

**ARTICLE I
TYPES OF SURVEYS**

Sec. 20-300b-1. General

There are many types of surveys. Choice of a *survey type* is made relative to the intent and purpose for which the survey is to be used. The *survey type* is intended to classify these criteria. When a map is prepared, the *survey type* shall be stated in the title of the map. In addition, the first note shall state the standards to which the survey was prepared, the applicable Class or Classes of Accuracy, the Type or Types of Survey, and the Boundary Determination Category or Categories.

Sec. 20-300b-2. Property/Boundary and Limited Property/ Boundary Surveys

(a) Property/Boundary and Limited Property/Boundary Surveys require sufficient investigation, study, field measurement and evaluation of factors affecting boundaries, real property interests and other relevant matters with respect to the subject real estate to enable the surveyor to render a professional opinion as to boundary locations and any conflicts therewith.

These surveys require the preparation of a detailed field survey and are intended to present the surveyor's property/boundary opinion. It is recognized that certain factors pertaining to boundary line determination are beyond the surveyor's purview and may require agreements between abutting property owners or action by the courts. Facts surrounding such circumstances shall be noted.

(b) Types of Property/Boundary Surveys

(1) Property Survey

A Property Survey is a type of survey intended to depict and/or note the position of boundaries with respect to:

- (A) locations of all boundary monumentation found or set;
- (B) apparent improvements and features, including as a minimum: dwellings, barns, garages, sheds, driveways, roadways, surface utilities, visible bodies of water and swimming pools;
- (C) record easements and visible evidence of the use thereof;
- (D) record and apparent means of ingress and egress;
- (E) lines of occupation, including as a minimum: fences, walls, hedges and yards;
- (F) deed restrictions pertaining to the location of buildings or other apparent improvements;
- (G) unresolved conflicts with record deed descriptions and maps;
- (H) all apparent boundary encroachments; and

(I) monumentation required to be set at all corners created by a deflection angle of not less than 70 degrees between two consecutive courses and at intervals not to exceed 600 feet along the boundaries between said corners, except where natural or man-made monumentation defines or occupies the line. Refer to Section 20-300b-14 of these regulations for a description of acceptable monuments. Except when intended for use for Subdivision or Resubdivision applications, this requirement may be waived only through written agreement between surveyor and client.

(2) Perimeter Survey

A Perimeter Survey is a type of survey intended to map a strip along the boundaries, the minimum width of which shall be 15 feet, oriented 10 feet within and 5 feet beyond the parcel limits. The purpose of this type of survey is to document the boundary locations by depicting and/or noting their position with respect to:

- (A) locations of all boundary monumentation found or set;
- (B) apparent improvements and features, including as a minimum: dwellings, barns, garages, sheds, driveways, roadways, surface utilities, visible bodies of water and swimming pools;
- (C) record easements and visible evidence of the use thereof;
- (D) record and visible means of ingress and egress;
- (E) lines of occupation, including as a minimum: fences, walls, hedges and yards;
- (F) unresolved conflicts with existing deed descriptions and maps;
- (G) deed restrictions pertaining to the location of buildings or other apparent improvements;
- (H) apparent boundary encroachments; and

(I) monumentation required to be set at all corners created by a deflection angle of not less than 70 degrees between two consecutive courses and at intervals not to exceed 600 feet along the boundaries between said corners, except where natural or man-made monumentation defines or occupies the line. Refer to Section 20-300b-14 for a description of acceptable monuments. This requirement may be waived only through written agreement between surveyor and client.

(c) Types of Limited Property/Boundary Surveys

(1) Existing Building Location Survey

An Existing Building Location Survey is a type of survey intended to depict and/or note the position of all buildings on the property with respect to boundaries, record easement lines and pertinent municipal setback requirements and deed restrictions. No other improvements or features need be depicted.

