



ELECTRONIC DOCUMENT AND PLAN SUBMISSION REQUIREMENTS

**University Planning, Design and Construction
Established: May 2015**

Revision #4 | December 2021

Appendix II: Electronic Document and Plan Submission Requirements

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Appendix II: Electronic Document and Plan Submission Requirements

1 Introduction

The purpose of this document is to serve as a tight specification for producing and delivering CAD drawings, image files, and geodatabases that document as-built conditions for all University construction projects. This guideline is intended to ensure consistency of materials and to maximize both short and long-term usability of the construction documentation.

Design Document Standards and Plan Submission Requirements document is intended to ensure that work produced for and submitted to the University is consistent in its ability to easily integrate into our existing file structure and database that is maintained by the University's Planning, Design and Construction department. Adherence to these and other University standards is required.

These Design Standards shall not be deviated from without explicit review and approval from the University Representative in conjunction with the University Planner and Chief Architect. However, should the Designer believe deviating from any single Design Standards would provide a better quality and performance product; such suggested deviation shall be proposed in writing and presented to the University Representative in conjunction with the UPDC Director overseeing the project. Authorization to deviate from what is represented shall be made with the inclusion of QAQC and the department who has ownership of the standard.

2 AutoCAD

To ensure consistency in the updating, use, and archiving of AutoCAD® files for our campuses; a standardized system has been implemented to ensure that drawings will be identified with relevant file numbers during the initial phases of each project.

The University works from the most current version of AutoCAD®, therefore any electronic document submissions shall be no less than three years behind the most current version of AutoCAD® that exists at the time a new assignment is issued. The University has established a template of dwg. files to be used by all Designers and it is posted on the University's UPDC website under Contractors and Consultants <https://updc.uconn.edu/contractors-working-at-uconn/>. The template of dwg. files are already preset with the Line types and weights, standard symbols and arrows, text appearance and sizes, and standardized units and measurement scales, which follow the AIA guidelines for AutoCAD® files. All other nuances that the University requires are provided below.

2.1 File Format

The University has an established Title Block and Cover Sheet template which includes all the layering requirements. No other file format shall be used. All information identified to be provided within the title block shall be filled in completely and in the proper location.

Electronic File Format

As-built construction project drawings must be submitted to the University in full compliance with the most recent or prior version of AutoCAD® software at the time of submission (file extension = .DWG).

Scale, Unit and Tolerances

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All CAD drawing models should be drafted at full scale in architectural units, such that one drawing unit equals one inch.

Fonts and Text Styles

Verify that the text setting in the CAD/BIM software used to produce drawings are using TrueType fonts. Make changes to the existing format settings to ensure that you are selecting a font that is TrueType. Do not use Vector, SHX, RSC or Optical Character Recognition font formats.

Special fonts which are not packaged with AutoCAD® are not allowed and only those that are TrueType shall be used. Dimensions, labels and notes, should be not less than 1/8" height on printed drawings. Acceptable Font type shall be TrueType Arial, Arial Narrow, Courier New or Tahoma.

Drawing Text

When with design documents are saved as a PDF, the documents must be searchable and selectable. All notes, callouts, labels, etc. including coversheet and title block text etc shall be embedded as searchable font.

Blocks

All entities within a block must be created on layer 0. Drawing entities translated into blocks from non-AutoCAD® systems must revert to layer 0 when exploded. Any file translation from other systems which result in wall blocks within the .DWG file are unacceptable. North arrow to be included.

Image Files

All images (*JPGs, BMPs, and PNGs*) included in a CAD drawing must be cut and pasted into the drawing so that they are embedded within the CAD file. Referenced images will be discarded and therefore might cause incomplete drawings.

XRef's must be inserted into sheet files as an attachment using the Relative Path as the Path Type. By setting the XRef's to Relative Path, drawings can be moved as needed and still maintain their links, eliminating any further maintenance to re-link the XRef's. The Absolute Path method of attaching XRef's will not be permitted. XRef's must be inserted using a 0,0-reference point.

XRef's can also be bound and packaged. Binding an XRef's to a drawing makes the XRef's a permanent part of the design drawing. Keeping all files together as a package allows functionality in any situation. This method shall apply to all submissions that do not use relative paths.

The University's Standard Border shall be used. The text/attributes shall be inserted into each sheet as an independent element. The text block shall not be altered (exploded, rearranged, etc.) in any way. Refer to the following weblink to obtain the University's CAD templates:
<https://updc.uconn.edu/contractors-working-at-uconn/>

Model Space and Paper Space

Model Space - Floor plans, elevations, sections, relevant dimensions and other drawings shall be in model space only.

