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Chapter 3 - RESOURCE AND SUPPORT FILES

CADD Production Criteria Handbook

3.1 GENERAL

Florida Department of Transportation (FDOT) has developed Computer Aided Design and Drafting (CADD) Standards for the production of Florida transportation systems plans to be delivered with the aid of the FDOT CADD Software suites. Utilization of the FDOT CADD Software suites is strongly encouraged. FDOT CADD Standards are conveyed through customization within the FDOT approved design software and automated tools contained in the FDOT CADD Software suites. This chapter documents and defines the FDOT Resource and Support Files that are included in the FDOT CADD Software suites.

3.2 DATABASE

The Engineering / CADD Systems Office (ECSO) has created a GEOPAK Design and Computation Manager (D&C Manager) database (*FDOT2010.ddb*) file in the FDOT2010 folder located at *FDOT2010\geopak\databases*. This database has been set up specifically to create drawing elements with the correct level symbology and in many cases attach pay item data according to FDOT CADD Standards. Likewise, for Civil3D projects *FDOT2012.C3D\Support\QC\MasterStandards.xlsx* and *FDOT2012.C3D\Data\PayItemData\AECMerge.xml* serve the same function.

These resources may need to be modified for project specific items or to comply with District standards. If the *FDOT2010.ddb* database is customized, the user would save the customized database into the project directory in the *\symb* project sub-folder. Saving the database to the project directory is important to ensure the modified database will be delivered with the project. Likewise a modified copy of *AECMerge.XML* needs to be saved to the local project folder.

When modifying project specific resources, use the following naming convention:

[Project Financial Project Identification Number][Discipline Designation].ddb

Where discipline designation would be one of the following:

dr	(drainage)
its	(intelligent transportation system)
lnd	(landscape)
lt	(lighting)
rdwy	(roadway)
sg	(signalization)
sp	(signing and pavement markings)
util	(utilities)

Example: A modified standard DDB, **19728125201sg.ddb** would be stored in *.\19728125201\symb* subfolder of the aforementioned project.

3.3 CONTROL FILES

FDOT delivers the Create/Edit program to create the standard files in the expected locations within the project directory structure. The standard FDOT Design file is derived from a “seed” file as part of the FDOT software suite. An example would be an existing topography file produced by the Survey discipline – *TOPORD01.DGN* created in the *.lsurvey* sub-folder of the project. Control Files are implemented to control the parameters needed by the Create/Edit program for the creation of these standard design files in adherence with the naming conventions set forth in Chapter 5 of this document. When creating new standard design files, the correct control file must be selected.

Standard FDOT Control Files:

- GEOTECH.CTL Standard FDOT Geotechnical File Names
- ROADWAY.CTL Standard FDOT Roadway File Names
- RW.CTL Standard FDOT Right of Way File Names
- STRUCTURES.CTL Standard FDOT Structures File Names
- MECHELEC.CTL Standard FDOT Mechanical and Electrical File Names
- ARCHITECTURE.CTL Standard FDOT Architectural File Names

3.4 AUTOCAD CIVIL3D STANDARDS

FDOT made a commitment to implement and support AutoCAD Civil 3D on future projects. The intention is for the standard resources definitions for CAD drawings to be consistent between the MicroStation and AutoCAD platforms. To that end, when discussions arise regarding standards of a file name, level name, line style, cell name, line weight or color, the equivalent should be inferred for the AutoCAD standard.

<u>MicroStation</u>	<u>AutoCAD equivalent</u>
File name	File name
Level name	Layer name
Cell Library	Block Library
Cell name	Block name
Line Style	Line Type
Line Weight	Line Thickness
Color	Color
Seed file	Template file (Note: template files are handled differently for FDOT).
<i>And so on...</i>	

3.5 MICROSTATION SEED FILES

MicroStation uses “seed” files to create all graphics design files (Likewise, AutoCAD uses Template files). Seed files are empty drawing files that serve as a “template” for design content to be created and drawing objects added to.

The FDOT seed files define the working units for the graphics file, global origin of the file’s coordinate system, view attributes, default color table, text settings, coordinate readout and several other important parameters. FDOT supplies English unit seed files for both 2D and 3D CADD work.

Working units and global origin are two of the most important settings in the seed file. Working units are expressed as master units and sub-units. FDOT has defined all seed files for MicroStation, based on master unit of “Survey Feet” with a sub unit of “Survey Inches.” The global origin is located at the center of the design plane for all seed files.

The resolution is defined per the master unit and determines the size (working area) of the design plane, which will encompass an area large enough for any State Plane coordinate zone in Florida.

- English (Imperial) 2D Seed File (FDOTSEED2D.DGN)

The following settings apply to all 2D seed files. Working Units:

- Master Units = Survey Feet
- Sub-Units = Survey Inches
- Resolution = 304800 UOR per Survey Foot
- Global Origin: Center of Design plane

- English (Imperial) 3D Seed File (FDOTSEED3D.DGN)

The following settings also apply to 3D seed files. Working Units:

- Master Units = Survey Feet
- Sub-Units = Survey Inches
- Resolution = 304800 UOR per Survey Foot
- Global Origin: Center of Design plane

3.6 LEVELS AND SYMBOLOGY

FDOT defines CADD level / symbology standards and deploys the standard using Design Libraries (DGNLIB files), Color Tables, Line Style Resource files, Line Weights and Toolboxes. FDOT has created standard FDOT Design Libraries to propagate FDOT Standards for: cells, levels, level filters, line styles, multi-line styles, text styles, dimension styles, element templates, menu customizations, customized tools, tool boxes, and tasks. Each FDOT Design Library contains data that is shared throughout files and among users.

Each FDOT Standard defined in a Design Library is identified by a unique name. When used, it is copied into the active design file and is given the same name. This allows for comparison of the local resource to the FDOT Design Library resource for compliancy to FDOT CADD Standards.

