

FAA-STD-002H  
September 6, 2017

**U.S. DEPARTMENT OF TRANSPORTATION**  
**FEDERAL AVIATION ADMINISTRATION**  
**STANDARD**  
**ENGINEERING**  
**DRAWING PREPARATION & SUPPORT**



## FOREWORD

This standard was updated by the National Computer Aided Engineering Graphics (CAEG) Program Office (Air Traffic Control Facilities Operational Services) and has adopted the nationally accepted drawing practices of the American National Standards Institute (ANSI), the American Institute of Architects (AIA) and the Military to the extent specified herein. It will assist in developing a more efficient and effective means for management and technical data control of drawings prepared by and for the Federal Aviation Administration (FAA) and the National Airspace System (NAS) Program. This standard provides:

- a.** Drawing practices and format material for the preparation of architectural and engineering drawings.
- b.** Definitions and examples of the types of facility and standard drawings to be prepared by and for the Federal Aviation Administration.
- c.** Procedures for the creation of drawing title blocks.
- d.** Numbering, coding and identification procedures for drawings, associated lists, and documents referenced on these drawings and associated lists.
- e.** Practices applicable to Computer Aided Design and Drafting (CADD).

Changes from the previous version of this standard focus on:

- a.** Current technological trends that are gaining widespread acceptance in government and industry.
- b.** Greater use of electronic deliverables and delivery media.
- c.** Synchronization with standard industry practices.
- d.** Greater FAA-wide standardization to take full advantage of technological opportunities.

**MANUAL REVISION HISTORY**

<b>DATE</b>	<b>VERSION</b>	<b>DESCRIPTION</b>
3/11/1987	002C	
2/21/1997	002D	
9/21/1999	002E	Major rewrite to address adoption of CADD technology, also introduced standard title block and drawing numbers.
8/9/2002	002E, change 1	
1/23/2004	002E, change 2	Adopted FSEP equipment listing, modified Section 3.1.5.1 Drawing Number Structure, modified Equipment discipline, added Security Discipline, added Level/Layer sheets for NAS Equipment and Security
6/17/2005	002F	Updated due to technical advances in drafting software. Textural and illustrative clarifications.
8/29/2008	002G	Minor updates to Section 2.1 Government Documents, organized Orders and Standards list. Section 3.1.5.1 Drawing Number Structure, expanded the Non-NAS drawing number to contain up to 10 characters to accommodate the JCN number expansion. Section 4.1.3 Media Labeling, added the use of FOUO and SSI to the labeling list.
9/6/2017	002H	Updates to Section 2 Applicable Documents; minor updates to Section 3; rewrite of Q-Series drawing numbers; addition of True Type Fonts to Table 3-7 Comparison of Font Types; modifications to Appendix A; adopted government plain text; updated titles of ANSI standards at Paragraph 2.1 and 2.2; Table 5-1, all website links are updated. Also, Paragraph 3.1.2 and others are updated to reflect both MicroStation and AutoCAD capabilities on models/sheets inside the CAD files.

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**Changes or suggestions regarding this Standard:**

Any change requests to this standard must be submitted through the CAEG Technical Review Board (TRB). It will be the responsibility of the TRB to determine the merit of the change request for inclusion into this standard. Changes must be submitted using the TRB web site:

<http://caeg.faa.gov/compliance/index.cfm?content=101&navVar=10&UApp=TRBweb>

Omissions of information in this standard does not imply consent to make changes outside of the TRB authority.

This document should be reviewed and updated every three to five years as changes in the CADD or Drawing Standards industry warrant.

## **1. SCOPE**

### **1.1. Standards**

This standard prescribes general requirements for the preparation and revision of architectural and engineering drawings that are prepared for facilities by and for the Federal Aviation Administration (FAA), using the two FAA-accepted CADD software suites: *MicroStation* by Bentley Systems Inc. and *AutoCAD* by Autodesk, Inc.

### **1.2. Classification**

This standard shall apply, but not be limited to the following drawing types regardless of source:

- a. Project drawings for design, construction, and installation activities.
- b. Facility drawings, including depicting the facility as-built condition.
- c. FAA Standard engineering drawings: graphic templates that are reused & modified for site specific drawings.
- d. Drawings generated by Building Informational Modeling (BIM).

## **2. APPLICABLE DOCUMENTS**

### **2.1. Government Documents**

#### Standards

##### FAA

FAA-STD-058

FAA Standard Practice, Facility  
Configuration Management

##### Military

United States Army  
Corps of Engineers  
A/E/C CAD Standard

CAD/BIM Technology Center for facilities,  
infrastructure and environment: A/E/C CAD  
Standard, Release 6.0

#### Other Publications

NAS-SS-1000

Vol. 6 Facility Requirements for the  
National Airspace System

FAA FSEP

Facility, Service and Equipment Profile

#### Orders

DOT Order 1360.6  
DOT Order 1640.5

Graphic Standards  
Chapter 5, For Official Use Only  
Information (FOUO)

FAA Order JO 7340.2  
FAA Order 1800.66  
FAA Order 1600.75

Contractions  
Configuration Management Policy  
Protecting Sensitive Unclassified  
Information (SUI)

FAA Order 6000.55

National Standard Facility Drawing  
Library Procedure

FAA Order JO 3900.57

EOSH Requirements for Construction &  
Maintenance Activities

FAA Order 7350.9

Location Identifiers

FAA Order 6010.7

Joint Acceptance Inspection (JAI)

**NOTE:** Check the status and the latest version of Orders' revision at:

[https://employees.faa.gov/tools\\_resources/orders\\_notices/](https://employees.faa.gov/tools_resources/orders_notices/)

## **2.2. Commercial Documents**

### Standards

ANSI/AWS A2.4	Symbols for Welding & Nondestructive Testing
ANSI/AWS A3.0M/A3.0	Welding Terms and Definitions
ASME B1.1	Unified Inch Screw Threads
IEEE 91	Graphic Symbols for Logic Functions
ASME Y14.38	Abbreviations and Acronyms for use on Drawings and Related Documents
ASME Y14.1	Drawing Sheet Size and Format
ASME Y14.2	Line Conventions and Lettering
ASME Y14.5M	Dimensioning and Tolerance
ASME Y14.6	Screw Thread Representation
ASME Y14.7.1	Gear Drawing Standards - Part 1 for Spur, Helical, Double Helical and Rack
ASME Y14.7.2	Gear and Spline Drawing Standards - Part 2 Bevel and Hypoid Gears
ANSI Y14.13M	Mechanical Spring Representation
ANSI Y14.15	Electrical and Electronics Diagrams
ANSI Y14.15	Interconnection Diagrams
ANSI Y14.26.3	Dictionary of Terms for Computer-Aided Preparation of Product Definition Data
IEEE 315	Graphic Symbols for Electrical and Electronic Diagrams
ASME Y32.4	Graphic Symbols for Plumbing Fixtures for Diagrams used in Architecture & Building Construction
ANSI Y 32.9	Graphic Symbols for Electrical Wiring and Layout Diagrams Used in Architecture and Building Construction
AIA	CAD Layer Guidelines
U.S. National CAD Standard	V6 or current version, published by the National Institute of Building Sciences

## **2.3. Order of Precedence**

In the event of conflict between the documents referenced in Sections 2.1 and 2.2 and the contents of this standard pertaining to standard engineering drawing practices, the contents of this standard shall be considered the superseding requirement. Any contracts let after the release date of FAA-STD-002H, pertaining to standard engineering drawing practices, shall adhere to this standard. Any contracts previously awarded shall adhere to the Standard revision level approved at the time of contract award. See Manual Revision History Table on page iv for FAA-STD-002, U.S. Dept. of Transportation, FAA Standard Engineering Drawing Preparation and Support approval dates.

### **3. DRAWING REQUIREMENTS.**

#### **3.1. Drawing Production.**

##### **3.1.1. Drawing File Format.**

- a. Vector drawings must be created in native MicroStation or AutoCAD file formats (DGN or DWG). Use of Drawing Exchange Format (DXF) should be avoided. Electronic drawing deliverables from contractors must comply with Section 4.0, Electronic Deliverables, of this standard. The preferred delivered drawing file format must be coordinated with the local CADD Manager.
- b. Raster file format drawings must be generated in PDF Format and Tagged Image File Format (TIFF) Group 4.
- c. CADD practices to avoid: custom fonts, custom patterns, custom line types or styles (other than those depicted in Figure 3-11 and Figure 3-12), nested blocks, nested “Xrefs” or nested reference files and infinite lines.

### 3.1.2. Creation of CADD Files

All models in a CAD file should be created at full-scale (1-to-1). Drawing borders and text-heights must always be scaled to fit the **full-scale** drawing model(s). Sheet/Paper models should be “plotted size” (12” = 1’-0”) and reference models scaled down to fit. For those instances where the model and sheet references are in a single, full-scale design model, refer to *Table 3-1, Scale Factor and Text Height Conversion Table* for standard engineering, architectural and mapping scale factors and text heights to be used with full-size drawing models.

SCALE FACTOR and TEXT HEIGHT CONVERSION TABLE				
Plotted Scale	Scale Factor	Standard Text Heights		
		3/32” (0.09375”)	5/32” (0.15625”)	1/4” (0.25”)
1/32” = 1’-0”	384	3’	5’	8’
1/16” = 1’-0”	192	1.5’	2.5’	4’
3/32” = 1’-0”	128	12”	20”	32”
1/8” = 1’-0”	96	9”	15”	24”
3/16” = 1’-0”	64	6”	10”	16”
1/4” = 1’-0”	48	4.5”	7.5”	12”
3/8” = 1’-0”	32	3”	5”	8”
1/2” = 1’-0”	24	2.25”	3.75”	6”
3/4” = 1’-0”	16	1.5”	2.5”	4”
1” = 1’-0”	12	1.125”	1.875”	3”
1 1/2” = 1’-0”	8	0.75”	1.25”	2”
3” = 1’-0”	4	0.375”	0.625”	1”
6” = 1’-0”	2	0.1875”	0.3125”	0.5”
12” = 1’-0”	1	0.09375”	0.15625”	0.25”
1” = 10’-0”	120	0.9375’	1.5625’	2.5’
1” = 20’-0”	240	1.875’	3.125’	5’
1” = 25’-0”	300	2.34375’	3.90625’	6.25’
1” = 30’-0”	360	2.8125’	4.6875’	7.5’
1” = 40’-0”	480	3.75’	6.25’	10’
1” = 50’-0”	600	4.6875’	7.8125’	12.5’
1” = 60’-0”	720	5.625’	9.375’	15’
1” = 100’-0”	1200	9.375’	15.625’	25.0’
1”=150’-0”	1800	14.0625’	23.4375’	37.5’
1” = 200’-0”	2400	18.75’	31.25’	50’
1” = 250’-0”	3000	23.4375’	39.0625’	62.5’
1” = 300’-0”	3600	28.125’	46.875’	75’
1” = 400’-0”	4800	37.5’	62.5’	100’
1” = 500’-0”	6000	46.875’	78.125’	125’
1” = 600’-0”	7200	56.25’	93.75’	150’
1”=800’-0”	9600	75’	125’	200’
1” = 1000’-0”	12,000	93.75’	156.25’	250’
1 = 10	10	0.9375	1.5625	2.5
1 = 20	20	1.875	3.125	5
1 = 30	30	2.8125	4.6875	7.5

*Table 3-1, Scale Factor and Text Height Conversion Table*

### **3.1.2.1. Drawing Sheet Format**

FAA-approved drawing sheet formats include common drawing features such as boundary geometry, title block data, filename, pathname, zoning guides, and title block geometry. Copies of the approved sheet formats will be provided by the CAEG Program Office (PO) to both FAA and support organizations. All FAA offices and support organizations are required to use these formats. Contact the regional CAEG Administrators, who can provide FAA-STD-002 Standard drawing borders and logos used in creation of engineering drawings for the FAA. The FAA border, including the title block, for the sheet file can be 'referenced' into a drawing file as a seed file (DGN) or a reference block (DWG).

### **3.1.2.2. Drawing Sheet Sizes**

The most commonly used FAA standard drawing sheet size is ANSI-D (22" X 34"). Other sheet sizes are allowed as needed, and construction drawings for any of the larger facilities (such as an ATCT and administrative building, or a TRACON) may utilize the E-size sheet. All drawings within a set should be plotted on the same sheet-size if possible. Drawing sheet sizes and margins must follow the specifications shown in *Table 3-2, Standard Drawing Sheet Sizes*. Apply ASME Y14.1 Drawing Sheet Size and Format for any information not provided in this standard, but required on drawing sheet, such as border zoning specifications. The zoning specifications for the FAA D-size sheet are unique in that, the vertical margins contain eight zones (each measuring 2.75 in.) and the horizontal margins have eight zones (measuring 4.25 in. each). All zones should be measured from the edge of the sheet, and be aligned with the zones in the opposing margin.

<b>Size Designation</b>	<b>Vertical</b>	<b>Horizontal</b>	<b>Top Margin and Bottom Margin</b>	<b>Left Margin</b>	<b>Right Margin</b>
B	11"	17"	0.50"	1.50"	0.50"
D	22"	34"	0.50"	1.50"	0.50"
E	34"	44"	0.50"	1.50"	0.50"
F	28"	40"	0.50"	1.50"	0.50"

*Table 3-2, Standard Drawing Sheet Sizes*



### 3.1.2.3. Sizing Drawing Formats for Scaled Drawings

Each facility CADD file must be drawn at full size. *Table 3-3, Drawing Scales and Associated Drawing Field Sizes*, provides a cross reference of plotted scales to actual drawing field sizes.

Plotted Scale	Drawing Field Size (H x W)		
	'D' (21" x 24.5")	'E' (33" x 34.5")	'F' (27" x 30.5")
1/32"=1'-0"	672' x 784'	1056' x 1104'	864' x 976'
1/16"=1'-0"	336' x 392'	528' x 552'	432' x 488'
3/32"=1'-0"	224' x 261.3'	352' x 368'	288' x 325.3'
1/8"=1'-0"	168' x 196'	264' x 276'	216' x 244'
3/16"=1'-0"	112' x 130.7'	176' x 184'	144' x 162.7'
1/4"=1'-0"	84' x 98'	132' x 138'	108' x 122'
3/8"=1'-0"	56' x 65.3'	88' x 92'	72' x 81.3'
1/2"=1'-0"	42' x 49'	66' x 69'	54' x 61'
3/4"=1'-0"	28' x 32.7'	44' x 46'	36' x 40.7'
1"=1'-0"	21' x 24.5'	33' x 34.5'	27' x 30.5'
1 1/2"=1'-0"	14' x 16.3'	22' x 23'	18' x 20.3'
3"=1'-0"	7' x 8.17'	11' x 11.5'	9' x 10.17'
6"=1'-0"	3.5' x 4.08'	5.5' x 5.75'	4.5' x 5.08'
12"=1'-0"	1.75' x 2.04'	2.75' x 2.875'	2.25' x 2.54'
1"=10'-0"	210' x 245'	330' x 345'	270' x 305'
1"=20'-0"	420' x 490'	660' x 690'	540' x 610'
1"=25'-0"	525' x 612.5'	825' x 862.5'	675' x 762.5'
1"=30'-0"	630' x 735'	990' x 1035'	810' x 915'
1"=40'-0"	840' x 980'	1320' x 1380'	1080' x 1220'
1"=50'-0"	1050' x 1225'	1650' x 1725'	1350' x 1525'
1"=60'-0"	1260' x 1470'	1980' x 2070'	1620' x 1830'
1"=100'-0"	2100' x 2450'	3300' x 3450'	2700' x 3050'
1"=150'-0"	3150' x 3675'	4950' x 5175'	4050' x 4575'
1"=200'-0"	4200' x 4900'	6600' x 6900'	5400' x 6100'
1"=250'-0"	5250' x 6125'	8250' x 8625'	6750' x 7625'
1"=300'-0"	6300' x 7350'	9900' x 10,350'	8100' x 9150'
1"=400'-0"	8400' x 9800'	13,200' x 13,800'	10,800' x 12,200'
1"=500'-0"	10,500' x 12,250'	16,500' x 17,250'	13,500' x 15,250'
1"=600'-0"	12,600' x 14,700'	19,800' x 20,700'	16,200' x 18,300'
1"=800'-0"	16,800' x 19,600'	26,400' x 27,600'	21,600' x 24,400'
1"=1000'-0"	21,000' x 24,500'	33,000' x 34,500'	27,000' x 30,500'
1=10	210 x 245	330 x 345	270 x 305
1=20	420 x 490	660 x 690	540 x 610
1=30	630 x 735	990 x 1035	810 x 915

