

BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND SURVEYORS
CHAPTER 49

Statutory Authority: 1976 Code Sections 40-1-70, 40-22-60, and 40-22-130

- 49-103. Fees.
- 49-104. Examinations--General.
- 49-105. License Expiration, Renewal and Reinstatement--Individuals.
- 49-200. Professional Engineer Licensure Requirements.
- 49-201. Professional Land Surveyor Licensure Requirements.
- 49-202. Classifications and Scopes of Authority: Engineers and Surveyors.
- 49-304. Conflicts of Interest.
- 49-430. Nomenclature.
- 49-460. Survey Types and Requirements.
- 49-602. Requirements.

Synopsis:

To satisfy the requirements of licensure for engineers and surveyors, Regulations 49-104 through 49-105, 49-200 through 49-202, 49-304, 49-430, 49-460, and 49-602 are updated in conformance with the current Board of Engineers and Surveyors Practice Act.

The Notice of Drafting was published in the *State Register* on November 25, 2011.

Instructions:

The following sections of Chapter 49 are modified as provided below. All other items and sections remain unchanged.

~~Indicates Matter Stricken~~

Indicates New Matter

Text:

49-103. Fees.

A. The Board will charge fees sufficient to cover expenses for the following:

- ~~(1) Application Fee, Individual License: not to exceed \$200.~~
- ~~(2) Application Fee, Certificate of Authorization: not to exceed \$300.~~
- ~~(3) Examination Fee: not to exceed \$150, if applicable.~~
- ~~(4) Certificate Fee: not to exceed \$35 for individuals or \$50 for firms.~~
- ~~(5) Biennial Renewal Fee, Individual: not to exceed \$200.~~
- ~~(6) Biennial Renewal Fee, Firm: not to exceed \$400.~~
- ~~(7) Temporary Permits: not to exceed \$200 for individuals and \$300 for firms.~~

(1) Application Fee, Individual License:

- (a) Engineer-in-Training – NO FEE
- (b) Professional Engineer by Comity – \$75
- (c) Professional Engineer by Exam – \$65

- (d) Temporary License - \$100
- (e) Surveyor-in-Training – NO FEE
- (f) Tier A Professional Surveyor by examination – \$65
- (g) Tier A Professional Surveyor by comity - \$75
- (h) Tier B Surveyor - \$75

Education evaluation fees may be assessed by independent evaluators when required for licensure.

- (2) Application Fee, Firms
 - (a) Firm (Certificate of Authorization) – \$115
 - (b) Temporary Certificate of Authorization – \$150
- (3) Examination Fee – Set by the National Council of Examiners for Engineering and Surveying (NCEES)
- (4) Biennial Renewal Fee, Individual - \$100
 - (a) Biennial Renewal Fee, Individuals dually licensed - \$200
- (5) Biennial Renewal Fee, Firm - \$90
- (6) Temporary Permits
 - (a) Individuals - \$100
 - (b) Firms - \$150
- (7) Reinstatements Individuals – Governed by Section 40-22-240
- (8) Reinstatements Firms -- \$115 Governed by Regulation 49-106 (B), authorized by Section 40-22-

240

B. No fee, or any part thereof, paid by any applicant for application, examination and/or registration will be refunded once an application has been submitted to the Board for processing. Refunds will not be made.

49-104. Examinations--General.

A. Classifications--Engineering Examinations.

- (1) NCEES Fundamentals of Engineering (FE).
- (2) NCEES Principles and Practice of Engineering (PE).
- (3) NCEES Special Structural Engineering Examinations.

B. Classifications--Surveying Examinations.

- (1) NCEES Fundamentals of Surveying (FS).
- (2) NCEES Principles and Practice of Surveying (PS).
- (3) S.C. State Specific Surveying Examination (State-S).
- (4) TIER B Land Surveying (State-TIER B LS).
- (5) S.C. Board Rules and Regulations.
- (6) Principles and Practice of Photogrammetric Surveying.
- (7) Principles and Practice of GIS Surveying.

C. Examination for Record Purposes.

(1) Any engineer registered by this Board may take for record purposes one or more of the listed engineering examinations upon payment of a fee as established by the Board.

(2) Any surveyor registered by this Board may take for record purposes one or more of the listed surveying examinations upon payment of a fee as established by the Board.

(3) Failure to pass an examination will not affect current registration.

D. Re-Examination.

(1) An applicant who has failed the same topical examination two times shall provide evidence satisfactory to the Board that steps have been taken in preparation for a third examination on the same topical subject.

(2) ~~An application update~~ A new application will be required of any applicant who has failed the same topical examination three times. The applicant must also provide documentation that additional

study satisfactory to the Board was taken in preparation for further examination on the same topical subject.

49-105. License Expiration, Renewal and Reinstatement--Individuals.

A. Expiration and Renewal.

(1) The privilege to practice in any category or tier as a registered professional engineer or surveyor in South Carolina expires on June 30, biennially in even numbered years, unless the license is renewed. Every Registered Professional Engineer and Surveyor who elects to continue the practice of his profession shall complete and submit an application for renewal of licensure and pay the appropriate fee by June 30.

(2) Renewal notices will be mailed to the licensee's address on record with this Board in May each biennial year; however, it is the licensee's responsibility to renew his or her license prior to the official expiration date of June 30.

B. Reinstatement.

(1) A licensee whose license has lapsed and who can truthfully certify that he or she has not been engaged in the practice of engineering or surveying in South Carolina during the period the certificate was not in a current status, barring any other irregularities, shall be reinstated and retain the original registration number upon payment of the renewal fees and penalties. A licensee whose license has lapsed more than ~~one year~~ three months may be required to take and pass examinations as required by the Board.

(2) Those persons who cannot certify that they have refrained from practicing their profession in this State during the period in which their license lapsed may be required to show cause to the Board why their license should not be disciplined.

(3) Any person reinstating an expired registration will be required to meet the continuing professional competency requirements.

49-200. Professional Engineer Licensure Requirements.

A. Education Requirements.

(1) The Board will recognize the degrees of Master of Engineering or Master of Science in Engineering in a program accredited by EAC/ABET at either the baccalaureate or masters level as fulfilling the education requirements in satisfaction of the qualifications detailed in Section 40-22-220.

(2) The Board will recognize degrees from an engineering program evaluated as accredited by a foreign accreditation board or other authority recognized by ABET as having accreditation criteria substantially the same as that established by EAC/ABET. Engineering degree programs in this category include the following:

(a) Four-year engineering degree accredited by the Canadian Engineering Accreditation Board (CEAB).

(b) Four-year engineering degree from an accredited program in other countries listed in the ABET published "Washington Accord" document.

(c) Courses taken for credit and appearing on official college or university transcripts must be evaluated by a Board approved Education Consultant. The purpose of such evaluations shall be to determine whether or not the curriculum presented by the applicant complies substantially with accreditation criteria of EAC/ABET. Programs determined by the Board, based upon the evaluations, to be substantially equivalent to those accredited by EAC/ABET will be considered as fulfilling the education requirements.

(3) In addition to transcripts submitted for evaluation by the Education Consultant, an applicant shall have the academic institution furnish the Board such supporting documentation as necessary for a proper and sufficient evaluation.

B. Experience Requirements.

(1) General.

(a) An applicant must have completed the qualifying experience required by the Board by the application deadline. Experience cannot be anticipated. Experience gained prior to completion of degree requirements will not be accepted as qualifying experience.

(b) Qualifying experience must be progressive and of an increasing standard of quality and responsibility after graduation. Where guidelines for qualifying experience are published by NCEES, such guidelines may be used by the Board to evaluate experience of the applicant.

(2) Engineering Experience.

(a) The applicant should have meaningful design experience under the supervision of a registered professional engineer in designing components or processes that meet a public need. This experience should include exposure to the formation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, analytical calculations and detailed systems descriptions. If the experience was not gained under the direct supervision of a registered professional engineer, then the indirect supervision should be explained with clarification of the degree of supervision received.

