

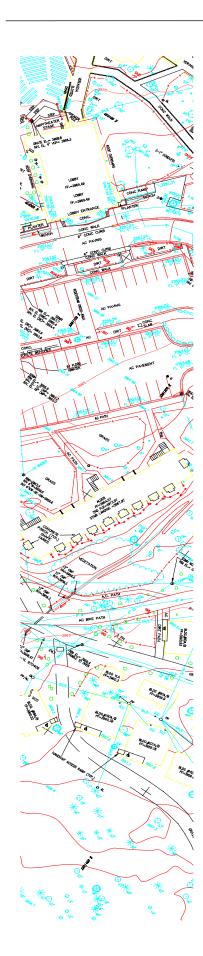
DSC CAD Standards

CAD Requirements for Design and Construction Drawings

Denver Service Center

January 2007





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Denver Service Center National Park Service Denver, Colorado

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Introduction

The Denver Service Center's **DSC CAD Standards** documents electronic customization that has been developed to capture the National Park Service Director's Order 10A Guideline for Design and Construction Drawings requirements. These electronic standards are available for use by all NPS employees as well as architectural and engineering (A&E) contractors who prepare CAD generated design and construction drawings for the National Park Service.

The NPS AutoCAD Tools have been developed to incorporate established standards into the electronic environment for creating drawing files in AutoCAD. Utilizing the NPS AutoCAD Tools will aid the user in avoiding duplication of effort and maintaining uniformity of work, resulting in consistent and compatible CAD files.

The NPS AutoCAD Tools can be downloaded from the following web site:

https://www.nps.gov/dscw/ds-cad-drafting.htm

This web site and the **DSC CAD Standards** focus on electronic CAD standards and related support. Refer to Director's Order 10A: Design and Construction Drawings, for specific drafting requirements that may be transparent in the customization and are not specifically addressed in this document. All electronic customization has been developed for AutoCAD software and complies with required standards documented in Director's Order 10A.

While striving to maintain the consistency necessary for life cycle maintainability, the **DSC CAD Standards** is to be considered a dynamic document from which increased experience, technological advancement, and industry wide standardization will provide future direction.

Questions should be directed to dsccadsupport@nps.gov.

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Chapter 1

General Standards

General Standards

These general standards are intended to include the fundamental requirements for the efficient generation, archival and retrieval of electronic drawings prepared for the Denver Service Center. Some of these standards will be explained more specifically in other sections of this document.

All CAD drawings will be prepared in AutoCAD.

CAD drawings shall be produced in accordance with Director's Order 10A: Design and Construction Drawings.

All drawings will be drawn at true scale and true coordinates in model space.

NPS border sheets shall be inserted in paper space at 0,0,0.

Drawings are to be plotted using paper space at 1:1 scale for full size prints or 1:2 scale for half size prints.

All external reference drawings (base files) shall use relative xref paths.

All externally referenced (xref) drawings will be attached (or overlaid) into the sub sheet at 0,0,0 Do not bind external references at completion of drawing.

All drawings shall use color dependant plot styles, not named plot styles.

All colors used in drawing files will comply with the DSC Pen/Color configuration.

All drawings will contain a date stamp that includes the AutoCAD release number, the drawing path name, the file name, and the latest date worked on.

Layer names will conform to DSC standards and all drawing elements will be drawn on the appropriate layer. All layers will be named using the discipline designation the drawing element represents as the first letter.

Each sub sheet will be created as an individual CAD file, using external references for base sheet information. One single drawing file containing multiple sub sheets is not acceptable.

All drawing path names shall follow the DSC folder structure and file naming conventions.

All site plan drawings shall utilize the same coordinate system used on the original base data. The original base data shall remain constant throughout all phases of the project. All site plans shall be at their true geo-referenced locations and shall be capable of being overlaid on the same coordinate system of the original topographic survey and/or base data. The digital data delivered shall be able to be integrated with the base data by inserting or overlaying at an origin of 0,0 and rotation angle 0.

For a checklist of items to assist in meeting our electronic drawing requirements, see the CAD Drafting Standards Checklist for Electronic Deliverables at https://www.nps.gov/dscw/ds-cad-drafting.htm



Chapter 2

Drawing Management

Drawing Management

To ensure accessibility of all drawing files and external references during the design and construction process, and for archival and retrieval purposes, it is imperative to maintain a standard folder structure. In addition, relative path names will be used for all drawings that are to be accessible as an external reference. (See page 2-3 for relative path names.)

Folder and File Naming Conventions

File organization is a necessity in managing CAD drawings. By stacking folders, the user can distinguish between park, PMIS number, discipline the drawing is associated with, and the specific file name. The specified folder structure and file naming conventions shall be followed in preparing CAD drawings for the DSC.

Folder Naming Conventions

DISCIPLINE or BASES\

To assure file sharing and accessibility of all drawings, the following folder structure should be used.

PARK\ 4 Letter Park Designation PMIS NO.\ **Project PMIS Number**

DRAWINGS\

FILE NAME (.DWG) **Drawing Name**

Example: C:\JELA\543210\DRAWINGS\ARCH\A1 floorpl.dwg

Arch, Civil, LA, Mech, Elec, Bases*, etc.

* - The bases folder is the designated location for storing all drawings that are created to be used as a "base" drawing and accessed as an external reference (xref). This folder is to be used for locating any base sheet needed by any discipline. (I.E.: mechanical designers may need to xref the architectural floor plan which will be used as the base for their mechanical design.) All base drawings will be located in one folder, with the file name indicating the specific type of base. (See File Naming of Xrefs in Bases Folder, page 2-3.)

File Naming

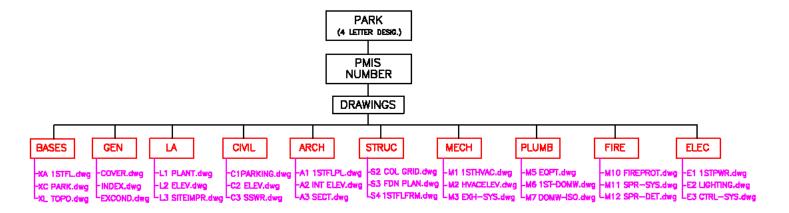
To assure file sharing, accessibility and compatibility of all drawings, file names will consist of a maximum of eighteen (18) characters, including spaces and the file extension. The file name should begin with the sub sheet number and then the design content of each specific drawing sheet.

Examples

L1 SITE PLAN.DWG S3ROOF FRAMING.DWG M2 1st HVAC.DWG E4 POWER PLAN.DWG

See Figure 2-1 below for an expanded version of the folder structure with file naming examples.

CADD File Management and Naming Conventions



Example: C:\YELL\123450\DRAWINGS\ARCH\A2 INT ELEV.DWG

Figure 2-1

Amendments or Modifications

In the event amendments or modifications are part of the project, an additional folder will be created beneath the DRAWINGS folder, with amended or modified drawings placed in the correct discipline folders.

Example: C:\YELL\123450\DRAWINGS\AMEND1\ARCH\A2 INT ELEV.DWG Example: C:\YELL\123450\DRAWINGS\MOD1\ARCH\A2 INT ELEV.DWG

File Naming of Xrefs in Bases Folder

In naming base drawings to be used as external references (xrefs), all files should begin with an "x", to distinguish it as an xref. The architectural base sheets shall begin with an xa, the civil base sheets shall begin with an xc, the landscape base sheets shall begin with an xl, etc. The remaining file name should be as descriptive as possible in describing the content of the base sheet. Naming base drawings this way will generate consistency and organization within the final drawing set.

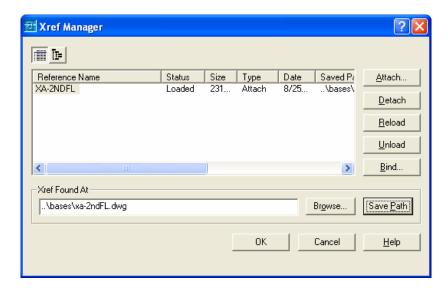
Examples

XA-FLRPL.DWG XC-SITE.DWG XL-LAYOUT.DWG

Relative Xref Paths

To ensure xrefs load when opening drawings, all xrefs will use relative paths. This eliminates all problems associated with accessing xrefs when drawings are shared, created or stored on different drives, or written to CD's.

To change an xref from an "absolute" path (the default), to a "relative" path, use the Xref Manager. In the Xref Manager Window, highlight the xref name, and in the Xref Found At box, change the path to ..\bases\[filename].dwg. Then Save Path.



The two dots (..\bases\) indicate backing up one folder from the current folder.

Layering

The Denver Service Center uses, in general, the AIA CAD Layer Guidelines. The AIA CAD Layer Guidelines give two methods for sharing graphic information. The single file approach, in which drawings are created by turning layers on and off, is **not** to be used on DSC drawings. The second method, **used on DSC drawings**, is the multiple file approach. This allows a drawing to be created by using reference files (xrefs). This method allows for a total team approach and easier file sharing.

Drawings that are to be used as external reference drawings, or base sheets, should be saved to the "bases" directory, to be available as needed for all disciplines. Base drawings should contain only the necessary information needed for use by other disciplines, but not the information specific to the original discipline. This way, base drawings can be utilized immediately, without the need to analyze and manipulate.

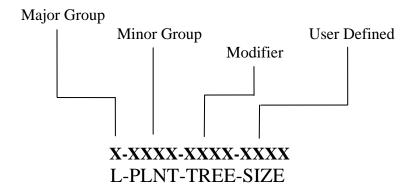
Any base drawing to be used as an xref shall have all objects created **color bylayer** only. This allows for easier pen weight modification, when necessary.

Layer Formats

The layering formats are organized as a hierarchy. This structure makes the list easier to use and accommodates future expansion. Layer names are alphanumeric and use easy-to-remember abbreviations such as A-DOOR for architectural doors, A-WALL for architectural walls, and C-TOPO for proposed contour lines and elevations.

Layer names shall be limited to 18 characters. Abbreviations for minor group, modifier and user defined fields should be 4 characters. Hyphens are used to separate major group, minor group, and modifier to improve readability.

Example



Major Groups

Major groups correspond to the traditional discipline designations used in construction document sub sheet numbering.

Major Group Designations: G General

C Civil

L Landscape Architecture

A Architecture S Structural

M Mechanical (HVAC)

P Plumbing
F Fire Protection

E Electrical

Minor Groups

Minor groups subdivide major groups. For example, the architectural major group contains minor groups for walls, doors, floors, ceilings, equipment, etc.

Modifier

A modifier may be added to a layer name for further differentiation. For example, walls (A-WALL) may be categorized as full height (A-WALL-FULL).

The modifier is optional and need not be used when the minor group layer name alone will suffice. The choice of using layer names with or without modifiers allows the standards to be used in a straightforward, streamlined fashion for simple projects that do not need the level of detail required for large complicated projects.

User Definable Fields

The user-defined field allows additional layers to be added to accommodate special project requirements. The user-defined field may be added after a modifier or in place of a modifier.

Drawing Templates

There are standard template drawings (.dwt) available for use on NPS drawings. Each template has a master list of layers for the specific discipline. Layers can be added or purged as needed. These templates are included with the NPS AutoCAD Tools which can be downloaded from the DSC CAD web site at https://www.nps.gov/dscw/ds-cad-drafting.htm . Once downloaded, the templates can be found at c:\program files\NPS AutoCAD Tools\Proto.

The drawing templates are:

arch.dwt Architectural drawings

civldetl.dwtCivil drawings - detail sheets (inches)civlsite.dwtCivil drawings - plans (decimal,feet)

covbase.dwt Cover sheet - base drawing

covproj.dwt Cover sheet - project specific information

elec.dwt Electrical drawings

elecaux.dwt Electrical drawings (Auxiliary systems)

fire.dwt Fire Protection drawings

ladetl.dwt Landscape architecture drawings - detail sheets

(inches)

lasite.dwt Landscape architecture drawings - plans

(decimal, feet)

mech.dwt Mechanical (HVAC) drawings

plumb.dwt Plumbing drawings
struct.dwt Structural drawings

The layers in these drawing templates have been created with color number and linetype. Color number (pen weights) can and should change relative to the scale of the drawing. See Appendix A for DSC standard template drawing layer lists.

Common Layers

There are six common layers preset in these templates. They are:

Z-BRDR - for the standard sheet border

Z-CONST - for construction lines

Z-NOPLOT - for no plot graphics or notesZ-README - for user information (no plot)

Z-SYMS-GENR - for general symbols specific to the sheet

(north arrow, scales, etc.)

These layers are prefixed with a "Z", in an effort to keep the layers organized, with the "Z-" layers always listed last in the layer list.



Chapter 3 Drawing Format

Drawing Format

Standard Sheets

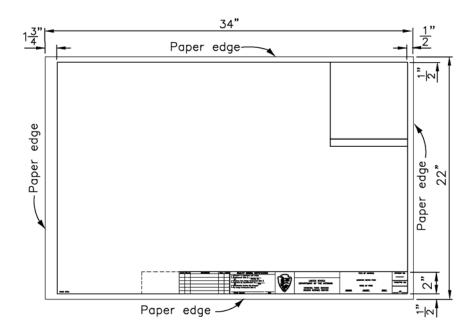
Standard 22"x34" NPS drawing sheets are used for design, construction and asconstructed drawings. See Figure 3-1 for the standard cover sheet border, which also shows the location of approval and revision blocks. See Figure 3-2 for the standard 2nd sheet border.

Standard sheets include:

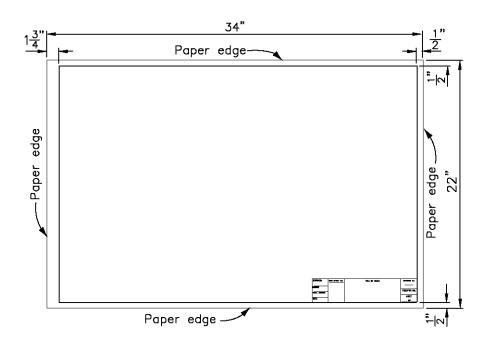
Cover Sheet - Standard cover sheet with vicinity, park map and project index.

Second Sheet - Standard border sheet.

Plan and Profile Sheets - Standard second sheet borders, with grids for a plan and profile sheet or a full profile sheet.



Standard Cover Sheet Border Figure 3-1



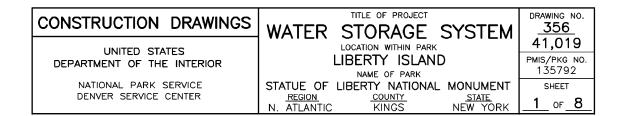
Standard Second Sheet Border Figure 3-2

Title Blocks

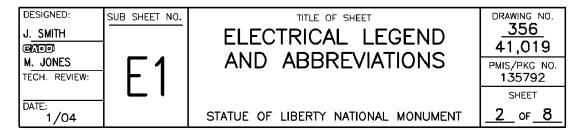
The title block on a cover sheet includes the project title, specific location within the park, park name, region, county and state, as shown in Figure 3-3.

Title blocks on second sheets contain the title of the sheet and the park name. See Figure 3-4.

Every title block will also include a drawing number, a PMIS number and sheet numbering. Each second sheet title block will also include a subsheet number.



Cover Sheet Title Block Figure 3-3



Second Sheet Title Block Figure 3-4

Approval and Revision Blocks

Approval Block - An approval block is required on the cover sheet of all design and construction drawing sets. See Figure 3-5. Signatures are required at the Schematic Design phase prior to the Development Advisory Board (DAB) presentation, and again at the completion of the Construction Drawing set.

QUALITY DESIGN CERTIFICATION
Prepared in Accordance with Design Development (Title I)
Project Manager Date

Approval Block Figure 3-5

Revision Block – Information should be added to the revision block when changes are made to construction drawings after they have been issued for bid and therefore are official contract documents. See Figure 3-6 for a sample of a completed revision block. Revision blocks are placed on the cover sheet only.

Mark	Sheet	REVISION		Initial
∇	1A,4A	MOD NO.1, REVISED SHT 1,4	4/04	L.E.N.

Revision Block Figure 3-6

Date Stamp

Each drawing must contain a date stamp that includes the latest date the file was worked on, the AutoCAD release number, the drawing path name, and the file name (including any external references). It is to be located vertically, on the left side of the border sheet, outside the border. Figure 3-7 below shows a sample of the date stamp.

12/1/04 16:24 CEVERMAN R15 P:\JELA\123456\DRAWINGS\ARCH\1STFLOOR.DWG

Date Stamp Figure 3-7

All standard border sheets, approval and revision blocks, and the date stamp are available through the NPS AutoCAD Tools. See Chapter 5, AutoCAD Customization.



Chapter 4

Drafting Practices

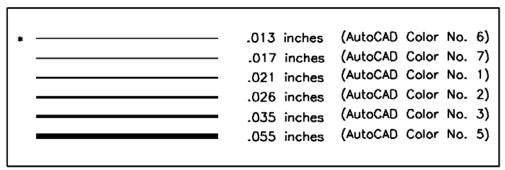
Drafting Practices

All NPS drawings are microfilmed and are often printed as half size (11x17) prints. All drawings must be capable of being reproduced as clear and legible half-size prints. Line quality and adequate lettering size are essential to meet these requirements. By following the recommended line weights and the DSC Standard Pen/Color Configuration (Figure 4-2), all drawing files will be reproducible as clear and legible half size drawings.

Line Weights

Any new work should be easily distinguishable from other information shown on the drawings. Show new work at 100% (unscreened) and show existing conditions, including text, screened at 50%. Background information shown for orientation or clarification may be screened at 50%.

Varying line widths on drawings substantially improve their readability. The line widths shown in Figure 4-1 have been established as the standard line widths for DSC CAD drawings. No line weight should be less than .013" in thickness.



^{*} Minimum line weight accepted for object lines.

Figure 4-1

Pen Colors

Colors relate to pen weights (line widths) that are mapped to the plotters. All drawings will be generated using the DSC Pen/Color Configuration. See Figure 4-2.