The following is a listing of all standard FDOT Design Libraries:

Design Library Name (DGNLIB)	DESCRIPTION
countymappinglevels.dgnlib	FDOT Standard County Mapping Levels
fdot_common_levels.dgnlib	FDOT Standard Common Levels
FDOT_PrintStyles.dgnlib	FDOT Standard Print Styles
FDOT_Styles.dgnlib	FDOT Standard Styles
fdot_v8_levels.dgnlib	FDOT Standard Roadway Levels
FDOTtoolboxes.dgnlib	FDOT Standard Toolboxes
GeoTech.dgnlib	FDOT Standard Geotechnical Levels
photogrammetry.dgnlib	FDOT Standard Photogrammetric Levels
rwlevels.dgnlib	FDOT Standard Right of Way Levels
strlevels.dgnlib	FDOT Standard Structure Levels
survey_levels.dgnlib	FDOT Standard Survey Levels
v7_levels.dgnlib	FDOT Standard V7 Levels

For Civil 3D projects, FDOT supplies templates found in the *FDOT2012.C3D\Data\Templates* folder of your installation which define Layers and symbology. In addition, the *MasterStandards.xlsx* file located in the *FDOT2012.C3D\Support\QC* folder is used to help control some of the same file/symbology standards when using FDOT developed productivity tools for AutoCAD Civil 3D, such as the FDOT Entity Manager.

3.6.1 LEVELS AND LAYERS

The standard FDOT Design Libraries define the MicroStation Levels (and by convention the AutoCAD Layers) for each Discipline. Designers shall use the standard FDOT Levels / Layers in the production of FDOT CADD design files.

The following are FDOT's basic level / layer naming conventions to assist CADD users in utilization:

- Level / Layer Names have 18 maximum characters.
- The format of the Level / Layer Name is: **object_sv**

Where: (**object** = element type)_(**s** = state)(**v** = view)

State Designations

p (proposed)
d (drafting element)
e (existing)

View Designations

p (plan)
r (profile)
x (cross section)

Note Level / layer Names with no “_sv” portion in the name are assumed to be: **_pp** (proposed plan).
Example: With this information one can determine the following about the Level names below:

gas	- Proposed Plan view elements for “gas” related items
gas_ep	- Existing Plan view elements for “gas” related items
gas_px	- Proposed cross section view elements for “gas” related items

3.6.2 COLOR

The standard FDOT Color Table (*FDOTColor.tbl*) for MicroStation was created to allow users to visually identify elements in shared files and for consistency in color plotting. The FDOT Color Table is a modified version of the default MicroStation color table (*color.tbl*) which defines 256 colors. The most important aspect for the standardization of colors is the color number that is applied to MicroStation (or AutoCAD) elements.

FDOT Color Table customizes various colors, 0 through 166, as defined in the table below. The FDOT Color Table is named “FDOTColor.tbl” as preset by the FDOT workspace variable MS_DEFCTBL and attached in the FDOT seed files. Some FDOT disciplines use the MicroStation default color table, or their own customized color table in place of the standard FDOT Color Table. These are defined in the discipline specific chapters later in this Handbook.

FDOT Color Table is shown below:

Note These apply to AutoCAD colors as well.

MicroStation Color	Acad Color non-Structures (fdotcolor.tbl)	Acad Color Structures (color.tbl)	MicroStation Color	Acad Color non-Structures (fdotcolor.tbl)	Acad Color Structures (color.tbl)
0	7 (255,255,255)	7 (255,255,255)	27	240,0,0	240,0,0
1	5 (255,0,255)	5 (255,0,255)	28	240,240,0	240,240,0
2	3 (255,0,0)	3 (255,0,0)	29	240,0,240	240,0,240
3	1 (0,0,0)	1 (0,0,0)	30	240,122,0	240,122,0
4	2 (0,255,0)	2 (0,255,0)	31	0,255,255	0,255,255
5	6 (255,165,0)	6 (255,165,0)	32	225,225,225	225,225,225
6	255,165,0	255,127,0	33	0,0,225	0,0,225
7	4 (255,255,0)	4 (255,255,0)	34	225,225,0	225,225,0
8	148,0,211	64,64,64	35	225,0,0	225,0,0
9	140,88,44	192,192,192	36	225,225,0	225,225,0
10	200,176,125	254,0,96	37	225,0,225	225,0,225
11	192,192,192	160,224,0	38	225,117,0	225,117,0
12	255,192,203	0,254,160	39	0,225,225	0,225,225
13	0,100,0	128,0,160	46	225,117,0	225,117,0
14	176,176,176	176,176,176	55	0,210,210	0,210,210
15	0,240,240	0,240,240	68	195,195,0	195,195,0
16	240,240,240	240,240,240	71	0,195,195	0,195,195
17	0,0,240	0,0,240	84	180,180,0	180,180,0
18	0,240,0	0,240,0	86	180,102,0	180,102,0
19	240,0,0	240,0,0	99	165,0,0	165,0,0
20	225,225,225	240,240,225	100	165,165,0	165,165,0
21	240,0,240	240,0,240	142	135,87,0	135,87,0
22	240,122,0	240,122,0	150	120,82,0	120,82,0
23	0,240,240	0,240,240	152	120,120,120	120,120,120
24	240,240,240	240,240,240	154	0,120,0	0,120,0
25	0,0,240	0,0,240	157	120,0,120	120,0,120
26	0,240,0	0,240,0	255	250 (0,0,0)	250 (0,0,0)

Note Color 255 is used as the background color (usually black).

3.6.3 LINE WEIGHT

Line weight for MicroStation is defined by a numerical index within the range of 0 to 31 that designates the stroke width (or thickness) of the line used to draw and print a graphic element. Each element has its own line weight. The standard line thickness (width) of a printed graphic element is in inches on the paper. Some printers may require an adjustment of these weights.

Note For Right of Way Mapping Line Weight requirements see Chapter 9.

Printed Outputs from the design file plots must be of a quality legible on 2nd generation copies. Line Weights / Thicknesses in the table below are represented in inches, and are default settings (also set in the FDOT delivered print drivers). These may need to be adjusted depending on your hardware to produce the required quality of printed documents.