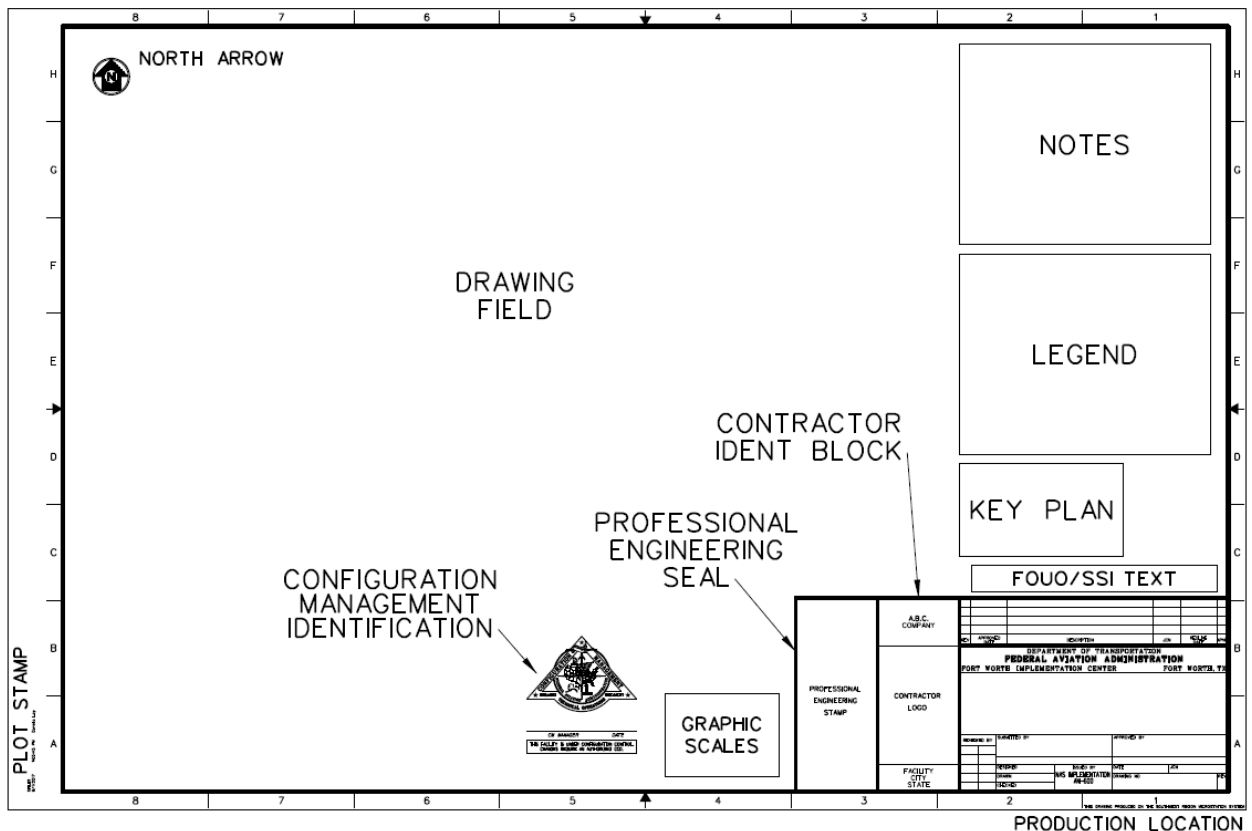
*Table 3-3, Drawing Scales and Associated Drawing Field Sizes*

### 3.1.2.4. Appearance

*Figure 3-1, Drawing Appearance*, shows the typical features as applicable for the appearance of CADD-produced drawings. The figure shows the location of these features in a construction drawing. These features include:

- Border
- Title Block
- Contractor Identification Block
- Production Location
- Drawing Field
- Notes
- Plot Stamp (File name, Date, Time, User name)
- For Official Use Only/ Sensitive Security Information Text
- Key Plan
- Graphic Scales
- Configuration Management (CM) Identification
- North Arrow
- Legend
- Professional Engineering Stamp

**NOTE:** The preferred orientation of the north arrow should be pointing toward the top or the left-hand side of the sheet. Where more than one scale size is used on the drawing, it is recommended putting the graphic scales just below the title and written scale descriptions of each of the views.

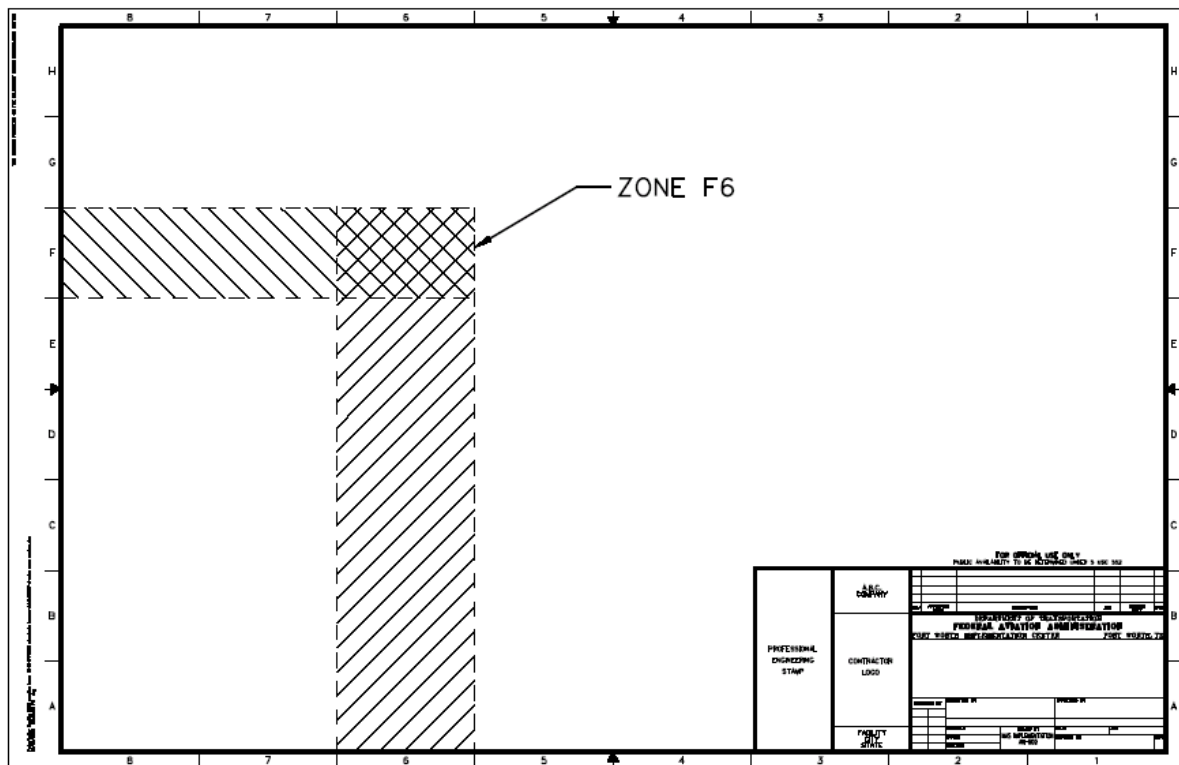


*Figure 3-1, Drawing Appearance*

### **3.1.3. Drawing Border and Title Block**

#### **3.1.3.1. Border**

The border is the rectangular frame surrounding the drawing. It contains a “zoning system” that can be used to call-out specific areas of a drawing when changes, or new graphics, are incorporated. The alphabetic characters are located on the left and right sides and the numeric characters are on the top and bottom. The zones are referred to using an alphanumeric description, such as “Zone F6” depicted in *Figure 3-2, Drawing Zoning System*.



*Figure 3-2, Drawing Zoning System*

#### **3.1.3.2. Title Block**

The title block shown in *Figure 3-3, Drawing Title Block*, is used for recording specific drawing metadata. The title block is located in the lower-right corner and just inside the drawing zone boundary. It is sub-divided into rectangular areas that contain specific text data such as drawing title, drawn by, approved by, date and drawing number. All text in the title block must be in upper-case, except for the electronic signatures, which may be both upper and lower-case characters.

##### **3.1.3.2.a.**

The title block in *Figure 3-3* is subdivided into three main sections. The revision section is located at the top. The authorizing agency section is located in the middle and the main section at the bottom. The main section of the title block contains the title, signatures, drawing identification and the issuing office. All title blocks for drawing sizes D through F must conform to *Figure 3-3*. The title block overall dimensions are 7-3/8” x 5-5/16”.

**3.1.3.2.b.**

Items labeled in *Figure 3-3* are described in *Table 3-4, Drawing Title Block Descriptions*. The contractor logo must be located to the left of the title block and shall not exceed 2-1/4" in width. Any Professional Engineering seal should be located to the left of the Contractor identification block (or to the left of the title block, if the Contractor block is absent) and must not exceed 2-1/4" in width. The Configuration Management stamp, if needed, is to be located to the left of any graphic scales, space permitting, as shown in *Figure 3-1, Drawing Title Block*.

**3.1.3.2.c.**

Every drawing that is designated as For Official Use Only (FOUO) must also include the text "For Official Use Only" and "Public availability to be determined under 5 USC 552" as specified in FAA Order 1600.75, Appendix D. When required, the FOUO text must be placed centered above the drawing title block (see item 28 in *Figure 3-3 Drawing Title Block*).

**3.1.3.2.d.**

When a set of drawings has been designated as "Sensitive Security Information (SSI)", each drawing must include the text as specified in FAA Order 1600.75 Appendix E, Marking Sensitive Security Information. This text will be placed centered above the title block.

The diagram shows a drawing title block with the following sections and fields:

- Item 28:** FOR OFFICIAL USE ONLY  
PUBLIC AVAILABILITY TO BE DETERMINED UNDER 5 USC 552
- Item 1:** REVISION table with columns: REV, APPROVED DATE, DESCRIPTION, JCN, REDLINE DATE, APVD.
- Item 2:** AUTHORIZING AGENCY: FAA OFFICE
- Item 3:** DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION
- Item 4:** CITY, STATE
- Item 5:** FACILITY
- Item 6:** TITLE 1, TITLE 2, TITLE 3
- Item 7:** CITY
- Item 8:** AIRPORT OR LOCATION
- Item 9:** STATE ABBREV.
- Item 10:** REVIEWED BY
- Item 11:** SUBMITTED BY
- Item 12:** APPROVED BY
- Item 13:** SUBMITTER'S TITLE
- Item 14:** APPROVER'S TITLE
- Item 15:** DESIGNED
- Item 16:** ISSUED BY
- Item 17:** DATE
- Item 18:** JCN
- Item 19:** DRAWING NO
- Item 20:** DRAWING NUMBER
- Item 21:** DRAWN
- Item 22:** CHECKED
- Item 23:** (Left margin)
- Item 24:** (Left margin)
- Item 25:** (Left margin)
- Item 26:** (Left margin)
- Item 27:** (Left margin)

**Figure 3-3, Drawing Title Block**

ITEM	BLOCK DESCRIPTION	TEXT SIZE	ITEM	BLOCK DESCRIPTION	TEXT SIZE
1	Revision Level ( <i>Uppercase Letter</i> )	0.100	15	Latest Revision Level	0.1563
2	Revision Approved Date	0.100	16	Drawing Number	0.1563
3	Revision Description	0.100	17	Signature Date	0.100
4	JCN ( <i>Authorizing Revision</i> )	0.100	18	Issued By ( <i>Division or Organization</i> )	0.132
5	Redline Date ( <i>Actual Date Red-lined in Field</i> )	0.100	19	Submitter's Title	0.100
6	Revision Approval ( <i>Initials</i> )	0.100	20	Designed By	0.080
7	DOT	0.120	21	Drawn By	0.080
8	FAA	0.150	22	Checked By	0.080
9	Issuing FAA Office, City, State	0.120	23	Submitted By ( <i>Signature Block Caption</i> )	0.075
10	Airport or Location	0.100	24	Reviewed By / Date	0.125
11	State ( <i>Two-letter Abbreviation</i> )	0.125	25	City	0.125
12	Approved By ( <i>Signature Block Caption</i> )	0.075	26	Drawing Title	0.200
13	Approver's Title	0.100	27	Facility Type	0.1875
14	Initial JCN	0.100	28	Security Stamp Text	0.125/0.10

**Table 3-4, Drawing Title Block Descriptions**

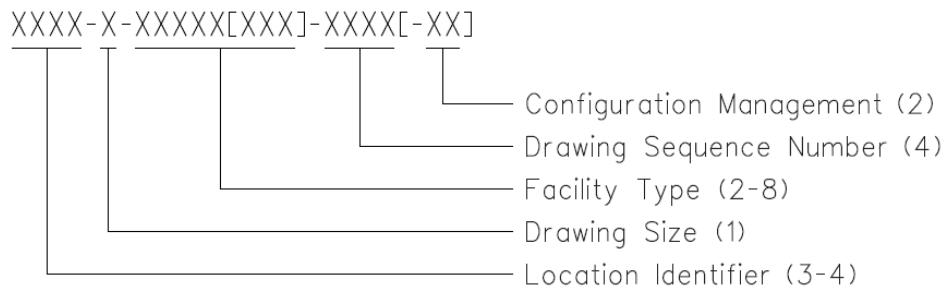
**3.1.4. Drawing Numbers**

It is essential that the drawing numbering schema be one that:

- a. Follows FAA Order 6000.55 National Facility Drawing Library Procedures.
- b. Facilitates electronic archiving, retrieval and interchange.
- c. Readily relates the drawing of the facility or object being represented.
- d. Facilitates unique identification.
- e. Promotes reuse of existing drawings.

**3.1.4.1. Drawing Number Structure**

The drawing number structure for all engineering drawings covered by this standard may consist of a maximum of 23 characters as shown in *Figure 3-4A, Typical Drawing Number Structure*. The portions of the drawing number shown in square brackets ([ ]) are used as required. *The brackets are for reference only and are not to be included in the drawing number.*



**Figure 3-4A, Typical Drawing Number Structure**

**3.1.4.1.a. Location Identifiers.**

The location identifier is assigned to each airport and the FAA facility is listed in the FAA JO7350.6 Location Identifiers or Facilities, Services Equipment Profile (FSEP) publications. If a facility has multiple location identifiers associated with different runways, the airport identifier must be used in all cases.

**3.1.4.1.b.**

The drawing sheet size is indicated with an upper-case letter (i.e. D, E or F).

**3.1.4.1.c.**

Facilities may be co-located with another facility. More than one facility may be tied to a single Location ID. Facilities may be related to a runway. Each of the following examples addresses these unique situations:

- a. Facilities co-located with another facility will be assigned the major facility's facility-type. An example would be a DME co-located with a GS would use the GS as the FAC-type.
- b. Multiple facilities with the same location identifier must have a letter appended after the facility-type. An example would be SLC-D-RTRA-XXXX, SLC-D-RTRB-XXXX.
- c. Facilities related to runways may append the runway number to the facility type. An example would be SLC-D-GS13L-XXXX.

**3.1.4.1.d.**

NAS Equipment Drawing numbers for an ARTCC facility should be numbered with the equipment acronym used in place of the facility-type. An example, a DMN drawing at the Seattle ARTCC would be ZSE-D-DMN-Q001.

**3.1.4.1.e. Drawing Sequence Numbers**

The *Drawing Sequence Number* for a construction drawing starts with an upper-case letter specifying the discipline, followed by a three-digit sequential number. An example of a construction drawing number is ORD-D-ATCT-A001. The discipline designators are listed below:

A-architectural	G-general	Q-NAS equipment	Z-contractor
C-civil	H-hazardous material	R-real estate/lease	/ shop drawing
D-demolition	L-landscape	S-structural	
E-electrical	M-mechanical	T-telecommunications	
F-fire protection	P-plumbing	Y-security	

**NOTE:** High-voltage power connections will be shown on the Electrical Discipline (E-Electrical) drawings and low-voltage power connections will be shown on NAS Equipment (Q-NAS Equipment) drawings.

**3.1.4.1.f.**

Any Real Estate drawings will require the use of the Real Estate discipline designation within the drawing number. Real Estate drawings will utilize levels according to the Civil Discipline in Appendix A of this Standard. An example of a Real Estate drawing number would be ATL-D-RCAG-R001.

**3.1.4.1.g.**

The drawing number for a Configuration Management baseline drawing must insert a “-BL” at the end of the drawing number after the Drawing Sequence Number. The drawing number for a Configuration Management end-state drawing must insert an “-ES” in this same location. An example of a CM baseline drawing number would be ORD-D-TRACO-A001-BL.