The Pen/Color Configuration chart shows the color numbers that represent each specific line width, as mapped to the plotters. The chart includes colors that are mapped for plotting 100% density, 50% density (screened), and 30% density (screened). The 30% screened pattern is not recommended for use, other than poche, symboling or hatching. If used, please note that it may or may not reproduce clearly or legibly, and portions could be lost.

Masked Colors

The masking colors, 136 and 137, plot like an eraser and can overwrite or mask other pens. If you use the solid command to create a solid using color 136, that solid could mask objects "underneath" (in the context of the DRAWORDER command). Objects "above" the solid would print. An example for using one of the masked colors would be to hide a portion of a contour line which would otherwise run through text.

PEN/COLOR CONFIGURATION

Plotted full size	Rapido	Decimal	%	Color Number	Color Number
	1	.021	100%	Red 1,33,65,97	129,161,193,225
	2	.026	100	Yellow 2,34,66,98	130,162,194,226
	3	.035	100	Green 3,35,67,99	131,163,195,227
	000	.010	100	Cyan 4,36,68,100	132,164,196,228
	5	.055	100	Blue 5,37,69,101	133,165,197,229
	00	.013	100	Magenta 6,38,70,102	134,166,198,230
	0	.017	100	White 7,39,71,103	135,167,199,231
	No plot	-	_	Dk Grey 8,40,72,104	136 Nask' Colors
	No plot	-	-	Grey 9,41,73,105	137 Mask Colors
	0	.017	50	10,42,74,106	138,170,202,234
	1	.021	50	11,43,75,107	139,171,203,235
***************************************	2	.026	50	12,44,76,108	140,172,204,236
	3	.035	50	13,45,77,109	141,173,205,237
	000	.010	50	14,46,78,110	142,174,206,238
	5	.055	50	15,47,79,111	143,175,207,239
	00	.013	50	16,48,80,112	144,176,208,240
	No plot	_	_	17,49,81,113	
	No plot	-	-	18,50,82,114	
	No plot	-	-	19,51,83,115	
***************************************	0	.017	30	20,52,84,116	
	1	.021	30	21,53,85,117	
	2	.026	30	22,54,86,118	
	3	.035	30	23,55,87,119	
	000	.010	30	24,56,88,120	
	5	.055	30	25,57,89,121	
***************************************	00	.013	30	26,58,90,122	
	4	.043	100	27,59,91,123	
	4	.043	50	28,60,92,124	
	4	.043	30	29,61,93,125	
	6	.067	100	30,62,94,126	
	6	.067	50	31,63,95,127	
	6	.067	30	32,64,96,128	

Figure 4-2

Lettering

Standard text height is .130 and should be maintained for most drawing annotation. A minimum lettering height of .110 is acceptable, when used for special purposes such as symboling or stacked fractions.

The following pen and lettering sizes are required for full size drawings so that text will be easily readable after drawings are reduced to half-size.

Use	Printed Height	Pen Width	Colors
Standard text and dimensions	0.13	0.017	White (7), 39, 71, 103, 135, 167, 199, 231
Sub-titles, headings	0.14	0.021	Red (1), 33, 65, 97, 129, 161, 193, 225
Plan titles, detail titles, section or detail call outs.	0.175	0.026	Yellow (2), 34, 66, 98, 130, 162, 194, 226
Absolute minimum text height, used for stacked fractions, symbols	0.110	0.013	Magenta (6), 38, 70, 102, 134, 166, 198, 230

See Figure 4-2, DSC Pen Color/Configuration chart, for color numbers for screened text.

Text Styles

Standard text fonts (styles) to be used on all DSC drawings are the roman simplex (romans.shx), or the architectural (arch.shx). See Figure 4-3 for examples of the lettering styles. The romans.shx font provides the maximum readability and transportability of text entities between CAD drawings. The clarity of this font provides the ability to plot readable text at a height of 0.110 inches (DSC minimum). The arch.shx font is not a standard AutoCAD font, but has been approved as an option for architectural style text and is available through the NPS AutoCAD Tools.

Lettering Styles

ROMANS AT .130 - PEN 7
ROMANS AT .140 - PEN 1
ROMANS AT .175 - PEN 2
ROMANS AT .240 - PEN 3

ARCH AT .130 - PEN 1
ARCH AT .140 - PEN 1
ARCH AT .175 - PEN 2
ARCH AT .240 - PEN 3

Figure 4-3

TWIZ – An NPS AutoCAD Tools command called "TWIZ" (Text Wizard) is available to configure your text styles based on user selected options. The TWIZ command can be entered at the AutoCAD command prompt, selected from the NPS General Toolbar, or selected from the Command Add-ons located in the NPS pull down menu.

Dimensions

DWIZ -Another NPS AutoCAD Tools command similar to the text wizard is called "DWIZ" (Dimension Wizard). DWIZ configures your dimension styles based on user selected options. The command can be entered at the AutoCAD command prompt, selected from the NPS General Toolbar, or selected from the Command Add-ons located in the NPS pull down menu.

Standard Details

In an effort to keep layers at a minimum, the DSC layering standard for details incorporates only the necessary layers needed for editing the details easily.

The list below defines the needs that should be met to ensure compatibility with DSC AutoCAD drawings.

- All details shall be drawn full size in model space
- Layering shall be as follows (with c indicating civil for discipline type)

<u>Layer Name</u>	<u>Description</u>
c-detl-objt	for objects and anything other than annotation and hatching
c-detl-anno	for text and dimensioning
c-detl-htch-bdry	for hatch boundary polylines
c-detl-htch	for hatch patterns
z-noplot	for user information

- architectural detail layers would start with an a-
- landscape detail layers would start with an l-
- electrical detail layers would start with an e-
- etc.
- Dimension style should be associative
- Use standard DSC text styles
- Hatch should be associative
- Hatch boundary use a noplot polyline (on layer detl-htch-bdry) to create boundary for hatch.
- Creator shall use the z-noplot layer for user information such as plot scale, etc. Place any user information below the detail on this z-noplot layer.
- Details should be drawn following standards identified in the Director's Order 10A guideline to insure compatibility and half-size reproducibility.
- Details should be drawn using the DSC CAD Standard Pen/Color Configuration.



Chapter 5 AutoCAD

Customization

Customization

NPS AutoCAD Tools

This section is designed to give information on AutoCAD customization that has been developed for the Denver Service Center. Repetitively used setups, commands and symbols have been customized and made available to users to add functionality to the AutoCAD program, specific to the needs of the NPS design and construction program.

The NPS AutoCAD Tools can be downloaded from the following website: https://www.nps.gov/dscw/ds-cad-drafting.htm

The NPS Pulldown Menu

After installation and configuration of the NPS AutoCAD Tools, a NPS pulldown menu will appear on the AutoCAD menu bar. This pulldown menu contains access to customized commands and toolbars created for use in preparing design and construction drawings for the NPS. The NPS pulldown menu offers:

- Command Add-ons A list of custom commands
- Toolbars
 Discipline specific toolbars

Command Add-ons

The Command Add-ons menu selection brings up a dialogue box listing all custom commands available to the user and a general description of each commands function. Instructions are contained in the dialogue box, which allow the user to browse the list of commands, select a command for use, or generate a more detailed description of the selected command functionality. See Appendix B for a list of the DSC specific commands.

Toolbars

The Toolbars menu displays selections for the Main Toolbar, and the discipline specific toolbars that have been developed to meet DSC needs. See Appendix C for DSC Custom Toolbars.

The Main Toolbar

The Main Toolbar brings up a menu that offers a main toolbar with flyouts or individual toolbars that contain the main tools, grouped by function. The Main Toolbar was created to provide easy access to DSC specific functions that benefit all users.

Main/Tools

Icon Menu - Will take the user directly to the Icon Menu for

selection of symbols

Add-on Commands - Custom commands

Open Recent Drawing - Displays a list of recently opened drawings for

user selection

Get Layer - Displays the layer of user selected object Get Point Between - Allows user to find midpoint of 2 selected

points while in a command

Main/Object Properties

Layer Set - Set Current Layer All Layers On - Turns on all layers

Layer Off - Turns off selected layers

Thaw All Layers - Thaws all layers

Layer Freeze - Freezes selected layers
Layer Lock - Locks selected layers
Layer Unlock - Unlocks selected layers

Set Layer/Color/Ltype - Sets layer, color and/or linetype to match

existing objects

Text Set - Select text to match attributes

Main/Modify Objects

Change Layer - Changes the layer of objects

Copy Properties - Changes properties to match selected objects

Change Text Height - Changes text height of selected text

Main/Construction Entities

Freestyle Construction Line - Construction line drawn in no-plot pen

X-axis - Draws construction line across x-axis at point

specified

Y-axis - Draws construction line across y-axis at point

specified

X-Y axis - Draws construction line across x and y axis at

point specified

Point - Places a point (node) at user specified location

(no plot)

Erase Construction Entities - Erases selected construction entities

The General Toolbar

The general toolbar is used by all disciplines on design and construction drawings. It contains the standard drawing sheet symbols for NPS drawings and has been divided into 6 flyouts.

General

Sheet specific symbols

Insert 2nd sheet - takes user to the Icon Menu for border

sheet selection

Scale Markers - takes user to a dialogue box for selecting

scale options

North Arrow - standard NPS north arrow

Detail specific symbols

Section Cuts - standard NPS section cut
Detail Titles - standard NPS detail titles
Elevation Target - standard elevation target

Detail Identification - detail bubble, multiple functions. Dimension Wizard - imports and sets up dimension style, based on

user selections

Text Wizard - imports and sets up text style, based on user

selections

Leaders - arc leader lines - 3 pt or 4 pt (single or double arc)

- loop leader lines - 3 pt or 4 pt (single or double

arc)

- 'into' leader lines - 3 pt or 4 pt (single or double

arc)

Break lines - arc break symbol

- straight line break symbol

- stacked fractions

The Architectural Toolbar

The architectural toolbar supports the architectural design features.

Architectural

Architectural Plumbing fixtures - This icon takes users to the Icon Menu

for selection of plumbing fixtures

Architectural Labels - flyout offers wall, door, room and

window labels

Door Swing - flyout containing one icon for creating door

swings, and one icon for batt insulation

The Civil Toolbar

The civil toolbar is divided into three flyouts. The first flyout offers users five categories of symbols specific to civil engineering. The second flyout offers linetypes. The third flyout is for accessing hatch patterns.

Civil

General civil symbols

Drainage symbols

Sewer symbols

Water symbols

Plumbing symbols

General linetypes

Engineering linetypes

- takes user to the Icon Menu specific to drainage

- takes user to the Icon Menu specific to sewer

- takes user to the Icon Menu specific to water

- takes user to the Icon Menu specific to plumbing

- takes user to the Icon Menu specific to plumbing

- takes user to the Icon Menu specific to plumbing

- takes user to the Icon Menu specific to plumbing

- takes user to the Icon Menu specific to water

- takes user to the Icon Menu specific to glumbing

- takes user to the Icon Menu specific to water

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- takes user to the Icon Menu specific to plumbing

- takes user to the Icon Menu specific to plumbing

- takes user to the Icon Menu specific to plumbing

- takes user to the Icon Menu specific to plumbing

- takes user to the Icon Menu specific to plumbing

Site linetypes - offers site specific linetypes

General hatch patterns - takes user to the Icon Menu for site related hatch patterns

The Electrical Toolbar

The electrical toolbar contains the symbols most often used on electrical drawings. By selecting the electrical engineering menu, a second menu offers the user a main electrical flyout toolbar containing symbols covering all three areas of electrical drawings or individual toolbars that are specific to the three areas of electrical engineering - power, lighting, and controls.

Electrical/Power

- contains icons for the most often used graphic symbols related to electrical power
- the last icon displays the Icon Menu for additional symbols

Electrical/Lighting

- contains icons for the most often used graphic symbols related to electrical lighting
- the last icon displays the Icon Menu for additional symbols

Electrical/Controls

- contains icons for commonly used symbols on control drawings
- the last icon displays the Icon Menu for additional symbols

The Mechanical Toolbar

The NPS mechanical toolbar contains the symbols most often used on mechanical drawings. By selecting the Mechanical Engineering menu selection, a menu offers the users a main mechanical flyout toolbar or individual toolbars that are specific to the 3 areas of mechanical engineering.

The main mechanical flyout toolbar is a toolbar with three flyouts, each flyout specific to either the HVAC, the plumbing or the fire sprinkler system symbols. The individual toolbars offer the symbols to users on separate toolbars.

Mechanical/HVAC Toolbar

- contains icons for the most often used graphic symbols for HVAC drawings
- the last icon displays the Icon Menu for additional symbols

Mechanical/Piping Toolbar

- contains icons for the most often used graphic symbols for plumbing/piping drawings
- the last icon displays the Icon Menu for additional symbols

Mechanical/Fire Sprinkler Toolbar

- Contains icons offering graphic symbols for fire sprinkler system drawings

The Structural Toolbar

The structural toolbar was developed to aid in the design and graphic representation of structural elements throughout the design and construction documents.

Structural

DD Welds - weld symbol editor dialogue box
W section - flyout containing steel shapes
- flyout containing one icon for bolt construction and one

icon for nut construction

Gridline - construction of grid lines and grid bubble (grid mark)

Graph $f_{(X)}$ - This function draws a graph of a mathematical expression that you input using AutoCAD's calculator syntax.

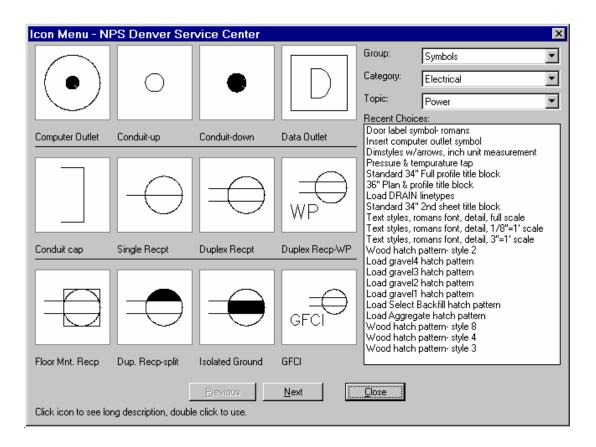
Appendix D offers individual icon descriptions for each icon shown on the DSC Custom Toolbars.

Symbols

Icon Menus

The graphic symbols used on NPS design and construction drawings can best be accessed by selecting the Icon Menu icon from the discipline specific toolbars. The Icon Menu can also be accessed by typing "ICONMENU" at the command prompt and selecting the descriptive group, category and topic (in that order) that the symbol would be found under. When group, category and topic are selected, the Icon Menu will display the related symbols.

Below is an example of the symbol Icon Menu. In this case, the group is "Symbols", the category is "Electrical" and the topic is "Power".

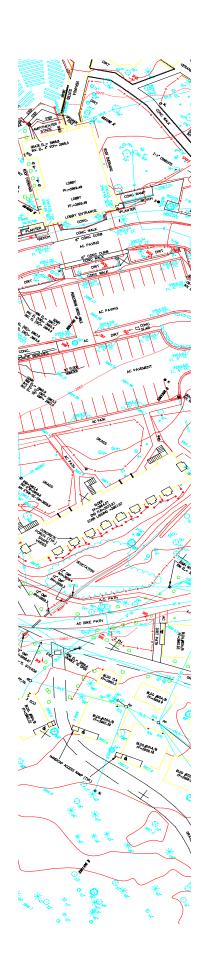


Below each symbol on the Icon Menu is a short description of the individual symbol. For a more complete description, click on the icon once. A longer description will appear on the lower left corner of the Icon Menu. To access the symbol for placement on a drawing, double click on the symbol. Once a symbol has been selected, the user is prompted for placement specifics, such as units,

scale, insertion point, rotation angle and attributes. Prompts will vary depending on the individual symbol and its common use. The "Recent Choices" list displays the most recently accessed symbols. Double clicking on a symbol description in this list can also access symbols.

Some NPS standard symbols produce graphics using a series of commands (lisp routines) based on user input, such as border sheets, section cuts, title and detail callouts and some discipline specific symbols. These are also accessible from the Icon Menu.

For a complete listing of symbols available from the Icon Menu, see Appendix E.



Chapter 6

Plotting Drawings For DSC

Plotting AutoCAD Drawings for DSC

CTB Files

When plotting AutoCAD drawings, the software controls the final output through the use of CTB (color plot style tables) files. The CTB files identify pen assignments related to color.

Drawings created for DSC shall be plotted using the DSC standard .ctb file, NPS_HP_GRAYSCALE.ctb, which is included with the NPS AutoCAD Tools. This CTB file is set up in relation to the pen/color configuration, shown on page 4-3, which must be maintained for archival and retrieval of files.

Only one .ctb pen settings file is required (AutoCAD 2000+) for both half size and full size prints. (Use "scale lineweight" feature).

Important plotting standards to be followed for archiving and maintainability include:

- Drawings are to be plotted using paper space
- DSC border sheet will always be inserted at full size in paper space
- Full size plots are achieved by plotting at a 1:1 scale. Half size plots are achieved by plotting at a 1:2 scale (Do NOT create two layouts one full size and one half size.)
- Use the NPS supplied .ctb file NPS_HP_GRAYSCALE.ctb
- Do not rename the .ctb file
- No objects are to be drawn outside the border lines (plot "Extents")
- Use no-plot color to hide viewport border
- No paper trim lines

See CAD Drafting Standards Checklist https://www.nps.gov/cad-checklist.htm for additional assistance.



