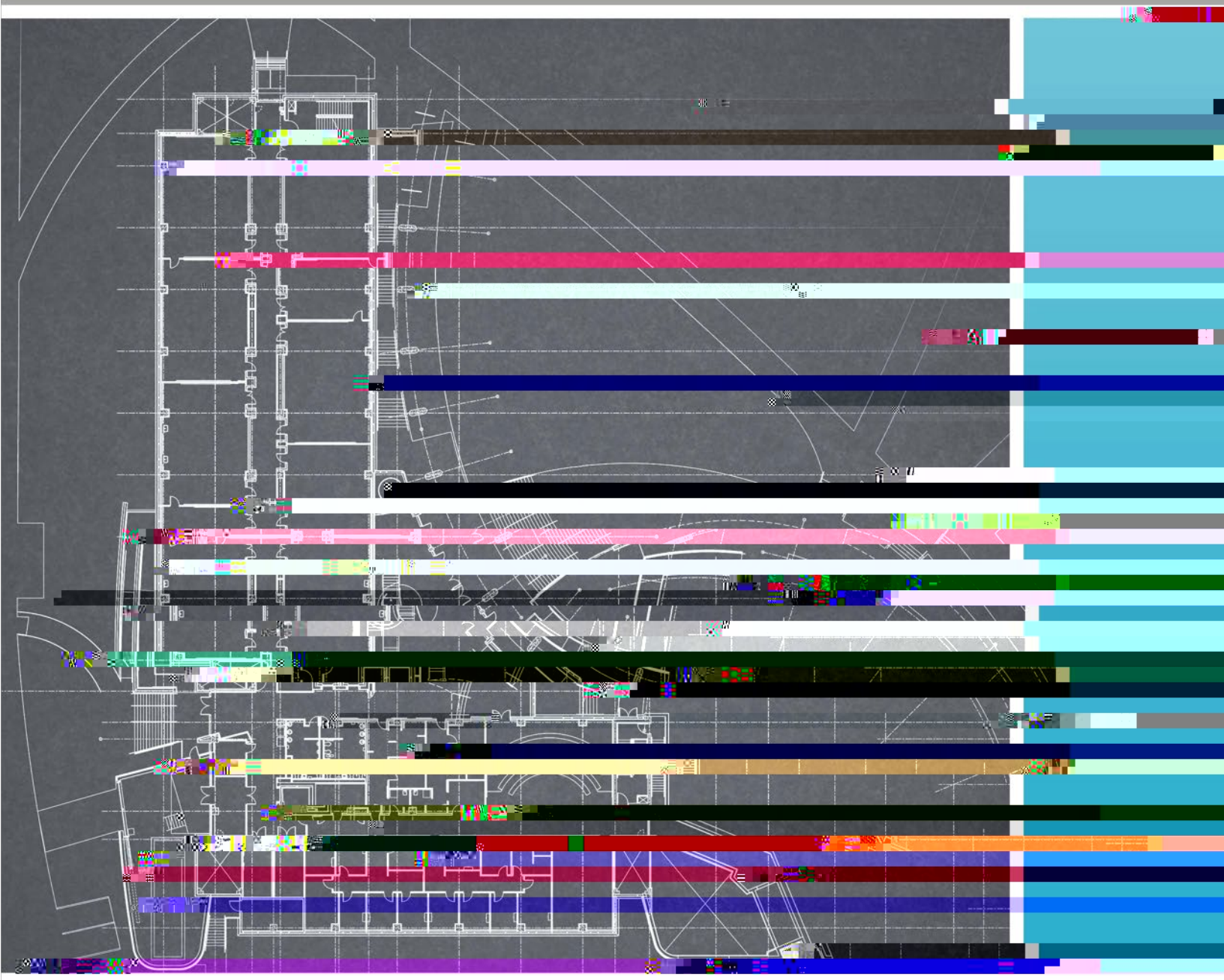
UNIVERSITY of SOUTH FLORIDA

A/E Guidelines and Standards

for Architects, Engineers and Contractors



Facilities Management

June 6, 2023

CAD Guidelines and Standards

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SECTION 1: THE PURPOSE OF USING CAD DATA STANDARDS

The University of South Florida has adopted a system of electronically cataloging information concerning the buildings on our campuses. This system requires the effective use of Computer Aided Design (CAD) in architecture, engineering and facility management and depends on the sharing of graphic information.

