

Article X

SURVEYING STANDARDS

1000 PURPOSE

These Standards are intended to define the minimum requirements for the practice of surveying within Delaware County. They include standards and accuracies that are acceptable for property surveys, the preparation of survey plats and subdivision plats, and the information to be indicated thereon.

1001 GENERAL STANDARDS

- A. Property surveying activities conducted within the County shall be performed by or under the direction and close supervision of an Ohio Registered Professional Surveyor.
- B. Plat approval: A copy of the final plat shall be sent to the County Engineer a minimum of four weeks in advance of Delaware County Regional Planning Commission (RPC) approval. This will allow the County Engineer an opportunity to review the plat and resolve any comments prior to actual approval. The Owner is encouraged to submit the final plat to all parties signatory to the final plat a minimum of four weeks prior to the RPC deadline for final approval. At the request of the Owner, the County Engineer will schedule a meeting with all plat signatories to discuss comments on the final plat. This meeting is not mandatory, but is encouraged.
- C. Surveys conducted for the purpose of designing or preparing plans and maps for improvements requiring approval by Delaware County shall be performed only by or under the direction of an individual who has a thorough knowledge of surveying science and practice. Emphasis of experience shall be in the complexities of survey measurements and their analysis.

1002 DEFINITIONS

As used herein:

- A. Photogrammetry: the science of making measurements on photographs. Terrestrial photogrammetry applies to the measurement of photographs that are taken from a ground station, the position of which usually is known or can be readily determined. Aerial photogrammetry applies to the measurement of photographs taken from the air and includes all operations, processes and products involving the use of aerial photographs. Among these are: the measurement of horizontal distances, the determination of elevations, the compilation of planimetric and topographic maps, the preparation

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of mosaics and orthophotos, and the interpretation and analysis of aerial photographs.

- B. Plat, Subdivision: a map of a subdivision of land prepared in accordance with State plat statutes and the Subdivision Regulations of Delaware County, current edition.
- C. Plat, Survey: a graphical description drawn to scale showing all essential data pertaining to the boundaries and subdivisions of a tract of land.
- D. Professional Surveyor: a registered surveyor authorized to practice professional surveying by the Ohio State Board of Registration, as specified under Section 4733 (Adm. Code) ORC.
- E. Property Surveying: the branch of surveying that involves “the art and science of: (1) reestablishing cadastral surveys and land boundaries based on documents of record and historical evidence; (2) planning, designing and establishing property boundaries; and (3) certifying surveys as required by statute or local ordinance such as subdivision plats, registered land surveys, judicial surveys and space delineation” (knowledge of both the weight-of-authority and statute law relative to the establishment of boundaries by both written and unwritten methods is imperative).
- F. Subdivision:
 - (1) The division of any parcel of land shown as a unit or as contiguous units on the last preceding tax roll into two or more parcels, sites, or lots, any one of which is less than 5 acres for the purpose, whether immediate or future, of transfer of ownership provided, however, that the division or partition of land into parcels of more than 5 acres not involving any new streets or easements of access, and the sale or exchange of parcels between adjoining lot owners where such sale or exchange does not create additional building sites shall be exempted; or
 - (2) The improvement of one or more parcels of land for residential, commercial or industrial structures or groups of structures involving the division or allocation of land for the opening, widening or extension of any street or streets, except private streets serving commercial and industrial structures; the division or allocation of land as open spaces for common use by owners, occupants or lease holders or as easements for the extension and maintenance of public sewer,

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water, storm drainage or other public facilities. (Section 711.001, ORC)

- G. Surveying Practice: includes any professional service which requires the application of special knowledge of the principles of mathematics, the related physical and applied sciences, and the relevant requirements of law for the adequate performance of the art of surveying (included are all major categories of surveying practice, e.g., property, topographic, hydrographic, engineering, geologic, photogrammetric, environmental [remote sensing], soil surveying, etc.).