Chapter 7

Deliverables and Data Exchange

Deliverables and Data Exchange

General

The need to exchange electronic drawing files between the Denver Service Center and the A/E community as well as the need to maintain consistency necessary for archival and retrieval of electronic drawings necessitates certain requirements that must be met on all projects. The following information can be used as a partial checklist of pertinent items before submitting work for approval. For a more complete checklist, see the Drafting Standards Checklist at https://www.nps.gov/cad-checklist.htm

- AutoCAD is the standard software to be used in preparing all drawing files
- Converted files are problematic, therefore, unacceptable
- One .dwg = one sub sheet
- Use DSC folder structure and file naming conventions
- Use relative path names for external references
- Use DSC Pen/Color Configuration
- Minimum text height is .130
- Use NPS supplied .ctb file NPS_HP_GRAYSCALE.ctb

Delivery Media

For required deliverables (electronic and hard copy) see the DSC Workflows website at https://www.nps.gov/dscw/deliverables.htm



Appendix A DSC Template Drawings

Appendix A DSC Template Drawings

Architectural

Layer List for C:\Program Files\NPS AutoCAD Tools\Proto\Arch.dwt

Layer List for C:1Program FilesinPS AutoCAD Tools/Proto/Arch.dwt			
Layer Name	Linetype	Description	
A-CLNG-GRID	CONTINUOUS	Ceiling grid	
A-COLS	CONTINUOUS	Columns	
A-COLS-BUBB	CONTINUOUS	Column bubble	
A-COLS-GRID	CENTER	Column grid	
A-DETL	CONTINUOUS	Details	
A-DETL-ANNO	CONTINUOUS	Detail text and dimensioning	
A-DETL-HTCH	CONTINUOUS	Detail hatch patterns	
A-DETL-HTCH-BDRY	CONTINUOUS	Detail hatch boundary polylines	
A-DETL-OBJT	CONTINUOUS	Detail objects	
A-DIMS	CONTINUOUS	Dimensions	
A-DOOR	CONTINUOUS	Doors	
A-DOOR-JAMB	CONTINUOUS	Door jambs	
A-ELEV	CONTINUOUS	Elevations	
A-FURN	CONTINUOUS	Furniture	
A-GLAZ	CONTINUOUS	Windows, window walls, curtain walls, glazed partitions	
A-HTCH	CONTINUOUS	Hatching	
A-PLUM-FIXT	CONTINUOUS	Plumbing fixtures	
A-ROOF	CONTINUOUS	Roof	
A-SECT	CONTINUOUS	Sections	
A-SYMS	CONTINUOUS	Symbols	
A-SYMS-LABL	CONTINUOUS	Labels: door, window, wall, etc.	
A-TEXT	CONTINUOUS	Text	
A-WALL	CONTINUOUS	Walls	
A-WIND	CONTINUOUS	Windows	
Z-BRDR	CONTINUOUS	Standard second sheet border	
Z-CONST	CONTINUOUS	Construction lines (no plot)	
Z-NOPLOT	CONTINUOUS	No plot	
Z-README	CONTINUOUS	Operator information for the drawing	
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrow, title bubbles, etc.	

Civil Details

Layer List for C:\Program Files\NPS AutoCAD Tools\Proto\CivIdetI.dwt

Layer Name	Linetype	Description
C-DETL	CONTINUOUS	Details
C-DETL-ANNO	CONTINUOUS	Detail text and dimensioning
C-DETL-HTCH	CONTINUOUS	Detail hatch patterns
C-DETL-HTCH-BDRY	CONTINUOUS	Detail hatch boundary polylines
C-DETL-OBJT	CONTINUOUS	Detail objects
C-DIMS	CONTINUOUS	Dimensions
C-ELEV	CONTINUOUS	Elevations
C-HTCH	CONTINUOUS	Hatching
C-SECT	CONTINUOUS	Sections
C-TEXT	CONTINUOUS	Text
Z-BRDR	CONTINUOUS	Standard 2nd sheet border
Z-CONST	CONTINUOUS	Construction lines (no plot)
Z-NOPLOT	CONTINUOUS	No plot
Z-README	CONTINUOUS	Operator information for the drawing
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrow, title bubbles, etc.

Civil Site

Layer List for C:\Program Files\NPS AutoCAD Tools\Proto\CivIsite.dwt

Layer Name	Linetype	Description
C-BLDG	CONTINUOUS	Building footprints
C-BLDG-EXST	CONTINUOUS	Existing building footprints
C-DETL	CONTINUOUS	Details
C-DETL-ANNO	CONTINUOUS	Detail text and dimensioning
C-DETL-HTCH	CONTINUOUS	Detail hatch patterns
C-DETL-HTCH-BDRY	CONTINUOUS	Detail hatch boundary polylines
C-DETL-OBJT	CONTINUOUS	Detail objects
C-DIMS	CONTINUOUS	Dimensions
C-ELEV	CONTINUOUS	Elevations
C-HTCH	CONTINUOUS	Hatching
C-PKNG	CONTINUOUS	Parking lots
C-PKNG-EXST	CONTINUOUS	Existing parking
C-ROAD	CONTINUOUS	Roads
C-ROAD-EXST	CONTINUOUS	Existing roads
C-SECT	CONTINUOUS	Sections
C-SSWR	SAN_SEWER	Sanitary sewer (manholes, pumping stations)
C-SSWR-EXST	SAN_SEWER	Existing sanitary sewer
C-STRM	STM_SEWER	Storm drainage
C-STRM-EXST	STM_SEWER	Existing storm drainage
C-SYMS	CONTINUOUS	Symbols
C-TEXT	CONTINUOUS	Text
C-TOPO	CONTINUOUS	Index contour lines and elevations
C-TOPO-EXST	CONTINUOUS	Existing index contour lines and elevations
C-TOPO-INTR	CONTINUOUS	Intermediate contour lines
C-TOPO-INTR-EXST	CONTINUOUS	Existing intermediate contour lines
C-WATR	WATER	Domestic water (manholes, pumping stations, storage tanks)
C-WATR-EXST	WATER	Existing domestic water
Z-BRDR	CONTINUOUS	Standard 2nd sheet border
Z-CONST	CONTINUOUS	Construction lines (no plot)
Z-NOPLOT	CONTINUOUS	No plot
Z-README	CONTINUOUS	Operator information for the drawing
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrow, title bubbles, etc.

Cover Sheet Base Information

Layer List for C:\Program Files\NPS AutoCAD Tools\Proto\Covbase.dwt

Layer Name	Linetype	Description
G-BLDG-EXST	CONTINUOUS	Existing buildings and structures
G-BLDG-TEXT	CONTINUOUS	Building,structure text
G-CITY-BDRY	CONTINUOUS	City boundary lines
G-CITY-TEXT	CONTINUOUS	Text for city boundaries
G-CNTY-LINE	CENTERX2	County boundary lines
G-CNTY-TEXT	CONTINUOUS	Text for county boundaries
G-DIMS	CONTINUOUS	Dimensions
G-FENC	FENCELINE1	Fences
G-FENC-TEXT	CONTINUOUS	Fences - text
G-GEOG	CONTINUOUS	Geographic features - mountains, canyons, etc.
G-GEOG-TEXT	CONTINUOUS	Text associated with geographic features
G-HTCH	CONTINUOUS	Hatching
G-HTCH-BDRY	CONTINUOUS	Hatch boundary polylines
G-MAJR-ROAD	CONTINUOUS	Major roads
G-MAJR-ROAD-TEXT	CONTINUOUS	Major roads - text
G-MINR-ROAD	CONTINUOUS	Minor roads
G-MINR-ROAD-TEXT	CONTINUOUS	Minor roads - text
G-PARK-BDRY	CENTER	Park boundaries
G-PARK-NAME	CONTINUOUS	Park name
G-RAIL	TRACKS	Railroad
G-RAIL-TEXT	CONTINUOUS	Railroad text
G-RIVR	RIVER1	River
G-RIVR-TEXT	CONTINUOUS	River - text
G-STAT-LINE	PHANTOM2	State line
G-STAT-TEXT	CONTINUOUS	State line - text
G-SYMS	CONTINUOUS	Symbols
G-SYMS-TEXT	CONTINUOUS	Symbols - text
G-TRAL	HIDDENX2	Trails
G-TRAL-TEXT	CONTINUOUS	Trails - text
G-TREE-LINE	CLOUD2	Tree lines
G-TREE-TEXT	CONTINUOUS	Trees - text
Z-BRDR	CONTINUOUS	Standard 2nd sheet border
Z-CONST	CONTINUOUS	Construction lines (no plot)
Z-NOPLOT	CONTINUOUS	No plot
Z-README	CONTINUOUS	Operator information for the drawing
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrow, title bubbles, etc.

Cover Sheet Project Specific Information Layer List for C:\Program Files\NPS AutoCAD Tools\Proto\Covproj.dwt

Layer Name	Linetype	Description
G-INDX-HEAD	CONTINUOUS	Index header
G-INDX-TEXT	CONTINUOUS	Index text
G-PROJ-AROW	CONTINUOUS	Project arrow - locates specific project location
G-PROJ-BASE	CONTINUOUS	Existing site map - converted file (no layers)
G-NOTE	CONTINUOUS	Notes
G-SYMS	CONTINUOUS	Symbols
G-SYMS-LGND	CONTINUOUS	Map symbols and legend
Z-BRDR	CONTINUOUS	Cover Sheet border
Z-CONST	CONTINUOUS	Construction lines (no plot)
Z-NOPLOT	CONTINUOUS	No plot
Z-README	CONTINUOUS	Operator information for the drawing
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrow, title bubbles, etc.

Electrical

Layer List for C:\Program Files\NPS AutoCAD Tools\Proto\Elec.dwt

Layer Name	Linetype	Description
E-DETL	CONTINUOUS	Details
E-DETL-ANNO	CONTINUOUS	Detail text and dimensioning
E-DETL-HTCH	CONTINUOUS	Detail hatch patterns
E-DETL-HTCH-BDRY	CONTINUOUS	Detail hatch boundary polylines
E-DETL-OBJT	CONTINUOUS	Detail objects
E-DIMS	CONTINUOUS	Dimensions
E-ELEV	CONTINUOUS	Elevations
E-HTCH	CONTINUOUS	Hatching
E-LITE	CONTINUOUS	Lighting
E-LITE-CIRC	CONTINUOUS	Lighting circuits
E-LITE-SITE	CONTINUOUS	Site lighting
E-POWR	CONTINUOUS	Power
E-POWR-CIRC	CONTINUOUS	Power circuits
E-POWR-EQPM	CONTINUOUS	Power equipment
E-POWR-SITE	CONTINUOUS	Site power
E-POWR-SITE-EXST	CONTINUOUS	Existing site power
E-POWR-WALL	CONTINUOUS	Power wall outlets and receptacles
E-SECT	CONTINUOUS	Sections
E-SYMS	CONTINUOUS	Symbols
E-TEXT	CONTINUOUS	Text
Z-BRDR	CONTINUOUS	Standard 2nd sheet border
Z-CONST	CONTINUOUS	Construction lines (no plot)
Z-NOPLOT	CONTINUOUS	No plot
Z-README	CONTINUOUS	Operator information for the drawing
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrow, title bubbles, etc.

Electrical Auxillary Layer List for C:\Program Files\NPS AutoCAD Tools\Proto\Elecaux.dwt

Layer Name	Linetype	Description
E-CCTV	CONTINUOUS	Closed circuit TV
E-COMM	CONTINUOUS	Telephone communication outlets
E-DETL	CONTINUOUS	Details
E-DETL-ANNO	CONTINUOUS	Detail text and dimensioning
E-DETL-HTCH	CONTINUOUS	Detail hatch patterns
E-DETL-HTCH-BDRY	CONTINUOUS	Detail hatch pattern boundary
E-DETL-OBJT	CONTINUOUS	Detail objects
E-DIMS	CONTINUOUS	Dimensions
E-ELEV	CONTINUOUS	Elevations
E-FIRE	CONTINUOUS	Fire alarm and fire extinguishers
E-HTCH	CONTINUOUS	Hatching
E-INTC	CONTINUOUS	Intercom system
E-LTNG	CONTINUOUS	Lightning protection system
E-SECT	CONTINUOUS	Sections
E-SERT	CONTINUOUS	Security
E-SOUN	CONTINUOUS	Sound or PA system
E-SYMS	CONTINUOUS	Symbols
E-TEXT	CONTINUOUS	Text
Z-BRDR	CONTINUOUS	Standard 2nd sheet border
Z-CONST	CONTINUOUS	Construction lines (no plot)
Z-NOPLOT	CONTINUOUS	No plot
Z-README	CONTINUOUS	Operator information for the drawing
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrow, title bubbles, etc.

Fire

Layer List for C:\Program Files\NPS AutoCAD Tools\Proto\Fire.dwt

Layer Name	Linetype	Description
F-DETL	CONTINUOUS	Details
F-DETL-ANNO	CONTINUOUS	Detail text and dimensioning
F-DETL-HTCH	CONTINUOUS	Detail hatch patterns
F-DETL-HTCH-BDRY	CONTINUOUS	Detail hatch boundary polylines
F-DETL-OBJT	CONTINUOUS	Detail objects
F-DIMS	CONTINUOUS	Dimensions
F-ELEV	CONTINUOUS	Elevations
F-HTCH	CONTINUOUS	Hatching
F-SECT	CONTINUOUS	Sections
F-SPRN	CONTINUOUS	Fire protection sprinkler system
F-SPRN-CLHD	CONTINUOUS	Sprinkler head (ceiling)
F-SPRN-OTHD	CONTINUOUS	Sprinkler head (other)
F-SPRN-PIPE	CONTINUOUS	Sprinkler piping
F-STAN	CONTINUOUS	Fire protection standpipe system
F-SYMS	CONTINUOUS	Symbols
F-TEXT	CONTINUOUS	Text
Z-BRDR	CONTINUOUS	Standard 2nd sheet border
Z-CONST	CONTINUOUS	Construction lines (no plot)
Z-NOPLOT	CONTINUOUS	No plot
Z-README	CONTINUOUS	Operator information for the drawing
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrow, title bubbles, etc.

LA Details

Layer List for C:\Program Files\NPS AutoCAD Tools\Proto\LadetI.dwt

Layer Name	Linetype	Description
L-DETL	CONTINUOUS	Details
L-DETL-ANNO	CONTINUOUS	Detail text and dimensioning
L-DETL-HTCH	CONTINUOUS	Detail hatch patterns
L-DETL-HTCH-BDRY	CONTINUOUS	Detail hatch boundary polylines
L-DETL-OBJT	CONTINUOUS	Detail objects
L-DIMS	CONTINUOUS	Dimensions
L-ELEV	CONTINUOUS	Elevations
L-HTCH	CONTINUOUS	Hatching
L-SCHD	CONTINUOUS	Schedules
L-SECT	CONTINUOUS	Sections
L-SYMS	CONTINUOUS	Symbols
L-TEXT	CONTINUOUS	Text
Z-BRDR	CONTINUOUS	Standard 2nd sheet border
Z-CONST	CONTINUOUS	Construction lines (no plot)
Z-NOPLOT	CONTINUOUS	No plot
Z-README	CONTINUOUS	Operator information for the drawing
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrow, title bubbles, etc.

LA Site

Layer List for C:\Program Files\NPS AutoCAD Tools\Proto\Lasite.dwt

Layer Name	Linetype	Description		
L-BLDG	CONTINUOUS	Building		
L-BLDG-EXST	CONTINUOUS	Existing building		
L-DETL	CONTINUOUS	Details		
L-DETL-ANNO	CONTINUOUS	Detail text and dimensioning		
L-DETL-HTCH	CONTINUOUS	Detail hatch patterns		
L-DETL-HTCH-BDRY	CONTINUOUS	Detail hatch boundary polylines		
L-DETL-OBJT	CONTINUOUS	Detail objects		
L-DIMS	CONTINUOUS	Dimensions		
L-ELEV	CONTINUOUS	Elevations		
L-HTCH	CONTINUOUS	Hatching		
L-IRRG	CONTINUOUS	Irrigation system		
L-PKNG	CONTINUOUS	Parking		
L-PLNT	CONTINUOUS	Plant and landscape materials		
L-PROP	CONTINUOUS	Property lines and survey benchmarks		
L-ROAD	CONTINUOUS	Roads		
L-SECT	CONTINUOUS	Sections		
L-SITE	CONTINUOUS	Site improvements		
L-SYMS	CONTINUOUS	Symbols		
L-TEXT	CONTINUOUS	Text		
L-TOPO	CONTINUOUS	Index contour lines and elevations		
L-TOPO-EXST	CONTINUOUS	Existing index contour lines and elevations		
L-TOPO-INTR	CONTINUOUS	Intermediate contour lines		
L-TOPO-INTR-EXST	CONTINUOUS	Existing intermediate contour line		
L-WALK	CONTINUOUS	Walks and steps		
Z-BRDR	CONTINUOUS	Standard 2nd sheet border		
Z-CONST	CONTINUOUS	Construction lines (no plot)		
Z-NOPLOT	CONTINUOUS	No plot		
Z-README	CONTINUOUS	Operator information for the drawing		
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrow, title bubbles, etc.		

Mechanical

Layer List for C:\Program Files\NPS AutoCAD Tools\Proto\Mech.dwt

Layer List for C:\Program Files\NP5 AutoCAD Tools\Proto\wech.dwt				
Layer Name	Linetype	Description		
M-CONT	CONTINUOUS	Controls and instrumentation		
M-CWTR-EQPM	CONTINUOUS	Chilled water equipment		
M-CWTR-RTRN	CHILL_RETURN	Chilled water return piping		
M-CWTR-SUPL	CHILL_SUPPLY	Chilled water supply piping		
M-DETL	CONTINUOUS	Details		
M-DETL-ANNO	CONTINUOUS	Detail text and dimensioning		
M-DETL-HTCH	CONTINUOUS	Detail hatch patterns		
M-DETL-HTCH-BDRY	CONTINUOUS	Detail hatch boundary polylines		
M-DETL-OBJT	CONTINUOUS	Detail objects		
M-DIMS	CONTINUOUS	Dimensions		
M-ELEV	CONTINUOUS	Elevations		
M-ELHT-EQPM	CONTINUOUS	Electric heat equipment		
M-EXHS	CONTINUOUS	Exhaust system		
M-EXHS-DUCT	CONTINUOUS	Exhaust system ductwork		
M-EXHS-EQPM	CONTINUOUS	Exhaust system equipment		
M-EXHS-RFEQ	CONTINUOUS	Rooftop exhaust equipment		
M-FUEL	CONTINUOUS	Fuel system piping		
M-HOTW-EQPM	CONTINUOUS	Hot water equipment		
M-HOTW-RTRN	HOT_RETURN	Heating water return piping		
M-HOTW-SUPL	HOT_SUPPLY	Heating water supply piping		
M-HTCH	CONTINUOUS	Hatching		
M-HVAC	CONTINUOUS	HVAC system		
M-HVAC-CDFF	CONTINUOUS	HVAC diffusers (ceiling)		
M-HVAC-DUCT	CONTINUOUS	HVAC ductwork		
M-HVAC-EQPM	CONTINUOUS	HVAC equipment		
M-HVAC-ODFF	CONTINUOUS	HVAC diffusers (other)		
M-SECT	CONTINUOUS	Sections		
M-SYMS	CONTINUOUS	Symbols		
M-TEXT	CONTINUOUS	Text		
Z-BRDR	CONTINUOUS	Standard 2nd sheet border		
Z-CONST	CONTINUOUS	Construction lines (no plot)		
Z-NOPLOT	CONTINUOUS	No plot		
Z-README	CONTINUOUS	Operator information for the drawing		
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrow, title bubbles, etc.		