(b) Successful completion of a Master's degree in a Board approved engineering curriculum may be accepted as one year of equivalent engineering experience credit. The completion of a PhD in a Board approved engineering curriculum may be accepted as two years of equivalent experience credit. However, in no case will more than two years of equivalent engineering experience credit be given for post baccalaureate education.

(c) For teaching experience to be considered by the Board, the engineer applicant must have taught design courses acceptable by the Board in an engineering curriculum accredited by ABET.

(d) Military experience must have been spent in engineering and of a character substantially equivalent to that required in the civilian sector for like work.

(e) For sales experience to be considered by the Board, the engineer applicant must demonstrate conclusively that engineering principles and engineering knowledge were actually employed. The mere selection of data or equipment from a company catalogue or a similar publication will not be considered qualifying engineering experience.

(f) Experience in construction supervision must show proficiency in engineering computational and problem-solving skills in assuring compliance with specifications and designs.

(g) The Board will not accept the mere execution as a contractor of work designed by a registered professional engineer, or the supervision of the construction documents, or similar non-engineering tasks as qualifying engineering experience.

(h) Industrial experience should be directed toward the identification and solution of practice problems in the applicant's area of engineering specialization. This experience should include engineering analysis of existing physical systems and the design of new ones.

(3) Engineering Experience.

(a) Qualifying experience must be progressive and exhibit an increasing standard of advancement in the application of technological principles.

(b) Experience must be gained by working under the supervision of a legally practicing engineer or on engineering assignments which exhibit an increasing standard of assigned responsibility.

(c) Industrial experience leading to registration as an associate professional engineer should be directed toward the identification and solution of practical problems in the applicant's area of technological specialization of engineering principles.

(d) Work as laboratory or field technicians where such work is merely the conduct of routine explorations or data acquisition activities shall not be considered as qualifying. In order to be qualifying, the experience should show a demonstrated and satisfactory use of basic engineering computational and problem-solving skills.

C. Examination Requirements.

(1) Engineer-in-Training (EIT).

(a) An applicant applying for certification as an engineer-in-training must take and pass one of the written examinations on the Fundamentals of Engineering (FE), prepared and graded by the NCEES.

(b) The Board may, at its discretion, exempt an applicant from taking the FE examination. These exemptions include the following:

1. An applicant who has earned a doctorate degree in engineering in which the undergraduate degree in the same field of study is accredited by EAC/ABET, and is otherwise qualified under the provisions of the South Carolina Code of Laws at the time the application is received.

2. An applicant with more than fifteen years of acceptable experience after the date of the accredited degree or who has been licensed in another jurisdiction not ~~less~~-fewer than 12 years, and is otherwise qualified under the provisions of Section 40-22-220 of the Practice Act, at the time the application is received.

49-201. Professional Land Surveyor Licensure Requirements.

A. Qualifying Experience and Documentation.

(1) Experience must be obtained under the supervision of a registered professional surveyor and must be of a character satisfactory to the Board.

(2) Qualifying experience approved by the Board is experience beyond elementary surveying duties such as chaining, rodman, and bush cutting duties. In order for work to be considered as qualifying experience, an advanced level of responsibility must have been placed on the applicant. Responsibility should involve mature judgment and expertise gained in such job assignments as instrument man, assistant crew chief or crew chief. Work claimed as qualifying experience should demonstrate a sound working knowledge of surveying with respect to research (records and field), instrumentation, note-keeping, calculations and mapping.

(3) An experience record in boundary and route surveying, topographical surveying, construction surveying, control/geodetic surveying, and rights-of-way delineation is beneficial to the applicant in the Board's evaluation of the application. Recognizing that boundary surveys are the types of surveys which more critically affect the public welfare, experience in boundary surveys should constitute a significant portion of the applicant's experience record and will be given more weight by the Board in considering an applicant's qualifications for licensure.

(4) An applicant must submit copies of three different maps and plats of land surveys on which he has worked. The documents must be signed by the professional land surveyor who supervised the work and contain a statement describing that part of the work done by the applicant. Submitted plats and maps must meet the requirements of the Standards of Practice Manual for Surveying in South Carolina, Chapter 49, Article 4, of the Code of Regulations, in effect at the time of licensure.

(5) An applicant must submit five references as to the applicant's character and quality of work, three or more must be registered land surveyors having personal knowledge of the applicant's qualifications.

B. Examination Requirements--Land Boundary Surveyor.

(1) An applicant applying for certification as land surveyor-in-training must take and pass a written examination on the Fundamentals of Surveying (FS), prepared and graded by the NCEES.

(2) An applicant applying for licensure as a TIER A land boundary surveyor must have taken and passed the FS written examination and must take and pass the Principles and Practice of Surveying (PS), prepared and graded by the NCEES, and a South Carolina State Specific Surveying examination.

(3) A person licensed as a professional land boundary surveyor may practice as a professional photogrammetric surveyor only by meeting the requirements as described in the section R.49-201C of this Chapter, and may practice as a professional GIS surveyor only by meeting the requirements as described in the section R.49-201D of this Chapter.

C. TIER A Professional Land Boundary Surveyor--Provisions for Geodetic Surveying.

(1) The practice of geodetic surveying is classified under land boundary surveying.

(a) Enforcement of the license requirement for geodetic surveyors will be effective July 1, 2004.

(b) After July 1, 2004 geodetic surveyors applying for licensure must meet all the requirements for land boundary surveyors as outlined in the subsection R.49-201A of this Chapter.

D. TIER A Professional Photogrammetric Surveyor.

(1) After June 30, 2004, any person applying for licensure as a photogrammetric surveyor must meet the following requirements:

(a) Education Requirement--Photogrammetric Surveyor.

1. Education must be evaluated by an Education Consultant and approved by the Board before an application can be considered for further processing.

2. In addition to one of the following degrees, an applicant must submit proof of satisfactorily completing not ~~less~~-fewer than 12 semester hours, or the equivalent in quarter hours, of course work specific to the discipline of photogrammetric surveying, satisfactory to the Board:

a. Four-year engineering or bachelor of science degree in a related field from a program accredited by the Related Accreditation Commission (RAC) or the Accreditation Board for Engineering and Technology (ABET).

b. Four-year civil engineering technology degree from a program accredited by the Technology Accreditation Commission (TAC) of ABET.

c. Four-year related baccalaureate degree, or equivalent degree, approved by the Board.

d. Two-year associate degree approved by the Board. Effective July 1, 2010, this degree will not be recognized as meeting the education requirements for registration as a photogrammetric surveyor.

(b) Experience Requirement--Photogrammetric Surveyor.

1. Photogrammetric Surveyor-in-Training.

a. An applicant applying for certification as a photogrammetric surveyor-in-training who meets the four-year education requirements must have one year of progressive practical experience.

b. An applicant who meets the two-year education requirements must have three years of progressive practical experience. Effective July 1, 2010, this provision will be void.

2. Photogrammetric Surveyor.

a. An applicant applying for licensure as a photogrammetric surveyor who meets the four-year education requirements must have four years of progressive practical experience.

b. An applicant applying for licensure as a photogrammetric surveyor who meets the two-year education requirements must have four years of progressive practical experience. Effective July 1, 2010 this provision will be void.

