



## Computer Aided Design (CAD) Standards Manual

Hillsborough County Aviation Authority

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Version 1.0

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# 1. INTRODUCTION

## 1.1 PURPOSE

The purpose of this manual is to:

- Explain how the consultant can obtain referential documentation (Computer Aided Design (CAD) templates, block library, linetypes, etc.) from the Hillsborough County Aviation Authority (HCAA) for the development of a project.
- Define the specific CAD standards that HCAA uses for any CAD deliverable (Layer naming convention, coordinate system, file naming convention, etc.)
- Describe how the CAD deliverables will be sent to HCAA.

CAD data created for HCAA must be developed and submitted according to the requirements documented in this manual.

This includes CAD data prepared both internally by HCAA staff and by outside organizations for work performed on behalf of airport tenants and consultants to HCAA. The objective is to standardize deliverables so that data is consistent and can be readily transposed between (CAD) & Geographic Information Systems (GIS) when necessary.

Each submitted CAD drawing file will become part of the permanent archive. The data used to produce the CAD drawings will serve as a critical source for updating information within HCAA's CAD data storage system.

This manual defines the standards for all CAD work produced for HCAA. It specifies CAD data requirements, such as a Coordinate System and symbology, HCAA's layer naming convention, file organization and delivery requirements. These standards apply to CAD deliverables, GIS and/or Building Information Modeling (BIM) project requirements and should be used with those corresponding guidelines and/or standards.

These standards assume that readers have a basic understanding of CAD concepts and terminology. Readers who are new to HCAA's CAD standards should review the document in its entirety. Those who are familiar with the standards may wish to use the document as a reminder of the specifics to which they must adhere.

The content of this manual supersedes all previously published CAD Standard versions and is subject to change and revision without notice. The latest version of this document and all supporting documentation (CAD Support Package) can be found at the following website: <https://tampaairportstg.prod.acquia-sites.com/reference-standards>

## 1.2 REFERENCED STANDARDS AND DOCUMENTS

HCAA's CAD Standard is part of the overall guidelines and standards with which consultants must comply. Additional HCAA documents such as BIM and GIS standards will be stored in the following website: <https://tampaairportstg.prod.acquia-sites.com/reference-standards>

Additional FAA documentation related to FAA's CAD requirements, specifically the "Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-18B (or the most current version) "General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards", can be found at [https://www.faa.gov/documentLibrary/media/Advisory\\_Circular/150-5300-18B-chg1-consolidated.pdf](https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5300-18B-chg1-consolidated.pdf)

The standards included herein are based heavily on the United States National CAD Standard (NCS) – V6, which can be found at <https://www.nationalcadstandard.org/ncs6/>

It is the responsibility of the consultant to obtain the latest set of standards referenced in this manual.

### 1.3 SOFTWARE REQUIREMENTS

The CAD software version will be defined at the beginning of the project and the version shall not change unless it is coordinated with the HCAA CAD-BIM Manager. Consultants who do not use this Autodesk software (AutoCAD, Civil 3D, Map 3D) shall ensure that all requirements defined in this manual are met in the DWGs they create and convert from other software, without any loss of quality or accuracy when they are opened in Autodesk software.

## 2. OBJECTS IN CAD DRAWINGS

### 2.1 OBJECT TYPES

Objects that depict real-world features shall be of the following geometry types:

- Point features shall be symbolized by the appropriate AutoCAD block. Examples include airfield lights, signs, and poles.
- Linear features shall only be represented by AutoCAD polylines and/or 3D polylines. Subsurface features shall be represented by 3D polylines. Examples include utility pipes, conduits, and duct banks.
- Polygonal features shall be represented by AutoCAD closed polylines. Hatch patterns may be used within polygonal features. Examples include property boundaries.
- Objects in drawings that are used to convey graphical references or alphanumeric information, such as annotations, text, dimensions, and leader lines may use other AutoCAD object types, including construction lines, revision clouds and wipeouts. It is suggested to use Multileaders instead of Single Leaders or Qleaders.
- All text used, whether it is annotations associated with features, values within title blocks, or other text, shall be multiline text (MTEXT).

### 2.2 COORDINATE SYSTEMS AND UNITS

In an effort to organize, consolidate and standardize the information generated for HCAA, Coordinate Systems must be used on all projects. The objective of this requirement is to make the data files easier for users to identify and integrate in planning and design.

The HCAA horizontal coordinate system is North American Datum of 1983 (NAD83), Florida West State Plane (Zone 902) US Feet.

The HCAA vertical coordinate system is North American Vertical Datum of 1988 (NAVD88).

All features located by survey methods shall be based on the 2011 adjustment of NAD83 for horizontal coordinates. All units for both horizontal and vertical data will be the U.S. survey foot. Three decimal units are used for all HCAA site/civil base maps.

Two points of geodetic control shall be included in each electronic file for spatial reference; the Primary Airport Control Station (PACS) and Secondary Airport Control Station (SACS) monument coordinates are listed in Appendix A, and available on-line from the National Geodetic Survey database. If the included PACS and SACS data is not applicable, acceptable control may include section corners, quarter section corners, and other existing airport monumentation.

Site/Civil base maps should NEVER be moved or rotated in a manner that removes the drawing from the coordinate system. If the orientation of the base map needs to be changed, the use of Paper Space with a User Coordinate System shall be used to rotate the perspective of the base maps.

### 2.3 TOPOLOGICAL INTEGRITY REQUIREMENTS

HCAA supports both CAD and GIS spatial datasets. CAD data is regularly converted to a GIS format for integration in HCAA's GIS database. GIS has more stringent data requirements than AutoCAD. In an effort to make the conversion between both formats and to comply with the FAA's data requirements, this section details the

topology requirements that must be followed for all CAD submittals to HCAA. Topology refers to the positional relationship between features. All features are required to meet the following topology rules:

- **Collocated Vertices** – Collocated vertices must share the same X, Y and Z coordinates.

