter 7 – Rail-Highway Crossings

- Figure 7 – 3 Pedestrian Crossings

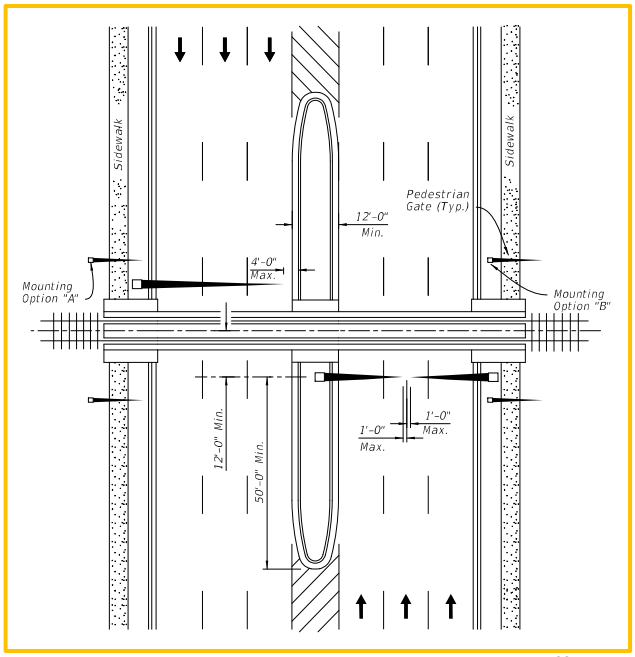


2018 Florida Greenbook Summary of Changes, August 2019

Slide 31

Chapter 7 – Rail - Highway Crossings

Sun Rail Crossing, Winter Park, FL



2018 Florida Greenbook Summary of Changes, August 2019

32

Chapter 8 – Pedestrian Facilities

- Sidewalks have a min. width of 5’ (6’ back of curb)
- Graded area ≥ 1 foot with 1:6 cross slope, flush with the sidewalk
- Buffer strips ≥ 2 feet if sidewalk separated from curb
- Cross slope ≤ 2%
- Include an evaluation of existing driveways for accessibility

Historic Downtown Ft. Myers, FL

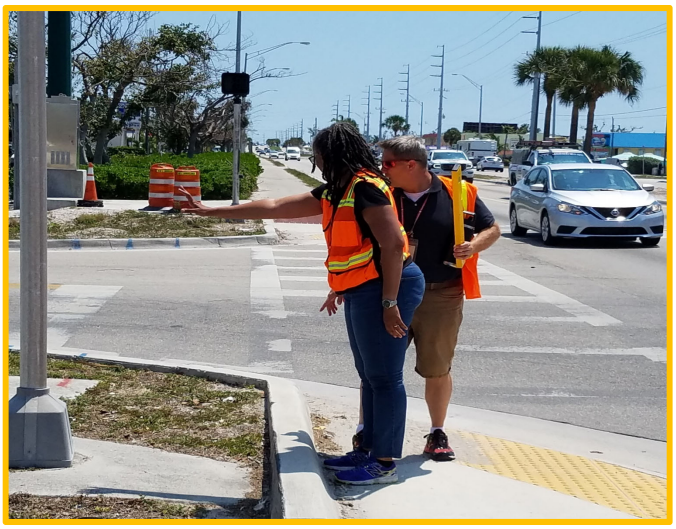
Chapter 8 – Pedestrian Facilities

- Grades ≤ 5%, unless accessible ramps and landings provided
  - In a right of way, grades are allowed to equal the general grade of the roadway
- Requires at least a 5’ wide connection between an accessible transit stop and the sidewalk
- New sidewalks need to connect to existing sidewalks, shared use paths and crosswalks on the adjoining project