3. Qualifying Experience and Documentation.

a. Experience must be obtained under supervision of a licensed photogrammetric surveyor or a recognized professional in the field of photogrammetry and must be of a character satisfactory to the Board.

b. Qualifying experience approved by the Board is experience beyond elementary level activities. In order for work to be considered as qualifying experience, an advanced level of responsibility must have been placed on the applicant. Work claimed as qualifying experience should demonstrate a sound working knowledge of photogrammetry.

c. At least two years of the required experience must have been at the professional level in responsible charge of photogrammetric mapping projects meeting National Mapping Accuracy Standards.

d. The applicant must submit proof of employment in responsible charge of at least one project as a photogrammetrist. Maps and documents satisfactory to the Board detailing methods, procedures, amount of applicant's personal involvement must be submitted to document this project. These maps and documents must be signed by the professional who supervised the work and contain a statement describing the part or the work done by the applicant. The applicant must submit the name, address and telephone number of references to verify this information.

e. An applicant must submit five references as to the applicant's character and quality of work, three or more must be licensed surveyors or practicing professionals in the field of photogrammetry, having personal knowledge of the applicant's photogrammetric surveying experience.

(c) Examination Requirements--Photogrammetric Surveyor.

1. An applicant applying for certification as a photogrammetric surveyor-in-training must take and pass a written examination on the Fundamentals of Surveying (FS), prepared and graded by the NCEES.

2. An applicant applying for licensure as a photogrammetric surveyor must have taken and passed the FS examination and must take and pass an examination on the principles and practice of photogrammetry and an examination on the Board's rules and regulations as referred to in the section R.49-104B(5) of this Chapter.

(2) A person licensed as a professional photogrammetric surveyor may practice as a professional land boundary surveyor only by meeting the requirements of the section R.49-201A of this Chapter, and may practice as a professional GIS surveyor only by meeting the requirements of the section R.49-201D of this Chapter.

E. TIER A Professional Geographic Information System (GIS) Surveyor.

(1) After June 30, 2004, any person applying for licensure as a geographic information system (GIS) surveyor must meet the following requirements:

(a) Education Requirement--GIS Surveyor.

1. Education must be evaluated by an Education Consultant and approved by the Board before an application can be considered for further processing.

2. In addition to one of the following degrees, an applicant must also submit evidence of completion of discipline specific courses of not ~~less~~-fewer than 12 semester hours or the equivalent in quarter hours satisfactory to the Board.

a. Four-year baccalaureate degree in a related field from a program accredited by the Accreditation Board for Engineering and Technology (ABET).

b. Four-year civil engineering technology degree from a program accredited by the Technology Accreditation Commission (TAC) of ABET.

c. Four-year related baccalaureate degree, or equivalent degree, approved by the Board.

d. Two-year Associate Degree approved by the Board. Effective July 1, 2010, this degree will not be recognized as meeting the education requirements for registration as a Geographic Information System Surveyor.

(b) Experience Requirements--GIS Surveyor.

1. Geographic Information System Surveyor-in-Training.

a. An applicant applying for certification as geographic information system surveyor-in-training who meets the four-year education requirements must have one year of progressive practical experience.

b. An applicant who meets the two-year education requirements must have three years of progressive practical experience. Effective July 1, 2010, this provision will be void.

2. Geographic Information System Surveyor.

a. An applicant applying for licensure as a geographic information system surveyor who meets the four-year education requirements must have four years of progressive practical experience.

b. An applicant applying for licensure as a geographic information system surveyor who meets the two-year education requirements must have four years of progressive practical experience. Effective July 1, 2010, this provision will be void.

c. An applicant applying for licensure as a geographic information system surveyor who holds a master's degree in surveying, geography, or a related field of study approved by the Board must have three years of practical experience.

3. Qualifying Experience and Documentation.

a. Experience must be obtained under supervision of a licensed geographic information system surveyor or a recognized professional in the field of GIS and must be of a character satisfactory to the Board.

b. Qualifying experience approved by the Board is experience beyond elementary level activities. In order for work to be considered as qualifying experience, an advanced level of responsibility must have been placed on the applicant. Work claimed as qualifying experience should demonstrate a sound working knowledge of GIS.

c. At least two years of the required experience must have been at the professional level in responsible charge of geographic information system mapping projects.

d. The applicant must submit proof of employment in responsible charge of at least one project as a GIS Surveyor. Maps and documents, satisfactory to the Board, detailing methods, procedures, amount of applicant's personal involvement must be submitted to document this project. The map and related project information submitted must include the project information.

e. Maps and documents must be signed by the professional who supervised the work and contain a statement describing the part or the work done by the applicant. The applicant must submit appropriate contact information including the name, address and telephone number of references to verify this information.

f. An applicant must submit five references as to the applicant's character and quality of work; three or more must be licensed surveyors or practicing professionals in the field of GIS having personal knowledge of the applicant's GIS surveying experience.

(c) Examination Requirements--GIS Surveyor.

1. An applicant applying for certification as geographic information system surveyor-in-training must take and pass the written examinations on the Fundamentals of Surveying (FS), prepared and graded by the NCEES.

2. An applicant applying for licensure as a geographic information system surveyor must have taken and passed the FS examination and must take and pass an examination on the principles and practice of geographic information systems and pass an examination on the Board's rules and regulations.

F. TIER B Professional Land Surveyor.

(1) An applicant shall be licensed as a TIER A Land Boundary Surveyor prior to submitting an application for licensure or registration as a TIER B Land Surveyor.

(2) An applicant must meet the requirements of education, experience and examinations.

(a) Examinations--TIER B Land Surveyor.

1. An applicant must have taken and passed the written examinations required for licensure as a TIER A Land Boundary Surveyor which include the FS and PS examinations, prepared and graded by the NCEES, and the State Specific Land Surveying Examination.

2. An applicant must also take and pass a special written examination pertaining to the practice of TIER B land surveying in the State which includes the design of storm drainage systems and preparation of sedimentation and erosion control plans associated with the development of residential subdivisions.

(3) A TIER B land surveyor may practice as a professional photogrammetric surveyor only by meeting the requirements of the section R.49-201D of this Chapter, and may practice as a professional GIS surveyor only by meeting the requirements of the section R.49-201E of this Chapter.

49-202. Classifications and Scopes of Authority: Engineers and Surveyors.

A. Category A Professional Engineer.

(1) A professional engineer who by reason of his special knowledge of the mathematical and physical sciences and the principles and methods of engineering analysis and design, acquired by professional education and practice experience, is qualified to practice engineering as defined in Section 40-22-~~2220~~ of the Practice Act, all as attested by his legal license and registration as a professional engineer in this State, is classified as a Category A license holder.

(2) The Category A professional engineer license holder is entitled to the unrestricted practice of engineering as described in Section 40-22-~~2220~~ of the Practice Act.

B. Category B Associate Professional Engineer.

(1) An associate professional engineer is qualified to practice within the profession of engineering in the restricted manner defined in the Code and as attested by his recognition and registration as an associate professional engineer in this State is classified as a Category B license holder.

(2) The practice of Category B associate professional engineers is subject to certain restrictions:

(a) An associate professional engineer must not assume direct responsibility, direct supervisory control or responsible charge for engineering work as an independent practitioner, or for engineering work provided by or through a "private practice organization" as defined by statute.

(b) Work by a Category B associate professional engineer employed by a "private practice organization" must be under the direct responsibility, supervisory control, and responsible charge of a Category A professional engineer.

(c) Where documents are required to be submitted to building officials and other authorities having jurisdiction for government review, approval or permitting, and where such documents are required to be submitted under the signature or seal of a Professional Engineer, the documents must be prepared by or under the responsible charge of and submitted only by a Category A professional engineer.

(d) A Category B associate professional engineer shall not, by title, verbal claim, sign, advertisement, letterhead, card or in any other way, represent himself to be a Professional Engineer.

(3) A Category B associate professional engineer may apply for an unrestricted Category A professional engineer license provided the requisite supplemental education is acquired to qualify under one or more of the provisions as described in the section R.49-200 of this Chapter. An associate engineer licensed for Category B practice as of July 1, 2006, may continue to practice under the conditions provided for in Regulation 49-202(B) or an identical successor regulation. As of July 1, 2020, Category B licensure ceases to exist.

