

(a) General: "Land Information System/Geographic Information System (LIS/GIS)" surveys are defined as the measurement of existing surface and subsurface features for the purpose of determining their accurate geospatial location for inclusion in an LIS/GIS database. All LIS/GIS surveys as they relate to property lines, rights-of-way, easements, subdivisions of land, the position for any survey monument or reference point, the determination of the configuration or contour of the earth's surface or the position of fixed objects thereon, and geodetic surveying that includes surveying for determination of the size and shape of the earth both horizontally and vertically and the precise positioning of points on the earth utilizing angular and linear measurements through spatially oriented spherical geometry, shall be performed by a Land Surveyor who is a licensee of this Board unless exempt by G.S. 89C-25. For the purpose of specifying minimum allowable surveying standards, five general classifications of LIS/GIS surveys are established, any of which may be specified by the client. In the absence of a specified standard, the surveyor shall conform the survey to the requirements for a Class B survey.

- (1) For horizontal accuracy, the five general classifications are:
  - (A) Class AA LIS/GIS Surveys. For Class AA LIS/GIS surveys in North Carolina, the relative accuracy shall be equal to or no less than 0.033 meter (0.10 feet);
  - (B) Class A LIS/GIS surveys. For Class A LIS/GIS surveys in North Carolina, the relative accuracy shall be equal to or less than 0.5 meter (1.64 feet);
  - (C) Class B LIS/GIS surveys. For Class B LIS/GIS surveys in North Carolina, the relative accuracy shall be equal to or less than 1.0 meter (3.28 feet);
  - (D) Class C LIS/GIS surveys. For Class C LIS/GIS surveys in North Carolina, the relative accuracy shall be equal to or less than 2 meters (6.56 feet); and
  - (E) Class D LIS/GIS surveys. For Class D LIS/GIS surveys in North Carolina, the relative accuracy shall be equal to or less than 5 meters (16.40 feet).
- (2) For vertical accuracy, the three general classifications are:
  - (A) Urban and suburban vertical control surveys (Class A). Urban and suburban vertical control surveys include lands that lie within or adjoin a town or city. For Class A vertical control surveys in North Carolina, the vertical error in feet shall not exceed 0.10 times the square root of the number of miles run from the reference datum.
  - (B) Other vertical control surveys (Class B). Other vertical control surveys include all lands which are not covered by Class A as described in Part (A) of this Subparagraph. For Class B vertical control surveys in North Carolina, the vertical error in feet shall not exceed 0.20 times the square root of the number of miles run from the reference datum.
  - (C) Trigonometric vertical control surveys (Class C). Trigonometric vertical control surveys shall be used for vertical control for aerial and topographic mapping. The vertical error in feet shall not exceed 0.3 times the square root of the number of miles run from the reference datum. The vertical error in Global Navigation Satellite System (GNSS) surveys shall not exceed five centimeters relative to the referenced benchmark(s) at the 95 percent confidence level (2 sigma) accuracy as defined in Federal Geographic Data Committee Standards.

(b) Nothing in this Rule negates or replaces the relative accuracy standards found in Rules .1601 through .1607 of this Section.

(c) The Professional Land Surveyor in responsible charge of the LIS/GIS boundary or geodetic control survey shall certify all of the following in either written or digital form:

- (1) Class of LIS/GIS survey. The method of measurement used to evaluate the accuracy shall be described as either statistical testing or least squares adjustment results, comparison with values of higher accuracy, and repeat measurements. The reporting standard in the horizontal component is the radius of a circle of uncertainty, such that the true or theoretical location of the point falls within that circle 95 percent of the time;
- (2) Method of measurement (i.e. global navigation satellite systems, electronic scanners, theodolite and electronic distance meter, transit and tape);
- (3) Date(s) of the survey; and
- (4) Datum used for the survey.

(d) A certificate, substantially in the following form, shall be affixed to all maps or reports:

"I, \_\_\_\_\_, certify that this project was completed under my direct and responsible charge from an actual survey made under my supervision; that this survey was performed to meet the requirements for an

LIS/GIS survey [21 NCAC 56.1608] to the accuracy of Class \_\_\_\_ and vertical accuracy; when applicable to the Class \_\_\_\_ standard method used to evaluate the accuracy was \_\_\_\_; method of measurement \_\_\_\_; date(s) of survey \_\_\_\_; datum used for survey \_\_\_\_; and all coordinates are based on \_\_\_\_ ['NAD 83' and realization (date of adjustment of coordinate system) or 'NAD 27'] and all elevations are based on \_\_\_\_ (NGVD 29, NAVD 88, or other)."

*History Note:* Authority G.S. 89C-10; 89C-20;

*Eff. February 1, 1996;*

*Amended Eff. August 1, 2014; August 1, 2011; July 1, 2009; May 1, 2009; August 1, 2002; August 1, 2000;*

*Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. April 27, 2019.*