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**Rules of  
 Department of Economic Development  
 Division 30—Missouri Board for Architects,  
 Professional Engineers and Land Surveyors  
 Chapter 16—Missouri Minimum Standards  
 for Property Boundary Surveys**

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**Title 4—DEPARTMENT OF  
ECONOMIC DEVELOPMENT**  
**Division 30—Missouri Board for Archi-  
tects, Professional Engineers and Land  
Surveyors**  
**Chapter 16—Missouri Minimum Stan-  
dards for Property Boundary Surveys**  
**4 CSR 30-16.010 Application of Stan-  
dards**

*PURPOSE: These minimum standards provide the surveyor and recipient of boundary surveys with a realistic guideline for adequate survey performance. This rule describes the types of surveys to which these minimum standards apply.*

The minimum standards in this chapter apply to all property boundary surveys made for determining the location of land boundaries and land boundary corners, but do not apply to preliminary plats or plans, plot plans, engineering surveys; geodetic surveys; cartographic surveys, or Surveyor's Real Property Report. Any individual or corporation registered with the board to perform land surveying services in this state shall be familiar with and comply with these minimum standards. The Missouri Minimum Standards for Property Boundary Surveys are not intended to be used in place of professional land surveying judgement. There may be special circumstances and conditions that make it impractical to comply with some provisions of the minimum standards. If the survey deviates from these minimum standards, this deviation shall be noted, described, and justified on the plat of survey by the professional land surveyor. This provision cannot be used to intentionally circumvent the basic tenets of these minimum standards.

*Auth: section 327.041, RSMo (Cum. Supp. 1993). \* Original rule filed May 3, 1994, effective Dec. 30, 1994.*

*\*Original authority 1969, amended 1981, 1986, 1989, 1993.*

**4 CSR 30-16.020 Definitions**

*PURPOSE: This rule defines the various technical and legal terms used in this chapter.*

(1) Block: Block means a group of lots existing within well-defined and fixed boundaries, usually being surrounded by streets or physical barriers, and usually having an assigned number, name, letter, or other identifier through which it may be identified.

(2) Class of Property.

(A) Rural property—Any property that is not urban or suburban that is used for the production of crops, livestock or minerals, or used as parks, forest or similar use.

(B) Suburban property—Any property which is not urban property that is or is intended to be primarily used for residential purposes or property lying between residential areas whose value is influenced by the presence of such nearby developed real estate.

(C) Urban property—Any property wholly or partly within the corporate limits of any city, town or village, and any commercial and industrial properties, condominium properties, town houses, apartments, and other multi-unit developments.

(3) Controlling corners. Controlling corners are the corners that determine the location of the record title boundary.

(4) Exterior corners of a parcel are the corners that define the shape and size of the parcel.

(5) Legal description. A description of real property by government survey, metes and bounds, or lot numbers of record. The description must be complete enough so a particular parcel of land can be located and identified.

(6) Linear error of closure is the square root of the sum of the squares of the error in north coordinates (Y) and in east coordinates (X).

(7) Material variations, whether between surveyed lines and lines of possession, or between record and measured distances or directions are variations so substantial and important that they would influence a reasonably prudent and otherwise knowledgeable person when making decisions in reliance upon the survey.

(8) Physical monument. The term physical monument refers to both natural and artificial physical objects which are accepted and used to mark boundaries and corners.

(9) Property boundary surveys.

(A) A condominium survey is a survey executed to create and define condominium property in accordance with Chapter 448, RSMo.

(B) An original survey is a survey which creates a new parcel out of a large parent tract, for the purpose of conveying the new parcel. Boundary adjustment plats, consolidation plats, riparian plats, lot splits, and minor subdivisions are examples of original surveys.

(C) A resurvey is a survey executed to remark, reestablish, restore or delineate the boundary line or corners of a parcel previously created by a deed, survey or subdivision.

(D) A subdivision survey is the partitioning of land into two or more parcels by platting the divisions of land in accordance with Chapter 445, RSMo and per the appropriate platting procedures, and from which parcels are then sold by reference to the plat of record.

