

Appendix B

Survey Standards

TABLE OF CONTENTS

APPENDIX B	2
B.1 Survey Standards	2
B.1.1 Introduction	2
B.2 Standard Levels, Line Weights & Styles	3
B.2.1 1986 Survey Level Structure	3
B.2.2 1995 to Date Survey TOPO Level Structure	4
B.2.3 1995 to Date Survey Utilities Level Structure	6
B.2.4 1995 to Date Survey Contour Level Structure	7
B.2.5 1995 to Date Survey DTM Level Structure	7
B.2.6 1995 to Date Survey Wetland Level Structure	8
B.2.7 2001 to Date Property Owner Level Structure	8
B.2.8 Line Weights and Thickness	9
B.2.9 Default Line Styles	10
B.2.10 Standard Survey Custom Line Styles	11
B.3 Survey Cell Library	16
B.3.1 Survey Cell Directories	16
B.3.2 Standard Survey Cell Library	16

Appendix B

B.1 Survey Standards

B.1.1 Introduction

This Appendix contains the CADD standards for all survey files. The survey cells and line styles in this Appendix are graphical representations only and are not drawn to scale. The operator is responsible for placing the cells in the file at the proper scale. The cells can be found in the survey, surv86, msurv, and msurv86 cell libraries.

The Master cell libraries are located in the Central Office under the following path:
//0501cosurvey/sur_sup/cel

The Master resource files that contain VDOT's standard survey line styles are located in the Central Office under the following path: //0501cosurvey/sur_sup/rsc

NOTE: These cells and line styles are **not to be changed** without the Permission of the Location and Design CADD Manager.

B.2 Standard Levels, Line Weights & Styles

B.2.1 1986 Survey Level Structure

Level No.	Description
Level 1	Survey Centerline WT=5, LC=0
Level 2	Major Road-edges of Pavement WT=2, LC=3 Bridges WT=3, LC=3 Minor Road-edges of Pavement, Entrances, Paved Shoulders WT=2, LC=2 Sidewalks, Curb, Curb and Gutter(Custom Line Styles)
Level 3	Buildings WT=4, LC=0 Porches WT=3, LC=0 Retaining Walls WT=2, LC=0 Steps, Conc. Slabs, Tanks, Columns, Signs and Posts WT=1, LC=0 Walks, Fences, Shrubs, Wood Lines, Guardrails(Custom Line Styles) Trees (Cell)
Level 4	Catch Basins, Drop Inlets WT=2, LC=5 Dams, Endwalls, Endsections WT=1, LC=0 Bodies of Water, Paved Ditches, and Existing Drainage(Custom Line Styles)
Level 5	Railroad Bridge WT=3, LC=3 Railroad Signal, Railroad Gate WT=2, LC=0 Railroad Track(Custom Line Style)
Level 6	Above/Underground Utilities (Power, Telephone, Gas, and Water Utilities) (Custom Line Styles and Cells)
Level 7	Temporary Easement WT=2, LC=6 Permanent Easements WT=2, LC=4 Existing Right of Way(Custom Line Style)
Level 8	Property Lines WT=3, LC=0 Utility Easements WT=2, LC=4
Level 9	Intermediate Contour WT=1, LC=0
Level 10	Index Contour and Spot Elevation WT=3, LC=0
Level 11 - 20	Annotation for Levels 1 - 10