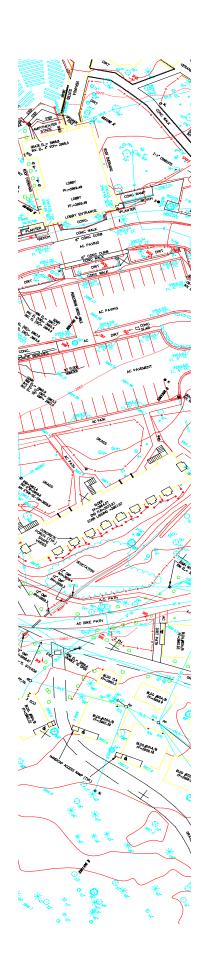
Plumbing
Layer List for C:\Program Files\NPS AutoCAD Tools\Proto\Plumb.dwt

Layer Name	Linetype	Description		
P-DETL	CONTINUOUS	Details		
P-DETL-ANNO	CONTINUOUS	Detail text and dimensioning		
P-DETL-HTCH	CONTINUOUS	Detail hatch patterns		
P-DETL-HTCH-BDRY	CONTINUOUS	Detail hatch boundary polylines		
P-DETL-OBJT	CONTINUOUS	Detail objects		
P-DIMS	CONTINUOUS	Dimensions		
P-DOMW-COLD	COLDWATER	Domestic cold water		
P-DOMW-EQPM	CONTINUOUS	Domestic hot and cold water equipment		
P-DOMW-HOTR	HOTRTN	Domestic hot water return		
P-DOMW-HOTS	HOTWATER	Domestic hot water supply		
P-DOMW-PIPE	CONTINUOUS	Domestic hot and cold water piping		
P-DOMW-RISR	CONTINUOUS	Domestic hot and cold water risers		
P-ELEV	CONTINUOUS	Elevations		
P-HTCH	CONTINUOUS	Hatching		
P-SANR	CONTINUOUS	Sanitary drainage		
P-SANR-FIXT	CONTINUOUS	Plumbing fixtures		
P-SANR-FLDR	CONTINUOUS	Floor drains		
P-SANR-PIPE	CONTINUOUS	Sanitary piping		
P-SANR-RISR	CONTINUOUS	Sanitary risers		
P-SECT	CONTINUOUS	Sections		
P-STRM	CONTINUOUS	Storm drainage system		
P-STRM-PIPE	CONTINUOUS	Storm drain piping		
P-STRM-RFDR	CONTINUOUS	Roof drains		
P-STRM-RISR	CONTINUOUS	Storm drain risers		
P-SYMS	CONTINUOUS	Symbols		
P-TEXT	CONTINUOUS	Text		
P-VENT	VENT	Vent		
P-WASTE	WASTEUG	Waste - below grade		
Z-BRDR	CONTINUOUS	Standard 2nd sheet border		
Z-CONST	CONTINUOUS	Construction lines (no plot)		
Z-NOPLOT	CONTINUOUS	No plot		
Z-README	CONTINUOUS	Operator information for the drawing		
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrows, title bubbles, etc.		

Structural

Laver List for C:\Program Files\NPS AutoCAD Tools\Proto\Struc.dwt

Layer Name	Linetype	Description		
S-ABLT	CONTINUOUS	Anchor bolts		
S-BEAM	CONTINUOUS	Beams		
S-COLS	CONTINUOUS	Columns		
S-DETL	CONTINUOUS	Details		
S-DETL-ANNO	CONTINUOUS	Detail text and dimensioning		
S-DETL-HTCH	CONTINUOUS	Detail hatch patterns		
S-DETL-HTCH-BDRY	CONTINUOUS	Detail hatch boundary polylines		
S-DETL-OBJT	CONTINUOUS	Detail objects		
S-DIMS	CONTINUOUS	Dimensions		
S-ELEV	CONTINUOUS	Elevations		
S-FNDN	CONTINUOUS	Foundation		
S-FNDN-PILE	CONTINUOUS	Foundation piles and drilled piers		
S-FNDN-RBAR	CONTINUOUS	Foundation reinforcing		
S-FRAM-BEAM	CONTINUOUS	Framing beams		
S-FRAM-DECK	CONTINUOUS	Framing structural floor deck		
S-FRAM-JOIS	CONTINUOUS	Framing joists		
S-GRID	CONTINUOUS	Column grid		
S-GRID-IDEN	CONTINUOUS	Column grid tags		
S-HTCH	CONTINUOUS	Hatching		
S-METL	CONTINUOUS	Miscellaneous metal		
S-SECT	CONTINUOUS	Sections		
S-SECT-IDENT	CONTINUOUS	Section identification		
S-SLAB	CONTINUOUS	Slab		
S-SLAB-JOIN	CONTINUOUS	Slab control joints		
S-SLAB-RBAR	CONTINUOUS	Slab reinforcing		
S-SYMS	CONTINUOUS	Symbols		
S-TEXT	CONTINUOUS	Text		
S-WALL	CONTINUOUS	Structural bearing and shear walls		
Z-BRDR	CONTINUOUS	Standard 2nd sheet border		
Z-CONST	CONTINUOUS	Construction lines (no plot)		
Z-NOPLOT	CONTINUOUS	No plot		
Z-README	CONTINUOUS	Operator information for the drawing		
Z-SYMS-GENR	CONTINUOUS	General sheet info: scales, north arrow, title bubbles, etc.		



Appendix B DSC Command Add-ons

Appendix B DSC Command Add-ons

The following DSC Command Add-ons can be accessed from the NPS menu.

DSC Command Add-ons

2ldr - Creates a leader line using two arcs and an arrowhead

2lldr - Creates a loop leader line using two arcs

2tldr - Creates a leader pointing to an area, using two arcs

angle - Returns an angle by picking a vertex and beginning and ending angle

arctxt - Draws text around an arc or circle object

atext - Draws text around an arc or circle object

- Macro to break an object in two at a single point

- Draws batt insulation using a polyline

'between - Locate a point midway between two points

bolt - Draws a bolt based on user input

chlayer - Changes the layer of objects. Creates the layer if it does not exist.

chline - Globally change properties of line objects

- Globally change properties of heavy polylines. Change plinegen, bulge

fix and remove xdata.

chtext - Globally change text properties

conse - Erase construction lines, but not other objects

consline - Draw lines on a construction layer, in a no-plot color

- Draw points on a construction layer, in a no-plot color

consx - Draw a horizontal xline on a construction layer, in a no-plot color

- Draw a horizontal and vertical xline on a construction layer, in a no-plot

color

- Draw a vertical xline on a construction layer, in a no-plot color

copyrot8 - Copy and rotate together in one command

cpprop - Change properties (layer, color, linetype) of objects to those properties

of an example object

cswap - Swap colors in a drawing to bylayer, or for example, change all red

objects to yellow. Also works with objects in blocks.

ddsc/ddscalemarkers - Inserts scale markers

ddwelds - Inserts weld symbols

dets - Inserts detail titles

dtid - Inserts detail reference ID's

dwiz - Dimension Wizard will set up Dimension Styles

eugroups - Explode all unnamed groups

explore - Starts Windows Explorer in the folder of the current drawing

fcr - Macro to draw a rectangular 3d-face by picking 2 corners. Includes an

elevation option.

Forces leaders to have arrowheads rather than ticks or other user defined

blocks

fixmirdim - Fixes the r13c4 and r13c4a bug when mirroring dimensions (the dim text

is backwards)

fraction - Inserts stacked fractions

getlayer - Returns the layer of a selected object, esp. useful within a block or xref

gridline - Inserts grid lines and grid marks

gridmark - Inserts grid marks

iconmenu - Insert DSC symbols, 2nd sheets, details etc. from an icon driven menu

keynote - Inserts keyed notes in your drawing

ldr - Creates an arc leader line

leo - "Layer Exclusive On" turns all layers off except those specified by

name or by picking objects

leu - "Layer Exclusive Unlock" locks all layers except those specified by

name or by picking objects

lfrz - Freeze layers by name or by picking objects

lldr - Creates an arc style loop leader line

llist - Creates a text file listing the current drawing's layer settings

llock - Lock layers by name or by picking objects

- Turn off layers by name or by picking objects

lon - Macro to turn on all layers

lthaw - Macro to thaw all layers

lunlock - Unlock layers by name or by picking layers

npsmask - Mask objects behind text or other objects

npscommands - Lists all DSC customized commands and a description of each

npsmenu - Reloads the NPS menus. Use if changing the main menu has caused sub-

menus to unload

nut - Draws a nut based on user input

openxref - Allows editing of xref drawing by opening two autocad sessions

pen - Set current layer, color, linetype to those properties of a selected

object

perpdoff - Set crosshairs (snapang) to zero

- Set crosshairs (snapang) to angle of a selected line

plrev - Reverse a polyline's start/end

qpurge - (R14) A quick way to purge all objects in the drawing. Executes purge

multiple times to purge nested objects.

rmelev - Inserts room elevation callout bubbles

'se - "Select by Entity" is a quick way to select specific types of objects

(quicker than Filter)

sect - Inserts section cuts

'sl - "Select by Layer" is a quick way to select objects by the layer they're on

(quicker than Filter)

tldr - Creates an arc style leader pointing to an area

tmenu - A text only replacement for the iconmenu command. Useful when your

screen resolution is to low to run iconmenu.

- Joins polylines, lines and arcs into continuous polylines. Faster then

using Pedit/Join.

tset - Set current text font, height etc. to those of existing text object

twiz - Text Wizard will set up Text Styles

websec - Draws cross section of common steel shapes

wpoints - Write point coordinate data to a text file



Appendix C DSC Custom Toolbars

Appendix C NPS Custom Toolbars

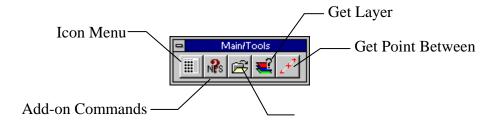
Below is a graphic representation of the NPS Main Toolbar. Additional main tools can be accessed from the flyouts off of the main toolbar or from individual toolbars that are grouped by function. To access the NPS tools in AutoCAD, select the toolbar, click on the icon and follow the prompts. For a description of the individual icon functions see Appendix D.

NPS Main Toolbar

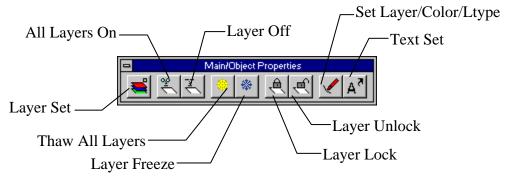


The tools available from the flyouts on the Main Toolbar have also been incorporated into individual toolbars, as shown below.

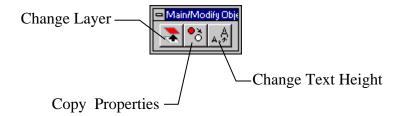
Main/Tools



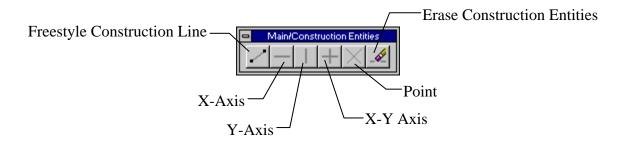
Main/Object Properties



Main/Modify Objects



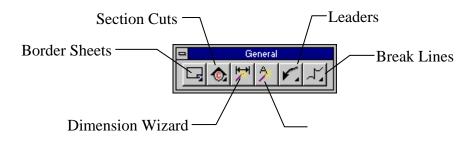
Main/Construction Entities



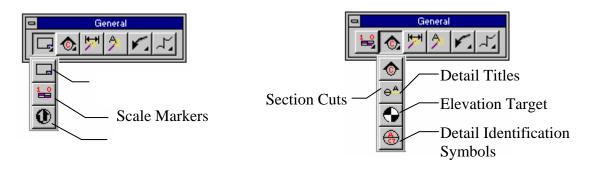
NPS General Toolbar

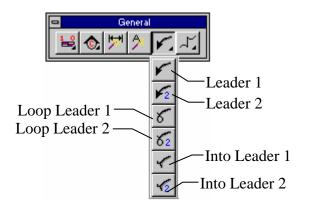
The General Toolbar is used by all disciplines. It contains the standard drawing sheet symbols for NPS drawings and is divided into four flyouts and two 'wizard' selections. See Appendix D for individual icon descriptions.

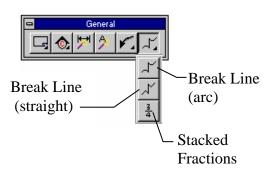
General Toolbar



General Toolbar Flyouts





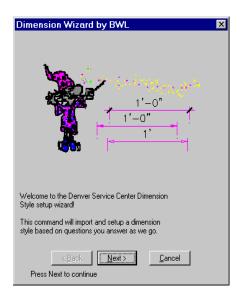


NPS Wizards

The Text Wizard and Dimension Wizard simplify the setup process for creating NPS standard text styles and dimension styles. The 'wizards' are accessed by selecting the icon from the NPS General Toolbar. A dialogue box will appear prompting for user selected settings.





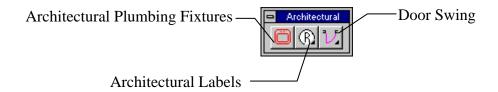


Dimension Wizard

NPS Architectural Toolbar

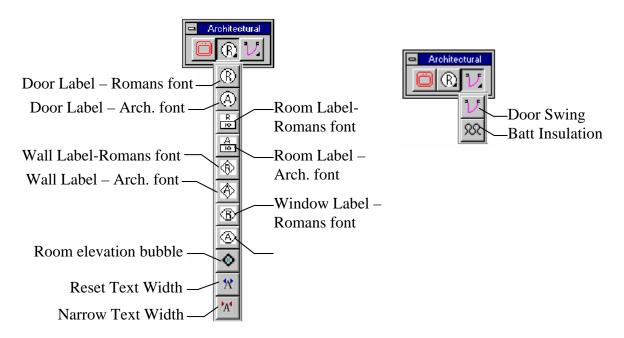
The Architectural Toolbar shown below supports the architectural design features.

Architectural Toolbar



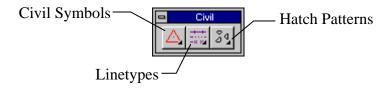
The first icon on the Architectural Toolbar will take the user to an icon menu which will offer a variety of architectural plumbing symbols. The second icon offers door, wall and window labels, accessible from a flyout. The third icon offers two routines - one for creating door swings, and the other for creating batt insulation. For a list and description of individual icons, see Appendix D. For a list and description of the individual symbols, see Appendix E.

Architectural Toolbar Flyouts

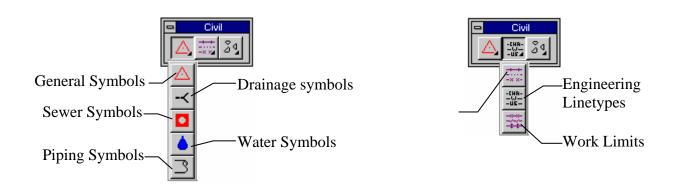


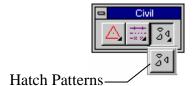
NPS Civil Toolbar

The Civil Toolbar is divided into four flyouts, which encompass civil symbols, linetypes, hatch patterns and standard details. Each flyout takes the user to an icon menu for selection of individual symbols. See Appendix D for a description of the individual icons, and Appendix E for a description of the individual symbols.



Civil Toolbar Flyouts





NPS Electrical Toolbar

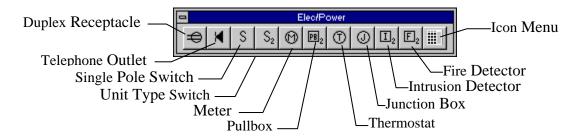
The Electrical Toolbar offers the users tools that can be accessed from flyouts off the main electrical toolbar or from individual toolbars that have been grouped by function. The electrical tools have been grouped into three categories - power, lighting and controls.

NPS Electrical Main Toolbar

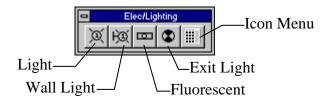


The individual toolbars created for power, lighting and controls offer users immediate access to the most often used graphic symbols for each function. The last icon on each toolbar takes the user to the icon menu for additional symbols. For a description of the individual symbols, see Appendix E.

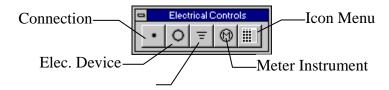
Elec/Power



Elec/Lighting



Elec/Controls



NPS Mechanical Toolbar

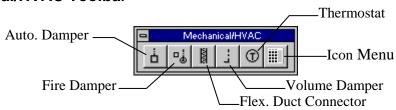
The Mechanical Toolbar offers the users tools that can be accessed from flyouts off the main mechanical toolbar or from individual toolbars that have been grouped by function. The mechanical tools have been grouped into three categories - HVAC, piping and fire sprinkler systems.