**3.1.4.1.h.**

Regional / National Standards must reference the two-letter regional code plus the letters “SD” representing “standard” in place of the Location Identifier. An example of a national standard drawing number would be WASD-D-ATCT-C001. The regional codes are as follows:

AL – Alaska	CE – Central	CT – Technical Center
EA – Eastern	GL – Great Lakes	NE – New England
MC – Monroney Center	NM – Northwest Mountain	SO – Southern
SW – Southwest	WA – Washington, DC	WP – Western Pacific

**3.1.4.1.i.**

Refer to the Facility, Service, and Equipment Profile (FSEP) website at

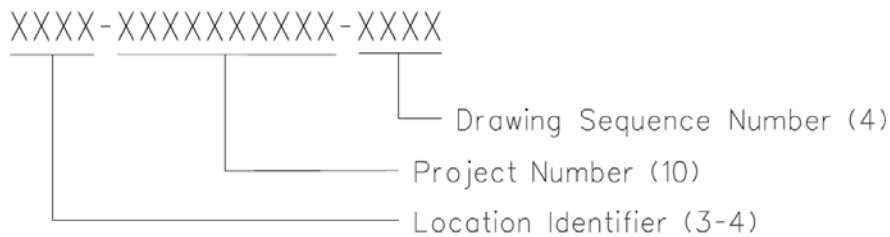
[https://employees.faa.gov/org/linebusiness/ato/operations/technical\\_operations/ajw1/ajw1B/fsep/](https://employees.faa.gov/org/linebusiness/ato/operations/technical_operations/ajw1/ajw1B/fsep/)

to obtain facility information for the creation of a drawing number. This website contains all of the authorized facility-types and equipment-types used within the FAA. Drawing numbers are to be assigned using facility-type acronyms, not equipment-type acronyms. For example: Terminal Voice Switch (TVS) is a valid equipment-type entry in the FSEP. Small Tower Voice Switch (STVS) and Enhanced Terminal voice Switch (ETVS) are types of TVS equipment. However, since TVS is not a facility acronym, the associated drawing numbers would be assigned the appropriate facility-type acronym (ATCT or TRACON). Subsets of the FSEP listing can be used at the regional level; however the information used must be taken from the FSEP listing. Additional facility or equipment-types can be requested for inclusion into the FSEP by obtaining and filling-out an electronic form from the CAEG Program Office. The CAEG PO will act as a clearing point for the FSEP office to avoid duplicate requests. Two additional facility-types *not listed* in the FSEP will be allowed:

- a.** ALD – Airport Layout Drawing    **b.** LAAS – Local Area Augmentation System

### **3.1.5. Non-NAS Facilities**

Non-NAS facility drawings will use a slightly different number configuration, as shown in *Figure 3-4B, Drawing Number Structure for Non-NAS Facilities*. Any drawings created for these facilities must use the format LID-Project Number-Drawing Sequence Number. An example of a drawing number for the Technical Center at Atlantic City would be ACT-1234567890-A001 for an architectural drawing.



*Figure 3-4B, Drawing Number Structure for Non-NAS Facilities*

### **3.1.6. Arrangement of Drawings**

#### **3.1.6.1. Construction Drawing Sets**

The drawings in a construction drawing set are listed by discipline in *Table 3-5, Construction Drawing Set*. These drawings are commonly used in identifying a complete set of drawings for the construction of a new facility. Drawing sets for the construction of a facility modification must consist of a subset of the drawings listed in this table. Construction drawing sets must be arranged by discipline in the following order:

DISCIPLINE	CODE	DRAWING DESCRIPTION
General	G	Cover, Index, Abbreviations, Symbols, Staging and Safety Plans
Real Estate/Lease	R	Property Boundaries and Legal Descriptions
Civil	C	Legend
Civil	C	Site
Civil	C	Boring Log
Civil	C	Under Slab Drainage
Civil	C	Building Site Plan
Civil	C	Grading Plan
Civil	C	Utility Plan
Civil	C	Details, Elevations and Sections
Civil	C	Site Improvements
Civil	C	Structural Canopy Details
Civil	C	Layout, Grading, Draining and Landscaping
Civil	C	Structural Details
Demolition	D	Removal of Existing Construction
Hazardous Materials	H	Hazardous Materials

(CONTINUE TO NEXT PAGE)



<b>DISCIPLINE</b>	<b>CODE</b>	<b>DRAWING DESCRIPTION</b>
Landscaping	L	Legend, Symbols and Abbreviations
Landscaping	L	Irrigation Plan
Landscaping	L	Planting
Landscaping	L	Irrigation and Planting Details
Architectural	A	Legend, Symbols and Abbreviations
Architectural	A	Floor Plan
Architectural	A	Reflected Ceiling Plan
Architectural	A	Roof Plan
Architectural	A	Elevations
Architectural	A	Sections
Architectural	A	Details
Architectural	A	Millwork
Architectural	A	Equipment
Architectural	A	Furniture
Structural	S	Legend, Symbols and Abbreviations
Structural	S	Structural Foundation Plan
Structural	S	Framing And Decking Plan
Structural	S	Roof Framing Plan
Structural	S	Structural Details
Structural	S	Structural Steel Grounding
Structural	S	Erection Drawings
Mechanical	M	Legend, Symbols and Abbreviations
Mechanical	M	Equipment Schedule
Mechanical	M	Elevations
Mechanical	M	Generator and Fan Room Plan
Mechanical	M	Chiller Room Plan
Mechanical	M	Mechanical Room Plan
Mechanical	M	Roof Plan
Mechanical	M	Sections and Details
Mechanical	M	Details
Mechanical	M	Hot and Cold Piping Diagrams
Mechanical	M	Miscellaneous
Mechanical	M	Steam Piping Systems
Mechanical - HVAC	M	Under Floor Plan
Mechanical - HVAC	M	Floor Plan (Room Area)
Mechanical - HVAC	M	Ceiling Plan
Plumbing	P	Legend, Symbols and Abbreviations
Plumbing	P	Foundation Plan
Plumbing	P	Piping Plan
Plumbing	P	Riser Diagram
Plumbing	P	Sanitary Riser Diagram
Plumbing	P	Storm Riser Diagram
Plumbing	P	Roof Drain System
Plumbing	P	Details
<i>(CONTINUE TO NEXT PAGE)</i>		
<b>DISCIPLINE</b>	<b>CODE</b>	<b>DRAWING DESCRIPTION</b>

<b>DISCIPLINE</b>	<b>CODE</b>	<b>DRAWING DESCRIPTION</b>
Electrical	E	Legend, Symbols and Abbreviations
Electrical	E	1st Floor Lighting Plan
Electrical	E	Power and Communications Plan
Electrical	E	Grounding Plan
Electrical	E	Security Plan
Electrical	E	Equipment
Electrical	E	Miscellaneous
Electrical	E	Details
Electrical	E	Single Line Diagrams
Electrical	E	Panel Schedules
NAS Equipment	Q	Refer to Table 3-6, Installation Drawing Number List
Telecommunications	T	Legend, Symbols and Abbreviations
Telecommunications	T	Communications Plan
Telecommunications	T	Details
Telecommunications	T	Manhole and Cable Diagrams
Security	Y	Closed-circuit TV
Security	Y	Security Cameras
Security	Y	Communication
Security	Y	Electrical
Security	Y	Sensor Locations
Security	Y	Equipment Details
Security	Y	Miscellaneous Alarm System
Fire Protection	F	Legend, Symbols and Abbreviations
Fire Protection	F	Sprinkler System
Fire Protection	F	Alarm Systems
Fire Protection	F	Fire Fighting Equipment
Fire Protection	F	Stand Pipe System
Contractor	Z	Shop Drawings

*Table 3-5, Construction Drawing Set*

### **3.1.6.2. Installation Drawing Sets**

NAS electronic equipment drawings provide technical details for installation and maintenance of NAS mission equipment in facilities. All these drawings must have the "Q" designator with three sequential numerals for the drawing numbers, for example, Q001, Q002, Q003, etc. For arrangement and numbering of Q-series drawings at ATCT and TRACON facilities, refer to *Table 3-6, ATCT/TRACON NAS Equipment Drawing Number List*. All NAS facility equipment drawing sets at ATCT and TRACON facilities should include index sheets(s) documenting the drawing number sequence, and should reserve Q001 and Q002 for these index sheets. Each electronic system should include a System Functional (Block) Diagram as the first drawing in each drawing group. For all other facilities (except ARTCC facilities, see Section 3.1.4.1.d), the NAS electronic equipment Q-series drawings should be numbered in the following order starting with Q001: Electronic Equipment Floor Plan, Rack Elevations, Antenna Layout and Details, System Wiring Diagrams, Connection Block Assignments and others, as needed.

<b>DRAWING DISCIPLINE</b>	<b>SEQUENCE NO. RANGE</b>
<b>Floor Plans</b>	<b>-Q001 to -Q100</b>
Index Sheets (2)	(sequential as needed)
Rack Layout Floor Plans (overhead)	
Cable Tray/Power Duct Floor Plans	
Phone/Data Jack Layout	
<b>Equipment Rack Elevations</b>	
Rack Elevations	
Distribution Frame Elevations	
<b>Controller Position Layouts</b>	
Plan View	
Console Layout	
<b>Distribution Cabling System</b>	<b>-Q101 to -Q249</b>
Demarcation System Block Diagrams	(sequential as needed)
Detailed Block Drawings/Pinouts	
Controller Position Demarcation Blocks	
<b>Communications</b>	<b>-Q250 to -Q649</b>
Fiber Optics Transmission System (FOTS)	(sequential as needed)
Voice Switching System (NVS/ETVS/RDVS/STVS)	
Voice Recorders (DALR), Time Code Displays/GPS Time Source, Displays/Generator	
Radio Control Equipment	
Air-Ground Radio System, Antenna Systems	
Emergency Communications Systems (VSBP/ECS/XCVR/etc.)	
Telco (Service Provider/FTI/DMN)	
RCL/Bandwidth Manager	
DataComm	<i>(CONTINUE TO NEXT PAGE)</i>

<b>DRAWING DISCIPLINE</b>	<b>SEQUENCE NO. RANGE</b>
<b>Radar and Automation</b>	<b>-Q650 to -Q799</b>
Primary Radar (ASR/ARSR)	(sequential as needed)
Secondary Radar (ATCBI/Mode-S)	
Surface Detection (ASDE/ASSC)	
ADS-B/Multi alteration	
ARTS/STARS/DBRITE	
FDIO/Electronic Flight Strip Systems (AEFS)	
TFMS	
TBFM	
NIDS/IDS-4/ACE-IDS	
TDLS/D-ATIS	
<b>NAVAIDS &amp; Weather</b>	<b>-Q800 to -Q949</b>
ILS Monitor and Controls	(sequential as needed)
RVR System	
Lighting Aids (ALSF/PAPI/VASI)	
LLWAS/SAWS/Wind Speed/Direction Equipment	
DASI	
TDWR/WSP/WARP	
ASOS/AWOS	
WCAM	
<b>PBX System</b>	<b>-Q950 to -Q999</b>
System Block Diagram	(sequential as needed)
System Drawing	
<b>DRAWING DISCIPLINE</b>	<b>SEQUENCE NO. RANGE</b>

*Table 3-6, ATCT/TRACON NAS Equipment Drawing Number List*

### 3.1.7. Typical Sheets and Layouts for Construction Drawing Sets

Nearly all construction drawing sets will use one of the following six standard sheets and layouts described in the following six sub-sections. All of the drawings depicted in this section are D-size sheets.

#### 3.1.7.1. Cover Sheet

Each construction drawing set must have a cover sheet that clearly identifies the drawing set. The cover sheet must have a title block containing the requisite information about the drawing set. See *Figure 3-5, Cover Sheet Layout*. If the Cover Sheet is part of a set of drawings that will be delivered outside of the FAA, the drawings may be required to include sensitive drawing marking information (as specified in FAA Order 1600.75 Appendix D, Marking FOUO Information), which will be placed centered above the title block. In addition a back sheet must be included with text as specified in FAA Order 1600.75.

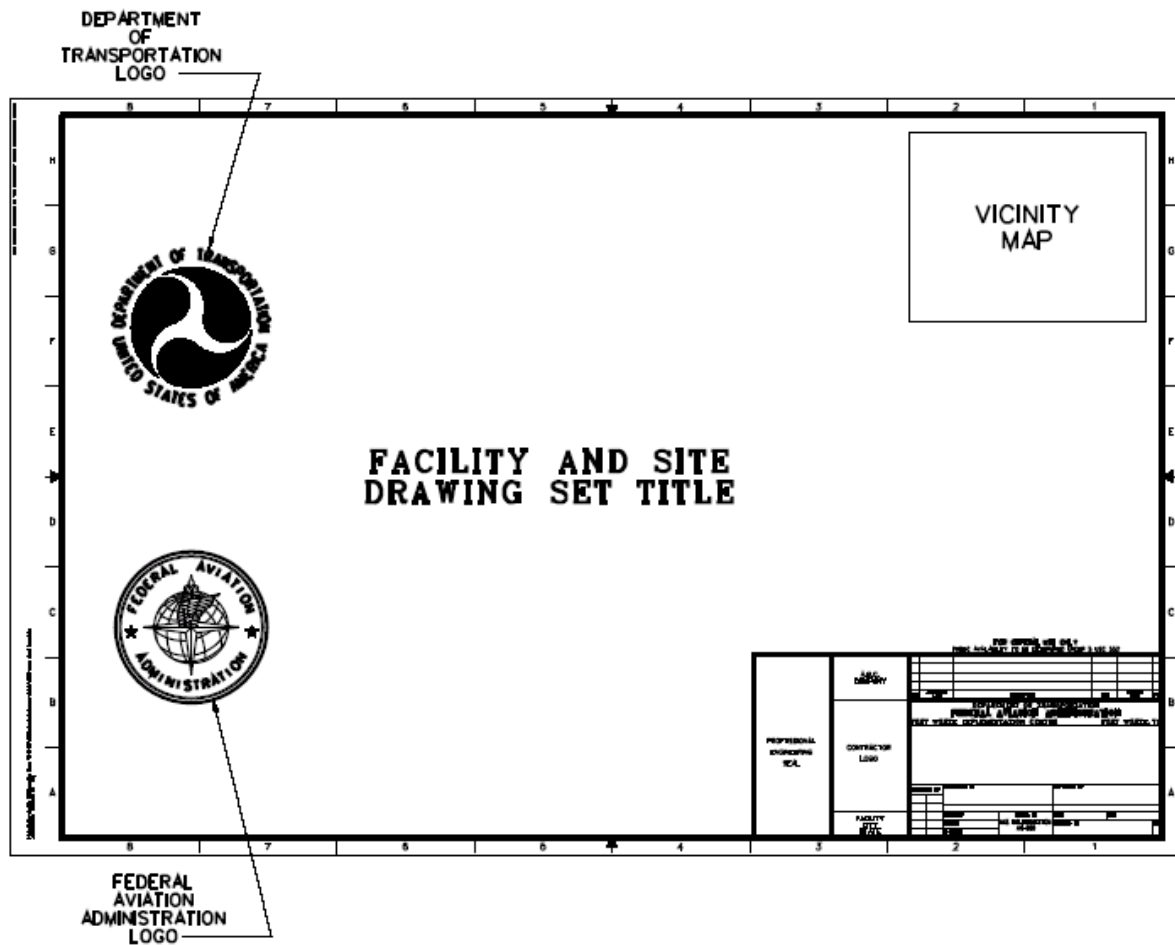


Figure 3-5, Cover Sheet Layout

**3.1.7.2. DOT/FAA Logo**

The CAEG Program Office will provide the following electronically formatted logos to be included in CADD products: Department of Transportation (DOT), Configuration Management (CM) and Federal Aviation Administration (FAA).

**3.1.7.3. Drawing Index Sheet**

The second sheet of each drawing set should be the Drawing Index Sheet. This lists every drawing contained in the drawing set. An example is shown in *Figure 3-6, Drawing Index Sheet*.

**NOTE:** If a project consists of 15 drawings or less, the drawing index may be placed (centered) on the Cover Sheet below the Drawing Set Title.

The drawing index sheet is a rectangular form with a grid border. The top edge is labeled with columns 8, 7, 6, 5, 4, 3, 2, 1 from left to right. The left edge is labeled with rows H, G, F, E, D, C, B, A from top to bottom. The form is divided into three main vertical sections:
 

- Column 8:** Labeled "DRAWING LIST" at the top. Below it is a small box containing the text "DRAWING NAME".
- Column 5:** Labeled "SYMBOLS LEGEND" at the top.
- Column 2:** Labeled "ABBREVIATIONS" at the top.