FDOT Line Weights:

MicroStation/Autocad Lineweight Mapping			
MS Weight	MS Plot(inches)	Autocad inches	Autocad mm
0	0.003	0.004	0.09
1	0.006	0.006	0.15
2	0.009	0.008	0.20
3	0.012	0.012	0.30
4	0.015	0.014	0.35
5	0.018	0.016	0.40
6	0.021	0.021	0.53
7	0.024	0.024	0.60
8	0.027	0.028	0.70
9	0.030	0.031	0.80
10	0.033	0.035	0.90
11	0.036	0.035	0.90
12	0.039	0.039	1.00
13	0.042	0.042	1.06
14	0.045	0.047	1.20
15	0.048	0.047	1.20
16	0.051	0.055	1.40
17	0.054	0.055	1.40
18	0.057	0.055	1.40
19	0.106	0.083	2.11
20	0.105	0.083	2.11
21	0.110	0.083	2.11
22	0.115	0.083	2.11
23	0.120	0.083	2.11
24	0.125	0.083	2.11
25	0.130	0.083	2.11
26	0.135	0.083	2.11
27	0.140	0.083	2.11
28	0.145	0.083	2.11
29	0.150	0.083	2.11
30	0.155	0.083	2.11

Available Autocad Line Weights	
inches	mm
0	0.000
0.002	0.050
0.004	0.090
0.005	0.130
0.006	0.150
0.007	0.180
0.008	0.200
0.01	0.250
0.012	0.300
0.014	0.350
0.016	0.400
0.02	0.500
0.21	0.530
0.024	0.600
0.028	0.700
0.031	0.800
0.035	0.900
0.039	1.000
0.042	1.060
0.047	1.200
0.055	1.400
0.062	1.580
0.079	2.000
0.083	2.110

3.6.4 LINE STYLES

FDOT Line style is part of the symbology of graphic elements. It defines a line's appearance as being solid, continuous dashes, dots and dashes, with embedded characters or symbols, and so on. Each element has its own line style. An element can be set to a standard MicroStation line style (numbered 0 - 7) or to a custom line style as defined in a custom line style resource file, or custom line style definition embedded in the design file. AutoCAD Line types have been created to match the name and appearance of FDOT MicroStation Line styles, including the MicroStation custom line styles.

Custom line styles are more complex and contain patterns of line segments and/or symbols. Some examples of custom line styles are a tree line, fence line, guardrail, etc.

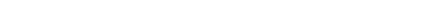
If non-standard custom line styles are required, the resource file defining them must be delivered in the project directory structure, or the custom line style definitions must be embedded in the design file. The user must not create conflicting custom line styles with the same name as an FDOT Standard Line Style.

User created resource files must be unique in name and copied to the *lsymb* sub-directory of the FDOT project directory structure.

For named styles, the MicroStation style name and Acad linetype should match DGN linetypes stored in the *FDOT.lin* file located in the *FDOTXX\Support\linetype* folder.

MicroStation Style	Acad Linetype
0	Continuous
1	DGN1
2	DGN2
3	DGN3
4	DGN4
5	DGN5
6	DGN6
7	DGN7

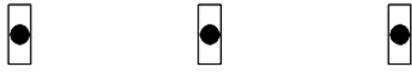
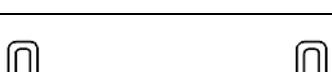
3.6.4.1 Standard English Line Style Measurements for Printing

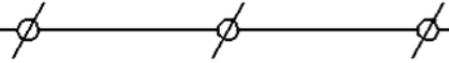
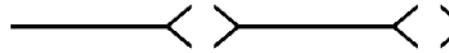
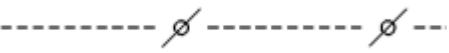
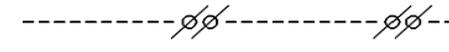
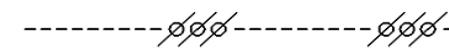
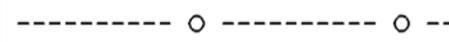
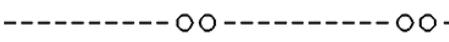
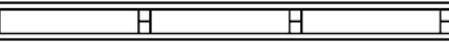
style(0) = continuous	0 
style(1) = (0.02, 0.04), for ACAD - DGN1	1 
style(2) = (0.08, 0.04), for ACAD - DGN2	2 
style(3) = (0.15, 0.05), for ACAD - DGN3	3 
style(4) = (0.200, 0.053, 0.03, 0.053). DGN4	4 
style(5) = (0.056, 0.056), for ACAD - DGN5	5 
style(6) = (0.32, 0.056, 0.048, 0.056, 0.048, 0.056)	6 
style(7) = (0.59, 0.053, 0.03, 0.053) , DGN7	7 

3.6.4.2 *FDOT Custom Line Style Resource Files*

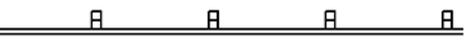
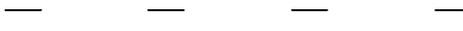
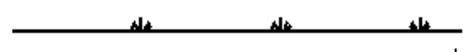
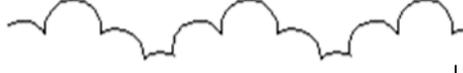
FDOT provides custom line styles for linear repeating patterns. Standard FDOT custom line styles will be carried forward into future FDOT CADD Software releases. Users shall not modify the standard FDOT Custom Line Style resource files.

