

## 26-2.0 OTHER SURVEY INFORMATION [REV. AUG. 2013]

A complete survey transmittal includes other survey information that is relevant to the project. This is described below. A submittal may be downloaded directly into the INDOT Electronic Records management System (ERMS) or the current version of INDOT's electronic document repository. However, each submittal shall include the minimum amount of information as outlined below, whether in electronic format, hardcopy, or a combination of the two.

1. Survey-Envelope Contents. The survey envelope should be a 9-in. x 12-in. manila envelope, or comparable type. It shall include all property-owner-interview sheets and the recorded LCRS. All other information should be packaged in a separate envelope and submitted with the completed survey.

Figure [26-2A](#), Survey-Envelope Label, illustrates how the survey envelope should be labeled. The outside of the survey envelope should include the following:

- a. route number and location description as it appears on the schedule sheet;
  - b. designation number;
  - c. project number, if available;
  - d. structure number, if applicable;
  - e. county;
  - f. district;
  - g. date of survey;
  - h. survey-party personnel, with designated party chief; and
  - i. list of envelope contents.
2. Survey Book. The survey book, a hardcopy or .pdf version, shall be submitted with the final survey materials.
  3. Miscellaneous Envelope. See Figure [26-2B](#), Miscellaneous Envelope. The miscellaneous envelope should be placed in the back of the survey book and should include the following:
    - a. copies of section plats to indicate adjoining property owners;
    - b. copies of digital photographs; and
    - c. section-corner reference cards (see Figure [26-2C](#)).
  4. Property Deeds. Property deeds that are within the survey limits and those deeds which appear necessary for other reasons shall be obtained by the survey party. Property deeds shall be submitted with the field survey and forwarded to the Office of Real Estate.

5. Subdivision Plat. Subdivision plats and town plats, if applicable, should be placed in the envelope that is submitted to the Department.
6. LCRS. A Location Control Route Survey (LCRS), and the associated LCRS plat, are required for an INDOT project that requires the purchase of right of way. The LCRS shall, at a minimum, comply with the requirements established by IAC 865 when conducting a route survey. A copy of the recorded LCRS plat is required for use by the Office of Real Estate. The recorded LCRS plat shall be submitted on 24" x 36" media (see Section 14-3.03); however the exact size of the recorded document is subject to requirements of the appropriate Office of the County Recorder. See Figure [26-2D](#), Location-Control Route-Survey Plat Example. The following guidelines are intended to aid in developing an LCRS to satisfy IAC 865, but are not intended to replace the surveyor's judgment as to what should appear in the survey.
  - a. The LCRS plat size may be reduced to satisfy specific requirements for recordation. The reduction should be considered in choosing font sizes and line thickness for the original-sized version.
  - b. Indicate the scale along with a graphical representation of the scale. A standard engineering scale shall be utilized. Consideration shall be made to ensure legibility at reduced scale that may be required for recordation. See Section 14-3.05(01).
  - c. Indicate the location of the project by identifying all roads on the plat. If no intersecting roads are within the project limits, include a description for the location in the surveyor's report.
  - d. Units shall be in US Survey feet. The U.S. Survey foot is defined based on 1 m = 39.37 in. The following conversion factor will be utilized:
$$1 \text{ meter} = 3.280833333 \text{ U.S Survey feet.}$$
  - e. Show all edges of pavement, fences, centerline points found or set, approximate locations of apparent property lines, buildings, etc. INDOT uses a separate plat for the LCRS and the Right of Way plat. For the LCRS, showing the right of way is not required. Only physical evidence of right of way is shown. The property lines shown on the field plat are for graphical representation only. They are not intended for a property retracement and may not be to scale.