(10) Radial survey measurement tolerance is the computed expected relative accuracy of any distance determined by radial surveying methods. It is computed using an analysis of component distance and direction errors.

(11) Radial survey method is the determination of the coordinate values of points by measuring directions and distance from a central point as opposed to determination of the coordinates of points by traverse. The determination of coordinates by "side shots" from a closed traverse is not considered a radial surveying method.

(12) Record title boundaries are the boundaries of the real estate described in the title of record.

(13) Relative position tolerance is the relative accuracy between all pairs of points in a survey. In practice it is computed for a sampling of pairs of points using either an analysis of component distance and direction errors or from a minimally constrained, correctly weighted least squares adjustment.

(14) Title of record. A title to real estate, evidenced and provable by one or more conveyances or other instruments all of which are duly entered on the public records.

(15) Traverse closure is the linear error of closure of the traverse computed either from an analysis of the component distances and direction errors or from the actual traverse measurements.

(16) United States Public Land Survey Corners. Corners of the United States Public Land Survey are those points that determine the boundaries of the various subdivisions represented on the official government plat such as the township corner, the section corner, the quarter-section corner, blank quarter-section corners, center of section, fractional-section corners, grant corner and meander corner.

*Auth: section 327.041, RSMo (Cum. Supp. 1993). \* Original rule filed May 3, 1994, effective Dec. 30, 1994.*

*\*Original authority 1969, amended 1981, 1986, 1989, 1993.*



**4 CSR 30-16.030 General Land Surveying Requirements**

*PURPOSE: This rule describes standards that apply to all property boundary surveys.*

(1) Research and Investigation

(A) Every survey executed shall be based on the legal description of the parcel or parent tract taken from the title of record. This legal description should be provided by the client.

(B) Prior to making a survey the surveyor shall, insofar as necessary to define the property to be surveyed, acquire other data, such as adjoining deeds, maps, subdivision plats, original plats and original notes. This shall not be construed that the surveyor has an obligation to research the title of record.

(C) The surveyor shall compare and analyze all of the data obtained and determine the record title boundaries of such parcel or parent tract as reflected by the documents of record supplied or acquired by the surveyor.

(2) The Field Survey. The registered land surveyor or a person under his/her direct personal supervision, shall—

(A) Search for and locate controlling corners and other physical monuments that may influence or are required to define the location of the exterior corners of the parcel to be surveyed;

(B) Search for and locate other real evidence, such as, where applicable, the location of streets, roads, lines of occupation, resident witness information, etc. which relates to the survey;

(C) Evaluate the reliability of the evidence and monuments that have been found;

(D) Obtain appropriate measurements to correlate all found evidence. Measurements will be taken to a precision compatible with the size and geometric shape of the parcel involved, and consistent with the accuracy desired for the class of property on which the survey is located, and in accordance with the accuracy standards as set out in this chapter;

(E) Correlate the facts obtained by the field survey with the record boundaries of the parcel or parent tract; and

(F) Reach a conclusion on the location of record title boundaries and set monuments as required.

(3) Publication of Results. A plat shall be made showing the results of the survey and a signed and sealed copy of the plat shall be furnished to the client. This survey plat shall conform to all of the following provisions, where applicable:

(A) The plat shall be a drawing made to a convenient scale on the type of material consistent with the purpose and permanency

required. If the client requests the survey plat to be provided in digital format (AutoCAD, etc.), the surveyor shall also provide a signed and sealed drawing. The drawing shall be the official plat and shall take precedence over the digital data;

(B) The plat shall show the name of the person for whom the survey was made and the date of the survey;

(C) The plat or copy of the plat furnished the client shall bear the signature and seal of the surveyor in responsible charge. Whenever more than one (1) sheet must be used to accurately portray the survey, each sheet shall bear the signature and seal of the surveyor;

(D) Lettering on the plat presented to the client or recorder shall be no smaller than eight-hundredths inch (0.08") in height. All characters shall be open, well-rounded and of uniform width;