1003 PROPERTY AND PLAN SURVEYING

- A. All research, investigation, monumentation, measurement specifications, plats of survey, descriptions, and subdivision plats shall conform to the Minimum Standards for Boundary Surveys in the State of Ohio, Section 4733-37 (Adm. Code) ORC. These Standards are intended to be a minimum requirement and where the surveying profession dictates a higher level of standards in one or several areas, the practitioner is encouraged to follow those particular standards of the profession.
- B. The basis for monumenting both non-platted and platted individual subdivision boundary and lot corners are as follows:
1. The surveyor shall set boundary monuments so that upon completion of the survey each corner of a subdivision lot, at the time it is platted for public record, will be physically monumented. On the plat of record a notation shall be made at each corner showing that either a boundary monument was found and/or set. In addition there shall be a statement or legend describing the monument found or set.
 2. A solid iron pin or steel pipe of at least one inch diameter shall be used as permanent markers. All pipe or iron pin markers shall have a cross section of 0.2 square inches, shall be at least thirty inches long and the bottom of such markers shall be set at least thirty inches below finished grade. On a curb and gutter street, a drill hole shall be set into the top of the concrete curb to reference the front property line or a PK nail/spike set into the centerline of the street after the subdivision has been constructed. Pins must also be set at this time on the rear lot corners. Iron pins must be set on the property corners at

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the street ROW line on each lot corner after construction of the house and final lot grading.

3. When it is physically impossible or impractical to set a boundary monument on a corner, the surveyor shall set a reference monument, similar in character to the normal corner monument and preferably along one of the property lines which intersect at that corner. When such a reference monument is used, it shall be clearly identified as a reference monument on the plat of record and in any deed description which may be written for the property.

4. The boundary monuments shall be identified with a durable marker bearing the surveyor's Ohio registration number and/or name or company name.

5. The setting of such markers shall not be required prior to completion of construction necessary to the improvement of the land but must be in place prior to recording of the plat.

- C. When a written and/or graphical description is prepared for the purpose of conveying a permanent easement (e.g. for utilities, right-of-way, etc.), said description shall include sufficient and adequate legal and technical working so that the easement can be definitely located and defined in relation to the actual property corners and/or the centerline survey control points involved. For this purpose, whenever the said corners or control points are determined to be obliterated or lost, or if they are to be called for in a description, they shall be established and monumented in accordance with the minimum standards as referred to above in paragraphs "A" and "B".
- D. All property transfers shall comply with the Delaware County Transfer Standards, current edition, the Subdivision Regulations of Delaware County, current edition, and these Standards, including the Supplemental Specifications to these Standards.

1004 PLAT AND FINAL AS-BUILT PLAN REQUIREMENTS

General: All final copies of required plats, plans and maps that are submitted for record shall comply with these Standards, including the Supplemental Specifications to these Standards. At minimum, the following items shall be included:

- A. Be neatly and legibly drawn or printed so that several successive reproductions shall be reasonably legible. The reproductions shall be

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legible when the plat, plan and maps are reduced to 11" X 17" size paper.

- B. Conform to the CADD standards as provided in these Standards.
- C. Final Engineering and Construction As-Built Plan and Signed Plat:
After all of the proposed improvements have been made and are complete, the Owner shall submit for record an updated as-built plan and signed plat to the County Engineer. As built plans are required for the following:
 - 1. All streets (public or private) built to public standards.
 - 2. All portions of Commercial, CAD's, Industrial and Multi-family developments that contain storm water management facilities maintained by Delaware County.
 - 3. All Master Grading Plans for Commercial, CAD's, Industrial and Multi-family developments. In addition to the requirements of these Standards, the information and data obtained for and presented on the as-built plan shall conform to the as-built survey specifications currently accepted by the surveying profession.
 - 4. All as-built submissions shall include a plan view of all retention/detention facilities, showing the approved plan contours (dashed lines) and the "as-built" contours (solid lines). This plan view must use the same scale as was used on the approved plans. Calculations for the as-built storage volumes must be provided. In addition, a table showing the contours and associated storage volumes for the approved plans and the as-built plan is required.
 - 5. This plan shall be a permanent mylar copy of the Final Engineering and Construction Plan. Each sheet shall be eleven inches by seventeen inches (11" x 17") in size. A title block should be placed in the lower right corner of each sheet.
 - a) One reduced set of mylar (11" X 17") as-built plans and four compact discs (CD) shall be submitted with the following information: as-built plan, storm water management calculations, traffic impact study, sight distance exhibits and basin proof survey. Acceptable formats: high resolution PDFs and TIFs (provide resolution of 300 dpi or greater).
 - b) Where changes have been made to the storm water management system which deviate from the approved

