

## Chapter 29. Standards of Practice for Boundary Surveys

### §2901. Scope and Purpose

A. The following standards of practice for boundary surveying in the state of Louisiana have been adopted to help ensure that boundary surveys are performed in accordance with acceptable procedures.

B. The purpose of these standards is to safeguard life, health and property, and to promote the public welfare, by establishing technical standards of practice for every boundary survey performed in the state of Louisiana so that professional performance can be evaluated for but not limited to research, field work, monuments, descriptions, plats and maps. If higher standards are required by clients, or by local, state and federal jurisdictions, then those standards shall govern. When a boundary survey involves certain corners or lines that are covered under the appropriate edition of the *Manual of Instructions for the Survey of the Public Lands of the United States*, then the Manual's rules or instructions for these particular surveys shall apply. Every professional land surveyor performing a boundary survey in the state of Louisiana is required to follow these standards.

C. A boundary survey in this state shall only be performed by a professional land surveyor, licensed pursuant to the laws of this state, or persons under his/her responsible charge. The professional land surveyor shall at all times comply with the provisions of the licensure law and the rules of the board.

D. It is intended that these standards of practice not be relied upon by the professional land surveyor as a substitute for the exercise of proper individual skill, professional discretion, and professional judgment in fulfilling the contractual requirements of any boundary survey. This also does not absolve the professional land surveyor from his/her obligation to use due diligence in the practice of land surveying and from complying with all applicable laws and rules pertaining to the practice of land surveying.

E. When in the professional land surveyor's opinion, special conditions exist that effectively prevent the boundary survey from meeting these standards of practice, the special conditions and any necessary deviation from these standards shall be noted upon the drawing. It shall be a violation of this Chapter to use special conditions to circumvent the intent and purpose of these standards of practice.

AUTHORITY NOTE: Promulgated in accordance with R.S. 37:688.

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### §2903. Definitions

A. Any terms not specifically defined herein shall be as defined in the most current publication of *Definitions of Surveying and Associated Terms* as published by the American Congress on Surveying and Mapping. For the purpose of this Chapter, all the definitions listed that differ from any other source are to be interpreted as written herein.

*Artificial Monuments*—relatively permanent objects used to identify the location of a corner. Artificial monuments shall retain a stable and distinctive location and

shall be of sufficient size and composition to resist the deteriorating forces of nature.

*Client*—the person with whom the contract for work is made. This may or may not be the owner.

*Corner*—a point on a land boundary at which two or more boundary lines meet. It is not the same as a monument, which refers to the physical evidence of the corner's location on the ground.

*Deed*—an instrument in writing which, when executed and delivered, conveys an estate in real property or interest therein.

*Description, Legal*—a written description usually contained in an act of conveyance, judgment of possession, or recognized by law which definitely locates property by metes and bounds or by reference to government surveys, coordinate systems or recorded maps; a description which is sufficient to locate the property without oral testimony.

*Description, Metes and Bounds*—a description of a parcel of land by reference to course and distances around the tract, or by reference to natural or artificial monuments.

*Encroachment*—any structure or obstruction which intrudes upon, invades or trespasses upon the property of another.

*May*—when used means that a choice on the part of the professional land surveyor is allowed.

*Monument*—a physical object or structure which marks the location of a corner or other survey point. In public lands surveys, the term *corner* is employed to denote a point determined by the surveying process, whereas the *monument* is the physical object installed, or structure erected, to mark the corner point upon the earth's surface. Monument and corner are not synonymous, though the two terms are often used in the same sense.

*Natural Monuments*—objects which are the works of nature, such as streams, rivers, ponds, lakes, bays, trees, rock outcrops, and other definitive topographic features.

*Positional Accuracy*—the difference between the actual position of a monument and the position as reported on the plat or map.

*Positional Tolerance*—the distance that any monument may be mislocated in relation to any other monument cited in the survey.

*Prescription*—title obtained in law by long possession. Occupancy for the period prescribed by the Louisiana Civil Code, as sufficient to bar an action for the recovery of the property, gives title by prescription.

*Right of Way*—any strip or area of land, including surface, overhead, or underground, encumbered by a servitude. Rights are typically granted by deed for access or for construction, operation and/or maintenance purposes, according to the terms of the grant.

*Servitude*—an interest held by one person in land of another whereby the first person is accorded partial use of such land for a specific purpose. A servitude restricts but does not abridge the rights of the fee owner to the use and enjoyment of his/her land. The term *easement* is often used interchangeably with *servitude* and generally means the same thing.

