The state plane coordinate system utilized in Arizona has been established by the United States government. It is based on the Transverse Mercator projection. The current statutes pertaining to use of state plane coordinates in Arizona allow the use of either the 1927 datum or the newer 1983 datum recently developed by the National Geodetic Survey. The 1927 datum utilizes the Clark Spheriod of 1866. The 1983 datum (NAD '83) has been developed from a newer more accurate ellipsoid, more geodetic data and a more sophisticated mathematical adjustment. The 1927 datum is to be phased out and totally replaced by the NAD '83, effective January 1, 1997. A.R.S. 33-121 thru 33-128 discusses use of both the 1927 and 1983 datum which are the statutes to be phased out in 1997. A.R.S. 33-131 thru 33-138 define only the 1983 datum and was effective in 1987. This chapter will breifly discuss the applicable statutes and show them.

Shown next are the current statutes defining the Arizona coordinate system, A.R.S. 33-121 thru 33-123:

ARTICLE 2. ARIZONA COORDINATE SYSTEM

Article 2, consisting of §§ 33-121 to 33-128, is repealed by Laws 1985, Ch. 197, § 12, effective January 1, 1997.

§ 33-121. Arizona coordinate system; zones; composition

A. The Arizona coordinate system is the system of plane coordinates which has been established by the United States national geodetic survey for defining and stating the positions or locations of points on the surface of the earth within the state of Arizona.

B. The Arizona coordinate system shall contain three zones as follows:

1. The west zone, composed of La Paz, Mohave and Yuma counties.

2. The central zone, composed of Coconino, Maricopa, Pima, Pinal, Santa Cruz and Yavapai counties.

3. The east zone, composed of Apache, Cochise, Gila, Graham, Greenlee and Navajo counties.

C. In any land description in which the Arizona coordinate system is utilized the system shall be designated "Arizona coordinate system, _____ zone", with the name of the appropriate zone inserted, and the datum used, either 1927 or 1983.

Amended by Laws 1983, Ch. 291, § 8, eff. April 27, 1983; Laws 1985, Ch. 197, § 6.

Repeal

This section is repealed by Laws 1985, Ch. 197, § 12, effective January 1, 1997.

§ 33-122. Coordinates of system; zone definitions

A. The plane coordinates of a point on the earth's surface, to be used in expressing the position or location of such point in the appropriate zone of this system, shall consist of two distances, expressed in feet and decimals of a foot. One of these distances, to be known as the "X-coordinate", shall give the position in an east-and-west direction; the other, to be known as the "Y-coordinate", shall give the position in a north-and-south direction. These coordinates shall be made to depend upon and conform to the coordinates, on the Arizona coordinate system, of the triangulation and traverse stations of the United States national geodetic survey within the state of Arizona, as those coordinates have been determined by such survey.

B. For the purpose of more precisely defining the Arizona coordinate system, the following definitions of the United States national geodetic survey are adopted:

1. The Arizona coordinate system, west zone, is a transverse mercator projection, having a central meridian 113° 45' 00" west of Greenwich, on which meridian the scale is set at one part in fifteen thousand too small. The origin of coordinates is at the intersection of the meridian 113° 45' 00" west of Greenwich and the parallel 31° 00' 00" north latitude. This origin is given the coordinates of "X" equals five hundred thousand feet, if using 1927 datum, or seven hundred thousand feet, if using 1983 datum, and "Y" equals zero feet in either case.

2. The Arizona coordinate system, central zone, is a transverse mercator projection, having a central meridian 111° 55' 00" west of Greenwich, on which meridian the scale is set at one part in ten thousand too small. The origin of coordinates is at the intersection of the meridian 111° 55' 00" west of Greenwich and the parallel 31° 00' 00" north latitude. This origin is given the coordinates of "X" equals five hundred thousand feet, if using 1927 datum, or seven hundred thousand feet, if using 1983 datum, and "Y" equals zero feet in either case.

