2014 Structures Related Design Standards Updates

Design Update Training

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Introduction:

- *Guide to FDOT Publications*
- *Website navigation -specific to structures related Design Standards and their support documents.*
- *General Revisions*
- *Deleted Design Standards*
- *New Design Standards*
- *Significant Revisions to Structures Related Design Standards*
- *Drainage related Design Standards updates*
- *Looking Ahead*

Guide to FDOT Publications

Speaking to the Designer:

- ❑ Structures Manual
- ❑ Plans Preparations Manual
- ❑ Basis of Estimates
- ☑ Instructions for Design Standards
- ❑ Design Bulletins
- ❑ Other design manuals such as Traffic Engineering, Drainage, Pavement, Soils and Foundations, etc.

Speaking to the Contractor/Manufacturer's: Designers must be familiar with each of these components, but direction to, or information for designers are not (should not be) included in these documents.

- ☑ Design Standards
- ❑ Specifications
- ❑ Materials Manual
- ❑ Qualified Products

Speaking to the CEI:

- ❑ Construction Project Administration Manual (CPAM)
- ❑ Construction Memos

Guide to FDOT Publications

Instructions for Design Standards (IDS):
Provides specific instructions to assist the Design Engineer of Record in properly incorporating the associated Design Standards into the Contract Plans.

Design Standards:
Established to ensure uniform application of standard designs and details in the preparation of Contract Plans.

> ***Developmental Design Standards** (DDS): Design Standards that are in development and require approval for use; semi-experimental.*
>
> ***Design Standards Revisions** (DSR): Significant Revisions to structures related Design Standards between the annual Design Standard release dates*

Website Navigation

Design Standards Website:

http://www.dot.state.fl.us/rddesign/DesignStandards/Standards.shtm

Support Documents for Structures Related Design Standards

Roadway Design / Design Standards / Design Standards eBooklet 2013

Design Standards eBooklet 2013

You must have the free **Adobe Acrobat Reader** to view and/or print these files. Entire groups may be printed by selecting the group name. The default print size for the Design Standard drawing files is 11 X 17 inches. Any available Instructions for Design Standards (IDS) are listed with their related Index. For questions, please contact the person noted under the area of responsibility listed beside the group headings (click on link for contact information). For use concerning plans incorporation and effective dates for the Design Standards and for information on the Data Tables select the **General Web Site Information** link.

Design Standards eBooklet		Index Title	Revision	Design Information		
Index No	Total Sheets			Instructions for Design Stds (IDS)	Data Table Cell Library	Borderless DGNs
(PDF)				(PDF)	(ZIP)	(ZIP) Terms of Use
Complete eBooklet *(268mb)*	932			Combined Available IDS *(10mb)*	Combined Available CELs *(1mb)*	Combined Available DGNs *(55mb)*
		* COVER, TABLE OF CONTENTS AND REVISIONS *				
Cover	3	Booklet Cover		Cover		
Content	2	Table of Contents		Content		
Revisions	2	Booklet Revisions		Introduction Revisions		
		* ABBREVIATIONS AND SYMBOLS *		Roadway Contact		

TERMS OF USE

The Microstation Drawings listed with their related Index (as zipped DGN files) are provided for designers who decide to modify a Design Standard to suit project specific requirements. It should be clearly understood that if modifications to the Design Standards are required, the work shall be performed under the direct supervision of a Professional Engineer. If any portion of a Design Standard is modified, the Professional Engineer responsible for the modifications to the drawings becomes the EOR. Use one of the following methods:

Method 1:

Produce a new project specific drawing using the details within the Microstation Drawing as a guide or template. In this event, no reference to the related Design Standard will be called out in the plans. The details in the plans which were created from the Microstation drawing cease to be a standard and the engineer responsible for the modifications to the drawings becomes the EOR for the application of the entire system.

Method 2:

Modify the details and notes within the Microstation Drawing for the project specific requirements. In this event, no reference to the related Design Standard will be called out in the plans. It is important that the plans clearly depict evidence that modifications have been made to the original design standard to avoid any confusion by the user. A plan note indicating the details are based on modifications to the original Design Standard may be appropriate. The details in the plans which were created from the Microstation drawing cease to be a standard and the engineer responsible for the modifications to the drawings becomes the EOR for the application of the entire system, including the applicability and correctness of the unaltered portions of the Microstation Drawings.

Method 3:

If the required modifications are minor, use the Microstation drawing to create details showing the modifications to the Design Standard on a separate sheet in the plans. In this event, reference the related Design Standard in the plans. Place the modified details in the plans on a sheet entitled, "Modifications to Design Standards Index XXXX". The engineer responsible for the modifications to the Design Standard becomes the EOR for the details on this sheet and for all effects the modification has on other components within the Design Standard.

Support Documents include:

- *IDS*
- *Data Tables*
- *DGN's (see Terms Of Use)*

Support Documents for Structures Related Design Standards

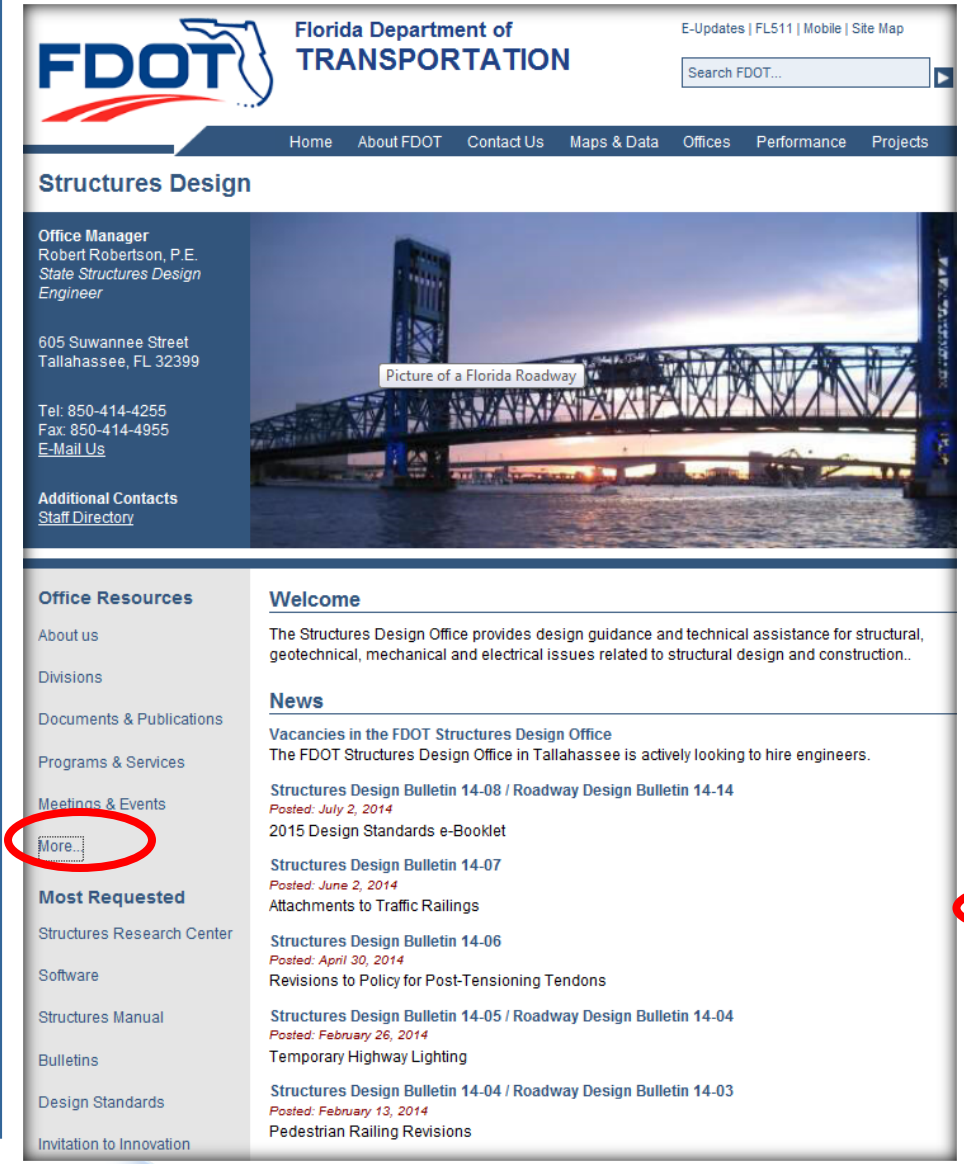
		* PRESTRESSED CONCRETE BEAMS *		Structures Contact		
20005	1	Prestressed I-Beam Temporary Bracing		IDS-20005	CEL-20005	DGN-20005
20010	2	Typical Florida I-Beam Details and Notes				DGN-20010
20036	2	Florida-I 36 Beam - Standard Details				DGN-20036
20045	2	Florida-I 45 Beam - Standard Details				DGN-20045
20054	2	Florida-I 54 Beam - Standard Details				DGN-20054
20063	2	Florida-I 63 Beam - Standard Details		IDS-20010	CEL-20010	DGN-20063
20072	2	Florida-I 72 Beam - Standard Details				DGN-20072
20078	2	Florida-I 78 Beam - Standard Details				DGN-20078
20084	2	Florida-I 84 Beam - Standard Details				DGN-20084
20096	2	Florida-I 96 Beam - Standard Details				DGN-20096
20199	1	Build-Up & Deflection Data for Florida-I Beams		IDS-20199	CEL-20199	DGN-20199
20210	2	Typical Florida U Beam Details and Notes				DGN-20210
20248	3	Florida U 48 Beam - Standard Details				DGN-20248
20254	3	Florida U 54 Beam - Standard Details		IDS-20210	CEL-20210	DGN-20254
20263	3	Florida U 63 Beam - Standard Details				DGN-20263
20272	3	Florida U 72 Beam - Standard Details				DGN-20272
20299	1	Build-up and Deflection Data for Florida U Beams		IDS-20299	CEL-20299	DGN-20299