(E) The direction of boundary lines on the plat shall be shown by direct angles between established lines or by azimuths or bearings based upon a described direction reference system. The direction reference system shall be clearly described on the plat and must be retracable for future surveys;

(F) A prominent north arrow shall be drawn on every sheet;

(G) Complete dimensions (distances, directions, and curve data) of all parcels surveyed and/or created shall be shown;

(H) All dimensions shall be shown in feet or meters. All plat dimensions shall be given as horizontal distances at the ground surface. A written scale shall be noted on all plats. Drawings eight and one-half inches by fourteen inches (8 1/2" x 14") or larger shall also show a graphic scale;

(I) All vertical dimensions shall be shown by elevations above an established or assumed datum;

(J) Measurements and calculated areas will be shown on the plat to a number of significant figures representative of the actual precision of the measurements;

(K) Curved lines shall show at least two (2) elements of the curve and preferably these three (3): radius, central angle and length of arc. When not tangent to the preceding and/or succeeding course, the bearing or angle of either the initial tangent, radial line or long chord shall be shown. Pertinent information on compound curves shall be shown;

(L) The survey shall show sufficient data (distances and directions) to positively locate the parcel surveyed within the United States Public Land Survey, or within the recorded subdivision. If the survey cannot be located by either of the previously mentioned provisions, it must be referenced to other lines and points sufficiently established by record;

(M) All controlling corners accepted or restored shall be shown or noted on the plat;

(N) All controlling corner physical monuments either found or set shall be shown and described on the plat. A note or symbol shall show which were found and which were set;

(O) The class of property shall be noted on the plat; and

(P) Any material variation between measured and record dimensions shall be noted on the plat.

*Auth: section 327.041, RSMo (Cum. Supp. 1993). \* Original rule filed May 3, 1994, effective Dec. 30, 1994.*

*\*Original authority 1969, amended 1981, 1986, 1989, 1993.*

**4 CSR 30-16.040 Accuracy Standards for Property Boundary Surveys**

*PURPOSE: This rule prescribes the accuracy standards for all property boundary surveys.*

(1) The surveyor shall select the proper equipment and method necessary to achieve either the required relative position tolerance, required radial survey measurement tolerance or required traverse closure.

(2) If the computed relative position tolerance is greater than the required relative position tolerance, the survey shall be considered unacceptable and shall be remeasured.

(3) If the computed traverse closure is greater than the required traverse closure, the traverse shall be considered unacceptable and shall be remeasured.

(4) When the radial survey methods are used, it is the responsibility of the surveyor to provide sufficient checks to insure that the relative positional tolerance of all points is not greater than that required in this regulation.

(5) The required relative position tolerance and traverse closure at sixty-eight percent (68%) confidence level shall be—For urban property: one-tenth of a foot (0.10') or 1:20,000 for distances greater than two thousand feet (2000'); Suburban property: one-tenth of a foot (0.10') or 1:10,000 for distances greater than one thousand feet (1000'); Rural property: two-tenths of a foot (0.20') or 1:5,000 for distances greater than one thousand feet (1000').

*Auth: section 327.041, RSMo (Cum. Supp. 1993). \* Original rule filed May 3, 1994, effective Dec. 30, 1994.*

*\*Original authority 1969, amended 1981, 1986, 1989, 1993.*

#### 4 CSR 30-16.050 Use of Missouri Coordinate System, 1983

*PURPOSE: This rule designates how state coordinates shall be obtained and shown on plats.*

(1) When the surveyor is specially requested by the client or required by statute, ordinance or regulation to obtain coordinates based on the Missouri Coordinate System of 1983 and to define the position of points on a land boundary—

(A) The coordinates shall be based upon a first or second order station as defined in 4 CSR 30-18;

(B) The survey making the connection from the first or second order control station shall meet the accuracy standards for property boundary surveys required in this chapter and the one kilometer (1 km) limitation in section 60.461, RSMo is herewith waived;

(C) The plat or approved corner registration documents shall note which control station(s) were used to determine the coordinates, the coordinates of those stations and the grid factor used; and

(D) The plat or approved corner registration documents shall contain a table showing how the connection was made by showing grid distances and grid bearings to the control or a statement of the relative positional tolerance of the coordinates, relative to the first or second order control.