C. TIER A Land Surveyor.

(1) The practice of TIER A land surveying consists of three separate disciplines: (a) land boundary surveying, (b) photogrammetry, and (c) geographic information systems (GIS). A land surveyor may be licensed in one or more of the disciplines and practice is restricted to only the discipline or disciplines for which the land surveyor is licensed.

(2) The scopes of authority for the individual disciplines of TIER A land surveying are identified as follows:

(a) Professional Land Boundary Surveyor (PLS).

1. Locates, relocates, establishes, re-establishes, lays out or retraces any property line or boundary of any tract of land or any road, right-of-way, easement, alignment, or elevation of any fixed works embraced within the practice of land surveying, or makes any survey for the subdivisions of land;

2. Determines, by use of principles of land surveying, the position for any survey monument or reference point; or sets, resets, or replaces such monument or reference; determines the topographic configuration or contour of the earth's surface with terrestrial or extraterrestrial measurements; conducts hydrographic surveys;

3. Conducts geodetic surveying which includes surveying for determination of geographic position in an international three-dimensional coordinate system, where the curvature of the earth must be taken into account when determining directions and distances; geodetic surveying includes the use of terrestrial measurements of angles and distances, as well as measured ranges to artificial satellites;

4. Creates graphical representations of the data related to items C(2)(a)1.2.3 above.

5. Performs work of a professional photogrammetric surveyor as described in the item C(2)(b).

(b) Professional Photogrammetric Surveyor (PPS).

1. Determines the configuration or contour of the earth's surface or the position of fixed objects thereon by applying the principles of mathematics on remotely sensed data, such as photogrammetry.

2. Creates graphical representations of data relating to the item (b)1 above.

3. Performs work of a land boundary surveyor as described in the item C(2)(a) above or as a geographic information systems (GIS) surveyor as described in the item C(2)(c) below only after obtaining a license in those categories.

(c) Professional Geographic Information System Surveyor (GIS).

1. Creates, prepares, or modifies electronic or computerized data including land information systems and geographic information systems relative to the performance of the activities described in subsections (a) and (b) above.

2. Creates digital spatial data based on integration, interpretations, transformations, and/or the manipulation of primary data sources that affects the health, welfare, or safety of the public.

3. Performs work of a land boundary surveyor as described in subsection C(2)(a) above or as a photogrammetric surveyor as described in the item C(2)(b) above only after obtaining a license in those categories.

(3) The practice of TIER A land surveying does not include the use of GIS or LIS to create maps pursuant to Section 40-22-290 of the Practice Act, analyze data, or create reports.

D. TIER B Professional Land Surveyor.

(1) Persons registered as both Professional Land Surveyor and Professional Engineer are classified as TIER B Professional Land Surveyors.

(2) The practice of TIER B land surveying as described by Section 40-22-20(24) of the Practice Act, and regulated by the Board shall include the authority, within the limits set by these regulations, to practice the design of storm drainage systems and the preparation of sedimentation and erosion control plans associated with the development of residential subdivisions. Included within this practice of TIER B land surveying is the design of stormwater detention or retention facilities incidental to the surveyor's design of storm drainage systems; provided, however, that these facilities are not lakes, ponds or similar impoundments intended to contain water at all times.

(a) As used in this section, the term "residential subdivision" means property developed for single family residences and other type projects where individual lots are established for each residential unit. The density of these projects shall be limited to two lots or units per acre. Apartment projects and projects for developments of commercial or industrial properties are not included within the scope of authority.

(b) Where reference has been made to "lakes, ponds or similar impoundments intended to contain water at all times," such reference is not intended to limit a TIER B Land Surveyor's authority to prepare calculations pertaining to the hydrology or hydraulics of these impoundments. It is expected, however, that such impoundments will require a more detailed analysis and design with respect to soil mechanics. Consequently design of impoundments intended to contain water at all times should be based upon appropriate geotechnical evaluations conducted under the direction of a licensed engineer experienced in such matters. The geotechnical investigations and report should, as a minimum, evaluate site conditions and provide recommendations for materials and methods of construction of the impoundment.

(3) The practice of TIER B land surveying shall not include the design of drainage structures, drainage systems, or other drainage features which are not incidental to the development of a residential subdivision. Projects which are purely drainage in nature or where a subdivision of a parcel of land into small parcels is not involved shall not fall within the scope of practice authorized for TIER B land surveyors. The design of such features as water systems, sanitary sewer systems, surcharged storm drainage systems or pumping stations which may also be incidental to the project are not included in this practice. The exclusion from the scope of authority of the design of "surcharged storm drainage systems" is not intended to apply to submerged outlet pipes routinely used in detention and retention basins.

(4) The practice of TIER B land surveying is further limited to the use of predesigned structures, which are approved by the county or municipal governmental agency having jurisdiction. Where standard design structures cannot be used because of extra loading, extreme depth or unusually large size, the structure shall be designed by a licensed engineer. "Predesigned Structure" is intended to cover two situations:

(a) As used in this section, the standard design for catch basins, junction boxes, and headwalls that are specified by local governments will be considered "predesigned".

(b) As used in this section, precast basins, junction boxes, and headwalls produced by concrete companies are considered as "predesigned" and may be used where allowed by the local authority.

(5) In exercising powers of a TIER B Land Surveyor, the surveyor shall undertake to perform only those assignments for which he is authorized by the statute and these regulations and for which he is qualified by education or experience in the specific technical area of TIER B land surveying involved.

49-304. Conflicts of Interest.

The Engineer or Surveyor shall avoid conflicts of interest.

A. The Engineer or Surveyor shall conscientiously strive to avoid conflicts of interest with employer or client, but when unavoidable, the Engineer or Surveyor shall forthwith disclose the circumstances to his employer or client. In addition the Engineer or Surveyor shall avoid all known conflicts of interest with his employer or client and shall promptly inform his employer or client of any business association, interests, or circumstances which could influence his judgement or the quality of his service.

B. The Engineer or Surveyor shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to, by all interested parties.

C. The Engineer or Surveyor shall not solicit or accept financial or other valuable considerations from material or equipment suppliers for specifying their projects.

D. The Engineer or Surveyor shall not solicit or accept gratuities, directly or indirectly from contractors, their agents, or other parties dealing with his client or employer in connection with work for which he is responsible.

E. When in public service as a member, advisor, or employee of a governmental body or department, the Engineer or Surveyor shall not participate in considerations or actions with respect to services provided by him or his organization in private engineering or surveying practices.

49-430. Nomenclature.

A. In surveying work, it is acceptable to employ abbreviations and symbols. When use of such abbreviations and symbols are necessary, the following are acceptable and may be employed in land surveying work in South Carolina:

- (1) Acres: AC
- (2) Acrylonitrile Butadiene ABS
- (3) Angle: Ang
- (4) Avenue: AV
- (5) Azimuth: Az
- (6) Bench Mark: BM
- (7) Catch Basin: CB
- (8) Calculated Course(s): CC
- (9) Calculated Distance: CD
- (10) Corrugated Metal Pipe: CMP
- (11) Crimp /Clip/Pinch Top: CT
- (12) Curb Face: CF or FOC
- (13) Curb Inlet: CI
- (14) Curb and Gutter: CG
- (15) Chord: CH
- (16) Center Line: CL or C/L or CL
- (17) Concrete Monument: Con. Mon.
- (18) Continuously Operating Reference Station: CORS
- (19) Degree of Curve: D
- (20) Deed Book: DB
- (21) Deflection Angle: Defl Ang
- (22) Departure: Dep
- (23) Ductile Iron Pipe: DIP
- (24) Drop Inlet: DI
- (25) Drill Hole: DH
- (26) Delta Angle : Δ or I
- (27) Double Meridian Distance: DMD