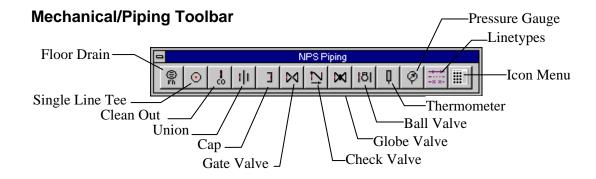
Mechanical Main Toolbar



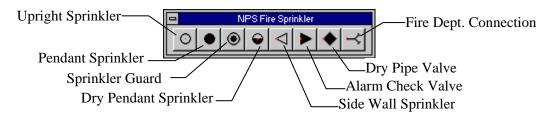
The individual toolbars created for HVAC, piping and fire sprinkler systems offer users immediate access to the most often used graphic symbols. The last icon on each toolbar takes the user to the Icon Menu for additional symbols. For a description of the individual symbols, see Appendix E.

Mechanical/HVAC Toolbar



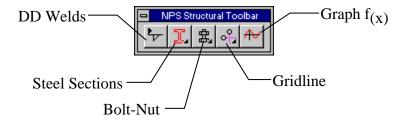


Mechanical/Fire Sprinkler Toolbar

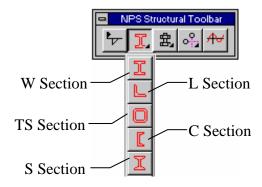


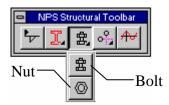
NPS Structural Toolbar

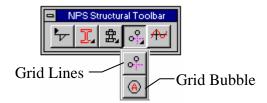
The Structural Toolbar aids in the design and representation of structural elements throughout the design and construction documents.



Structural Toolbar Flyouts









Appendix D DSC Icon Descriptions

Appendix D DSC Icon Descriptions

Note: The following buttons are grouped so that all functions on a toolbar are together. The order of the toolbars is the same order reflected in Appendix C.

Function Name	Icon	Description
NPS Main Toolbar		
Main Tools		Offers Main/Tools on a flyout
Object Properties	*	Offers object property tools on a flyout
Modify Tools	*	Offers object modify tools on a flyout
Construction Entities		Offers construction entity tools on a flyout
Main/Tools		
Icon Menu		Brings up Icon Menu for selection of symbols
Add-on Commands	№ S	Custom Commands developed for DSC use
Open Recent Drawing	Ê	Displays a list of recently opened drawings for user selection
Get Layer	Æ	Displays the layer of user selected object
Get Point Between	A7	Allows user to find midpoint of 2 selected points while in a command
Main/Object Properties		
Layer Set		Set current layer
All Layers On	\$	Turns on all layers
Layer Off	7	Turns off selected layers

Function Name	Icon	Description
Thaw all layers		Thaws all layers
Layer Freeze	*	Freezes selected layers
Layer Lock	<u>√</u>	Locks selected layers
Layer Unlock	(et	Unlocks selected layers
Set Layer/Color/Ltype	!	Sets layer, color and/or linetype to match existing objects
Text Set	A	Select text to match attributes
Main/Modify Objects		
Change Layer	*	Changes the layer of objects
Copy Properties	°	Changes properties to match selected objects
Change Text Height	AA	Changes text height of selected text
Main/Construction Entitie	es	
Freestyle Construction Line	/	Construction line drawn in no-plot pen
X-axis		Draws construction line across x-axis at point specified
Y-axis		Draws construction line across y-axis at point specified
X-Y axis	+	Draws construction line across x and y axis at point specified
Point	\times	Places a point (node) at user specified location (no plot)
Erase Construction Entities	<u>A</u>	Erases selected construction entities
General Toolbar Flyouts		
Insert 2nd Sheet		Takes user to the Icon Menu for selection of 2nd sheet border

Function Name	Icon	Description
Scale Markers	1.0	Inserts graphic scale marker based on user input
North Arrow	•	Inserts north arrow based on user input
Section cuts	©	Inserts section cuts based on user input
Detail Titles	⊕	Inserts detail/section titles based on user input
Elevation Target	•	Inserts elevation target based on user input
Detail Identification Symbols		Inserts detail bubbles based on user input
Text Wizard	<u>^</u>	Creates NPS standard text styles based on user input
Dimension Wizard	 	Creates and loads standard dimension styles based on user input
Leader 1	مسكا	Draws are leader line - 3 points - last point places arrowhead
Leader 2	F 2	Draws double are leader line - 4 points - last point places arrowhead
Loop Leader 1	8	Draws are leader line - 3 points - last point places a loop
Loop Leader 2	62	Draws double are leader line - 4 points - last point places a loop
Into Leader 1	1	Draws are leader line - 3 points - last point places an arrowhead/tilde
Into Leader 2	42	Draws double are leader line - 4 points - last point places an arrowhead/tilde
Break Line (arc)		Draws a break line and inserts an arc style break in the center
Break Line (straight)		Draws a break line and inserts a straight style break in the center
Stacked Fractions	3/4	Inserts stacked fractions based on user input

Architectural Toolbar

Architectural Plumbing Features



Takes user to the Icon Menu for a selection of plumbing features

Architectural Labels



Flyout offering door, room, wall and window labels in both the romans font and the arch font

Door Swing



Flyout offering door swing and batt insulation

Architectural Flyouts

Door Label



Door labels - Romans font

Door Label



Door labels - Architectural font

Room Label



Room labels - Romans font

Room Label



Room labels - Architectural font

Wall Label



Wall labels - Romans font

Wall Label



Wall labels - Architectural font

Window Label



Window labels - Romans font

Window Label



Window labels - Architectural font

Room Elevation



Room elevation bubble

Reset Text Width



Resets text width

Narrow Text Width



Narrows Text Width

Door Swing



Routine prompts for door swing placement

Batt Insulation



Routine prompts for batt insulation placement

Function Name	Icon	Description
Civil Toolbar Flyouts		
Civil Symbols General Symbols	Δ	Takes user to the Icon Menu for selection of general civil symbols
Drainage Symbols	<	Takes user to the Icon Menu for selection of drainage symbols
Sewer Symbols		Takes user to the Icon Menu for selection of sewer symbols
Water Symbols	•	Takes user to the Icon Menu for selection of water symbols
Plumbing Symbols	$\boxed{3}$	Takes user to the Icon Menu for selection of piping/plumbing symbols
Civil Linetypes General Linetypes	-X X-	Takes user to the Icon Menu for selection of general linetypes
Engineering Linetypes	-EHR- -IJ- -UE-	Takes user to the Icon Menu for selection of engineering linetypes
Site Linetypes		Takes user to the Icon Menu for selection of site linetypes
Civil Hatch Patterns General Hatch Patterns	åd	Takes user to the Icon Menu for site related hatch patterns
Electrical Toolbar Flyouts	5	
Electrical/Power Duplex receptacle	*	Inserts symbol based on user input
Telephone outlet	M	Inserts symbol based on user input
Single pole switch	\$	Inserts symbol based on user input
Unit type switch	S_2	Inserts symbol based on user input
Meter	Θ	Inserts symbol based on user input

Function Name	Icon	Description
Pullbox	PB ₂	Inserts symbol based on user input
Thermostat	①	Inserts symbol based on user input
Junction box	0	Inserts symbol based on user input
Intrusion detector		Inserts symbol based on user input
Fire detector	\mathbb{F}_2	Inserts symbol based on user input
Icon Menu		Takes user to the Icon Menu for selection of additional electrical power symbols
Electrical/Lighting	5-21	
Light	<u>Ø</u>	Inserts symbol based on user input
Wall Light	130	Inserts symbol based on user input
CM Fluorescent		Inserts symbol based on user input
Exit Light	•	Inserts symbol based on user input
Icon Menu		Takes user to the Icon Menu for selection of additional electrical lighting symbols
Electrical/Controls		
Connection	•	Inserts symbol based on user input
Electrical Device	\Diamond	Inserts symbol based on user input
Ground Symbol	宣	Inserts symbol based on user input
Meter Instrument	Θ	Inserts symbol based on user input
Icon Menu		Takes user to the Icon Menu for selection of additional electrical lighting symbols

Function Name Description Icon **Mechanical Toolbars** Mechanical/HVAC Auto Damper Inserts automatic damper symbol based on user input Ġ Fire Damper ا_ة Inserts fire damper symbol based on user input Flexible Duct Connector Inserts flexible duct connector symbol based on user input Volume Damper -Inserts volume damper symbol based on user input **Thermostat** Inserts thermostat symbol based on user input \oplus Icon Menu Takes user to the Icon Menu for selection of additional **HVAC** symbols Mechanical/Piping Floor Drain Inserts floor drain symbol based on user input ⊜ Fin Single Line Tee Inserts single line tee symbol based on user input **⊙** | Clean Out i. Inserts clean out symbol based on user input Pipe Union 1 | Inserts pipe union symbol based on user input Pipe Cap Inserts pipe cap symbol based on user input 3 Gate Valve Inserts gate valve symbol based on user input M Check Valve Inserts check valve symbol based on user input Ŋ Globe Valve Inserts globe valve symbol based on user input M Ball Valve Inserts ball valve symbol based on user input 181 Thermometer Inserts thermometer symbol based on user input Q Inserts pressure gage symbol based on user input Pressure Gage Ø

Function Name	Icon	Description
Piping Linetypes	-x x-	Loads and initiates piping linetypes based on user input
Icon Menu		Takes user to the Icon Menu for selection of additional piping symbols
Mechanical/Fire Sprinkler Upright Sprinkler	\circ	Inserts upright sprinkler symbol based on user input
Pendant Sprinkler	•	Inserts pendant sprinkler symbol based on user input
Sprinkler Guard	③	Inserts sprinkler guard symbol based on user input
Dry Pendant Sprinkler	•	Inserts dry pendant sprinkler symbol based on user input
Side Wall Sprinkler	\triangleleft	Inserts side wall sprinkler symbol based on user input
Alarm Check Valve		Inserts alarm check valve based on user input
Dry Pipe Valve	•	Inserts dry pipe valve symbol based on user input
Fire Department Connection		Inserts Fire Department connection symbol, based on user input.
Structural Toolbar		
DD Welds		Dialogue box for creating weld symbols
Graph $f_{(X)}$	₩	Draws a graph of a mathematical expression based on user input using AutoCAD's calculator syntax.
Structural Toolbar Flyout	ts	
W Section	I	Draws structural steel W shape based on user input
L Section		Draws structural steel L shape based on user input
TS Section		Draws structural steel TS shape based on user input
C Section		Draws structural steel C shape based on user input

Function Name	Icon	Description
S Section	I	Draws structural steel S shape based on user input
Bolt	盘	Draws a bolt based on user input
Nut	\bigcirc	Draws a nut based on user input
Grid Lines	o- 	Draws grid lines based on user input
Grid Bubble	A	Draws grid bubble based on user input



Appendix E

DSC Symbol Libraries

Appendix E Symbols

After installing the NPS AutoCAD Tools the symbols will be located in the **c:\Program Files\NPS AutoCAD Tools** folder (recommended). In listing the access for the symbols below, the "IM Group", "IM Category", and "IM Topic" show how to locate each symbol in the DSC custom Icon Menu, as described on page 5-7.

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
	Standard 2nd sheet	Annotation	Border Sheets	Second Sheets
7.			\std\gen\2ndsht2	g.dwg
	Full Profile sheet	Annotation	Border Sheets	Second Sheets
	2 022 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		\std\gen\fulpro2a	ı.dwg
	Plan and profile	Annotation	Border Sheets	Second Sheets
- F-AX	sheet		\std\gen\plnpro2a	a.dwg
	Standard 2nd sheet – Metric (insert at	Annotation	Border Sheets	Second Sheets
	25.4 scale factor)\std\gen\2ndsht2e.dwg			e.dwg
	36" border sheet (old	Annotation	Border Sheets	Second Sheets
	2nd sheet)	\std\gen\2ndsht1d.dwg		
	36" border sheet (old	Annotation	Border Sheets	Second Sheets
	profile sheet)		\std\gen\fullpro1.dwg	
	36" border sheet (old plan and profile	Annotation	Border Sheets	Second Sheets
Eq. ma	sheet)		\std\gen\planpro]	l.dwg
	36" border sheet (old	Annotation	Border Sheets	Second Sheets
	2nd sheet - metric)		\std\gen\2ndsht1	l.dwg
<auto stamp=""> NOT REQUIRED</auto>	Deta/Eilo etamo	Annotation	Border Sheets	Second Sheets
IF USING LATEST 2ND SHEETS	Date/File stamp		(custom lisp rout	ine)

	Symbol File Access			cess
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	ı
	Form DSC-44	Annotation	Border Sheets	Second Sheets
	Tomin Disc 11		\std\gen\frmdsc4	4.dwg
	Cover sheet border	Annotation	Border Sheets	Cover Sheets
#####			\std\gen\coverc	.dwg
RECOMMENDED: Tright Nationager Code	Design development	Annotation	Border Sheets	Cover Sheets
APPROVEDS. Superintendent Date	approval block	\s	ym\gen\cover\zab	16dd.dwg
OUALITY DESIGN CERTIFICATION Presents In Assertance with Design In Indigent (Table 0 Tracks IN. Justices from Design Designation (Table 0 Justices from Design Designation 0 Justices from Design Designation 0	Construction drawing	Annotation	Border Sheets	Cover Sheets
df Color Col	set approval block	\s	sym\gen\cover\zab	16cd.dwg
Nach Steel REVISION Deb Intel	D 11 1	Annotation	Border Sheets	Cover Sheets
	Revision block	\sym\gen\cover\zrevis.dwg		
حد.		Annotation	Border Sheets	Cover Sheets
THIS PROJECT	Project arrow	\sym\gen\cover\zproaro1.dwg		
<u> </u>	Target	Annotation	Miscellaneous	General/Common
Ψ	Turget	\sym\gen\target.dwg		
XXXX	Detail Title	Annotation	Miscellaneous	General/Common
XXX SCALE			\sym\gen\title1	.dwg
	2/4 2111	Annotation	North Arrows	General/Common
	3/4" North Arrow	\sym\gen\znorth.dwg	n.dwg	
	1/2" North Arrow	Annotation	North Arrows	General/Common
	1/2 NOIH AHOW		\sym\gen\znorth	5.dwg
350-1	Duilding Ages	Annotation	North Arrows	General/Common
	Building Arrow	(custom lisp routine)		

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
16 0 16 32	1/16" = 1'-0"	Annotation	Scales	Architectural
SCALE OF FEET	bar scale		\sym\gen\zsca1_1	6.dwg
<u>8 0 8 18</u>	1/8" = 1'-0"	Annotation	Scales	Architectural
SOALE OF FEET	bar scale		\sym\gen\zsca1_8	3.dwg
4_0 4 8 12	3/16" = 1'-0"	Annotation	Scales	Architectural
SCALE OF FEET	bar scale		\sym\gen\zsca3_1	6.dwg
4 0 4 B	1/4" = 1'-0"	Annotation	Scales	Architectural
SCALE OF FEET	bar scale		\sym\gen\zsca1_4	4.dwg
4 0 4 B	3/8" = 1'-0"	Annotation	Scales	Architectural
SCALE OF FEET	bar scale	\sym\gen\zsca3_8.dwg		
2 0 2 4	1/2" = 1'-0" bar scale	Annotation	Scales	Architectural
SCALE OF FEET		\sym\gen\zsca1_2.dwg		
1 0 1 2 3	3/4" = 1'-0" bar scale	Annotation	Scales	Architectural
SCALE OF FEET		\sym\gen\zsca3_4.dwg		
1 D 1 2	1" = 1'-0"	Annotation	Scales	Architectural
SCALE OF FEET	bar scale	\sym\gen\zsca1.dwg		
12 6 0 12	1-1/2" = 1'-0"	Annotation	Scales	Architectural
SCALE OF NOTES	bar scale	\sym\gen\zsca11_2.dwg		
B 3 0 8	3" = 1'-0"	Annotation	Scales	Architectural
SOME OF NOHES	bar scale	\sym\gen\zsca3.dwg		dwg
2 0 2 +	1/2" = 1" (half scale)	Annotation	Scales	Architectural
SCALE OF INCHES	bar scale	\sym\gen\zscahlfi.dw		i.dwg
9CALE OF INCHES	1" = 1" (full scale) bar scale	Annotation	Scales	Architectural
			\sym\gen\zscaful	l.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
10 0 10 20	1" = 10'	Annotation	Scales	Engineering
SCALE OF REET	bar scale		\sym\gen\zsca10	.dwg
20 0 20 40	1" = 20'	Annotation	Scales	Engineering
SCALE OF FEET	bar scale		\sym\gen\zsca20	.dwg
20 0 20 40	1" = 30'	Annotation	Scales	Engineering
SOUTE DE LEET	bar scale		\sym\gen\zsca30	.dwg
40 <u>0 40 8</u> 0	1" = 40' bar scale	Annotation	Scales	Engineering
SCALE OF FEET	bai scale		\sym\gen\zsca40	.dwg
5 <u>0</u> 0 60 100	1" = 50'	Annotation	Scales	Engineering
SCALE OF FEET	bar scale		\sym\gen\zsca50	.dwg
8 <u>0 0 60 1.2</u> 0	1" = 60'	Annotation	Scales	Engineering
SOME OF FEET	bar scale	\sym\gen\zsca60.dwg		
105 0 100 205	1" = 100' bar scale	Annotation	Scales	Engineering
SCALE OF FEET		\sym\gen\zsca100.dwg).dwg
200 0 200 400	1" = 200'	Annotation	Scales	Engineering
SCALE OF FEET	bar scale	\sym\gen\zsca200.dwg		
2 0 2 + 0 •	1:100 metric bar scale	Annotation	Scales	Metric
SCALE OF METERS			\sym\gen\zscm10	0.dwg
25 0 25 5 7,5 10	1:125	Annotation	Scales	Metric
scale of Heters	metric bar scale	\sym\gen\zscm125.dwg		5.dwg
8 0 8 18 18	1:200	Annotation	Scales	Metric
SCALE OF NETERS	metric bar scale	\sym\gen\zscm200.dwg		0.dwg
5 6 5 10 15 2 0	1:250	Annotation	Scales	Metric
SCALE OF METERS	metric bar scale	\sym\gen\zscm250.dwg	0.dwg	
5 0 5 10 15 20 25	1:300	Annotation	Scales	Metric
904LE OF METERS	metric bar scale		\sym\gen\zscm30	0.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
		1 	Pathname	
	1:500	Annotation	Scales	Metric
10 0 10 20 30 40 SOME OF NETERS	metric bar scale		\sym\gen\zscm50	0.dwg
20 to 60 to	1:1000 metric bar scale	Annotation	Scales	Metric
RAME OF METERS			\sym\gen\zscm100	00.dwg
25 <u>4 25 50 75 10</u> X	1:1250 metric bar scale	Annotation	Scales	Metric
SCALE OF METERS	220000		\sym\gen\zscm125	60.dwg
25 0 25 50 75 10 0 125	1:1500 metric bar scale	Annotation	Scales	Metric
SCALE OF METERS	metre bar seare		\sym\gen\zscm150	00.dwg
80 0 60 100 150	1:2000	Annotation	Scales	Metric
BCALE OF METERS	metric bar scale		\sym\gen\zscm200	00.dwg
50 0 50 100 150 200	1:2500 metric bar scale	Annotation	Scales	Metric
John Cor Million	metre our seure	\sym\gen\zscm2500.dwg		
SCALE (A)	Label - Scale A	Annotation	Scales	Scale ID
			\sym\gen\zscalea	dwg
SCALE (B)	Label - Scale B	Annotation	Scales	Scale ID
		\sym\gen\zscaleb.dwg		
SCALE ①	Label - Scale C	Annotation	Scales	Scale ID
33.122		\sym\gen\zscalec.dwg		
SCALE (D)	Label - Scale D	Annotation	Scales	Scale ID
9	Laber - Scare D	\sym\gen\zscaled.dwg		l.dwg
	Wood 1	Drawing Setup	Hatch Patterns	Architectural
	1100u 1		\support\wood1	.pat
3(3(1)(1)(1)(1)(1)	Wood 2	Drawing Setup	Hatch Patterns	Architectural
3(1)(1)(1)(1)	WOOU Z		\support\wood2.pat	