- f. Indicate all centerline points, random control points, and reference baseline points that are set. The stationing used on the centerline should be shown and the basis of the stationing indicated in the surveyor's report. Section corners should also be graphically indicated on the plat where feasible due to scale considerations. All points should have references drawn according to the type of monument (e.g., centerline, section corner, subdivision corner, survey marker, etc.). The arrow for a centerline point indicates the direction of the alignment. For a section corner, the arrow indicates the direction for north. This should be shown in the reference boxes. See Figure [26-2D](#), Location-Control Route-Survey Plat Example.
- g. Indicate as to whether the monument was found or set, and include a description in the surveyor's report. This should include the size, type of monument, vertical description (e.g., flush, buried, protruding), location to physical features around the monument, origin (if known), uncertainty, etc.
- h. The location of the monument can be identified with an angle and distance, station and offset, or a coordinate system. Coordinates shall be reproducible with the information contained on the LCRS. Include all necessary information so that this may be accomplished. INDOT uses an assumed ground coordinate system. However, survey control ties shall be referenced to the Indiana State Plane Coordinate System. The metadata required and identified in 865 IAC Rule 12 in referencing state plane coordinates or utilizing Global Positioning System (GPS) shall be included.
- i. Copies of all road and/or bridge plans, both INDOT and local, within the area of the survey being conducted, shall be obtained prior to the start of the survey. If there are existing plans for the area, the survey alignment shown on said plans shall be reestablished and used for the survey being conducted. If plans are not available, a survey alignment shall be established in a close approximation of the center of present roadway. If a new roadway is proposed, the survey alignment shall be established based upon project location scope and corridor requirements. Survey alignments, established or reestablished, shall have monuments at all PCs, PIs, PTs, POTs, and intersections with other survey alignments. These monuments shall be any combination of the following:
  - 1) original survey alignment monument;
  - 2) monument set (where possible and practical); or
  - 3) monument that is not an original survey alignment monument, but is accepted as marking the original location. The surveyor's opinion as to the amount (in feet) of uncertainty of marking original location shall be provided.

- j. Monuments shall be set on the survey alignment at intervals that typically do not exceed one quarter (1/4) mile from the nearest survey alignment monument. Said monuments shall be shown on the LCRS plat. A statement regarding the surveyor's opinion of cause and amount (in feet) of uncertainty associated with the reestablished survey alignment and stationing shall be provided on the LCRS plat.
- k. The basis of bearings shall be on State Plane Coordinate (SPC) grid bearings. Local Ground Coordinates (LGC) shall be used for survey alignment data, topography, PLSS corners, and basis of all distances shown on the LCRS plat.
- l. The monuments, as listed below, shall be shown on the LCRS plat with both a LGC and SPC for each of the following:
- 1) PLSS corner monuments;
  - 2) survey alignment monuments;
  - 3) monuments that appear to locate property ownership;
  - 4) monuments used as a basis of translation between LGC and SPC; and
  - 5) monuments located along roadway used to collect topographic details for the survey.
- m. The LGC shall be derived from an SPC that is converted to ground coordinates and translated, without rotation, to coordinate values smaller than SPCs, thereby not being mistaken as an SPC, and also having a value that, if the survey is extended, the LGC will not result in a negative value. This LGC shall not have the appearance of being a truncated SPC.
- n. The following information shall be shown on the recorded LCRS plat:
- 1) the point number, with both SPC and LGC, used for translating SPC to LGC;
  - 2) the Combined Scale Factor (CSF), being the product of the Scale Factor and the Elevation Factor, used to translate an SPC to an LGC;
  - 3) the formula used to convert data from LGC to an SPC; and
  - 4) the name, datum tag, and epoch date [for example, NAD83(2011) epoch 2010.00] used for GNSS data acquisition.
- o. Control monuments (coded PGPS for INDOT InRoads formatting) shall be set in an area near the roadway that would facilitate a direct GNSS observation. An existing found monument, meeting the parameters described herein, may be substituted as a control monument. The established SPC for each control

monument, whether set or found, shall not be derived from or based on a traverse. Control monuments shall be located outside construction limits at the start of the project and at a similar location beyond the end of the project construction. Both the SPC and LGC for said control monuments shall be shown on the LCRS plat.

p. Precisions called for below are not an indication that they can be achieved, but only to assist in the conversions from LGCs to SPCs.

1) LGCs and SPCs shall be shown to four (4) digits to the right of the decimal when in US Survey feet, and five (5) digits to the right of the decimal when in meters.

2) Latitude and Longitude shall be shown in degrees, minutes, seconds (DMS) format, with seconds shown to six (6) places to the right of the decimal.

3) Combined Scale Factor (CSF) shall be shown to ten (10) places to the right of the decimal.

q. Show the property owners' names on the plat at the time of the survey.

r. Include all title-block information known at the time the plat is transmitted to the Office of Real Estate.

7. Recorded Plats. The recorded surveys that were obtained from the recorder's office should be submitted with the survey.

8. Plans. Copies of plans that have been obtained from the Central Office, district office, or other sources should also be submitted to the Department.

9. Electronic Data Submittal. All data or information submitted in digital format shall be copied to and stored on compact disc or digital video disc optical storage media, a copy of which shall be included with the submittal. A submittal can require larger memory storage capacity. If so, approval to submit data on media other than standard discs must be obtained prior to submittal. All submitted discs shall be labeled with the appropriate route number, designation number, location description, survey start and finish dates, and disc number. Disc labels shall not be hand written. The text on the label shall be in the Arial font with a minimum point size of 10. See Figure [26-2E](#).