FACILITIES MANAGEMENT SYSTEM

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CAD STANDARDS

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REVISION: July 2007

University of California, Riverside
CAD Standards
April 12, 2007

Introduction

The Purpose of this document is to define the Computer Aided Design (CAD) drawing standards for the University of California, Riverside (UCR). The standards outlined in this document are to be utilized for the development of any CAD document of record generated by UCR in-house CAD operators, and external consulting Architectural/Engineering firms. These drafting conventions are also employed by the UCR Facilities Management System (FMS). FMS therefore relies on the accuracy of CAD documents and the implementation of UCR CAD drawing standards to integrate AutoCAD files with campus facilities data information.

The drawing conventions outlined in this document reflects industry standards. These standards are not intended to be either static or all inclusive. The document will be updated periodically. Therefore, it is essential that when an architectural firm is awarded a UCR project the firm is provided current standards documents. All updated FMS Standard documents will be available through the Capital and Physical Planning web page at http://www.ucrapb.ucr.edu.

For questions or suggestions regarding the CAD Standards, please contact the Office of Capital and Physical Planning at (951) 827-2431.

Drawing Delivery – General Requirements

Accepted Media

Drawings should be provided to UCR on one of the following media formats to the Office of Design and Construction, Physical Plant, and Capital and Physical Planning:

- E-Mail
- CD-ROM

Media should be labeled clearly with the following information:

- Submitting Firm Name
- Date
- Facility Name
- UCR Project Number
- Project Name
- General Description of Contents

Documentation

CAD drawing submittals must be accompanied by the following documentation:

- Letter of transmittal with a listing of all files being submitted.
- Hard copy prints for drawing set.
- Standards Compliance Checklist Form for each drawing file
- Design Drawing Catalog information in Electronic File format as follows.

Design Drawing Catalog Format

The following information must be provided in an Electronic File. The spreadsheet should be entitled as follows:

BUILDING - PROJECT NUMBER - SUBMITTAL PHASE

An example file name would be:
X-95XXXX-60.XLS

File Name	Project #	Building Name	Floor #	Title/Sheet #	Date of Issue	Comments	Revision Date
nnnnnnn	95XXXX	X	01	Arch Model File	08/25/99	60% Submittal	08/25/02
nnnnnnn	95XXXX	X	01	Sheet File A2.1	08/25/99	60% Submittal	08/25/02

Required Data

Text

Design consultants may define text styles to suit their personal requirements on drawings. Consultants will use one of the following TEXT styles: SIMPLEX, TXT, OR ROMANS. Text style names will be the same as the FONT being used. Any customized TEXT or FONT types are to be included in submitted drawings.

Drawing Files

All drawings submitted to UCR shall be AutoCAD 2004 or above formats.

File Information

All information that is included on hard copy submittals are to be included in electronic data deliverables.

File format

All submittals are to be clearly and systematically organized and incorporate good drafting practices.
Graphic elements representing a physical component of the project (i.e., lines indicating a wall or a block indicating a light fixture) shall be shown only one time in the submittals. If additional references to the object are needed in additional drawing files they shall be shown via an external reference of the original file.

File Size

It is the responsibility of the Architectural firm to maintain an appropriate file size. All drawing files are to be purged to remove unused blocks, line types and fonts –prior to submittal to UCR.

Reference Files

All referenced files, X-Refs, shall be located in the same directory as the dependent files and shall NOT include pathnames in the reference file attachment. This includes any raster images that may be included such as title photos, etc.

Document Format

There shall be one drawing file, saved in a plot-ready format, corresponding to each hard copy submittal sheet. Document files shall be formatted utilizing paper space. Plotting should take place from paper space at a scale of 1 = 1.

There are two distinct types of CAD files, model files and sheet files.

Model files contain the actual geometry that makes up the drawing. Model files should always be drawn in model space. Sheet files are scaled views that are designed for presentation and output only. A separate sheet file could be created for each plotted drawing required. Sheet files are essentially "ready to plot" CAD files analogous to reports from databases.

Sheet files are composed through the use of XREF's of the model file(s) into model space of the sheet file, and the setup of viewports in paper space that are scaled to a full size title block in paper space. The following table illustrates correct placement of entities with respect to Model Space and Paper Space.

Model Space	Paper Space
• Basic Drawing Geometry • Dimensions • Leaders • *etc.*	• Titleblocks • Clouds • Notes • Titles • Schedules/Tables • *etc.*

File Naming

All files included in the electronic data deliverable package will conform to a logical file naming convention. All consultants are requested to follow the Campus's typical file naming convention. When this does not exist the consultant must submit the file naming scheme. Each submittal must be accompanied by an Electronic File that provides information about the drawing set. For more on this, please refer to the *Submittal* section of this document.