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Paper Space - Each CAD file shall be set up to contain only one title block in paper space which references the building model(s) contained in model space. Tabs may not be created to accommodate multiple sheets.

Any update revisions to the design that are reflected on the .dwgs submitted to the University for review must reflect the date revision, the author of the revisions and the revision bubbled on the drawing to clearly reflect what has been changed from the previous submission review.

2.2 Layering

Layer Naming and Attributes (colors, line type, pens)

The University requires that the Designer adhere to the AIA CAD Layer Guidelines found in the United States National CAD Standards for all Layering, including names and attributes. In addition to the National CAD Layer Standards, the University has additional layer requirements, they are identified below.

LAYER NAME	DESCRIPTION	COLOR	LINE TYPE
<u>ARCHITECTURAL PLAN</u>			
A-ANNO-TEXT	General Text	4-cyan	continuous
A-ANNO-REDL	Redlines	1-red	continuous
A-ANNO-SYMB	Symbols	4-cyan	continuous
A-ANNO-KEGN	Legends and schedules	4-cyan	continuous
A-ANNO-DIMS	Dimensions	4-cyan	continuous
A-ANNO-TTLB	Border and Title Block	7-white	continuous
A-ANNO-NOTE	Job Notes	4-cyan	continuous
A-ANNO-NPLT	Construction lines, non-plotting information	7-white	continuous
A-ANNO-KEYN	Key notes	4-cyan	continuous

Space Allocation Plan

SP-AREA	Area polylines for all interior spaces	252	continuous
SP-CASE	Fixed Casework	11	continuous
SP-CASEHIDE	Fixed Casework - Overhead	11	hidden4
SP-COLUMN	Columns	40	continuous
SP-COL GRID	Column grids, bubbles and nomenclature	8	center
SP-DOOR	Doors (including frames)	blue	continuous
SP-ELEVATOR	Elevator cab	112	continuous
SP-EQUIP	Fixed Equipment (AHU's, transformers, etc.)	13	continuous
SP-FIXT	Plumbing Fixtures (excluding piping)	35	continuous
SP-FLOOR	Change in floor elevation (ramps, pits, etc.)	27	continuous
SP-FLORIDEN	Floor Room Identity	80	continuous
SP-FURN	Movable furniture (panels, desks, etc.)	52	continuous
SP-GROSS	Area polyline for entire building (gross SF)	30	continuous
SP-GUARDRAIL	Handrails, guardrails, etc.	150	continuous
SP-HATCH	Hatching/Poche	varies	continuous

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SP-LOUVER	Louvers	white	continuous
SP-NOPLOT	No-plot layer	magenta	continuous
SP-OH	Overhead info (beams, balconies, headers, etc.)	white	hidden4
SP-PRINT_TEXT	Building name, # and floor number	250	continuous
SP-ROOF	Roof edge, crickets, parapets, etc.	252	continuous
SP-SITE	Site information (walks, curbs, drives, etc.)	65	continuous
SP-STAIR	Stairs	red	continuous
SP-TEXT	Text	72	continuous
SP-WALL	Walls	white	continuous
SP-WALLHALF	Walls - half height	42	continuous
SP-WINDOW	Windows (including frames)	magenta	continuous
SP-PARTITION	Bathroom and Furniture Partitions	225	continuous
All layers by line weight: default. All layer's "true" status for plot mode except SP-NOPLOT			

2.3 CAD File Translation

Error-free CAD Drawing Deliverables:

Design firms may not have the same version of AutoCAD® currently used by the University. However, it is required that the Designer submit all DWG formatted CAD files upon project closeout. CAD files shall be fully compliant with the standards outlined herein and shall have no significant loss of drawing entities or project data that can result from standard AutoCAD® file translation procedures.

The University requires DWG CAD files that can be manipulated using standard AutoCAD® drafting procedures. Non-compliance will result in the rejection of CAD files submitted and will result in delayed final payment to the Designer. DXF files are not an acceptable substitution for DWG CAD file deliverables.

Translation Testing Recommended:

For firms translating their native CAD, VT, SHP or other file formats into the University AutoCAD® format, the Designer shall verify they are delivering error-free CAD files. Thorough file translation testing is recommended before the drawing development phase of the project. Early detection of possible file conversion problems will allow for corrective measures before project closeout.

2.4 Drawing Organization and Maintenance

Orientate site plans and floor plans in the same direction with the north arrow pointed to the top of the page. See standard block for north arrow.

XRef's shall be bind with all drawing entities that pertain to each drawing on their proper layer (etc.). All title sheets shall be in paper space and all dimensions shall be in model space. If the drawing cannot be bind, all attachments should be provided in the same folder.