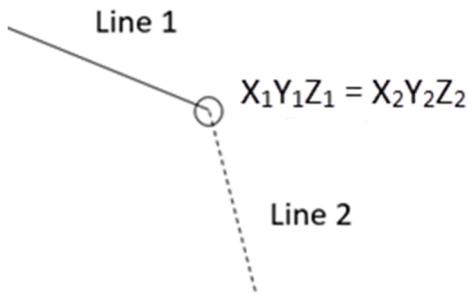


Figure 1. Collocated Vertices

- **Polylines Meet at Endpoints** – Polylines that join to represent one continuous string of linear features (e.g., a utility network) should have collocated vertices as endpoints.

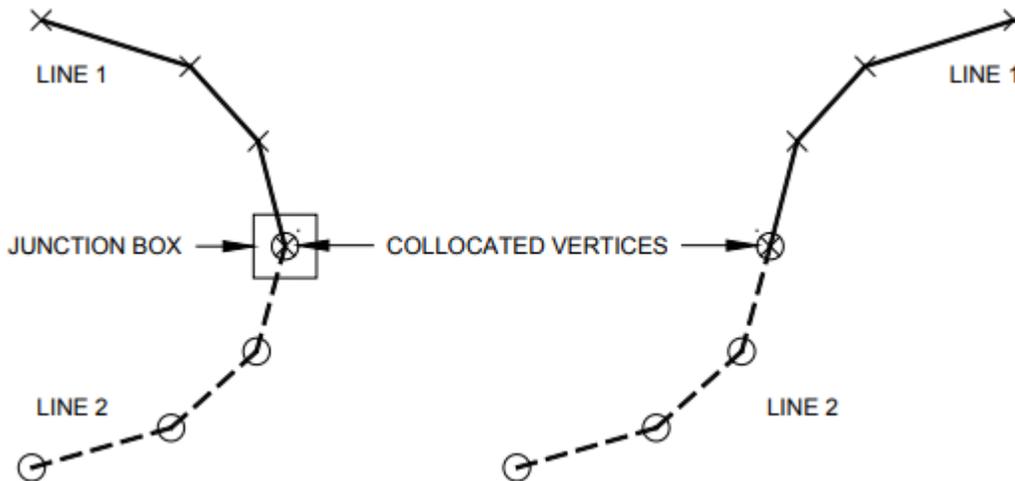


Figure 2. Lines Meeting at Endpoints

- **Sufficient Density of Vertices** – Lines and polygon edges should contain one or more segments with vertices placed at intervals, so the feature does not stray from the actual object it represents by more than half of the defined accuracy limit.

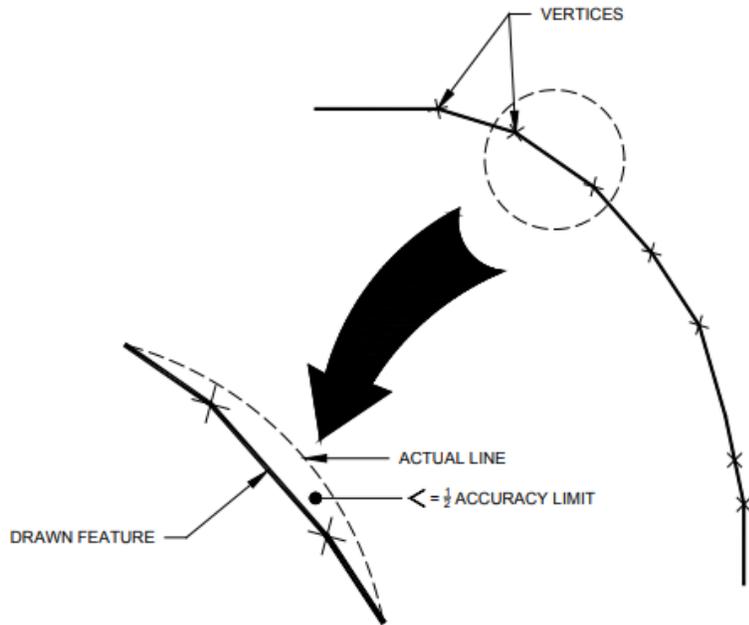


Figure 3. Density of Vertices

- **Shared Vertices between Adjacent Features** – Features that are intended to be adjacent to one another should share all collocated vertices along their common edge(s). This ensures that there are no unintentional gaps (empty space) or slivers (overlaps) between adjacent features.

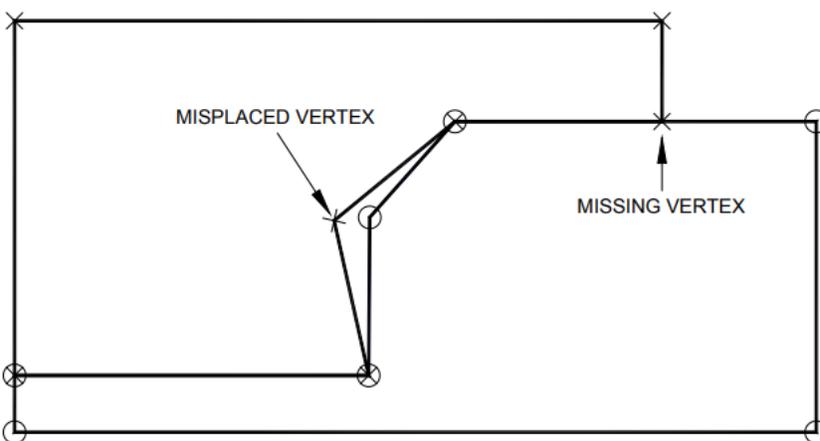


FIGURE 4. SHARED VERTICES

- **Polygons must be closed** – The endpoints of line segments that form a polygon must be collocated and closed in the CAD program.

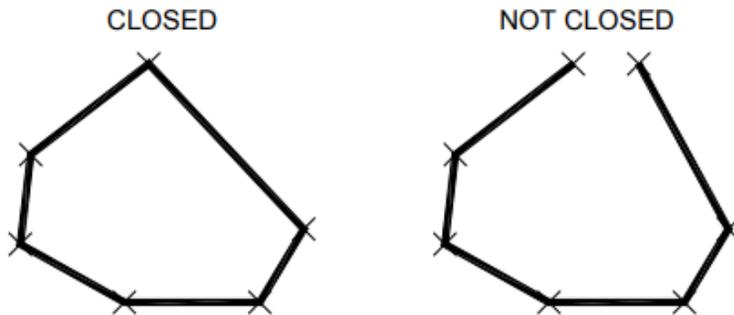


Figure 5. Closed Polygons

## 2.4 ACCURACY AND PRECISION

All newly collected objects that represent real-world objects shall be located within the specified tolerance from the real-world object they represent (i.e., absolute positional accuracy). The tolerances specified must be achieved at a 95-percent confidence level, meaning that, statistically, 95 percent or more of the objects will be at this accuracy level or better. Coordinate values shall be recorded to a precision (i.e., number of decimal places in the coordinate value) that is at least sufficient to represent the accuracy level specified.