The intent of these standards is to serve as a guideline by which an information sharing system can be utilized and maintained. The absence of a standard would result in unrealized potential for sharing graphic information. The standards strive for a balance, providing a general framework for practice while allowing expansion and modification.

Computer-Aided Design (CAD) is an accepted tool for producing the documentation required for construction and management of facilities; it also provides for a common medium of information exchange. In fact, the true power and potential of CAD is the ability to use and share the information contained within the CAD document. The key to realizing this potential is common organizing principles and standards for the production and dissemination of CAD information.

1.1 Industry Standards

The University is committed however, to enforcing the CAD data standards and information delivery to insure usability and reuse of information. As a result, these standards are part of and referenced in the contractual requirements for delivery of electronic information to the University of South Florida.

SECTION 3: REQUESTING CAD DATA FROM THE UNIVERSITY

CAD data request for University facilities shall only be accepted and provided to consultants currently under contract for services and based on availability. Any provided data is for use of the recipient only and shall not be shared without prior USF FM approval.

The University's data has been gathered from a variety of sources, and it may3 o,ec 0 (s)-1e

- Submittals shall match exactly the final plotted drawings. Use only electronic data generated with AutoCAD. (Do not use hand notes or markings of any kind)
- File names must incorporate the sheet numbers and conform to the file naming matrix (See Section 6 of this document)
- All model drawings must be drawn “Life-size” (1:1 CAD Units) also referred to as “Full-Size”
- Include all CAD design and supporting files such as: fonts, shape files, raster images, external references (xrefs) and databases including field collection data etc.
- The use of the AutoCAD “E-transmit” routine (Included in all versions of AutoCAD) is the preferred and strongly recommended method of packaging all AutoCAD drawing files and related supporting files for submittal. This routine will automatically create a folder or .zip file that includes the base or sheet files and all supporting files including the attached xrefs with the path intact (set for relative pathing is preferred) to maintain their linkages

4.5 Delivery of PDF Files

Adobe Portable Document File (.pdf) files shall be submitted that match exactly the final plotted hardcopy. Submit a set of full-size individual separate .pdf files for each sheet in the set that have been generated from the original authoring software in the native graphic format (submitted PDF sheet files should not be scans of the hard copy prints) rotated to a plan readable state. File names shall incorporate the sheet numbers and conform to the file naming matrix. (See Section 6 of this document)

4.6 Project Manual & Specifications

Electronic documents shall be produced on 8.5”x 11” sheet size, portrait orientation. Provide one (1) each “Combined” electronic file containing all divisions/sections in both Microsoft Word .docx and Adobe Portable Document File (.pdf) file formats. The cover must also contain and be consistent with the drawing set cover sheet or title information. A separate title page may be omitted if the cover provides the prescribed content. The file name shall include the word “Spec” or “PM Manual” in place of the sheet number in the file name as appropriate and be prepared in accordance with the file naming matrix. (See Section 6.1 of this document)

4.7 Submittal Checklist

Refer to and complete the Electronic File Submission Checklist provided at the end of this document. This checklist shall be signed by the responsible consultants proje63 0 Td r.2 ((am)-6.7 (an)2.a3 (g

6.5 Sheet Order

6.6 Sheet Numeration Chart

The sheet numbering shown in the chart below shall be used as a guide and method of labeling sheets. Sheet numbers shall be arranged and used on a project by project basis as it pertains to the size and complexity of the project. The sheets shown provide an example of sheet order, smaller projects may not require all sheets and larger projects will require additional sheets

Notes:

”

NUMBER

SECTION 7: DRAWING LAYER DESCRIPTION

The University has developed standards in part from the AIA CAD Layer Guidelines and the U.S. National CAD Standard, both having major influence in the development of these standards. The University also utilizes Autodesk's AutoCAD Architecture where the built-in layer structure is based on these industry standards. Therefore, the following layer naming system is a direct derivation of these standards.

7.1 Layer Standards

The USF derivative of this layering standard simplifies the AutoCAD Architecture layering standard by elimination of the subcategories available in the Discipline Code. Likewise, the USF standard also does not utilize the AutoCAD Architecture Minor Group 2 field; therefore, they are not included in this document.