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construction plans, the Professional Engineer shall submit supporting documentation with the as-built plans which proves that the storm water system is in compliance with these Standards and Supplement Specifications.

- c) Prior to submitting the record set of as-built plans, a check-set shall be submitted to the County Engineer for review and approval as a final change order for the improvement. The County Engineer shall review these plans and provide approval to prepare the final record set of as-built plans. This check-set of as-built plans shall be submitted with an opinion statement by a Professional Engineer and/or Professional Surveyor that these plans conform to the intent of the approved Final Engineering and Construction Plan.
- d) CADD Standards (for final record size copies)
 - i. Current ODOT standards for CADD developed drawings shall be followed unless otherwise noted in these standards.
 - ii. The minimum letter size shall not be less than 3/32”.
 - iii. Lettering within lined areas, such as a quantity box, shall at no time come in contact with any of these lines.
 - iv. Letters shall be properly spaced so that a crowded condition does not exist.
 - v. All lines shall be of uniform weight and density.

1005 ENGINEERING AND TOPOGRAPHIC SURVEYING

A. Master Benchmark Standards

1. Definitions

As used herein:

- a) Master benchmark: shall be a vertical control monument which is durable, easily identifiable and permanently located within the development area in a position which affords the highest possible protection from disturbance. Master benchmarks shall be provided for each section, phase or part of a development, or as directed by the County Engineer. The master benchmark(s) shall be

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located within a reserve lot. At least one master benchmark shall be located within a reserve lot near an existing County or Township road. Temporary benchmarks of a lesser nature and with elevations derived from the “master benchmark” may be used for control within the development area.

- b) Source benchmark: shall be an existing, permanently established and undisturbed monument with a known elevation which is related to the “National Geodetic Vertical Datum” with a high level of certainty.
- c) Development area: is the area of land included within each individual subdivision (section or phase of subdivision) as submitted for review and approval.

2. Minimum Requirements

- a) The elevation of each “master benchmark” shall be determined and established by measurements designed and executed with control over uncertainty, through use of well designed specifications.
- b) The following shall be on all Final Engineering and Construction Plans:
 - (1) the location, description and elevation of the “master benchmark(s)” within the subject development area and the “source benchmark(s)”, and
 - (2) the total expected error and its certainty (90% or greater) in vertical measurements between each “master benchmark” and its respective “source benchmark(s)” based on actual design or sound judgment.

A variance to this requirement may be granted for a Common Access Drive (CAD), or if no public road will be extended or widened.

B. Topographic Standards¹

¹ * U.S. Department of Agriculture, Soil Conservation Service, Engineering Field Manual, Chapter 1, Table 1-1, Pg. 1-2

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1. The elevation of ninety percent (90%) of all identifiable points shall be in error not more than one-half contour interval.
2. No point shall be in error more than a full contour interval.

C. “As-built” Surveys

These are surveys to determine positions of structures as actually constructed. “As-built” surveys are required to check the contractor’s work, assure that the structures will function according to design, and provide a record of locations of structures for maintenance and other subsequent design purposes. In addition to the requirements of these Standards, the information and data obtained for and presented on the “as-built” plan should conform to the as-built survey specifications currently accepted by the surveying profession. See Section 1004, for additional “as-built” survey requirements.