Centerville Road, Tallahassee, FL

Chapter 8 – Pedestrian Facilities

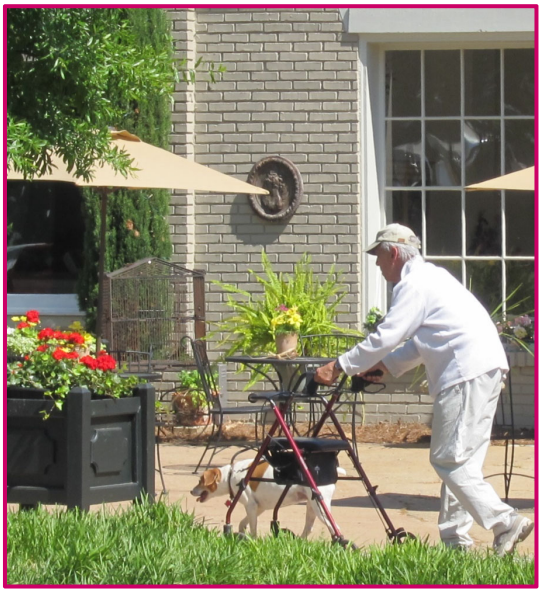
- Guidance for evaluation of existing driveways for accessibility and placement of new utility poles
- Revised section for curb ramps and blended transitions
- Clarifications of when to place detectable warnings



US 1, Marathon, Florida

Accessibility

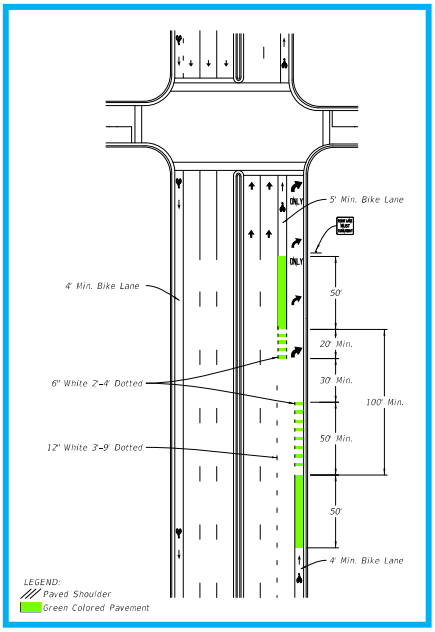
- United States Access Board
  - Public Rights of Way
  - Shared Use Paths
  - https://www.access-board.gov/guidelines-and-standards/streets-sidewalks



- https://www.access-board.gov/guidelines-and-standards/streets-sidewalks

Chapter 9 – Bicycle Facilities

- Updated placement of bicycle lane markings and figures
- Added example of obstruction pavement marking
- Added requirement to redistribute pavement width to provide bicycle facilities with new table for lane widths
- New section on buffered bike lanes and green bike lanes
- Revised shared lane marking section to place in middle of lane



Chapter 9 – Shared Use Paths

- Minimum standard width for a two-way path is 10 feet
- Can be 10 - 14 feet (wider trails with high use, variety of users, steep grades, SUN Trail)
- Rarely, 8 feet if:
  - Bicycle traffic is low, even on peak days or hours
  - Only occasional pedestrians expected
  - Frequent passing and resting opportunities
  - Infrequent maintenance vehicle loading
  - Available on-street facility such as bike lanes
  - Short distance due to a physical constraint (environmental feature, bridge abutment, utility structure, or fence)

Goose Pond Trail, Tallahassee

Chapter 9 - Shared Use Paths

- Require a separation from the roadway (horizontal space of at least 5’ or barrier)
- Fixed objects should not be permitted to protrude within the vertical or horizontal clearance
- Running grade, cross slope and curb ramp requirements same as sidewalks
- Include an evaluation of existing driveways for accessibility

Courtney Campbell Trail, Pinellas County

Chapter 9 – Shared Use Paths

- Graded shoulder ≥ 2 feet with 1:6 slope
  - 3 feet or more desirable (clearance from trees, poles, walls, fences, guardrails, etc.)
  - Adjacent to canals, ditches, or slopes steeper than 1:3, a wider separation recommended
- Separation from edge of path to top of slope ≥ 5 feet
  - Depending on height of embankment and condition at the bottom, a barrier may be needed
- Vertical clearance of 8 feet
  - 10 feet is desirable, especially if emergency vehicles need to pass through
- Clear width on structures same as approach path, plus ≤ 2 foot shoulders

Legacy Trail, Sarasota

2018 Florida Greenbook Summary of Changes, August 2019

Slide 41

Chapter 9 – Shared Use Paths

- For paths in relatively flat areas (grades ≤ 4%), use design speed of 18 mph
- For sustained downgrades greater than 4% exists, refer to the ***AASHTO Guide for the Development of Bicycle Facilities (2012, 4th Edition)*** for further guidance