3. The Arizona coordinate system, east zone, is a transverse mercator projection, having a central meridian 110° 10' 00" west of Greenwich, on which meridian the scale is set at one part in ten thousand too small. The origin of coordinates is at the intersection of the meridian 110° 10' 00" west of Greenwich and the parallel 31° 00' 00" north latitude. This origin is given the coordinates of "X" equals five hundred thousand feet, if using 1927 datum, or seven hundred thousand feet, if using 1983 datum, and "Y" equals zero feet in either case.

Amended by Laws 1985, Ch. 197, § 7.

Repeal

This section is repealed by Laws 1985, Ch. 197, § 12, effective January 1, 1997.

§ 33-123. Ground markings of system

The position of the Arizona coordinate system shall be as marked on the ground by triangulation or traverse stations established in conformity with standards adopted by the United States national geodetic survey for first-order and second-order work, whose geodetic positions have been rigidly adjusted on the north American datum of either 1927 or 1983, and whose coordinates have been computed on the system defined in this article. Any such station may be used for establishing a survey connection with the Arizona coordinate system.

Amended by Laws 1985, Ch. 197, § 8.

The statutes A.R.S. 33-131 thru 33-133 which will replace A.R.S. 33-121 thru A.R.S. 33-123 are shown next:

ARTICLE 3. ARIZONA COORDINATE SYSTEM, 1983

Article 3, consisting of §§ 33-131 to 33-138 was added by Laws 1985, Ch. 197, § 11, effective January 1, 1987.

Laws 1985, Ch. 197, § 13 provides: "Sec. 13. Effective date

"Section 11 of this act is effective from and after December 31, 1986."

§ 33-131. Arizona coordinate system, 1983; zones; composition

A. The Arizona coordinate system, 1983, is the system of plane coordinates which has been established by the national geodetic survey for defining and stating the positions or locations of points on the surface of the earth in this state.

B. The Arizona coordinate system, 1983, contains three zones as follows:

1. The west zone, composed of La Paz, Mohave and Yuma counties.

2. The central zone, composed of Coconino, Maricopa, Pima, Pinal, Santa Cruz and Yavapai counties.

3. The east zone, composed of Apache, Cochise, Gila, Graham, Greenlee and Navajo counties.

C. In any land description in which the Arizona coordinate system, 1983, is utilized the system shall be designated "Arizona coordinate system, 1983, _____ zone", with the name of the appropriate zone inserted.

Added by Laws 1985, Ch. 197, § 11, eff. Jan. 1, 1987.

§ 33-132. Coordinates of system; zone definitions

A. The plane coordinates of a point on the earth's surface, to be used in the position or location of such point in the appropriate zone of the system, shall consist of two distances, expressed in feet and decimals of a foot (foot value 0.3048 meter exact). One of these distances, to be known as the "X-coordinate", shall give the position in an east-and-west direction, and the other, to be known as the "Y-coordinate", shall give the position in a north-and-south direction. These coordinates shall depend on and conform to the coordinates on the Arizona coordinate system, 1983, of the horizontal control stations of the national geodetic survey in this state, as these coordinates have been determined by the survey.

B. For the purpose of more precisely defining the Arizona coordinate system, the following definitions of the national geodetic survey are adopted:

1. The Arizona coordinate system, 1983, west zone, is a transverse mercator projection of the North American datum, 1983, having a central meridian 113° 45' 00" west of Greenwich, on which meridian the scale is set one part in fifteen thousand too small. The origin of the coordinates is at the intersection of the meridian 113° 45' 00" west of Greenwich and the parallel of 31° 00' 00" north latitude. This origin is given the coordinates of "X" equals seven hundred thousand feet and "Y" equals zero feet.

2. The Arizona coordinate system, 1983, central zone, is a transverse mercator projection of the North American datum, 1983, having a central meridian 111° 55' 00" west of Greenwich, on which meridian the scale is set at one part in ten thousand too small. The origin of the coordinates is at the intersection of the meridian 111° 55' 00" west of Greenwich and the parallel of 31° 00' 00" north latitude. This origin is given the coordinates of "X" equals seven hundred thousand feet and "Y" equals zero feet.

