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# Chapter 11 - SURVEY STANDARDS

## CADD Production Criteria Handbook

### 11.1 GENERAL

This chapter will describe the minimum CADD requirements for Survey operations.

### 11.2 STANDARD FILE NAMES

FDOT utilizes standard naming conventions for all of its files. Automation implemented in various tools provided by FDOT in the CADD Software delivery is dependent on this naming convention being met. More importantly, the naming convention confers data information to the downstream customer.

Standard file names should follow this format: AAAABB##.ext

Where **AAA** = abbreviated file description, **BB** = Discipline Denotation, **##** =Sequence number.

*Note* See Chapter 5 for more information about file naming.

The following table defines the Survey File Name Standards in regards to FDOT Projects with the understanding that each file name will include sequential numbering. Standard Model names are also provided, however, it is not mandatory to use more than the default model, with the exception of those listed in this table.

*Note* See Chapter 4 for the symbology standards for each applicable Standard Rule.

File Type	Critical File	File Name	Model Name	File Description	Standard Rule	MicroStation Seed File	Civil 3D Template File
Drainage	X	DREXRD*	default	Drainage Structures - Existing	drexrd	fdotseed2d.dgn	drexrd.dwt
Existing DTM		GDTMRD*	default	Digital Terrain Model / TIN Model - 3D	dtmrd	fdotseed3d.dgn	dtmrd.dwt
Existing Topography	X	TOPORD*	default	Topography - Existing	topord	fdotseed2d.dgn	topord.dwt
Existing Topography		TREERD*	default	Tree Survey Sheet	topord	fdotseed2d.dgn	topord.dwt
Existing Utilities	X	UTEXRD*	default	Utilities - Existing	utexrd	fdotseed2d.dgn	utexrd.dwt
Project Network Control		CTLSRD*	default	Survey Project Network Control Sheets	planrd	fdotseed2d.dgn	ctlsrd.dwt
Survey Development		SURVRD*	default	Survey Development Model	open	fdotseed3d.dgn	survey.dwt
Verified Utilities	X	UTVHRD*	default	Survey of Verified Utilities (3D version of UTEXRD.dgn)	utexrd	fdotseed3d.dgn	utexrd.dwt

## 11.3 DATA FILES CREATED BY SURVEY

Additional geometry input files are also created for delivery to design. For example, files of existing profiles, chains, points, etc. All data delivered to FDOT, including necessary directories and survey files, should be placed under the \Survey discipline folder, which the FDOT standard directory structure includes for this purpose. Additional sub-directories may be created under the \Survey discipline folder to segregate and organize data.

For Example: the case where a CAiCE project is placed within the project directory structure under the \Survey discipline folder for delivery.

*Note* See Chapter 5 for requirements for creating additional sub-folders in the project directory structure.

## 11.4 RESOURCE FILES

CAiCE and GEOPAK use a feature table to look-up appropriate element symbology for given objects, defined by their “feature” found in the survey. Civil 3D uses similar technology.

For CAiCE, the feature table is found in the directory named **x:\FDOT2010\CAiCE\FTB\**, where “x” is the workstation drive letter. The naming convention for this table includes “E” for English units and “10” for the 2010 standards.

### 11.4.1 CAiCE FEATURE TABLE

The CAiCE feature table id named **FDOTE\_10.ftb** that is required to correlate the level numbers (200+ through 9xxx) used in CAiCE to the level names corresponding to the MicroStation DGN library file. This table is placed in the \CAiCE\FTB\ directory.

A corresponding feature table called **FDOTE\_10.ftm** is also loaded to the x:\FDOT2010\CAiCE\FTB\ directory to control symbology on alignment chains (Geometry Chains with stationing). This table is used by the *Settings > Object Display > Geometry Chains* command in CAiCE to control the proper symbology of alignment stationing, station tics, and station labels based upon scale.

*Note* The name of the .ftm feature table must match the name of the active .ftb feature table in use during a CAiCE session.

- **Feature List Files**

Feature List files, **FDOTTOPO.lis**, **FDOTDran.lis**, and **FDOTUtil.lis**, are also installed into the x:\FDOT2010\CAiCE\FTB\ directory to assist the user in creating the CAiCE screen graphics containing the appropriate data for producing the three typical graphics files required by design, **TOPORD00.dgn**, **DREXR00.dgn**, and **UTEXRD00.dgn**. These List files are listings of the feature codes that belong in the respective design files. Consult your CAiCE documentation on the use of List files.

*Note* An FDOT CAiCE application, *Theme Viewer*, can accomplish a similar function to using CAiCE list files.

### 11.4.2 CAiCE CELL LIBRARY

MicroStation Cell libraries cannot be used or attached by CAiCE directly. The MicroStation cell library is translated to CAiCE’s own version of a cell library (\*.CCL versus \*.CEL, hence **SYENG10.ccl** and **SURVEY10.ccl**).