(2) Only coordinates based on the Missouri Coordinate System of 1983 may be recorded in any public land record or deed.

*Auth: section 327.041, RSMo (Cum. Supp. 1993). \* Original rule filed May 3, 1994, effective Dec. 30, 1994.*

*\*Original authority 1969, amended 1981, 1986, 1989, 1993.*

#### 4 CSR 30-16.060 Approved Monumentation

*PURPOSE: This rule prescribes the approved type of monumentation to be used on property boundary surveys.*

(1) General Requirement for Permanent and Semi-Permanent Monument. The surveyor shall select a type of monument providing a degree of permanency consistent with that of the adjacent terrain and physical features and

as required by these standards. All monuments shall be solid and free from movement. They shall be set in the ground at least to the depth of the minimum length given unless they are encased in concrete. With the exception of drill holes and cut crosses, the precise position of the corner shall be marked by a point on a cap and the cap shall be inscribed with the registration number of the land surveyor in responsible charge, or the corporate registration number or name of the company.

(2) Permanent monuments shall be selected from the following:

(A) Concrete monuments consisting of reinforced concrete at least four inches (4") square or in diameter and no less than twenty-four inches (24") in length with its precise position marked by a point on a brass or aluminum cap not less than one and one-half inch (1 1/2") in diameter;

(B) Commercial cast iron or aluminum survey markers no less than twenty-four inches (24") in length. Nonferrous markers shall have ceramic magnets attached to aid in recovery;

(C) Steel, coated steel, or aluminum rod markers not less than five-eighths inch (5/8") in diameter, iron pipe markers not less than three-quarter inch (3/4") inside diameter and not less than twenty-four inches (24") in length. These monuments shall have a permanently attached cap of the same metal or of a dissimilar metal if the metals are insulated with a plastic insert to reduce corrosion. Nonferrous rod markers shall have ceramic magnets attached to aid in recovery; and

(D) Brass or aluminum disk not less than two inches (2") in diameter, countersunk and well-cemented in a drill hole in either solid rock or concrete. Ceramic magnets shall be attached or installed with the disk to aid in recovery.

(3) Semi-permanent monuments shall be selected from the following:

(A) Iron pipe markers not less than three-fourths inch (3/4") outside diameter at least eighteen inches (18") in length and having a plastic or metal cap;

(B) Steel or aluminum rod markers not less than one-half inch (1/2") in diameter and not less than eighteen inches (18") in length and having a plastic or aluminum cap;

(C) In urban built-up areas, a cross-cut in concrete, brick, or stone paving at the precise position of the corner or on a prolongation of a boundary line; and

(D) In asphalt paving, railroad (R.R.) spikes, cotton picker spindles, and other metal devices that are solid and not easily removed or destroyed. P.K. nails and concrete nails are not to be used as semi-permanent monuments.

(4) Installation of Survey Monuments. All monuments will be installed in accordance with these standards and according to installation details approved by the local governing body that take into account local conditions.

(5) Existing Survey Monuments. Existing monuments shall be evaluated for permanency by the surveyor. In no instance shall the surveyor be required by these standards to remove existing monuments unless the installation of a new monument is necessary to preserve the position of the corner.

(6) When it is impractical to set a required monument, a witness monument shall be set. It should be placed five feet (5') or more away from the point and preferably at an even foot. Witness monuments less than five feet (5') from the point must be clearly identified and shown on the plat. The location of the witness monument should be along a line of the survey or a prolongation of such line.