Drawing file names must be consistent with the name that appears in the title block. Easily read and free of stray elements. Random filenames are not acceptable. The file name must describe the drawing being submitted and relate to the drawing title. Abbreviations must be clear and easy to understand. Tiff & PDF files should be named in a similar format.

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Drawing Number:

The University maintains a list of all buildings owned or occupied by the University. The buildings are named, numbered and the gross square footage and net square footage of all areas are tracked. The Designer shall confirm the building number with the University's Planning Department and this number shall be on all drawings in the title box (along with the project name and number as provided by the University Representative). The drawings shall be identified by their discipline as the first number as follows:

"A" for Architectural	"FP" for Fire Protection	LS for Life Safety or Code
"AV" for Audiovisual	"FFE" for Fixtures, Furniture, Equipment	"M" for Mechanical
"C" for Civil Work	"G" for General & Code	"P" for Plumbing
"D" for Demolition	"H" for HVAC	"S" for Structural
"E" for Electrical	"I" for Interior	:SC" for Security Systems
"FA" for Fire Alarm	"L" for Landscape	"T" for Telecommunications

After the first letter, the drawings thereafter should use a hyphen and then up to a three character system starting with "1" (Example: A-1).

Details: The Designer is responsible for ensuring that all details are properly identified and keyed, and that all key details are completely and correctly labeled and coordinated. Such coordinated keying shall be required no later than 50% Design Development review phase.

Table of Contents:

The Designer shall list each page of the drawing set on the table of contents, what work is reflected on the page, the page identifier number along with the latest revision date prior to bidding. Each listed page will be hyperlinked to that exact page within the electronic file of record document set.

Space Allocation Plans:

Within each building, the University documents each space, room or area by assigning a specific numbering system, naming convention, FICM identifier and obtaining the square footage. The Designer is therefore required to utilize the University's space identification system for all design documents and produce a single polyline drawing that defines and identifies the areas and spaces by both the unique identifier with the net area (in square feet) as well as the gross area of the building through the SP layering requirements. The single continuous closed polyline shall utilize the inside face of all rooms and spaces to calculate the net square footage, which shall be provided below each space identifier on the space plans. The additional drawings to be used by the University for documenting the space plans shall be identified as SP-XXX as represented in the additional layering requirements.

In the case of a renovation or addition to an existing building, the existing numbering system shall be only at the direction of the University Planning Department, abandoned in order to use the following standards.

All floors, rooms, closets, corridors, stairwells, elevators, shafts or other spaces as identified below shall have an identifier number for that space. Net square footage shall be calculated by polyline and auto

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populate with the identifier name and number. The Main Entrance shall be labeled as the first floor and any secondary public entrances that are below the first floor shall be labeled as the Ground floor. The University uses an identifier and two digits, for identifying space in a building (assuming no more than 9 floors above grade). The first identifier in the space identification is the floor of the building and shall be labeled as follows:

- SB – Sub-Basement**
- B – Basement**
- G – Ground Floor** (only utilized if entries exist on two levels)
- 1 - First Floor**
- MZ – Mezzanine** (only utilized for a partial floor at a low/high story)
- 2 – 9 Second Floor** (2 and each floor above, numbered sequentially)
- PH – Penthouse** (Utilized when the floor area is less than 30% of a typical building floor and two-thirds of the area houses mechanical equipment)
- AT – Attic** (Utilized when the floor area is greater than 30% of a typical building floor and the area houses only unoccupied space)
- RF– Roof**

The Designer is responsible to ensure that coordination is performed when identifying how the numbering of the elevator buttons are submitted for approval.

Interior Space Identification:

For most spaces, and except as noted herein, the Designer shall utilize the floor number and two digits (examples: B01 and 101). The Designer shall number the First Floor or largest floor plate first, starting at the main entrance to the building, and working in a clockwise direction using sequential numbers starting with 01. Typically, the rooms shall be numbered in a zig-zag configuration such that sequential numbers end up on opposite sides of the corridor (odds on one side and evens on the other). When the end of the building is reached, the numbering shall then continue starting at the main entrance and working in a counter-clockwise direction. Once the space identification for the first floor or largest floor plate is completed, the upper and lower floors shall utilize the same system, however where possible, shall have room identifications and numbering stacked such that rooms above or below other rooms in the same column in the building have similar identifiers (example: 318 should be above 218 if possible).

For specific types of space, the University would prefer to utilize a special space-type identifier as opposed to the floor identifier as the first character. In these specific cases, in lieu of the floor identifier, utilize the letters below as the first part of the space identifier. The second part of the identifier shall be the floor number. The third part in the identifier shall also be a letter, starting with "A" and following the clockwise and counter-clockwise convention from the main entrance above, through the alphabet.