## 2.5 OBJECT DATA

Object data is attribute data that is attached to objects in the CAD drawing and stored in tables in the drawing. Object data tables shall be connected to objects where attribute data and metadata are required.

In addition to the object data requirements defined in this document, Airports GIS (AGIS) projects must comply with the object data requirements of FAA AC 150/5300-18. Refer to this document for additional information.

## 2.6 OBJECT GRAPHICS

A template file (HCAACIVIL.dwt) has been developed for use by consultants and HCAA staff. This template file includes the appropriate layers, linetypes, and symbols/blocks for use with these standards. All objects in the CAD drawings shall use graphics that meet the requirements detailed in the following sections.

### 2.6.1 BLOCKS

Point features are represented by blocks. The insertion point of these blocks is at the location of the object represented by the feature. HCAA uses standard engineering symbols as blocks which are provided as part of the HCAACIVIL.dwt template file. If HCAA does not have a particular block, the consultant may use its symbol as the "block." However, the consultant must provide all symbols used to create the drawings to HCAA in AutoCAD format. An index, in electronic and hard copy format, shall also be provided, listing the block names and contents.

Blocks shall be created on layer 0 (zero), they should be close to coordinate 0,0 and no block may be nested. All block properties shall be By Layer.

## 2.6.2 LINETYPES

HCAA accepts both AutoCAD default and custom linetypes. HCAACIVIL.lin is available for download and contains custom linetypes. For installation of these custom linetypes, the proper .shx files must be installed. It is recommended that users place these .shx files within the user support directory so that they are properly referenced in the template files. Support directory paths may be different on each PC but should generally be similar to this: C:\Program Files\Autodesk\AutoCAD 2018\Support.

The use of AutoCAD default linetypes shall be in accordance with industry standards. These generally include center, continuous, dashed, hidden and phantom linetypes.

## 2.6.3 LINEWEIGHTS, LINEWORK AND PLOT STYLES

Lineweights shall be controlled via the layer manager and dimension style manager only.

Polylines shall only be used to control lineweights in the airport-provided title block sheets.

Printers and plotters are controlled by color table files (or CTB files). These files convert thicknesses and/or color in an electronic file to line thicknesses on a paper drawing.

By employing the standard HCAA pen table, the consultant can ensure that consistent drawings are produced from an electronic file regardless of the type of printer or plotter used. Required standard pen tables are provided below. Any modification to the CTB file shall be coordinated with HCAA CAD-BIM Manager.

TABLE 1. Required standard pen table

Color	In.	% Screen	Alternate Colors
1	0.010	100	11,21,31,41...241
2	0.014	100	12,22,32,42...242
3	0.020	100	13,23,33,43...243
4	0.028	100	14,24,34,44...244
5	0.039	100	15,25,35,45...245
6	0.055	100	16,26,36,46...246
7	0.007	100	17,27,37,47...247
8	0.004	100	18,28,38,48...248
9	0.014	30	19,29,39,49...249
10	0.020	30	20,30,40,50...250
251	By Object	50	N/A
252	By Object	20	N/A
253	By Object	10	N/A
254	By Object	5	N/A
255	By Object	0	N/A

**Note:** These colors are best viewed on a monitor with a black background.

## 2.6.4 TEXT STYLES

HCAA has selected Verdana as the default annotation font as this font is typically installed on most computers as a default Windows True Type font, and Arial for the default Border Sheet font for contrast.

Verdana was designed to be readable at small sizes. Additionally, the lack of serifs, large x-height, wide proportions, loose letter-spacing and emphasized distinctions between similarly shaped characters are chosen to increase legibility.

Contrasting text styles are used within a drawing to delineate types of information.

For HCAA deliverable CAD drawings, only the Verdana font shall be used. However, the Verdana font may be modified in size, color, or style (bold, italics, underline, outline, etc.) as needed by the consultant for additional emphasis or deemphasize. Only Verdana True Type Font available through a standard MS Windows program is permitted. No special Verdana font downloads are permitted as they will not be “universal” on every PC.

Final text height should be plotted at no less than 0.125 inches on full-size prints.

## 2.6.5 DIMENSIONS/MULTILEADERS

The dimension style has lineweights defined for dimension lines and extension lines at 0.006 inches. Extend beyond dimension lines and offset from origin lines are set at 0.0625 inches. Arrowheads are closed and filled at 0.125 inches in size. The text height for dimensions is 0.125 inches with text alignment set to horizontal. The format, structure, and content of the multileader style is similar to that of the dimension style. The dimension style and multileader style are provided in the HCAA DWTs.