*Shall*—the subject is imperative or mandatory and must be done by the professional land surveyor.

*Should*—past tense of *shall* and used to express obligation, duty or desirability.

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### **§2905. Classification of Boundary Surveys**

A. Types of Boundary Surveys. Three types of boundary surveys, which relate to or define property boundaries, are regulated by these standards. These are property boundary surveys, route surveys and mineral unitization surveys.

B. Presented below are categories which define the degree of accuracy which shall be attained for boundary surveys performed in Louisiana. These classifications are based upon the purposes for which the property is being used at the time the survey is performed and any proposed developments which are disclosed to the professional land surveyor by the client. Refer to §2913 for accuracy standards for each of the following classes of boundary surveys.

1. Class A Surveys. Boundary surveys which require maximum surveying accuracy. This includes, but is not limited to, surveys of urban business district properties and highly developed commercial properties.

2. Class B Surveys. Boundary surveys of properties which justify a high degree of surveying accuracy. This includes, but is not limited to, surveys of commercial properties and higher priced residential properties located outside urban business districts and highly developed commercial areas.

3. Class C Surveys. Boundary surveys of residential and suburban areas. This includes, but is not limited to, surveys of residential areas which cannot be classified as Class A or Class B surveys.

4. Class D Surveys. Boundary surveys of all remaining properties which cannot be classified as Class A, B or C surveys. This includes, but is not limited to, surveys of farm lands and rural areas.

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### **§2907. Property Boundary Survey**

#### **A. Definition**

*Property Boundary Survey*—a survey which, after careful study, investigation, and evaluation of major factors influencing the location of boundaries, results in the deliberate location or relocation on the ground of, and the recovery or installation of monuments that define the location and extent of, one or more boundaries. Surveying and mapping activities which meet the definition of a property boundary survey are listed in Subparagraph a of §105.A, *Practice of Land Surveying*. Any plat or map prepared from surveying and mapping activities listed in Subparagraph b of §105.A, *Practice of Land Surveying*, which does not meet the definition of a property boundary

survey, shall have a note stating that it that does not represent a property boundary survey.

B. Purpose. The primary purpose of the property boundary survey is to locate or relocate the physical position and extent of the boundaries of real property, and the discovery of visible evidence of prescriptive rights relating thereto. A property boundary survey may also include the location or relocation of the physical position and extent of political boundaries which define the perimeters of public or private ownership. In addition, the property boundary survey is a means of marking boundaries for sufficient definition and identification to uniquely locate each lot, parcel, or tract in relation to other well recognized and established points of reference, adjoining properties and rights-of-way.

C. Product. A property boundary survey shall result in the recovery, establishment or reestablishment of monumented corners and points of curvature and tangency. Reference monuments shall be established or reestablished when required by these standards (see Subsection E, "Monuments"). In the event that no plat or map of survey is required, the professional land surveyor shall maintain adequate records to substantiate his/her professional opinion in reestablishing boundary lines and corners on a survey. If requested by the client, a property boundary survey may also include the following:

1. a signed, sealed and dated metes and bounds written description depicting the surveyed boundary (see Subsection H, "Descriptions");

2. a certified plat or map depicting the survey as made on the ground; and

3. a signed, sealed and dated written report of the professional land surveyor's findings and determinations.

D. Research and Investigation. Where the purpose of a property boundary survey neither requires nor includes research and investigation of servitudes, a note to that effect shall be placed upon the plat or map of survey. However, when such research or investigation is required, the professional land surveyor shall request from the client or their agent the most recent legal description, plats or maps describing the property to be surveyed. The professional land surveyor shall then evaluate the necessity to obtain the following data based on the specific purpose of the survey:

1. additional recorded legal descriptions and plats or maps of the tract to be surveyed and tracts adjoining or in proximity to the property to be surveyed;

2. the recorded legal descriptions of adjoining, severing, or otherwise encumbering servitudes or rights-of-way, including but not limited to, highways, roadways, pipelines, utility corridors, and waterways used for drainage, navigation or flood control; and

3. grants, patents, subdivision plats or maps or other recorded data that will reference or influence the position of boundary lines.

E. Monuments. The professional land surveyor shall set monuments at all boundary or lot corners, including points of curvature and points of tangency unless monuments already exist or cannot be set due to physical obstructions. The following guidelines apply to artificial monuments to be set.