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	I
	Wood 3	Drawing Setup	Hatch Patterns	Architectural
			\support\wood3	3.pat
	Wood 4	Drawing Setup	Hatch Patterns	Architectural
777777			\support\wood	1.pat
	Wood 8	Drawing Setup	Hatch Patterns	Architectural
			\support\wood8	3.pat
	Aggregate	Drawing Setup	Hatch Patterns	General/Common
200220032	1155105410		\support\aggrega	at.pat
\$	Select backfill	Drawing Setup	Hatch Patterns	General/Common
≥ °		\support\sbackfil.pat		
	Gravel 1	Drawing Setup	Hatch Patterns	General/Common
\$\$\$\$\$\$\$\$\$		\support\gravel1.pat		
	Gravel 2	Drawing Setup	Hatch Patterns	General/Common
		\support\gravel2.pat		
	Gravel 3	Drawing Setup	Hatch Patterns	General/Common
5115115		\support\gravel3.pat		
	Gravel 4	Drawing Setup	Hatch Patterns	General/Common
\$\frac{1}{2}\frac{1}\frac{1}{2}\f		\support\gravel4.pat		
XXXXXXXX	Batt insulation	Drawing Setup	Linetypes	Architectural
			\support\insul.lin	
A23	Door Label -	Symbols	Architectural	General/Common
	Romans font	\sym\arch\adoorr.dwg		r.dwg
	Door Label -	Symbols	Architectural	General/Common
(~2)	Arch. font		\sym\arch\adoora	a.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
OFFICE	Room Label -	Symbols	Architectural	General/Common
123	Romans font		\sym\arch\aroom	nr.dwg
OFFICE	Room Label -	Symbols	Architectural	General/Common
123	Arch. font		\sym\arch\aroom	a.dwg
A23	Wall Label -	Symbols	Architectural	General/Common
	Romans font		\sym\arch\awall	r.dwg
A23	Wall Label -	Symbols	Architectural	General/Common
	Arch. font		\sym\arch\awall	a.dwg
(P)	Window Label -	Symbols	Architectural	General/Common
· · ·	Romans font		\sym\arch\awind	lr.dwg
⟨₽⟩	Window Label - Arch. font	Symbols	Architectural	General/Common
· · ·		\sym\arch\awinda.dwg		
	Single lav - plan	Symbols	Architectural	Plumbing Fixtures
	view	\sym\arch\alavp1.dwg		1.dwg
	Round sink - plan	Symbols	Architectural	Plumbing Fixtures
	view	\sym\arch\alavovp1.dwg		
	Single sink - plan view	Symbols	Architectural	Plumbing Fixtures
			\sym\arch\asink1	p1.dwg
	Double sink - plan	Symbols	Architectural	Plumbing Fixtures
ا ا	view	\sym\arch\asink2p1.dwg		p1.dwg
	Triple sink - plan	Symbols	Architectural	Plumbing Fixtures
	view		\sym\arch\asink3	p1.dwg
	Single lav - front	Symbols	Architectural	Plumbing Fixtures
\ \ 	view		\sym\arch\asink1	f1.dwg

		Symbol File Access			
Symbol	Description	IM Group	IM Category	IM Topic	
	9		Pathname		
(<u>~</u>)	Oval sink - plan	Symbols	Architectural	Plumbing Fixtures	
	view		\sym\arch\alavov	p2.dwg	
\bigcup	Oval sink - front	Symbols	Architectural	Plumbing Fixtures	
U .	view		\sym\arch\alavov	f1.dwg	
\bigcup	Oval sink - side view	Symbols	Architectural	Plumbing Fixtures	
	Ovar sink - side view		\sym\arch\alavovs	s1.dwg	
=	Water closet #1 -	Symbols	Architectural	Plumbing Fixtures	
\cup	plan view		\sym\arch\awcp1	1.dwg	
	Water closet #1 -	Symbols	Architectural	Plumbing Fixtures	
Ħ	front view	\sym\arch\awcf1.dwg			
	Water closet #1 -	Symbols	Architectural	Plumbing Fixtures	
	side view		\sym\arch\awcs1	arch\awcs1.dwg	
57	Water closet #2 -	Symbols	Architectural	Plumbing Fixtures	
U	plan view	\sym\arch\awcp2.dwg			
	Water closet #2 -	Symbols	Architectural	Plumbing Fixtures	
	front view		\sym\arch\awcf2	2.dwg	
	Water closet #2 -	Symbols	Architectural	Plumbing Fixtures	
	side view	\sym\arch\awcs2.dwg		2.dwg	
X	Water closet #3 -	Symbols	Architectural	Plumbing Fixtures	
\bigcirc	plan view	\sym\arch\awcp3.dv		3.dwg	
**	Water closet #3 -	Symbols	Architectural	Plumbing Fixtures	
M	front view		\sym\arch\awcf3	3.dwg	
<u>≻</u>	Water closet #3 -	Symbols	Architectural	Plumbing Fixtures	
⁄حرا	side view		\sym\arch\awcs3	3.dwg	

			Symbol File Ac	cess
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	1
	Urinal #1 - plan view	Symbols	Architectural	Plumbing Fixtures
	·		\sym\arch\aurnlp	o1.dwg
	Urinal #1 - front	Symbols	Architectural	Plumbing Fixtures
لـــ	view		\sym\arch\aurnlf	1.dwg
Ŋ	Urinal #1 - side view	Symbols	Architectural	Plumbing Fixtures
Ų			\sym\arch\aurnls	1.dwg
M	Urinal #2 - plan view	Symbols	Architectural	Plumbing Fixtures
	Official #2 plan view		\sym\arch\aurnlp	2.dwg
<u>.</u>	Urinal #2 - front	Symbols	Architectural	Plumbing Fixtures
\vee	view		\sym\arch\aurnlf	2.dwg
À	Urinal #2 - side view	Symbols	Architectural	Plumbing Fixtures
7	Offilal #2 - side view	\sym\arch\aurnls2.dwg		
	Water closet - handicap -	Symbols	Architectural	Plumbing Fixtures
Ĭ	plan view	\sym\arch\ahandp1.dwg		ol.dwg
	Water closet -	Symbols	Architectural	Plumbing Fixtures
	handicap - front view		\sym\arch\ahandi	f1.dwg
,	Water closet - handicap -	Symbols	Architectural	Plumbing Fixtures
7 /	side view		\sym\arch\ahands	s2.dwg
 	Drinking fountains - plan view	Symbols	Architectural	Plumbing Fixtures
Û	plan view		\sym\arch\adrp1	l.dwg
	Drinking fountains -	Symbols	Architectural	Plumbing Fixtures
	front view		\sym\arch\adrf1	.dwg
Y 	Culvert w/end	Symbols	Civil	Drainage
 	sections - single line		(custom lisp rou	tine)

			Symbol File Acc	cess
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
	Culvert w/mixed (headwall and end section - single line)	Symbols	Civil	Drainage
			(custom lisp rou	tine)
T I	Culvert w/wall (with headwall - single	Symbols	Civil	Drainage
i ±	line)		(custom lisp rou	tine)
Ħ II	Culvert w/end (with end sections - dbl	Symbols	Civil	Drainage
Ц	line)		(custom lisp rou	tine)
H II	Culvert w/mixed	Symbols	Civil	Drainage
 	(headwall and end sections - dbl line)		(custom lisp rou	tine)
TI 	Culvert w/wall (with	Symbols	Civil	Drainage
	headwall - dbl line)		(custom lisp rou	tine)
Δ	Benchmark	Symbols	Civil	General/Common
		\sym\civil\cbenmrk.dwg		
M	Benchmark II	Symbols	Civil	General/Common
		\sym\civil\cbm2.dwg		
+	Grid tick	Symbols	Civil	General/Common
		\sym\civil\cgridtck.dwg		
8.53	Grid labal	Symbols	Civil	General/Common
ш + N 11.51	Grid label		\sym\civil\cgridll	ol.dwg
.	Soil boring	Symbols	Civil	General/Common
¥			\sym\civil\boring	g.dwg
•	New cleanout	Symbols	Civil	Sewer
	New cleanout		\sym\civil\co.c	lwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
Q	Existing cleanout	Symbols	Civil	Sewer
	Existing Cleanout		\sym\civil\coex.d	lwg
	New manhole	Symbols	Civil	Sewer
	New mannote		\sym\civil\mh.dv	wg
	Existing manhole	Symbols	Civil	Sewer
Δ	Laisting maintoic		\sym\civil\mhex.o	dwg
⊑ ⊢ ∢	Air relief valve	Symbols	Civil	Water
	7 III Teller valve		\sym\civil\arv.dv	wg
ı∓	New fire hydrant	Symbols	Civil	Water
`¥		\sym\civil\hyd.dwg		
ᄶ	Existing fire hydrant	Symbols	Civil	Water
'Υ		\sym\civil\hydex.dwg		
M	Water meter	Symbols	Civil	Water
	vv deer meter	\sym\civil\meter.dwg		
H	New valve	Symbols	Civil	Water
	New varve		\sym\civil\valve.c	dwg
×	Existing valve	Symbols	Civil	Water
	Zaisting varve	\sym\civil\valveex.dwg		
⊬●	New yard hydrant	Symbols	Civil	Water
	Tiew yard nyarant		\sym\civil\hydyd.	dwg
ю	Existing yard	Symbols	Civil	Water
	hydrant		\sym\civil\hydydex	a.dwg
Е	Pipe plug	Symbols	Civil	Water
	1 tpc plug		\sym\civil\cpipeeno	l.dwg

			Symbol File Acc	ess	
Symbol	Description	IM Group	IM Category	IM Topic	
			Pathname		
II	Screened end	Symbols	Civil	Water	
П	Screened end		\sym\civil\cscrenc	d.dwg	
•	Computer outlet	Symbols	Electrical	Power	
)	Computer outlet	\sy	vm\elec\power\econ	npout.dwg	
0	Conduit up	Symbols	Electrical	Power	
V	Conduit up	\s;	ym\elec\power\ecor	ndup.dwg	
	Conduit - down	Symbols	Electrical	Power	
	Conduit down	\s;	ym\elec\power\ecor	nddn.dwg	
П	Data outlet	Symbols	Electrical	Power	
<u> </u>		\sym\elec\power\edataout.dwg			
]	Conduit cap	Symbols	Electrical	Power	
-		\sym\elec\power\ecap.dwg			
\overline{a}	Single receptacle	Symbols	Electrical	Power	
)	Single receptation	\s	\sym\elec\power\esglrcpt.dwg		
\bigoplus	Duplex receptacle	Symbols	Electrical	Power	
)	2 uprom receptuere	\s <u>;</u>	ym\elec\power\edup	prept.dwg	
	Duplex receptacle -	Symbols	Electrical	Power	
WP —	waterproof	\sym\elec\power\ercptwp.dwg			
#	Floor mounted	Symbols	Electrical	Power	
	receptacle	\s	ym\elec\power\ercp	otfm.dwg	
=	Duplex receptacle -	Symbols	Electrical	Power	
)	split wired	\s	ym\elec\power\ercp	otsw.dwg	
	Duplex receptacle -	Symbols	Electrical	Power	
)	isolated ground	2/	sym\elec\power\erc	ptig.dwg	

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
4	Duplex receptacle	Symbols	Pathname Electrical	Power
GFCI	GFCI	\s	ym\elec\power\ercpg	gfci.dwg
#	Triplex receptacle	Symbols	Electrical	Power
)	The second secon	\a	sym\elec\power\ercpt	ttri.dwg
=⊞	Double duplex	Symbols	Electrical	Power
)	receptacle	\s	ym\elec\power\ercpt	tdd.dwg
	Floor receptacle - 2	Symbols	Electrical	Power
D	inches from wall	\s	ym\elec\power\ercpt	tflr.dwg
- 	Double duplex receptacle - flush	Symbols	Electrical	Power
- NL12	mounted	\sym\elec\power\ercpddfm.dw		dfm.dwg
	Double duplex receptacle - isolated ground	Symbols	Electrical	Power
IG ³		\sym\elec\power\ercptigd.dwg		
<u></u>	Multi outlet	Symbols	Electrical	Power
Ľ ;	assembly	\s	ym\elec\power\ercpt	mo.dwg
(1	Cable TV outlet	Symbols	Electrical	Power
7	Casic 1 V Sutici	\s	ym\elec\power\ectvo	out.dwg
N	Computer modem	Symbols	Electrical	Power
	outlet	\sym\elec\power\emodout.dwg		
	Telephone outlet -	Symbols	Electrical	Power
	floor mounted	\sy	m\elec\power\ephou	utfm.dwg
ه .	Pay phone outlet	Symbols	Electrical	Power
٠ '٩	ray phone outlet	\sy	vm\elec\power\ephou	ıtpa.dwg
M	Recessed phone	Symbols	Electrical	Power
1.7	outlet	\s	ym\elec\power\epho	utr.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
s⊭	Surface mounted	Symbols	Electrical	Power
3	phone outlet	\sy	m\elec\power\ephou	tsm.dwg
M	Meter	Symbols	Electrical	Power
€)	Wieter	\:	sym\elec\power\emet	ter.dwg
PB #	Pullbox	Symbols	Electrical	Power
#	1 unbox	\s	ym\elec\power\epulll	box.dwg
мн "	Manhole	Symbols	Electrical	Power
#	Walmole	\sy	rm\elec\power\emanl	nole.dwg
SB	Splice box	Symbols	Electrical	Power
□ #		\sym\elec\power\esplbox.dwg		
╗	Pad transformer	Symbols	Electrical	Power
Ŀ	Tud trunsformer	\sym\elec\power\epadtr.dwg		
Δ	Pole transformer	Symbols	Electrical	Power
		\sym\elec\power\epoletr.dwg		
FIAP	Combination alarm	Symbols	Electrical	Power
[panel	2/	sym\elec\power\efire	int.dwg
IAP	Intrusion alarm	Symbols	Electrical	Power
2		\sym\elec\power\eintpnl.dwg		
FAP	Fire alarm panel	Symbols	Electrical	Power
[1.11]	The durin puner	\s	ym\elec\power\efire	pnl.dwg
II	Intrusion detector	Symbols	Electrical	Power
□ #		2/	sym\elec\power\einto	let.dwg
F	Fire detector	Symbols	Electrical	Power
F#	The detector	\s	ym\elec\power\efire	det.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category Pathname	IM Topic
FS	Flow switch	Symbols	Electrical	Power
		\s <u>:</u>	ym\elec\power\eflow	rsw.dwg
TS	Tamper switch	Symbols	Electrical	Power
		\sy	ym\elec\power\etamp	osw.dwg
мѕ	Manual pull station	Symbols	Electrical	Power
[MIO]	ivianuai pun station	\s	ym\elec\power\eman	nps.dwg
FЫ	Fire/intrusion horn	Symbols	Electrical	Power
#	The mirusion nom	\	sym\elec\power\ehoi	rn.dwg
Гъ	Bell	Symbols	Electrical	Power
	Ben	\	\sym\elec\power\ebe	ll.dwg
М	Magnetic switch	Symbols	Electrical	Power
im.	Wagnetic switch	\sym\elec\power\emagsw.dwg		
K	Keypad	Symbols	Electrical	Power
	Tieypud	\sym\elec\power\ekeypad.dwg		
[AP]	Annunciator	Symbols	Electrical	Power
<u> </u>	7 Minune lates	\sym\elec\power\eannpnl.dwg		
[ATD]	Auto phone dialer	Symbols	Electrical	Power
[2]	Auto phone dialer	\sym\elec\power\eautopd.dwg		
D	Magnetic door	Symbols	Electrical	Power
	holder	\sy	m\elec\power\emage	loor.dwg
EOL	EOL device	Symbols	Electrical	Power
[-7-]	LOD device	\sym\elec\power\eeoldev.dwg		
[CCTVb	Closed signif TV	Symbols	Electrical	Power
[CCTV]Þ	Closed circuit TV		sym\elec\power\ecct	v.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
	Meter socket	Symbols	Electrical	Power
<u> </u>	1,2002 2002	\sy	ym\elec\power\emtrsc	ock.dwg
•	Pushbutton	Symbols	Electrical	Power
			.\sym\elec\power\epb	.dwg
abla	Door buzzer	Symbols	Electrical	Power
U	Boor outler	\	sym\elec\power\ebuz	z.dwg
HD	Hand dryer	Symbols	Electrical	Power
[115]	Trand dryer		.\sym\elec\power\ehd	.dwg
EH	Electric heater	Symbols	Electrical	Power
[211]	Electric ficater		.\sym\elec\power\eeh	.dwg
DF	Drinking fountain	Symbols	Electrical	Power
		\sym\elec\power\edf.dwg		
СО	CO sensor	Symbols	Electrical	Power
	CO Selisor		.\sym\elec\power\eco	.dwg
RS	Radon sensor	Symbols	Electrical	Power
	Rudon sensor		\sym\elec\power\ers.	.dwg
UPS	Uninterruptable	Symbols	Electrical	Power
	power supply	\sym\elec\power\eups.dwg		
PLC	Programmable	Symbols	Electrical	Power
[]	lighting controller	\sym\elec\power\eplc.dwg		e.dwg
PA	PA system	Symbols	Electrical	Power
[]			.\sym\elec\power\epa	.dwg
DCP	Duplex pump	Symbols	Electrical	Power
	controller		\sym\elec\power\edcp	o.dwg