Model file name example: A – F P 0 1

A - Architecture
C - Civil
E - Electrical
F - Fire Protection
G - General
H - Hazardous material
I - Interiors
L - Landscape
M - Mechanical
P - Plumbing
Q - Equipment
R - Resource

S - Structure
T - Communications
X - Facilities Management
U - Utilities Infrastructure
Z - Contractor/Shop drawings

Drawing Formats and Graphics

Title Block

Sheet border, title block, consultant's stamps logos and all similar components of the drawings shall be in paper space.

UCR title blocks can be obtained through the UCR Capital and Physical Planning (C&PP) office or the Office of Design and Construction (OD&C).

Origin and Base

All UCR drawings shall reference a common 0,0,0 origin point for alignment of drawings. This allows drawings to be Externally Referenced together to form composite plans. The origin shall be in the lower left hand corner of the drawing with the geometry positioned in the positive X and Y directions.

All UCR drawings shall have a *BASE* of 0,0,0.

Standard Sheet Size

All sheet sizes are to be limited to the five standards formats. Required sheet sizes is specific to each project.

A size – 8 ½" x 11"
B size – 11" x 17"
C size – 17 "x 22"
D size - 22" x 34"
E size - 34" x 44"

Graphics

All graphic entities shall be comprised of representational and geometrically accurate entities. For example, a circle shall be represented by a circle entity and not a visually equivalent collection of line segments. The same is to be true with arcs and ellipses. Items shown in a dashed line type shall be created with the "LINETYPE" feature and not by individual line elements.

Blocks

In general, the following guidelines should be followed in the definition of blocks:

1. Insertion points should be mapped to allow easy block placement within the drawing.
2. Blocks should be created with entities on layer 0 and should be inserted onto their appropriate layer in the drawing.
3. Blocks should not be inserted with different X,Y,Z scaling.
4. Nested Blocks should be avoided.
5. The use of text in blocks should be avoided when possible.
6. Certain blocks requiring textual information should use attribute-based text

Raster Images

Raster files shall not be used to represent the project's major architectural elements-floor plans.

Raster files can be used for the incorporation of existing building condition photos. The only types of raster or image files that will be accepted are TIFF, JPG, or BMP.

Dimensioning

Design consultants may define dimension styles to suit their personal requirements on Drawings. Dimension styles shall be named with the word "DIM" followed by the Dim Scale in inches i.e. Dim48, Dim96, etc. (see table LTScale, under column "scale factor")

Viewres

The AutoCAD VIEWRES variable should be set to 200 to allow adequate resolution on circular objects without undue performance degradation. Although higher values exist up to a maximum of 32767 and provide for a better description of arcs, ellipses, and circles, UCR reserves the right to dictate this variable setting on a case by case basis

Fill and Hatch Patterns

Limit excessive use of hatch patterns to avoid large files. A hatch pattern shall be created through the AutoCAD hatch command. Individual lines for a hatch pattern are unacceptable.

Line Weights

All entities in UCR drawings shall be created with linetypes *by layer*. All drawings should use linetypes that are defined in the standard ACAD.LIN file that comes with AutoCAD.

Scale

All entities in AutoCAD drawings are either considered scaled or non-scaled. This is based on the intended plot scale of the drawings. UCR As-Built drawings shall be created and maintained with an intended plot scale of 1/8" or 96 as required. An adjustment to the layer names for all text and dimension layers can be utilized to assist in plotting at different scales. An example of this could be a layer called:
A-PFLR-NOTE to denote floor plan notes at 1/8" scale.

The following guideline should be used when inserting or drawing scaled entities in AutoCAD;

Plot Scale	Dim Scale	Text Height	Title Text Height
1/4"=1'-0"	48	4.8	9.6
1/8"=1'-0"	96	9.6	19.2
1/16"=1'-0"	192	19.2	38.4

Layering Standards

UCR utilizes the AIA Layer Guidelines, Second Edition as the standard layering convention for this standards document. The AIA guideline provides a consistent, industry standardized approach that will facilitate exchange of information with multiple agencies and consultants.

Because this text is a guideline and not a rigid standard, UCR understands consultants may utilize slightly different standards for their Construction Documents. UCR does require however, that all submitted As-Built Drawings strictly adhere to these AIA based standards.

UCR understands that all of the layers in the tables herein may not need to be used on each drawing. The intent is to minimize and standardize the layers used by the design team.