### 11.4.3 CAiCE TRANSLATION TABLE

A CAiCE Translation Table, **Edgntype.tbl**, is another resource file provided for CAiCE that maps CAiCE line styles to MicroStation custom line styles. This table is in the FDOT10 Software Install at the x:\FDOT2010\CAiCE\DGN\ subdirectory.

*Note* To have compatibility with MicroStation’s long name cells and levels, two files, **DGNCell.TBL** and **DGNLevel.tbl**, must reside under your \CAiCE\DGN\V8 directory.

### 11.4.4 ADDITIONAL CAiCE TABLES AND CELL LIBRARIES

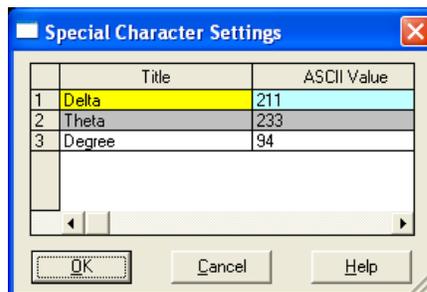
Additional CAiCE feature tables and cell libraries are also provided for existing topography files, created for Right-of-Way mapping purposes. Mapping uses additional consolidation of certain monument symbols and has other symbolization requirements. The tables and cell libraries included are:

- **FDOTE\_10RW.FTB**  
Feature table containing the topography features used in ROW Mapping
- **FDOTE\_10RW.FTM**  
Corresponding table for controlling alignment / chain symbology and bearing / distance chain labeling (attaches automatically when FDOTE\_80RW.FTB is attached)
- **Survey10.CCL**  
CAiCE format of the cell library for use in ROW mapping
- **Survey10.CEL**  
MicroStation format of the topo cell library for use in ROW mapping

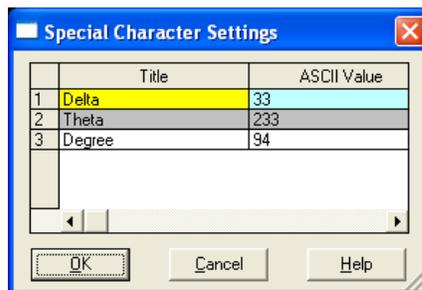
### 11.4.5 CAiCE SPECIAL CHARACTERS

*Note* CAiCE does not support True Type Fonts. Fonts 48 & 58 used by CAiCE will have to be manually replaced by True Type Fonts in MicroStation if the CDG2V8 Macro is used for importing CAiCE data.

- **CAiCE font 48 and translating to MicroStation**  
Font 48 does not use the standard ASCII table for all special characters. In particular, the degree symbol “ ° ” for MicroStation requires that CAiCE place the hat symbol “ ^ ” in CAiCE text strings so MicroStation will look correct when data is translated to MicroStation graphics. To force CAiCE to substitute the “ ^ ” for the degree “ ° ”, CAiCE needs to be set by selecting the menu options: *Settings > Special Characters* and set the ASCII value of 94 to represent degrees as shown in the figure to the right.



- **Right of Way project font 58 in MicroStation.**  
If exporting to a Right of Way map, CAiCE needs to be set by selecting the menu items: *Settings > Special Characters* and set the ASCII value 33 to the Delta symbol as shown in the figure to the right.



## 11.5 GEOPAK SURVEY & DATA ACQUISITION

For GEOPAK, the Survey application uses a feature table called *FDOTE\_10.smd*. This feature table is installed into the *x:\FDOT2010\geopak\databases\* directory by the FDOT2010 Software Install routine ('x' is the drive letter where the FDOT2010 software is installed). The *FDOTE\_10.smd* should be used when processing field measurement .OBS files, importing CAiCE KCP files, reading GEOPAK Input files and visualizing features with the Survey Display dialogue box or the COGO Navigator. The *FDOTE\_10RW.smd* feature table is the Right of Way counterpart feature table and should be used when importing or visualizing Right of Way features or products such as the *TOPORW.dgn* file.

Both GEOPAK and CAiCE use the similar cell libraries for survey graphics. The cell libraries (*SYENG.cel* for Roadway design and *SURVEY.cel* for Right of Way) should be referenced from the *x:\FDOT2010\RESOURCES\Cell* directory.

## 11.6 SURVEYING DATA

The FDOT Surveying Procedure, Topic 550-030-101A and the Surveying Handbook governs the requirements for survey procedure for FDOT projects.