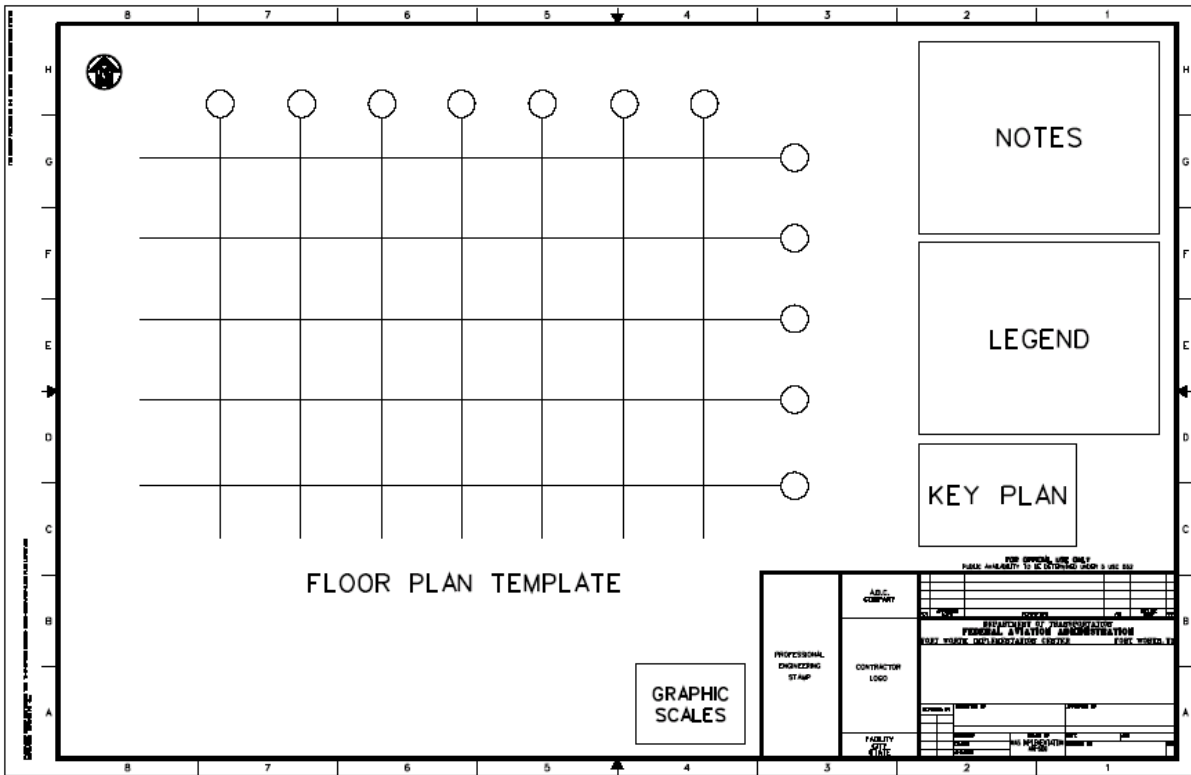
 At the bottom right, there is a title block area containing:
 

- A small table with columns for "DATE" and "BY".
- The text "FOR OFFICIAL USE ONLY" and "PUBL. AVAILABILITY TO BE DETERMINED BY GPO".
- The text "DEPARTMENT OF TRANSPORTATION" and "FEDERAL AVIATION ADMINISTRATION".
- The text "PUBLIC WORKS DEVELOPMENT CENTER" and "FIVE STAR, CA".
- Fields for "DRAWN BY" and "CHECKED BY".
- Fields for "PROJECT NO." and "JOB NO.".
- Fields for "FACILITY" and "STATE".
- Fields for "DATE" and "BY".
- Fields for "NO. OF SHEETS" and "TOTAL SHEETS".

*Figure 3-6, Drawing Index Sheet*

### 3.1.7.4. Floor Plan Layout

The Floor Plan Layout sheet is intended for all plan-type drawings regardless of discipline. See *Figure 3-7, Floor Plan Layout*.

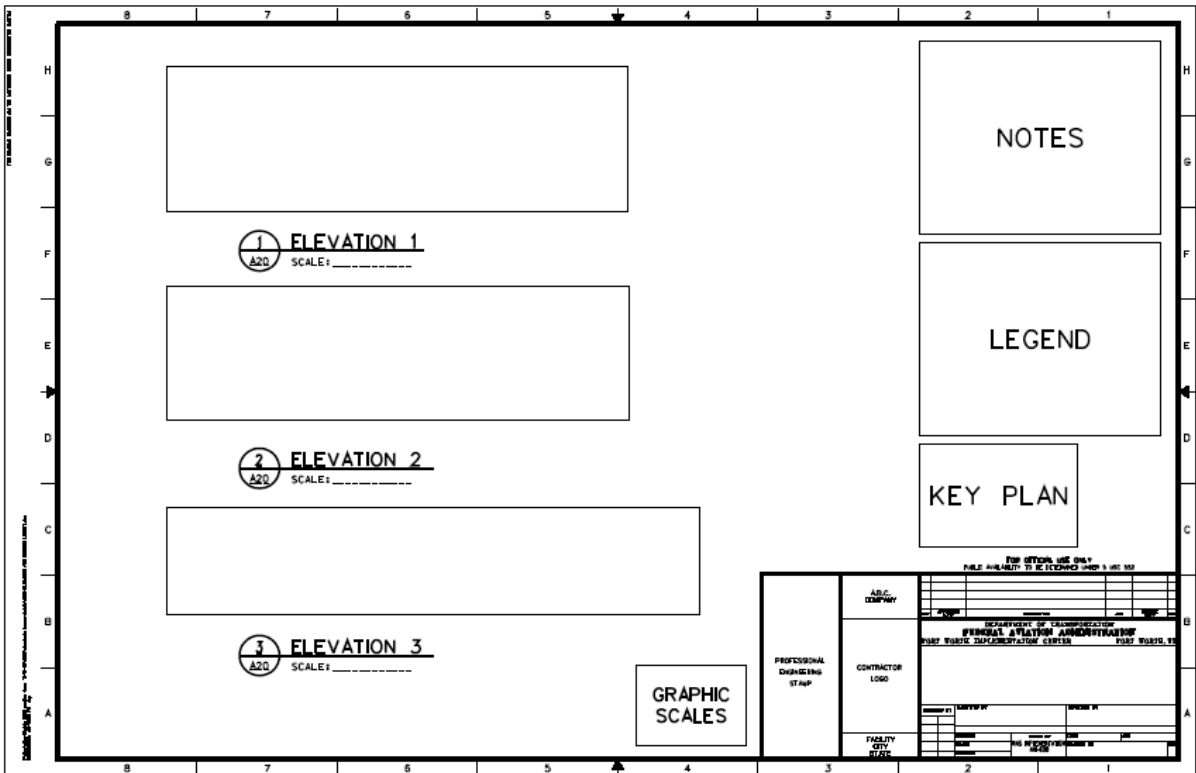


*Figure 3-7, Floor Plan Layout*

### 3.1.7.5. Elevation and Section Plan Drawing Layout

The elevations details must be stacked in the upper-half of the drawing field. The bottom of the drawing field is available for details when the detail sheet is full.

See *Figure 3-8, Elevation and Section Plan Drawing Layout*.



*Figure 3-8, Elevation and Section Plan Drawing Layout*



**3.1.7.6. Detail Sheet Layout**

A Detail Sheet Layout is a collection of details that clarify construction or installation details that cannot be shown at a smaller scale. The detail will cross-reference the detail with the drawing sheet from which it was taken. The typical layout has six columns, including an area for Notes and four rows. When the scale calls for a larger detail block, use surrounding blocks. Try to keep the details in square shaped blocks. Identify the blocks as shown in *Figure 3-9, Detail Sheet Layout*.

**3.1.7.6.a.**

Details should start with the first detail in the upper left-hand corner and move across the top of the sheet. Continue to create rows for new details below the first row of details. The area for Notes must be on the right-hand side of the sheet.

**3.1.7.6.b.**

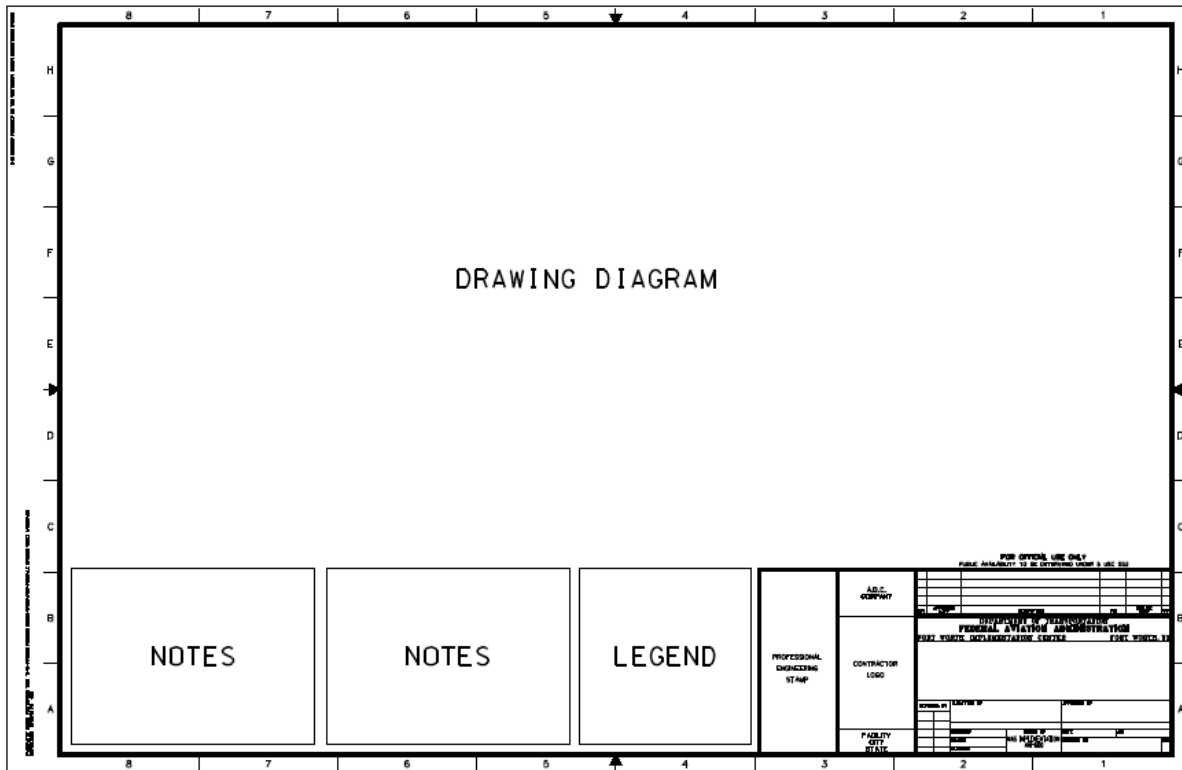
Detail sheets with multiple scales should be scaled according to the primary detail on the sheet or, if there is no primary detail, according to the scale that represents the majority of the details. The remaining details should be referenced into the drawing at the correct scale.



*Figure 3-9, Detail Sheet Layout*

### 3.1.7.7. Schedule/Diagram Sheet Layout

*Figure 3-10, Schedule/Diagram Sheet Layout*, shows the format for schedules and diagrams that are frequently used in drawing sets for electrical, plumbing, and mechanical drawings. The drawing field may extend above the title block, as long as the notes or legends can be relocated on the sheet as shown.



*Figure 3-10, Schedule/Diagram Sheet Layout*

### 3.1.8. Layers/Levels

CADD levels (*MicroStation*)/layers (*AutoCAD*) are analogous to overlays in manual drafting systems and serve to separate graphic elements according to the design discipline they represent. *MicroStation* and *AutoCAD* allow an unlimited number of levels/layers to be identified with names. The levels/layers defined within this standard are based on those set forth in the American Institute of Architects' publication, "CAD Layer Guidelines." The AIA "Group" categories were used to develop the Level/Layer Naming Scheme found in Appendix A of this standard. The Real Estate Discipline (R-Real Estate) will not contain any levels/layers designations in Appendix A. Any levels/layers required to define any Real Estate features within a drawing can be found under the Civil Discipline levels/layers scheme located in Appendix A of this standard.

### **3.1.9. Text Styles/Fonts**

Customized text fonts must not be used in FAA drawings. The True Type fonts are acceptable, if not desirable. Since there is not a direct relationship between MicroStation resource files and AutoCAD shape files, it is important that font use be reviewed at the start of a project and decisions made on fonts that are then used consistently throughout the project by the various disciplines. If a project is to be exchanged between CAD platforms, either because individual offices require different applications (or because the end-users require a specific software format) a general guideline is to use True Type fonts. These fonts will allow direct transitions between the applications, and are specified in *Table 3-7, Comparison of Font Types*. When True Type fonts are not utilized such as in older drawing files, use the fonts that are most compatible (nearly identical in appearance and size) between MicroStation and AutoCAD which are also defined in *Table 3-7, Comparison of Font Types*. These particular fonts do not translate perfectly and some cleanup may be required after any translation between systems.

<b>FONT TYPE</b>	<b>TrueType</b>	<b>AutoCAD FONT</b>	<b>MicroStation FONT</b>
Proportional	Arial	RomanS	Working
Monotext	Lucinda Console	Monotxt	Engineering
Standard	Tahoma	Txt	Standard
Roman Triplex	Times New Roman	RomanT	Fancy
Slanted	<i>Arial (slanted angle 21.8)</i>	<i>RomanS (obliquing angle 21.8)</i>	<i>Italics</i>
Symbology	Symbol	GreekS	Greek
Filled	Arial Black	Swiss 721 BT	Low_Res_Filled

***Table 3-7, Comparison of Font Types***

- a.** Proportional – appropriate for general notes or labels. This font creates text where the characters are proportionally spaced. In AutoCAD, use the “RomanS” font with a width factor of 1.0. In MicroStation use Font #1, “Working” font. Also appropriate for subtitles.
- b.** Monotext – appropriate when text fields need particular justifications such as in schedules or title blocks. This font creates text characters that are evenly spaced. In AutoCAD, use the “Monotxt” font, and in MicroStation, use Font #3, “Engineering” font.
- c.** Standard – appropriate for notes, callouts, etc. In AutoCAD, use the “Txt” font. In MicroStation use Font #0, “Standard” font.
- d.** Roman Triplex – appropriate for subtitles. In AutoCAD, use the “RomanT” font. In MicroStation use Font #2, “Fancy” font.

- e. Slanted – appropriate where certain text needs to be distinguished from other text, such as bodies of water. This font can be created in AutoCAD by using the “RomanS” font with the Obliquing Angle set to 21.8 degrees to achieve the American Standard slope of 2:5 (68.2 degrees). In MicroStation use Font #23, “Italics” font.
- f. Symbology – This font provides special characters for use in labeling electronic components. In AutoCAD use the “GreekS” font with a width factor of 1.0. In MicroStation use Font #26, “Greek” font.
- g. Filled – The filled font is used primarily for titles and on cover sheets. In AutoCAD use the Swiss 721 BT font. In MicroStation use Font #43, “Low\_Res\_Filled”.

### **3.1.9.1. General Text Placement**

All drawing text shall be in upper case, except for special case abbreviations such as “dB”, “MHz”, and “NiCd”. Abbreviations must not be followed with a period unless that abbreviation spells another word. General use of abbreviations must be avoided. There must be no stacked fractions, that is, fractions shall be shown with a slash, e.g. 1/4. Contrasting text styles or fonts are to be used within a drawing to delineate types of information. Fonts used within FAA drawings must be restricted to those shown in *Table 3-7, Comparison of Font Types*. See *Table 3-8, Text Heights and Line Widths*, and *Section 3.1.10, Line Weights*, for appropriate line weights for text. The Annotation Table in Appendix A defines appropriate levels for text used in FAA drawings.

<b>APPLICATION</b>	<b>TEXT HEIGHT (IN INCHES)</b>	<b>LINE WIDTH</b>
Titles	0.25 (1/4")	Medium
Subtitles	0.15625 (5/32")	Medium
Notes; Callouts; etc.	0.09375 (3/32")	Thin

*Table 3-8, Text Heights and Line Widths*

### **3.1.9.2. Text Justification**

Text justification depends upon how the text will be used in a drawing. Call out notes or local notes, also referred to as “leadered notes”, shall always be left justified regardless of which direction the leader is pointing.

### **3.1.10. Line Widths**

The five line widths defined in *Table 3-9, CADD Line Weights and Associated Plotted Widths*, should be sufficient for the majority of A/E/C drawings and must not be expanded unless an appreciable improvement in drawing clarity or contrast can be realized. Any deviation shall be coordinated with the local CADD Manager. The line thickness values (in both millimeters and inches) are to be considered ‘nominal’, as adjustments may be necessary to the values used in the pen tables, in order to achieve the weights specified in *Table 3-9, CADD Line Weights and Associated Plotted Widths*. Typical applications for each of the line widths are described below:

- a. Fine (0.006 in. / 0.15 mm). Fine lines should be used for depicting dimension lines, extension lines, leader lines, object lines “seen in the distance”, hidden lines, grid lines and patterning.
- b. Thin (0.012 in. / 0.30 mm). Thin lines should be used for depicting minor object lines, including existing object lines, line terminators (arrowheads, dots, and slashes), dimension text, text for notes and callouts, and text inside schedules.
- c. Medium (0.019 in. / 0.475 mm). Medium lines should be used for depicting schedule boxes and charts, most object lines, including new object lines, text for titles and underlining.
- d. Wide (0.026 in. / 0.65 mm). Wide lines should be used for object lines requiring special emphasis and separating portions of drawing.
- e. Extra wide (0.032 in. / 0.825 mm). Extra wide lines should be used for border only.

