

Campus Master Plan - CAD Standards

Introduction

The CSU Board of Trustees requires that every campus maintain an approved master plan showing existing and anticipated facilities necessary to accommodate a specified enrollment target. The State University Administrative Manual (SUAM), Section II 9007, defines the campus master plan requirements for a clear, concise graphic presentation document. “The Physical Master Plan is a graphic representation of how a campus will implement its Academic and Strategic Plans, showing the existing and anticipated facilities necessary to accommodate a specified enrollment at an estimated target date or planning horizon, in accordance with approved educational policies and objectives.”

<https://calstate.policystat.com/policy/8837634/latest#autoid-dgx6z>

Graphic standards have been developed for the master plan presentations to the Board of Trustees and for inclusion in the annual CSU Capital Improvement Program. Heretofore, physical master plans have been defined in terms of graphic standards for publication and reproduction; this document sets forth a standard proposed for the development and maintenance of digital master plan maps in a computer aided design (CAD) format.

The primary purpose of the CAD based master plan is identical to that of the printed presentation documents, to provide the Board of Trustees with a definitive campus plan of present and proposed facilities and to support the capital budget and planning process. The CAD standard advanced herein has the further technical objective of improving the accuracy, consistency, reliability and availability of the digital master plan maps, and enabling the formation of a web accessible database of current campus master plans.

The standard outlined below was developed for the express purpose of accurately defining the overall campus physical master plan, as distinct from other CAD based plans which campuses may develop for design and construction of individual facilities or for other space and facilities management applications. As campuses have initiated CAD systems on their own for these wider applications, a great deal of variation has developed in the style and quality with which these systems portray the required elements of the campus master plan. This standard draws from previously approved CSU graphic guidelines for map legends and master plan map submittals. The proposed CAD standard integrates information from these guidelines, adapts it where necessary, and supplements it with new guidelines for uniform CAD drafting and file structure.

CSU Campuses

Bakersfield

Channel Islands

Chico

Dominguez Hills

East Bay

Fresno

Fullerton

Humboldt

Long Beach

Los Angeles

Maritime Academy

Monterey Bay

Northridge

Pomona

Sacramento

San Bernardino

San Diego

San Francisco

San José

San Luis Obispo

San Marcos

Sonoma

Stanislaus

Master Plan Map

The prototype digital master plan map illustrates the boundaries and planimetric features of campus land, including buildings, bridges, roadways, parking lots, major surface and site features and natural resources such as lakes and streams. Importantly, it also depicts the temporal planning status of existing and proposed boundaries, buildings and parking lot features. The map legend is keyed to all approved master plan facilities as recorded in the campus Space and Facilities Database.



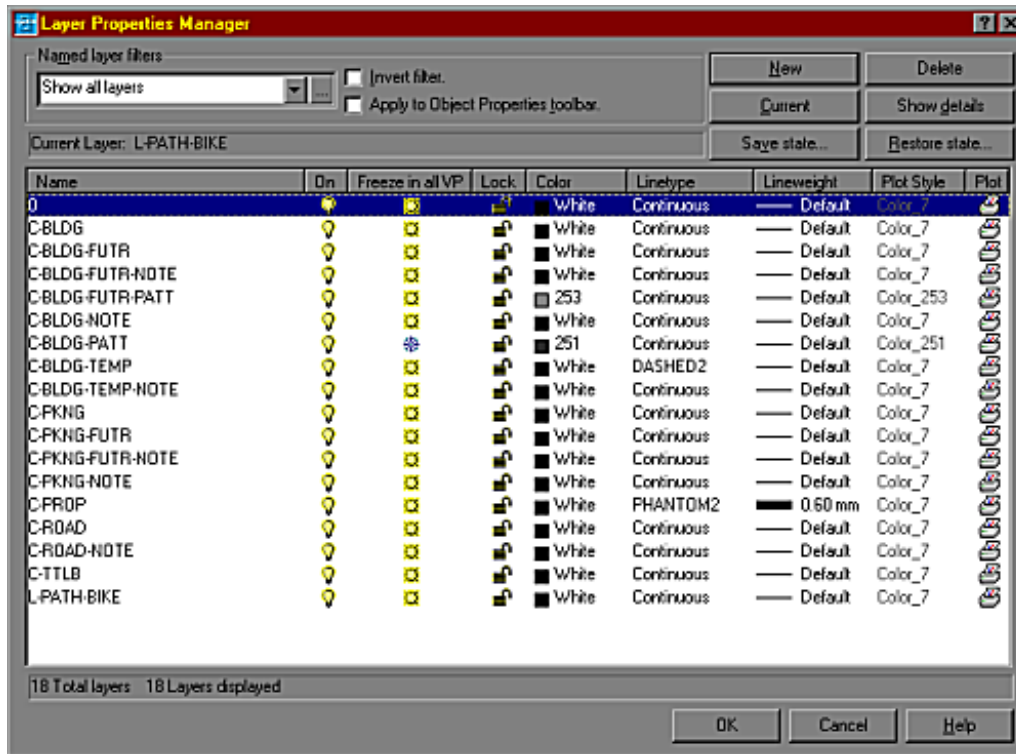
One of the decisions adopted with this standard is to maintain the digital master plan map in AutoCAD drawing file format (.dwg). AutoCAD is a robust CAD platform and de facto industry standard that supports efficient map drafting and editing, entity scaling and coordinate intelligence, separation of function by layer, and common data exchange interfaces. Use the latest AutoCAD Version available to the campus for map files, as it offers cross-application compatibility with other file formats.