The special space-type identifiers, and an example of the full identification for each, are as follows:

- | | |
|----------------------|---|
| L - Lobby | L1A is the main lobby on the first floor |
| LG- Lounge | LG1C Third Lounge on the first floor |
| V - Vestibule | V1B is the second vestibule on the first floor |
| C - Corridors | C2B is the second corridor from the Lobby on the second floor |
| S - Stair | S3C is the third stairwell on the third floor |
| E - Elevator | E0A is the first elevator on the basement level |

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RR - Restroom	RR4C is the third restroom on the fourth floor
CC - Concourse	CC1A is the first concourse on the first floor (A Concourse is a large open space for accommodating a gathering or passage of crowds)

Special Conditions:

For these special conditions, the Designer should follow these rules:

- In ALL Houses, in lieu of using “C” for corridors, the Designer should utilize “H” for hallway.
- In ALL residential Houses, use “CL” for closets.
- In office areas that are subdivided using cubicles, the Designer should label all cubicles with the main room number and “CU” and shall sequentially number same (example: 101CU-1, 101CU-2, etc.).
- If the building has a space or floor that is not full height and is below grade, the Designer should not use B or SB, but should use the label “CS” as the identifier of crawl space
- If a room is accessible through a door, hatchway or access panel, but its only purpose is to house ductwork or serve as a plenum, then the Designer should use the label “SH” as an identifier for a shaft.

Multiple Rooms within a Space:

Typically, each room will be identified with the next sequential number or value in a series. However, the exception is when a room is part of a larger space that serves one purpose. In these cases, rather than use the next sequential number or value, a letter shall be added to the overall space identifier, starting with “A” and continuing through the alphabet. An example is a residential apartment, where the living room, kitchen and bathroom are all identified as 201, the bedroom(s) as 201A and 201B since they are all subcomponents of the same space.

Suites – Suites are spaces that generally have one entrance with one primary room and one to many sub-rooms within. The entrance room to a suite area gets a typical room number while sub-rooms within the suite are numbered beginning with the main suite room number followed by a letter moving in a clock-wise direction.

Outdoor Areas:

Generally, outdoor spaces do not need to be labeled with a space identifier. The exception is if the outdoor space is to be utilized as programmed space by the University. In those cases, the outdoor space shall be labeled with one of the following identifiers, and shall be included on drawing X-XXX:

PL - Plaza	A Plaza is an open outdoor area near or adjacent to a building, such as a public square or seating area.
CY - Courtyard	A Courtyard is an unroofed area that is completely or mostly enclosed by the walls of a building.
T - Terrace	A Terrace is an open, with multiple relatively-level paved or planted platforms.
BA - Balcony	A Balcony is an exterior space, normally on an upper floor of a building that has only one point of entry and exit from the interior.

Door Identification:

Doors should be numbered with the same system which reflects the room number to which the door allows access. For example, the door to room 104 should be labeled “104A”, continuing sequentially

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clockwise if there are multiple doors in the space and starting at the main entry to the space. Closet doors should be included in the sequence and should not have a different system for labels.

2.5 Design Documents Submission Requirements by Phase:

It is understood that no review and approval by the University of any design or design documents submitted by the Designer at any phase or stage will relieve the Designer of their responsibility to design the Project in accordance with the approved program and budget. Any design or design documents will be in full compliance with the University's Design Standards and Performance Guidelines, Connecticut Building and Fire Safety Codes, all applicable laws, statutes, regulations and ordinances or of any responsibility of the Designer arising out of the University's reliance on the Designer's professional skill and ability to discharge the services required.

When updating a drawing, the change block area of the .dwg (above the title block) must indicate the reason for the issue. i.e. "Issued for Bids," – Issued for Construction" etc. Include number sequence and date of each issued revision. The Designer must note the revision date in the block area for all drawings revised from the previous review, prior to distribution for the next review.

When submitting documents on a flashdrive or CD – ROM, label the CD with the following information:

- Project Name and Project Number
- Building Number
- The Designer's Firm name and those of their sub-consultants
- Identify what Submission Phase is on the CD and the Submission Date
- Include the independent cost estimate relating to the submission phase

Documents required for review at each interval of a Design Phase (when applicable to a Project)	PDS	SD	DD 50 & 100%	CD 50, 90 & 100%
Title Sheet		X	X	X
Construction Site Logistics Plan			X	X
Site Plan		X	X	X
Utility Plan		X	X	X
Landscape Plans		X	X	X
Civil Plans		X	X	X
Preliminary Framing Plans		X		
Structural Plans		X	X	X
Architectural Floor Plans		X	X	X
Interior Elevations			X	X
Exterior Elevations		X	X	X
Building Sections		X	X	X
Reflected Ceiling Plans			X	X
Enlarged Plans			X	X
Wall Sections			X	X
Details and Schedules			X	X
HVAC Load Calculations		X	X	X