3.6.4.3 *Custom Line Style Graphics*

Discipline	Name	Description	Sample Image
Maintenance of Traffic	attenuator	Attenuation Systems	
Maintenance of Traffic	barricade1	Barricade Symbol Type 1 or 2 at 15' spacing	
Maintenance of Traffic	barricade2	Barricade Symbol Type 1 or 2 at 30' Spacing	
Maintenance of Traffic	barricade3	Barricade Symbol Type 1 or 2 at 50' Spacing	
Maintenance of Traffic	barricade4	Barricade Symbol Type 1 or 2 at 100' Spacing	
Maintenance of Traffic	cone1	Cones at 25' Spacing	
Maintenance of Traffic	cone2	Cones at 50' Spacing	
Maintenance of Traffic	drum1	Drums at 15' Spacing	
Maintenance of Traffic	drum2	Drums at 30' Spacing	
Maintenance of Traffic	drum3	Drums at 50' Spacing	
Maintenance of Traffic	drum4	Drums at 100' Spacing	
Maintenance of Traffic	sign1	Traffic Control Sign Symbol at 500' Spacing	
Maintenance of Traffic	sign2	Traffic Control Sign Symbol 400' Spacing	
Maintenance of Traffic	sign3	Traffic Control Sign Symbol 200' Spacing	
Roadway	barrier1	Turbidity Barrier 1 (floating)	

Discipline	Name	Description	Sample Image
Roadway	barrier2	Staked Turbidity Barrier	
Roadway	Cable-Barrier	Cable Barrier	
Roadway	conduit1	Conduit for Utilities and Encasements	
Roadway	conduit2	Conduit & Encasements	
Roadway	directbore	Directional Bore	
Roadway	easement	Easement Lines	
Roadway	exlite_cond1	Conduit Underground (Existing)	
Roadway	exlite_cond2	Conduit Under pavement (Existing)	
Roadway	exlite_cond3	Conduit Jacked (Existing)	
Roadway	exlite_cond4	Conduit Surface Mounted (Existing)	
Roadway	exlite_cond5	Conduit In Box Girder (Existing)	
Roadway	grdbl	Guardrail Double Face	
Roadway	hay_bales	Sediment Barriers – Synthetic Bales	
Roadway	silt_fence	Sediment Barriers – Silt Fence	
Roadway	intcon1	Cable Interconnect	
Roadway	intcon2	Interconnect Cable (Existing)	
Roadway	lite_cond1	Street Lighting Conductors, Conduit Underground	

Discipline	Name	Description	Sample Image
Roadway	lite_cond2	Conduit Under pavement	
Roadway	lite_cond3	Conduit Jacked Under pavement	
Roadway	lite_cond4	Conduit Surface Mounted	
Roadway	lite_cond5	Conduit In Box Girder	
Roadway	PS_PAT2'	Shoulder Paved 2ft	
Roadway	PS_PAT4'	Shoulder Paved 4ft	
Roadway	PS_PAT5'	Shoulder Paved 5ft	
Roadway	PS_PAT6'	Shoulder Paved 6ft	
Roadway	PS_PAT8'	Shoulder Paved 8ft	
Roadway	PS_PAT10'	Shoulder Paved 10ft	
Roadway	PS_PAT12'	Shoulder Paved 12ft	
Roadway	PS_PAT15'	Shoulder Paved 15ft	
Roadway	RockBag	Rock Bag	
Roadway	rpm_skip1	Reflective Pavement Markers Skip Striping Temporary	
Roadway	rpm_solid	Reflective Pavement Markers Solid Striping	
Roadway	rpm10	Reflective Pavement Markers 10' spacing	
Roadway	rpm20	Reflective Pavement Markers 20' spacing	

Discipline	Name	Description	Sample Image
Roadway	rpm30	Reflective Pavement Markers 30' spacing	
Roadway	rpm40	Reflective Pavement Markers 40' spacing	
Roadway	rr1	Railroad	
Roadway	rr2	Railroad	
Roadway	rumble_cont	Rumble Strip Continuous	
Roadway	rumble_skip	Rumble Strip Skip	
Roadway	signal_cable	Signal Cable	
Roadway; Survey & Mapping	grail1	Guardrail Left	
Roadway; Survey & Mapping	grail2	Guardrail Right	
Roadway; Survey & Mapping	laft	Fence Limited Access Left	
Roadway; Survey & Mapping	laft	Fence Limited Access Right	
Roadway; Survey & Mapping	LaneLine_exist	Lane Lines - Existing	
Roadway; Survey & Mapping	wetland	Edge of Mangrove, Wetlands (Marsh or Swamp)	
Roadway; Survey & Mapping	Wetland_ep	Edge of Mangrove, Wetlands (Marsh or Swamp) (Existing)	
Roadway; Survey & Mapping	woodline	Wood Line, Groves & Orchards Boundary, Scattered Trees	
Signing & Pavement Markings	10/10/20 Alt. Skip	Pavement Markings	
Signing & Pavement Markings	crosswalk1	Emphasis Crosswalk 6ft High	

Discipline	Name	Description	Sample Image
Signing & Pavement Markings	crosswalk2	Emphasis Crosswalk 10ft High	
Signing & Pavement Markings	dbl_line	Pavement Marking Traffic Stripe 6" Double Yellow	
Signing & Pavement Markings	Delineators40	40' Spacing	
Signing & Pavement Markings	Delineators300	300' Spacing	
Signing & Pavement Markings	skip 10/30 contrast	Pavement Marking Traffic Stripe Skip 10/30 (Contrast)	
Signing & Pavement Markings	skip/solid	Pavement Markings	
Signing & Pavement Markings	skip 10/10/20contrast	Pavement Markings	
Signing & Pavement Markings	skip10_30	Pavement Marking Traffic Stripe Skip 10/30	
Signing & Pavement Markings	skip 10_30ext	Pavement Marking Traffic Stripe Skip 10/30 (Existing)	
Signing & Pavement Markings	skip 2_4	Pavement Marking Traffic Stripe Skip 2/4	
Signing & Pavement Markings	skip 2_4ext	Pavement Markings Skip 2_4 (Existing)	
Signing & Pavement Markings	skip 3_12 (6")	Pavement Markings Paint Skip 3_12 6"	
Signing & Pavement Markings	skip 3_12ext (6")	Pavement Markings Paint Skip 3_12 6" (Existing)	
Signing & Pavement Markings	skip 3_9 (6")	Pavement Markings Paint Skip 3_9 6"	
Signing & Pavement Markings	skip 3_9ext (6")	Pavement Markings Paint Skip 3_9 6" (Existing)	
Signing & Pavement Markings	skip 6_10	Pavement Markings	