The organization of the digital master plan map file specifies that the geometry describing all of the site features listed above will have each feature set on its own layer.

Site features are drawn to scale in model space using the California State Plane coordinate system, NAD83 datum. Features specific to map output such as title blocks and borders are drawn in paper space. A composite paper space layout should be available for plotting in grey scale at 11x17.

CAD standards

Layer Standards. Adhering to layer guidelines and separation of features by function and layer are *fundamental requirements* for this master plan map standard. The master plan map layers section provides the common standard for a table of civil base map and planning layers. Its content is based on the CSU CAD Standard, which is in turn based on the widely supported AIA Layer Guidelines and National CAD Standards.



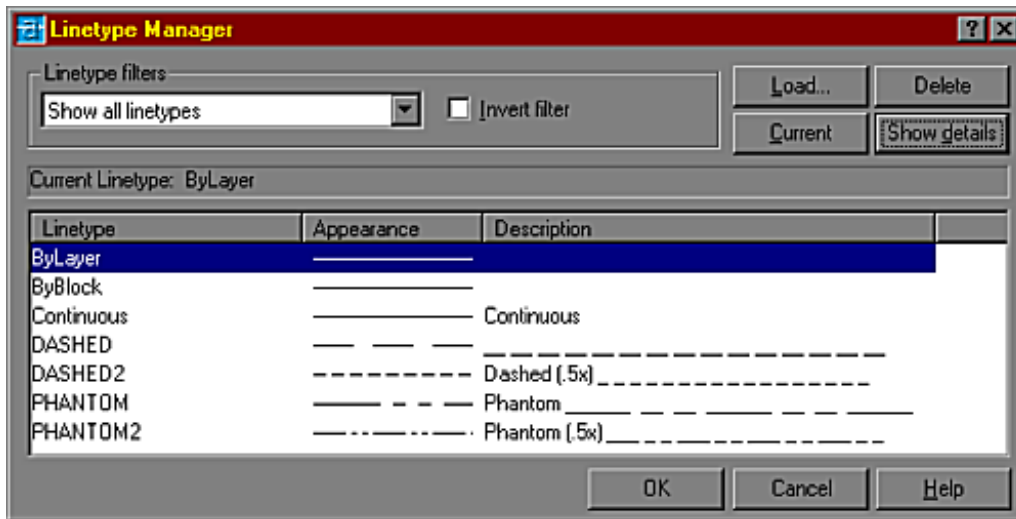
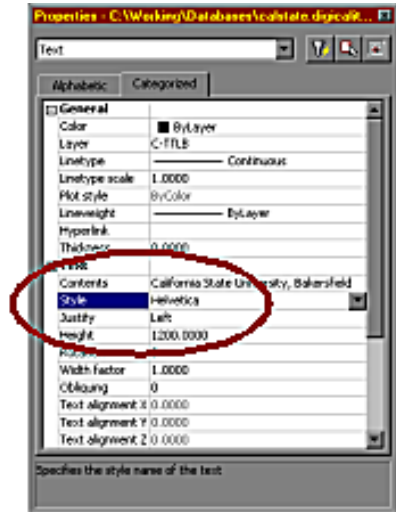
One advantage of establishing the CAD standard around a uniform layer dictionary is that it can be extended as needed using the same drafting conventions. The goal for master plan map maintenance over time is consistency in organization across map files, which enables graphic conformity and data reliability.