1. All monuments set shall be composed of a durable material and shall incorporate a ferrous material to aid in locating them by magnetic locators and, if composed of a

ferrous material, shall be a minimum of 1/2 inch outside diameter, and a minimum of 18 inches in length unless it is physically impossible to set such a monument. If rebar rods are used as survey monuments, the minimum size shall be a #4 bar.

2. Concrete monuments shall be at least 3 inches in width or diameter by 24 inches in length, reinforced with an iron rod at least 1/4 inch in diameter, and may contain a precise mark on top indicating the exact location of the corner.

3. Marks on existing concrete, stone, or steel surface shall consist of drill holes, chisel marks or punch marks and shall be of sufficient size, diameter or depth to be definitive, stable and readily identifiable as a survey monument. Marks on asphalt roads may consist of railroad spikes, large nails, or other permanent ferrous spikes or nail-like objects.

4. It is unacceptable to set wooden stakes as permanent boundary monuments.

5. Monuments shall be set vertically whenever possible and the top shall be reasonably flush with the ground when practical. Monuments subject to damage from earthwork, construction or traffic should be buried at a sufficient depth to offer protection.

6. When physically impossible to set a monument at the corner, witness or reference monuments shall be set, preferably on each converging line at measured distances from the corner and identified as such in the description and on the plat or map of the property.

F. Field Procedures. All field work shall be performed in accordance with accepted modern surveying theory, practice and procedures. Any person in charge of a survey field party shall be well-trained in the technical aspects of property boundary surveying. Every professional land surveyor under whose responsible charge a property boundary survey is conducted is also required to adhere to the following.

1. All field measurement procedures shall be consistent with these standards and modern surveying theory, procedures and techniques.

2. In performing resurveys of tracts having boundaries defined by lines established in public lands surveys, the professional land surveyor shall, as nearly as possible, reestablish the original lines of any prior survey made under United States or state authority. In all townships or portions of townships where no property boundary survey has been made, the professional land surveyor, in surveying or platting the township or portion thereof, shall make it conform as nearly as practicable to the lots and section indicated upon the plats or maps according to which the lands were granted by the state or by the United States (R.S. 50:125).

3. Where applicable, property boundary surveys necessitating the division of a section shall be performed in accordance with the appropriate instructions for the subdivisions of sections as published by the United States Department of the Interior, Bureau of Land Management, in its book entitled *Manual of Instruction for Survey of the Public Lands of the United States*, and all applicable federal laws.

4. Special consideration shall be afforded by the rules of evidence and "hierarchy of calls" before any decision is made regarding property boundaries. "The legal guides for determining a question of boundary or the location of a land

line in order of their importance and value are: 1–natural monuments, 2–artificial monuments, 3–distances, 4–courses, 5–quantity. But the controlling consideration is the intention of the parties" (see citation in *Myer vs. Comegys*, 147 La. 851, 86 So. 307, 309 (1920)).

5. A careful search shall be made for corner monuments affecting the location of the boundaries of land to be surveyed. Any evidence discovered shall be evaluated for its agreement in description and location with the call in the relevant deeds and/or plats or maps.

6. All boundary discrepancies, visible evidence of possible encroachments, and visible indications of rights which may be acquired through prescription or adverse possession shall be physically located. All evidence of servitudes that is visible without meticulous searching shall be physically located during the survey. Furthermore, nonvisible servitudes shall be located only upon the client's specific request and the client's delivery of any necessary documentation.

7. All field data gathered shall satisfy the requirements of the following Subsection on plats and maps.

G. Plats and Maps. Every original plat or map of a property boundary survey should be a reproducible drawing at a suitable scale which clearly shows the results of the field work, computations, research and record information as compiled and checked. The plat or map shall be prepared in conformity with the following guidelines.

1. Any reasonably stable and durable drawing paper, linen or film of reproducible quality will be considered suitable material for property boundary survey plats and maps.

2. The minimum dimensions for plats and maps shall be 8 inches by 10-1/2 inches.

3. All dimensions, bearings or angles, including sufficient data to define the curve, shall be neatly and legibly shown with respect to each property or boundary line. To define a circular curve, the following four elements shall be shown: chord bearing, chord distance, arc and radius. When possible, all bearings shall read in a clockwise direction around the property. All lines and curves shall show sufficient data on the plat or map to calculate a plat or map closure.