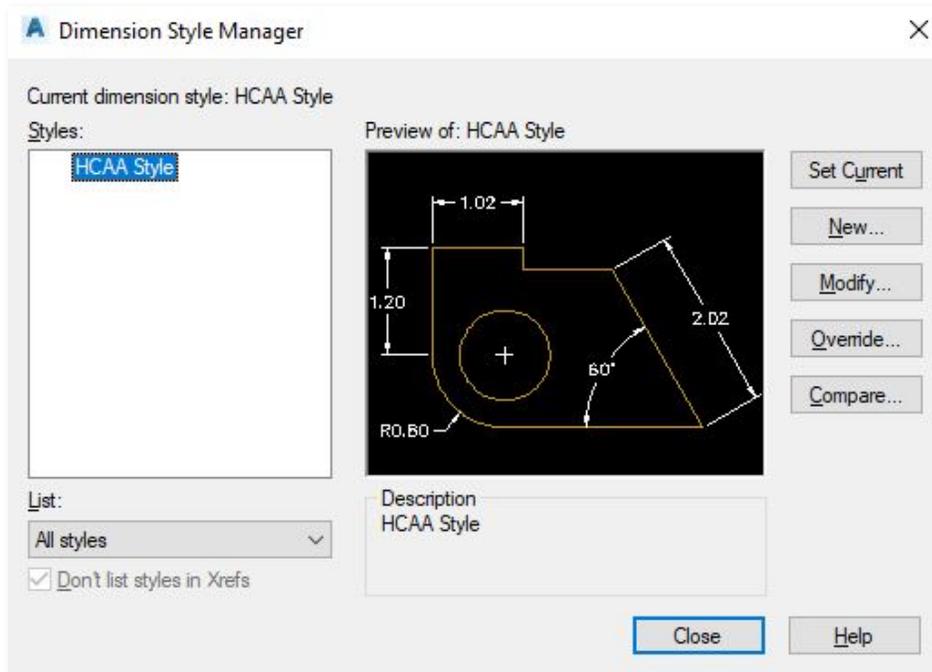


Figure 6. Dimensions Example

# 3. LAYERS

Objects shall be placed on a layer that corresponds to the type of real-world feature it represents. Objects that are used to provide supplemental information about features such as annotations, dimensions, leader lines, and revision clouds should be placed on separate layers designated for this purpose.

## 3.1 LAYER NAME FORMAT

The layer names for HCAA are organized as a hierarchy. Names consist of distinct subject fields separated by dashes (“-”) to distinguish between the distinct sections of the layer names. The HCAA CAD template files are loaded with layers meant to be applicable to the type of data to be included in a particular drawing, as defined by Discipline Designators. Related layers are grouped together in the various HCAA CAD template (e.g., HVAC, Civil, etc.).

The sections of a layer name are defined as:

- **Discipline Designator** (one mandatory character and a second optional character).
- **Major Group** (four-characters).
- Up to Four **Minor Groups** (four-characters each).
- An optional **Status** (A one-character code appended to the end of the layer name to indicate the status of the real-world feature the object represents).

Only the Discipline Designator and Major Group are mandatory fields. In general, it is recommended at least one Minor Group be utilized but it may not be required for general or generic features.

Additional Minor Groups are optional and used by HCAA when additional detail is needed to divide features on a drawing. Submitters may also use the additional Minor Groups to establish further distinctions between layers.

An example of this is a layer name such as A-WALL-FULL-EXTR for an architectural exterior full height wall versus A-WALL-FULL-INTR for an interior full height wall.

The layer name format shown below is used by HCAA for the level of detailed information desired.

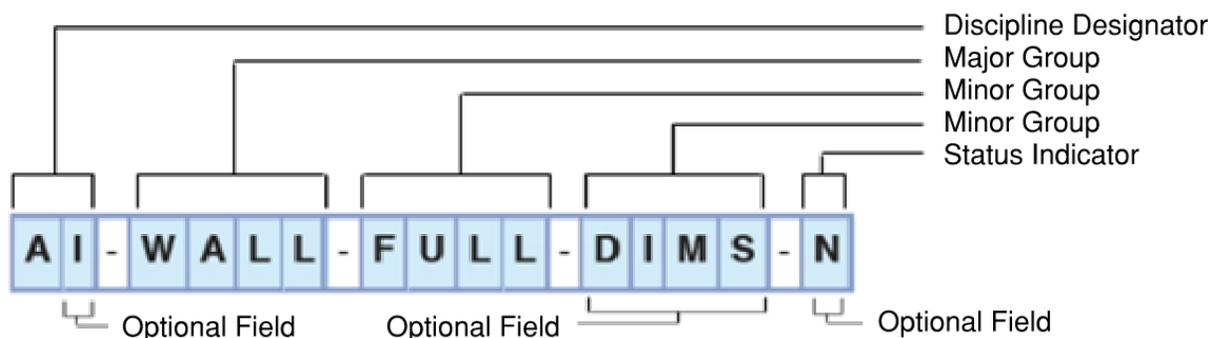


Figure 7. Layer Name Format

The full list of acceptable discipline codes is shown in Table 2:

TABLE 2 DISCIPLINE CODES

Discipline	Designator
Architectural	A
Geotechnical	B
Civil	C
Process	D
Electrical	E
Fire Protection	F
General	G
Hazardous Materials	H
Interiors	I
Landscape	L
Mechanical	M
Operations	O
Plumbing	P
Equipment	Q
Resource	R
Structural	S
Telecommunications	T
Utilities	U
Survey/Mapping	V
Distributed Energy	W
Other Disciplines	X
Contractor/Shop Drawings	Z

The full list of acceptable status codes is shown in Table 3:

TABLE 3 STATUS CODES

Code	Description
A	Abandoned
D	Demolished/Existing to be Demolished
E	Existing *
F	Future Work *
M	Item to be Moved *
N	New/As-built post design

P	Proposed/Design
T	Temporary Work *
S	Surveyed

\* These status codes indicate a status that is applicable to all HCAA drawings. Drawings that represent the as-built or recorded final condition at the end of a project should use a status code of “N” for a new as-built record.

## 3.2 LAYERS TO USE

Only layers contained in the HCAACIVIL.dwt template file – with the appropriate status code added – may be used in HCAA DWGs. The most appropriate layer for each object shall be selected from this list. Layers not included in the HCAACIVIL.dwt file should be added following the standards established in this document.

## 3.3 DIMENSIONS, TEXT, AND ANNOTATION LAYERS

Dimensions, annotations, and hatch patterns used in reference to specific drawing objects outside of the title block shall be placed on layer names with DIMS, ANNO and PATT designators appended before the status code of the layer on which the reference objects appear between dashes, based on the following rules:

- Dimensions are used to indicate distances, sizes, and measurements of or between objects. For example, dimensions related to specific bridges on a drawing should appear on the C-BRDG-DIMS layer.
- Annotations are used to provide additional details about specific objects. For example, the diameter of a storm pipe shall be placed on the C-STRM-PIPE-ANNO layer. Leader lines connecting an annotation with their corresponding objects shall appear on the same layer as the annotation itself. In some cases, such as with pavement markings, text is a physical feature or object that belongs on a specific layer and not on an ANNO layer. For example, runway numbers and letters that are painted on the pavement of a runway would appear on the C-RUNW-NUMB layer.
- Text is used to provide notes or general information that is not specific to objects. For example, general text items belong on C-MISC-TEXT. General text related to roads should be on C-ROAD-TEXT. It is the intent that all other text/annotations follow the ANNO layering reference above.
- Identification tags are utilized for unique identification numbers associated to objects. For example, a unique ID number on a storm sewer manhole would be placed on the U-STRM-MHOL-IDEN layer.
- Hatch patterns are used to fill an area with a color and/or pattern. For example, hatch patterns used to fill building footprints shall appear on C-BLDG-OTLN-PATT.