For layers that are not specifically listed in this document, consultants and design firms must reference the AIA Layer Guidelines, Second Edition for applicable layers.

Layer names are designed using a concatenated form of multiple group codes. The group codes are designed in a GENERAL->SPECIFIC format that allows simplified management of layers through the use of prefixes and wildcards. Each layer is comprised of the following components:

Discipline – Major Status

Optionally, layers can be created with modifiers through the use of a minor group as follows:

Discipline – Major - Minor Status

The following tables communicate appropriate values for each of the groups above.

Major Groups

Status Code	Use
NEWW	New work
EXST	Existing items to remain

Major groups identify the information contained within each building system. Examples would be:

A-WALL - Walls
A-DOOR - Doors
A-GLAZ – Windows

Minor Groups

An optional component, minor groups further differentiate the information contained within each of the major groups with a more detailed description such as the following:

A-WALL-PRHT - Partial Height Wall
A-WALL-FULL - Full Height Wall

Common minor group modifiers include:
IDEN - Identification
PATT – Pattern

Status

AIA utilizes this group to identify the disposition of the particular layer. Valid status codes are listed below. The status field plays a role in some processes utilized to integrate As-Built Drawing changes into the Facilities Existing Drawings. If separate drawing files are utilized to determine the status of entities, then a file name modifier like E and/or N to distinguish between Existing and New plans will be utilized. Existing drawing files will include demo layers and new drawing files will include future layers.

DEMO	Existing items to be demolished as part of a project
FUTR	Items to be constructed in the future

Layer Details

The following tables designate proper layer names for layers to be included with UCR drawings. UCR will update the table with line type definitions for each layer at a future date. The table is designed to communicate the following:

Column Header	Column Details
Layer Name:	The name of the layer as it is input into AutoCAD
N:	The AutoCAD color assignment for the layer if the NEWW status modifier is used
E:	The AutoCAD color assignment for the layer if the EXST status modifier is used
D:	The AutoCAD color assignment for the layer if the DEMO status modifier is used
Description:	A description of what information resides on the drawing layer.

Layer EXST: colors shall be selected with LINEWEIGHTS that varies from .05mm to .20mm

Layer NEWW: colors shall be selected with LINEWEIGHTS that varies from .10mm to .35mm

SCREENED Layers: Use colors 8&9,250 to 255.

The color number 180 is reserved for UCR logo, so this color is plotted as is even in black & white.

Sample:

Layer Name	N	E	D	Description
A-AREA	30	35	33	Area calculation boundary lines

1.1.1.Architectural Layers

Layer Name	N	E	D	Description
A-AREA	30	35	33	Area calculation boundary lines
A-AREA-IDEN	170	237	153	Room numbers, tenant identifications, area calculations
A-AREA-OCCP	132	57	204	Occupant or employee names
A-AREA-PATT	222	136	94	Area cross hatching
A-AREA-PROJ		4		Project Areas
A-CLNG	40	107	103	Ceiling information
A-CLNG-ACCS	62	86	53	Ceiling access
A-CLNG-GRID	70	187	183	Ceiling grid
A-CLNG-OPEN	100	157	24	Ceiling/roof penetrations
A-CLNG-PATT	230	197	44	Ceiling patterns
A-CLNG-SUPS	62	36	174	Suspended elements
A-CLNG-TEES	171	45	33	Main tees
A-COLS	31	246	54	Columns
A-DETL	140	66	213	Details
A-DETL-IDEN	41	137	103	Component identification numbers
A-DETL-MBND	120	116	53	Materials beyond section cut
A-DETL-MCUT	70	87	154	Materials cut by section
A-DETL-PATT	231	196	173	Textures and hatch patterns
A-DOOR	101	166	53	Doors
A-DOOR-ELEV	202	206	113	Doors:
A-DOOR-FULL	71	65	104	Full-height (to ceiling) door: swing and leaf
A-DOOR-IDEN	121	46	23	Door number, hardware group, etc.
A-DOOR-PRHT	32	247	63	Partial-height door: swing and leaf
A-ELEV	141	67	24	Interior and exterior elevations
A-ELEV-CASE	172	146	104	Wall mounted casework
A-ELEV-FIXT	232	117	214	Miscellaneous fixtures
A-ELEV-FNSH	71	96	163	Finishes, woodwork, trim
A-ELEV-IDEN	42	197	134	Component identification numbers
A-ELEV-OTLN	102	157	34	Building outlines
A-ELEV-PATT	122	207	54	Textures and hatch patterns
A-ELEV-PFIXT	72	105	113	Plumbing fixtures in elevation
A-ELEV-SIGN	101	46	83	Signage
A-EQPM	41	26	104	Equipment
A-EQPM-ACCS	142	76	64	Equipment access
A-EQPM-CLNG	172	147	113	Ceiling mounted or suspended equipment
A-EQPM-ELEV	50	97	223	Equipment surfaces:
A-EQPM-FIXD	72	126	164	Fixed equipment
A-EQPM-IDEN	80	206	224	Equipment identification numbers
A-EQPM-MOVE	110	166	184	Moveable equipment
A-EQPM-NICN	100	216	63	Equipment not in contract
A-FLOR	180	115	114	Floor information
A-FLOR-CASE	240	47	133	Casework (manufactured cabinets)
A-FLOR-EVTR	42	27	193	Elevator cars and equipment
A-FLOR-FIXT	150	77	73	Miscellaneous fixtures