		Symbol File Access			
Symbol	Description	IM Group	IM Category	IM Topic	
			Pathname		
Ω	Motor	Symbols	Electrical	Power	
, •		\2	sym\elec\power\em	otor.dwg	
CR#)	Control relay coil	Symbols	Electrical	Power	
	Control relay con		\sym\elec\power\e	cr.dwg	
ക	Duct heater	Symbols	Electrical	Power	
(Buct neuter		.\sym\elec\power\ea	dh.dwg	
<u>(()</u>	Occupancy sensor	Symbols	Electrical	Power	
89	Occupancy sensor		.\sym\elec\power\ed	os.dwg	
60	Photo cell relay	Symbols	Electrical	Power	
9	r noto cen relay	\sym\elec\power\epc.dwg			
9	Time switch	Symbols	Electrical	Power	
9)	Time switch	\sym\elec\power\ets.dwg			
(AR)	A '1' 1	Symbols	Electrical	Power	
	Auxiliary relay		\sym\elec\power\e	ar.dwg	
(PR)	Protective relay	Symbols	Electrical	Power	
9	Trotective relay		.\sym\elec\power\ep	pr.dwg	
	Undervoltage	Symbols	Electrical	Power	
PM	Ondervoltage	\sym\elec\power\euv.dwg			
P	Primary coil	Symbols	Electrical	Power	
)		\sym\elec\power\epcoil.dwg			
(S)	Secondary coil	Symbols	Electrical	Power	
>	zecondary con	\s	ym\elec\power\esec	ecoil.dwg	
Ē	Thermostat	Symbols	Electrical	Power	
9	Thermostat	\s	ym\elec\power\ethe	ermo.dwg	

		Symbol File Access		
Symbol	Description	IM Group	IM Category Pathname	IM Topic
(H)	Humidistat	Symbols	Electrical	Power
	Traincistat	\	sym\elec\power\eh	stat.dwg
©	Generator	Symbols	Electrical	Power
•	Concrator	\	\sym\elec\power\eg	gen.dwg
	Special purpose	Symbols	Electrical	Power
₩	receptacle	\s;	ym\elec\power\espe	ecial.dwg
S	Single pole switch	Symbols	Electrical	Power
J	Single pole switch	\:	sym\elec\power\esp	osw.dwg
S#	Unit type switch	Symbols	Electrical	Power
#	Ome type switch	\sy	ym\elec\power\esw	-unit.dwg
s A	Switch and	Symbols	Electrical	Power
	receptacle combo	\sym\elec\power\esrcombo.dwg		
(J)	Junction box	Symbols	Electrical	Power
	Junction box	\sym\elec\power\ejbox.dwg		
Osr.	Time delay relay	Symbols	Electrical	Power
	Time delay relay	\	sym\elec\power\etc	lrel.dwg
	Enclosure - surface	Symbols	Electrical	Power
	mounted	\sym\elec\power\eencl-sm.dwg		
	Enclosure - flush	Symbols	Electrical	Power
	mounted	\sy	ym\elec\power\eenc	el-fm.dwg
	Panelboard - surface	Symbols	Electrical	Power
	mounted	\sy	m\elec\power\epnl	bdsm.dwg
_	Panelboard - flush	Symbols	Electrical	Power
	mounted	\sy	m\elec\power\epnl	bdfm.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
мсс	Motor control center	Symbols	Electrical	Power
		\	\sym\elec\power\em	ncc.dwg
П	Disconnect switch	Symbols	Electrical	Power
	Disconnect Switch	\s	ym\elec\power\edis	scon.dwg
\square	Motor starter	Symbols	Electrical	Power
	Wiotor starter	\2	sym\elec\power\ems	start.dwg
Σh	Starter and	Symbols	Electrical	Power
	disconnect means	\sy	m\elec\power\ecom	abosd.dwg
	Telephone terminal	Symbols	Electrical	Power
	board		.\sym\elec\power\et	tb.dwg
<i>\</i> হ্	Speaker	Symbols	Electrical	Power
₩		\sym\elec\power\espkr.dwg		
PA	PA System	Symbols	Electrical	Power
A,M	,	\sym\elec\power\epas.dwg		
TCP	Temperature control	Symbols	Electrical	Power
	panel	\sym\elec\power\etcp.dwg		
a	Solenoid valve	Symbols	Electrical	Power
700∑	Solellold valve	\sym\elec\power\esolnoid.dwg		noid.dwg
RHP #	Radiant heater panel	Symbols	Electrical	Power
#	Tadium neuter puner		\sym\elec\power\er	hp.dwg
AHU	Air handler unit	Symbols	Electrical	Power
	The number unit		\sym\elec\power\ea	hu.dwg
ı#∇	Track light	Symbols	Electrical	Lighting
	Track fight	\s <u>y</u>	ym\elec\lighting\etra	acklt.dwg

		Symbol File Access			
Symbol	Description	IM Group	IM Category	IM Topic	
			Pathname		
<u>[#</u>	Strip light	Symbols	Electrical	Lighting	
1 1		\s <u>y</u>	ym\elec\lighting\est	triplt.dwg	
(#)	Emergency	Symbols	Electrical	Lighting	
	fluorescent	\sy	m\elec\lighting\een	nerflr.dwg	
(#)	Fluorescent - wall	Symbols	Electrical	Lighting	
	mount	\sy	m\elec\lighting\eltf	lrwm.dwg	
	Continuous row fluorescent - surface	Symbols	Electrical	Lighting	
(#)	or pendant mounted	\syı	m\elec\lighting\eco	ntrow.dwg	
\m\ 	Light fixture	Symbols	Electrical	Lighting	
, #		\s	ym\elec\lighting\el	ight.dwg	
∟ ` æ√	Light fixture - wall mounted	Symbols	Electrical	Lighting	
		\sym\elec\lighting\elightwm.dwg			
(#)	Fluorescent - ceiling	Symbols	Electrical	Lighting	
	mounted	\sym\elec\lighting\elightcm.dwg			
%	Pilot light	Symbols	Electrical	Lighting	
. \\\\	Thot light	\sy	ym\elec\lighting\ep	ilotlt.dwg	
(₹)	Exit light	Symbols	Electrical	Lighting	
		\sym\elec\lighting\eexit.dwg			
1-1	Emergency lighting	Symbols	Electrical	Lighting	
	converter	\sym\elec\lighting\econv.dwg		conv.dwg	
•	Connection	Symbols	Electrical	Controls	
		\s;	ym\elec\controls\ec	conn.dwg	
>>	Separable connector	Symbols	Electrical	Controls	
	1	\syı	m\elec\controls\esep	pconn.dwg	

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
	Terminal block	Symbols	Electrical	Controls
		\	sym\elec\controls\e	etb.dwg
\otimes	Connection from	Symbols	Electrical	Controls
Ò	external equipment	\syı	m\elec\controls\eex	tconn.dwg
11	Electrical contacts,	Symbols	Electrical	Controls
11	N.O.	\sy	m\elec\controls\end	ocont.dwg
W	Electrical contacts,	Symbols	Electrical	Controls
<i>X</i> I	N.C.	\sy	m\elec\controls\en	ccont.dwg
m	Current transformer	Symbols	Electrical	Controls
111	Current transformer	\sy	/m\elec\controls\ec	trans.dwg
3 {	Potential transformer	Symbols	Electrical	Controls
) (Totelliai transformer	\sym\elec\controls\eptrans.dwg		
ulu	Transformer	Symbols	Electrical	Controls
35	Transformer	\s;	ym\elec\controls\et	rans.dwg
\cap	Electrical device -	Symbols	Electrical	Controls
)	function as noted	\sy	m\elec\controls\eele	ecdev.dwg
#	1 Pole circuit breaker	Symbols	Electrical	Controls
	Trote effective oreaser	\sy	ym\elec\controls\e1	p-cb.dwg
— <u> </u>	2 Pole circuit breaker	Symbols	Electrical	Controls
	2 1 010 chedit breaker	\sy	ym\elec\controls\e2	p-cb.dwg
#	3 Pole circuit breaker	Symbols	Electrical	Controls
	5 Tota circuit oreaser	\sy	ym\elec\controls\e3	p-cb.dwg
٥١٥	3 Pole - single throw	Symbols	Electrical	Controls
000	5 Fole - Single unow	\s <u>y</u>	ym\elec\controls\e3	pole.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
lılı	Battery	Symbols	Electrical	Controls
ויןי	,	\sy	m\elec\controls\ebatt	ery.dwg
	Bayonet fuse	Symbols	Electrical	Controls
\	Bayonet fuse	\s <u>y</u>	ym\elec\controls\ebay	yfs.dwg
Ľŷ	Conduit seal	Symbols	Electrical	Controls
LEP	(explosion proof)	\sy	vm\elec\controls\esea	lep.dwg
e_ 0	Flow actuated sw	Symbols	Electrical	Controls
4	(closes on increasing flow)	\sy	m\elec\controls\eflwo	clos.dwg
مـــاـــه	Flow actuated switch (opens on increasing	Symbols	Electrical	Controls
Á	flow)	\syr	m\elec\controls\eflwo	open.dwg
XHO	Flexible conduit	Symbols	Electrical	Controls
X4X,		\sym\elec\controls\eflxcond.dwg		
#_n	T 1 1 1	Symbols	Electrical	Controls
—TI-11 —	Fused switch - open	\sym\elec\controls\efsopen.dwg		
#	Eng (const)	Symbols	Electrical	Controls
	Fuse (general)	\s	ym\elec\controls\efu	se.dwg
#_	Fuse	Symbols	Electrical	Controls
, ()		\sym\elec\controls\efusesz.dwg		
=	Ground	Symbols	Electrical	Controls
	Stoulia	\sym\elec\controls\eground.dwg		und.dwg
Q	Latching relay	Symbols	Electrical	Controls
0		\s;	ym\elec\controls\elat	ch.dwg
مـــاــه	Liquid level actuated switch, closes on	Symbols	Electrical	Controls
٥	rising level	\sym\elec\controls\ellclose.dwg		

	1	Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
0,0	Liquid level actuated switch, opens on	Symbols	Electrical	Controls
0	rising level	\sy	m\elec\controls\ello	ppen.dwg
(M)	Meter instrument	Symbols	Electrical	Controls
)	112001 111012 0111011	\s <u>y</u>	ym\elec\controls\em	eter.dwg
°-Ţ-"	Time delay - closes	Symbols	Electrical	Controls
<u> </u>	on deactivation	\s	ym\elec\controls\en	ctd.dwg
~	Time delay - opens	Symbols	Electrical	Controls
Ψ.	on deactivation	\s	ym\elec\controls\en	otd.dwg
مكم	Time delay - N.C closing on deactivation	Symbols	Electrical	Controls
^		\sy	m\elec\controls\enct	tdact.dwg
~	Time delay - N.O opening on deactivation	Symbols	Electrical	Controls
λ'		\sym\elec\controls\enotdact.dwg		
C.	Cord and plug	Symbols	Electrical	Controls
			ym\elec\controls\ep	lug.dwg
0,0	Pressure or vacuum actuated switch -	Symbols	Electrical	Controls
∆`	closes on rising pressure	\sy	m\elec\controls\epro	open.dwg
o-7-6	Pressure or vacuum actuated switch -	Symbols	Electrical	Controls
۵	opens on rising pressure	\sym\elec\controls\eprclose.dwg		
	Probe	Symbols	Electrical	Controls
\forall	11000	\s <u>y</u>	ym\elec\controls\epr	robe.dwg
A #	Shunt trip circuit	Symbols	Electrical	Controls
ST ST	Shane trip eneut	\syı	m\elec\controls\eshu	intcb.dwg
<u> </u>	Lightning arrestor	Symbols	Electrical	Controls
重	Digitiming arrestor	\s <u>r</u>	ym\elec\controls\esu	irge.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
9,	Transfer switch	Symbols	Electrical	Controls
#		\s	ym\elec\controls\et	rsw.dwg
- α,-	Thermal element -	Symbols	Electrical	Controls
	motor overload	\syı	m\elec\controls\eth	ermal.dwg
٠٢-٠	Temperature actuated switch -	Symbols	Electrical	Controls
L	opens on falling temperature	\s	ym\elec\controls\et	tfall.dwg
o/ o	Temperature actuated switch -	Symbols	Electrical	Controls
, , ,	opens on rising temperature	\s	ym\elec\controls\et	rise.dwg
· ·	Switch, SPST	Symbols	Electrical	Controls
		\sym\elec\controls\esw-spst.dwg		
هـــه	Switch, SPDT	Symbols	Electrical	Controls
0		\sym\elec\controls\esw-spdt.dwg		
ه ره	Switch, DPST	Symbols	Electrical	Controls
0		\sym\elec\controls\esw-dpst.dwg		
هــــه	Switch, DPDT	Symbols	Electrical	Controls
مله		\syr	n\elec\controls\esw	-dpdt.dwg
^	3-Phase delta	Symbols	Electrical	Controls
\triangle	5-F Hase ucità	\sym\elec\controls\edelta.dwg		
X	3-Phase grounded	Symbols	Electrical	Controls
	wye	\sym\elec\controls\ewye.dwg		
وهسو	Multi position switch	Symbols	Electrical	Controls
0	F	\sym\elec\controls\emulti.dwg		
5 5	N.C. Pushbutton	Symbols	Electrical	Controls
هــــه	N.C. Pushbutton	\s:	ym\elec\controls\er	ncpb.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
	N.O. Pushbutton	Symbols	Electrical	Controls
0 0		\s	sym\elec\controls\ei	nopb.dwg
o= ∷ o	N.C. Limit switch	Symbols	Electrical	Controls
	Tv.e. Emit switch	\s	ym\elec\controls\er	aclsw.dwg
00	N.O. Limit switch	Symbols	Electrical	Controls
~	1	\s;	ym\elec\controls\en	olsw.dwg
(Upright Sprinkler	Symbols	Fire	Sprinkler Systems (piping)
			\sym\fire\f-upspi	r.dwg
•	Pendant Sprinkler	Symbols	Fire	Sprinkler Systems (piping)
	1 chaint Sprinkler		\sym\fire\f-pensp	r.dwg
	Sprinkler guard	Symbols	Fire	Sprinkler Systems (piping)
		\sym\fire\f-sprgrd.dwg		
Q	Dry pendant	Symbols	Fire	Sprinkler Systems (piping)
	Dry pendant		\sym\fire\f-drype	n.dwg
1	Sidewall sprinkler	Symbols	Fire	Sprinkler Systems (piping)
7	Side wan springer		\sym\fire\f-sidew	l.dwg
1	Alarm check valve	Symbols	Fire	Sprinkler Systems (piping)
	Main check varve		\sym\fire\f-alarm	n.dwg
•	Dry pipe valve	Symbols	Fire	Sprinkler Systems (piping)
•	Diy pipe varve	\sym\fire\f-drypip.dwg		
	Fire Department	Symbols	Fire	Sprinkler Systems (piping)
>	connection		\sym\fire\f-conn	.dwg
	Brook line (straight)	Symbols	General	(No Topic)
V	Break line (straight)		(custom lisp rout	tine)

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
/_	Break line (arc)	Symbols	General	(No Topic)
,	` ,		(custom lisp routi	ne)
⁺ 123.45	Spot elevation	Symbols	General	(No Topic)
125.75	Spot elevation		\sym\gen\spotel_1	.dwg
×07450	Existing spot	Symbols	General	(No Topic)
×234.56	elevation		\sym\gen\spotelx1	.dwg
!	A 1	Symbols	Mechanical	HVAC
4	Auto damper		\sym\mech\madam	p.dwg
_ ,	D - 1-1 6 1	Symbols	Mechanical	HVAC
1/2	Backdraft damper	\sym\mech\mbkdrft.dwg		
	Fire damper w/door	Symbols	Mechanical	HVAC
		\sym\mech\mfired1.dwg		
(A)	Fire damper	Symbols	Mechanical	HVAC
•	The damper	\sym\mech\mfired2.dwg		
1	Flexible duct	Symbols	Mechanical	HVAC
WWW	connector		\sym\mech\mflxcor	n.dwg
	Humidistat	Symbols	Mechanical	HVAC
	Trainingial	\sym\mech\mhumid.dwg		
	Volume damper	Symbols	Mechanical	HVAC
	volume damper		.\sym\mech\mmdam	p.dwg
	Smoke detector	Symbols	Mechanical	HVAC
LET D	SHOKE detector	\sym\mech\msmkdet.dwg		
(T)	Temperature sensor	Symbols	Mechanical	HVAC
∍s	Temperature sensor		\sym\mech\mtsens	.dwg