B.2.2 1995 to Date Survey TOPO Level Structure

Level No.	Description
Level 1	Centerline, Traverse, and Control Stations WT=5, LC=0
Level 2	Bridge Information WT=3, LC=3
Level 3	Edge of Pavement, Gravel, Concrete, Asphalt, Parking Lot WT=2, LC=3
Level 4	Curb and Gutter(Custom Line Style)
Level 5	Curb and Concrete Islands(Custom Line Style)
Level 6	Paved and Gravel Shoulder WT=2, LC=2
Level 7	Sidewalk Along Roads; Wheelchair Ramps(Custom Line Style)
Level 8	Buildings WT=4, LC=0 Porches, Decks, Patios, and Swimming Pools WT=3, LC=0
Level 9	Walks(Around Houses and Buildings)(Custom Line Style)
Level 10	Steps WT=1, LC=0
Level 11	Fences, Gates(Custom Line Style)
Level 12	Wood Line, Brush Line, Trees, Shrubs, and Hedgerows(Custom Line Styles)
Level 13	Retaining Walls WT=2, LC=2
Level 14	Concrete Slabs, Bollards, Columns, Signs, Posts, Playsets WT=1, LC=0
Level 15	Above Ground Tanks, Dumpsters, Propane Tanks WT=1, LC=0
Level 16	Guardrail and Jersey Barrier(Custom Line Style)
Level 17	Bodies of Water, Streams, Lakes, Etc.(Custom Line Style)
Level 18	Paved Ditches, Rip-Rap(Custom Line Style)

Level No.	Description
Level 19	Drainage Items, Dams, Endwalls, and Endsections WT=1, LC=0 Catch Basins, Drop Inlets, and DI Manholes WT=2, LC=5 Culvert Pipes(Custom Line Style)
Level 20	All Railroad Items, Railroad Ties WT=2, LC=0
Level 21	Septic Tanks, Drain Fields, and Wells WT=1, LC=2
Level 22	Cemetery Location and Graves(Cells)
Level 23	Right of Way Lines and Right of Way Monuments(Custom Line Style and Cells)
Level 24	Property Lines WT=3, LC=0 Temporary Easements WT=2, LC=6 Permanent Easements WT=2, LC=4 Property Pins(Cells)
Level 25	State, County, and City Boundary Lines(Custom Line Styles)
Level 26	Utility Easements WT=2, LC=4
Level 27	Wetlands(Custom Line Style) *These items are located in a separate file
Level 28	Gas Pumps, Gas Tanks, Filler Caps, Monitoring Wells, Vent Pipes, Etc.
Level 29	Mine Information
Level 30	Existing noise barrier walls
Level 31 - 60	Annotation for Levels 1 – 30 (Level 60 also used for obscured Areas – Custom Line Style)
Level 61	Base Plan Sheet, Scale Bar, North Arrow, etc.(Cells)
Level 62	Grid and Labels; Elevation Ticks, Project Notes
Level 63	Not Assigned

NOTE : Survey Contour, DTM, Topo, Property Owners, Wetlands and Utility information will be in separate files.

B.2.3 1995 to Date Survey Utilities Level Structure

Level No.	Description
Level 1 - 2	Not Assigned
Level 3	Sanitary Sewer Utility (Lines, Force Main, MH, Valves Pump Stations, Etc.)(Custom Line Styles and Cells)
Level 4	Electrical Utility (Lines, Guy Wires, Poles, Ped., MH, Ducts, Etc.)(Custom Line Styles and Cells)
Level 5	Water Utility (Lines, MH, WM, Valves, Etc.)(Custom Line Style and Cells)
Level 6	Gas Utility (Lines, MH, GM, Valves, Etc.)(Custom Line Style and Cells)
Level 7	Telephone Utility (Lines, Ped., Poles, MH, Ducts, Etc.)(Custom Line Style and Cells)
Level 8	Cable TV Utility (Lines, Ped., Etc.)(Custom Line Styles and Cells)
Level 9	Traffic Control Utility (MH, Poles, Boxes, Ducts, Etc.)(Custom Line Style and Cells)
Level 10	Fiber Optic Line (Ducts, Etc.)(Custom Line Styles)
Level 11	Unknown Utility Line(Custom Line Style)
Level 12 - 32	Not Assigned
Level 33 - 41	Annotation for Levels 3 - 11
Level 42 - 60	Not Assigned
Level 61	Utility Key and Utility Owners
Level 62	Miscellaneous Notes for Designated Utility Company
Level 63	Not Assigned