*Auth: section 327.041, RSMo (Cum. Supp. 1993). \* Original rule filed May 3, 1994, effective Dec. 30, 1994.*

*\*Original authority 1969, amended 1981, 1986, 1989, 1993.*

#### 4 CSR 30-16.070 Detail Requirements for Resurveys

*PURPOSE: This rule provides specific detail requirements that apply only to resurveys.*

(1) Monumentation. The land surveyor shall establish semi-permanent or confirm existing monuments at each and every exterior corner of the parcel or tract being surveyed. All exterior corners shall be set or witnessed with the exception of those along streams or lakes or undedicated/unrecorded roads.

(2) Publication of Results.

(A) Any material variation between surveyed lines and lines of possession or previous surveys at each exterior corner as shown by fences, survey monuments, walls or other structures whether on the property surveyed or on adjoining property, along with the extent of such variations, shall be shown on the plat.

(B) If the boundary description surveyed is from a recorded document, then the plat shall show or reference, or both, the record source of the boundary description surveyed. For example: lot, block, subdivision name; deed record book and page; document number.

(C) If the boundary description surveyed is not contained in a recorded document (for example, boundary description contained in a

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lease, or unrecorded contract for deed), then the description provided the surveyor shall be quoted on the plat.

(3) Certification. The surveyor's certification or declaration on the plat shall include a statement that the survey was executed in accordance with the current Missouri Minimum Standards for Property Boundary Surveys.

*Auth: section 327.041, RSMo (Cum. Supp. 1993). \* Original rule filed May 3, 1994, effective Dec. 30, 1994.*

*\*Original authority 1969, amended 1981, 1986, 1989, 1993.*

**4 CSR 30-16.080 Detail Requirements for Original Surveys**

*PURPOSE: This rule provides specific detail requirements that apply only to original surveys.*

(1) Monumentation. The land surveyor shall establish semi-permanent monuments at each and every exterior corner of the tract being surveyed. All exterior corners shall be set or witnessed with the exception of those along streams or lakes or undedicated/unrecorded roads.

(2) Publication of Results.

(A) The plat shall show or reference the record source of the parent parcel from which the original survey was made.

(B) Legal description of the parcel created shall be written and shown on the resulting plat of survey.

(3) Certification. The surveyor's certification or declaration on the plat shall include a statement that the survey was executed in accordance with the current Missouri Minimum Standards for Property Boundary Surveys.

*Auth: section 327.041, RSMo (Cum. Supp. 1993). \* Original rule filed May 3, 1994, effective Dec. 30, 1994.*

*\*Original authority 1969, amended 1981, 1986, 1989, 1993.*

**4 CSR 30-16.090 Detail Requirements for Subdivision Surveys**

*PURPOSE: This rule provides specific detail requirements that apply to subdivision surveys.*

(1) Monumentation.

(A) Prior to recording a new subdivision plat the surveyor shall establish semi-permanent or confirm existing monuments at each and every exterior corner on the boundaries of the tract of land being subdivided.

(B) The surveyor shall establish at least two (2) permanent monuments for each block created. This requirement is waived when the survey does not create more than four (4) lots or parcels and new public or private streets, roads or access easements.

(C) The permanent monuments required in subsection (1)(B) shall be set prior to the recording of the plat if they will not normally be moved or destroyed by construction within six (6) months of their installation. If the required permanent monuments will be moved or destroyed by construction, they must be installed upon completion of the construction but in any event, within twelve (12) months after the plat has been recorded. The plat shall show all monuments to be set and note when they will be set.

(D) The surveyor shall, within twelve (12) months after recording the plat, monument all lot corners in the subdivision with semi-permanent monuments. The front lot corners may be monumented by notches or cross cut in concrete paving on the prolongation of the lot line.

(E) When the subdivision is a cemetery, the requirements of subsection (1)(B) for installation of permanent monuments shall be increased to include four (4) permanent monuments per block and the monumentation of all lot corners required in subsection (1)(D) shall not be required.

(2) Publication of Results. The plat shall show or reference the record source of the parent parcel from which the subdivision survey was made.

(3) Certification. The surveyor's certification or declaration on the plat shall include the statement that the surveyor has surveyed the described property and subdivided it as shown on the plat in accordance with the current Minimum Standards for Property Boundary Surveys.