Legacy Trail, Sarasota

2018 Florida Greenbook Summary of Changes, August 2019

Slide 42

Chapter 9 – Shared Use Paths

- Permission for grade to match slope of roadway in constrained rights of way extended to shared use paths
  - US Access Board Guidelines and Standards for Shared Use Paths
  - https://www.access-board.gov/guidelines-and-standards/streets-sidewalks

Camp Helen State Park, Bay County

Accessibility

- Curb ramps should be parallel to and the full width of the path
- Pull boxes, manholes, etc. in the curb ramp or detectable warning area should be relocated when feasible
- Specify an appropriate detectable warning system compatible with path surface
- Push buttons within reach range (10”) of sidewalk/path and 42” high

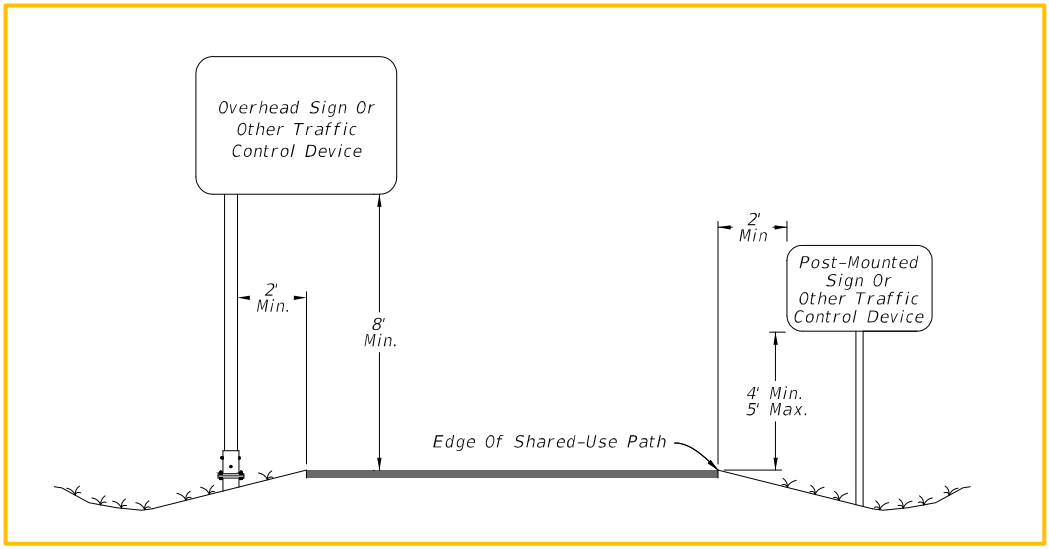
Welaunee Blvd., Tallahassee

Chapter 9 – Shared Use Paths

- Use the *AASHTO Guide for the Development of Bicycle Facilities (2012, 4th Edition)* to determine the minimum radius of curves
- Transition towards the roadway at intersections to provide a more functional crossing location

US 41, Lecanto

Figure 9-27 Sign Placement on Shared Use Paths



Chapter 11 – Work Zone Safety

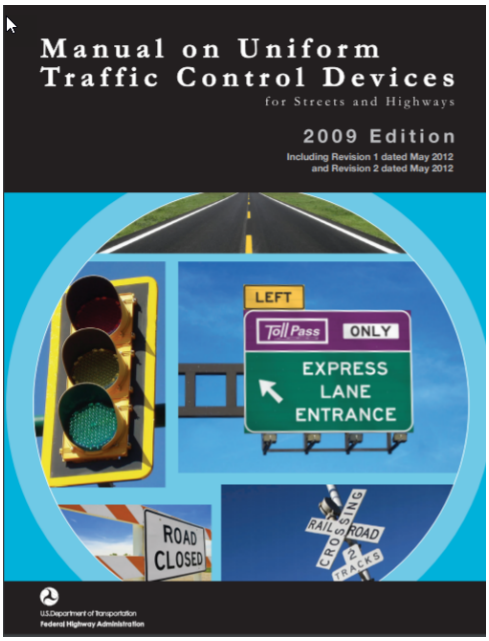
- Applies to any activity within the right of way
- Temporary Traffic Control Plan (TTC) must address all road users (pedestrians, cyclists, drivers, transit, trucks)
- Follow Part 6 D of the MUTCD

Chapter 11 – Work Zone Safety

- Added requirements for clear zone in traffic control plans
- Guidance for the use of transverse rumble strips
- Requirements for barrier selection and placement

