

## 6.8 Basis of Bearing Statements.

Section 38-51-106(1)(e), C.R.S., requires professional land surveyors to include an explanatory statement concerning the basis of bearings, if used, on their land survey plats.

**6.8.1 Purpose.** The purpose of a basis of bearing statement on a land survey plat is to enable other surveyors to retrace all or part of that survey. Any basis of bearing statement that does not facilitate a retracement is inadequate.

**6.8.2 Composition.** The basis of bearing statement shall state the method used to derive the bearing (i.e., assumed, astronomic, geodetic, grid, reference to recorded or deposited survey, etc.) and the bearing between fully described monuments (i.e., monument material, diameter, length (if set), cap size and material, cap markings/stampings, etc.) at each end of a single line. When the monuments at each end of the reference line are fully described on the plat, they need only be referenced in the "Basis of Bearings" statement. A land survey plat shall show the graphic and mathematical relationship between the basis of bearing and the survey.

**6.8.3 Methods.** When bearings are used, there are four generally accepted methods of stating a basis of bearing on a land survey plat: "astronomic or geodetic," "reference to recorded or deposited survey plat," "grid," and "assumed." Examples of the basis of bearing statement are as follows, but are not limited to:

**6.8.3.1 Astronomic or Geodetic.** This is normally an observation of the Sun or Polaris or Global Positioning System (GPS) observations. Examples are as follows:

- (a) **Astronomic Example** – "Bearings determined by Polaris observations while occupying the Southwest Corner of Section 8. The astronomic bearing from the Southwest Corner of Section 8 to the West One-Quarter Corner of Section 8 is  $N00^{\circ}10'45''W$ . The monuments are fully described on the plat."
- (b) **Geodetic Example** – "The basis of bearing is a geodetic bearing of Line 1-2 of the Mother Lode claim (monuments fully described hereon) as determined by static GPS observations collected simultaneously at both corners. The geodetic bearing from Corner No. 1 to Corner No. 2 is  $S01^{\circ}00'54''E$ ."

**6.8.3.2 Reference to Recorded or Deposited Survey Plat.** This usually involves a subdivision plat, a land survey plat or Bureau of Land Management/Government Land Office plat. Examples are as follows:

- (a) "Bearings based on west line of Lot 7, Block 10, Sunshine Subdivision, Filing 2, Book 13, Page 69, County of Douglas ( $N 04^{\circ} 10' 30'' E$ ); southwesterly corner is No. 5 rebar with a 1" diameter aluminum cap stamped RLS 0001; northwesterly corner is 2" diameter brass cap in concrete marked with punch mark and L.S. 1980."
- (b) "Bearings based on north line of deposited land survey plat of Jackson Parcel (Map Book 17, Plat 4, La Plata County) as  $N 00^{\circ} 10' 12'' E$ . Both ends of said line are found No. 4 rebars in mounds of stone."
- (c) "Bearings are based on the G.L.O. Dependent Resurvey of T. 5 S., R. 75 W. of the 6<sup>TH</sup> PM, dated June 30, 1909, record of  $N 89^{\circ} 30' E$  along the north line of the NW 1/4 of Section 8 (monuments described on plat)."

**6.8.3.3 Grid.** An example is, "All bearings are grid bearings of the Colorado State Plane Coordinate System, Central Zone, North American Datum 1983. The bearing of the line between triangulation stations "Double" (a USC&GS standard disk cemented in a boulder that is 10 inches above ground) and "Black" (a NGS standard disk cemented in a drill hole in outcropping bedrock) is  $S 57^{\circ} 51' 07'' W$ ."

**6.8.3.4 Assumed.** An example is, "Bearings are based on the assumption that the east line of the Southwest 1/4 of Section 17, bears N 00°00'00" E. South 1/4 corner is B.L.M. brass cap on 2 1/2" diameter pipe, Center 1/4 corner is a 3 1/4" aluminum cap on a 1 1/4" diameter axle on west side of 8" x 8" fence post."

**6.8.3.5 Unacceptable Statements.** Following are examples of two unacceptable statements:

**(a)** "Basis of bearings from plat of adjoining Sunrise Knolls."

This is unacceptable because monuments are not described nor is the basis of bearing line identified.

**(b)** "Bearings based on north line of NW 1/4, Section 10 as being N 89° 30' E."

This is unacceptable because monuments are not described.