Architectural Layers, *continued*

Layer Name	N	E	D	Description
A-FLOR-HRAL	210	156	114	Stair and balcony handrails, guard rails
A-FLOR-IDEN	51	106	224	Room numbers, names, targets, etc.
A-FLOR-LEVL	80	127	173	Level changes, ramps, pits, depressions
A-FLOR-OTLN	181	207	223	Floor and building outline
A-FLOR-OVHD	112	167	194	Overhead items (skylights, overhangs--usually dashed line)
A-FLOR-PATT	92	217	64	Paving, tile, carpet patterns
A-FLOR-PFIX	81	125	34	Plumbing fixtures
A-FLOR-RAIS	241	146	123	Raised floors
A-FLOR-RISR	50	36	203	Stair risers
A-FLOR-SIGN	151	86	74	Signage
A-FLOR-SPCL	181	157	123	Architectural specialties (toilet room accessories, display cases)
A-FLOR-STRS	52	107	233	Stair treads, escalators, ladders
A-FLOR-TPTN	81	136	174	Toilet partitions
A-FLOR-WDWK	182	216	153	Architectural woodwork (Field-built cabinets and cases)
A-FURN	120	226	204	Furniture
A-FURN-CHAIR	242	135	73	Chairs and other seating
A-FURN-ELEV	61	66	254	Furniture
A-FURN-FILE	82	147	124	File cabinets
A-FURN-FREE	51	37	213	Furniture: freestanding (desks, credenzas, etc.)
A-FURN-IDEN	152	87	83	Furniture numbers
A-FURN-PATT	250	166	124	Finish patterns
A-FURN-PLNT	60	116	234	Plants
A-FURN-PNLS	82	137	183	Furniture system panels
A-FURN-POWR	91	217	214	Furniture system--power designators
A-FURN-STOR	121	145	244	Furniture system storage components
A-FURN-WKSF	251	177	74	Furniture system work surface components
A-GLAZ	190	67	33	Windows, window walls, curtain walls, glazed partitions
A-GLAZ-ELEV	211	156	153	Glazing and mullions--elevation views
A-GLAZ-FULL	52	46	223	Full-height glazed walls and partitions
A-GLAZ-IDEN	160	96	84	Window number
A-GLAZ-PRHT	191	167	133	Windows and partial-height glazed partitions
A-GLAZ-SILL	202	117	243	Window sills
A-GRID	90	146	184	Planning grid or column grid
A-HVAC-RDFF	252	155	224	Return air diffusers
A-HVAC-SDFF	122	236	153	Supply Diffusers
A-LITE	30	186	83	Light fixtures
A-ROOF	230	76	63	Roof
A-ROOF-ELEV	212	157	33	Roof surfaces
A-ROOF-HRAL	60	47	233	Stair handrails, nosings, guardrails
A-ROOF-LEVL	161	97	93	Level changes
A-ROOF-OTLN	132	176	134	Roof outline
A-ROOF-PATT	220	126	244	Roof surface patterns, hatching
A-ROOF-RISR	91	147	193	Stair risers
A-ROOF-STRS	230	165	154	Stair treads, ladders
A-SECT	130	237	133	Sections
A-SECT-IDEN	242	187	84	Component identification numbers

Architectural Layers, *continued*

Layer Name	N	E	D	Description
A-SECT-MBND	31	77	134	Materials beyond section cut
A-SECT-MCUT	192	166	34	Materials cut by section
A-SECT-PATT	61	56	234	Textures and hatch patterns
A-WALL-ELEV	162	177	94	Wall surfaces
A-WALL-FIRE	200	106	143	Fire wall patterning
A-WALL-FULL	220	127	243	Full-height walls, stair and shaft walls, walls to structure
A-WALL-HEAD	92	156	203	Door and window headers (appear on reflected ceiling plans)
A-WALL-JAMB	32	175	194	Door and window jambs (appear on reflected ceiling plans)
A-WALL-MOVE	131	246	43	Moveable partitions
A-WALL-PATT	221	196	93	Wall insulation, hatching and fill
A-WALL-PRHT	201	86	144	Partial-height walls (do not appear on reflected ceiling plans)

1.1.2.CAFM / Facilities Management Layers

Program These layers have been developed for specific use with ARCHIBUS/FM.