*Auth: section 327.041, RSMo (Cum. Supp. 1993). \* Original rule filed May 3, 1994, effective Dec. 30, 1994.*

*\*Original authority 1969, amended 1981, 1986, 1989, 1993.*

**4 CSR 30-16.100 Detail Requirements for Condominium Surveys**

*PURPOSE: This rule provides specific detail requirements that apply to condominium surveys.*

(1) Monumentation. The monumentation required by this chapter for subdivision surveys shall be met for the original or overall condominium survey and plat. No monumentation is required on later phases in the same condominium unless additional streets are to be dedicated by the plat.

(2) Publication of Results. Each plat shall show the following:

(A) The name and a survey or general schematic map of the entire condominium; if the plat is of a later phase, the recorded location of the original condominium plat shall be given;

(B) The location and dimensions of all real estate not subject to development rights, or subject only to the development right to withdraw, and the location and dimensions of all existing improvements within that real estate in accordance with this chapter;

(C) A legally sufficient description of any real estate subject to development rights, labeled to identify the rights applicable to each parcel;

(D) The extent of any encroachments by or upon any portion of the condominium in accordance with 4 CSR 30-16.110(1);

(E) To the extent feasible, a legally sufficient description of all easements serving or burdening any portion of the condominium in accordance with 4 CSR 30-16.110(2);

(F) Unless shown on plans of the units, the location and dimensions of any vertical unit boundaries and that unit's identifying number;

(G) Unless shown on plans of the units, the location with reference to an established datum of any horizontal unit boundaries and that unit's identifying number;

(H) A legally sufficient description of any real estate in which the unit owners will own only an estate for years, labeled as leasehold real estate;

(I) The distance between noncontiguous parcels of real estate comprising the condominium;

(J) The location and dimensions of limited common elements, including porches, balconies and patios, other than parking spaces and the other limited common elements described in subdivisions (2) and (4) of section 448.2-102, RSMo;

(K) The plat shall clearly define the elevation datum used. The current North American Vertical Datum, or a similar well documented datum is preferred. The location and elevation

of the benchmark used to establish project datum shall be described on the plat. If no such established datum exists within a reasonable distance of the project, the surveyor will set a permanent monument as a bench mark and shall show its location and elevation on the plat; and

(L) A plat may also show the intended location and dimensions of any contemplated improvement to be constructed anywhere within the condominium. Any contemplated improvement shown must be labeled either **SHALL BE BUILT** or **NEED NOT BE BUILT**.

*Auth: section 327.041, RSMo (Cum. Supp. 1993). \* Original rule filed May 3, 1994, effective Dec. 30, 1994.*

*\*Original authority 1969, amended 1981, 1986, 1989, 1993.*

(3) Certification. Each condominium plat shall contain a certification or declaration that the plat contains all information required by section 448.2-109, RSMo and that the survey and plat are in compliance with the current Missouri Minimum Standards for Property Boundary Surveys.

*Auth: section 327.041, RSMo (Cum. Supp. 1993). \* Original rule filed May 3, 1994, effective Dec. 30, 1994.*

*\*Original authority 1969, amended 1981, 1986, 1989, 1993.*

#### 4 CSR 30-16.110 Location of Improvements and Easements

*PURPOSE: This rule designates how and what improvements and easements are to be located and shown on a property boundary survey.*

(1) When the surveyor is specifically requested by the client to locate the improvements on the property boundary survey, the surveyor shall:

(A) Locate by measurement all permanent structures having fixed foundations, slabs, or footings such as houses, in-ground swimming pools, concrete walls and buildings; and

(B) The permanent structure shall be shown on the plat with a minimum of three (3) dimensions to the property lines. Dimensions to straight property lines shall be perpendicular to the property lines, and dimensions to curved property lines shall be radial to the property lines.

(2) When the surveyor is specifically requested by the client to locate and show easements on a property boundary survey, s/he shall show all easements shown on the recorded subdivision plat and all easements evidenced by a record document which has been delivered to the surveyor by the client.