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Mechanical Plans		X	X	X
Mechanical Schedules			X	X
Mechanical Riser Diagrams			X	X
Mechanical Flow Diagrams			X	X
Mechanical Details and Schedules			X	X
Controls Points Schedule			X	X
Controls Location Plan			X	X
Electrical Riser Diagram		X	X	X
Electrical Power Plan		X	X	X
Electrical Lighting Plan			X	X
Electrical One-Line Diagrams		X	X	X
Electrical Details and Schedules			X	X
Electrical Load Calculations		X	X	X
Security Systems Plans		X	X	X
Photometric Plan			X	X
Fire Protection Plans		X	X	X
Fire Protection Riser Diagrams		X	X	X
Fire Protection Details and Schedules			X	X
Hazardous Materials Abatement Plan		X	X	X
Plumbing Plans		X	X	X
Plumbing Details and Schedules			X	X
Plumbing Riser Diagrams		X	X	X
Roof Plans			50%	X
Roof Details and Schedules			50%	X
Special Systems Plans, Details and Schedules			X	X
Telecommunications Plans/Riser		X	X	X
Furniture Layout Plans			X	X
Space Allocation Plans and Space Program			50%	50%
Other Documents required for review				
Meeting Minutes	X	X	X	X
Outline Specifications (System Format)		X		
Outline Specifications (CSI Master Format 2004 or latest edition numbers and titles, with the exception of Division One)			X	X
Outline Division One Specifications based on formulating project specific requirements from the University's Division One standard specification.			X	X
Project Manual			X	X
Construction Cost Estimate*		X	X	50% 90%
Value Engineering Analysis			X	50%

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Sustainable / LEED Design		X	X	X
Code Review/Analysis		X	X	X
Life Cycle Cost Analysis			X	X
Block Heating and Cooling Loads			X	X
Area Efficiency Calculations		X	X	X
List of Proprietary, Non-University Standard Items, or when deviation from what is represented in the University Design Standards.			X	X
Sequence of Operation			X	X
Study Report and Basis of Program	X			
Perspective Sketches/Study Models (if required)	X	X		
Presentation Renderings	X	X		
Presentation Models	X	X		
Project Schedule with Construction Phasing		X	X	X
Stormwater Management Plan (if applicable)			X	X
Soil Erosion and Sedimentation Control Plan (if applicable)			X	X
Permit Applications (if applicable)			X	X
Vehicle and Pedestrian Traffic Control Plan (if applicable)		X		

* LEED costs to be tracked separately

Progress and Phasing Submission Requirements:

Below are the general submission requirements. Unless otherwise noted in your award assignment as not being required, the following requirements shall be followed, and documents are to be submitted to the University Representative in the following manner:

- **Pre-Design (PDS):** An electronic searchable selectable PDF of the Report, photographs of the models and a submission of the models themselves; where Conceptual Design is applicable, include three (3) sets of professionally mounted presentation boards are required;
- **Schematic Design (“SD”) Review Phase:** An electronic searchable selectable PDF of the plans and specifications;
- **Design Development (“DD”) 50% Review Phase:** An electronic searchable selectable PDF of the plans and specifications, including a separate electronic set of Space Allocation Plans with room labeling, room numbering and room square footage tags and a detailed independent cost estimate.

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The Space Allocation Plans and Space Program shall be submitted for review and comment to the University Representative who will be responsible to send the documents to space@uconn.edu to ensure that the documents were submitted to the department. For large complex projects we will also require two (2) hard copy sets of full-size drawings and specifications;

- **Design Development (“DD”) 100% Review Phase:** An electronic searchable selectable PDF of the plans and specifications, and an updated detailed independent cost estimate. For large complex projects we will also require two (2) hard copy sets of full-size drawings and specifications (including Division One);
- **Construction Documents (“CD”) 50% Review Phase:** An electronic searchable selectable PDF of the plans and specifications, including a separate electronic set of Space Allocation Plans with room labeling, room numbering and room square footage tags and a detailed independent cost estimate.