Layer Name	E	Description
RM	4	Room level space delineations (uncatalogued)
RM$	5	Room level space delineations (catalogued)
RM$TXT	5	Room level space delineations text (catalogued)
GROS	7	Gross (floor) level space delineations (uncatalogued)
GROS$	1	Gross (floor) level space delineations (catalogued)
GROS$TXT	1	Gross (floor) level space delineations text (catalogued)

1.1.3.Electrical Layers

Layer Name	N	E	D	Description
E-1LIN	30	35	33	One-line diagrams
E-ALRM	170	237	153	Miscellaneous alarm system
E-AUXL	132	57	204	Auxiliary systems
E-BELL	222	136	94	Bell system
E-CCTV	40	107	103	Closed-circuit TV
E-CLOK	62	86	53	Clock system
E-COMM	70	187	183	Telephone, communication outlets
E-COMM-IDEN	100	157	24	Telephone, communication identification
E-CTRL	120	116	53	Electrical control systems

1.1.3 Electrical Layers, *continued*

Layer Name	N	E	D	Description
E-CTRL-DEVC	70	87	154	Electrical control devices
E-CTRL-WIRE	231	196	173	Electrical control wiring
E-DATA	101	166	53	Data Outlets
E-DATA-IDEN	202	206	113	Data Outlet Identification
E-DICT	71	65	104	Central dictation system
E-FIRE	121	46	23	Fire alarm, fire extinguishers
E-GRND	32	247	63	Ground system
E-GRND-CIRC	141	67	24	Ground system circuits
E-GRND-DIAG	172	146	104	Ground system diagram
E-GRND-EQUI	232	117	214	Equipotential ground system
E-GRND-REFR	71	96	163	Reference ground system
E-INTC	42	197	134	Intercom system
E-LEGD	102	157	34	Legend of symbols
E-LITE	122	207	54	Lighting
E-LITE-CIRC	72	105	113	Lighting circuits
E-LITE-CLNG	101	46	83	Ceiling mounted lighting
E-LITE-EMER	41	26	104	Emergency lighting
E-LITE-EXIT	142	76	64	Exit lighting
E-LITE-FLOR	172	147	113	Floor mounted lighting
E-LITE-IDEN	50	97	223	Luminaire identification and text
E-LITE-JBOX	72	126	164	Junction box
E-LITE-NUMB	80	206	224	Lighting circuit numbers
E-LITE-OTLN	110	166	184	Lighting outline for background (optional)
E-LITE-ROOF	100	216	63	Roof lighting
E-LITE-SITE	180	115	114	Site lighting (see also civil group)
E-LITE-SPCL	240	47	133	Special lighting
E-LITE-SWCH	42	27	193	Lighting--switches
E-LITE-WALL	150	77	73	Wall mounted lighting
E-LTNG	210	156	114	Lighting protection system
E-NURS	51	106	224	Nurse call system
E-PGNG	80	127	173	Paging system
E-POWR	181	207	223	Power
E-POWR-BUSW	112	167	194	Busways
E-POWR-CABL	92	217	64	Cable trays
E-POWR-CABL-TEXT	81	125	34	Cable tray text.
E-POWR-CIRC	241	146	123	Power circuits
E-POWR-CLNG	50	36	203	Power--ceiling receptacles and devices
E-POWR-EQPM	151	86	74	Power equipment
E-POWR-FEED	181	157	123	Feeders
E-POWR-IDEN	52	107	233	Power identification, text
E-POWR-JBOX	81	136	174	Junction box
E-POWR-NUMB	182	216	153	Power circuit numbers
E-POWR-OTLN	120	226	204	Power outline for backgrounds
E-POWR-PANL	242	135	73	Power panels