<b>Line Thickness</b>	<b>Plotted Line Width (mm)</b>	<b>Plotted Line Width (in)</b>	<b>MicroStation Line Weight Designator</b>
Fine	0.15	0.006	0
Thin	0.30	0.012	1
Medium	0.475	0.019	2
Wide	0.65	0.026	3
Extra Wide	0.825	0.032	5

*Table 3-9, CADD Line Weights and Associated Plotted Widths*

**3.1.11. Color Usage**

The use of color in CADD files is for on-screen visualization and design aid. Default color assignments are delineated in Appendix A, Layer/Level Naming Scheme. The use of other colors is allowed to provide an appreciable improvement in drawing clarity or contrast. The color yellow is reserved for highlighted graphic entities. The use of color mapping in AutoCAD drawings to represent line width is discouraged.

**3.1.12. Line Types**

The line styles applicable to this standard are represented in Figure 3-11, Standard Line Types. Additionally, typical custom line types are represented in Figure 3-12, Typical Custom Line Types.

DESCRIPTION	EXAMPLE	MICROSTATION DESIGNATOR	AUTOCAD DESIGNATOR
CONTINUOUS	—————	0	CONTINUOUS
DOTTED	.....	1	ACAD_IS007W100
DASHED	— — — — —	2	ACAD_IS002W100
DASHED SPACED	— — — — —	3	ACAD_IS003W100
DASHED DOTTED	— . — . — . — .	4	ACAD_IS010W100
DASHED DOUBLE-DOTTED	— . . — . . — . . — . .	6	ACAD_IS012W100
DASHED TRIPLE-DOTTED	— . . . — . . . — . . .	*	ACAD_IS014W100
CHAIN	— — — — —	7	ACAD_IS008W100
CHAIN DOUBLE-DASHED	— — — — —	**	ACAD_IS009W100

\* This line style is available in the MicroStation resource file LSTYLE.RSC as "DASHED TRIPLE-DOT".  
 \*\* This line style is available in the MicroStation resource file ACADLSTY.RSC as "PHANTOM".

**Figure 3-11, Standard Line Types**

TYPE	EXAMPLE
Contour Line	
Property Line	
Cable	
Fence	
Water	
Gas	
Telephone	
Sanitary Sewer	
Storm Sewer	
Power	
Railroad	
Break	

*Figure 3-12, Typical Custom Line Types*

**3.1.13. Drawing Origins**

Consistent origins must be used to ensure ease of translation and attaching of reference files in both software packages.

**3.1.13.1. AutoCAD Working Units and Drawing Origin**

AutoCAD has an infinite design plane, eliminating limitations to the space available for drawing. Working units must be selected according to the discipline of the drawing: architectural (feet and inches), engineering (feet and tenths), or decimal (metric). AutoCAD models should utilize real-world coordinates. AutoCAD layouts should position the origin in the lower-left corner of drawings at the Cartesian coordinate point of 0,0,0.

**3.1.13.2. MicroStation Working Units and Global Origin**

The global origin must be positioned in the center of the design plane to avoid loss of data exceeding the design plane. If option for True Scale is available (such as in placing cells, or attaching references), it is encouraged that the setting be turned on. Otherwise, working units must be set to those shown in *Table 3-10, MicroStation Working Units*.

Units	MU	SU	PU
Imperial (A/E/C)	1 (ft)	12 (in)	8000
Imperial (Civil/Site, Civil Works, Geotechnical, Survey/Mapping)	1 (ft)	100	10

*Table 3-10, MicroStation Working Units*

**NOTE:** Working units of 96,000 per foot equals the 12:8000 MU/SU/PU listed above.

### **3.1.14. Externally Referenced Files**

The use of externally referenced files by MicroStation and AutoCAD allows for the viewing of all or part of a drawing file from another drawing file (host file). Only full-scale drawing files must be utilized as references. Nesting of reference files must be avoided. As files are created and referenced, reference filenames must not be changed, as it will result in the inability of the host file to find its reference files. All reference files must be included with file transfers to and from the FAA.

#### **3.1.14.1. Specific Use of AutoCAD Reference Files**

All files referenced in the host file must use the "Attach" option within the XREF command. AutoCAD users **MUST NOT** use the "Save Path" method when attaching drawing files for reference.

#### **3.1.14.2. Specific Use of MicroStation Reference Files**

MicroStation users **MUST NOT** use the "Save Full Path" method when attaching drawing files for reference.

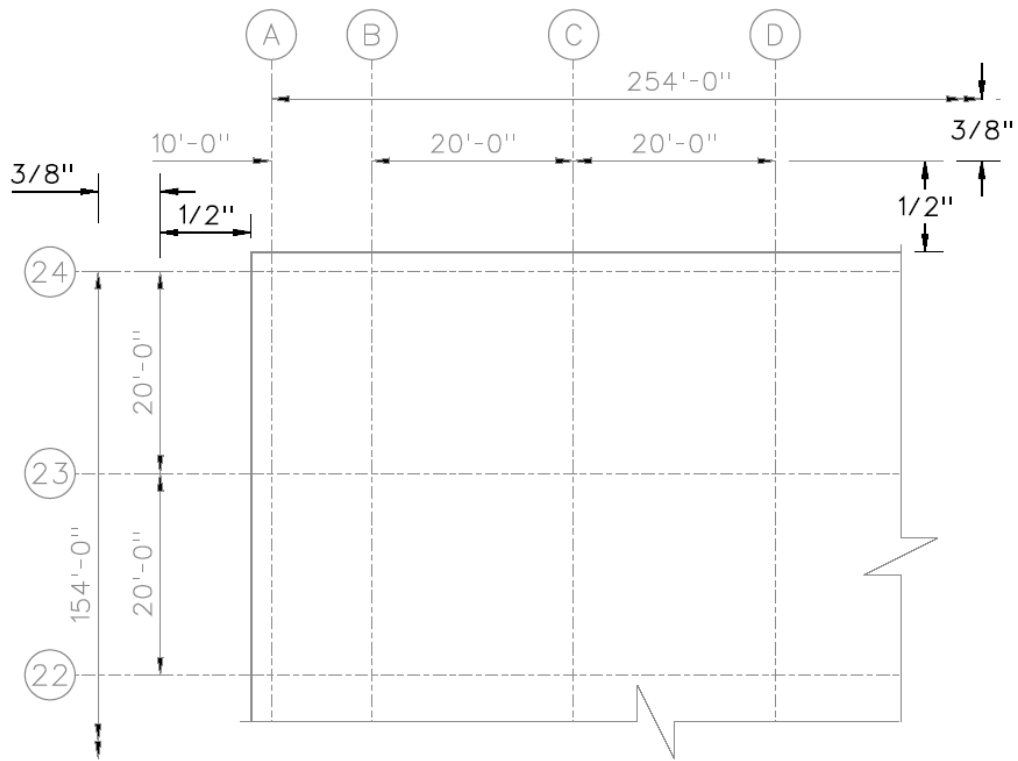
### **3.1.15. Patterning**

Do not create customized patterns; use the patterns supplied with the CADD software. Use associative locks when using MicroStation, unless a pattern boundary/border is not desired.

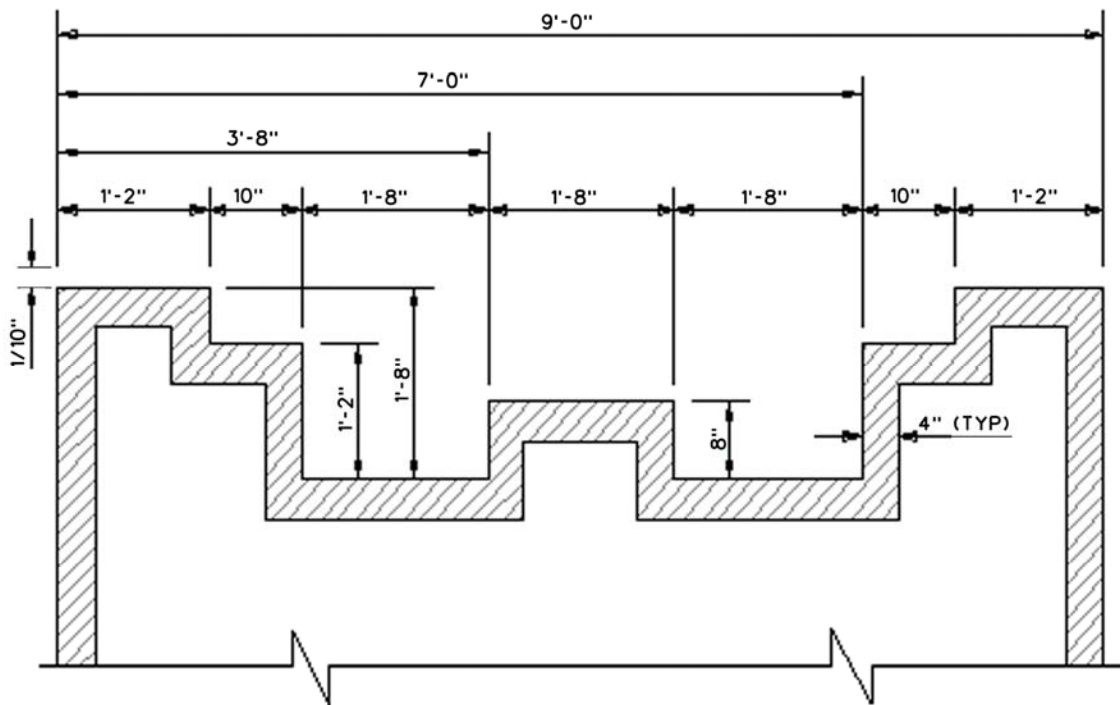
### **3.1.16. Dimensioning**

The labeling units for all A/E/C drawings must be units of feet and inches and fractions of an inch, with the smallest fraction usually being 1/8" or as decimals in feet, inches, and hundredths of an inch. Dimensions of less than 12" must be shown in inches or fractions of inches, and on one line with a space between the whole-inch and fraction. Dimensions greater than 12" should be specified in feet and inches (i.e., 21 1/2" should be shown as 1'- 9 1/2"; and not as 1'-9 1/2"). There should be no stacked fractions. Fractions are to be shown with a virgule, or "slash", using numerals that are all of the same height, e.g., 10 3/4". This applies to any dimensions specified in the general notes of a drawing, as well. Survey units may be used as required on specific projects. Refer to the ASME Y14.5M, Dimensioning and Tolerance standard for additional dimensioning information not provided in this standard. The distance from the object for the first dimension is 1/2" and each additional dimension is 3/8" further apart as shown in *Figure 3-13, Dimensioning Styles and Directions*. Also, there should be a 1/10" space between the object and the extension lines as illustrated in *Figure 3-14, Dimension and Extension Line Spacing*.





*Figure 3-13, Dimensioning Styles and Directions (Not to Scale)*



*Figure 3-14, Dimension and Extension Line Spacing (Not to Scale)*

### **3.1.16.1. Dimension Text Size and Font Style**

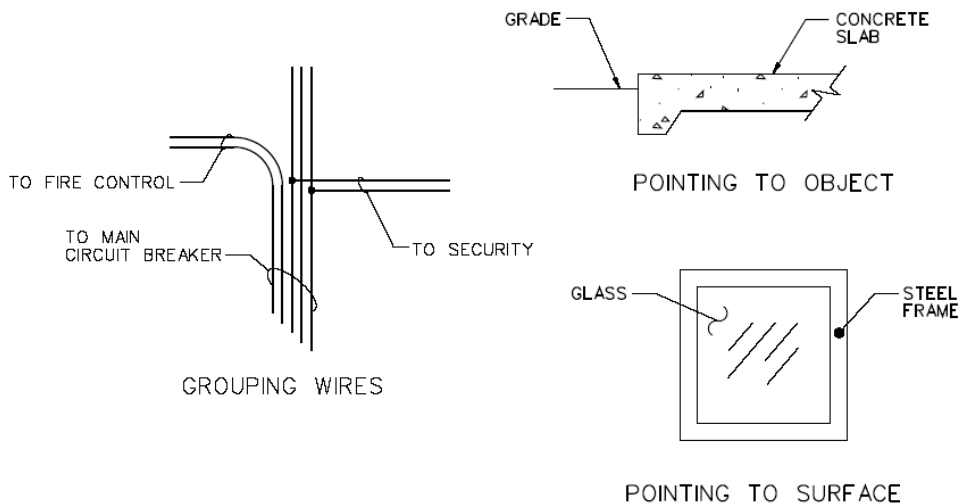
All dimensioning text must be placed into the dimension layer/level. The font and size of dimension text is the same as text in the drawing field. Refer to *Table 3-1, Scale Factor and Text Height Conversion Table*, for scaling factors and text heights.

### **3.1.16.2. Positioning Dimensions**

See *Figure 3-13, Dimensioning Styles and Directions*, for examples. Avoid crossing dimension lines. Centerlines may be extended and used as extension lines. Longer dimensions shall be placed outside of shorter ones. Do not cover dimensions with patterns in sectioned areas. Whenever possible, arrange dimensions so they can be read easily on one continuous line. Dimensions are always placed on the drawing so that the text may be read from the bottom or the right. Locate dimension lines so that they do not cross extension lines. If it is necessary to dimension at an angle, that angle should be in the quadrant between the horizontal and vertical; so that the text may be read between 0 and 90 degrees. All text must be located above or centered on the dimension lines. The location of text on the dimension line must be consistent throughout the drawing set. All dimension and extension lines must be created using the “fine” line weight. Arrowheads and dimension text must be created using the “thin” line weight. See *Table 3-9, CADD Line Weights and Associated Plotted Widths*, for line weight definitions.

### **3.1.16.3. Leaders**

When a note or dimension cannot be placed close to an object, a leader may be used. A leader consists of a short horizontal line, an angled line and a terminator. See *Figure 3-16, Placement of Leaders*. When a leader points to an object, the angled line must terminate with an arrowhead at its first object line. When the information refers to (applies to, or points to) the surface of an object, use a small filled dot or tilde. When the information refers to a bundle or grouping of wires or cables, use a “lasso”. An example of this is shown in *Figure 3-15, Typical Leaders*. All leader lines must be created using the “fine” line weight. Also, arrowheads and other line terminators must be created using the “thin” line weight. See *Table 3-9, CADD Line Weights and Associated Plotted Widths*, for line weight definitions.



***Figure 3-15, Typical Leaders***

THIS FIGURE SHOWS THE PLACEMENT OF LEADERS FOR ENGINEERING NOTES, VENDOR DESCRIPTIONS, OR OTHER EQUIPMENT CALL OUTS ON A DRAWING. THE LEADERS CAN BE LOCATED AT THE START OF THE NOTE OR AT THE END.

THIS FIGURE SHOWS THE PLACEMENT OF LEADERS FOR ENGINEERING NOTES, VENDOR DESCRIPTIONS, OR OTHER EQUIPMENT CALL OUTS ON A DRAWING. THE LEADERS CAN BE LOCATED AT THE START OF THE NOTE OR AT THE END.

***Figure 3-16, Placement of Leaders***

### **3.1.16.4. Arrowheads**

Arrowheads denote termination of dimensions and leader lines and show direction. Arrowheads should be filled, and must be the same size and style as the arrowheads used elsewhere in the drawing. Arrowhead size should be a 3:1 ratio for length to width, and in proportion to any associated text.

### **3.1.17. Symbols**

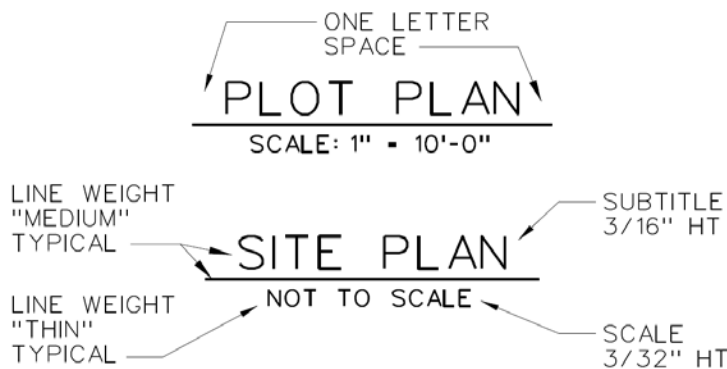
Symbols used in drawings must comply with the National CAD Standard, US Army Corps of Engineers Standards or ASME Standards at the discretion of the local CADD Managers. All symbols used in a drawing must be indicated in a legend.

### **3.1.18. Drawing Titles**

Titles must be used on drawings with more than one subtitle to logically group associated drawing components. Titles must also be used on drawings with multiple views when title block information is inadequate and additional identification is required.

