

Basis of Bearings (Optionally including Coordinates)

Introduction

The California Coordinate System (“CCS”) is defined and regulated in the California Public Resources Code (“PRC”) §§8801-8819 California Coordinate System.

The purpose of this document is to provide guidance and sample language for preparing a statement to document the basis of the bearings and, as an option, the use of coordinates, on a record of survey or subdivision map submitted for filing. The use of CCS stations to establish the orientation and location of these surveys requires specific documentation, to be in compliance with the aforementioned sections of the PRC.

This document is prepared in 2015 and assumes a modern survey and the usage of the current CCS version based on the North American Datum of 1983 (“NAD83”), known as CCS83. For surveys made prior to January 1, 2006, refer to §§8812-8813 and §8815.4 for superseded requirements. For surveys based on the North American Datum of 1927 (“NAD27”), additionally adjust references accordingly (e.g. CCS27).

The use of the term “State Plane Coordinates” in California refers only to CCS27 and CCS83 coordinates and is subject to the requirements of §§8801-8819.

Plane coordinate values (i.e. CCS27 or CCS83) are expressed in feet and decimals of a foot, or meters and decimals of a meter. When expressed as feet, the “U.S. Survey Foot” (i.e. one foot = 1200/3937 meters) shall be used for both CCS27 and CCS83. The Cartesian “Y” coordinate will be known as the “Northing” and the “X” coordinate will be known as the “Easting”.

As a matter of survey procedure, any survey that uses or establishes a CCS83 value shall have field-observed statistically independent connections to one or more horizontal reference stations published by the California Spatial Reference Center (CSRC) or the National Geodetic Survey (NGS) or stations that meet all the requirements for inclusion in the California Spatial Reference Network as detailed in §8813.1(a).

The additional documentation required for accuracy statements, per 8813.2 and §8815.4 are not covered in this document

Surveys and maps submitted that use or establish CCS83 values shall include in their documentation (i.e. statement of basis of bearings and optionally coordinates) the following items, under Sample Language. The use of CCS83, even if only for a basis of bearings without intent to establish coordinates still must show the CCS83 values of the referenced and connected reference station(s) per §8813.3(a) and thereby becomes subject to the requirements of §8815.5 as well. The appurtenant §8815.1 requires the epoch date in decimal year format with 2 decimal places (i.e Year and Julian Date/365) and the format of the datum and zone names are regulated in §8815 and §§8803-8809, respectively.

Sample Language

Basis of [Coordinates and] Bearings

The [coordinates and] bearings shown hereon are based upon the California Coordinate System of 1983, CCS83, Zone N, (20NN.NN) in accordance with the California Public Resources Code Sections 8801-8819; said [coordinates and] bearings are based locally upon field-observed ties to the following California Spatial Reference Network, or equivalent stations:

Referenced CSRC (optionally NGS) Station(s) Connected

Station	Northing (Y)	Easting (X)	Height (or) Elevation	Accuracy(ies)

All [coordinates and] distances shown, unless otherwise noted, are in terms of the U.S. Survey Foot (optionally Meter).

Mapping Angle and Grid Factor

Station (optional)	Northing (Y)	Easting (X)	Mapping Angle	Combination Factor	Elevation (optional)	Height

Note: As used in tables above, Elevation refers to the California Orthometric Height or equivalent of the point where the mapping angle and combination factor were calculated and Height refers to the California Geodetic Coordinate or equivalent ellipsoid height used to calculate the combination factor. In the event that the calculations are not performed at a point in the survey, there may be no Station or Elevation to list.

“Ground” Survey * If the survey and map are showing ground distances, the following statement should be made in some form:

Distances shown hereon, are ground distances. To approximate CCS83 grid distances multiply the distances by the combination factor provided hereon.

“Grid” Survey * If the survey and map are showing CCS83 grid coordinate values or distances, the following statement should be made in some form:

Distances shown hereon or inverted from coordinates shown hereon are in reference to CCS83. To approximate local ground distances divide by the combination factor provided hereon.