- (28) Easement: ESMT
- (29) East: E
- (30) Error of Closure: EC
- (31) Elevation: EL
- (32) Edge of Pavement: EP
- (33) Foot: Ft.
- (34) Found: Fd. or F
- (35) Global Navigation Satellite System: GNSS
- (36) Global Positioning System: ~~GSPGPS~~
- (37) Global'naya Navigatsionnava SputnikovavaSistima: GLONASS
- (38) Gutter: Gut
- (39) Highway: Hwy
- (40) Invert Elevation: I.E. or Inv.
- (41) Iron Pipe, Set: IPS
- (42) Iron Pipe, Found: IPF
- (43) Length of Curve: L or Arc
- (44) Latitude: Lat
- (45) Long Chord: LC
- (46) Mag Nail: MN
- (47) Magnetic course: MC
- (48) Manhole: MH
- (49) Mile: Mi
- (50) Marker: Mk
- (51) Monument: Mon
- (52) Nail and Cap: N & C
- (53) New: N or (N)
- (54) Not To Scale: NTS
- (55) North: N
- (56) North American Datum 1927: NAD 27
- (57) North American Datum 1983: NAD 83
- (58) North American Vertical Datum 1988: NAVD 88
- (59) National Geodetic Survey: NGS
- (60) National Geodetic Vertical Datum 1929: NGVD 29
- (61) Offset: O.S. OR O/S
- (62) Old: O or (O)
- (63) On-line Positioning User Service (NGS): OPUS
- (64) Parts Per Million: PPM
- (65) Perimeter: P
- (66) Pavement: Pave
- (67) PK Nail: PK
- (68) Plat Book: PB
- (69) Point of Beginning: POB
- (70) Point of Curvature: PC
- (71) Point of Compound Curve: PCC
- (72) Point on Curve: POC
- (73) Point of Intersection: P.O.I. or P.I.
- (74) Point of Tangent: POT
- (75) Point of Reverse Curvature: PRC
- (76) Point on Tangency: PT
- (77) Point: Pt
- (78) Polymerized Vinyl Chloride: PVC

- (79) Position Dilution of Position: PDOP
- (80) Private: Pvt
- (81) Property Line: PL
- (82) Radius: R
- (83) Reference Point: RP
- (84) Railroad: RR
- (85) Railroad Spike: RRS
- (86) Reinforced Concrete Pipe: RCP
- (87) Register of Mesne Conveyance: RMC
- (88) Railway: Rwy
- (89) Real Time Kinematic Surveying: RTK
- (90) Real Time Network: RTN
- (91) Rebar: RB
- (92) Register of Deeds: ROD
- (93) Right of way: R/W
- (94) Satellite Receiver for RTK or VRS Surveying: Rover
- (95) Satellite Receiver Base Station: Base
- (96) South: S
- (97) SC State Plane Coordinate-South Zone NAD 27: SC SPCS 27
- (98) SC State Plane Coordinate NAD 83: SC SPC 83
- (99) South Carolina Geodetic Survey: SCGS
- (100) Square: Sq
- (101) Square Feet: SF or FT²
- (102) Street: St
- (103) Station: Sta
- (104) Stake: Stk
- (105) Tangent of Curve: T
- (106) Tack: Tk
- (107) Traverse: Tra
- (108) Track: Trk
- (109) US Bureau of Standards: USBS
- (110) Vertical: Vert
- (111) Vitriified Clay Pipe: VCP
- (112) Virtual Reference Station Network: VRS
- (113) West: W
- (114) Wood: Wd
- (115) Symbols:
 - (a) Degree: o
 - (b) Minute: '
 - (c) Second: "
 - (d) Foot or Feet: '

B. The following are acceptable abbreviations for metric measures:

- (1) Area: A
- (2) Centimeter: CM.
- (3) Decimeter: DM.
- (4) Hectare: HA.
- (5) Kilometer: KM.
- (6) Meter: M
- (7) Millimeter: MM.
- (8) Square Meter: M²

C. Definitions: The following definitions and terminology shall be used in land descriptions:

(1) Boundary Line: Any line bounding an area or dividing separate properties; adequately dimensioned and described. Such lines may be straight, irregular, circular, or spiral.

(2) Point of Beginning: A well defined, readily located, and permanent point or monument that is the starting point on a parcel for a metes and bounds description; and also is the final point of such description.

(3) Point of Commencement: A well defined, readily located, and permanent point or monument that is the point to which the Point of Beginning is tied for a permanent reference.

(4) Convey: The act of transferring title or rights to a property.

(5) Grantor: A person or party conveying property or rights to a grantee.

(6) Grantee: A person or party receiving title or rights to property.

(7) Title: A written claim or right which constitutes a just and legal cause of exclusive possession.

(8) Metes and Bounds Description: A description in which the boundary lines start from a given point and is described by listing the direction, distance, and description of corners of the lines forming this boundary; in succession and adjoining owners.

(9) Description by Lot Number: A description which identifies a lot or tract of land by reference to a previously surveyed subdivision plat together with other pertinent information.

(10) Recorded: Placed on record in the office of the Clerk of Court, Register of Deeds or Register of Mesne Conveyance for the county in which all or part of the land lies.

(11) Coordinate Description: A description of lands in which the angle points or other points in the boundary are each referred to by grid coordinates on the South Carolina State Plane Coordinate System (current Datum) or similar coordinate system.

(12) Grid Coordinates: Distances measured at right angles to each other in a rectangular system having two base lines at right angles to each other.

(13) Survey: The orderly process of determining data relating to the physical characteristics of the earth, which may be further defined according to the type of data obtained, the methods and instruments used, and the purpose(s) to be served.

(14) Boundary Survey: A survey, the primary purpose of which may include, but is not limited to, the determining of the perimeters of a parcel or tract of land by establishing or reestablishing corners, monuments, and boundary lines for the purpose of describing, or platting or dividing the parcel.

(15) Closing/Loan or Mortgage Survey: A boundary survey of a parcel or lot which includes all improvements obvious and apparent found on the property, to be used in the preparation of a mortgage, loan or deed document.

(16) Topographical Survey: A survey of the natural and selected man-made features of a part of the earth's surface by remote sensing and/or ground measurements to determine horizontal and vertical spatial relations.

(17) Compiled Map: A map drawn from previously recorded or unrecorded documents, photographic material or tax maps which represent the general configuration of the parcel where partial or no actual surveying has been performed by the land surveyor preparing the map.

(18) Right of Way Survey: A Survey of any strip or area of land, including surface, overhead, or underground, granted fee simple for a designated use, such as for drainage and irrigation canals and ditches; electric power, telegraph, and telephone lines; gas, oil, water, and other pipe lines; highways, and other roadways, or other similar uses.

(19) Geodetic Survey: A survey of areas and points affected by and taking into account the curvature of the earth using a nationally defined horizontal and vertical datum. Geodetic surveys may be performed with terrestrial or satellite surveying technology but must be connected to the coordinate realization of the North American Datum 1983 or other recognized datum. All geodetic surveys, both vertical and horizontal, in the State of South Carolina shall conform to the Federal Geographic Data Committee's Geospatial Positioning Accuracy Standards, Part 2: Standards for Geodetic Networks in their most current publication. Geodetic surveys shall be performed by a surveyor licensed by this board.

(20) Geodetic Datum: The recognized horizontal and vertical datum for South Carolina shall be North American Datum 1983 (NAD83) and North American Vertical Datum 1988 (NAVD88)

respectively, or later accepted datum if applicable. The National Geodetic Survey no longer publishes relative accuracies such as first, second or third order. Instead, accuracies are now published as relative network positional accuracy stated at the 95% confidence level. These positional accuracies are in complete agreement with the Federal Geographic Data Committee.

(21) State Plane Coordinate System: The official coordinate system for surveying purposes in South Carolina is the South Carolina State Plane Coordinate System, single zone Lambert Polyconic Projection designated by the National Geodetic Survey as Zone 3900. For the purpose of the South Carolina State Plane Coordinate System, the foot is the International Foot with one inch being exactly 2.54 centimeters. To convert metric coordinates to the international feet multiply by 3.280839895.