Block Entities. The use of predefined blocks and symbols simplifies the drafting and maintenance of visually complex entities. The result is greater visual consistency both within drawings and across the system wide database of master plan maps. To implement this standard, blocks are available for master plan map title block and legend elements, and for labels describing building and parking lot features that are existing, temporary and proposed. All CSU master plan maps will conform to this standard for common block and legend elements, in a manner equivalent to current graphic standards.



Font Selection. To improve visual consistency for master plan maps, this graphic standard prescribes the use of **Helvetica typeface** for title block text, building and parking labels. Font substitution typically degrades the visual quality of a drawing; therefore, when working with digital maps, font selections should use standard AutoCAD or operating system Helvetica fonts to reduce the occurrence of font substitution.

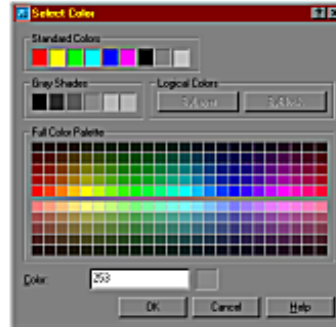
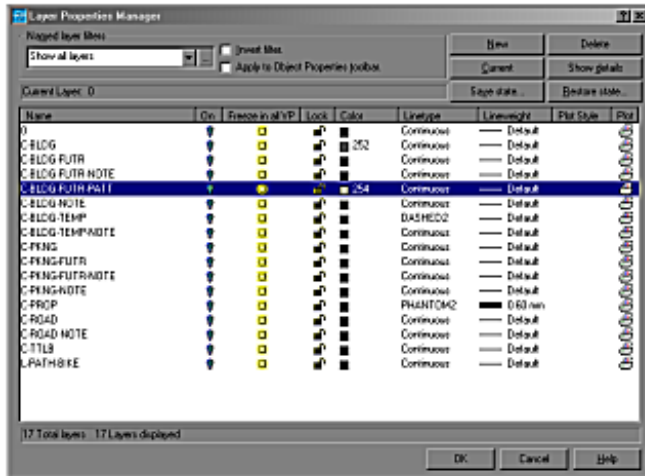
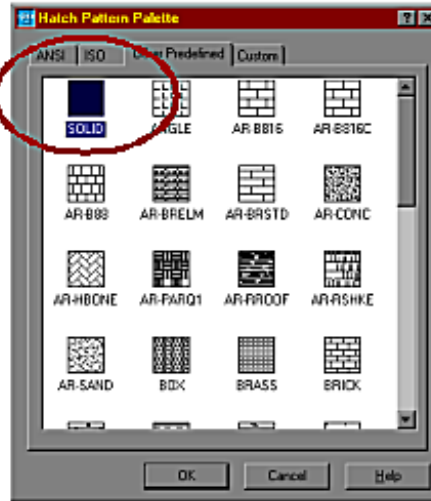
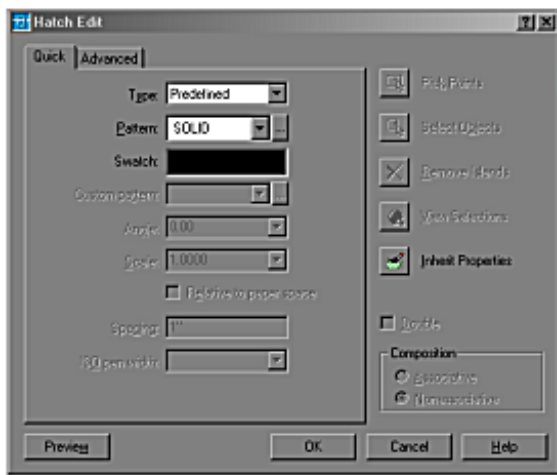
Boundary Lines. With master plan maps, line type is used to visually distinguish between different types of campus boundaries, existing and proposed. Existing campus boundaries should be set to the AutoCAD PHANTOM line type and proposed boundaries should be set to DASHED. Both line types provide continuous lines composed of dashes and line breaks. Line type must be represented using an AutoCAD line type with continuous lines and not with a collection of broken single lines.