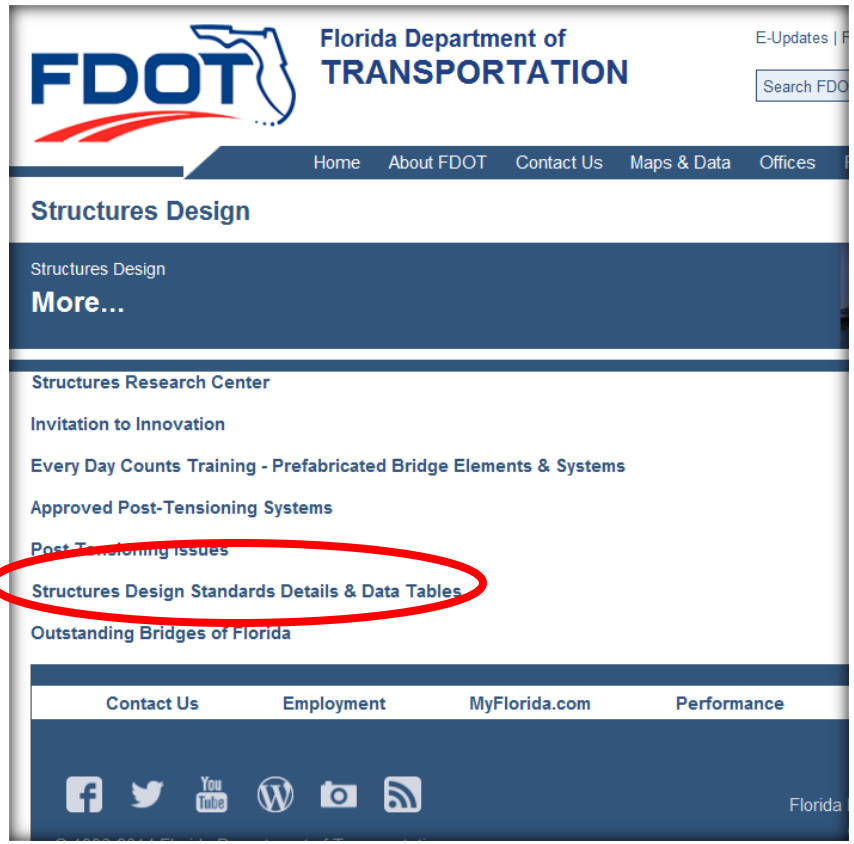
Individual IDS

Individual MicroStation Cell (Data Table)

Index DGN (without the border)

Support Documents for Structures Related Design Standards





Support Documents for Structures Related Design Standards

Also available on the Structures Design Office website:

- MicroStation cell libraries; .pdf's of Load Rating Tables (since not associated with a particular Design Standard);
- Structures Bar Menu cells.xml file (Data Tables pull-down menu update for FDOT2010 MR3 CADD Software download):

Structures Design

Structures Design Standards Details & Data Tables

PLEASE READ THE FOLLOWING BEFORE DOWNLOADING MICROSTATION DRAWINGS

The official Design Standards are available at the Roadway Office website:
Design Standards webpage
Design Standards depict common structural components or elements suitable for standard
the Contract Plans to the official Design Standards as specified in the Plans Preparation Ma
"Structures" Design Standards require the designer to complete a Data Table(s) and includ
Tables should be available on the FDOT Structures bar menu within the TTF_V8semi-stand
is not included in the FDOT Structures bar menu, the latest cell library can be downloaded fr
individual cells can be downloaded from the Design Standards webpage for FY2012/2013

1.) Structures Related Design Standards Details:

(see Design Standards website for FY 2012/2013 and later Design Standards Details &
(see Archived Drawings for 2010/2011 and earlier Design Standards Details & Interims

2.) FDOT Structures Menu Data Table Cell Libraries:

(in Microstation format. PDF examples are available in the Instructions for Design Stan

TTF-V8semi-standards.cel v2014.1 (July 2013 - For use with 2014 Design Standards. Included in FDOTSS2 CADD Software Release)
(0.9MB zip)
TTF-V8semi-standards.cel v2015.1 (July 2014 - For use with 2015 Design Standards. To be included in FDOTSS2 MR1 CADD Software Release)
(0.9MB zip)

3.) FDOT Structures Menu Data Tables not included in the IDS:

(available in Microstation TTF_v8semi-standards.cel Cell Library)

Drilled Shaft Data Tables (last revision: July 2013 - PDF)
(.11MB)
Steel Sheet Pile Walls Data Tables (last revision: July 2013 - PDF)
(.50MB)
LRFR Summary Tables (last revision: January 2014 - PDF)
(1.3MB)

4.) FDOT Structures Menu v8 Structures Cell Library:

(in Microstation or AutoCAD format on request. Includes Key Sheet cell updates based on RDB 12-16/SDB 12-13.)

TTF_v8structures.cel (FDOTSS2 MR1)
(0.6MB)

5.) FDOT True Type Fonts:

(Copy these files into the C:\Windows\Fonts directory to correctly display the .dgns dated July 2011 or later. These files are automatically included in the FDOTSS2 CADD Software download)

FDOT True Type Fonts
(1.4MB)

6.) FDOT Structures Menu UI:

(Copy the cells.xml file into the \FDOTSS2\MENU\UI\UI.Menus\Structures folder to correctly display the pull down menu for the Data Tables cells that were released in the 2015 Design Standards and the new Key Sheet text cell resulting from RDB 12-16/SDB 12-13.)

cells.xml
(4KB zip)

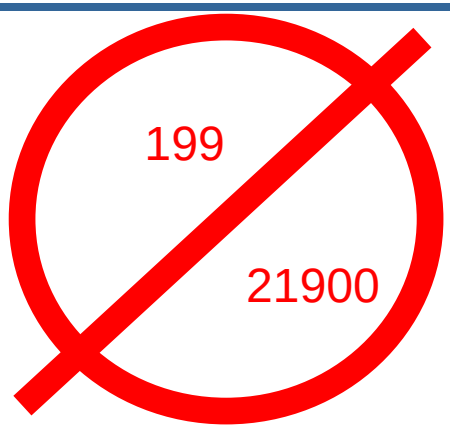
7.) Training Presentations of Interim Changes:

(links to the Roadway Design Office Training web sites)

2007 Design Update Training (January 2006, July 2006 & January 2007 Interims)
2009 Design Update Training (January 2008, July 2008 & January 2009 Interims)
2010 Design Update Training (July 2009 & January 2010 Interims)
2011 Design Update Training (July 2010 & January 2011 Interims)
2012 Design Update Training (July 2011 & FY2012/2013 Design Standards)
2013 Design Update Training (2013 Design Standards)
2014 Design Update Training (2014 Design Standards)

General Revisions

- Changed all ***QPL*** references to ***APL***
  - ✓ On drawings, tables, cells, and in the ***IDS's***
- Updated ***Structures Manual*** references from Volume 9 to Volume 3.
  - ✓ On drawings, tables, cells, and ***IDS***'s (14 Indexes)
- Updated Traffic Railing Index drawings to match the new 31" height of W-Beam Railings and updated the guardrail bolt locations to match. (***Indexes 420, 421, 422, 423, 425, & 477***)
- Added limitation to the ***IDS*** for all Traffic Railings limiting the number (*two*) and size (*2" dia.*) of conduits - to protect crashworthiness.



Deleted Standards

- ***Index 199: Geotextile Criteria*** Information moved to ***Specification Section 985***
  - ✓ All references to ***Index 199*** changed to Specification Section 985.