MUTCD

- Manual on Uniform Traffic Control Devices
  - Part 6 – Temporary Traffic Control
  - Interim Approvals
  - https://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htms



2018 Florida Greenbook Summary of Changes, August 2019

49

Chapter 11 – Work Zone Safety

- Provide safe passageways for pedestrians through, in, and/or around construction or maintenance work zones, including persons with disabilities in compliance with the:
  - ***2006 Americans with Disabilities Act Standards for Transportation Facilities*** as required by ***49 C.F.R 37.41 – Construction of Transportation Facilities by Public Entities,*** or
  - ***37.43 - Alteration of Transportation Facilities by Public Entities,*** and
  - ***2017 Florida Accessibility Code*** as required by ***61G20-4.002.***

2018 Florida Greenbook Summary of Changes, August 2019

Slide 50

Chapter 14 – Design Exceptions & Variations

- Revised controlling criteria to be consistent with FHWA (published May 2016)
- Required when not possible to meet the min. standards
- Recommended by PE, signed by maintaining authority's PE or designee
- If project is on SHS or NHS, follows process in FDM, signed by DDE

Naples, Florida

Shalls

- Examples of shall conditions
  - Design speed
  - Stopping and passing sight distance
  - Lane widths
  - Cross slope
  - Shoulders
  - Medians
  - Shielding
  - Rail crossings
  - Sidewalks, bike lanes, shared use paths
  - Design exceptions

Centerville Road, Tallahassee, FL

Design Exceptions

- Historically based on 13 controlling elements
- FHWA published a notice of revisions for criteria May 2016
- Established 2 categories based upon design speed
- High Speed is ≥ 50 mph and has 10 Controlling Criteria
- Low Speed is ≤ 45 mph and has 2 Controlling Criteria

A1A, Volusia County, FL

High Speed (≥ 50 mph)

- 10 Controlling Criteria
  - Design Speed
  - Lane Width
  - Shoulder Width
  - Horizontal Curve Length
  - Superelevation Rate
  - Stopping Sight Distance (SSD)
  - Maximum Grade
  - Cross Slope
  - Vertical Clearance
  - Design Loading Structural Capacity

US 41, Dunnellon, FL

Low Speed (≤ 45 mph)

- 2 Controlling Criteria
  - Design Speed
  - Design Loading Structural Capacity

FAMU Way Connector, Tallahassee, FL

Changes in Controlling Criteria

- The Silent 3 Controlling Criteria
  - Vertical Alignment
    - Associated with Stopping Sight Distance
  - Horizontal Clearance
    - Addressed in Shoulder Width, Lateral Offset and Clear Zone Requirements
  - Bridge Width
    - Addressed in Lane and Shoulder Width Requirements

US 98, Carrabelle, FL

Design Speed

- Consider the anticipated operating speed, topography, land use, bicycle and pedestrian traffic, and functional classification
  - Shall not be less than the posted speed
  - Compatible with terrain, local development, safety and funding
  - Consistent over a given section of street or highway
  - Values in Chapter 3, Table 3 – 1 Minimum and Maximum Design Speed

Coastal Highway (US 98), Apalachicola, FL

2018 Florida Greenbook Summary of Changes, August 2019

57

Pavement (Lane) Width

- Minimum lane widths for travel, speed change, turn and passing lanes provided in Chapter 3, Table 3 – 18 Minimum Lane Widths
- On multilane urban streets where there is insufficient space for bike lanes, consider unequal lane widths

Thomasville Road, Tallahassee, FL

2018 Florida Greenbook Summary of Changes, August 2019

58

Shoulder Width

- Width of outside and median shoulders for two-lane, two-way roadways shall not be less than the values in Chapter 3, Table 3 – 18 Minimum Shoulder Widths for Flush Shoulder Highways
  - Two lane roadways - dependent on volume
  - Multilane divided roadways – dependent on # of lanes (decreased from 2016 to 2018)
- Paved outside shoulders required for rural, high speed, multilane highways

SR 145, Pinetta, FL

Horizontal Curve Length

- The minimum lengths that should be used in establishing horizontal alignment are shown in Table 3 – 7 Minimum Lengths of Horizontal Curves
  - Based upon design speed and deflection angle
  - Should be the greater of the lengths (design speed and deflection angle)
  - If curve lengths cannot be attained, provide greatest length possible but not less than 400’