## 3.4 NON-PLOT LAYERS

Sometimes it is advantageous to include text and graphical references that are visible to the consultant but are not intended to be plotted when the drawing is plotted. To conveniently turn these layers off, a non-plot designator NPLT shall be appended to the end of the layer name to which the references apply.

## 4. PRACTICES AND PROCEDURES

Drawings are made up of objects placed onto appropriate layers within model space or paper space. This work must be done in a methodical and organized manner that yields clear, consistent, and legible results.

### 4.1 PROJECT DIRECTORY STRUCTURE

All HCAA CAD projects shall follow the directory structure as described in this section. The root folder shall include the following two folders underneath the main project folder which shall include both the project name and number:

- CAD – All CAD drawings shall be stored in this folder in subfolders, including externally referenced files. This folder shall also include any plot style files and any non-standard AutoCAD font files.
- Shortcuts – All automatically generated Civil 3D folders shall be placed under this subfolder and shall include:

Alignments  
PipeNetworks  
Profiles  
Surfaces  
ViewframeGroups

### 4.2 EXTERNALLY REFERENCED FILES

Basemaps and related drawings being developed by others shall be incorporated into as separate drawings for reference. These externally Referenced (XRef) drawings allow objects to be available for viewing and reference without the need to redundantly store a copy of these objects in the drawing itself. The insertion point for XRefs shall be 0,0 for two-dimensional drawings and 0,0,0 for three-dimensional drawings. The rotation angle shall be set to zero.

All external reference files shall be attached as “Overlays” and the path types shall be set to “Relative Path”. This ensures the proper exchange of drawings between consultants and HCAA.

XRef files should be appropriately and uniquely named and prefaced with an “X” for XRef.

### 4.3 EXTENT OF PROJECT AREA

At the start of a project, a drawing showing the extent of the project area shall be provided to HCAA. The project extent shall be a closed polyline stored on a layer called C-LOCN-OTLN-PROJ within the drawing.

### 4.4 FILE NAMING CONVENTION

The use of SSM (Sheet Set Manager) is recommended for managing the sheet sets of the project.

The drawings can use multiple layouts for each sheet and at the end of the project, every sheet should be saved as an individual digital file (alternatively LayoutsToDwgs.lsp can be used in order to convert each layout to an individual CAD file). For construction drawings, the name of the files should match those of the sheet numbers like those represented in the tables below:

TABLE 4 EXAMPLE FILE NAMES FOR CAD CONSTRUCTION DRAWINGS

	YEAR	PROJECT(s)	SHEET NAME	SHEET #	PHASE	REV.	EXTENSION
<b>CHARACTERS:</b>	<b>4</b>	<b>4-X</b>	<b>X</b>	<b>6</b>	<b>3</b>	<b>2</b>	<b>3</b>
<b>EXAMPLE:</b>	1988	1234	Floor Plan - Level 1	A101	REC	01	DWG
	<b>1988-1234-Floor Plan - Level 1-A101-REC-01.DWG</b>						
<b>EXAMPLE:</b>	1988	1234.5678	Floor Plan - Level 1	M1.2.2	REC	02	DWG
	<b>1988-1234.5678-Floor Plan - Level 1-M1.2.2-REC-02.DWG</b>						

TABLE 5 EXAMPLE FILE NAMES FOR PDF CONSTRUCTION DRAWINGS

	YEAR	PROJECT(s)	AIRPORT	PROJECT NAME	Discipline	Type	Volume	Extension
<b>CHARACTERS:</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>X</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>
<b>EXAMPLE:</b>	1988	1234	TPA	Fuel Pipeline Alignment	ARC	ASB	01	PDF
	<b>1988-1234-TPA-Fuel Pipeline Alignment-ARC-ASB-01.PDF</b>							
<b>EXAMPLE:</b>	1988	1234.5678	TPA	Fuel Pipeline Alignment	ARC	ASB	01	PDF
	<b>1988-1234.5678-Fuel Pipeline Alignment-ARC-ASB-01.PDF</b>							

Any variation of the sheet numbering shall be coordinated with HCAA's CAD-BIM Manager.

## 4.5 BORDER SHEETS

### 4.5.1 STANDARD SHEETS

Standardized versions of standard Cover sheets, Index sheets, and Borders with Title Blocks are included in the CAD Support Package and should be requested by the consultant at the beginning of work on each design project.

### 4.5.2 SHEET SIZES

Except as noted below, all CAD drawings for a project will be prepared on ANSI Size sheets in accordance with the ANSI sheet size shown in Table 6. Any suggested modification of the sheet size for a project shall be coordinated with the HCAA CAD-BIM Manager. The ANSI D sheet is recommended for large maps (for example, airport master plans and drawings for civil works projects). Other sheet sizes listed in in Table 6 may be used in certain circumstances if specified in writing by HCAA.

TABLE 6 ANSI, ARCHITECTURAL & ISO SHEET SIZE DEFINITIONS

SIZE	INCHES
ANSI A	8.5 x 11.0
ANSI B	11.0 x 17.0
ANSI C	17.0 x 22.0
ANSI D	22.0 x 34.0
ARCH A	9 x 12.0
ARCH B	12.0 x 18.0
ARCH C	18.0 x 24.0
ARCH D	24.0 x 36.0
ARCH E	36.0 x 48.0
ARCH E1	30.0 x 42.0

### 4.5.3 COVER AND INDEX SHEETS

Each set of drawings will include a cover sheet (Figure 9) and one or more index sheets (these may be combined for small drawing sets). The content and layout of the cover and index sheets is project specific. All text provided on the cover and index sheets must be of such size that it will be legible if the drawings are reduced to half size. The cover sheet will contain the project name, HCAA, FAA or FDOT project number, consultant project number, Project issue, date, revision, and date.