#### **3.1.18.1. Drawing Subtitles**

Subtitles must be used on drawings with more than one view or when sections or details are required for clarity. Subtitles must also be used on drawings with a single view when title block information is inadequate and additional identification is required. Subtitles are always located below and centered on the view to which they apply, except for detail drawings where the subtitle shall be located to the lower left. Subtitles for plans, standard details, typical details, etc., which are not referenced in other views, consist of two lines of text. The first line of text shows the exact title of the view or detail. The second line of text indicates the scale of the view or detail. The line dividing the first and second lines of text shall begin with one character space and extend one character space beyond the text of the first line. Both lines of text must be center justified. See *Figure 3-17, Standard Subtitle Annotation*. For Detail Subtitles see Section 3.1.19.2 in this standard.



*Figure 3-17, Standard Subtitle Annotation*

### **3.1.19. Sections and Details**

#### **3.1.19.1. Sections**

Sections must be drawn whenever additional clarification is warranted. Sections must be drawn using the drafting standards shown in *Figure 3-18, Standard Section Annotation and Building Section*. When space is limited on a drawing an alternate section marker may be used as shown in *Figure 3-19, Alternate Section Annotation, Wall Section, or Elevation*.

##### **3.1.19.1.a.**

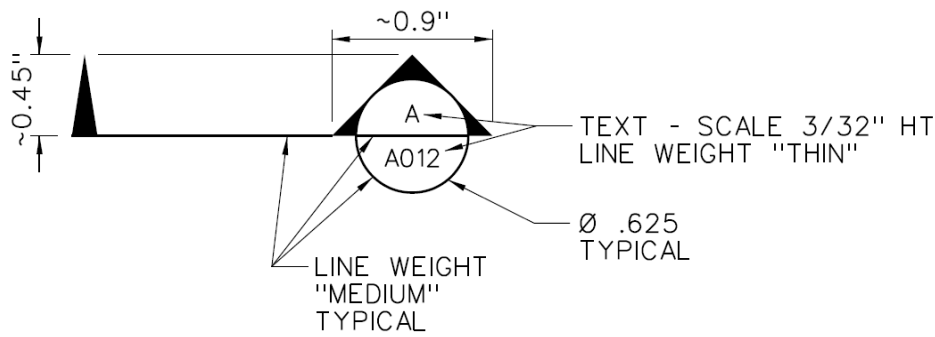
The three types of section indicators to be used are short sections, extended sections, offset sections. These are shown in *Figure 3-21, Short Sections, Extended Sections, Offset Sections, and Alternate Sections*. The use of alternate section symbols is also demonstrated.

##### **3.1.19.1.b.**

All sections must be cut toward the top or left side of the drawing except in unusual situations. In some cases, it may be necessary to cut a short section reading from the left, but this should be avoided if possible. Sections should appear on the same drawing on which they are cut. If the section cannot be drawn on the same drawing, it must appear on a separate drawing reserved for sections. Under no circumstances are sections to be scattered indiscriminately throughout the set of drawings.

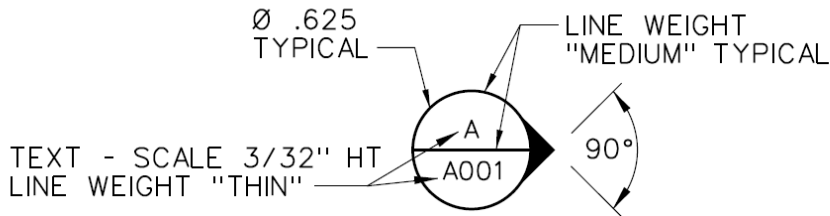
##### **3.1.19.1.c.**

Sectional cuts must be lettered in alphabetical order on each drawing. The letter in the top half of the circle marker must indicate the section letter. The alphanumeric number in the lower-half of the circle marker must indicate the drawing on which the section is shown. Any text used within the circle marker must remain horizontal. Heavy dark lines located in the position where the section is cut must indicate the location of the cutting plane. Offset sections may be used only when section clarity requires adjustment of a portion of the cutting plane. The limits of extended or offset section cuts must be indicated by a circular marker at both ends of the cutting plane. The limits of short section cuts must be indicated by a circular marker at one end and by an arrowhead at the opposite end, as shown in *Figure 3-21*. Sectional cuts must refer to a detail location on only one sheet in the lower-half of the circular marker. Other references to the detail in the drawing set must be handled with a callout and notes. See *Figure 3-20, Standard Section Subtitle with Specifications*, for the creation of section subtitles.



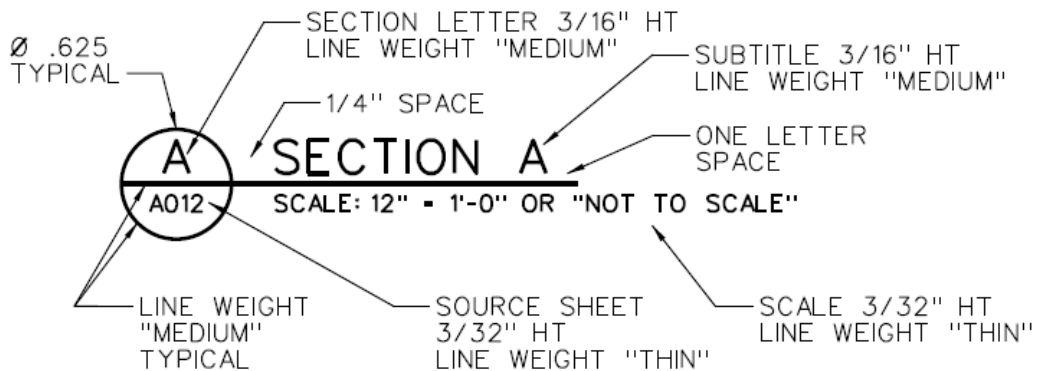
SECTION SYMBOL WITH SPECIFICATIONS

**Figure 3-18, Standard Section Annotation and Building Section**



ALTERNATE SECTION SYMBOL WITH SPECIFICATIONS

**Figure 3-19, Alternate Section Annotation, Wall Section, or Elevation**



SECTION SUBTITLE WITH SPECIFICATIONS

**Figure 3-20, Standard Section Subtitle with Specifications**

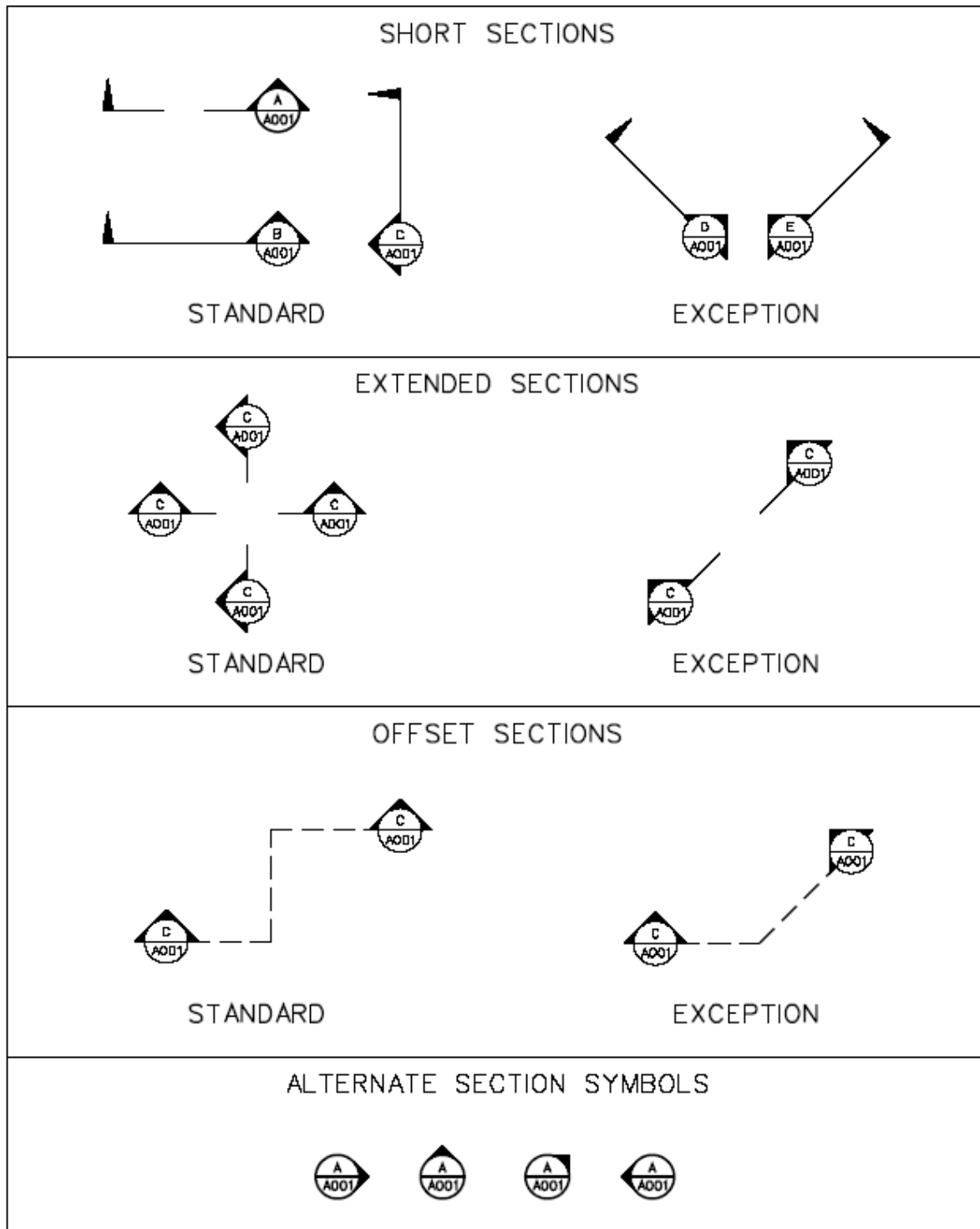
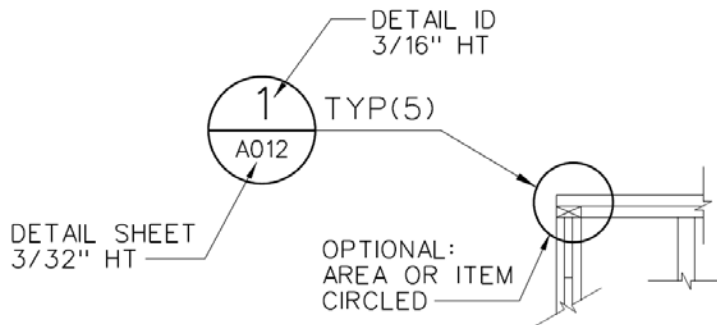


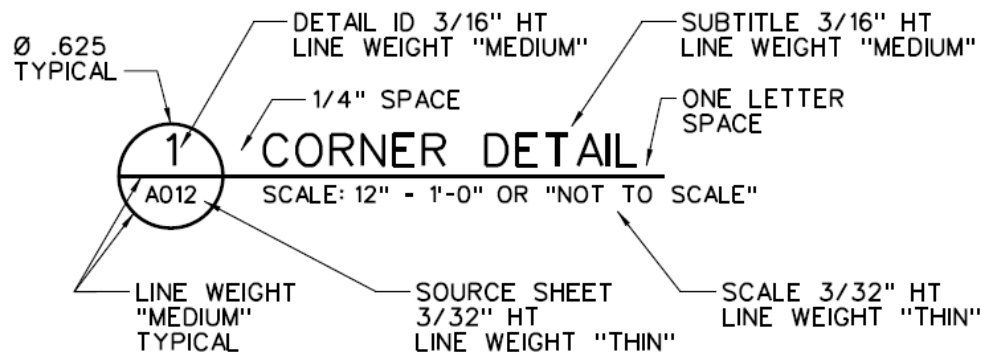
Figure 3-21, Short Sections, Extended Sections, Offset Sections, and Alternate Sections

### 3.1.19.2. Detail Drawings

Detail drawings must be created whenever additional clarification is required and a section cannot be readily cut. The detail must either be a plan view, an elevation, or an enlargement. Details must have a numeric designation in the upper-half of the circle marker. The alphanumeric number in the lower-half of the circle marker must indicate the sheet number on which the detail resides. The text within the circle marker must remain horizontal. See detail *Figure 3-22, Standard Detail Symbol and Detail Subtitle*. When a detail appears more than once on the same drawing, extend a line off the detail marker, abbreviate the word typical (TYP), and indicate the quantity in parentheses. When a detail appears more than once on the same drawing, extend a line off the detail marker, abbreviate the word typical (TYP), and indicate the quantity in parentheses.



DETAIL MARKER AS USED WITH SPECIFICATIONS



DETAIL SUBTITLE WITH SPECIFICATIONS



DETAIL SUBTITLE AS USED

*Figure 3-22, Standard Detail Symbol and Detail Subtitle*



### **3.1.20. Revision of Drawings**

#### **3.1.20.1. Revision Methods**

Revisions must be made by the addition or deletion of information on the drawing. In the case of “As-Built” drawings, graphics may not require modifications. Drawings under Configuration Management must be revised in accordance with [FAA Order 1800.66](#) and [FAA-STD-058](#). These documents provide the guidance that needs to be adhered to when work is being completed on a facility under Configuration Management. Changes to base-lined facilities under Configuration Management are required to be identified and approved using the NAS Change Proposal (NCP) process.

#### **3.1.20.1.a. Required Revisions**

After a drawing is signed or revision approved, any subsequent changes must be recorded as the next revision.

#### **3.1.20.1.b. Drawing Practices**

When revising an existing drawing the most recently approved graphic symbols, abbreviations, and drawing practices must be used for any changes or revisions. Superseded symbology, etc., already appearing in the drawing and in accordance with formerly approved standards, may remain unchanged provided the interpretation is clear and unambiguous. Drawing entities that do not adhere to an FAA-approved standard must be updated to comply with current standards.

### **3.1.20.2. Identifying Revisions on Drawings**

Revisions to the drawing must be identified in the revision description area and the revision letter area in the title block. The most current revision letter must be placed in the “latest revision level” portion of the title block, to the right of the drawing number, as shown in [Figure 3-3, Drawing Title Block](#).

#### **3.1.20.2.a. Revision Letters**

Uppercase letters must be used in alphabetical sequence, excluding the letters “T”, “O”, “Q”, “S”, “X” and “Z”. Revision letters must not exceed one character and numbers must not be used. The first release or initial issue of a drawing does not require the use of a revision letter. The first revision to a drawing must be assigned the letter “A”. When a drawing exceeds the letter revision “Y”, refer to [Section 3.1.20.4, Superseded Drawings](#), within this standard.

#### **3.1.20.2.b. Multiple Changes**

The same revision letter must identify all changes to a drawing that are incorporated at the same time.

**3.1.20.3. Revision Block**

The revision block size and format must conform to *Figure 3-23, Identifying Revision Locations*. Only the four-most recent revisions will be shown in the revision block at any one time. Each revision must be recorded in the revision block in accordance with the following:

- a. The identifying letter pertaining to the revision must be entered in the “REV” column.
- b. The date the revision is approved must be entered in the “APPROVED DATE” column.
- c. A brief description of the change must be entered in the “DESCRIPTION” column. The description may contain the drawing zone changed. Alternatively, the description should refer to the identity number of the document authorizing the change (e.g. CCD, JON, etc.).
- d. The job control number (JCN) authorizing the revision must be entered in the “JCN” column.
- e. The date of the actual redline changes is entered in the “REDLINE DATE” column.
- f. Initials of the approving official must be entered in the “APVD” column.

E	09/08/1998	ZONE A8 THRU H3 CUSTOMER MODIFICATIONS	1928374	07/30/1998	BAR
D	10/15/1997	AS-BUILT (PER ENGINEER'S NAME; JON: 1234567)	9876543	09/08/1997	DNK
C	06/20/1996	ZONE G7, ADDED WIRING DIAGRAM AND DETAIL B	6789123	04/18/1996	EAT
B	05/11/1995	ZONE F6 ENGINEER REVISION	1234567	04/05/1995	ICU
REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD
DEPARTMENT OF TRANSPORTATION <b>FEDERAL AVIATION ADMINISTRATION</b> FAA OFFICE <span style="float: right;">CITY, STATE</span>					

*Figure 3-23, Identifying Revision Locations*

**3.1.20.4. Superseded Drawings (formerly “Redrawn or Replaced Drawings”)**

When manual drawings are converted to CADD; when there are extensive changes to a CADD file or when the revision letter reaches “Y”, the original drawing must be superseded. The new drawing must contain a specific note referencing the superseded drawing. The note must be located above the revision block on the new drawing (in upper-case letters, 3/32-inches tall) stating: “DRAWING \_\_\_\_\_, DATED \_\_\_\_\_ SUPERSEDES DRAWING \_\_\_\_\_, REVISION\_\_\_\_, DATED \_\_\_\_\_”. Revision level for the new drawing shall start with the letter “A”, regardless of the revision letter of the drawing being superseded. See *Figure 3-24, Revision Block Example Note for New Superseding Drawing*.