4. Monuments shall be labeled as "found" or "set" with a sufficient description of the monument. The description shall include but not be limited to the size and type of material, and relevant reference markers, if any, along with their position in relation to the corner.

5. When the purpose of the property boundary survey dictates, the area of the tract and all pertinent natural or man-made features located during the course of the field survey (water courses, streets, visible utilities, etc.) shall be labeled or represented by an appropriate symbol on the plat or map in its proper location. When appropriate, the feature shall be dimensioned and referenced to the nearest property line.

6. A statement indicating the origin of azimuths or bearings shall be shown on each plat or map. If bearings are used, the basis of the bearing shall include one or more of the following:

a. reference to true north as computed by astronomic observation within one mile of the surveyed site;

b. reference to the Louisiana State Plane Coordinate System with the appropriate zone and when applicable a controlling station(s) with coordinates and datum noted;

c. reference to the record bearing of a well-established line found monumented on the ground as called for in a relevant deed or survey plat or map; or

d. when none of the above alternatives are practical, a magnetic bearing (corrected for declination) may be used.

7. If a coordinate system other than the Louisiana State Plane Coordinate System is used on a plat or map, that system shall be identified. If that system is the Louisiana State Plane Coordinate System, the appropriate zone shall be shown on the plat or map.

8. Where the new survey results differ significantly from the prior deed information in regard to course, distance, location or quantity, the plat or map shall indicate such differences or discrepancies.

9. Where separate intricate details, blowups or inserts are required for clarity, they shall be properly referenced to the portion of the plat or map where they apply. This applies particularly to areas where lines of occupation do not conform to deed lines and to areas where a comparison of adjoining deeds indicates the existence of a gap or an overlap.

10. Cemeteries and burial grounds known by the professional land surveyor to be located within the premises being surveyed shall be indicated on the plat or map. However, a detailed survey of the limits of the cemetery shall not be required unless directed by the client.

11. When the purpose of the property boundary survey dictates, properties, water courses and rights-of-way surrounding, adjoining, or severing the surveyed site shall be identified. Private lands or servitudes should be labeled with the name of the owner or with a reference to the deed under which ownership is held, provided that such information is furnished by the client.

12. Original section, grant, subdivision or survey lines, when an integral part of the deed, shall be shown in proper location with pertinent labeling. A measurement of course and distance shall be shown to a parent tract corner, block corner, section corner, subdivision or grant corner, and existing monuments shall be indicated.

13. Differing line weights or delineating letters or numbers (A, B, C, etc. or 1, 2, 3, etc.) shall be used to clearly show the limits of what is being surveyed.

14. Each plat or map shall show the following:

a. caption or title;

b. client and/or purpose;

c. vicinity map. A vicinity map will not be required if there are sufficient features and landmarks (officially named streets and street intersections, lots and blocks within a subdivision, adjoining subdivisions, Township-Range-Section lines, etc.) on the plat or map that would sufficiently enable a person to identify the location of the survey site;

d. date of the survey;

e. name, telephone number, mailing address and license number of the professional land surveyor, or the firm who employs the professional land surveyor;

f. signature and seal of the professional land surveyor under whose responsible charge the survey was done;

g. scale, written and/or graphic;

h. north arrow, and it is recommended that the drawings be oriented so that north is toward the top of the sheet; and

i. legend for symbols and abbreviations used on the plat or map.

15. Final plats or maps issued to the client shall contain a certification statement by the professional land surveyor certifying its authenticity (that it represents his/her survey) and stating that the property boundary survey is in accordance with the applicable standards of practice as stipulated in this Chapter, based on the current survey "classification" (see §2905, *Classification of Boundary Surveys*).

H. Descriptions. A written legal description of the surveyed tract of land shall provide information to properly locate the property on the ground and distinctly set it apart from all other lands. The following guidelines apply.

1. When the surveyed property's dimensions, boundaries and area are in agreement with the existing recorded deed or platted calls, the existing recorded description may be used if it approximates the standards contained herein.

2. When the property is an aliquot part of a rectangular section or a lot in a platted subdivision, the aliquot method or the lot, block and subdivision method (including recordation data) of describing the property may be used. Metes and bounds descriptions of this type of property are optional.

3. Every aliquot description shall contain the following basic information: aliquot part of section, township, range, parish, land district and meridian (if applicable), parish and state.