- ***Index 21900: Fender Systems- Polymeric Piles***
  - ✓ See ***Structures Bulletin 12-11*** and ***SDG 3.14*** for more information.
    - Effective date: January 2015

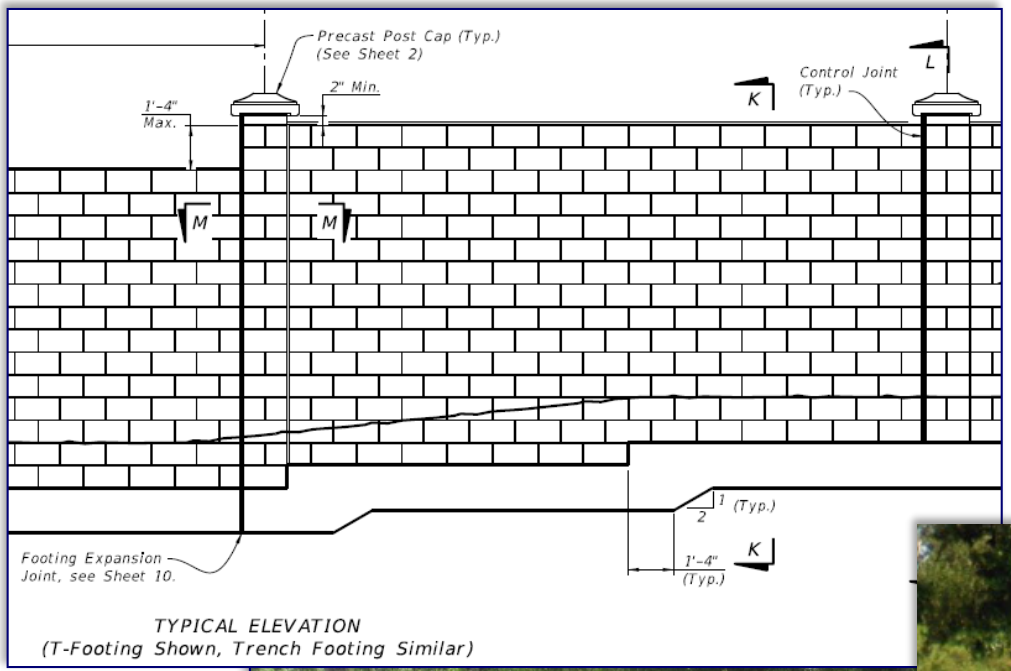
General Revisions - Cells

- Many of the Structures Cells were updated:
  - ✓ *QPL* to *APL*
  - ✓ Notes
  - ✓ General clean-ups (formatting, spelling, etc.)

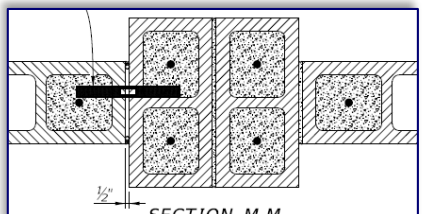
Update your cells!

- Other Cells with minor changes:
  - ✓ ***11320***: added missing columns “DF” & “FF”
  - ✓ ***17743***: added N-blowcount to soil criteria notes
  - ✓ ***20005***: Change some terminology & notes
  - ✓ ***20510***: Change bearing pads (for AASHTO Type II Beam)
  - ✓ ***LRFR_PCB***: Deleted Service III check for FL120 permit
- New Cells added: ***05250*** & ***21252***: (2014 Revisions)

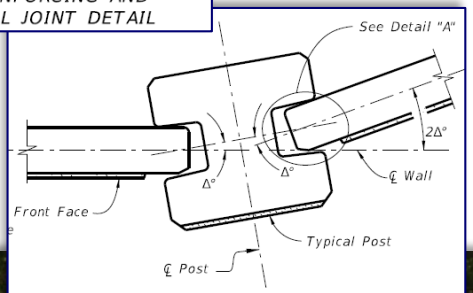
New Design Standard
Index 5250 - Perimeter Walls



TYPICAL ELEVATION
(T-Footing Shown, Trench Footing Similar)



SECTION M-M
PILASTER REINFORCING AND
WALL CONTROL JOINT DETAIL



PIVOTING JOINT DETAILS

Design Update Training

New Design Standard Perimeter Walls (continued)

- Developed to assist Districts by providing a standard for visual barriers that meets the newly developed statewide policy for the use of Perimeter Walls.
  - ✓ See *Structures Bulletin 14-03 for more information.*
    - Contractor's option to use precast concrete or masonry block construction.
- Archived *Developmental Design Standard Index **D5250***
  - ✓ Simplified (reduced) the foundation options available for precast walls.

New Design Standard Perimeter Walls (continued)

- Updated ***Specification*** *Section 534* to include Perimeter Walls and specifications for masonry block and block construction.
  - ✓ Removed *Developmental Specification Dev534*.
- The following Manuals also have updates relating to the policies for use of Perimeter Walls:
  - ✓ *Project Development and Environment (PD&E) Manual,*
  - ✓ *Project Management Handbook*
  - ✓ *Plans Preparation Manual (PPM), Volume 1, Chapter 32*

New Design Standard Index 21252 - Access Door Assembly for Steel Box Sections

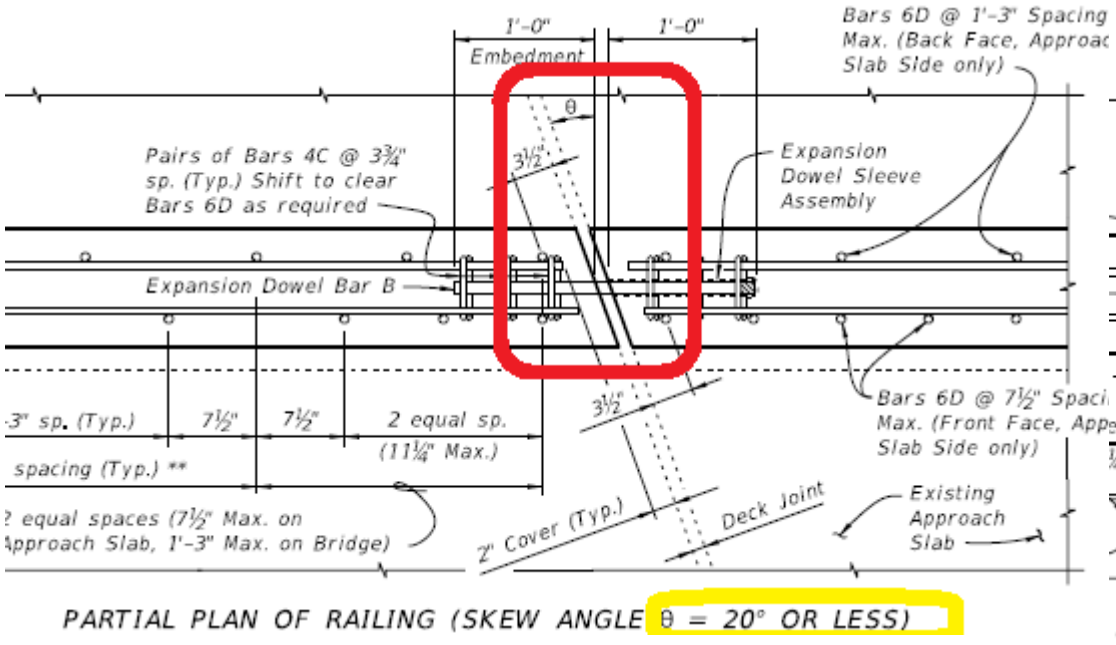
Released in *Structures Bulletin 14-02*

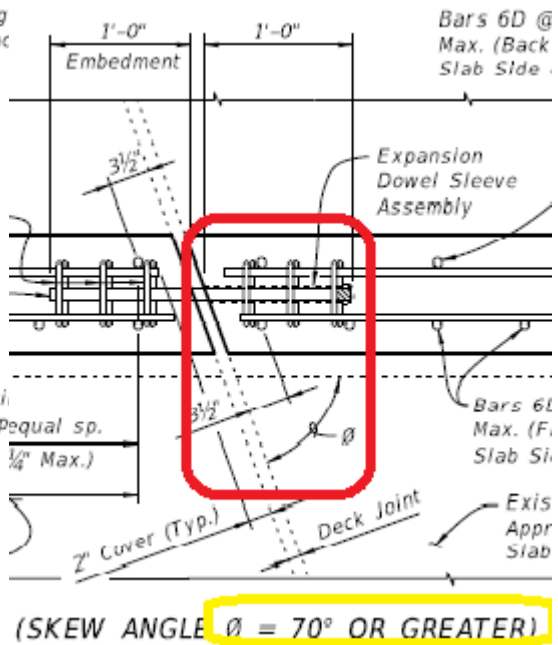
- 2014 Revisions

Photo taken at Tampa Steel Erection Co.

Significant Revisions

- ***Index 480:*** *Traffic Railing-(Vertical Face Retrofit) General Notes and Details*
  - ✓ Changed “Skew” angle to match other details in the Structures Manual. Measure angle from a line drawn perpendicular to the centerline.