(22) Hydrographic Survey: A survey having for its principal purpose the determination of data relating to bodies of water, and which may consist of the determination of one or several of the following classes of data; depth of water and configuration of bottom; directions and force of current; heights and times and water stages; and location of fixed objects for survey and navigation purposes.

(23) Wetlands Survey: A survey showing the boundaries of an area delineated as "jurisdictional waters of the US." Wetland Boundaries shall be tied by course and distance to either 1) property corners that are properly monumented, or 2) project boundaries that have been properly monumented, or 3) State Plane Coordinates. This shall be done in a manner that permits future surveyors to readily retrace the wetland boundary. The error of closure of such ties must be consistent with the land use classification of the parcel being surveyed as described in section 49-440 Classification of Surveys. Data collection and platting of these types of wetland boundaries must be performed by or under the direct supervision of a surveyor. A surveyor may not accept wetlands survey data from non-licensed individuals who are not under their direct supervision for the purpose of recording the information on survey plats. If equipment other than survey grade accuracy equipment is used on the survey, a statement indicating the equipment and procedures used for the work must be clearly stated on the plat.

(24) Corner: A point on a land boundary.

(25) Monument: A shaft of ferrous metal, concrete, stone or concrete and metal; placed to designate a fixed point; placed near vertically in the earth; designed for maximum permanency, placed by a land surveyor to mark corners.

(26) Witness Monument: Any monument that does not occupy the same defined position as the corner itself, but whose relationship to the corner is established.

(27) Reference Point: Any defined position that is or can be established in relation to another defined position.

(28) Benchmark: A relatively permanent material object, natural or artificial, bearing a marked point whose elevation above or below a referenced datum is known.

(29) Plat: A diagram drawn to scale showing all essential data pertaining to the boundaries and subdivisions of a tract of land, as determined by a survey and must be signed and sealed by the surveyor.

(30) Map: A representation on a plane surface, at an established scale, of the physical features of a part of the earth's surface, shown by the use of, but not limited to lines, arcs, signs, alpha numeric characters and symbols.

(31) Map of Survey, Plat of Survey, Survey for or other Similar Titles: Any drawing of a parcel or tract of real property used for the purpose of depicting the results of a field survey. Each survey drawing shall state the type of survey it depicts as defined in this manual.

(32) Global Navigation Satellite System (GNSS): Any satellite system which can be used to determine a precise location on the surface of the Earth. The US system is known as NAVSTAR Global Positioning System (GPS). The Russian system is known as the Global'naya Navigatsionnaya Sputnikovaya Sistema or GLONASS. The European Space Agency system is known as GALILEO.

(33) Position Dilution of Precision (PDOP): A numerical measure of the predicted accuracy of a geodetic position determined from GNSS satellites. The term represents the goodness of the geometry of the satellites with respect to the receiver location. A PDOP of 3 or less will generally insure accuracy of the highest survey quality. A PDOP of 5 or less is generally acceptable for most surveying and mapping projects where the distance between Rover and the nearest Base station is less than 10KM.

(34) **Multipath:** Multipath is an erroneous GNSS distance measurement between a GNSS satellite and either the Rover or Base. The multipath signal results from the receiver using a signal that has been reflected off a structure or water surface on its way to the receiver. The resulting measurement of distance from the satellite to the receiver is longer.

(35) **Base Station:** The name given to a GNSS receiver located over a known point or geodetic control monument.

(36) **Rover:** The name given to a GNSS receiver located over an unknown survey point whose coordinates are to be determined or checked against known geodetic control.

(37) **Static GNSS Survey:** A geodetic survey that uses multiple survey grade satellite receivers each collecting the same satellite data simultaneously. At least one satellite receiver must be on a known geodetic control station. The data ~~is~~are post-processed to yield three dimensional vectors between the known and unknown control stations. Static vectors solutions yield a "no check" solution and therefore by themselves do not meet minimum standards without additional independent checks. An expected relative accuracy of 0.07 foot plus 1:50,000 of the distance separating the Base and Rover can be obtained dependent on the length of time of simultaneous observations, the quality of the receivers, multipath and PDOP of less than 5.

(38) **Static GNSS Positioning of Property Corners:** If GNSS STATIC survey techniques are used to establish SC State Plane Coordinates on property corners, the corners shall be positioned from the nearest two (2) first or second order horizontal control monuments in the National Geodetic Survey (NGS) data base. Property corners shall be positioned to a horizontal accuracy of at least 0.07' + 1/20,000 or 0.2 feet (whichever is smaller) with relation to the nearest NGS horizontal control monument.

(39) **Real Time Kinematic (RTK) GNSS Survey:** A geodetic survey that uses multiple survey grade satellite receivers each collecting the same satellite data simultaneously. At least one Base receiver must be on a known geodetic control station and is capable of transmitting satellite data in real time to other Rover receivers. The data ~~is~~are processed by the Rovers in real time to yield three dimensional vectors between the Base and Rover stations. RTK vectors solutions yield a "no check" solution and therefore by themselves do not meet minimum standards without additional independent checks. RTK surveys require a site calibration to the NAD83 and NAVD88 in the vicinity of the survey. An expected relative accuracy of 0.05 foot plus 1 PPM of the distance separating the Base and Rover can be obtained dependent on the length of time of RTK observations, the quality of the receivers, PDOP of less than 3, a minimum of 5 GPS satellites, multipath and quality of the site calibration.

(40) **VRS GNSS Survey:** A geodetic survey that uses multiple dual frequency survey grade satellite receivers each collecting the same satellite data simultaneously. Base stations are operated by the SCGS and data ~~is~~are streamed to the Rovers via the Internet and processed in real time to yield three dimensional vectors between the Base Stations and Rovers. VRS vectors solutions yield a "network check" solution and therefore will meet minimum standards without additional independent checks. VRS surveys require an "independent check" by occupying a known geodetic control point in the National datum in the vicinity of the survey to verify the proper operation of the Rover. An expected relative accuracy of 0.05 foot can be obtained dependent on the length of time of VRS observations, the quality of the receivers, PDOP of less than 3, a minimum of 5 GPS satellites and minimal multipath.

(41) **Classification of Geodetic Surveys (Performed using GNSS Technology)**

Type	Relative Accuracy (95%)	Max PDOP	Min # of Satellites	Site Calibration
Static	GNSS 0.07' + 1:50,000	5	4	N
Property Corner	Positions 0.07' + 1:20,000	5	4	N
RTK GNSS	0.07' + 1PPM dist from Base	3	5	Y
VRS GNSS	0.07'	3	5	N

All the above Geodetic Surveys will achieve the required minimum accuracy for Land Surveys

49-460. Survey Types and Requirements.

A. General Property Surveys: The following general requirements apply to all survey types included in this manual, other than GIS Surveys and Photogrammetric Surveys (see section 49-450-D and section 49-450-E of these standards for the general requirements of these surveys).

(1) The size of the plat should conform to the requirements of the Clerk of Court, Register of Deeds or the Register of Mesne Conveyance of the county in which the plat is to be recorded with minimum size to be eight and one-half inches by eleven inches.

(2) A plat shall be a print or tracing, signed and sealed with the surveyor's impression seal.

(3) All survey plats shall have a title and contain the following information:

(a) The embossed seal and the signature of the Surveyor responsible for the full conduct of the survey;

(b) A location map and/or adequate descriptive location of the property surveyed;

(c) The state, county and/or city in which the property is located;

(d) The name of the owner, company or agent of the property who requested the survey document;

(e) The date the field survey was completed;

(f) A graphic scale;

(g) A numerical scale;

(h) The name, registration number, address and phone number of the land surveyor.