4. Every subdivision lot description shall also contain the following basic information: lot, block, unit (if applicable), name of subdivision, city (if applicable), parish and state.

5. Every metes and bounds description may be written in at least two parts. The first part, called the "general description," shall indicate the general location of the property by naming the particular lot or block within which it is located if in a subdivision or by naming the grant or aliquot part of a rectangular section within which it is located, along with the township, range, land district and meridian (if applicable), city (if applicable), parish and state. The second part, called the "particular description," shall logically compile and incorporate calls for the following:

a. courses and distances of the new survey, preferably in a clockwise direction;

b. adjoining apparent rights-of-way or servitudes;

c. monuments (when controlling), including descriptions of type, size, material, reference monuments (if applicable), and whether found, set or replaced; and

d. the area, if stated, shall be in square feet or acres or hectares within the tolerances specified in this Chapter.

6. The "point of beginning" should ideally be the property corner that is most accessible and most easily identifiable by interested parties. This point shall be carefully chosen and described in a manner which will distinguish it indisputably from any other point. The "commencing point" shall be any identifiable point used to locate the "point of beginning."

7. The courses in the written description shall be as brief and yet as explanatory as the professional land surveyor can construct. Brevity should not cause important locative information to be omitted, and explanatory phrases should not enlarge the description to the extent of confusion.

8. Curved boundaries shall be identified, and sufficient data to define the curve shall be presented. To define a circular curve, the following four elements shall be listed:

- a. chord bearing;
- b. chord distance;
- c. arc; and
- d. radius.

9. Each metes and bounds description shall return to the "point of beginning" and close mathematically within the tolerances stated in this Chapter.

10. A statement at the end of the description shall connect the description to the specific survey on which it is based and to the plat or map which depicts the survey. Such a statement may be phrased:

"This description is based on the property boundary survey and plat or map made by \_\_\_\_\_(name)\_\_\_\_\_, Professional Land Surveyor, dated \_\_\_\_\_."

or

"This description is based on plat or map recorded \_\_\_\_\_(give recordation data)\_\_\_\_\_."

11. The metes and bounds description shall then be signed, sealed and dated by the professional land surveyor.

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### **§2909. Route Survey**

#### **A. Definition**

*Route Survey*—a survey for determining the route of a proposed pipeline, power line, cable, road or other linear facilities in order to acquire a right-of-way, servitude or easement from the property owner being crossed.

B. Scope and Product. A route survey shall, as a minimum, consist of the following elements.

1. The professional land surveyor shall utilize sufficient title information and research as needed to define the tract boundaries.

2. The professional land surveyor shall locate sufficient evidence, on the ground, to determine the location of all boundary lines that will be crossed by the proposed right-of-way, servitude or easement. Installation of new monuments is not required when defining the limits of the right-of-way, servitude or easement to be acquired.

3. The professional land surveyor shall prepare a plat(s) or map(s) for those tracts being crossed, showing the alignment of the proposed route and the length of the proposed right-of-way, servitude or easement across the tract. These plats or maps shall be prepared in compliance with those requirements for property boundary survey plats or maps that are specifically contained in §2907.G.1, 2, 6, 7 and 14. Final plats or maps issued to the client shall contain

a statement by the professional land surveyor certifying its authenticity (that it represents his/her survey) and stating that the route survey complies with the applicable standards of practice as stipulated in this Chapter. Sufficient information to re-establish the right-of-way, servitude or easement, including any found monuments, must be shown at a suitable scale or in a separate detail on each plat or map.

4. If requested by the client, the professional land surveyor shall prepare a legal description of the proposed right-of-way, servitude or easement for each tract crossed by the proposed facility. The description shall describe the alignment and length of the proposed right-of-way, servitude or easement and shall comply with those requirements for legal descriptions for property boundary surveys that are specifically contained in §2907.H.6 through 11.

5. The accuracy standards that are required for route surveys shall be based on property classification D, as presented in §2913.

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HISTORICAL NOTE: Promulgated by the Department of Transportation and Development, Professional Engineering and Land Surveying Board, LR 37:2418 (August 2011).

### **§2911. Mineral Unitization Survey**

#### **A. Definition**

*Mineral Unitization Survey*—a survey performed to define subsurface mineral tracts for the specific purpose of allocating mineral rights within a mineral unit.