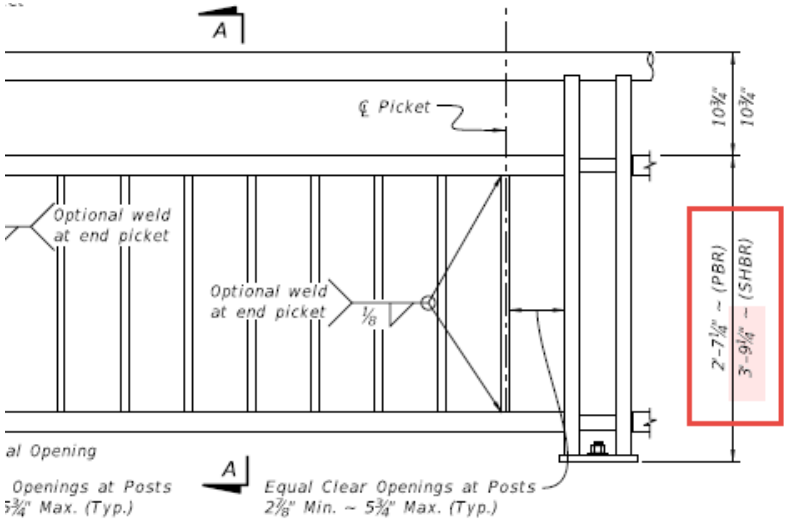


Revised Drawing

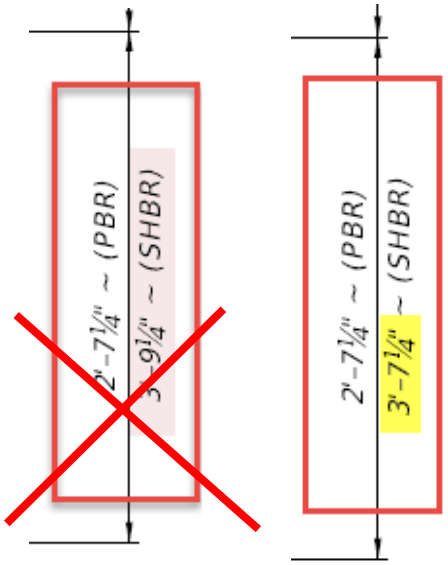
Prior to Revision

Significant Revisions

- ***Indexes 852 & 862**: Pedestrian/Bicycle Railings*
  - ✓ Clarified that sawcut joints in sidewalks (do not require 6” offset to the anchor bolts);
  - ✓ Corrected dimension for Type 1 - Special Height Bicycle Railing (SHBR);
  - ✓ ***IDS*** - Clarification added for Line of Sight, Sphere Rules and deleted information that is already covered in the ***Structures Manual***.



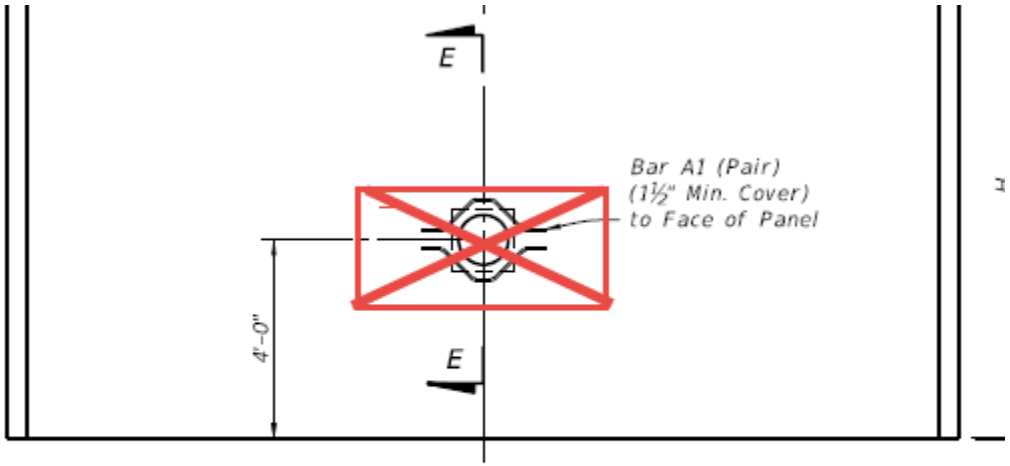
TYPE 1 - PICKET INFILL PANEL



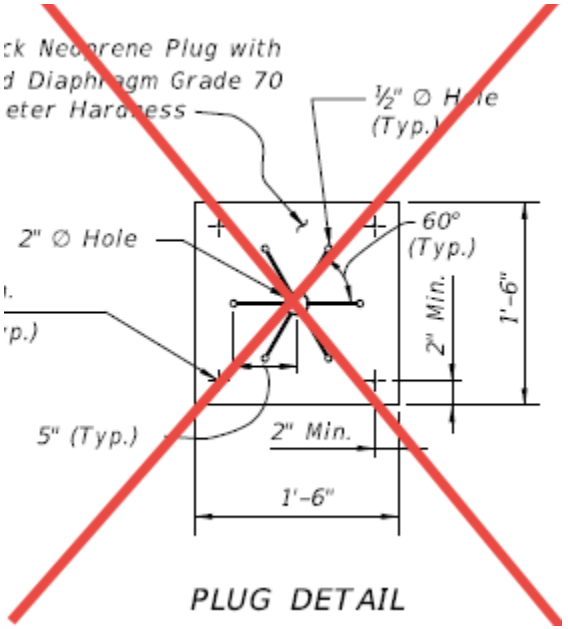
Design Update Training

Significant Revisions
Index 5200 Series - Noise Walls

- Deleted Fire Access Hole Details (***Indexes 5200, 5210 & 5211***)



FIRE HOSE ACCESS HOLE TYPICAL DETAIL



PLUG DETAIL

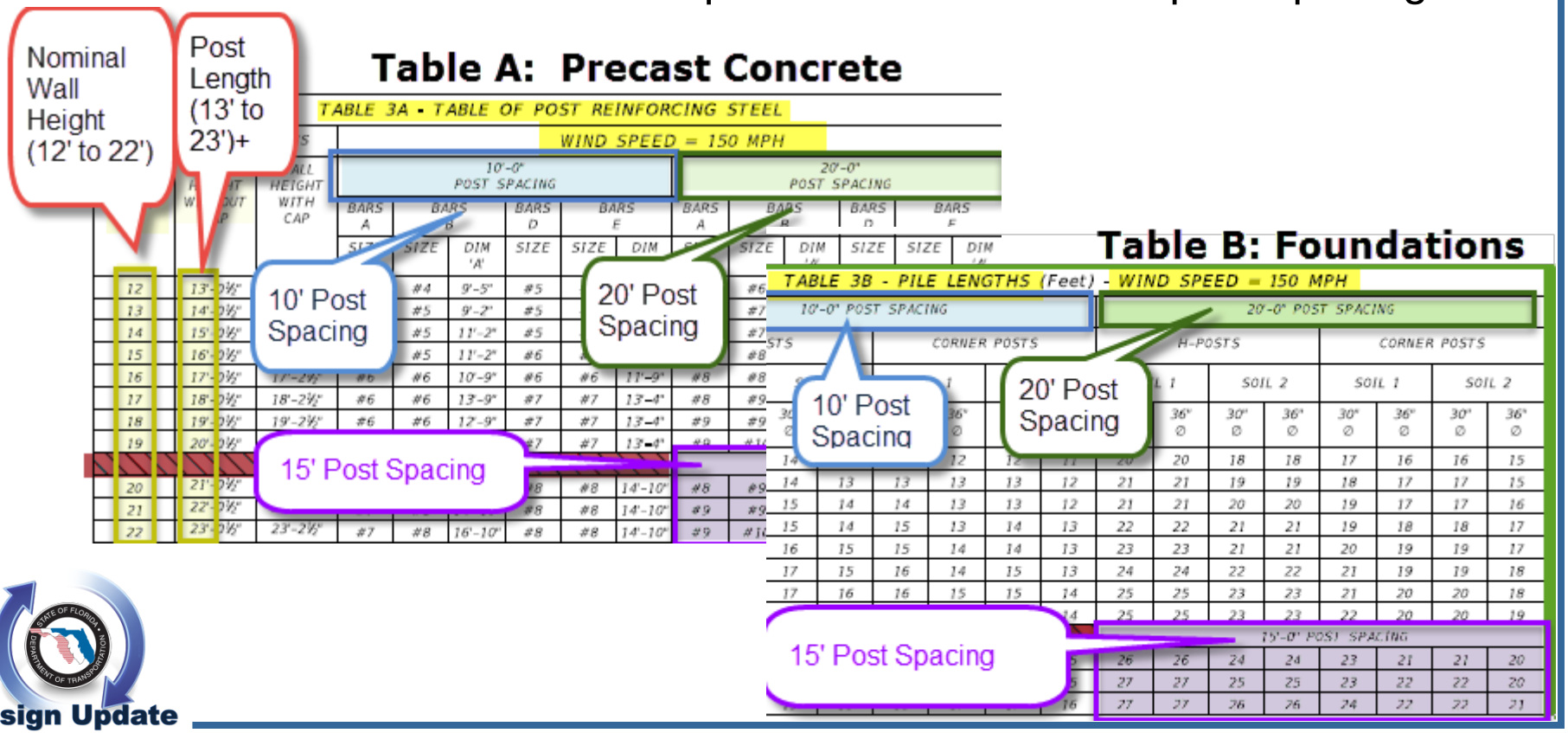
Design Update Training

Significant Revisions
Index 5200 - Noise Walls

- **They're ba-ack - with <u>more</u> revisions for 2015!**
- General Notes have been updated and reorganized.
- Wall height is clarified as: the nominal wall height measured from finished grade (+ - 6 inches).
  - ✓ Wall height for the Tables is the wall height required for noise abatement.
  - ✓ Stacked panel height (constructed wall height) is the required wall height plus 1 foot.
  - ✓ Design includes the extra 1'-0" as exposed to wind loads (conservative).