The Surveying Handbook is available at:

[http://www.dot.state.fl.us/surveyingandmapping/doc\\_pubs.shtm](http://www.dot.state.fl.us/surveyingandmapping/doc_pubs.shtm)

**Note** *Civil 3D surveying deliverables must be developed within Civil 3D to be compatible with Autodesk workflows. Surfaces and Alignments are specific formats within Civil 3D. Point objects and figures (chains) are also specific to Civil 3D. Converting Surveying deliverable MicroStation DGN files to DWG or vice versa will not create an acceptable deliverable in the current workflows for either Bentley or Autodesk products.*

## 11.7 LEVEL AND SYMBOLOGY STANDARDS

Symbology Standards that apply to FDOT Projects are set up under a listing of Standard Level Names with specific ByLevel Color, Style and Weight attributes. These levels are grouped under specific Standard Rules which are associated to each valid Standard Filename of each Discipline for the purpose of performing the Quality Control check for FDOT Standard compliancy of each FDOT project design file. Section 11.2 of this chapter provides for the complete Standard File Name listing with associated Standard Rules.

**Note** *Refer to Chapter 4 CADD Standard Rules to review the each associated Standard Rule with allowable Levels and Symbology.*

## 11.8 COUNTY MAPPING

The production of County Maps is an internal function of the FDOT Surveying and Mapping Office. This document refers to the graphical symbology standards used for the production of those maps for reference. For information regarding file naming conventions and other standards in use during the production of FDOT County maps, contact the Geographic Mapping Office in the FDOT Surveying and Mapping Office at (850) 245-1555.

File Type	Description	Color	Line Style	Weight	Cell
All	Adjacent County and State Text				
All	Airport Names				
All	Airport Runways			6	
All	Airports Commercial				cscapt
All	Airports Commercial				cap
All	Airports Landing Strip or Private Airport				cslstp
All	Airports Landing Strip or Private Airport				ldarsp
All	Airports Military				csmfld
All	Airports Military				milffad
All	Backdrop	30			
All	Backdrop	60			
All	Bay				2
All	Bay Text				2
All	Bayou and Harbor etc				3
All	Bayou and Harbor etc Text				3
All	Boundary Section Lines (hidden)	31			
All	Bridges			0	
All	Bridges			1	
All	Bridges Interstate	1			
All	Bridges and Drawbridges County Highways	4			
All	Bridges and Drawbridges County Highways Text	8			
All	Bridges and Drawbridges Local Roads				
All	Bridges and Drawbridges Local Roads Text	18			
All	Bridges and Drawbridges State Highways	3			
All	Bridges and Drawbridges State Highways Text	7			
All	Bridges and Drawbridges Toll Roads	5			
All	Bridges and Drawbridges Toll Roads Text	5			
All	Bridges and Drawbridges US Highways	2			
All	Bridges and Drawbridges US Highways Text	6			
All	Bridges Interstate Text	4			
All	Cities Incorporated Area			0	
All	Cities Incorporated Linear Boundaries			1	
All	City Streets			1	
All	Coastal Waterway				csicw
All	Coastal Waterway Text				10
All	College or University	71			
All	College or University Text	30			8
All	Communities and Subdivisions Names without Post Office				3
All	Communities Names with Post Office				2
All	Connecting Roads			2	
All	Coordinate ticks Lat Longs				csotic
All	Coordinate ticks State Plane				csstic
All	County Boundary		7	6	
All	County Parks	70			
All	County Parks Text	148			10
All	County Roads Related Text				
All	County Route Divided Highway Outline and Fill				

File Type	Description	Color	Line Style	Weight	Cell
All	County Routes Highway Center Lines			3	
All	County Routes Ramps			2	
All	County Seat				cscose
All	County Seat Names			4	
All	County Seat Names			6	
All	Culture			0	
All	Culture			1	
All	Culture			2	
All	Culture Text				1
All	Cut Border				
All	Extended Township Lines	43	3	2	
All	Forbes Purchase		3	3	
All	Forbes Purchase Section lines		3	0	
All	Forbes Purchase Township and Range Lines		3	2	
All	Geographic Features Text			1	
All	Heliports				csheli
All	Intermittent Ponds				1
All	Intermittent Ponds Text				8
All	Interstate Divided Highway Outline and Fill				
All	Interstate Highway Center Lines			3	
All	Interstate Ramps			2	
All	Interstates Related Text				
All	Islands				
All	Islands Text Coastal (Keys etc)			2	
All	Islands Text Inland (Hammocks and Ridges etc)				1
All	Lakes and Ponds				
All	Lakes and Ponds Text				9
All	Land Grant Boundaries		4	0	
All	Legend				
All	Local Roads Divided Highway Outline and Fill				
All	Local Roads Improved	11		1	
All	Local Roads Paved	11		2	
All	Local Roads Related Cells				cslgf0
All	Local Roads Related Cells				cslgf1
All	Local Roads Related Cells				cslgf2
All	Local Roads Related Cells				cslgf3
All	Local Roads Related Cells				cslgf4
All	Local Roads Related Cells				csp1
All	Local Roads Related Cells				csp2
All	Local Roads Related Cells				cspnf1
All	Local Roads Related Cells				cspnf2
All	Local Roads Related Cells				cspsf1
All	Local Roads Related Cells				cspsf2
All	Local Roads Related Text				
All	Local Roads Unimproved	10		1	
All	Mangroves				mg
All	Mangroves				csman1
All	Mangroves				smg
All	Map Border				
All	Map Border Text and Cells				
All	Map Information Text and Cells				
All	Map Information Text and Cells				
All	Masks for Road Features				
All	Masks for Text				
All	Military Bases	66			
All	Military Bases Text	146			7