B. Scope and Product. A mineral unitization survey shall, as a minimum, consist of the following elements.

1. The professional land surveyor shall utilize sufficient title information, as provided by the client, needed to define the mineral tracts, in conjunction with adequate information to define the unit boundary.

2. The professional land surveyor shall determine, on the ground, the location of the unit well and the location of sufficient tract lines in order to determine the subsurface mineral tracts located inside the unit boundaries. Geologically significant wells, as identified by the Louisiana Department of Natural Resources, Office of Conservation field order or the client, will be located with respect to the unit boundaries. Installation of new monuments defining the limits of the unit, or of the tracts which comprise the unit, is not required.

3. The professional land surveyor shall prepare a unitization plat or map (Louisiana Department of Natural Resources, Office of Conservation field order unit, voluntary unit or declared unit) showing the mineral participant(s) and limits of the tracts (or portions of tracts) which are included in the proposed mineral unit. These plats or maps shall be prepared in compliance with those requirements for property boundary survey plats or maps that are specifically contained in §2907.G.1, 2, 6, 7 and 14. These plats or maps shall contain bearings and distances around the perimeter of the unit boundary, but are not required to depict or list such calls for the individual tracts which comprise the unit. Final plats or maps issued to the client shall contain a statement by the professional land surveyor certifying its authenticity (that it represents his/her survey) and stating that the mineral unitization survey complies with the applicable standards of practice as stipulated in this Chapter. In addition, the plats or maps, when applicable, shall be in compliance with the Louisiana Department of Natural Resources, Office of

Conservation's requirements governing unit plats and survey plats (LAC 43:XIX.Chapter 41).

4. The accuracy standards that are required for mineral unitization surveys shall be based on property classification D, as presented in §2913.

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### §2913. Positional Accuracy Specification and Positional Tolerances [Formerly §2909]

A. If radial survey methods, global positioning systems (GPS) or other acceptable technologies or procedures are used to locate or establish points on the boundary survey, the professional land surveyor shall apply acceptable surveying procedures in order to assure that the allowable positional accuracy and/or positional tolerance of such points are not exceeded. Any conversion from meters to feet shall use U.S. Survey Feet.

Condition	A	B	C	D	Remarks and Formula
	Urban Business District	Urban	Suburban	Rural	
Unadjusted Closure (maximum allowable)	1:15,000	1:10,000	1:7,500	1:5,000	Traverse Loop or between Control Monuments (closed traverse)
Angular Closure (maximum allowable)	10"√N	15"√N	25"√N	30"√N	N = Number of Angles in Traverse (closed traverse)
Accuracy of Bearing	± 15 Sec.	± 20 Sec.	± 30 Sec.	± 40 Sec.	In Relation to Source (closed traverse, radial or GPS)
Linear Distances Accurate to: (maximum allowable)	0.05 ft ± ± 0.05 ft per 1,000 ft	0.05 ft ± ± 0.1 ft per 1,000 ft	0.07 ft + ± 0.15 ft per 1,000 ft	0.1 ft + ± 0.2 ft per 1,000 ft	Applies when the Distance is not part of a Closed Traverse (radial or GPS)
Positional Tolerance and Positional Accuracy of any Monument (maximum)	0.1' + AC/15,000	0.1' + AC/10,000	0.1' + AC/7,500	0.2' + AC/5,000	AC = Length of Any Course* (closed traverse, radial or GPS)
Calculation of area - accurate and carried to nearest ____ (decimal place) of an acre (closed traverse, radial or GPS)	0.001 0.001 0.01 0.1	0.001 0.001 0.01 0.1	0.001 0.01 0.1 0.2	0.001 0.01 0.1 0.3	To 1 acre To 10 acres To 100 acres To 1,000 acres
Elevations for Boundaries Controlled by Tides, Contours, Rivers, etc. Accurate to:	0.2 ft.	0.3 ft.	0.4 ft.	0.5 ft.	Based on Accepted Local Datum (closed traverse, radial or GPS)
Location of Improvements, Structures, Paving, etc. (Tie Measurements)	± 0.1 ft.	± 0.2 ft.	± 0.5 ft.	± 1 ft.	(closed traverse, radial or GPS)
Adjusted Mathematical Closure to Survey (Minimum)	1:50,000	1:50,000	1:50,000	1:50,000	(closed traverse, radial or GPS)

\*Short courses in categories "A" and "B" may generate positional errors of less than 0.01 feet. A minimum course distance of 200 feet shall be used in calculating positional error.

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