Facilities as Filled Polygons. Shading is used on Master Plan Maps to indicate the planning status of various buildings and parking lot features. Maps should create filled polygon features for all facilities using AutoCAD hatch entities. Hatch style should be set to AutoCAD SOLID. Using dense hatch patterns to create solid fill shall not be permitted in the drawing set. Hatches shall be associative where possible and shall be retained (not exploded) as drawn.

EXISTING map features call for an 80% screening value, which corresponds to setting the solid hatch color to AutoCAD grey 250.

PROPOSED features should set the solid hatch color to AutoCAD grey 253. Polygon fills should be represented with solid hatching and not with other hatch types or disconnected parallel lines.



Master plan map layer guidelines

The table below outlines the baseline set of civil and physical master planning layers to be maintained in CSU master plan maps. It is based on layer guidelines found in the existing AIA Layer Guidelines and National CAD Standards. The layer dictionary will be extended as needed using the same concepts and conventions. The table is divided into sections by discipline.

Geography Layers

	<u>Description</u>
C-GRID	Grid Lines
C-GRID-NOTE	Grid Labels

Property Layers

	<u>Description</u>
C-PROP	Existing Property Lines
C-PROP-PROPOSED	Proposed Property Lines
C-PROP-ESMT	Easements
C-PROP-RWAY	Rights of Way

Civil Layers

	<u>Description</u>
C-ROAD	Roads and Streets
C-ROAD-NOTE	Road Names
C-ROAD-CURB	Road Curb Lines
C-ROAD-STRP	Road Striping
C-ROAD-BRDG	Bridges
C-ROAD-BRDG-NOTE	Bridge Names
C-ROAD-FUTR	Proposed Roads
C-ROAD-FUTR-NOTE	Proposed Road Names
C-ROAD-DEMO	Roads to be Demolished
C-ROAD-DEMO-NOTE	Demolished Road Names
C-BLDG	Building Footprints
C-BLDG-NOTE	Building Names
C-BLDG-PATT	Building Hatching
C-BLDG-TEMP	Temporary Buildings
C-BLDG-TEMP-NOTE	Temporary Building Names
C-BLDG-TEMP-PATT	Temporary Building Hatching
C-BLDG-FUTR	Proposed Buildings
C-BLDG-FUTR-NOTE	Proposed Building Names
C-BLDG-FUTR-PATT	Proposed Building Hatching
C-BLDG-DEMO	Buildings to be Demolished
C-BLDG-DEMO-NOTE	Demolished Building Names
C-BLDG-DEMO-PATT	Demolished Building Hatching
C-PKNG	Parking Lot Outlines
C-PKNG-NOTE	Parking Lot Numbers
C-PKNG-FUTR	Proposed Parking Lots
C-PKNG-FUTR-NOTE	Proposed Lot Numbers
C-PKNG-DEMO	Parking Lots to be Demolished
C-PKNG-DEMO-NOTE	Demolished Lot Numbers

C-WATR
C-WATR-NOTE
C-WATR-LAKE
C-WATR-RIVR

Site Layers

L-SITE
L-SITE-NOTE
L-SITE-WALK
L-SITE-BRDG
L-SITE-SPRT
L-SITE-POOL

Water Features
Water Feature Names
Lakes and Lagoons
Rivers and Streams

Description

Site Features
Site Annotations
Pedestrian Walks
Pedestrian Bridges
Athletic Sport Fields
Swimming Pools