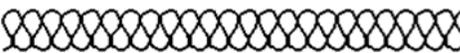
Discipline	Name	Description	Sample Image
Signing & Pavement Markings	skip 6_10ext	Pavement Markings Paint Skip 6_10 8" (Existing)	
Signing & Pavement Markings	stripe06	Pavement Marking Traffic Stripe 6in	
Signing & Pavement Markings	stripe06ext	Pavement Marking Traffic Stripe 6in (Existing)	
Signing & Pavement Markings	stripe08	Pavement Marking Traffic Stripe 8in	
Signing & Pavement Markings	stripe08ext	Pavement Marking Traffic Stripe 8in (Existing)	
Signing & Pavement Markings	stripe12	Pavement Marking Traffic Stripe 12in	
Signing & Pavement Markings	stripe12ext	Pavement Marking Traffic Stripe 12in (Existing)	
Signing & Pavement Markings	stripe16	Pavement Marking Traffic Stripe 16in	
Signing & Pavement Markings	stripe16ext	Pavement Marking Traffic Stripe 16in (Existing)	
Signing & Pavement Markings	stripe18	Pavement Marking Traffic Stripe 18in	
Signing & Pavement Markings	stripe18ext	Pavement Marking Traffic Stripe 18in (Existing)	
Signing & Pavement Markings	stripe24	Pavement Marking Traffic Stripe 24in	
Signing & Pavement Markings	stripe24ext	Pavement Marking Traffic Stripe 24in (Existing)	
Signing & Pavement Markings	Vibratory	Audible and Vibratory Pavement Marking 6in	
Signing & Pavement Markings	yield	Yield Pavement Markings 3' Spacing	
Signing & Pavement Markings	yield1	Yield Pavement Markings 2' Spacing	
Survey & Mapping	Angle	Annotation Angles	

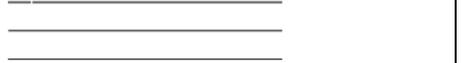
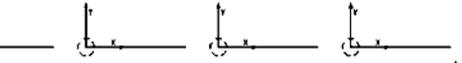
Discipline	Name	Description	Sample Image
Survey & Mapping	ARROW2	Annotation: RW Width	
Survey & Mapping	ArrowPoint	Annotation: Station Offset	
Survey & Mapping	ArrowTie	Annotation: Station Tie	
Survey & Mapping	CLIMIT	City Limit Line	
Survey & Mapping	Climit2	City Limit	
Survey & Mapping	COLINE	County Line	
Survey & Mapping	EECL	Existing Easement Centerline	
Survey & Mapping	EXLA	Limited Access Right of Way (Existing)	
Survey & Mapping	fence1	Fence	
Survey & Mapping	GRTL	Government: Grant Line	
Survey & Mapping	LA	Limited Access Right of Way	
Survey & Mapping	LEADERLT	Annotation: Begin End Leader Left	
Survey & Mapping	LEADERRT	Annotation: Begin End Leader Right	
Survey & Mapping	LICENSE	Easement: License (Agreement)	
Survey & Mapping	LOC	Construction Limits	
Survey & Mapping	NONVH	Non-Vehicular Access	
Survey & Mapping	NSPF	Government: National or State Forest Park Line	

Discipline	Name	Description	Sample Image
Survey & Mapping	NSPF2	Government: National or State Forest Park Line (Hash Only)	
Survey & Mapping	PESMT	Easement Lines Perpetual	
Survey & Mapping	PL	Property Line	
Survey & Mapping	QSEC	Quarter Section Line	
Survey & Mapping	RR	Railroad	
Survey & Mapping	RW	Right of Way Lines - Existing	
Survey & Mapping	SECLIN	Section Lines	
Survey & Mapping	STL	Government: State Line	
Survey & Mapping	SUBDIV	Annotation: Subdivision Boundary Arrows <---->	
Survey & Mapping	SUBDIV2	Annotation: Subdivision Boundary Arrows Double <<---->>	
Survey & Mapping	SUBDIV2LT	Annotation: Subdivision Boundary Arrows Two Left <<---->	
Survey & Mapping	SUBDIV2LTOOnly	Annotation: Subdivision Boundary Arrows Two Left Only <<----	
Survey & Mapping	SUBDIV2RT	Annotation: Subdivision Boundary Arrows Two Right <---->	
Survey & Mapping	SUBDIV2RTOOnly	Annotation: Subdivision Boundary Arrows Two Right Only ---->>	
Survey & Mapping	SUBDIVLT	Annotation: Subdivision Boundary Arrows Single Left <----	
Survey & Mapping	SUBDIVRT	Annotation: Subdivision Boundary Arrows Single Right ---->	
Survey & Mapping	TEMPE	Easements Temporary (Existing)	

Discipline	Name	Description	Sample Image
Survey & Mapping	TIITF	Safe Upland – Murphy Reservation	-----
Survey & Mapping	TWPRGE	Township / Range Lines	-----
Survey & Mapping	WaterMapBoundary	Major Water Mapping Boundary	=====
Utilities– existing; Survey & Mapping	e-be	Existing Conductors (Transmission), Buried Power	BE - - - - - BE
Utilities - Existing; Survey & Mapping	e-bfo	Existing Fiber Optics Cable (Underground)	BFO - - - - - BFO
Utilities - Existing; Survey & Mapping	e-bt	Existing Telephone (Buried), Duct, Toll	BT - - - - - BT
Utilities - Existing; Survey & Mapping	e-btv	Existing Cable TV Line (Buried)	BTV - - - - - BTV
Utilities - Existing; Survey & Mapping	e-cas	Existing Conduit & Pipe Encasements	CAS - - - - - CAS
Utilities - Existing; Survey & Mapping	e-dt	Existing Telephone Buried Duct	DT - - - - - DT
Utilities - Existing; Survey & Mapping	e-g	Existing Gas Line	G - - - - - G
Utilities - Existing; Survey & Mapping	e-npw	Existing Non-potable Water Line	NPW - - - - - NPW
Utilities - Existing; Survey & Mapping	e-oe	Existing Power Lines (Aerial), High Voltage Transmission Lines	OE - - - - - OE
Utilities - Existing; Survey & Mapping	e-fo	Existing Fiber Optics Cable (Overhead)	OFO - - - - - OFO
Utilities - Existing; Survey & Mapping	e-ot	Existing Telephone Line (aerial)	OT - - - - - OT
Utilities - Existing; Survey & Mapping	e-otv	Existing Cable TV Line (Aerial)	OTV - - - - - OTV
Utilities - Existing; Survey & Mapping	e-pet	Existing Oil Line	PET - - - - - PET
Utilities - Existing; Survey & Mapping	e-rd	Existing Roof Drain	RD - - - - - RD