DRAWING ATL-D-GS17R-C023, DATED 04/01/1999, SUPERSEDES DRAWING  
ATL-D-LOC17R-C011, REVISION C, DATED 06/20/1996

FOR OFFICIAL USE ONLY  
PUBLIC AVAILABILITY TO BE DETERMINED UNDER 5 USC 552

NEW DRAWING	REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE
DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION FAA OFFICE CITY, STATE					
	DRAWN	NAS IMPLEMENTATION ANI-600		DRAWING NO	REV
	CHECKED			ATL-D-GS17R-C023	

NEW DRAWING ATL-D-GS17R-C023, DATED 04/01/1999

*Figure 3-24, Revision Block Example Note for New Superseding Drawing*

**3.1.20.4.a.**

A note shall also be located above the revision block on the existing, superseded drawing stating: “DRAWING \_\_\_\_\_, REVISION\_\_\_\_, DATED \_\_\_\_\_ SUPERSEDED BY DRAWING \_\_\_\_\_, DATED \_\_\_\_\_.” The note shall be in upper-case letters, 3/32-inches tall. See *Figure 3-25, Revision Block Example Note for Superseded Drawing.*

DRAWING ATL-D-LOC17R-C011, REVISION C, DATED 06/20/1996, SUPERSEDED  
BY DRAWING ATL-D-GS17R-C023, DATED 04/01/1999

FOR OFFICIAL USE ONLY  
PUBLIC AVAILABILITY TO BE DETERMINED UNDER 5 USC 552

EXISTING SUPERSEDED DRAWING	C	06/20/1996	ZONE G7, ADDED WIRING DIAGRAM AND DETAIL B	6789123	04/18/1996
	B	05/11/1995	ZONE F6 ENGINEER REVISION	1234567	04/05/1995
	REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE
DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION FAA OFFICE CITY, STATE					
	DRAWN	NAS IMPLEMENTATION ANI-600		DRAWING NO	REV
	CHECKED			ATL-D-LOC17R-C011	C

EXISTING ATL-D-LOC17R-C011, REVISION C, DATED 06/20/1996

*Figure 3-25, Revision Block Example Note for Superseded Drawing*

## **3.2. Drawing Support**

### **3.2.1. File Naming**

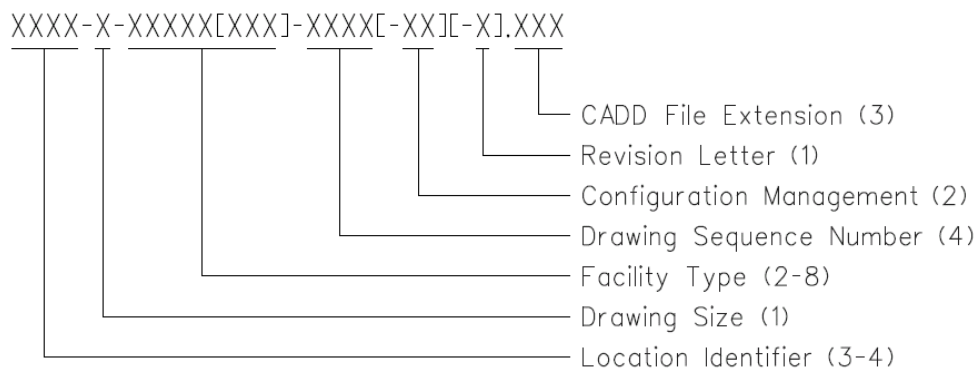
Duplicate filenames must not be used. Conventions for file naming must be implemented to ensure that each drawing is uniquely identified. The file naming convention must be based on the drawing numbering convention in Section 3.1.4.1, Drawing Number Structure as they relate to NAS facilities and Non NAS projects.

#### **3.2.1.1.**

See Figure 3-26, File Naming Convention, for the format of CADD file names. The portions of the file name shown in square brackets ( [ ] ) are used as required. The brackets are for reference only and are not included in the file name.

#### **3.2.1.2.**

The “Drawing Size” field for model files (reference files) must be filled with the letter “M”. Revision letters do not apply to model files.



***Figure 3-26, File Naming Convention***

### **3.2.2. Drawing Configuration Management (CM)**

For guidelines on the handling of drawings under configuration management control, see configuration management documents listed in Section 2.1, Government Documents, in this standard. FAA Order 1800.66 and FAA-STD-058 documents provide the guidance that needs to be adhered to when work is being completed on a facility under Configuration Management.

## **4.0. ELECTRONIC DELIVERABLES**

### **4.1. General**

The need to exchange electronic drawing or data files, between the FAA and the A/E/C community, necessitates the requirements stated in this section.

#### **4.1.1. Electronic Delivery Media**

Electronic delivery media shall be coordinated with the FAA CADD Manager to ensure compatibility with the FAA's hardware. Accepted media or file transfer methods:

- a. Establishment of a secure FTP site with support contractors;
- b. DVD
- c. Email through FAA network in accordance with FAA security policy

#### **4.1.2. Compression Software**

Compression methods shall be coordinated with the FAA CADD Manager to ensure the FAA's ability to accommodate the compression method used. File compression should be used when transferring bundles of files to an FTP site. File compression shall not be used when writing to electronic media other than FTP sites.

#### **4.1.3. Media Labeling**

All media shall have a label containing, but not limited to:

- a. Preparation date of the media.
- b. The project description.
- c. Contractor name and contract reference.
- d. Contract transmittal number/Logistics contract number  
(example: DTFASO-XXX-XXXX)
- e. Quantity of files.
- f. Operating System and version, and application software used to create the files.
- g. The utility or command used to write the files to the media.
- h. Files marked SSI shall be labeled as such and shall be hand-delivered, not mailed to the requesting organization in accordance with FAA Order 1600.75.
- i. Job Control Number (JCN)

#### **4.1.4. Electronic File Preparation**

All electronic files shall be delivered in the formats described in Section 3.1.1, Drawing File Format, of this standard. Deliverable file format shall be coordinated with the FAA CADD Manager to ensure the FAA's ability to use the delivered files. Before a file is placed on the electronic delivery media, the following procedures shall be performed:

- a. Drawing files shall be in their native format, not DXF, or other neutral format.
- b. Only one bordered drawing shall be represented by each CADD file. Also, each CADD file shall only contain one sheet model/layout/paper space. However, multiple design models are permissible.
- c. Remove all unnecessary graphics outside the drawing border area and set the active parameters to a standard setting of those in the seed or prototype file.

- d. Ensure all external reference files are attached without device or directory specifications. Refer to Section 3.1.14.1, Specific Use of AutoCAD Reference Files and Section 3.1.14.2, Specific Use of MicroStation Reference Files.
- e. Include a list of files included in the deliverable in a text document on the media.
- f. All deliverables shall be certified virus-free.

#### **4.1.5. Documentation**

All drawing packages submitted to the FAA shall include, but not be limited to, a transmittal containing the same information as on the external media label, and:

- a. A hardcopy list of files included in the deliverable, including DGN and/or DWG electronic format files.
- b. A submitted hardcopy that matches with its corresponding final electronic file identically.
- c. Person designated as point of contact.
- d. Certification in the form of a signed statement, that the delivery data is free of known computer viruses, including the name(s) and release date(s) of the virus scanning software used to check the media.

#### **4.1.6. Ownership**

A statement similar to the following should be included in each contract with electronic drawing deliverables:

The FAA shall have ***UNLIMITED RIGHTS*** under this contract to all information and materials developed under this contract and furnished to the FAA and documentation thereof, reports and listings, and all other items pertaining to the work and services pursuant to this agreement including any copyright. Unlimited rights under this contract are rights to use, duplicate, or disclose data and information, in whole or part in any manner and for any purpose whatsoever without compensation to or approval from Contractor. The FAA will at all reasonable times have the right to inspect the work and will have access to and the rights to make copies of the above-mentioned items. All digital files and data, and other products generated under this contract shall become the property of the FAA.

### **4.2. Quality Assurance**

This section lists the requirements for the inspection and submittal of drawings, and the engineering data quality assurance system for contractors.

#### **4.2.1. Responsibility for Inspection**

The contractor is responsible for providing quality assurance checking of drawings, CADD files and deliverables according to this standard prior to providing the deliverable to the FAA.

##### **4.2.1.1.**

The FAA CADD Manager is responsible for assuring that the electronic files are in compliance with FAA standards. This check would examine files for entities placed in the proper layer or level, proper drawing and plot parameters, completed and correct title blocks, and verification that the drawing is free of unwanted entities.

## **5.0. GENERAL**

### **5.1. Drawing Definitions**

The following sections define general A/E/C drawing types:

#### **5.1.1. Project Drawings**

Project Drawings are formal representations used to convey the physical and functional end product design and/or installation requirements of an item. They may include pictorial, graphical, schematic or textual presentations.

#### **5.1.2. Construction Drawings**

Construction Drawings are engineering drawings, which show the design of buildings, structures, or the related construction, and are normally associated with the architectural, construction and civil engineering operations. Construction drawings establish all the interrelated elements of the pertinent services, equipment, utilities and other engineering skills.

#### **5.1.3. Installation Drawings**

Installation drawings are engineering drawings, which show the installation requirements of NAS mission equipment in facilities.

#### **5.1.4. National Standard Drawings**

National standard drawings may be either construction or installation drawings generated for or by Washington Headquarters Program Offices and depict standard design and installation requirements.

#### **5.1.5. Regional Standard Drawings**

Regional standard drawings are generated and maintained by the Regional Offices, Aeronautical Center and Technical Center, and are intended for their exclusive use.

#### **5.1.6. Facility Drawings**

A master set of Facility drawings is generated to show end-state (or as-built) conditions of a location once any construction (or modifications) is completed. As new construction or modifications are finished, the master sets of facility drawings are revised.

## **5.2. Glossary**

The following are definitions of terms used in this standard:

**AutoCAD**—AutoCAD is a full-featured CADD tool produced by AutoDesk Inc. that handles both 2D and 3D design. The native file format is DWG and AutoCAD also reads and writes DXF files.

**BIM**—Building Information Model (BIM), reference to 3D building or facility models which may contain advanced technologies for building management.

**CADD**—Computer Aided Design & Drafting. Graphic software used by engineers and drafters to create and modify drawings in 2D and 3D.

**CAEG**—Computer Aided Engineering Graphics. The FAA’s technical graphics initiative, CAEG, includes Computer Aided Design & Drafting (CADD), Computer-Aided Engineering (CAE), and Geographical Information Systems (GIS). The National CAEG Program Office is structured within the Air Traffic Control Facilities Operational Services organization.

**Design Model**—A model is a container for elements within MicroStation. Models can be either 2D or 3D, see Model Space for AutoCAD equivalent.

**DGN**—MicroStation’s native CADD file format.

**Drawing Sheet Format**—The sheet boundary lines, zoning system and title block geometry used to record administrative information about the CADD file.

**Drawing Sheet Sizes**—Standard sheet sizes are determined by the American National Standards Institute. Alphabetic characters name sheet sizes such as: D, E and F.

**Drawing Zone System**—Boundary information that is sub-divided on a sheet for easy referencing in a revision block.

**DWG**—AutoCAD’s native CADD file format.

**DXF**—AutoCAD drawing exchange format for CADD files.

**EDMS**—Electronic Drawing Management System.

**Job Control Number (JCN)**—A unique number assigned to each project and tracked by the Corporate Work Plan (CWP).

**MicroStation**—MicroStation is a full-featured CADD tool produced by Bentley Systems Inc. that handles 2D and 3D design. The native file format is DGN and MicroStation also reads and writes DWG and DXF files.



**Model File**—Model files are to be used to describe the facility’s physical layout and components. This includes the building’s walls, doors, windows, structural system, mechanical system, etc. All model files are drawn at full size (1-to-1). Model files can be 2D or 3D.

**Model Space**—AutoCAD Model Space is where the user creates a 2D or 3D full-size (1-to-1) drawing. Model file types are created in Model Space. See Design Model for MicroStation equivalent.

**Paper Space/Layouts**—AutoCAD Paper Space/Layouts is where the user organizes different layouts for the purpose of plotting to an appropriate English or Metric drawing scale. See Sheet Model for MicroStation equivalent.

**Plot Stamp**—Plots of CADD drawing files should include a plot stamp, which should include the file name, date, time, and the user name.

**ProjectWise**—The EDMS deployed by the CAEG Program to manage engineering drawings, data, and files for FAA facilities.

**Raster**—a digital image process producing lines made of rectangular dots. Examples of raster formats are TIFF, JPG, BMP, GIF, etc.

**Reference File**—A CADD software capability that allows vector or raster files to be attached to CADD files and displayed, plotted and (in the case of reference design files) used for construction purposes. This capability is generally used as a project organization tool to segregate the sources of project drawing files. Additionally, it allows designers to share drawing information electronically.

**Revised Drawing**—A drawing that has been replaced by a newer revision.

**Sheet File**—MicroStation sheet files are to be used to assemble model files, text, title block and other information for plotting purposes. Each sheet file represents one plotted drawing. Generally sheet files are plotted at a 1-to-1 scale.

**Sheet Model**—A type of model within DGN files that serves as an electronic drawing sheet. It typically consists of design model references that are scaled and positioned to create a printable drawing. See Paper Space/Layouts for AutoCAD equivalent.

**TIFF**—Tagged Image File Format. Raster graphics format developed by a committee chaired by Aldus Corporation, with contributions from Microsoft and Hewlett-Packard. The FAA standard format is TIFF Group 4.

**Vector**—Computer graphics represented by points, lines and other geometric entities.

**Workflow**—the automatic routing of documents to the users responsible for working on them.

### **5.3. Acronyms and Abbreviations**

The following are definitions of acronyms and abbreviations used in this standard:

**2D**—Two Dimensional

**3D**—Three Dimensional

**A-E** – Architect –Engineer

**A/E/C**—Architectural, Engineering and Construction

**AIA**—American Institute of Architects

**ANSI** – American National Standards Institute

**BIM** – Building Information Model

**CCD**—Configuration Control Decision

**CIFM**—Computer Integrated Facilities Management

**CM**—Configuration Management

**CD-R**—Compact Disc-Recordable

**CSI**—Construction Specifications Institute

**CWP**—Corporate Work Plan

**DoD** – Department of Defense

**DPN**—Delphi Project Number

**EC**—Engineering Center

**EDMS**—Engineering Drawing Management System

**FM** – Facility Management

**GIS**— Geographic Information Systems

**GSA**—General Services Administration

**IAI**—International Alliance for Interoperability

**IFC**—Industry Foundation Class

**ISO**—International Organization for Standardization

**IC**—Implementation Center

**JCN**—Job Control Number

**NCP**—NAS Change Proposal

**NIBS**—National Institute of Building Sciences

**OS**—Operating System

**PBS**—Public Buildings Service

**PDF**—Portable Document Format

**SI**—International System of Units (Le Systeme International d’Unites)

**UDS**—Uniform Drawing System

#### **5.4 FAA, Standards and CADD Web Sites**

<b>FAA</b>	<a href="http://www.faa.gov/">http://www.faa.gov/</a>
<b>FAA National CAEG</b>	<a href="http://caeg.faa.gov/">http://caeg.faa.gov/</a>
<b>FAA Standards</b>	<a href="http://caeg.faa.gov/">http://caeg.faa.gov/</a>
<b>FAA Acronyms &amp; Abbreviations</b>	<a href="https://employees.faa.gov/acronyms/">https://employees.faa.gov/acronyms/</a>
<b>ANSI</b>	<a href="http://www.ansi.org/">http://www.ansi.org/</a>
<b>AutoCAD</b>	<a href="http://www.autodesk.com/">http://www.autodesk.com/</a>
<b>MicroStation</b>	<a href="http://www.bentley.com/">http://www.bentley.com/</a>
<b>GSA PBS CAD/CIFM Standard</b>	<a href="http://www.gsa.gov/portal/content/104697">http://www.gsa.gov/portal/content/104697</a>
<b>National CADD Standard</b>	<a href="http://www.nationalcadstandard.org/ncs6/content.php">http://www.nationalcadstandard.org/ncs6/content.php</a>
<b>CADD / GIS Technology Center</b>	<a href="http://www.erdc.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/476676/cadbim-technology-center/">http://www.erdc.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/476676/cadbim-technology-center/</a>

*Table 5-1, Internet URLs*

## **APPENDIX A**

### **LAYER/LEVEL Naming Scheme**

#### **Preface**

This alphabetical appendix addresses the usage of MicroStation levels and AutoCAD layers by disciplines. The associated MicroStation and AutoCAD color numbers listed in the following tables shall be used.