B.2.4 1995 to Date Survey Contour Level Structure

Level No.	Description
Level 1 - 8	Not Assigned
Level 9	Intermediate. Contour WT=1, LC=0
Level 10	Index Contour and Elevation Text WT=3, LC=0
Level 11	Spot Elevation
Level 12 - 39	Not Assigned
Level 40 - 41	Not Assigned
Level 42 - 63	Not Assigned

B.2.5 1995 to Date Survey DTM Level Structure

Level No.	Description
Level 1 - 2	Not Assigned
Level 3	Pavement Spot Shots/Helicopter Photography (Low Level)
Level 4	Pavement Break Lines/Helicopter Photography (Low Level)
Level 5 - 11	Not Assigned
Level 12	Obsured Areas/Requiring Field Survey
Level 13	Spot Shots / Field Survey
Level 14	Break Lines / Field Survey
Level 15 - 22	Not Assigned
Level 23	Spot Shots / Standard Aerial Photography
Level 24	Break Lines / Standard Aerial Photography
Level 25 - 33	Not Assigned

Level No.	Description
Level 33	Spot Shots / LIDAR
Level 34	Break Lines / LIDAR
Level 35 - 39	Not Assigned
Level 40	Spot Shots / Bridge Decks
Level 41	Break Lines / Bridge Decks
Level 42	Not Assigned
Level 43	Spot Shots / Digital Elevation Model
Level 44 - 52	Not Assigned
Level 53	Lower Accuracy Spot Shots / Standard Aerial Photography (Orthophoto Generation and Soundwall DTM use only)
Level 54	Lower Accuracy Breaklines / Standard Aerial Photography (Orthophoto Generation and Soundwall DTM use only)
Level 55 - 63	Not Assigned

B.2.6 1995 to Date Survey Wetland Level Structure

Level No.	Description
Level 27	Wetland Location Information
Level 57	Wetland ID Descriptions









B.2.7 2001 to Date Property Owner Level Structure

Level No.	Description
Level 54	Property Owner information

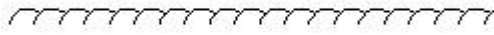
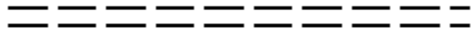
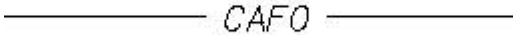
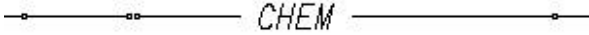



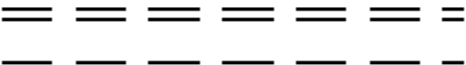

B.2.8 Line Weights and Thickness

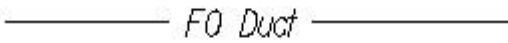
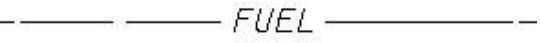
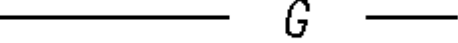
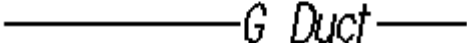



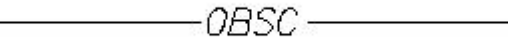
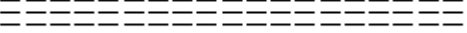
MicroStation Line Weights	Plotter Line Thickness
WT = 0	0.0075 inches
WT = 1	0.0125 inches
WT = 2	0.0150 inches
WT = 3	0.0175 inches
WT = 4	0.0200 inches
WT = 5	0.0225 inches
WT = 6	0.0275 inches
WT = 7	0.0325 inches
WT = 8	0.0375 inches
WT = 9	0.0450 inches
WT = 10	0.0500 inches
WT = 11	0.0525 inches
WT = 12	0.0550 inches
WT = 13	0.0575 inches
WT = 14	0.0600 inches
WT = 15	0.0625 inches
WT = 16	0.0650 inches