Significant Revisions
Index 5200 - Noise Walls

- Tables of Variables divided into Two Tables (**A & B**)
  - ✓ Wind Speed Category (***Table 1*** **= 110 mph,** ***Table 2*** **= 130 mph & *Table 3* = 150 mph**)
  - ✓ **Tables 3A & 3B** have separate sections for 15’ post spacing



Design Update Training

Significant Revisions: Junction Slabs

Index 5210: *Traffic Railing/Noise Wall (8'-0") Junction Slab*

Index 6110: *Wall Coping with Traffic Railing/Junction Slab*

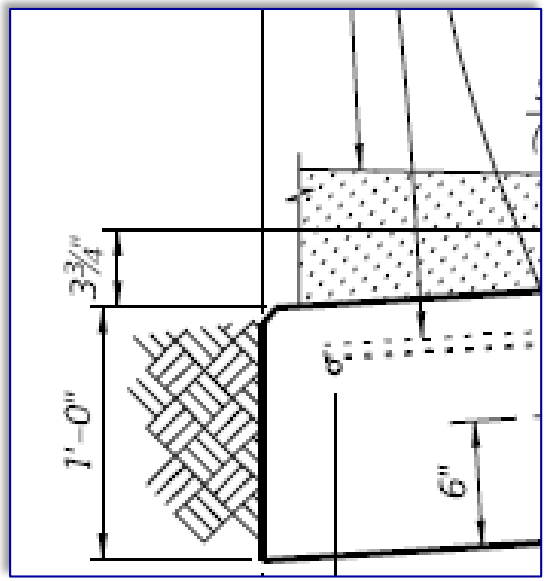
- Slope of junction slab can be varied to maintain required asphalt overlay thickness at the toe.

NOTES:

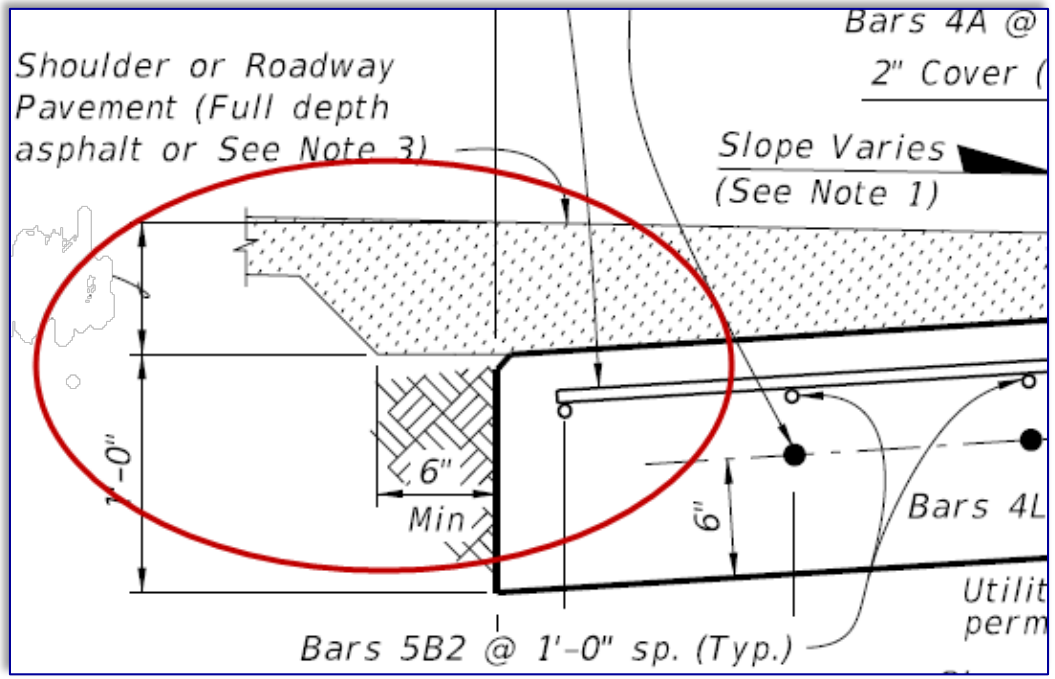
1. *Match Cross Slope of Travel Lane or Shoulder.*
2. *Vary the Junction Slab slope based on the roadway cross slope to maintain a minimum 6" asphalt depth at the edge of the slab.*

Significant Revisions: Junction Slabs

- Changed the Toe Details to clarify intent and improve constructability.
  - ✓ Minimum asphalt thickness of 6” extended a minimum of 6” beyond the toe.



Previous Detail

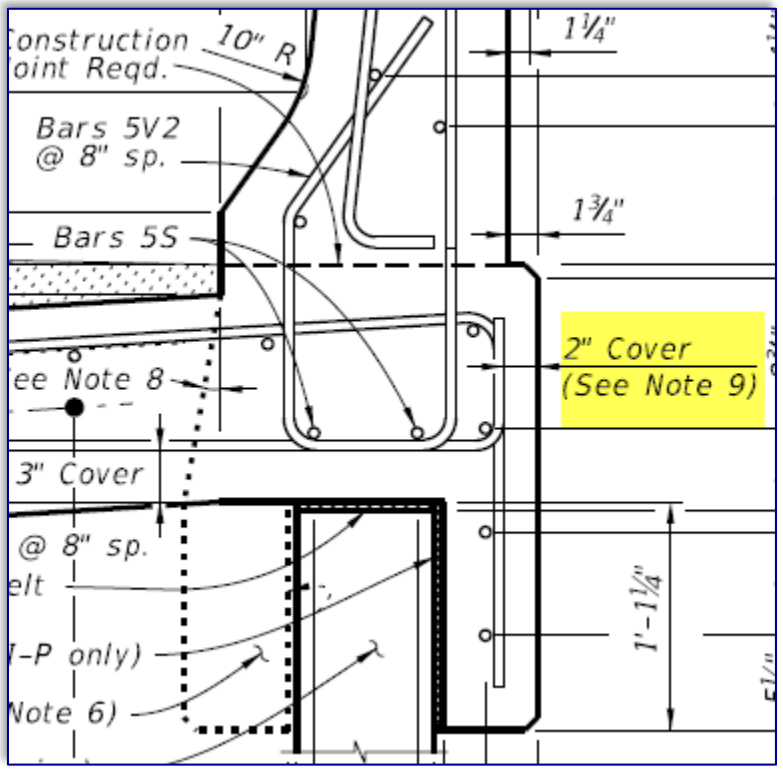


2015 Detail

Design Update Training

Significant Revisions: Junction Slabs

- Slip forming of coping with junction slab is allowed
- Requires shop drawings.

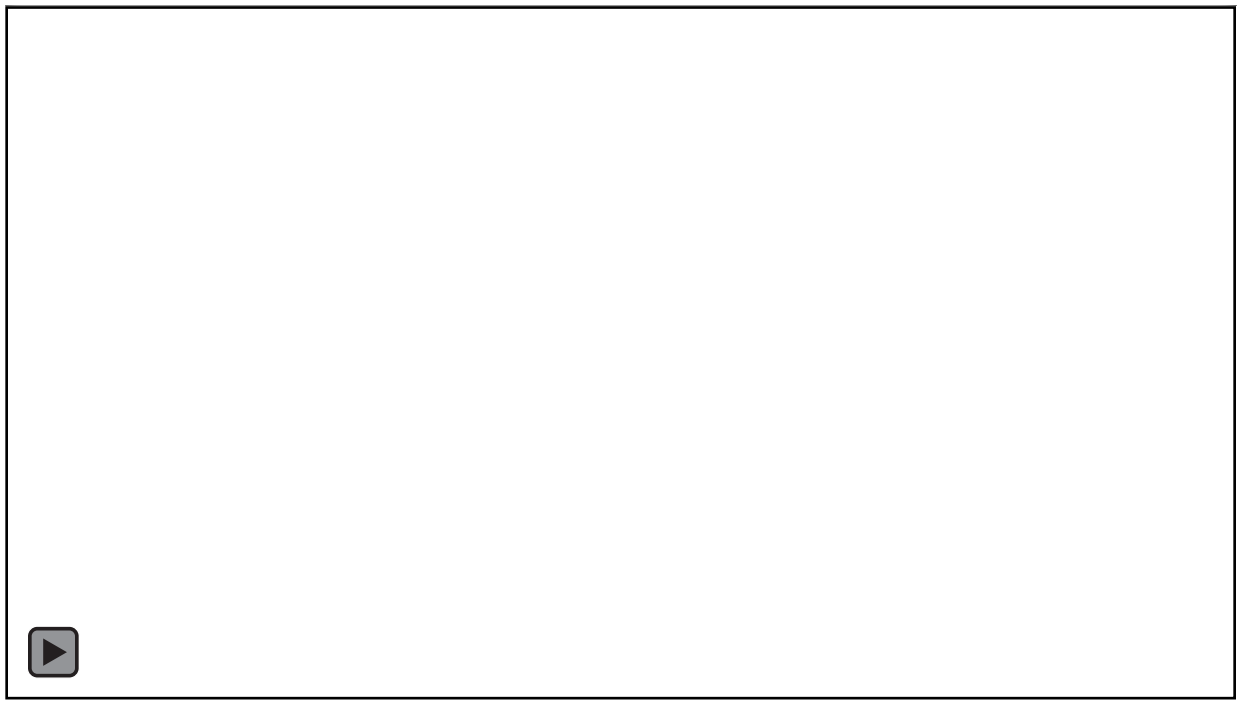


provide a maximum 2½" air gap.