(i) A certification executed by the Surveyor which will contain a statement of the class of the survey performed as follows:

"I hereby state that to the best of my professional knowledge, information, and belief, the survey shown hereon was made in accordance with the requirements of the Standards of Practice Manual for Surveying in South Carolina, and meets or exceeds the requirements for a Class __ survey as specified therein."

(j) The area of the parcel of tract surveyed will be shown consistent with the class of survey or at least to the nearest one-hundredth (0.01) of an acre.

(k) At least one corner of the property surveyed shall be referenced so as to form a tie-line which can be used to help establish or verify the correct location of the property.

(l) The distances to the nearest intersections of a street or right-of-way shall be shown on the survey document.

(m) The North arrow shall be shown and shall be ~~accurately correlated~~ accurately with the courses so that it is accurately positioned and designated as astronomic, grid or magnetic.

(n) All property lines shall be defined by bearings and horizontal distances and plotted to the scale indicated on the plat.

(o) Bearings and distances shall be shown consistent with the class of the survey.

(p) The Land Surveyor shall retrace the boundaries of the property being surveyed and set or reset monuments or corners consistent with the class of survey and accepted practices of boundary retracement. All monuments found or placed must be described in detail on the survey plat or drawing, with data given to show their location upon the ground in relation to the boundary lines. When a property corner is inaccessible and cannot be set, a witness or reference monument shall be placed on the boundary line and the offset distance noted on the survey document, plat or drawing. Control corners, monuments or property corners, on adjoining properties, used in the establishment or verification of property corners, shall be identified, located and defined, by course and distance, to an accuracy consistent with the class of survey.

(q) All new or re-established corners shall be:

1. Metal, concrete, or other durable material and detectable with conventional instruments for finding ferrous or magnetic objects;

2. No less than 1/2 inch in diameter for metal corners and 4 inches in diameter for concrete;

3. No less than 24 inches in length;

4. If the corner location falls on pavement, concrete, or other material where one of the above cannot be placed, it is permissible to use nails, spikes, scribes, etc. in or on the surface;

5. In place prior to the signing, sealing and issuance of the plat.

(r) Where a boundary is formed by a curved line, the curve will be defined by curve data to include the radius, delta arc length and the long chord, by course and distance. The curve may also be defined as a traverse of chords around curve. Chord shall be defined by course and distance.

(s) All visible items across the property line shall be indicated with their extent shown or noted on the survey plat/map. The use of the words projection or encroachment shall be at the discretion of the surveyor.

(t) Visible indications of easements and rights-of-way on the site (i.e. power lines, etc.), obvious and apparent at the time of the survey or known to the surveyor, shall be shown and shall include their widths, if known.

(u) Cemeteries and burial ground located within the premises surveyed shall be located and shown upon the drawing, plat or map if obvious and apparent observed by the surveyor at the time of the survey, or if knowledge of their existence and location is furnished to the land surveyor prior to or during the performance of the survey.

(v) Lot and block numbers and/or the full names of adjoining land owners, and the names and/or numbers of principal highways, roads, streets or railroads, shall be shown, on the plat, with their rights-of-way. The plat book and page number of the subdivision as recorded by the Register of Mesne Conveyance, Register of Deeds or Clerk of Court of the county where the survey document is recorded should be included, if known.

(w) Boundaries formed by water courses shall be located and plotted to scale as shown in the title.

(x) If calculated lines are not shown, traverse lines and/or off-set lines used to close water course boundaries shall be shown, plotted to scale, and defined by course and distance. Note "Creek the line" where applicable.

(y) Maps prepared partially or entirely from reference or source data, such as compiled maps, do not represent land surveys as defined herein, and shall be clearly marked accordingly. Compiled maps must have a prominently displayed statement that the said document does not represent a land survey and is unsuitable for deeding of property or recordation.

(z) Plot plans representing planned locations prepared for city, county, state, federal governmental or other uses may be signed and sealed. A prominent statement shall be placed on the face of the document stating "This plot plan does not represent a land survey, was not prepared for recordation, and is not suitable for deeding of property. No ground survey was performed."

B. Closing/Loan or Mortgage Surveys: In addition to the requirements set forth in Section 49-460 A., General Property Surveys, the following applies to closing/loan or mortgage surveys:

(1) If a survey is all or a portion of a lot which is part of or adjoining a recorded subdivision, lot and block numbers or other designations including those of adjoining lots must be shown on the drawing.

(2) Structures shall be dimensioned to show size and location in relation to the boundary.

(3) Location distances are to be measured perpendicular from the closest side and front lines.

(4) Types of construction should be noted.

(5) Physical features obvious and apparent at the time of the survey to the surveyor such as storm drains, power lines, etc. on the subject property shall be shown and plotted to scale.

(6) Accuracy requirements of residential lots shall be consistent with the class of survey or a maximum closure of 0.05 foot, whichever is less restrictive.

(7) A certification shall be executed by the Surveyor as follows:

"I hereby state that to the best of my professional knowledge, information, and belief, the survey shown herein was made in accordance with the requirements of the Standards of Practice Manual for Surveying in South Carolina, and meets or exceeds the requirements for a Class __ survey as specified therein; also there are no visible encroachments or projections other than shown."

C. Topographical Surveys: The following applies to topographical surveys:

(1) Structures shall be shown in relation to the boundary.

(2) Physical features obvious and apparent at the time of the survey to the surveyor such as storm drains, sanitary sewers, power lines, gas lines and water lines on the subject property shall be shown and plotted to scale.

- (3) Elevations may be shown as spot elevations and/or contours.
- (4) Contour intervals shall be noted.
- (5) The vertical and horizontal error of contour lines and physical features shown shall not exceed one-half the contour interval.
- (6) An on-site temporary bench mark shall be established with reference to datum, preferably NGVD and plotted to scale as shown on the title.
- (7) The following items from Section 49-460 A. (3) shall be used when a general property survey is not made in conjunction with the topographic survey: a through h, l through n, and t through w.
- (8) Where the property boundaries are not surveyed, the source from which the boundary data was taken must be clearly noted thereon.
- (9) A certification shall be executed by the Land Surveyor which will contain a statement as follows:
"I hereby state that to the best of my professional knowledge, information, and belief, the survey shown herein was made in accordance with the requirements of the Standards of Practice Manual for Surveying in South Carolina, and meets or exceeds the requirements as specified therein."

D. Geographic Information System Surveys: The following applies to Geographic Information System Surveys.

(1) Purpose: The purpose of these standards is to provide the Surveyor with a guideline for surveys that provide the location of infrastructure information used in a geographic information system (GIS). The primary objective of this standard is to insure that surveyed information in a GIS is reliable and can be used to make definitive decisions. These standards are not to be used in place of professional judgment.

(2) The Survey: Geographic information system (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 a GIS database. All 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 which 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 Surveyor who is a licensee of this Board.

The Surveyor shall select the proper equipment and methods necessary to achieve at least the Minimum Horizontal and Vertical Accuracy required in Sections 5a and 5b of these standards. The survey work will be executed in a professional manner by the Surveyor or by personnel under the direct personal supervision of the Surveyor. In the event that more stringent survey requirements are required for a given project than what is provided for herein, the more stringent requirements shall be ~~adhered to~~ followed.

(3) Coordinate values: Coordinate values should be in the South Carolina State Plane Coordinate System or Geographic Positions based on the National Coordinate System. Horizontal coordinate values should be in the North American Datum of 1983 (NAD 83) 2007 or the most current datum published by the National Geodetic Survey (NGS). Vertical coordinate values should be in the North American Vertical Datum of 1988 (NAVD 88) or the most current datum published by the National Geodetic Survey (NGS). If coordinates are not referenced to the National Coordinate System, identify the local coordinate system used and its relationship to the National Coordinate System. Coordinates shall be given in either metric or English units. The English unit in South Carolina is the international foot.