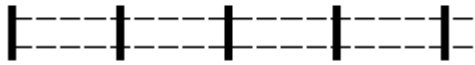

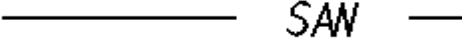
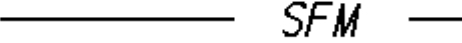

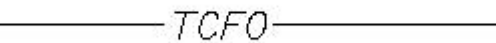
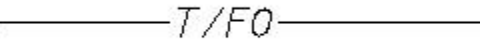
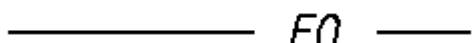
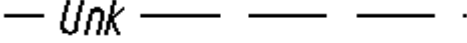
B.2.9 Default Line Styles

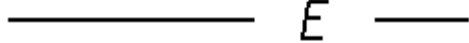
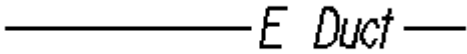
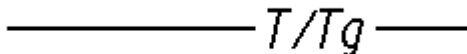
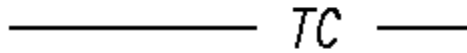
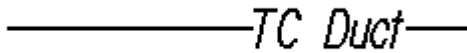
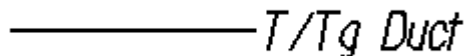
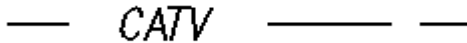


Line Style	Line Codes	Line Style Description
	LC = 0	Solid
	LC = 1	Dotted
	LC = 2	Medium Dash
	LC = 3	Long Dash
	LC = 4	Dot Dash
	LC = 5	Short Dash
	LC = 6	Dash Dot Dot
	LC = 7	Long Dash/Short Dash




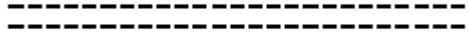
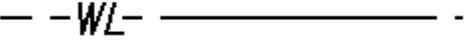

B.2.10 Standard Survey Custom Line Styles

Custom Line Style	Line Style Name	Line Style Description	Line Style Scale	Line Weight
	BR	Brush Line	job	0
	C *	Existing Pipe Culverts	Off	0
	CAFO	Cable TV Fiber Optic	job	0
	CHEM	Chemical Line	job	0
	CIL	City Line	Off	6
	COL	County Line	Off	6
	ECC.5	Curb	Off	2
	ECG *	Curb and Gutter	Off	2
	FE	Fence	job	0

Custom Line Style	Line Style Name	Line Style Description	Line Style Scale	Line Weight
	FoDUCT	Fiber Optic Duct	job	0
	FUEL	Fuel Line	Job	0
	G *	Gas	job	0
	GDUCT	Gas Duct	job	0
	GR	Guardrail	job	1
	HR	Hedge Row	job	0
	JB	Jersey Barrier	Off	1
	OBSC	Obscure Areas	job	0
	PD *	Paved Ditch	Off	2

Custom Line Style	Line Style Name	Line Style Description	Line Style Scale	Line Weight
	RR	Railroad	Off	0
	RW	Right of Way	Off	2
	S *	Sanitary Sewer	job	0
	SFM *	Sanitary Sewer Force Main	job	0
	STL	State Line	Off	9
	TCFO	Traffic Control Fiber Optic	job	0
	TFO	Telephone Fiber Optic	job	0
	UFO	Fiber Optic	job	0
	UNK	Unknown Utility	job	0

Custom Line Style	Line Style Name	Line Style Description	Line Style Scale	Line Weight
	UP	Underground Electric	job	0
	UPDUCT	Underground Electric Duct	job	0
	UT	Underground Telephone	job	0
	UTC	Traffic Control	job	0
	UTCDUCT	Traffic Control Duct	job	0
	UTDUCT	Telephone Duct	job	0
	UTV	Cable Television	job	0
	UTVDUCT	Cable Television Duct	job	0
	VS	Vacuum Sewer	job	0

Custom Line Style	Line Style Name	Line Style Description	Line Style Scale	Line Weight
	W *	Water Lines	job	0
	WA	Water Edge	job	0
	WDUCT	Water Line Duct	job	0
	WK *	Sidewalk	Off	2
	WL	Wet Lands	job	0
	WO	Woods	job	0

Metric line code names are the same, except they start with "m".