8. Angle varies ~ 0° min., 20° max.
9. If slip forming is used, submit shop drawings for approval showing 3" side cover with the Typical Section dimensions adjusted.

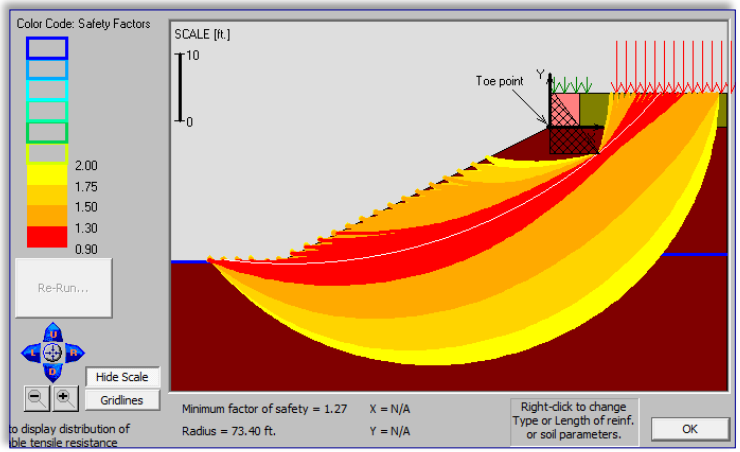
Significant Revisions: Junction Slabs

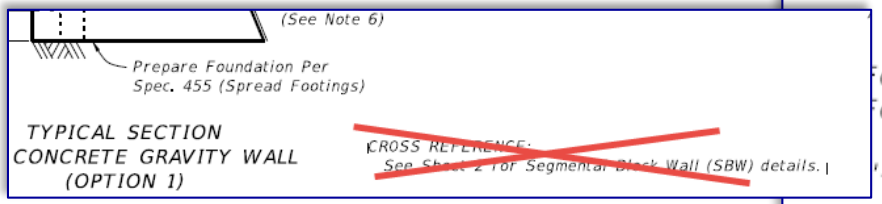
- Slip Forming:

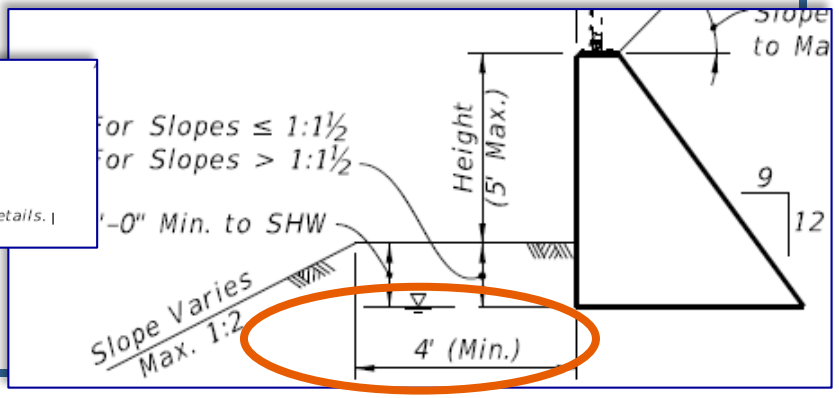


Significant Revisions

- ***Index 6011: Gravity Walls***
- Was: ***C-I-P Gravity Walls***
  - ✓ Precast walls are now permitted
  - ✓ Added Toe Slope minimum dimensions based on global stability analysis;
  - ✓ Coming Soon ***Developmental Design Standard (DDS) D6011****: Gravity Walls* for use of Segmental Block Walls (SBW).
  - ✓ Ignore cross reference to SBW Details on “Sheet 2”.

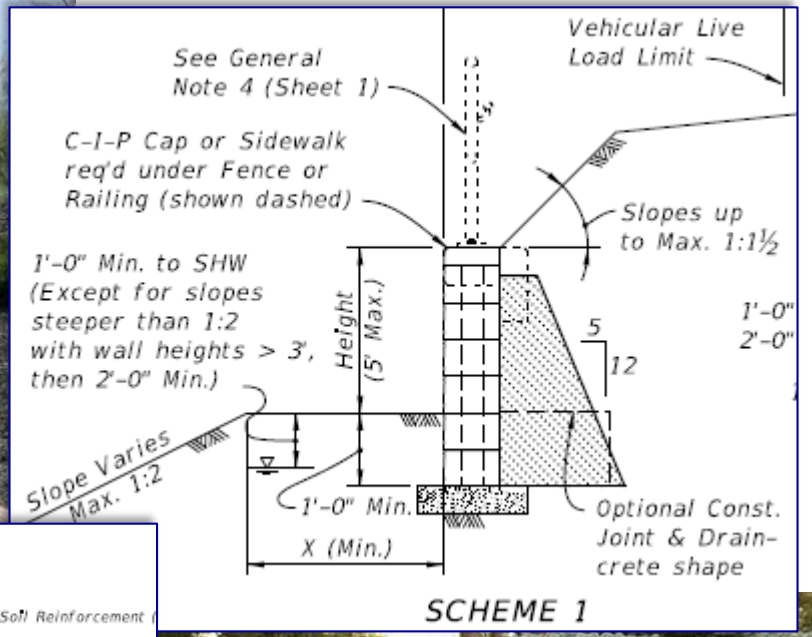


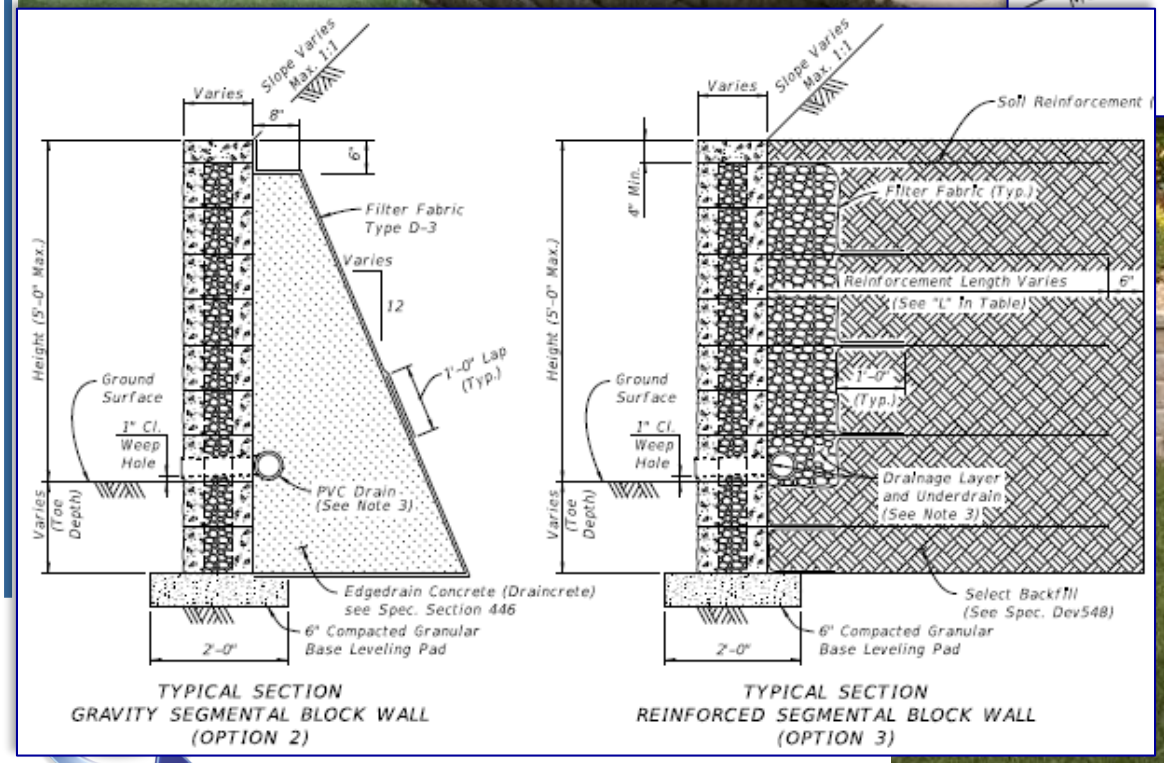


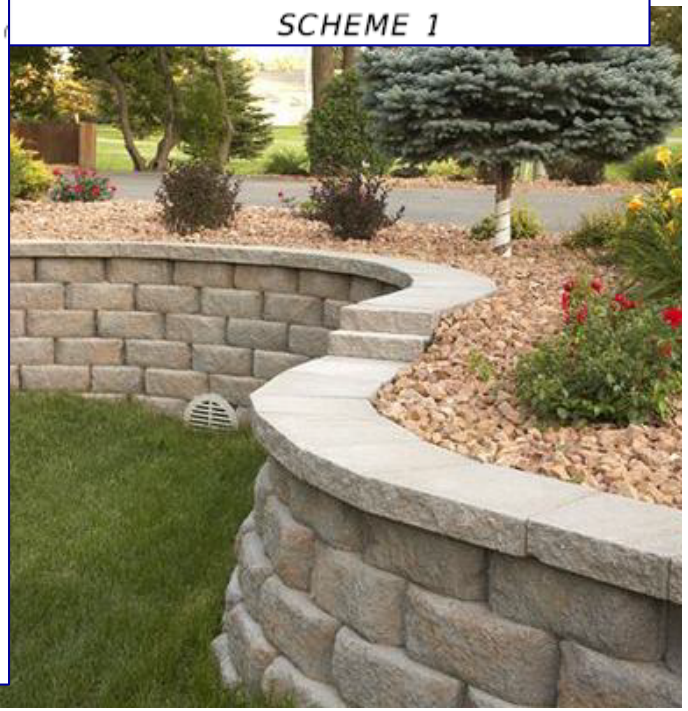


Design Update Training

Developmental Design Standard Index D6011 (Gravity Segmental Block Walls)