Superelevation Rates

- Values for two types of roadways:
  - Rural highways, urban freeways and high speed urban freeways are found in Table 3 – 9 Superelevation Rates for Rural Highways, Urban Freeways, and High Speed Urban Highways (e max = 0.10)
  - Low speed urban freeways are found in Table 3 – 10 Superelevation Rates for Low Speed Arterials and Collectors (emax = 0.05)
  - Terms rural and urban reflect the location of the roadway

Table 3 – 10 Superelevation Rates for Low Speed Arterials and Collectors (e_{max} = 0.05)

Degree of Curve D	Radius R (ft.)	Tabulated Values Design Speed (mph) 30	35	40	45
2° 00'	2,865	NC	NC	NC	NC
2° 15'	2,546				
2° 45'	2,083				NC
3° 00'	1,910				RC
3° 45'	1,528			NC	
4° 00'	1,432			RC	
4° 45'	1,206				
5° 00'	1,146		NC		
5° 15'	1,091		RC		
5° 30'	1,042				
5° 45'	996				
6° 00'	955				RC
6° 15'	917				0.022
6° 30'	881				0.024
6° 45'	849				0.027
7° 00'	819	NC			0.030
7° 15'	790	RC			0.033
7° 30'	764				0.037
7° 45'	739				0.041
8° 00'	716			RC	0.045
8° 15'	694			0.022	0.050
8° 30'	674			0.025	Dmax = 8° 15'
8° 45'	655			0.027	
9° 00'	637			0.030	
9° 30'	603			0.034	
10° 00'	573			0.040	
10° 30'	546		RC	0.047	
11° 00'	521		0.023	Dmax = 10° 45'	
11° 30'	498		0.026		
12° 00'	477		0.030		
13° 00'	441		0.036		
14° 00'	409	RC	0.045		
15° 00'	382	0.023	Dmax = 14° 15'		
16° 00'	358	0.027			
17° 00'	337	0.032			
18° 00'	318	0.038			
19° 00'	302	0.043			
20° 00'	286	0.050			
		Dmax = 20° 00'			

NC = Normal Crown (-0.02) RC = Reverse Crown (+0.02)

2018 Florida Greenbook Summary of Changes, August 2019

61

Stopping Sight Distance

- Safe stopping and passing sight distance shall be provided
- Distances determined by:
  - Vehicle speed
  - Driver's total reaction time
  - Characteristics and condition of the vehicle
  - Friction capabilities
  - Vertical and horizontal alignment
- Minimum values in Chapter 3, Table 3 – 3 Minimum Stopping Sight Distance

St. Armand's Circle, Sarasota, FL

2018 Florida Greenbook Summary of Changes, August 2019

62

Maximum Grade

- Should be as flat as practical and not greater than the values in Chapter 3, Table 3 – 15 Maximum Grades
- Notes:
  - Grades 1% steeper may be provided in urban areas
  - Short lengths of grade, one-way downgrades, and grades on low-volume collectors may be 2% steeper
  - Residential street grades should be < 15%, commercial and industrial areas < 8%

Iceland

2018 Florida Greenbook Summary of Changes, August 2019

63

Traveled Way Cross Slope

- Cross slope of the traveled way should be a compromise between meeting drainage requirements and smooth vehicle operation
  - Recommended slope is 0.02 feet per foot
  - The outside lane in a 3 lane section should be 0.03 feet per foot
  - Shall not be less than 0.015 feet or greater than 0.04 feet per foot
  - Found in Section C.7.b.2 Traveled Way Cross Slope

US 41, White Springs, FL

2018 Florida Greenbook Summary of Changes, August 2019

64

Shoulder Cross Slope

- The cross slope of shoulders should be within the range given in Chapter 3, Table 3 – 20 Shoulder Cross Slopes
  - Paved – 2 to 6%
  - Gravel/Crushed Rock – 4 to 6%
  - Turf – 6 – 8%
  - Existing shoulder cross slopes (paved and unpaved) ≤ 12% may remain