The Space Allocation Plans and Space Program shall be submitted for review and comment to the University Representative who will be responsible to send the documents to space@uconn.edu to ensure that the documents were submitted to the department. For large complex projects we will also require one (1) hard copy set of full-size drawings and specifications;

- **Construction Documents (“CD”) 90% Application Review Phase:** An electronic searchable PDF (ADOBE PRO) of the plans and specifications, updated detailed independent cost estimate, two (2) sets of half-size drawings, two (2) set of full-size drawings and specification sets;
- **Construction Documents (“CD”) 100% Permit Review Phase:** Two electronic file formats (AutoCAD 2013 and a searchable selectable PDF) of the plans and specifications electronically signed and sealed by the Designer; an updated detailed independent cost estimate, two (2) set of half-size drawings and two (2) sets of full-size drawings and specification sets signed and sealed by the Designers. Electronic signatures and stamp seals are acceptable. Permit document sets that do not contain signatures and seals shall be returned without review;
- **Bidding/Proposal Phase:** Should the 100% CD Permit Review Set get returned for corrections, repeat the above submission requirement. An electronic searchable selectable PDF of the Addenda’s must be issued electronically and must be organized to accommodate any necessary printing. Include appropriate stamps and signatures for any calculations or sketches within the addenda package. Documents that do not reflect required stamps and signatures shall be returned for resubmission;

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In addition, at the conclusion of the bidding process, provide a **Conformance Set** reconciling all bid clarifications to the Bid/Permit documents and incorporate any physical layout changes. One complete paper Conformance Set shall be issued to the Contractor to be used as the Field Set for redlined changes. One electronic set of conformed Space Allocation Plans and updated Space Program shall be submitted to the University Representative who is responsible to send the documents to space@uconn.edu where the information will be incorporated into the Space Management database.

- **Construction Administration Phase:** Upon request from the Contractor, the Designer shall release at no additional cost to the University, Contractor or Subcontractor, appropriate design documents for use by the Contractor and/or subcontractors to assist with documenting red-lined as-built, formulation of shop drawings and coordination sets. Such documents must be complete and inclusive of any XRef's, *JPGs, BMPs, or PNGs imported into the documents for use*. Condition of the files being sent to the Contractor and/or subcontractor shall meet all University requirements.
- **Closeout Phase:**
 - Record Documents:** The Designer shall provide as part of their base services, an electronic searchable selectable PDF of all record drawings and noted changes to the project specifications and in the most recent version of AutoCAD and/or Revit/BIM Model software. Designer must formally submit as part of their closeout requirements, a flash drive of the electronic documents to the University Representative for review and acceptance. Final billing from the Designer shall not be processed prior to receipt of acceptance of all required closeout documents from the University Representative. Submit Space Allocation drawings separate from the contract document set.

The Record Set shall be produced by the Designer and shall incorporate all changes to the contract documents during the period of construction administration and field changes identified on the redline as-built drawings. Designer shall obtain the updated building relined drawings and final GIS mapping surveys received from the Contractor and incorporate those changes into the record set. Such as-built set shall be reviewed by the Designer to confirm conformance with the design.

The Designer shall not charge the Contractor for incorporating the redline documentation into the electronic Record Set files. Should information received from the redline documents be in conflict with what was required by the Contractor's contract and/or the Construction documents, the Designer is responsible for bringing such conflict or discrepancy to the Contractor and University Representative's attention for collective resolution.

Operations and Maintenance (O&M) Manuals: The Designer is responsible for reviewing the draft submission of the O&M manuals received from the Contractor and providing comments back to the Contractor for corrections. Designer is responsible for reviewing the initial set of manuals and one corrected submission document as part of their basic services.

Designer is responsible for submitting to the University Representative the final accepted O&M manuals with the redline set / as-built set and the final Record document set.

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2.6 Preparation and Submission of Space Allocation Plans:

In addition to the drawings and specifications making up the Construction Documents, the University requires a separate set of plan documents that document the appropriate labeling of space.

The University's current facilities/space management software is AIM by Assetworks. In order to prepare for a building to be brought on-line under Operations, the Designer must prepare proper Space Allocation Plans and provide an electronic set to the University Representative for review and acceptance at no later than the end of the following phases: Design Development for review 90% and 50% Construction Documents for confirmation and acceptance. After bidding, a Conformance Set shall be generated and distributed to the Contractor and Owner. Receipt of the conformed space allocation plan is a critical factor for University Space Management. The final Space Allocation Plan and space program with the Record Set reflecting any changes during construction (as-builts) – shall also be included.

Similar to the Title Block and Cover Sheet template drawing standards, the Space Allocation CAD Floor Plan Template has been established. The Designer must match the University's standard 2-dimensional drawing setup (per current version of AutoCAD – in .dwg format) as follows:

- One file per floor of each building, oriented at lower left corner on coordinate 0,0 and lined up to stack with all other floors.
- Simple 2-D line work (no smart walls, no duplication of line work, no 3-D blocks, etc.) following the layer system noted below.
- Z plane at height 0'-0" (flatten all work).
- Polylines (on layer SP-AREA) placed along inside walls of every individual space except non-occupiable HVAC shafts. Room number, type of space, square footage and FICM code shall be represented.
- Polyline (on layer SP-GROSS) placed along the outside wall of building.