* Denotes items of varying sizes (i.e. C18 = 18"pipe).

Line Style Scale has two settings as follows:

job = scale factor is on and value field should be set to **.25** for 25/250 scale or **.50** for 50/500 scale.

Off = Turn toggle switch off.

For additional Line Types see Appendix A in [Survey Manual](#).

B.3 Survey Cell Library

B.3.1 Survey Cell Directories

survey.cel (Current CADD Standard)

surv86.cel

msurv.cel

msurv86.cel

B.3.2 Standard Survey Cell Library

Cell Name	Cell Description	Cell Name	Cell Description
ANG	Delta Symbol	CORORG	Origin Coordinate Position
CORPLA	Coordinate Plan Sheet	CTOWER	Cell Phone Tower
CS	Control Station	DARR	Drainage Arrow
EGW	Electric Guy Wire	EHH	Electric Hand Hole
EM	Electric Meter	EMH	Electric Manhole
EMP	Electric Marker Post	EPED	Electric Box
EQ	Equality Symbol	ESTUB	Electric Stub
FH	Fire Hydrant	FOM	Fiber Optic Marker
GM	Gas Meter	GMH	Gas Manhole
GMP	Gas Marker Post	GRAVE	Tombstone
GSTUB	Gas Stub	GWELL	Gas Well
GV	Gas Valve or Meter	HC	Horizontal Control Card
INT	Intersection Symbol	LD200	LD200 Control Card

Cell Name	Cell Description	Cell Name	Cell Description
LD23	Bridge Data Sheet	MINE	Mine Entrance
LP	Light Pole	NA	North Arrow
PL	Property Line Symbol	PLA	Blank Plan Sheet
PLP	Iron Property Pin	PLSMIN	Plus or Minus Symbol
PM	Property Monument	POST	Post
PP	Power Pole	RM	VDOT Right of Way Monument
RP	Iron Right of Way Pin	RRLP	Railroad Light Pole
RRMM	Rail Road Mile Marker	RRSP	Rail Road Signal Pole
RRTP	Rail Road Telephone Pole	SARR	Sanitary Arrow
SATDIS	Satellite Dish	SBAR1	Scale Bar 1:100
SBAR2	Scale Bar 1:25	SBAR5	Scale Bar 1:50
SCO	Sewer Cleanout	SFMV	Sanitary Force Main Valve
SH	Shrub	SMH	Sanitary Sewer Manhole
SSMH	Storm Sewer Manhole	SSTUB	Sanitary Stub
STUB	End of Utility Line (1986 level structure use only)	TB	Title Block
TCH	Traffic Control Hand Hole	TCMH	Traffic Control Manhole
TGW	Telephone Guy Wire	THH	Telephone Hand Hole
TMH	Telephone Manhole	TMP	Telephone Marker Post

Cell Name	Cell Description	Cell Name	Cell Description
IP	Telephone Pole	TPED	Telephone Pedestal
IR	Tree	TSP	Traffic Signal Pole
TSTUB	Telephone stub	TVHH	Television Hand Hole
TVMH	Television Manhole	TVPED	Television Pedestal
UK	Utilities Key	WELL	Well
WETA	Wetland Flag automatic	WETM	Wetland Flag manual
WM	Water Meter	WMH	Water Manhole
WSTUB	Water Stub	WV	Water Valve
X	Spot Elevation	Z	Connected Plat Symbol

For additional information see Appendix A in [Survey Manual](#)