SR 145 Pinetta, FL

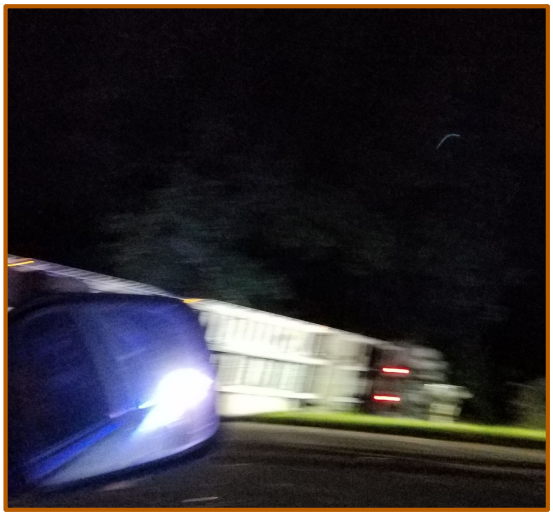
Roadside Slopes

- Side slope adjacent to the shoulder of the roadway
- Shall not be steeper than 1:3
  - Should be 1:4
  - Should be flatter on the outside of horizontal curves
- Backslopes on ditches or cuts should not exceed 1:3 if within the clear zone
  - Should be 1:4

US 17, Doctor's Inlet, FL

Vertical Clearance

- Freeways and arterials shall have a vertical clearance of at least 16 and ½ feet
- Other streets and highways should have a clearance of 16 feet
- Pedestrian or shared use path bridges require at least 17 feet clearance
- Bridges over railroads require at least 23 feet
- Found in Chapter 3, Section C.7.j.4(b) Vertical Clearance



I-10 at Greensboro

Design Loading Structural Capacity

- Design in accordance with AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, 8th Edition (2017)
  - Uses notional (HL – 93) design load
- Bridges also require a FL 120 permit load rating greater than 1 as defined in the Department's Structures Manual, Volume 1 – Structures Design Guidelines, 2018 (SDG)
  - Allows for a more consistent load rating comparison

Cross Seminole Trail, Red Bug Lake Road, Seminole County, FL

Design Exceptions and Variations

- Design Exceptions
  - Required when proposed controlling design elements are below both AASHTO's new construction criteria and the criteria in Florida Greenbook
- Design Variations
  - Required when proposed features other than controlling design elements do not meet Florida Greenbook criteria
- Sample Letter
  - Can use Exhibit 14-A to submit request or Design Exception and Variation Sample Letter on Greenbook web page

Exhibit 14-A Sample Request Letter for Design Exception or Variation

TO: _____ DATE: _____

SUBJECT: ☐ DESIGN EXCEPTION or ☐ DESIGN VARIATION

Local road number or street name: _____
Project description (limits): _____
Type construction (new, rehabilitation, adding lanes, resurfacing, etc.) _____
Design Speed _____
State and/or Federal road number (if applicable): _____
FDOT Financial Project ID No. (if applicable): _____

DESIGN EXCEPTION OR VARIATION FOR THE FOLLOWING ELEMENT:

( ) Design speed	( ) Stopping Sight Distance	( ) Other (explain):
( ) Lane Width	( ) Maximum Grade	_____
( ) Shoulder Width	( ) Cross Slope	_____
( ) Horizontal Curve Radius	( ) Vertical Clearance	
( ) Superelevation Rate	( ) Design Loading Structural Capacity	

Include a brief statement concerning the project and items of concern.

Attach all supporting documentation to this exhibit in accordance with Chapter 14.

Recommended by: _____
(Responsible Professional Engineer)

Approval: _____
(Maintaining authority's designated Professional Engineer)

Concurrence: _____
FDOT (if applicable)

Concurrence: _____
FHWA (if applicable)

Chapter 17 – Bridges and Other Structures

- Updated references to AASHTO Manuals
  - Load and Resistance Factor Design (LRFD) Bridge Design Specifications, 8th Edition (2017)
  - LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 1st Edition, 2018 Interim Revisions
  - Structures Manual, Volume 1 – Structures Design Guidelines, 2018 (SDG)
- Edited sections for:
  - Navigational aids and vessel collisions
  - Routine maintenance and inspection

17th Street

Chapter 18 – Signing and Marking

- Added reference to the Manual on Speed Zoning for Highways, Roads, and Streets in Florida
  - http://www.fdot.gov/traffic/speedzone/Speed_Zone_Manual.shtm
- Established minimum levels of maintained reflectivity for overhead street name signs
- Expanded guidance on audible and vibratory markings to improve effectiveness
- Added guidance on transverse rumble strips (crash history, roadway geometry, land use)

US 1, Marathon, Florida Keys

Questions?

Mary Anne Koos, CPM
Special Projects Coordinator
Office of Design, FDOT
MaryAnne.Koos@dot.state.fl.us
850-414-4321