(4) Results: The results of the survey shall be transmitted to the client in the form of a drawing in a digital format. The following information shall be included in the drawing or in the Federal Geographic Data Committee (FGDC) Metadata and certified to by the Professional Surveyor in responsible charge;

- (a) The accuracy classification to which the data was gathered.
- (b) The methods and procedures used to obtain the data, including but not limited to: equipment, (i.e. global positioning system, theodolite and electronic distance meter, transit and tape), documentation of positional inaccuracies, control points, bench marks, and PDOP levels for GPS surveys.
- (c) Date of the survey work.
- (d) Datum used for the survey.

(5) Accuracy - General: The minimum positional accuracy of the survey data is a Geospatial Positional Accuracy that is relative to the mapping scale, and therefore it is the accuracy of the base map on which the GIS is based. The reporting methodology shall be in accordance with the Federal Geographic Data Committee, Geospatial Positioning Accuracy Standards, Part 1 Reporting Methodology. The Geospatial Position Accuracy shall be reported by positional accuracy as defined in two components: horizontal and vertical. Horizontal Positional Accuracy is the radius of the circle of uncertainty, such that the true or theoretical location of the point falls within that circle 95-percent of the time. Horizontal Accuracy may be tested by comparing the planimetric coordinates of surveyed ground points with the coordinates of the same points from an independent source of higher order. Vertical Positional Accuracy is a linear uncertainty value, such that the true or theoretical location of the point falls within +"/- of that linear uncertainty value 95-per cent of the time. Vertical Accuracy may be tested by comparing the elevation of surveyed ground points with the elevations of the same point determined from a source of higher accuracy.

(a) Horizontal Accuracy: The horizontal accuracy is based upon the American Society of Photogrammetry and Remote Sensing (ASPRS) Standard for Class 2 and reported in agreement with the National Standard for Spatial Data Accuracy. The NSSDA Horizontal Positional Accuracy Statistic at the 95% confidence level is determined by multiplying the Root Mean Square Error (RMSE) of the data set by 1.7308.

Acceptable	
Base Mapping Scale of LIS/GIS	Positional Accuracy Statistic of Survey Data
1"= 20 ft.	0.7 feet
1"= 50 ft.	1.7 feet
1"= 100 ft.	3.5 feet
1"= 200 ft.	6.9 feet
1"= 400 ft.	13.8 feet
1"= 500 ft.	17.3 feet
1"= 1000 ft.	34.6 feet
1"= 2000 ft.	69.2 feet

(b) Vertical Accuracy: The vertical accuracy is based upon the ASPRS Standard for Class 1 and reported in agreement with the National Standard for Spatial Data Accuracy. The NSSDA Vertical Positional Accuracy Statistic at the 95% confidence level is determined by multiplying the Root Mean Square Error (RMSE) of the data set by 1.9600.

Acceptable	
Base Mapping Contour Interval	Positional Accuracy Statistic of Survey Data
1 foot	0.7 feet
2 feet	1.3 feet
5 feet	3.2 feet
10 feet	6.5 feet
15 feet	9.7 feet

(6) Certification: A certification shall be executed by the Surveyor which will contain a statement of the class of survey performed as follows:

"I hereby state that to the best of my professional knowledge, information, and belief, the GIS survey shown herein was made in accordance with the requirements of the Standards of Practice Manual for Surveying in South Carolina, and meets or exceeds the requirements as specified therein."

E. Photogrammetric (Airborne and Spaceborne) Surveys:

(1) Airborne and spaceborne surveys are defined as the use of photogrammetry, LIDAR, IFSAR, or other similar measurement technologies for obtaining reliable information about physical objects and the environment, including terrain surface, through the process of recording, measuring, and interpreting images and patterns of electromagnetic radiant energy and other phenomena. This Rule establishes minimum allowable photogrammetric production procedures and standards for photogrammetric mapping and digital data production.

(2) Production procedures for topographic and planimetric mapping surveys shall be in accordance with the standards established by Chapter 3 of the Federal Geographic Data Committee (FGDC) Geospatial Positioning Accuracy Standard and applicable extensions and revisions. These standards are incorporated by reference including subsequent amendments and editions.

(3) Topographic or planimetric maps, orthophotos, or related electronic data, unless clearly marked as "Preliminary Map," shall meet contractually specified FGDC Standards for horizontal and vertical accuracies (in the absence of specified standards, the National Map Accuracy Standards apply) and shall be sealed, signed and dated by the licensee.

(4) When the issued product is a digital (electronic) data set, or a map or document consisting of more than one sheet or otherwise cannot be signed and sealed, a project report shall be certified, signed and sealed. Such report shall be clearly marked "Preliminary" if applicable.

(5) Ground control for topographic and planimetric mapping projects shall be in South Carolina State Plane Coordinate System grid coordinates, NAD83/2007, and distances in International feet or meters. A minimum of one permanent project vertical control point shall be shown.

(6) A project map or report shall contain the applicable following information:

- (a) Date of original data acquisition;
- (b) Altitude of sensor and sensor focal length, as applicable;
- (c) Date of document or data set compilation;
- (d) If hard copy product is produced, the maps shall contain a north arrow, map legend, final document scale, including barograph, and contour interval, as applicable;
- (e) Coordinate system for horizontal and vertical denoting SI (System International English units (i.e., NAD83 and NAVD 88, assumed, or other coordinate system);
- (f) A list or note showing the control points used for the project. The minimum data shown for each point shall include: physical attributes (i.e. iron rod, railroad spike, etc), latitude and longitude (or Easting and Northing Grid coordinates), and elevation, as applicable;
- (g) If other data is included, the source and accuracy of those items must be clearly indicated;
- (h) A statement of accuracy complying with contractually specified FGDC standards consistent with Paragraph (c) of this Rule;
- (i) For topographic maps or data sets, contours in areas obscured by man-made or natural features shall be uniquely identified or enclosed by a polygon clearly identifying the obscured area. The accuracies of the contours or of features in this obscured area shall be noted "No reliance is to be placed on the accuracy of these contours";
- (j) A vicinity map depicting the project location shall appear on the first sheet of all hard copy maps or in the report accompanying digital files;
- (k) Company name, address and phone number; and
- (l) The name of the client for whom the project was conducted.

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

"I hereby state that to the best of my professional knowledge, information, and belief, that this photogrammetric project was performed in accordance with the requirements of the Standards of Practice Manual for Surveying in South Carolina, and meets or exceeds the requirements as specified therein."

(*) Documents transmitted electronically shall have the computer-generated seal removed from the original file and a copy of the project report shall be signed, sealed and sent to the client. The electronic data shall have the following inserted in lieu of the signature and date:

"This document originally issued and sealed by (name of sealer), (license number), on (date of sealing). This electronic media shall not be considered a certified document. See the project report for certificate and seal."

F. Right of Way Surveys: Right-of-way surveys are surveys of the boundaries of a strip, area or parcel of land being used for some designated public or private use. When these rights of way are taken in fee simple, the surveys and plats shall be performed in accordance with the requirements of Section 49-460-A "General Property Surveys."

49-602. Requirements.

A. Each licensee is required to obtain 30 PDH units during each biennial renewal period.

B. If a licensee exceeds the requirements in any renewal period, a maximum of 15 PDH units may be carried forward into the subsequent renewal period.

C. PDH units may be earned as follows:

- (1) Successful completion of college courses.
- (2) Successful completion of continuing education courses.
- (3) Successful completion of correspondence, televised, videotaped, and other short courses/tutorials.
- (4) Attending qualifying seminars, in-house courses, workshops, or professional or technical presentations made at meetings, conventions, or conferences.
- (5) Teaching or instructing in (1) through (4) above.
- (6) Authoring published papers, articles, or books.
- (7) Active participation in professional or technical societies.
- (8) Successful application for patents.

Fiscal Impact Statement:

There will be no cost incurred by the State or any of its political subdivisions.

Statement of Rationale:

These regulations are updated in conformance with the current Engineers and Surveyors Practice Act.