			Symbol File Acc	ess
Symbol	Description	IM Group	IM Category	IM Topic
	3 5		Pathname	
\bigcirc	Thermostat	Symbols	Mechanical	HVAC
)			\sym\mech\mtstat	t.dwg
	Pipe break - single	Symbols	Plumbing	(No Topic)
)	line pipe		\sym\plumb\pipebi	1.dwg
$\overline{}$	Pipe break - double	Symbols	Plumbing	(No Topic)
	line pipe		\sym\plumb\pipebi	r2.dwg
٦	Pipe cap	Symbols	Plumbing	(No Topic)
_	гре сар		\sym\plumb\pcap	o.dwg
1	Cleanout	Symbols	Plumbing	(No Topic)
-o		\sym\plumb\pco.dwg		
٦	Wall cleanout	Symbols	Plumbing	(No Topic)
wcq		\sym\plumb\pwco.dwg		
•	Floor cleanout	Symbols	Plumbing	(No Topic)
FCO	1 loor eleanout	\sym\plumb\pfco.dwg		
_	Grade cleanout	Symbols	Plumbing	(No Topic)
GCO	Grade cleanout		\sym\plumb\pgco	o.dwg
(a)	Floor drain	Symbols	Plumbing	(No Topic)
FD	1 loor drain		\sym\plumb\pfd.	dwg
0	Elbow tee	Symbols	Plumbing	(No Topic)
	Libow tee	\sym\plumb\psgl-tee.dwg		ee.dwg
	Elbow base	Symbols	Plumbing	(No Topic)
工一	Dioow base		.\sym\plumb\pel-ba	se.dwg
	Evpansion joint	Symbols	Plumbing	(No Topic)
	Expansion joint		\sym\plumb\pexp-	jt.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
	Flex connector	Symbols	Plumbing	(No Topic)
			\sym\plumb\pfle	x.dwg
Д.	2-way auto	Symbols	Plumbing	(No Topic)
X	2 way date		\sym\plumb\p2wa	y.dwg
	3-way auto	Symbols	Plumbing	(No Topic)
\mathbb{R}	3 way auto		\sym\plumb\p3wa	y.dwg
A	Angle gate valve	Symbols	Plumbing	(No Topic)
Δ,	Tingle gate varve		\sym\plumb\paga	te.dwg
⊗ 1	Angle gate valve -	Symbols	Plumbing	(No Topic)
~	plan view		.\sym\plumb\pagate	epl.dwg
Æ	Angle globe valve	Symbols	Plumbing	(No Topic)
Δ		\sym\plumb\paglobe.dwg		
•⊲	Angle globe valve -	Symbols	Plumbing	(No Topic)
- 1	plan view		\sym\plumb\paglı	ol.dwg
	Air separator	Symbols	Plumbing	(No Topic)
9	All separator		\sym\plumb\pair-s	ep.dwg
П	Air vent	Symbols	Plumbing	(No Topic)
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	All vent		\sym\plumb\pav	.dwg
Г	Ball valve	Symbols	Plumbing	(No Topic)
Ф	Daii vaive		\sym\plumb\pball	1.dwg
ΙŌΙ	Ball valve	Symbols	Plumbing	(No Topic)
101	Daii valve		\sym\plumb\pball	2.dwg
7/5	Dalamaina1	Symbols	Plumbing	(No Topic)
	Balancing valve		\sym\plumb\pbaln	ce.dwg

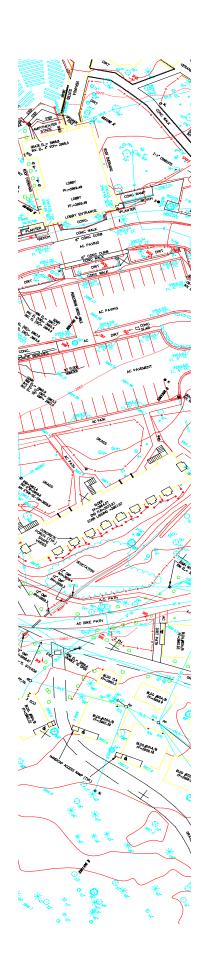
		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
BFP	Backflow preventer	Symbols	Plumbing	(No Topic)
			\sym\plumb\pbfp	.dwg
ıſı	Butterfly valve	Symbols	Plumbing	(No Topic)
111	Butterry varve		\sym\plumb\pbtrfly	y.dwg
7	Check valve	Symbols	Plumbing	(No Topic)
-			\sym\plumb\pchec	k.dwg
\triangleright	Concentric reducer	Symbols	Plumbing	(No Topic)
	Concentre reducer		.\sym\plumb\pcon-re	ed.dwg
Δ	Eccentric reducer	Symbols	Plumbing	(No Topic)
	Eccentric reducer	\sym\plumb\pecc-red.dwg		
<u>1</u>	Flow meter	Symbols	Plumbing	(No Topic)
L-—-J		\sym\plumb\pflo-mtr.dwg		
FS	Flow switch	Symbols	Plumbing	(No Topic)
T		\sym\plumb\pflow-sw.dwg		
IMI	Fluid meter	Symbols	Plumbing	(No Topic)
IMI	Traid meter		.\sym\plumb\pflu-m	tr.dwg
Y	Funnel drain	Symbols	Plumbing	(No Topic)
1	T dimer drum	\sym\plumb\pfnl-dr.dwg		
<u></u> _	Gate valve	Symbols	Plumbing	(No Topic)
<i>Y</i> 7	Saic varve		\sym\plumb\pgate	.dwg
⋈	Globe valve	Symbols	Plumbing	(No Topic)
	Sioce varve		\sym\plumb\pglob	e.dwg
Ŧ HB	Hose bibb	Symbols	Plumbing	(No Topic)
1	11030 0100		\sym\plumb\phb.	dwg

			ess	
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
Ь	Hose connection	Symbols	Plumbing	(No Topic)
			\sym\plumb\phc.	dwg
ļ	Manual air vent	Symbols	Plumbing	(No Topic)
ľών	Manual an Vent		\sym\plumb\pmv	.dwg
111	Orifice plate	Symbols	Plumbing	(No Topic)
III	Office plate		\sym\plumb\pori-p	ol.dwg
\wedge	Dlug volvo	Symbols	Plumbing	(No Topic)
\vee	Plug valve		\sym\plumb\pplug	g.dwg
J.	Pressure reducing valve	Symbols	Plumbing	(No Topic)
М		\sym\plumb\ppr-rdc.dwg		
₽s]	Pressure switch	Symbols	Plumbing	(No Topic)
T		\sym\plumb\ppr-sw.dwg		
Ø	Pressure gauge	Symbols	Plumbing	(No Topic)
Υ	Tressure gauge		\sym\plumb\pprgag	ge.dwg
— P/T	Pressure and temperature	Symbols	Plumbing	(No Topic)
1 ′	tap		\sym\plumb\pprta	p.dwg
(A)	Pump	Symbols	Plumbing	(No Topic)
	- ump	\sym\plumb\ppump.dwg		
4.	Relief valve	Symbols	Plumbing	(No Topic)
⅓			\sym\plumb\prelie	f.dwg
SA	Shock arrestor	Symbols	Plumbing	(No Topic)
			\sym\plumb\psa.	dwg
-	Sight glass	Symbols	Plumbing	(No Topic)
10	Digiti glass		\sym\plumb\psiteg	gl.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
			Pathname	
4	Stem and yoke	Symbols	Plumbing	(No Topic)
	20011 0110) 5110		\sym\plumb\pst-y	k.dwg
#	Stem and yoke	Symbols	Plumbing	(No Topic)
ζ	w/tamper switch		\sym\plumb\pst-ys	sts.dwg
	Strainer w/blowdown and	Symbols	Plumbing	(No Topic)
Z.	hose connection		\sym\plumb\pstra	in.dwg
	Thermal bulb	Symbols	Plumbing	(No Topic)
			.\sym\plumb\pth-bu	ılb.dwg
	Thermometer	Symbols	Plumbing	(No Topic)
<u></u>	Thermonicter		\sym\plumb\pther	m.dwg
ılı	Pipe union	Symbols	Plumbing	(No Topic)
1 1		\sym\plumb\punion.dwg		
T wн	Wall hydrant	Symbols	Plumbing	(No Topic)
	wan nyuran	\sym\plumb\pwh.dwg		ı.dwg
	8x8 CMU	Symbols	Structural	CMU Masonry
	one ente		\sym\struc\8x8cm	u.dwg
	8 in. CMU lintel	Symbols	Structural	CMU Masonry
<u> </u>		\sym\struc\8xlintel.dwg		
	8x8 Bond beam	Symbols	Structural	CMU Masonry
	one bond beam		.\sym\struc\8x8bbe	am.dwg
	8x16 Stretcher	Symbols	Structural	CMU Masonry
	OATO BUCCHO!		\sym\struc\8x16	.dwg
	8x16 - 1 plain end	Symbols	Structural	CMU Masonry
	oxio - i piani ciid		\sym\struc\8x16_	1.dwg

		Symbol File Access		
Symbol	Description	IM Group	IM Category	IM Topic
 			Pathname	
	8x16 - 2 plain ends	Symbols	Structural	CMU Masonry
			\sym\struc\8x16_	2.dwg
	12 0 CMI	Symbols	Structural	CMU Masonry
	12x8 CMU		\sym\struc\12x8cr	nu.dwg
	12 in. CMU lintel	Symbols	Structural	CMU Masonry
Zinin			\sym\struc\12xlin	tl.dwg
	12x8 Bond beam	Symbols	Structural	CMU Masonry
	12x8 Bond beam		.\sym\struc\12x8bb	om.dwg
	12x16 stretcher	Symbols	Structural	CMU Masonry
	12X10 Stretcher		\sym\struc\12x10	5.dwg
	12x16 - 1 plain end	Symbols	Structural	CMU Masonry
	12x16 - 1 plain end	\sym\struc\12x16_1.dwg		
		Symbols	Structural	CMU Masonry
	12x16 - w plain ends	\sym\struc\12x16_2.dwg		
	Delt.	Symbols	Structural	Fasteners
	Bolt		\sym\struc\zboltn	ut.dwg
\bigcirc	Nut - plan	Symbols	Structural	Fasteners
9	Nut - pian		\sym\struc\znut	.dwg
	Wald carrel - 1	Symbols	Structural	Fasteners
	Weld symbols	(Dialogue Box for weld symbols)		
STELL STIMES 0	Wall anchor	Standard Details	Structural	Masonry
OMU WALL ANCHOR	wan anchor	\std\struc\wlanchor.dwg		

			Symbol File Acc	cess		
Symbol	Description	IM Group	IM Category	IM Topic		
			Pathname			
A TO SOLUTION OF THE PARTY OF T	CMU Wall int.	Standard Details	Structural	Masonry		
Con arr man so sessions	CWO Wall Inc.		\std\struc\cmuwlint.dwg			
ECIDES DA PORTE ARRESTANCE DE L'ANTICION DE	CMILEY joint	Standard Details	Structural	Masonry		
CHU EXPANSION JOINT BY SOME	CMU Exp. joint	\std\struc\cmuexpjt.dwg				
A STEEL WAS	Anghan Dataila	Standard Details	Structural	Masonry		
4 CMU ANCHOR DETAIL NO SOULE	Anchor Details	\std\struc\masancdt.dwg				
SMEDT NO.		Standard Details	Structural	Concrete		
H BOW COMEGON CON-	Expansion joint	\std\struc\conexpjt.dwg				



Appendix F

Text Height vs. Plotting Height

Appendix F **Text Height vs. Plotting Height**(Relative to Model Space)

When Model Space Drawing Unit = 1 Inch

Text Height:

Plot Scale	PS Zoom XP	<u>.100</u>	<u>.130</u>	<u>.140</u>	<u>.175</u>	<u>.240</u>	<u>.500</u>	<u>Multiplier</u>
Full	1	. 100	.130	.140	.175	.240	.500	1.00
Half	1/2	.200	.260	.280	.350	.480	1.00	2.00
3"=1'	1/4	.400	.520	.560	.700	.960	2.00	4.00
1 1/2"=1'	1/8	.800	1.04	1.12	1.40	1.92	4.00	8.00
1"=1'	1/12	1.20	1.56	1.68	2.10	2.88	6.00	12.0
3/4"=1'	1/16	1.60	2.08	2.24	2.80	3.84	8.00	16.0
1/2"=1'	1/24	2.40	3.12	3.36	4.20	5.76	12.0	24.0
3/8"=1'	1/32	3.20	4.16	4.48	5.60	7.68	16.0	32.0
1/4"=1'	1/48	4.80	6.24	6.72	8.40	11.52	24.0	48.0
3/16"=1'	1/64	6.40	8.32	8.96	11.2	15.36	32.0	64.0
1/8"=1'	1/96	9.60	12.48	13.44	16.8	23.04	48.0	96.0
3/32"=1'	1/128	12.8	16.64	17.92	22.4	30.72	64.0	128
1/16"=1'	1/192	19.2	24.96	26.88	33.6	46.08	96.0	192

When Model Space Drawing Unit = 1 Foot

Text Height:

Plot Scale	PS Zoom XP	<u>.100</u>	<u>.130</u>	<u>.140</u>	<u>.175</u>	<u>.240</u>	<u>.500</u>	<u>Multiplier</u>
Full	12	.0083	.0108	.0117	.0146	.02	.0417	.0833
Half	6	.0167	.0217	.0233	.0292	.04	.0833	.1667
1"=10'	1/10	1	1.3	1.4	1.75	2.4	5	10
1"=20'	1/20	2	2.6	2.8	3.5	4.8	10	20
1"=25'	1/25	2.5	3.25	3.5	4.375	6	12.5	25
1"=30'	1/30	3	3.9	4.2	5.25	7.2	15	30
1"=40'	1/40	4	5.2	5.6	7	9.6	20	40
1"=50'	1/50	5	6.5	7	8.75	12	25	50
1"=60'	1/60	6	7.8	8.4	1.5	14.4	30	60
1"=100'	1/100	10	13	14	17.5	24	50	100

Larger scales when Model Space drawing unit = 1 Foot

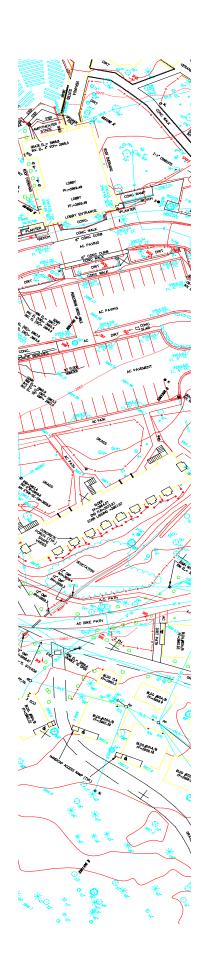
Text Height:

Plot Scale	PS Zoom XP	<u>.100</u>	<u>.130</u>	<u>.140</u>	<u>.175</u>	<u>.240</u>	<u>.500</u>	<u>Multiplier</u>
1"=200'	1/200	20	26	28	35	48	100	200
1"=300'	1/300	30	39	42	52.5	72	150	300
1"=400'	1/400	40	52	56	70	96	200	400
1"=500'	1/500	50	65	70	87.5	120	250	500
1"=750'	1/750	75	97.5	105	131.25	180	375	750
1"=1000'	1/1000	100	130	140	175	240	500	1000
1"=2000'	1/2000	200	260	280	350	480	1000	2000
1"=2500'	1/2500	250	325	350	437.5	600	1250	2500
1"=3000'	1/3000	300	390	420	525	720	1500	3000
1"=4000'	1/4000	400	520	560	700	960	2000	4000

Model Space drawing unit = 1 Mile

Text Height:

		,	9					
Plot Scale	PS Zoom XP	<u>.100</u>	<u>.130</u>	<u>.140</u>	<u>.175</u>	<u>.240</u>	<u>.500</u>	<u>Multiplier</u>
1"=1mi	1	.1	.13	.14	.175	.24	.5	1
1"=2mi	1/2	.2	.26	.28	.35	.48	1	2
1"=3mi	1/3	.3	.39	.42	.525	.72	1.5	3
1"=4mi	1/4	.4	.52	.56	.7	.96	2	4
1"=5mi	1/5	.5	.65	.7	.875	1.2	2.5	5
1"=6mi	1/6	.6	.78	.84	1.05	1.44	3	6
1"=7mi	1/7	.7	.91	.98	1.225	1.68	3.5	7
1"=8mi	1/8	.8	1.04	1.12	1.4	1.92	4	8



Appendix G Contributors/ References

Appendix G Contributors/References

Contributors

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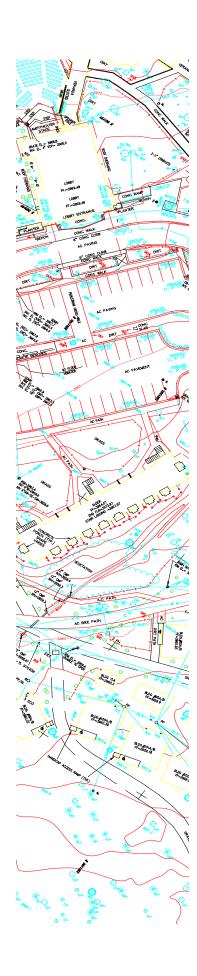
Bruce Littlehorn, Senior Technical Specialist Mindbank Technical Solutions, LLC

DSC CAD Standards Committee/Contributors: Robert Pilk Dan Savage Steve Schrempp Bill Shelley Dave Snow Al Thornton

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