Discipline	Name	Description	Sample Image
Utilities - Existing; Survey & Mapping	e-s	Existing Force Main, Sanitary Sewer	S - - - - - S
Utilities - Existing; Survey & Mapping	e-stm	Existing Steam Pipe	STM - - - - - STM
Utilities - Existing; Survey & Mapping	e-w	Existing Water Line	W - - - - - W
Utilities -Proposed	be	Proposed Electrical Transmission Conductors Power (Buried)	BE BE BE BE BE
Utilities -Proposed	bfo	Proposed Fiber Optics Cable (Buried)	BFO BFO BFO BFO
Utilities -Proposed	bt	Proposed Telephone (Buried)	BT BT BT BT BT
Utilities -Proposed	btv	Proposed Cable TV Line (Buried)	BTV BTV BTV BTV
Utilities -Proposed	cas	Proposed Casing	CAS CAS CAS CAS
Utilities -Proposed	dt	Telephone Buried Duct	DT DT DT DT DT
Utilities -Proposed	g	Proposed Gas	G G G G G G G G G G
Utilities -Proposed	npw	Proposed Water Line Non Potable, Sanitary Sewer Effluent NPW	NPW NPW NPW NPW
Utilities -Proposed	oe	Proposed Transmission Conductors High voltage Line (Overhead)	OE OE OE OE OE
Utilities -Proposed	ofa	Fiber Optics Cable (Aerial)	OFA OFA OFA OFA
Utilities -Proposed	ota	Cable TV Line (Aerial)	OTA OTA OTA OTA
Utilities -Proposed	otv	Proposed Overhead Television	OTV OTV OTV OTV
Utilities -Proposed	pet	Proposed Oil Pipeline, Petroleum	PET PET PET PET
Utilities -Proposed	rd	Proposed Roof Drain	RD RD RD RD RD

Discipline	Name	Description	Sample Image
Utilities -Proposed	s	Proposed Sanitary Sewer, Force Main	S S S S S S S S S S S S
Utilities -Proposed	stm	Proposed Steam Pipes	STM STM STM STM
Utilities -Proposed	w	Proposed Water	W W W W W W W W W W W W
	(Border)	Default MicroStation	— — — — . — — — — —
	(Center)	Default MicroStation	————— — — — —————
	(Dashdot)	Default MicroStation	— — — . — — — . — — — . — — —
	(Dashed)	Default MicroStation	— — — — — — — — — — — — — — —
	(Divide)	Default MicroStation	— — — . . — — — . . — — — . . — — —
	(Dot)	Default MicroStation	. .
	(Hidden)	Default MicroStation	- -
	(Phantom)	Default MicroStation	————— — — — —————
	{-E-}	Default MicroStation - Electric Line	————— E ————— E
	{Arrow}	Default MicroStation	————— →
	{Batten}	Default MicroStation – Batt Insulation	
	{Cable/Tele}	Default MicroStation – Cable/Telephone	— C — T ——— C — T ——— C —
	{Chain Double-Dash}	Default MicroStation	— — — — — — — — — — — — — — —
	{Curtain}	Glare Screen & Blinds Curtain Wall	—————  —————
	{Dashed Triple-Dot}	Default MicroStation	. . . — — — — — . . . — — — — — . . .
	{Diamond}	Default MicroStation	— ◆ — ◆ — ◆ — ◆ — ◆ — ◆ — ◆ — ◆ — ◆
	{Gas Line}	Default MicroStation	————— - - - - - —————
	{Ground Line}	Ground Lines (Existing)	

Discipline	Name	Description	Sample Image
	{Half Dash}	Default MicroStation	
	{Leader Line}	Default MicroStation	
	{Offset Lines}	Default MicroStation	
	{Origin Line}	Default MicroStation	
	{Rail Road}	Default MicroStation	
	{Tapered Dash}	Default MicroStation	
	{Tree Line}	Default MicroStation	
	{Wide Dash}	Default MicroStation	

Note Some of the custom line types have not been developed in the FDOT AutoCAD Civil 3D resources (FDOT.lin) file. The reason for this is the appearance of those lines can be created with the FDOT Pavement Marking tool and the FDOT Place Block Group tool for AutoCAD Civil 3D.

3.7 PRINTER DRIVER CONFIGURATION FILES

The FDOT CADD Software supplies MicroStation print configuration files to generate prints to scale using the sheet cells (also provided with the FDOT CADD Software) on specific printers. All print configuration files have raster printing enabled. These print configuration files are examples due to various site-specific configurations and the types of printers encountered.

The table below lists the print configuration file names and the type of printer on which it was developed and tested. Each printer has its own footprint, or area on the paper on which it can print. For this reason, if a printer is not listed below and is used to generate prints, the print configuration file may require modification by the user.