File Type	Description	Color	Line Style	Weight	Cell
All	Narrow Canals		5		
All	Narrow Canals		5		
All	Narrow Canals		5		
All	Narrow Canals Text				7
All	Narrow River Creek and Branch and Slough	12		1	
All	Narrow River Creek and Branch and Slough	12		1	
All	Narrow River Creek and Branch and Slough	12		1	
All	Narrow River Creek and Branch and Slough Text				6
All	National Forest	65			
All	National Forest Text	44			1
All	National Park	69			
All	National Park Text	44			2
All	National Wildlife Refuge and Preserve	75			
All	National Wildlife Refuge and Preserve Text	144			3
All	Ocean and Gulf				1
All	Ocean and Gulf Text				1
All	Other Incorporated Names			2	
All	Other Incorporated Names			3	
All	Other Survey Related Text				3
All	Planning Number Interstates				cssir1
All	Planning Number Interstates				cssir2
All	Planning Number Interstates				cssir3
All	Planning Number US Highways				cssus1
All	Planning Number US Highways				cssus2
All	Planning Number US Highways				cssus3
All	Planning Number US Highways				cssus1
All	Planning Number US Highways				cssus2
All	Planning Number US Highways				cssus3
All	Populations				1
All	Quad Borders				
All	Railroad Stations				csrsta
All	Railroads	3			
All	Railroads Text				
All	Road shields County Roads				cs1crs
All	Road shields County Roads				cs2crs
All	Road shields County Roads				cs3crs
All	Road shields County Roads				cs4crs
All	Road shields Interstates				cs1irs
All	Road shields Interstates				cs2irs
All	Road shields Interstates				cs3irs
All	Road shields State Highways				cs1srs
All	Road shields State Highways				cs2srs
All	Road shields State Highways				cs3srs
All	Road shields Toll roads				cs1trs
All	Road shields Toll roads				cs2trs
All	Road shields Toll roads				cs3trs
All	Road shields Toll roads				cstps
All	Road shields US Highways				cs1urs
All	Road shields US Highways				cs2urs
All	Road shields US Highways				cs3urs
All	Road shields US Highways Alternate				cs1usa
All	Road shields US Highways Alternate				cs2usa
All	Road shields US Highways Alternate				cs3usa
All	Road shields US Highways Business				cs1usb
All	Road shields US Highways Business				cs2usb
All	Road shields US Highways Business				cs3usb

File Type	Description	Color	Line Style	Weight	Cell
All	Seaplane facility				csseap
All	Section Lines		0	0	
All	Section Numbers				1
All	State Boundary		6	6	
All	State Capital				cscptl
All	State Forest	67			
All	State Forest Text	145			4
All	State Park	14			
All	State Park Text	145			5
All	State Prisons	124			
All	State Prisons Text	124			9
All	State Roads Related Text				
All	State Route Divided Highway Outline and Fill				
All	State Routes Highway Center Lines			3	
All	State Routes Ramps			2	
All	State Survey Lines		1	1	
All	State Wildlife Refuge and Preserve	72			
All	State Wildlife Refuge and Preserve	74			
All	State Wildlife Refuge and Preserve Text	147			6
All	Street Related Text				
All	Strip Mining Area	117			
All	Survey by Others		2	1	
All	Survey Correction Text within map				4
All	Swamps				sw3
All	Swamps	15			
All	Swamps Text	45			
All	Toll Divided Highway Outline and Fill				
All	Toll Highway Center Lines			3	
All	Toll Ramps			2	
All	Toll roads Related Text				
All	Town Centers				cscctr
All	Township and Range lines		0	2	
All	Township and Range Tics				csttic
All	Township and Range Text				2
All	Triangulation Station				cstria
All	Triangulation Station				trista
All	Triangulation Station Text	97			2
All	Uninventoried Roads and Features				
All	US Highways Related Text				
All	US Route Divided Highway Outline and Fill				
All	US Routes Highway Center Lines			3	
All	US Routes Ramps			2	
All	Wide Rivers and Canals	12		1	4
All	Wide Rivers and Canals Text				5
All	Wildlife Management Area Text	94			11