

# PROFESSIONAL LAND SURVEY REQUIREMENTS

April 1, 1997  
Revised April 2014

TVA requires the following information to prepare maps and descriptions for any land transaction that requires a land survey to acquire or dispose land. These requirements are listed with further explanation below:

Plat (and description) must meet the minimum state standards as well as the following specific items:

- Be the results of a actual field survey,
- Fully encompass the whole tract with a direction (bearing) and a distance on all courses,
- Show the tract's relationship to all of the onsite or local TVA boundary.

The following outline summarizes how the above three items must be accomplished:

## I. Surveying

### A. Control

1. Call TVA's Survey Control Information Unit and ask for Sheree Vincent at (423) 751-7644.
2. Identify project limits by faxing a marked up TVA property map (D-stage, C-stage map, or Land Acquisition map) with project boundaries.
3. Identify project as being a Land Use project that will be coordinated through a regional field office. This will ensure that the control report will be compatible with reservation boundary.
4. A nominal fee is charged.

### B. Horizontal

1. Basis for direction must be the appropriate state grid direction (bearing or north azimuth) as represented by the datum the reservoir was constructed.
  - a. Determine by use of the record direction between two consecutive found TVA boundary monuments or boundary compatible control. Determine the record direction by inverting the published state grid coordinates to the nearest arc-second from the control report (I.A.3). The inverse sometimes will differ slightly from the published direction shown on the property maps.  
e.g. 17-20 N. 498,332.7 E. 2,520,180.1  
S24°13'40"E  
17-21 N. 498,308.7 E. 2,520,190.9
  - b. Celestial observation to determine geodetic direction and conversion to the appropriate state grid direction. This should only be done as a last resort and after consulting TVA surveying.
  - c. There is no need to apply grid factors (to correct distance for scale and elevation) as the original TVA surveys were not adjusted in this manner. Distances shown should be **ground distances**.
2. Closure should be a precision greater than one part in 10,000. This closure is accounted within the surveyor's traverse itself and not to other supposed positional relationship.

- C. Vertical
  1. Basis for the elevation must be at least 1 stable benchmark holding the datum compatible with the construction of the reservoir (usually NGVD 29). It is recommended that two stable benchmarks are used.
  2. Error of closure for the leveling loop shall not exceed 0.1 foot times  $\sqrt{l}$  miles of levels run, except in cases where extremely flat terrain exists, resulting in the application of 3<sup>rd</sup> order leveling procedures.
- II. Bounds of the tract
  - A. Straight line
    1. Requires a monument set or found at each change in course and each intersection of tract bounds with TVA straight line or contour boundary.
    2. Bearings should be shown to at least the nearest 5 seconds of arc and distances to at least the nearest five hundredths (0.05) of a foot.
  - B. Curvilinear
    1. Monument and describe the beginning and end of each curve and tangent.
    2. State whether the curve is to the right or left, the radius of the curve and its length including a parenthetical statement of the long chord's length and bearing as a geometric check.
  - C. Contour(s) - Established in Section I.C. (above)
    1. In general the location of a TVA property line or reserved rights line defined by a contour is fixed in space at the time of conveyance as shown on the land sale map. Therefore, the elevation may not be the overriding factor for locating the property line (contour).
    2. In the field coordinate contours at temporarily marked points (nails and flagging or pegs) no further than 50 feet apart.
    3. Chords of contours must not separate from the contour by more than 5 feet.
    4. Give bearing and length of chords.
    5. Begin and end contour portion on a monument.
    6. Monument at major breaks along the contour.  
(i.e., when the deflection angle from the back line exceeds 45 degrees.)
  - D. Monumentation
    1. Monument is to be described as "found" or "set" in the present survey, this includes the monuments for the Basis of coordinates and direction (I.B.1). If not described as found or set it is assumed that the corner is being shown to graphically represent the property line in areas adjacent to the land use boundaries.
    2. Character of monument is described (angle iron, iron pin, concrete monument with brass cap, etc.).
    3. Find or replace with a set monument all previous TVA boundary corners which are a part of the tract bounds.
    4. New monumentation should conform to the minimum requirements of the appropriate state.
      - a. Iron pipe or rebar  $\frac{1}{2}$  inch in diameter, or larger, and 18 inches in length, or longer.
      - b. Plastic cap attached to iron marker bearing the RLS name or number.
    5. Witness corners must be monumented for the corners which are physically impossible to set.

- III. Tract relationship to the local TVA boundary.
  - A. Isolated tracts which are not coincident with present TVA straight line boundary must be tied by a course or courses having state grid directions to:
    - 1. Points monumented by TVA on the contour boundary.
    - 2. Points monumented by TVA on the previous (older) straight line boundary.
  - B. Conform to Section II.D in replacing TVA boundary.
  - C. Conform to Section I for basis of horizontal and vertical control.
- IV. Plats (general)
  - A. Must reference TVA map numbers (Land Acquisition, C-stage, D-stage, land sale, etc.) e.g. 12 MS 421 A 519
  - B. Must conform to the Minimum State Standards.
    - 1. North arrow labeled/noted as State Grid North.
    - 2. Title block.
    - 3. Bar scale must be stated and graphic.
    - 4. Surveyors' certificate, stamp, signature and **date of survey**.
  - C. A statement relating the basis for the coordinates of the present survey, the basis for direction, and the basis for elevation if applicable. If more than one basis for coordinates and direction is needed for any tract it should be shown on a separate map. The basis for coordinates must be a found TVA monument. The following statement **must** appear on the plat:
    - Basis of Coordinates: *TVA corner name* (coordinates)
    - Basis of Direction: *TVA corner name to TVA corner name* (direction)
    - Basis of Elevation: *TVA BM name* (if applicable)

e.g.

    - Basis of Coordinates: 17-20 (N. 498,332.7 E. 2,520,180.1)
    - Basis of Direction: 17-20 to 17-21 (S24°13'40"E)
    - Basis of Elevation: TTN9A (215.72')
  - D. Must show measured (present survey) and published (map record) bearings and distances between TVA monuments. The published measurements must be shown in parenthesis on the line or in a table.
  - E. Point of Commencement
    - 1. The tract or each individual parcel must be tied (direction and distance) from the Basis of Coordinates to the Point of Beginning.
    - 2. If long route non-contiguous projects require multiple Basis for Coordinates/Direction they should be shown on separate maps.
  - F. Monumentation
    - 1. Must show status of each monument during the present survey (found or set)
    - 2. Must show the character of each monument during the present survey (angle iron, iron pin, concrete monument with brass cap, etc.)
- V. Deliverables
  - G. A hard copy plat must be delivered with each revision and be folded to no larger than 8 ½" x 11" with title block visible.
  - H. Provide a digital file in .DWG, .DXF, or DGN format on floppy or cd-rom to accompany hard copy plat. The spatial relationships and coordinates must match what is identified in the basis of directions and coordinates. e.g. The drawing should represent the data as it is on the ground and not be scaled or rotated differently than the basis of coordinates/directions.
  - I. A copy of survey field notes or raw data file made available upon request
  - J. Written description (on plot or accompanying).

## CONTACTS

### Survey Requirements/questions

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