### 4.5.4 TYPICAL SHEET TITLE BLOCK

The standard HCAA plan sheet layout is a horizontal landscaped orientation with the various title blocks arranged along the right side of the sheet, in a vertical arrangement. The exact arrangement of the various title blocks differs slightly depending on the sheet size.

- A typical drawing layout is shown in Figure 8. Each title block includes the following data blocks:
- Designer Identification block
- Revision block
- Owner block
- Index and Notes block
- Sheet Identification block

# Tampa International Airport

## CONSTRUCTION PLANS FOR

**Project Name**

**HCAA PROJECT NUMBER**

**FAA PROJECT NUMBER**

**FDOT PROJECT NUMBER**

**CONSULTANT PROJECT NUMBER**



**Project Issue  
Date**

**Current Revision  
Date**

**HILLSBOROUGH COUNTY AVIATION AUTHORITY**

BOARD MEMBERS

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ROBERT I. WATKINS - VICE CHAIRMAN  
BRIG. GENERAL CHIP DIEHL - TREASURER  
HILLSBOROUGH COUNTY COMMISSIONER LESLEY "LES" MILLER, JR -  
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SECRETARY

JOSEPH W. LOPANO - CHIEF EXECUTIVE OFFICER

NOTE:  
DO NOT SCALE PRINTS  
REPRODUCTION MAY CAUSE DISTORTION

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 TEL: 813.274.2000 FAX: 813.274.2001  
 WWW.HILLSBOROUGHCOUNTYFLA.GOV

<b>CONSTRUCTION DATA</b> PRIME CONTRACTOR _____ WORK: COMMENCED _____ COMPLETED _____ COST: \$ _____ COST: \$ _____ FINAL _____ PROJECT ENGINEER/INSPECTORS _____ MAJOR SUBCONTRACTORS AND/OR SUPPLIERS _____ ALL CONTRACTS AND SUBCONTRACTS MUST BE REVIEWED AND APPROVED BY THE CONSULTANT AND THE CLIENT BEFORE ANY WORK IS PERFORMED. THIS IS A CONDITION OF THE CONTRACT AND THE CLIENT SHALL BE RESPONSIBLE FOR THE COST OF SUCH REVIEW. PROJECT ENGINEER _____ DATE _____		<b>FEDERAL AVIATION ADMINISTRATION</b> APPROVED _____ DATE _____ <b>FLORIDA DEPT. OF TRANSPORTATION</b> APPROVED _____ DATE _____	<b>HILLSBOROUGH COUNTY AVIATION AUTHORITY</b> TAMPA, FLORIDA APPROVED _____ DATE _____	<b>[CONSULTANT LOGO]</b> SUBMITTED _____ DATE _____ P. E. No. _____
--	--	--	--	---

FIGURE 8 TYPICAL COVER SHEET



#### 4.5.4.1 DESIGNER IDENTIFICATION BLOCK

The designer identification block (Figure 9. Designer Identification Block) will be consistent across the entire set, it contains the initials of who designed, drew, and checked the drawing files as well as the HCAA project number, consultant job number, date, and sheet number. The date shall reflect the agreed upon schedule date for each design submission.

DESIGNED:	RCC
DRAWN:	JHC
CHECKED:	MPL
HCAA NO.:	3510 08
JOB NO.:	JOB NO
DATE:	10/31/2021
<b>A101</b>	
SHEET NO.:	

Figure 10. Designer Identification Block

#### 4.5.4.2 REVISION BLOCK

The revision block (Figure 10.) contains a history of revisions, addenda, and/or clarifications to the sheet. The first entry should be placed on the upper row of the issue revision block and subsequent entries should be made below it.

REVISION			
No.	DATE	DESCRIPTION	BY
△1	05/20/2020	ADDENDUM 1	JHC

Figure 11. Revision Block

#### 4.5.4.3 PROJECT & SHEET INFORMATION BLOCK

The Project & Sheet Information Block (Figure 11. Sheet Identification Block) contains general information about the project and the sheet.

PROJECT NAME  <b>Long Term Parking Garage</b>
SHEET TITLE  <b>Partial Plan - Level 1</b>

Figure 12. Sheet Identification Block

#### 4.5.4.4 USE OF BLOCKS TO STORE ATTRIBUTES ABOUT THE SHEET

Consultants are permitted to establish AutoCAD blocks which contain attributes for the border sheet items described above. This provides an efficient way to change the graphical elements described above when the values of attributes such as sheet number and title change.

## 4.6 DRAWING SCALES

Typical drawing scales for English measurements are indicated in Table 8. Drawing Scales below.

TABLE 7. DRAWING SCALES

Drawing Type	Civil ( Decimal Units) Where 1 AutoCAD unit equals 1 decimal foot	Architectural (Inch) Where 1 AutoCAD unit equals 1 inch
Site plans	1" = 20'	1" = 20' - 0"
	1" = 30'	1" = 30' - 0"
	1" = 40'	1" = 40' - 0"
	1" = 50'	1" = 50' - 0"
	1" = 60'	1" = 60' - 0"
	1" = 100'	1" = 100' - 0"
	1" = 200'	1" = 200' - 0"
	1" = 400'	1" = 400' - 0"
	1" = 500'	1" = 500' - 0"
	1" = 1000'	1" = 1000' - 0"
	1" = 2000'	1" = 2000' - 0"
Floor plans	N/A	1/4" = 1' - 0"
	N/A	1/8" = 1' - 0"
	N/A	1/16" = 1' - 0"
Reflective ceiling plans	N/A	1/4" = 1' - 0"
	N/A	1/8" = 1' - 0"
	N/A	1/16" = 1' - 0"
Roof plans	N/A	1/16" = 1' - 0"
Exterior elevations	N/A	1/16" = 1' - 0"

Drawing Type	Civil ( Decimal Units) Where 1 AutoCAD unit equals 1 decimal foot	Architectural (Inch) Where 1 AutoCAD unit equals 1 inch
	N/A	1/8" = 1' - 0"
Interior elevations	N/A	1/8" = 1' - 0"
	N/A	1/4" = 1' - 0"
Cross sections	1" = 5'	1/8" = 1' - 0"
	1" = 10'	1/4" = 1' - 0"
	1" = 50'	1/16" = 1' - 0"
	1" = 100'	N/A
Wall sections	1/2" or 3/4" = 1' - 0"	1/2" or 3/4" = 1' - 0"
Stair details	1" or 1-1/2" = 1' - 0"	1" or 1-1/2" = 1' - 0"
Details	3" = 1' - 0"	3" = 1' - 0"