Space Allocation CAD Floor Plan Template is located at the following weblink:
<https://updc.uconn.edu/contractors-working-at-uconn/>

See Appendix III Space Standards Guidelines for additional details on the FICM codes used.

Space/Area:

Each base plan created of each floor must be in Model Space and have closed polylines drawn on a layer named SP-Area. This layer shall consist of a tracing of every room using a single continuous closed polyline to the inside face of all walls that define that room. All drawings must be purged completely to remove all unused blocks, dimension styles, layers, line types, plot styles, text styles, multi-line styles, etc.

No later than 100% Design Development Phase review documents, the University will require review of the space or floor plan represented within the program reflecting all interior and exterior spaces for verification that the University's space identification guidelines have been followed and all labeling is correct. Such plan shall reflect all floor numberings, corridor and other circulation space numberings, elevator and stair numberings, room numberings, the room within a room numberings and door

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numberings that have been programmed to date. Any corrections shall be incorporated, and re-submission shall be made at the 90% permit set for review and acceptance prior to releasing the bid set.

It is the intent that the space identifications that are shown on the design drawings shall serve as the basis to produce the signage for wayfinding, directories and room identification. Additionally, the space identifications should be sufficient and comprehensive to be utilized for the programming of the fire alarm system without modifications.

The Conformance Set shall also include a separate file of the Space Allocation Floor Plan documents. It is imperative that the Designer has complete continuous closed polylines with each space being measured. The Designer shall be responsible for corrections and resubmission of the documents should it be discovered that continuous closed polylines are not 100 percent complete.

The block that identifies the room name, room number, square footage and FICM number, shall be tied to the polyline for each area or room.

The Designer is responsible for submitting documents that includes the space requirements by type with size and quantity to reflect as-built conditions and incorporate a single continuous closed polyline to the inside space of all rooms and spaces affected to incorporate its square footage calculations below the room or space identifier. The Designer shall be responsible for corrections and resubmission of the documents should it be discovered that continuous closed polylines are not 100 percent complete.

3 Electronic Programs

The Designer shall be fully versed in all programs offered in Microsoft Office Suite, current versions. The Designer shall submit for review and acceptance a Project Schedule which shall be in the latest version of Microsoft Project or an acceptable format as determined by the University Representative to properly plan and track progress of the Project Schedule. The Project Schedule will be provided in an electronic file format for review and acceptance within two weeks of assignment/contract execution. The Project Schedule will include all milestones identified as part of the Project and shall include but not limited to the following: (1) deadlines for information exchange and decision-making for programing and design, (2) major meetings, (3) progress and mid and end-of-phase document submissions, (4) University Representative review/approval periods, (5) submission for approval of authorities having jurisdiction, (6) value engineering sessions, (7) prequalification and bidding periods, (8) Construction Administration and 9) Closeout periods and (10) other major activities as are appropriate to the Project. The Designer is required to provide an update on the schedule and notify the University Representative of any delays or impediments that may be causing the design schedule to slip and present any adjustments required to recover the accepted schedule in increments required by the University Representative.

4 REVIT / BIM Standards

The University recognizes the potential benefits of Building Information Modeling (BIM) software and has developed elementary standards for A/E consultant firms that work in this media. The Designer is required to use parametric BIM authoring software for the creation of models that include all geometry,

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physical characteristics and product data needed to describe the design and construction project in detail. Submitted files should be in AUTODESK REVIT format (.rvt) or must be Revit compatible. *All Revit submissions shall also be accompanied by a converted version of the drawing set in AutoCAD 2012-13 format.*

The Designer is required to utilize Revit or other 3D modeling programs for its documentation. If the Design utilizes Revit or BIM modeling, then it shall provide the documents in their native format to both the University and Contractor (for coordination purposes) both prior to the start of construction and the end of construction. In addition, the Designer shall also provide the documents converted into two-dimension CAD drawings (in the latest version of CAD). Under both scenarios, the Designer shall have the obligation to coordinate the design such that all work that is shown fits within the spaces that are provided and that there are no major conflicts in the different aspects of the work.

5 SURVEY STANDARDS

Surveying, Civil Engineering (including all subsurface Utilities Infrastructure and Telecommunications) and Landscape Architecture must adhere to the same electronic document format as the Architectural design standards indicate.

When surveying an existing area within the University Campuses, the use of Global Navigation Satellite System (GNSS) logging shall be used. The mapping and survey shall be in accordance with the "Regulations of Connecticut State Agencies, Sections 20-300b-1 thru 20-300b-20", and the "Minimum Standards for Surveys and Maps in the State of Connecticut" endorsed by the Connecticut Association of Land Surveyors, Inc. on September 26, 1996. Any University requirements that may conflict with State requirements shall be brought to the attention of the University Representative for clarification.