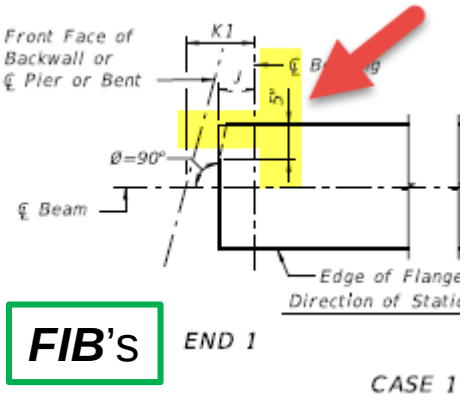


Significant Revisions

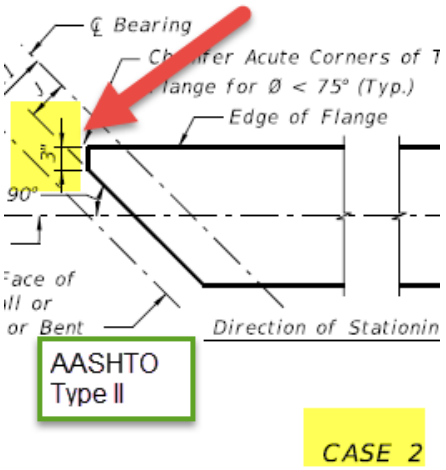
- ***Index 6020*: *Permanent MSE Retaining Wall Systems***
  - ✓ Removed redundant notes (Notes in the *Specifications*, ***IDS***, *or* ***SDG***). Updated ***IDS***
- ***Index 6200:** Coping Mounted Light Pole Pedestal*
  - ✓ May now be either C-I-P or Precast.
- ***IDS 6025:** GRS-IBS*
  - ✓ Added requirement for EOR to detail the rip-rap rubble in the Plans.

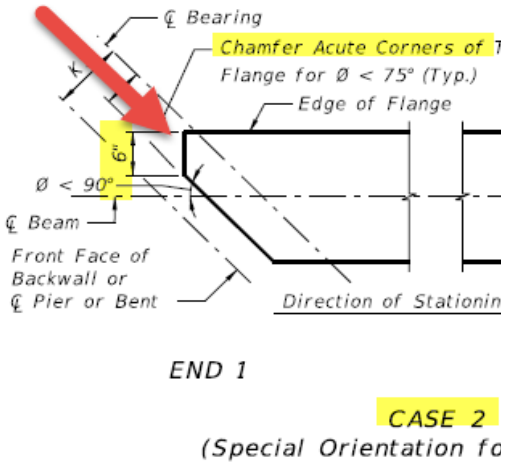
Significant Revisions

- ***Index 20010:*** *Typical Florida-I Beam Details and Notes*
  - ✓ Changed the bottom flange chamfer dimensions for CASE 2 & 3
  - ✓ Changed top flange clip dimension for CASE 1



- ***Index 20120:*** *AASHTO Type II Beam*
  - ✓ Deleted top flange clip from CASE 1





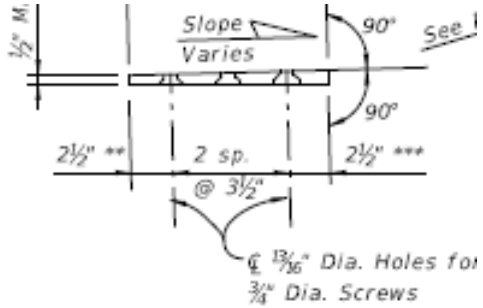
Design Update Training

Significant Revisions

- ***Index 20510:** Composite Elastomeric Bearing Pads*
  - ✓ Optimized bearing pads for AASHTO Type II Beams
  - ✓ Named new pads AA and AB;
- ***Index 20511:** Bearing Plates (Type 1)*
  - ✓ Removed exception for Type A & C Bearing Pads – see *Index 20510* updates
  - ✓ Changed corner clips – see ***Index 20010 & 20120*** updates
  - ✓ Rearranged Drawings and clarified Notes

Significant Revisions

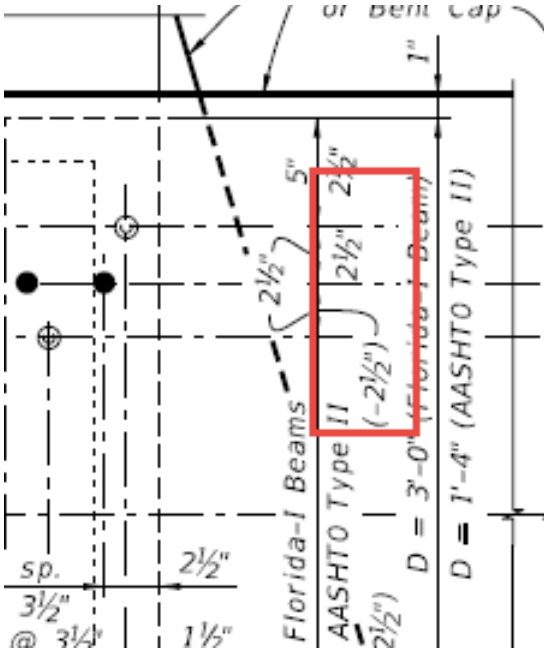
- ***Index 20512:*** *Bearing Plates (Type 2)*
  - ✓ Removed exception for Type A & C Bearing Pads – see *Index 20510* updates
  - ✓ Corrected dimensions to holes and studs for AASHTO Type II's
  - ✓ Rearranged Drawings and clarified Notes.



BEVELED BEARING PLATE B
(Along ℄ Beam)
(Positive Slope shown; Negative Slope similar)

LEGEND:

* ½" for Pad Type K
** 4" for Pad Type K at End 1
*** 4" for Pad Type K at End 2



Design Update Training

Significant Revisions

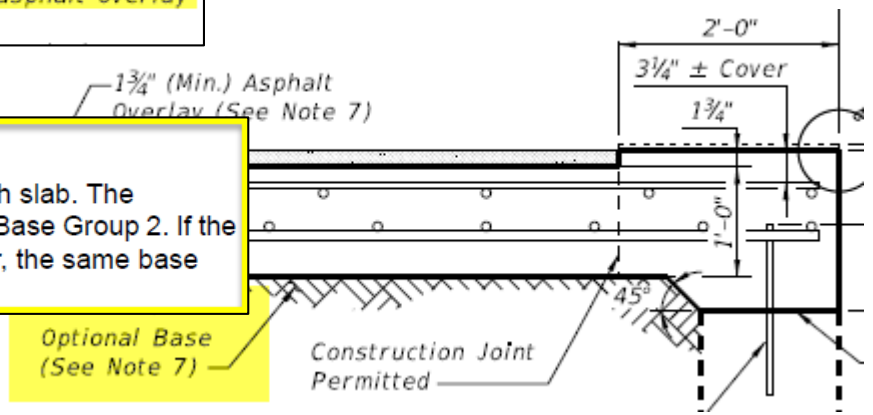
- ***Index 20900 and 20910:*** *Approach Slabs*
  - ✓ Changed Base under the Approach Slabs from “Optional Base Group 2” to “Optional Base (See Note 7)”.
    - “See the Roadway Plans for asphalt overlay and optional base details.”
  - ✓ Moved the asphalt information from Index 20900 into the ***IDS***.
  - ✓ Added instructions to the ***IDS*** for the Optional Base.

7. Continue the asphalt pavement over the approach slab and match the friction course type used on the roadway. See the Roadway Plans for asphalt overlay and optional base details.

IDS:

In the Roadway Plans:

Include details and payment for the optional base under the approach slab. The minimum structural requirement under the approach slab is Optional Base Group 2. If the optional base group for the roadway approaches is Group 2 or better, the same base group may be continued under the approach slab.