1.1.3 Electrical Layers, *continued*

Layer Name	N	E	D	Description
E-POWR-ROOF	61	66	254	Roof Power
E-POWR-SITE	82	147	124	Site power (see also civil group)
E-POWR-SWBD	51	37	213	Power switchboards
E-POWR-UCPT	152	87	83	Under-carpet wiring
E-POWR-URAC	250	166	124	Under floor raceways
E-POWR-WALL	60	116	234	Power wall outlets and receptacles
E-RISR	82	137	183	Riser diagram
E-SERT	91	217	214	Security
E-SITE	121	145	244	See electrical substations, poles (changed from C-Ectr)
E-SITE-LITE	251	177	74	Site lighting (changed from C-Ectr-Lite)
E-SITE-OVHD	190	67	33	Overhead lines (changed from C-Ectr-Ovhd)
E-SITE-POLE	211	156	153	Electrical poles (changed from C-Ectr-Pole)
E-SITE-UNDR	52	46	223	Underground electrical lines (changed from C-Ectr-Undr)
E-SOUN	160	96	84	Sound/PA system
E-TVAN	191	167	133	TV antenna system

1.1.4.Mechanical Layers

Layer Name	N	E	D	Description
M-BRIN	30	35	33	Brine systems
M-BRIN-EQPM	170	237	153	Brine systems equipment
M-BRIN-PIPE	132	57	204	Brine systems piping
M-CHIM	222	136	94	Prefabricated chimneys
M-CMPA	40	107	103	Compressed air systems
M-CMPA-CEQP	62	86	53	Compressed air equipment
M-CMPA-CPIP	70	187	183	Compressed air piping
M-CMPA-PEQP	100	157	24	Process air equipment
M-CMPA-PPIP	230	197	44	Process air piping
M-CONT	62	36	174	Controls and instrumentation
M-CONT-THER	171	45	33	Thermostats
M-CONT-WIRE	31	246	54	Low voltage wiring
M-CWTR	140	66	213	Chilled water systems
M-CWTR-EQPM	41	137	103	Chilled water equipment
M-CWTR-PIPE	120	116	53	Chilled water piping
M-DUST	70	87	154	Dust and fume collection system
M-DUST-DUCT	231	196	173	Dust and fume ductwork
M-DUST-EQPM	101	166	53	Dust and fume collection equipment
M-ELHT-EQPM	202	206	113	Electric heat equipment
M-ENER	71	65	104	Energy management system
M-ENER-EQPM	121	46	23	Energy management equipment
M-ENER-WIRE	32	247	63	Energy management wiring
M-EXHS	141	67	24	Exhaust system
M-EXHS-DUCT	172	146	104	Exhaust system ductwork
M-EXHS-EQPM	232	117	214	Exhaust system equipment

1.1.4 Mechanical Layers, *continued*

Layer Name	N	E	D	Description
M-EXHS-RFEQ	71	96	163	Rooftop exhaust equipment
M-FUEL	42	197	134	Fuel system piping
M-FUEL-GGEP	102	157	34	Fuel gas general piping
M-FUEL-GPRP	122	207	54	Fuel gas process piping
M-FUEL-OGEP	72	105	113	Fuel oil general piping
M-FUEL-OPRP	101	46	83	Fuel oil process piping
M-FUME-EQPM	41	26	104	Fume hoods
M-FUME-EXHS	142	76	64	Fume hood exhaust system
M-HOTW	172	147	113	Hot water heating system
M-HOTW-EQPM	50	97	223	Hot water equipment
M-HOTW-PIPE	72	126	164	Hot water piping
M-HVAC	80	206	224	HVAC system
M-HVAC-CDFF	110	166	184	HVAC ceiling diffusers
M-HVAC-DUCT	100	216	63	HVAC ductwork
M-HVAC-EQPM	180	115	114	HVAC equipment
M-HVAC-ODFF	240	47	133	HVAC other diffusers
M-HVAC-RDFF	42	27	193	Return air diffusers
M-HVAC-SDFF	150	77	73	Supply diffusers
M-LGAS	210	156	114	Laboratory gas system
M-LGAS-EQPM	51	106	224	Laboratory gas equipment
M-LGAS-PIPE	80	127	173	Laboratory gas piping
M-MACH	181	207	223	Machine shop equipment
M-MDGS	112	167	194	Medical gas systems
M-MDGS-EQPM	92	217	64	Medical gas equipment
M-MDGS-PIPE	81	125	34	Medical gas piping
M-NGAS	241	146	123	Natural gas piping
M-NGAS-EQPM	50	36	203	Natural gas equipment
M-NGAS-PIPE	151	86	74	Natural gas piping
M-PROC	181	157	123	Process system
M-PROC-EQPM	52	107	233	Process equipment
M-PROC-PIPE	81	136	174	Process piping
M-RCOV	182	216	153	Energy recovery
M-RCOV-EQPM	120	226	204	Energy recovery equipment
M-RCOV-PIPE	242	135	73	Energy recovery piping
M-REFG	61	66	254	Refrigeration systems
M-REFG-EQPM	82	147	124	Refrigeration equipment
M-REFG-PIPE	51	37	213	Refrigeration piping
M-SPCL	152	87	83	Special systems
M-SPCL-EQPM	250	166	124	Special systems equipment
M-SPCL-PIPE	60	116	234	Special systems piping
M-STEM	82	137	183	Steam systems
M-STEM-CONP	91	217	214	Steam systems condensate piping
M-STEM-EQPM	121	145	244	Steam system equipment
M-STEM-HPIP	251	177	74	High pressure steam piping