## 4.7 SENSITIVE SECURITY INFORMATION (SSI)

All parties who receive electronic or hard copy drawings pertaining to HCAA properties must comply with the following HCAA Regulation, as may be amended, or revised:

### § 1520.13 Marking SSI.

- a) Marking of paper records. In the case of paper records containing SSI, a covered person must mark the record by placing the protective marking conspicuously on the top, and the distribution limitation statement on the bottom, of:
  - 1) The outside of any front and back cover, including a binder cover or folder, if the document has a front and back cover.
  - 2) Any title page; and
  - 3) Each page of the document.
- b) Protective marking. The protective marking is: SENSITIVE SECURITY INFORMATION/FLORIDA INFRASTRUCTURE RECORD.
- c) Distribution limitation statement. The distribution limitation statement is:

WARNING: This record contains Sensitive Security Information that is controlled under 49 CFR parts 15 and 1520. No part of this record may be disclosed to persons without a "need to know", as defined in 49 CFR parts 15 and 1520, except with the written permission of the Administrator of the Transportation Security Administration or the Secretary of Transportation. Unauthorized release may result in civil penalty or other action. For U.S. government agencies, public disclosure is governed by 5 U.S.C. 552 and 49 CFR parts 15 and 1520.....INFRASTRUCTURE RECORD Section 149.433(A)(2), ORC

- d) Other types of records. In the case of non-paper records that contain SSI, including motion picture films, videotape recordings, audio recording, and electronic and magnetic records, a covered person must clearly and conspicuously mark the records with the protective marking and the distribution limitation statement such that the viewer or listener is reasonably likely to see or hear them when obtaining access to the contents of the record.

## 5. CAD QUALITY ASSURANCE/QUALITY CONTROL

Before consultants submit DWGs to HCAA and before consultant's staff share DWGs with other consultants, they are responsible for conducting Quality Assurance (QA) of the CAD data content on those drawings. QA shall be conducted by individuals who are familiar with the content and the requirements of this manual, but who did not directly work on the data in the drawing being checked. QA shall check the drawing(s) against all applicable requirements in this manual, including but not limited to:

- Objects have the correct geometry, adhere to topology rules, and are on correct layers.
- Proper title block is used with metadata fields filled in correctly and completely.
- Proper cover sheet is used with metadata fields filled in correctly and completely.
- Sheets are numbered correctly and provided in the correct order.
- Filenames are correct.
- External referenced (X-ref) files should be included and attached.

QA should also check to ensure that the CAD data in the drawing is comprehensive, accurate, and correct. It may not be feasible to check all objects on drawings. At a minimum, a statistically valid sample of objects to establish a 95 percent confidence level in the data shall be checked. Objects shall be sampled randomly but their location shall be distributed across the extent of the drawing's contents. Objects on numerous layers shall be selected. All properties of the selected objects (i.e., geometry type, topology, layer, symbology, and object data, if present) shall be checked. If any property is not correctly recorded, then the object shall be considered as unacceptable and shall be corrected. If a large number of unacceptable findings (e.g., on a specific layer or in a specific area) is evident then all content in the drawing shall be thoroughly checked and corrected before QA recommences.

## 6. DRAWING SUBMITTALS

HCAA requires the delivery of all submittals to the Records Management's office as well as a copy of all CAD files be sent to the HCAA CAD-BIM Manager. The consultant will coordinate with the CAD-BIM Manager the option to deliver the different CAD files using eTransmit for the submission of all drawing files.

The eTransmit feature collects all of a drawing's associated files such as font and XRef and incorporates them into a transmittal package. Figure 12 shows the settings which HCAA requires.