3. The Arizona coordinate system, 1983, east zone, is a transverse mercator projection of the North American datum, 1983, having a central meridian 110° 10' 00" west of Greenwich, on which meridian the scale is set at one part in ten thousand too small. The origin of coordinates is at the intersection of the meridian 110° 10' 00" west of Greenwich and the parallel of 31° 00' 00" north latitude. The origin is given the coordinates of "X" equals seven hundred thousand feet and "Y" equals zero feet.

Added by Laws 1985, Ch. 197, § 11, eff. Jan. 1, 1987.

§ 33-133. Ground markings of system; accuracy specifications; horizontal control stations

A. The position of the Arizona coordinate system shall be marked on the ground by horizontal control stations which have been established in conformity with standards adopted by the federal geodetic control committee for first order, second order class I or second order class II surveys or equivalent standards adopted by successors, at the time the surveys were made and computed on the North American datum, 1983.

B. A horizontal control station normally consists of, if practicable, a group of bronze or brass discs imbedded in concrete posts nearly flush with the ground surface or cemented into holes drilled into rock outcrops or ledges in such a configuration that the station is referenced by a subsurface mark in a precise vertical register with the surface mark, two reference marks, similar to the surface mark accurately located by azimuth and horizontal distance in respect to the horizontal control station and not more than one hundred fifty feet distant and an azimuth mark which may be similar to the horizontal control station not less than one thousand feet distant, or optionally, an object not less than three thousand feet distant such as a church spire, water tank, radio or television transmitting antenna, by which azimuth mark subsequent surveys may be accurately oriented.

C. Horizontal control stations shall be established, if practicable, in proximity to road intersections, hill or mountain tops and similar locations as an aid in the field searches for the horizontal control stations.

Added by Laws 1985, Ch. 197, § 11, eff. Jan. 1, 1987.

For effective date provision of Laws 1985, Ch. 197, see Historical Note following § 33-131.

Current statute A.R.S. 33-124 will be replaced by A.R.S. 33-138 These statutes establish certain criteria which must be met before state plane coordinates can be presented for recordation in any document. Both statutes are shown next:

Repeal

This section is repealed by Laws 1985, Ch. 197, § 12, effective January 1, 1997.

§ 33-124. Recording prerequisite; exception

No coordinates based on the Arizona coordinate system, purporting to define the position of a point on a land boundary, may be presented to be recorded in any public land records or deed records unless such point is within three statute miles of a triangulation or traverse station established in conformity with the standards prescribed in § 33-123, except that a six mile limitation may be substituted in isolated rural areas.

Amended by Laws 1985, Ch. 197, § 9.

§ 33-138. Recording prerequisite

Coordinates based on the Arizona coordinate system, 1983, shall not be presented to be recorded in any public land records unless the recording document also contains the descriptions of not less than two horizontal control stations of first order, second order class I or second order class II positional accuracy which shall not exceed six miles from the nearest point or line of the land survey.

Added by Laws 1985, Ch. 197, § 11, eff. Jan. 1, 1987.

Sometimes a survey extends from one zone to another and a decision must be made as to which zone is utilized if the coordinates are used in a description. A.R.S. 33-125 is the current statute to be replaced by A.R.S. 33-134. Both statutes are shown next:

§ 33-125. Tract located in more than one zone; description

When any tract of land to be defined by a single description extends from one into another of the coordinate zones established by this article, the positions of all points on its boundaries may be referred to either of the two zones, the zone which is used being specifically named in the description.

Amended by Laws 1985, Ch. 197, § 10.

Repeal

This section is repealed by Laws 1985, Ch. 197, § 12, effective January 1, 1997.

§ 33-134. Tract located in more than one zone; description

If a tract of land to be defined by a single description extends from one into another of the coordinate zones established by this article, the position of all points on its boundaries may be referred to as either of the two zones, the zone which is used being specifically named in the description.