1.1.4 Mechanical Layers, *continued*

Layer Name	N	E	D	Description
M-STEM-LPIP	190	67	33	Low pressure steam piping
M-STEM-MPIP	211	156	153	Medium pressure steam piping
M-TEST	52	46	223	Test equipment

1.1.5.Plumbing Layers

Layer Name	N	E	D	Description
P-ACID	30	35	33	Acid, alkaline, oil waste systems
P-ACID-PIPE	170	237	153	Acid, alkaline, oil waste piping
P-DOMW	132	57	204	Domestic hot and cold water systems
P-DOMW-CPIP	222	136	94	Domestic cold water piping (changed from P-DOMW-PIPE)
P-DOMW-EQPM	40	107	103	Domestic hot and cold water equipment
P-DOMW-HPIP	62	86	53	Domestic hot water piping (changed from P-DOMW-PIPE)
P-DOMW-RISR	70	187	183	Domestic hot and cold water risers
P-EQPM	100	157	24	Plumbing miscellaneous equipment
P-FIXT	230	197	44	Plumbing Fixtures
P-SANR	62	36	174	Sanitary drainage
P-SANR-EQPM	171	45	33	Sanitary equipment
P-SANR-FIXT	31	246	54	Plumbing fixtures
P-SANR-FLDR	140	66	213	Flood drains
P-SANR-PIPE	41	137	103	Sanitary piping and vents
P-SANR-RISR	120	116	53	Sanitary risers
P-STRM	70	87	154	Storm drainage system
P-STRM-PIPE	231	196	173	Storm drain piping
P-STRM-RFDR	101	166	53	Roof drains
P-STRM-RISR	202	206	113	Storm drain risers

1.1.6.Structural Layers

Layer Name	N	E	D	Description
S-GRID	30	35	33	Column grid
S-GRID-EXTR	170	237	153	Column grid outside building
S-GRID-INTR	132	57	204	Column grid inside building
S-GRID-DIMS	222	136	94	Column grid dimensions
S-GRID-IDEN	40	107	103	Column grid tags
S-FNDN	62	86	53	Foundation
S-FNDN-PILE	70	187	183	Piles, drilled piers
S-FNDN-RBAR	100	157	24	Foundation reinforcing
S-SLAB	230	197	44	Slab
S-SLAB-EDGE	62	36	174	Edge of Slab
S-SLAB-RBAR	171	45	33	Slab reinforcing
S-SLAB-JOIN	31	246	54	Slab control joints
S-ABLT	140	66	213	Anchor bolts

1.1.6 Structural Layers, *continued*

Layer Name	N	E	D	Description
S-COLS	41	137	103	Columns
S-WALL	120	116	53	Structural bearing or shear walls
S-METL	70	87	154	Miscellaneous metal
S-BEAM	231	196	173	Beams
S-JOIS	101	166	53	Joists
S-DECK	202	206	113	Structural floor deck

1.1.7.Fire Protection Layers

Layer Name	N	E	D	Description
F-CO2S	30	35	33	CO2 system
F-CO2S-PIPE	170	237	153	CO2 sprinkler piping
F-CO2S-EQPM	132	57	204	CO2 equipment
F-HALN	222	136	94	Halon
F-HALN-EQPM	40	107	103	Halon equipment
F-HALN-PIPE	62	86	53	Halon piping
F-IGAS	70	187	183	Inert gas
F-IGAS-EQPM	100	157	24	Inert gas equipment
F-IGAS-PIPE	230	197	44	Inert gas piping
F-SPRN	62	36	174	Fire protection sprinkler system
F-SPRN-CLHD	171	45	33	Sprinkler head - ceiling
F-SPRN-OTHD	31	246	54	Sprinkler head - other
F-SPRN-PIPE	140	66	213	Sprinkler piping
F-SPRN-STAN	41	137	103	Sprinkler system standpipe
F-STAN	70	87	154	Fire protection standpipe system
F-PROT	231	196	173	Fire protection systems
F-PROT-EQPM	222	136	94	Fire system equipment (fire hose cabinet extinguishers)
F-PROT-ALRM	40	107	103	Fire alarm
F-PROT-SMOK	62	86	53	Smoke detectors / heat sensors