The type of survey will be a "Topographic and General Location Survey". The topographic and existing location survey will be to "A-2" and "T -2" standards. Vertical accuracy will be to V-2 standards. Utilities will be to "T-2" and Class "D" (compiled) accuracy. Some projects may require utility location to a higher degree of accuracy, the appropriate subsurface utility location methods shall be used to locate underground infrastructure.

Survey shall depict the following (where applicable for the project):

- topographic and location survey of the project
- 1 ft. contours, spot grades and finish floor elevations of all buildings and all building entrance elevations;
- All site features within the project area, including but not limited to utilities, light standards, signage, roads, drives, parking areas, curbing, sidewalks (bituminous, concrete, pavers or stone dust, etc.), paths, stairs, retaining walls, fencing, emergency call boxes, guiderail, benches, trash receptacles and mailboxes locations;
- All Trees within the project area; identify location and tree tag number and for shrubs; show shrub mass boundaries;
- All walkway elevations, at all intersections and change in direction and every 25'-0" on center;
- All top and bottom of curb elevations, at all intersections and change in direction and every 25'-0" on center;

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- All top and bottom of wall elevations, at all intersections and change in direction and every 25'-0" on center;
- All corners of patios.
- Top of frame elevations on all utility structures;
- Depict flow lines and inverts for storm water and sanitary sewer;
- Location and compilation of underground (U/G) utilities wetlands or wetland flags, and property boundary from information supplied by Municipal, Facility, and utility companies willing to supply information;
- Electronic base map, including point files shall be provided. Provide two (2) stamped and signed copies of completed survey.

5.1 Datums, Projections, and Units of Measure

Adherence to specific datums (more recently called **reference frames**), map projections, and units of measure ensures data integrity, overall operability, and accuracy. The University adheres to the following datums, projections, and units.

Reference Frames

Data shall refer to the latest US National Spatial Reference Frame (NSRF). (See <http://oceanservice.noaa.gov/facts/nsrs.html> for more information.) As of this writing, the NSRF for longitude, latitude, and ellipsoid height is the North American Datum of 1983 (2011), and the vertical datum for orthometric heights (aka elevations) is the North American Vertical Datum of 1988. The national authority for geodetic positioning is the National Oceanic and Atmospheric Administration's (NOAA) National Geodetic Survey (NGS), not to be confused with the U.S. Geological Survey (USGS). The State authority for geodetic positioning is the Connecticut Department of Transportation's geodetic survey (CTGS).

Projections

Coordinates shall be referenced to the latest State Plane Coordinate System for Connecticut. As of this writing, this is SPC83 (2011) zone 0600.

Units of Measure

Linear units shall be consistent with the latest State Plane Coordinate System for Connecticut. As of this writing, this is United States Survey Feet (USFt), which is defined to be 3937 USFt = 1200 meters exactly. Unit conversions between USFt and meters must use this conversion exactly.

A minimum of two (2) horizontal and vertical control points with ties will be established in the project area for use during future construction projects.

Drawing Format Requirements:

The drawing will be prepared in the current version of AutoCAD available. Sheet size and an agreed upon scale will be determined as subject to layout requirements for the project area. Border requirements and layer naming conventions will be to University electronic submission standards.

- All grid positioned work shall be in an AutoCAD model space environment drawn at a one (1) to one (1) scale. For production of hard copy mapping, sheet borders, notes, etc. shall be in an AutoCAD paper space environment utilizing viewports with respect to required scale.

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- Orient north arrow and magnetic north toward the top of the sheet.
- All line work shall be two dimensional with a zero (0) elevation with the exception of contour lines which shall have their respective elevation assigned.
- Include legend of symbols, line types and abbreviations
- All AutoCAD entities such as boundaries, utilities, contouring, planimetric features, etc. shall be segregated on corresponding layers, line types and colors.

Raster Images:

When requested, scale rectified digital color aerial orthophoto imagery, photo scale of 1"=350'; 0.50 ft. pixel resolution.

- Vector mapping scale is 1" = 40' photogrammetric mapping. Utilize projected coordinate system NAD_1983_StatePlane_Connecticut_FIPS_0600_Feet for digital orthophotos spatial reference.
- Horizontal Control based on North American Datum of 1983 (NAD 83(2011)).
- Vertical Control based on North American Vertical Datum of 1988 (NAVD 88).

Deliverables:

Two (2) sets of signed and sealed paper mapping documents of the existing survey.
One (1) CD-ROM disc containing all project electronic files as previously outlined.

END OF THE ELECTRONIC SUBMISSION DESIGN STANDARDS