Added by Laws 1985, Ch. 197, § 11, eff. Jan. 1, 1987.

Even with the advancement of technology such as a readjustment of the national network of coordinates to NAD '83 and more frequent use of Global Positioning System, the legislature has provided for a legal order of authority when using state plane coordinates in descriptions. A.R.S. 33-126 is the current statute to be replaced by A.R.S. 33-136, they are shown next:

Repeal

These sections are repealed by Laws 1985, Ch. 197, § 12, effective January 1, 1997.

§ 33-126. Public lands survey descriptions; conflicts; control

Where coordinates based on the Arizona coordinate system are used to describe any tract of land which in the same document is also described by reference to any subdivision, line or corner of the United States public land surveys, the description by coordinates shall be construed as supplemental to the basic description of such subdivision, line or corner contained in the official plats and field notes filed of record, and in the event of any conflict the description by reference to the subdivision, line or corner of the United States public land surveys shall prevail over the description by coordinates.

§ 33-136. Public lands survey descriptions; conflicts; control

If coordinates based on the Arizona coordinate system, 1983, are used to describe a tract of land which in the same document is also described by reference to a subdivision, line or corner of the United States public land surveys, the description by coordinates shall be construed as supplemental to the basic description of the subdivision, line or corner contained in the official field notes and plat filed of record, and in the event of a conflict the description by reference to the subdivision, line or corner of the United States public land surveys prevails over the description by coordinates.

Added by Laws 1985, Ch. 197, § 11, eff. Jan. 1, 1987.

Another legal consideration when using state plane coordinates is that a purchaser or mortgagee is not required to rely on a description that in whole or part depends exclusively on the Arizona coordinate system. The current statute A.R.S. 33-127 will be replaced by A.R.S. 33-135, both are shown next:

§ 33-127. Reliance of purchaser or mortgagee not required

Nothing contained in this article requires any purchaser or mortgagee to rely on a description, any part of which depends exclusively upon the Arizona coordinate system.

§ 33-135. Reliance of purchaser or mortgagee not required

Nothing contained in this article requires any purchaser or mortgagee to rely on any land description, any part of which depends exclusively on the Arizona coordinate system, 1983.

Added by Laws 1985, Ch. 197, § 11, eff. Jan. 1, 1987.

The current statute A.R.S. 33-128 is simply a limitation clause and has not been perpetuated in the 1997 enactment of the new statutes. It is shown next:

§ 33-128. Limitation

The use of the term "Arizona coordinate system" on any map, report of survey or other document, shall be limited to coordinates based on the Arizona coordinate system as defined in this article.

The following statute, A.R.S. 33-137 specifies criteria to be followed when extending or densifying the NAD '83 control network. Since this statute is currently in effect, any extention or densification of the Arizona coordinate system does fall within this statute (since the effective date of Jan. 1, 1987). This would apply to a project which establishes new control stations to be used by other surveys utilizing the Arizona coordinate system. A.R.S. 33-137 is shown next:

§ 33-137. Recording, filing, publishing extensions and densifications of the ground marking system

A. Extensions and densifications of the ground marking system of the Arizona coordinate system, 1983, shall be executed in conformity with the standards and specifications of the federal geodetic control committee for first order, second order class I and second order class II surveys and computed on the North American datum, 1983.

B. The results of these surveys shall be published by a competent department of the federal government, such as the national geodetic survey, or a surveyor qualified to practice in this state, in which case the survey results shall bear a certification to the effect that the specifications of the federal geodetic control committee have been

C. Extensions and densifications of the ground marking system by first order, second order class I or second order class II methods only shall be used. Such extensions and densifications shall be integrated with previously established horizontal control stations of equal or higher order to form a matrix or network no part of which shall have positional errors exceeding those specified for class II second order. The spacing intervals shall not exceed three miles.

D. The results of these surveys are public domain and shall be duly recorded in the office of the county recorder of the county where the horizontal control station is situated.

Added by Laws 1985, Ch. 197, § 11, eff. Jan. 1, 1987.