Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND PROFESSIONAL REGISTRATION
Division 2030—Missouri Board for Architects, Professional Engineers, Professional Land Surveyors, and Professional Landscape Architects
Chapter 18—First and Second Order Horizontal and Vertical Control

PROPOSED AMENDMENT

20 CSR 2030-18.050 GPS Survey Guidelines. The board is amending sections (1), (2), (3), (4), (8), (9), (10), and (11).

PURPOSE: This rule is being amended to reflect modern-day terminology and to be in compliance with HB 650, which was passed in 2013 and moves the State Land Surveyor's Office from the Missouri Department of Natural Resources to the Missouri Department of Agriculture.

(1) Direct connections must be made to any adjacent observable National *[Geographic]* **Spatial** Reference System (*[NGRS]* **NSRS**) and/or Missouri Geographic Reference System (MO GRS) station located five kilometers (5 km) or less from any new station.

(2) At least three (3) existing higher or equal order control points must be included in any proposed Global Positioning System (GPS) survey. Whenever possible**,** these should be three (3) ***[3-d]*** **three-dimensional** control *[points]* **stations**. Otherwise, two (2) sets of three (3) *[points]* **stations** (three (3) **two-dimensional [**2-d**]** horizontal *[points]* **stations** and three (3) vertical control *[points]* **stations**) must be used. These control *[points]* **stations** should be chosen to be roughly equidistant on the periphery of the *[network]* **proposed project** so that they enclose as much of the *[proposed network]* **project** as possible.

(3) Each new *[point]* **station** to be established by the proposed GPS survey must be occupied at least two (2) separate times to enable proper checking of blunders (for example, incorrect point, setup errors, incorrect antenna heights). A separate occupation is one *[where]* **in which** the antenna *[has]* **and its supporting device (tripod) have** been taken down and set up again and the receiver restarted.

(4) Each *[point]* **station** must be connected by simultaneous occupations (*[that is,]* base line**s**) to at least three (3) other *[points]* **stations** in the network after outlier base lines have been rejected from the adjustment. Because it is generally easier to resolve the integer phase ambiguities over shorter base line, adjacent *[points]* **stations** should be connected wherever possible.

(8) A detailed field log must be kept during observation taken at each station. At the very least the following information must be recorded:
(A) Universal Time *[Correction]* **Coordinated** (UTC) date of observations;

(B) Station identification (name and number);
(C) Session identification;
(D) Serial numbers of receiver, antenna, and data logger;
(E) Receiver operator;
(F) Antenna height and offset from monument, if any to one millimeter (1 mm). Note should be made *[of any deviation from standard method of measuring HI]* **as to whether the height is measured as a slant height or vertical height**;
(G) Diagram illustrating stamping on the monument;
(H) Other stations observed during session;
(I) Starting and ending time (UTC) of observations;
(J) Satellites observed (including time of changes); and
(K) Completed field log data forms for each station occupation will be submitted either using those provided by the **Missouri** Department of *[Natural Resources (DNR)]* **Agriculture (MDA)** or some other type containing all necessary information *[found]* **included** on the *[DNR]* **MDA** forms.

(9) The raw data files for all station occupations must be submitted. Each file*[, called an R-file,]* will consist of one (1) set of raw observations for each station occupation session. For example, four (4) receivers operating during each of five (5) sessions will produce twenty (20) *[R-files]* **raw data files**. *[An example of a raw data file would be the DAT, ION, MES, and EPH files produced by a Trimble receiver during a station occupation.]*

(10) The unadjusted base line vector solution files for all observed base lines, non-trivial and trivial, will be submitted. *[These files are produced by post-processing software such as the OPT or FIX, FLT, and TRP files produced by Trimvec post-processing software.]*

(11) If station description information is not provided by *[DNR]* **MDA,** it must be submitted for each station occupied. Station descriptions must include station name, county, township, range, section, United States Geological Survey (USGS) 7.5 *['quad.]* **minute quadrangle** name, date monumented, date of observations, complete descriptions of the station, azimuth and all reference monuments, a current "to reach" description, and any special information such as property owner name, address, and phone number. A sketch depicting the station and reference marks with dimensions and directions shown should accompany all narrative data. Examples of complete station description information may be obtained from *[DNR]* **MDA**.

*AUTHORITY: section**s** 327.041 **and 327.272**, RSMo [Supp. 1993] **2016**. Original rule filed May 3, 1994, effective Dec. 30, 1994. Moved to 20 CSR 2030-18.050, effective Aug. 28, 2006. Amended: Filed November 18, 2016.*

PUBLIC COST: This proposed amendment will not cost state agencies or political subdivisions more than five hundred dollars ($500) in the aggregate.

PRIVATE COST: This proposed amendment will not cost private entities more than five hundred dollars ($500) in the aggregate.

NOTICE TO SUBMIT COMMENTS: Anyone may file a statement in support of or in opposition to this proposed amendment with the Missouri Board of Architects, Professional Engineers, Professional Land Surveyors, and Professional Landscape Architects, PO Box 184, Jefferson City, MO 65102, via facsimile at (573)751-8046, or via email at moapels@pr.mo.gov. To be considered, comments must be received within thirty (30) days after publication of this notice in the ***Missouri Register****. No public hearing is scheduled.*