Because the University's layering standard differs slightly from AutoCAD Architecture, some alterations are necessary to the default layer settings in AutoCAD Architecture. The use of the "Layer Key Overrides" feature is necessary for compliance of these standards.

7.2 Layering

Drawing layers use a format that is organized as a hierarchy. This structure makes the list easier to use and accommodates future expansion. Layer names are alphanumeric and use easy to remember abbreviations such as "A-DOOR" for architectural doors, "A-WALL" for architectural walls and "E-POWR" for electrical power.

Graphic representations of related items shall be located on a single layer even when indicated on different drawings. For example, full height walls could be properly drawn on layer A-Wall or A-Wall-Full, but not both.

Graphic symbols connected to text and notes, (Leader lines, arrowheads, etc.) shall be located on the same layer as the corresponding text.

- Do not draw any entities on layer "0" (Leave this layer clean and unused)

7.3 Layer Format

Layer names shall be limited to 10 characters (Max.) subdivided into 4 sections using hyphens, these include: Discipline Designator, Major Group, Minor Group, and Status Codes as shown below. Layer names will consist of 5 characters (Min.) using the Discipline Code and Major Group designations.

Discipline Designator:
The Discipline Designator denotes the category of subject matter contained on the specified layer and corresponds to the traditional discipline designations used in construction document sheet numbering; they are not intended to suggest which member of the design team would draw which objects. For example, the column grid would be placed on layer "S-GRID" regardless of whether it was drawn by the architect or structural engineer.

Major Group:
The Major Group adds to the discipline code and identifies assemblies, building systems or major categories on the basis of construction or the type of information. For example walls, doors, ceilings, lights, power, sanitary sewer, domestic water, storm drains, etc.

Minor Group:

A Minor Group may be added to a layer name for further additional information and differentiation.

For example, walls "A-WALL" may be categorized as full height "A-WALL-FULL", partial 4 -0 0 8 12 2 mR -0. Tcl

8.11 Title Block Information

Sheets within a document set shall include a titleblock containing the information below

TITLE BLOCK INFORMATION	
Project Title	Example: USF Sarasota-Manatee Student Center & Residence Hall (SSV)
Data:	

- Use only those fonts or shape files provided with AutoCAD. If other files are used they must be included in the submittal (Non-AutoCAD fonts/shape files shall be restricted when possible).

9.5 Annotation

Annotation can be placed in either model space files or a paper space layout sheet files. Annotations related to model space data, such as dimensions, notes, and callouts must be included in the drawings model space file where they are easier to coordinate and revise.
Other annotations, such as drawing titles, legends, and sheet specific notes, are more convenient to work with when placed in a paper space layout sheet file.

9.6 Dimensions

Only associative dimensions shall be used. Consultants shall insure that all dimensions are in a named dimension style for all dimensions in CAD files. This allows the parameters within the style to control and readily modify the dimensions as needed. Dimension overrides are only acceptable for visual elements and dimension line text. Overrides shall not be used to change the measurement of the dimension. Model space objects shall never be scaled to facilitate dimension measurements. The measurement scale factor shall be modified in the related dimension style to accommodate using multiple dimension scales within one drawing file.

9.7 External Reference (Xref) Files

Xrefs may be used to subdivide a large CAD drawing into several smaller, more efficient drawings. This will reduce drawing size, increase performance, and make coordination of disciplines easier. Avoid nested xrefs. All xrefs must be attached to the based drawing using a relative path and reside in the same directory as the based drawing files or within a subfolder of the parent folder where the base files are stored. Xref files shall be named appropriately to differentiate them from other base or sheet files. (As a suggestion, include Xref or appropriate equivalent within the name)

10.3 Room Numbering Requirements

- All spaces must have a unique number within the building and the number on the drawing floor plan must correspond with the room signage
- Do not use periods, hyphens, spaces, or any other non-alphanumeric character in room numbers (Example: do not number a room as -116 or 01.14A etc)
- Corridors will change number when they change direction. Corridors will also change number where fire doors are constructed, even if the direction does not change
- Number all accessible spaces including: Stairwells, Elevators, Restrooms, Mezzanines & Penthouse spaces. Elevators are to receive a room number for each level they service; stairwells require room numbers at each floor level
- Rooms shall be numbered consecutively from one end of the hall to the other. Do not start numbering at one room and circle around the corridor
- Do not number internal courtyards and roof areas, unless covered. Exception: The top level of parking decks used for parking shall be assigned numbers
- Number all exterior covered spaces whether walled or not, including loading docks, connecting bridges and building roof overhangs that extend beyond 6 feet or more from the building exterior wall etc.
- Floor areas designed for Elevators, Stairwells, internal and covered external circulation, Restrooms, Electrical, Mechanical, Custodial, and Telephone equipment require rooms numbers (See Room Number Matrix in this Section of this document)
- Total Gross Square Feet (1) and Total Net Square Feet (2) must be calculated and clearly indicated on the drawings