1.1.8.Civil Layers

Layer Name	N	E	D	Description
C-PROP	30	35	33	Property lines, survey benchmarks
C-PROP-ESMT	170	237	153	Easements, right-of-ways
C-PROP-BRNG	132	57	204	Bearings and distance labels
C-PROP-CONS	222	136	94	Construction controls
C-TOPO	40	107	103	Proposed contour lines & elevations
C-TOPO-SPOT	100	157	24	Spot elevations
C-TOPO-BORE	230	197	44	Test borings
C-TOPO-RTWL	62	36	174	Retaining wall
C-BLDG	171	45	33	Proposed building footprints
C-PKNG	41	137	103	Parking lots
C-PKNG-STRP	70	87	154	Parking lot striping, handicapped symbol
C-PKNG-CARS	231	196	173	Graphic illustration of cars
C-PKNG-ISLD	222	136	94	Parking islands
C-PKNG-DRAN	40	107	103	Parking lot drainage slope indications
C-ROAD	62	86	53	Roadways
C-ROAD-CNTR	70	187	183	Center lines
C-ROAD-CURB	100	157	24	Curbs
C-STRM	230	197	44	Storm Drainage Catch basin, Manholes
C-STRM-UNDR	62	36	174	Storm drainage pipe underground
C-ELEC	171	45	33	Site electrical substations, poles
C-ELEC-LITE	31	246	54	Site lighting
C-ELEC-UNDR	140	66	213	Underground electrical lines
C-ELEC-POLE	41	137	103	Electric poles
C-ELEC-OVHD	120	116	53	Overhead lines
C-COMM	70	87	154	Site communication / telephone poles, boxes, towers
C-COMM-UNDR	231	196	173	Underground communication lines
C-COMM-OVHD	101	166	53	Overhead communication lines
C-WATR	202	206	113	Domestic water - manholes, pumping stations, storage, tanks
C-WATR-UNDR	30	35	33	Domestic water - underground lines
C-FIRE	170	237	153	Fire protection hydrants, connections
C-FIRE-UNDR	132	57	204	Fire protection - underground lines
C-NGAS	222	136	94	Natural gas manholes, meters, storage tanks
C-NGAS-UNDR	40	107	103	Natural gas - underground lines
C-SSWR	100	157	24	Sanitary sewer - manholes, pumping stations
C-SSWR-UNDR	230	197	44	Sanitary sewer - underground lines

Compliance Form for As-Built Drawing Submittals

Project Name:		Site Code:	
UCR Project #:		Building Code:	
Submitting Firm:		Floor Code:	
Submittal Date:		Drawing File Name:	
Firm Auditor:		UCR Auditor:	

Checklist

The following checklist must be completed for the submitted drawing file.

Open CAD file.	[ ]
Purge drawing of all unused blocks, layers, shapes and line types.	[ ]
Check drawing for any obvious entity or layer problems.	[ ]
Check that no non-standard AutoCAD fonts have been used, or that non-standard fonts have been utilized and provided in submittal.	[ ]
Check that all symbols and blocks conform to the set guidelines.	[ ]
Verify the entity handle counter as < 15 chars (Number of characters that make up the highest ehandle).	[ ]
Verify that the layering naming convention complies to the documented standard.	[ ]
Verify that all space measurement polylines are drawn to the documented standard on correct layers.	[ ]
Verify that all polylines are closed.	[ ]
Verify that the floorplan line work is in model space, and that all geometry is drawn at full scale.	[ ]
Verify the drawing limits and base point(s).	[ ]
Verify that the LTScale meets the documented standard.	[ ]
Verify that no entities have 3D properties.	[ ]
Verify that entity properties (especially color and linetype) are set BYLAYER.	[ ]

Please verify the following system settings:

Base = 0,0,0	[ ]
Elevation and Thickness = 0.0000	[ ]
Regenmode, Tilemode, UCS Icon = 1	[ ]
Color and Linetypes = BYLAYER	[ ]
Viewres is set to documented standard	[ ]
Visretain = 1	[ ]

Notes: _____

Signed: (Firm Auditor): _____ **Date:** _____