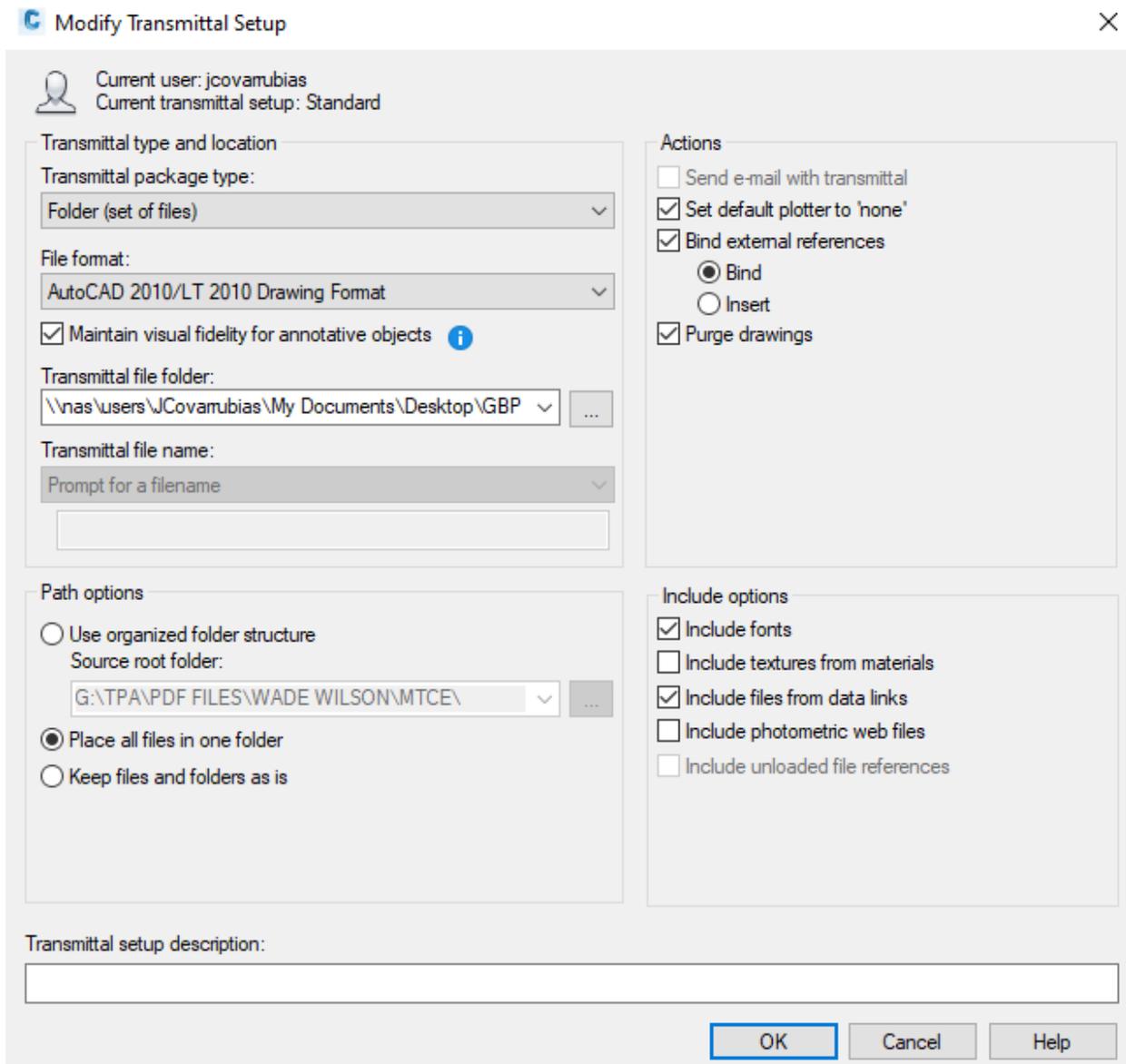


Figure 13. eTransmit Settings

# 7. APPENDIX A: PACS/SACS COORDINATES AND LOCATIONS

## 7.1 TPA - TAMPA INTERNATIONAL AIRPORT

Name	Northing	Easting	Elevation	Description
0011	1,322,561.25	481,746.04	8.43	PACS-DM4525
EGYPT A AZ MK	1,328,496.08	481,202.00	17.39	SACS-AG2101
AP 1966 STA F	1,319,653.55	480,915.35	7.71	SACS-AG2102



## 7.2 VDF - TAMPA EXECUTIVE AIRPORT

Name	Northing	Easting	Elevation	Description
VANDPORT	1,334,594.19	543,448.56	17.26	PACS-AL7875
VNC A	1,337,608.47	543,452.61	17.21	SACS-AA8124
VANDPORT AZ MK	1,336,748.98	543,461.79	16.57	SACS-AL7897



### 7.3 TPF - PETER O. KNIGHT AIRPORT

Name	Northing	Easting	Elevation	Description
KNIGHTPORT	1,322,561.25	481,746.04	8.43	PACS-AG9366
PETER	1,304,248.91	511,381.21	5.57	SACS-AG6019
KNIGHTPORT AZ MK	1,302,795.50	511,494.49	5.90	SACS-AG9377



## 7.4 PCM - PLANT CITY AIRPORT

Name	Northing	Easting	Elevation	Description
<b>PLANTPORT</b>	1,332,867.56	603,595.86	148.66	PACS-AL7873
<b>0018</b>	1,332,736.89	605,352.63	136.71	SACS-DM4084
<b>PLANTPORT AZ MK</b>	1,333,008.13	601,780.05	150.78	SACS-AL7892



## 8. REVISION HISTORY AND CHANGE CONTROL

TABLE 8. REVISION HISTORY

Version	Date Published	Summary of Changes
1	August 2020	Initial version
2	January 2021	Updates from HCAA review
3	October 2021	Updates from HCAA review

### 8.1 CHANGE CONTROL

HCAA understands and anticipates that the CAD Standards Manual will be updated periodically. Consultants and HCAA staff may submit requests for changes to this document. These changes may be clarifications, additions, or deletions. Requests to add layers shall follow the layer naming conventions specified in the latest version of the United States National CAD Standard (NCS). Any proposed changes will not be implemented until approved by HCAA. The CAD Standards that are in place at the start of a project are what the consultant will be held responsible for adhering to. If a modification to the CAD Standards takes place during the development of a drawing and said change can be applied with minimal effort, then the drawing should reflect the modification to the CAD Standards. As requests to modify Standards arise, a change control form shall be completed and submitted to [CADManager@TampaAirport.com](mailto:CADManager@TampaAirport.com).

Using a defined process to consider all requests and a standard request form will provide a consistent means to evaluate change requests. This process will also allow HCAA to accumulate information on both adopted and rejected changes to aid long-term standards maintenance.

Adopted changes shall be appended to this document in both electronic and optionally a hardcopy form to record the document evolution and change history. Rejected change requests shall be archived to accumulate a complete change request history to help consistently evaluate future requests and assist in consistent reasoning for rejections.

#### 8.1.1 CHANGE CONTROL PROCESS

1. Receive formal requests to for a modification to the HCAA CAD Standards and provide to the CAD-BIM Manager for review.
2. If the Change Request is approved, insert the approved Change Control Form in the Appendix to this electronic document for future reference.
3. Save previous version with publication date of approved document.
4. Revise this document to include the requested change and update the revision history table.
5. Archive all rejected change requests.
6. It is the consultant's responsibility to ensure the most current version of the HCAA CAD Standards is being used for the drawings at the start of a contract.

## 8.1.2 CHANGE CONTROL REQUEST FORM

HCAA CAD Change Control / Waiver Request Form	
<b>Date Submitted:</b>	
<b>Proposed By: Name, Title, Company</b>	
<b>Contact: Phone No. &amp; Email</b>	
<b>Project Name &amp; No.:</b>	
<b>Requested Revision or Waiver Request &amp; Applicable Section No.:</b>	
<b>Impact on Budget if not approved:</b>	
<b>Impact on Schedule if not approved:</b>	
<i>Signing this document confirms both the Proposer and CAD-BIM Manager have agreed on the changed standards as described in this form.</i>	
<b>Proposer:</b>	
<b>Signature</b>	<b>Date</b>
<b>HCAA CAD-BIM Manager:</b>	
<b>Signature</b>	<b>Date</b>
<b>Final Resolution: Approved as requested or as described here</b>	