PRINT CONFIGURATION FILE	PRINTER	DESCRIPTION
36x24.pro	N/A	Controls postscript image/print output
Color.plt		Color 11x17 (Raster Capable) Uses FDOT.TBL pen table and PSCRIPT.PRO prolog file.
Color_FDOTPDF.pltcfg	N/A	Creates a color PDF file. (Raster Capable) Uses FDOT.TBL pen table.
Color_Keysheet.pltcfg	ANY	To be used when printing key sheets containing maps with filled shapes.
FDOT.tbl	N/A	Pen table that also enters username, date time, and sheet border path.
FDOT_GrayExisting.tbl	N/A	Pen table that enters username, date time, sheet border path, and applies gray scale to files named like: TOPO*, UTEX*, and DREX*
FDOTbatchplt.spc	N/A	Batch print specification file customized for FDOT print configuration files. (Only used with old Batch Print dialog). This print configuration file is being replaced with Print Styles in MicroStation V8i)
FDOTPDF.plt	N/A	Creates a .PDF file. (Raster Capable) Uses FDOT.TBL pen table.
FDOTprinter.plt	Windows Printer	Copy of Bentley's PRINTER.PLT with weights and styles set to FDOT standards. Uses FDOT.TBL pen table.
HP1055.plt	HP 1055 CM	Monochrome 36x24 (Raster Capable) Uses 36x24.PRO prolog file.
HP1055C.plt	HP 1055 CM	Color 36x24 (Raster Capable) Uses 36x24.PRO prolog file.
HP5000.plt	HP 5000 GN	Monochrome 11x17 (Raster Capable) Uses FDOT.TBL pen table and HPTTABL1.PRO prolog file.
HP5000Legal.plt	HP 5000 GN	Monochrome 8.5x14 (Raster Capable) Uses FDOT.TBL pen table and HPTLEGAL.PRO prolog file.
HP5000Letter.plt	HP 5000 GN	Monochrome 8.5x11 (Raster Capable) Uses FDOT.TBL pen table and HPTLETTER.PRO prolog file.
hpglrtl.pltcfg	Large Format	Intended for use when printing large format monochrome sheets. (Raster Capable)
hpglrtl_c.pltcfg	Large Format	Intended for use when printing large format color sheets. (Raster Capable)
PostScript.plt	N/A	Creates postscript image file. (Raster Capable) Uses FDOT.TBL pen table and HPTTABL1.PRO prolog file.
Postscript36x24.plt	N/A	Creates postscript image file. (Raster Capable) Uses FDOT.TBL pen table and 36x24.PRO prolog file.
pscript.pro	N/A	Controls postscript image/print output
XeroxN40.plt	XEROX Docuprint N4025	Monochrome 11x17 (Raster Capable) Uses FDOT.TBL pen table and HPTTABL1.PRO prolog file.

3.8 CELL / BLOCK LIBRARIES

Cells and Blocks are frequently used as repeated components of drawings, complex symbols, notations, details, or parts that can be inserted into one or many drawings. Cells are defined and stored in design files called a Cell Libraries (Blocks in drawing files are called “Block Libraries”). Cell Libraries are DGN files, but with a .cel extension (Block libraries have a .DWG extension). Cells have been grouped by disciplinary usage into the standard FDOT Cell/Block Libraries delivered with the FDOT CADD software.

The Standard FDOT Cell/Block Libraries are listed in the following table:

MicroStation CELL LIBRARY	AutoCAD BLOCK LIBRARY	DESCRIPTION
alphabet.cel	<i>(Not Applicable)</i>	Alphabet & Numbers
arrows.cel	arrows.dwg	Distance & GuidSIGN Arrows
DrainXS.cel	DrainXS.dwg	Drainage Structure Cross Sections
drplan.cel	drplan.dwg	Drainage Proposed
drplan_ex.cel	drplan_ex.dwg	Drainage Existing
ftpsigns.cel	ftpsigns.dwg	Florida Traffic Plans Signs
geotech.cel	geotech.dwg	Geotechnical
its.cel	its.dwg	Intelligent Transportation Systems Signs
Landscape.cel	Landscape.dwg	Landscape
Lighting.cel	Lighting.dwg	Lighting
Mutcd.cel	mutcd.dwg	Manual on Uniform Traffic Control Devices
PavementMarkings.cel	pavementMarkings.dwg	Pavement Markings
Photogrammetry.cel	Photo.dwg	Photogrammetry
Roadway.cel	Roadway.dwg	Roadway
row.cel	ROW.dwg	Right of Way
Seals.cel	Seals.dwg	Professional Seals for Digital Signatories
Signalization.cel	Signalization.dwg	Signalization
SignalPoles.cel	SignalPoles.dwg	Signal Poles
survey.cel	survey.dwg	Survey Symbols for Right of Way
syeng.cel	syeng.dwg	Survey Symbols for Roadway
TollPlaza.cel	TollPlaza.dwg	Toll Plaza Signs
tplabels.cel	tplabels.dwg	Traffic Plans Labels
TrafficControl.cel	TrafficControl.dwg	Traffic Control
ttf_v8semi-standards.cel	Semi-Standards.dwg	Structures Semi-standards
ttf_v8structures.cel	Structures.dwg	Structures
TypicalSection.cel	TypicalSection.dwg	Typical Sections
utilities.cel	utilities.dwg	Utilities
v8structurespatterns.cel	<i>(Not Applicable)</i>	Patterns for Structures
XMSuperSection.cel	<i>(Not Applicable)</i>	Structures for Super sections
xsections.cel	<i>(Not Applicable)</i>	Cross Sections

3.9 TEXT

FDOT delivers a set of True Type Font (TTF) files to ensure text uniformity between applications supporting TTF fonts and legibility of FDOT CADD drawings. The FDOT CADD Software delivers a set of proportional and uniform spaced True Type Font files using vertical and slanted characters, the detail of which is reflected in the table below. These font files have additional characters added in the gaps of the Unicode definition so engineering symbols like: \bar{L} , \bar{C} , \oplus , \otimes , \ominus , \otimes , ∇ , \triangle , \triangle , etcetera, and fraction combinations are supported in the fonts directly. The MicroStation based *zdotfont.rsc* and *structuresfont.rsc* resource files are also delivered with the FDOT CADD software to maintain legibility of legacy files predating the use of True Type fonts.

MicroStation can utilize fonts contained within MicroStation RSC, AutoCAD SHX, and True Type Font files. MicroStation will read multiple font resource files according to the paths set by the MS_FONTPATH configuration variable in the selected workspace, and True Types Fonts registered with the Windows operating system. Within a MicroStation design file, font resources are compiled into a list of fonts from all the resource files that are found. The *MstnFontConfig.xml* file located by the MS_FONTCONFIGFILE variable determines if duplicate font names are displayed in font selection and lists how to resolve duplicate font names.

3.9.1 FDOT TRUE TYPE FONTS (TTF)

A single TTF file may contain thousands of characters. The FDOT TTF files contain special characters used by designers that are not normally found in standard publishing fonts (see the *Unicode mapping standard here: <http://www.unicode.org/charts/>*). If the FDOT TTF files are registered with the Windows operating system, the fonts may be used in any standard Windows program like Word, Excel, or other applications supporting TTF.