Layers/Levels specified under the ‘Annotation’ discipline (i.e., those named as “ANNO-xxxx”) are meant to be used in conjunction with all of the other disciplines listed in this Layer/Level Naming Scheme. Annotation layers/levels are for placing any elements related to text, notes, dimensions, schedules, labels, etc. There are also five (5) User-Defined layers/levels to be used for unique elements, as users see fit. Additions to the level/layer structure are only allowed with the User-Defined levels/layers.

## Annotation

The following AutoCAD layers/MicroStation levels shall be used to structure Annotation in Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
ANNO-DIMS	5	Dimensions and Dimensional Leaders	160	17
ANNO-IDEN	12	Identification Tags: Door #s; Hardware group; Window #s; Equipment Id #s; Furniture #s; Component Id.#s	7	0
ANNO-KEYN	9	Key Notes	7	0
ANNO-LABL	11	Identification Labels: Room #s, Floor #s, Tenant Identification, Area Calculations, Occupant or employee names, Elevation Id.#s	7	0
ANNO-LEGN	4	Legends and Schedules	4	7
ANNO-NOTE	7	Notes	7	0
ANNO-NPLT	8	Non-Plotting Graphic Information	8	9
ANNO-REDL	2	Redlines	1	3
ANNO-REVS	10	Revisions	4	7
ANNO-SYMB	3	Symbols: Bar Scales; North Arrow; Section Symbols; Detail Markers	4	7
ANNO-TEXT	1	Text and Text Note Leaders	7	0
ANNO-TITL	13	Drawing Component Titles; Detail Titles; Section Titles; Elevation Titles	3	2
ANNO-TTLB	6	Border and Title Block	30	6
VIEWPORTS	14	AutoCAD viewport clip window	2	NA
DEFPOINTS	15	AutoCAD dimensioning definition points for associative dimensioning	NA	NA
User Defined	16	User Level 1	User Defined Layer / Level	
User Defined	17	User Level 2	User Defined Layer / Level	
User Defined	18	User Level 3	User Defined Layer / Level	
User Defined	19	User Level 4	User Defined Layer / Level	
User Defined	20	User Level 5	User Defined Layer / Level	

## Architectural

The following AutoCAD layers/MicroStation levels shall be used to structure Architectural Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
A-CLNG	30	Ceiling information; Ceiling grid; Ceiling/roof penetrations; Main tees; Suspended elements; Ceiling access	1	3
A-COLS	31	Columns	1	3
A-CONV	32	Conveying Systems	4	7
A-DOOR	33	Doors: Full-height (to ceiling) doors, swing and leaf	4	7
A-ELEV	34	Elevations	1	3
A-EQPM	35	Equipment; Fixed or Moveable; Equipment access; Appliances	1	3
A-FLOR-EVTR	36	Elevator cars and equipment	4	7
A-FLOR-OTLN	37	Floor or building outlines	4	7
A-FLOR-RAIS	38	Raised floors	1	3
A-FLOR-TPTN	39	Toilet partitions; Architectural specialties (toilet room accessories, display cases)	1	3
A-FLOR-WDWK	40	Architectural woodwork (field-built cabinets and counters); Casework (manufactured cabinets); Finishes, woodwork, trim, wall-mounted casework	1	3
A-FURN-FREE	41	Furniture: freestanding (desks, credenzas, etc.), chairs and other seating, file cabinets, plants, furniture elevations	5	1
A-FURN-PNLS	42	Furniture: system panels and work surface components, storage components, system furniture power designations, finish treatments	1	3
A-GLAZ	43	Windows; Full and partial-height glazed walls and partitions; Windowsills; Glazing and mullions - elevation views	4	7
A-GRID	44	Planning grid or column grid	1	3
A-HVAC	45	Supply diffusers; return air diffusers	1	3
A-LITE	46	Light fixtures	1	3
A-PATT	47	Wall insulation and surfaces; Fire wall patterning; Paving, tile, carpet and ceiling patterns; Elevation textures and hatch patterns	160	17
A-ROOF	48	Roof, roof outline, level changes, roof surfaces	4	7
A-SIGN	49	Signage	1	3
A-WALL	50	Full and partial height walls; Door and Window headers and jambs; Overhead items (skylights, overhangs, usually dashed lines)	4	7

## Civil

The following AutoCAD layers/MicroStation levels shall be used to structure Civil Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
C-AFLD	60	Airfields; General Outline of Airports	8	9
C-ATNA	61	Antenna (Comm / Radar) - antenna towers and antennas	1	3
C-BLDG	62	Proposed building footprints, primary structures	4	7
C-BLIN	63	Baseline	4	7
C-BORE	64	Test Borings	1	3
C-BRDG	65	Bridge	4	7
C-CEME	66	Cemetery	8	9
C-CHAN	67	Navigable Channels, Rivers, Lakes, Bodies of Water	22	22
C-COMM	68	Site communications, (Overhead and Underground); telephone poles, boxes, towers	1	3
C-CTRL	69	Control Points	4	7
C-DFLD	70	Drain Fields	1	3
C-DTCH	71	Ditches or Washes	22	22
C-EROS	72	Erosion and Sediment Control, Riprap	4	7
C-FENC	73	Fences	160	17
C-FIRE	74	Fire protection: hydrants, connections; underground lines	1	3
C-FUEL	75	Fuel Gas	80	11
C-NGAS	76	Natural gas - manholes, meters, storage tanks, underground lines	1	3
C-PATT	77	Patterns	160	17
C-PKNG	78	Parking lots, islands, curbs, striping, handicapped symbols, drainage slope indications	1	3
C-POWR	79	Power: (Overhead and Underground); Poles; boxes, towers	1	3
C-PROP	80	Property lines, survey benchmarks, retaining walls	4	7
C-PROP-BRNG	81	Bearings and distance labels	7	0
C-PROP-ESMT	82	Easements, rights-of-way, setback lines, runway approach zones	1	3
C-RAIL	83	Railroad	4	7
C-ROAD	84	Roadways, runways, taxiways, curbs, Center lines	4	7
C-SSWR	85	Sanitary sewer -manholes, pumping stations, underground lines	1	3
C-STEM	86	Steam Systems	1	3
C-STRM	87	Storm drainage catch basins, manholes, underground lines	1	3
C-TINN	88	Triangulated Irregular Network	1	3
C-TOPO	89	Contour lines and elevations, spot elevations	5	1
C-WALL	90	Noise Barrier, Retaining Wall	4	7
C-WATR	91	Domestic water: manholes, pumping stations, storage tanks, underground lines	1	3

**Contractor/Shop**

The following AutoCAD layers/MicroStation levels shall be used to structure Contractor Shop Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
Z-CTR	100	Contractor and shop drawings	1	3

**Demolition**

The following AutoCAD layers/MicroStation levels shall be used to structure Demolition Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
D-COMM	110	Telephone and data lines, outlets	1	3
D-ELEC	111	Wiring, outlets, fixtures, lighting, equipment	1	3
D-FLOR	112	Floors, stairs, rails, woodwork, casework, trim	1	3
D-HVAC	113	HVAC equipment, ductwork, diffusers	4	7
D-PATT	114	Patterns	160	17
D-PLBG	115	Plumbing fixtures, equipment, drainage and piping, hot and cold water supply pipes and equipment	1	3
D-SITE	116	Site features, retaining walls, plants, trees, signs, fences	4	7
D-WALL	117	Full and partial height walls, structural walls, door and window headers and jambs, partitions	4	7



## Electrical

The following AutoCAD layers/MicroStation levels shall be used to structure Electrical Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name	Layer / Level #	Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
E-1LIN	120	One-line diagram	4	7
E-ALRM	121	Electrical alarm system	1	3
E-AUXL	122	Auxiliary System	12	12
E-COMM	123	Telephone, communications outlets	1	3
E-CTRL	124	Control systems devices and wiring	1	3
E-DATA	125	Data outlets	1	3
E-GRND	126	Ground system, counterpoise, ground rods	4	7
E-INTC	127	Intercom, sound/PA system	1	3
E-JBOX	128	Junction box	4	7
E-LEGN	129	Legend of symbols	4	7
E-LITE	130	Lighting, special lighting, ceiling-mounted lighting, wall-mounted lighting, floor-mounted lighting, lighting outline for optional background lighting, roof lighting, lighting circuits, emergency and exit lighting, site lighting	4	7
E-LTNG	131	Lightning protection system	4	7
E-PATT	132	Patterns	160	17
E-POWR-CABL	133	Under floor raceways, cable trays, bus ways	1	3
E-POWR-EQPM	134	Power panels, equipment, switchboards	4	7
E-POWR-RECP	135	Power: wall and ceiling outlets and receptacles	4	7
E-RISR	136	Riser diagram	1	3
E-SWCH	137	Lighting switches	1	3
E-TVAN	138	TV antenna system	1	3

**NOTE:** High voltage power connections will be shown on Electrical Discipline (E-Electrical) drawings and low voltage power connection will be shown on NAS Equipment (Q-NAS Equipment) drawings.

## **Fire Protection**

The following AutoCAD layers/MicroStation levels shall be used to structure Fire Protection Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
F-AFFF	150	Aqueous Film-Forming Foam System	120	12
F-CO2S	151	CO2 sprinkler piping and equipment	1	3
F-HALN	152	Halon piping and equipment	1	3
F-IGAS	153	Inert gas equipment and piping	1	3
F-PATT	154	Patterns	160	17
F-PROT	155	Fire system equipment (fire hose cabinet extinguishers), fire alarm, smoke detectors/heat sensors	1	3
F-SPRN	156	Fire protection sprinkler system, sprinkler piping, sprinkler heads, sprinkler standpipes, fire protection systems	1	3

## **General**

The following AutoCAD layers/MicroStation levels shall be used to structure General Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
G-ACCS	160	Access Plan	1	3
G-EVAC	161	Evacuation Plan	1	3
G-PATT	162	Patterns	160	17
G-PLAN	163	Key Plan	1	3
G-VCTY	164	Vicinity Map	1	3

### **Hazardous Material**

The following AutoCAD layers/MicroStation levels shall be used to structure Hazardous Material Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
H-HZMT	170	Hazardous materials on floor and/or site plan	4	7
H-PATT	171	Patterns	160	17

### **Landscaping**

The following AutoCAD layers/MicroStation levels shall be used to structure Landscape Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
L-IRRG	180	Irrigation systems, sprinklers, piping, equipment, coverage	1	3
L-PATT	181	Patterns	160	17
L-PLNT	182	Plant and landscape materials; Trees; Ground covers and vines; Rock, bark, and other landscaping beds; Planting beds	1	3
L-SITE	183	Site improvements, fencing, walls, steps, decks, bridges, pools, spas, sports fields, play structures, furnishings, walkways	1	3

## Mechanical

The following AutoCAD layers/MicroStation levels shall be used to structure Mechanical Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
M-CMPA	190	Plant compressed air systems, equipment and piping	4	7
M-CONT	191	Thermostats, controls and instrumentation	1	3
M-CONT-WIRE	192	Low voltage control wiring	1	3
M-CWTR	193	Chilled water system, piping and equipment	4	7
M-DUST	194	Dust and fume collection system, equipment and ductwork	4	7
M-ELHT-EQPM	195	Electric heat equipment	1	3
M-ENER	196	Energy management system, equipment and wiring	1	3
M-EXHS	197	Exhaust system, equipment and ductwork, roof exhaust equipment	1	3
M-FUEL-GAS	198	Fuel system tanks, piping, gas process piping, fuel gas general piping	1	3
M-FUEL-NGAS	199	Natural gas systems, equipment and piping	4	7
M-FUEL-OIL	200	Fuel oil process tanks, piping and general piping	1	3
M-HOTW	201	Hot water heating system, equipment piping	4	7
M-HVAC	202	HVAC system, HVAC ductwork and equipment	4	7
M-HVAC-DFF	203	HVAC ceiling diffusers, other diffusers, supply diffusers, return air diffusers	4	7
M-MACH	204	Machine shop equipment	1	3
M-PATT	205	Patterns	160	17
M-PROC	206	Process/instrument air piping and equipment	4	7
M-RCOV	207	Energy recovery system, equipment and piping	1	3
M-REFG	208	Refrigeration systems, equipment and piping	4	7
M-SPCL	209	Special systems, equipment and piping	1	3
M-STEM	210	Steam systems: Steam systems condensation piping and equipment; Low pressure steam piping; Medium pressure steam piping; High pressure steam piping	1	3
M-TEST	211	Test equipment	1	3

## NAS Equipment

The following AutoCAD layers/MicroStation levels shall be used to structure NAS Equipment Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
Q-CABL	220	Cables and Trays (Low voltage)	1	3
Q-CNSL	221	Console	1	3
Q-DTLS	222	Equipment details	4	7
Q-ELEV	223	Equipment elevations	1	3
Q-MNTS	224	Equipment mounts	4	7
Q-PATT	225	Patterns	160	17
Q-PLAN	226	Equipment plans	4	7
Q-POWR	227	Low voltage power connections	1	3
Q-RACK	228	Rack Details	1	3
Q-SCHM	229	Schematic and Block wiring diagram	4	7

**NOTE:** High voltage power connections will be shown on Electrical Discipline (E-Electrical) drawings and low voltage power connection will be shown on NAS Equipment (Q-NAS Equipment) drawings.

## Plumbing

The following AutoCAD layers/MicroStation levels shall be used to structure Plumbing Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
P-DOMW	240	Domestic hot and cold water systems and piping	1	3
P-FIXT	241	Plumbing fixtures and equipment	1	3
P-PATT	242	Patterns	160	17
P-SANR	243	Sanitary drainage and piping, floor drains and piping, sanitary risers and equipment	1	3
P-STRM	244	Storm drainage system, storm drain piping and risers	1	3
P-STRM-RFDR	245	Roof drains	8	9
P-WAST-OIL	246	Waste oil systems and piping	1	3

**Real Estate**

The following AutoCAD layers/MicroStation levels shall be used to structure Real Estate Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #	Layer / Level Description	Layer / Level Color	
		AutoCAD	MicroStation
<b>FOR REAL ESTATE LAYER/LEVELS SEE THE CIVIL DISCIPLINE LAYER/LEVEL SCHEMA</b>			

**Security**

The following AutoCAD layers/MicroStation levels shall be used to structure Security Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name	Level #	Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
Y-ALRM	250	Miscellaneous alarm system	1	3
Y-CAMS	251	Security cameras	4	7
Y-CCTV	252	Closed-circuit TV	1	3
Y-COMM	253	Security communication	1	3
Y-DTLS	254	Security equipment details	4	7
Y-ELEC	255	Security electrical	1	3
Y-PATT	256	Patterns	160	17
Y-SNSR	257	Security sensor locations	4	7

## Structural

The following AutoCAD layers/MicroStation levels shall be used to structure Structural Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
S-BEAM	260	Beams	4	7
S-BRAC	261	Bracing	4	7
S-COLS	262	Columns	4	7
S-DECK	263	Structural floor deck	1	3
S-FNDN	264	Foundation, piles, drilled piers	1	3
S-FNDN-RBAR	265	Foundation reinforcing; Slab reinforcing	1	3
S-GRID	266	Column grid outside building, inside building, grid dimensions, grid tags, columns	1	3
S-JNTS	267	Joints	4	7
S-JOIS	268	Joists	4	7
S-METL	269	Miscellaneous metal	1	3
S-PATT	270	Patterns	160	17
S-PROP	271	Property Lines	4	7
S-SLAB	272	Slab; Edge of slab; Slab control joints	1	3
S-STRS	273	Stair treads, escalators, ladders; Stair risers, balcony handrails, guard rails	1	3
S-TRUS	274	Trusses	4	7
S-WALL	275	Structural bearing or shear walls	4	7
S-ABLT	276	Anchor Bolts	8	9
S-GRAT	277	Grates	250	8
S-RBAR	278	Reinforcing Bar	22	22

## **Telecommunications**

The following AutoCAD layers/MicroStation levels shall be used to structure Telecommunications Drawings. The associated AutoCAD and MicroStation color numbers will be used as a standard.

Layer / Level Name #		Layer / Level Description	Layer / Level Color	
			AutoCAD	MicroStation
T-1LIN	290	One-line diagram	4	7
T-ALRM	291	Alarm system	1	3
T-CABL	292	Cable systems: coax cable, fiber optics cable, multi-conductor cable, cable tray and wireway	1	3
T-CATV	293	Cable television system	4	7
T-CCTV	294	Closed-circuit TV	1	3
T-DATA	295	Data/LAN system	80	11
T-ELEC	296	Electrical system, telecom plan	1	3
T-EQPM	297	Equipment	4	7
T-FIRE	298	Fire alarm, fire extinguishers	1	3
T-JBOX	299	Junction box	4	7
T-PATT	300	Patterns	160	17
T-PHON	301	Telephone system	1	3
T-RISR	302	Riser diagram	4	7
T-SERT	303	Security system	1	3
T-SOUN	304	Sound/PA system	120	12
T-TVAN	305	TV antenna system	11	19