(1) Gross Square feet = the area of the building defined from the exterior face of the building wall. The Gross also includes all covered external areas.
(2) Net Square feet = All interior usable spaces excluding walls and mechanical chases. Do not include exterior spaces in the Net SQ.FT.

10.4 Floor Levels

The lowest level of the building must be labeled “level 1”, not “ground floor” or “first floor”, whether it is below grade or not. The next levels above level 1 shall be labeled concurrently “level 2”, “level 3”, etc.

For buildings that are constructed with more than 9 levels, number rooms in the hundreds for levels 1-9 and starting with level 10 number in the thousands when possible. All attempts shall be made to restrict using more than 9 levels and 99 rooms per level (not including suites). If the facility requires more levels or rooms than this limit, (University approval will be required).

10.5 Numbering Patterns

All attempts shall be made to maintain consistency of the numbering scheme from floor to floor. Whenever consistency of numbering scheme cannot be maintained, rooms shall be numbered in a sequence that is consecutive and simple to locate from one end of the hall to the other.

When possible, rooms with the same usage type that are located directly above each other shall maintain the same organization with the number changing only to reflect the change in floor level.

NUMBERING PATTERN	EXAMPLES
Example 1	If the first floor Men’s Restroom is “0102”, then second floor Men’s Restroom would be “0202” and third floor Men’s Restroom would be “0302” etc.
Example 2	If a first floor Apartment is “1101”, then second floor Apartment would be “2101” and third floor Apartment would be “3101” etc.

SECTION 11: SIGNAGE

Signage shall maintain a consistent look and shall comply with all appropriate codes and installation requirements. Font style, lettering size and placard dimension shall be designed in accordance to building use and customer's recommendation, coordinate with USF Project Manager.

11.1 Signage Requirements

- All signage must comply with ADA requirements
- All room numbers on signage shall be fixed, i.e., non-changeable, and tamper resistant
- If the first digit of a room number is "0," it shall be omitted (This applies only to signage)
- Buildings with more than 9 levels, rooms above the ninth level shall be numbered with digit 4 number. Room signage above the ninth level will reflect the level on each placard's upper right hand corner. This number shall be done in the same font and one-third the size of the original number on the placard
- No office or room sign shall indicate the occupant or the room use except as follows:
  - The occupant name or room use indication can be changed or eliminated without replacement of room number signage
  - The room use will not change over the life of the building (restroom, mechanical, etc.) and the University deems it appropriate to indicate the room's use
  - The room use is part of an officially named room. (An officially named room is a room that has been formally dedicated to honor a contribution to the University by an individual, group, or company)
- In large facilities or facilities with a large number of rooms, corridor or office suites, directional signs shall be used at all points where there is a choice of directions. Signs shall indicate the room number range with an arrow pointing towards the path of travel. Signs shall not contain names of rooms unless the name is an officially dedicated room and will be referenced by this name
- Building directory signage shall be located at the main entrance. However, because of the placement of many university facilities, secondary entrances are used as the primary entrance. In these situations, a directory shall be used at these entrances or, at minimum, provide directions to the location of the primary directory
- Corridors will not require signage except to facilitate floor identification on structures exceeding

TERM	DEFINITION
Fabrication	The act or process of manufacturing, to make, build, or construct in reference to buil components. Usually means off site fabrication done within a controlled environment resulting in improv accuracy and efficiencies.
FM	Facilities Management - The University department that manages building design and construction. Each USF institution has a Facilities Department. FPC Tampa provides oversight for the entire USF portfolio
	term is commonly used in geo ion to spatial locations. Establishes control poin

USF REFERENCE DOCUMENTS AND ABBREVIATIONS

DOCUMENT TITLE	DOCUMENT ABBREVIATION	LOCATION
USF CAD Guidelines and		