Font	Description
FDOT	Standard slanted proportional spaced font used for most annotations
FDOT Bold	Bold version of the FDOT font
FDOT Heavy	Heavier Bold version of the FDOT font
FDOT Imprint	Chiseled font used mainly within the FDOT sheet border
FDOT Imprint Bold	Bold version of FDOTImprint font
FDOT Mono	Standard mono-spaced font used mainly in tables to keep characters aligned vertically
FDOT Mono Bold	Bold version of FDOTMono font
FDOT Mono Heavy	Heavier Bold version of FDOTMono font
FDOT Vert	Non-slanted proportional spaced version of FDOT font used mainly by Right Of Way discipline
FDOT Vert Bold	Bold version of FDOTVert font used mainly by ROW
FDOT Vert Heavy	Heavier Bold version of FDOTVert font used mainly by ROW
FDOT Vert Mono	Mono-spaced version for FDOTVert font used mainly in tables used mainly by ROW
FDOT Vert Mono Bold	Bold version of FDOTVertMono font used mainly by ROW
FDOT Vert Mono Heavy	Heavier Bold version of FDOTVertMono font used mainly by ROW

3.9.2 LEGACY MICROSTATION FONTS

The fonts within *zdotfont.rsc* are no longer in use, but must be maintained for backward compatibility purposes.

FDOT Font resource file - Zdotfont.rsc:

Font	Description
0	(Fast font) Simple font - Upper and Lower Case, Fractions
2	Wide font - Upper Case (used by survey & mapping)
3	Narrow font - Upper and Lower Case (used by survey & mapping)
4	Italics font - Upper and Lower Case (used by survey & mapping)
5	Script font - Upper and Lower Case (used by survey & mapping)
6	Simple Block font - Upper Case (used by survey & mapping)
7	Filled font - Upper Case (used by survey & mapping)
8	Filled font - Lower Case (no numbers - used by survey & mapping)
9	Filled font - Upper and Lower Case (used by survey & mapping)
10	Simple font - Upper and Lower Case, Fractions (used by survey & mapping)
11	Slanted font - Upper and Lower Case (used by survey & mapping)
12	Filled font - Upper Case (no numbers - used by survey & mapping)
13	Outline Block font - Upper Case (used by survey & mapping)
14	Script font - Upper and Lower Case (used by survey & mapping)
15	Old English style font - Upper and Lower Case (used by survey & mapping)
16	Upper Case and Engineering Symbols
17	Arrow and Miscellaneous Symbols
23	Slanted Simple font - Upper and Lower Case, Fractions
25	Standard font - Upper and Lower Case, Fractions (English projects prior to 2000 - No longer used)
26	Greek Symbols
41	Hand lettering font - Upper Case
42	Block outline font - Upper Case for Architecture plans
48	Slanted font (proportional spacing) Upper and Lower Case, fractions (the new English font for Design and Traffic Plans for labels)
49	Slanted font (proportional spacing) Upper and Lower Case, fractions (the new English font for Design and Traffic Plans for notes)
58	Vertical font (proportional spacing) Upper and Lower Case, fractions (used by R/W Engineering and Mapping for labels in English projects)
59	Slanted font (proportional spacing) Upper and Lower Case, fractions (used by R/W Engineering and Mapping for labels in Metric projects)
67	Provided for backward compatibility, no longer used.
68	Slanted font (proportional spacing) Upper and Lower Case, fractions (used by Structures for labels)

Font	Description
69	Slanted font (proportional spacing) Upper and Lower Case, fractions (used by Structures for notes)
70	Standard font - Upper and Lower Case, fractions (used in the Roadway and Traffic Design Standards)
71	Slanted font - Upper and Lower Case, fractions
72	Simple font - Upper and Lower Case, fractions
77	Filled font - Upper and Lower Case used for the titles in Sheet borders
78	Slanted font (proportional spacing) Upper and Lower Case (the Metric font for Design and Traffic Plans for labels)
79	Slanted font (proportional spacing) Upper and Lower Case (the Metric font for Design and Traffic Plans for notes)
80	True Type font Arial
81	True Type font Arial Italics
82	True Type font Courier
83	True Type font Courier Italics
84	True Type font Engravers Gothic
85	True Type font Photina
86	True Type font CG Times
87	True Type font Swis721
88	True Type font Times New Roman
89	True Type font Times New Roman Italics
90	True Type font Times New Roman Bold Italics
91	True Type font Garait
92	True Type font Garamond
93	True Type font Garamond Bold
94	True Type Greek Alphabet and Symbol
95	True Type Wingding
96	True Type WPMathA
97	True Type WPMathB
98	Character symbol text from cross section files
99	Block filled fonts - Upper and Lower Case for signs
100	Symbol arrows
101	Symbol fonts for cross section files
102	Topography symbol fonts (used by Surveying and Mapping)
126	Topography symbol fonts (used by Surveying and Mapping)

3.9.3 SIZE AND SPACING

FDOT has selected standard text sizes to ensure uniformity and legibility on FDOT Cadd drawings. The appropriate text size is dependent on the plot scale selected. Since the most important issue with text is legibility, font, weight and text size may vary as necessary. Text line spacing should be, on average, three-fourths of the text height.

FDOT CADD Software provides several Text Levels and Text Styles for designers to choose as guides or starting points to create text to fit their needs. Text Levels can be identified by the naming convention beginning with "Text".

The following table should be used as a guideline for standard text size definitions for plans at given plot scales.

English Text for B-Size Plans (11" x 17" paper)

English (Scale)	1"=1'	1"=20'	1"=40'	1"=50'	1"=100'	1"=200'	1"=400'	1"=500'
Minimum	0.06	1.2	2.4	3	6	12	24	30
Desired	0.07	1.4	2.8	3.5	7	14	28	35
Maximum	0.1	2.0	4	5	10	20	40	50

Note For Right of Way Mapping Standard Text Sizes, See Chapter 9.

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