Significant Revisions

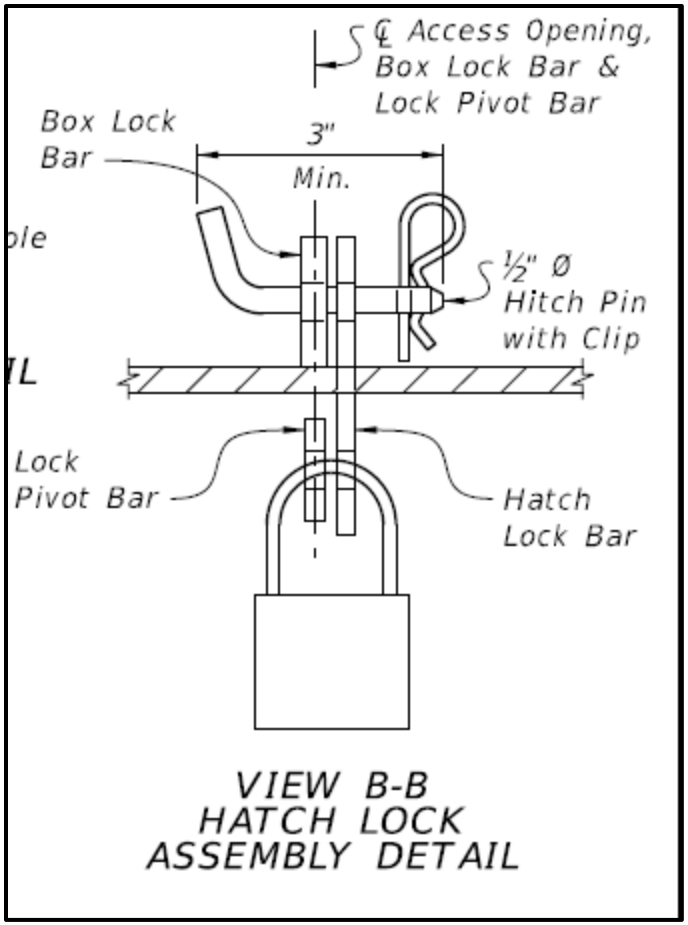
- ***Index 21930:*** *Fender System – Concrete Pile*
  - ✓ Changed “Clearance Gauge and Light” Note:
    - *Contractor to supply Clearance Gauge sign panel;*
  - ✓ Clarified convention in “Plastic Lumber and Structural Composite Lumber Wales” Note.

- ***Index 21900:*** *Fender System –* Deleted. *(Contractor designed FRP pile fender systems are coming.)*

Index 21250 & 21251 - Access Hatch Assemblies

Significant Revisions
Access Hatch Assemblies (continued)

- Redesigned lock release at the request of the Districts and Bridge Maintenance.
  - ✓ Hatch assemblies can be opened from the exterior and/or interior of the box sections.



Drainage Related Standard Updates

- ***Index 200:*** *Structures Bottoms Type J and P*
  - ✓ Clarification of reinforcing bars above pipe blockouts
- ***Index 206:*** *Closed Flume Inlet*
  - ✓ Increased cover over reinforcing bars
- ***Index 253:*** *Straight Concrete Endwalls - Single and Double 72” Pipe*
  - ✓ Corrected drawing to show reinforcing between pipe openings

Drainage Related Standard Updates

- ***Index 289:*** *Concrete Box Culvert*
  - ✓ Updated the ***IDS***
    - Joint openings with Type II Extensions
    - Deleted commentary

Looking Ahead

- **Fiber Reinforced Polymer(FRP) Standards:**
  - ✓ ***DDS Index D21310*** – FRP Bar Bending Details
  - ✓ ***Developmental FRP Specifications***
  - ✓ ***Future Developmental Standards***
- **Other *Developmental Design Standards:***
  - ✓ ***Index D6011*** – Segmental Block Gravity Wall
  - ✓ ***Index D420*** – Precast 32”-F Shape Traffic Railing
  - ✓ ***Index D206XX*** – Precast Bent Cap Details

Looking Ahead

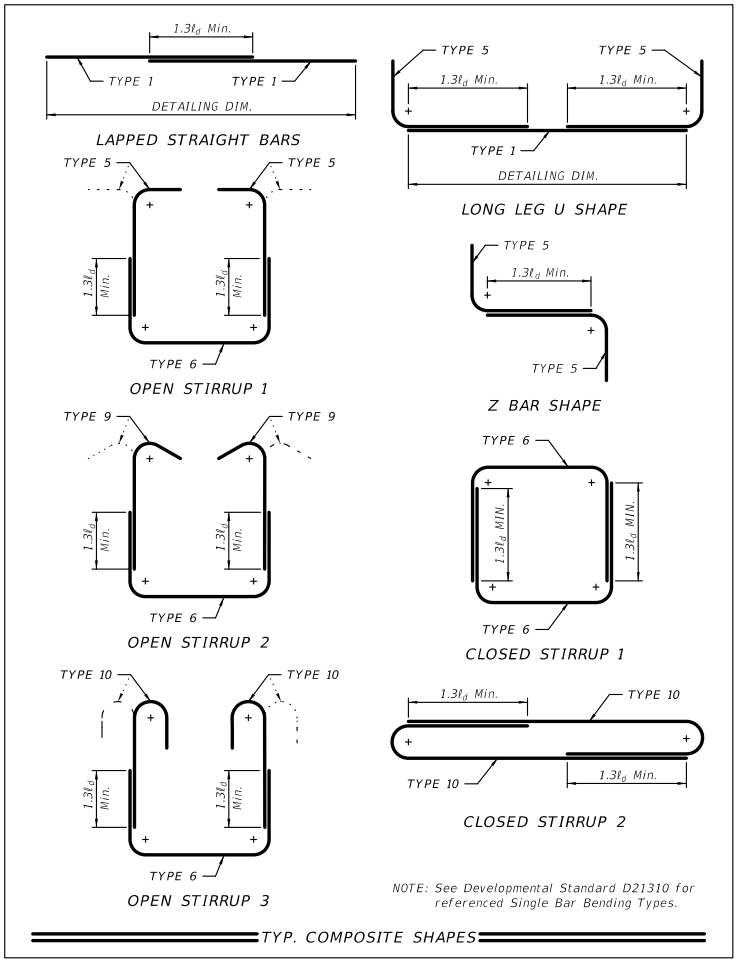
- **Fiber Reinforced Polymer(FRP) Standards (cont.):**
  - ✓ ***DDS Index D21310*** – FRP Bar Bending Details
    - includes commonly used types, shapes and configurations of straight and bent pultruded reinforcing Fiber-Reinforced Polymer (FRP) reinforcing bars.
    - The bar bend types and properties are limited and cannot be field formed or modified
    - shapes must be obtained utilizing splices

Looking Ahead

- **Fiber Reinforced Polymer(FRP) Standards (cont.):**

✓ ***DDS Index D21310 Cont.*** – FRP Bar Bending Details

- Design Aids in the ***IDS*** contain examples of typical composite shapes.



Looking Ahead

- **Fiber Reinforced Polymer(FRP) Standards (cont.):**
  - ✓ ***Developmental FRP Specification (published)***
    - Construction Specifications:
      - Dev 400: Concrete Structures
      - Dev 410: Precast Concrete Box Culverts
      - Dev 415: Reinforcing for Concrete
      - Dev 450: Precast Prestressed Concrete Construction
    - Material Specifications:
      - Dev. 933: Nonmetallic Accessory Materials for Concrete Pavement and Concrete Structures. (Glass-FRP & Carbon-FRP)
      - Dev 933: Prestressing Strand (Carbon-FRP)

Looking Ahead

- **Fiber Reinforced Polymer(FRP) Standards:**
  - ✓ ***Future Developmental Standards***
    - CFRP Square Prestressed Concrete Piles
      - Use of standard strand patterns
    - Concrete Sheet Piles
      - Combination of CFRP strand and GFRP spirals.

Design Standards Information:

- The ***Design Standards*** and their accompanying instructions, ***IDS****'s* are updated annually in July for implementation on January 1st of the following year,
  - ✓ AND as needed between the annual updates as a ***DSR- Design Standard Revision***.
- The Structures Standards Group strives to implement updates from the associated Design Specifications (***AASHTO*** and ***SDG***) into the ***Design Standards*** when applicable, AASHTO within a year of adoption by ***FDOT***.
- Please contact us when you find errors or think of possible improvements; we work on the ***Design Standards*** all year round.

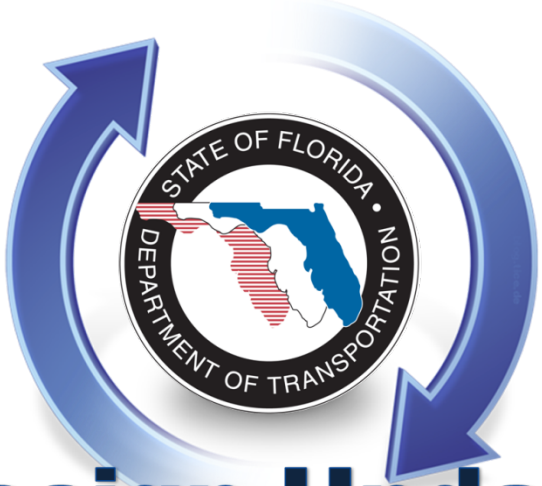
Message from the Structures Standards Group

- We are here to assist you with your questions and concerns. Please contact us:

  - ✓ If you have a suggestion:
    - for a new standard or
    - for an improvement to an existing standard.
  - ✓ If you have any issues during design or construction:
    - Fully explain the issue (photos help);
    - Provide suggestions (if you have any) and;
    - Any documentation that might support a proposed change and assist us during development.
  - ✓ Anytime you have questions or concerns *(but, please read the **IDS** first before contacting us)*.

Questions?

Contact Information:



Design Update Training

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