(2) Zoning Location Survey

A Zoning Location Survey is a type of survey intended to depict and/or note the position of existing or proposed improvements with respect to applicable municipal setback requirements. If existing record easements on the subject property may be affected, they shall be depicted. The purpose of this type of survey is to enable determination of compliance with said requirements. The specific scope of the improvements and matters being addressed by the survey shall be noted. Only those portions of the property, and the improvements and features pertinent to the issues being addressed, must be depicted.

(3) Improvement Location Survey

An Improvement Location Survey is a type of survey intended to depict and/or note the position, horizontally and, where required, vertically, of particular existing or proposed improvements with respect to the applicable municipal or statutory requirements. If existing record easements on the subject property may be affected, they shall be depicted. The purpose of this type of survey is to enable determination of compliance with said requirements. The specific scope of the improvements and matters being addressed by the survey shall be stated and/or a reference to said municipal or statutory requirements shall be noted.

(4) Subdivision or Resubdivision Map

A Subdivision or Resubdivision Map is a type of survey intended to depict and/or note the layout of lots and the associated public or private highways, easements and lands and is intended for submission to applicable regulatory entities. This map shall conform to the requirements of a Property Survey or be submitted along with a Property Survey. The monumentation requirements of Article III of these regulations do not apply to the Original Survey portions.

(5) Easement Map

An Easement Map is a type of survey intended to depict and/or note the position of existing and/or proposed easements with respect to:

- (A) boundary monumentation found or set;
- (B) improvements and features, including as a minimum: dwellings, barns, garages, sheds, driveways, roadways, surface utilities, visible bodies of water, fences, walls, hedges, yards and swimming pools;
- (C) other record easements and visible evidence of the use thereof; and
- (D) unresolved conflicts with record deed descriptions and maps.

All visible encroachments shall be depicted or noted thereon. For boundaries intersected by the easement lines, the surveyor shall indicate the Boundary Determination Category used.

(6) Boundary Stake-Out

A Boundary Stake-Out is a type of survey intended to mark or monument the physical position of property corners or lines. The surveyor shall issue a signed and sealed letter or sketch indicating the monuments or markers set and indicating the Boundary Determination Category used. No other features need be depicted.

(d) Additional Requirements

All survey types listed in subsections (b) and (c) of this section shall comply with the following:

- (1) AA, A-1 or A-2 Classes of Horizontal Accuracy as defined in subsection (b) of Section 20-300b-11 of these regulations;
- (2) monumentation or marker Location Requirements as defined in Section 20-300b-13 of these regulations;
- (3) research requirements defined in Article IV of these regulations;
- (4) distances along boundary or easement lines expressed to the nearest .01 of a foot, except where said lines are irregular and constantly changing, as along a body of water;
- (5) directions, defined by angles, bearings or azimuths, along boundary or easement lines expressed to the nearest 10 seconds for Class A-2 and to the nearest 1 second for Classes AA and A-1, except where said lines are irregular and constantly changing, as along a body of water;
- (6) curved lines defined with the central angle, radius, arc length and tangent. For curves which are not tangent to an adjoining course, the information required to reproduce them shall be indicated. Lines which are radial shall be so noted;
- (7) in areas where lines are irregular and constantly changing, as along a body of water, meander, tie or reference lines shall depict or note the position of points located along said lines and allow for a mathematical closure of the map;
- (8) adjoining properties identified by most recently published owners' names (N/F, now or formerly) or by subdivision map and lot numbers;
- (9) areas noted in acres or square feet;
- (10) all monuments or markers set or found depicted and adequately described. When reference markers have been used, their position with respect to the boundary shall be indicated; and
- (11) a north arrow depicted on every sheet. The reference to grid, magnetic or north from another map, shall be noted. If magnetic, the date of the reading shall be noted.

(e) Boundary Determination Categories

The category used in determining property/boundary opinions for all survey types listed in subsections (b) and (c) of this section shall be identified within the title or notes on the map, and shall be one of the following:

(1) First Survey:

A First Survey is a survey of existing property lines made when the surveyor has not found a map or other document of the subject property, such as a metes and bounds description, which presents a surveyor's professional opinion. The volume and page containing the record description of the subject property shall be noted. If the surveyor has found a prior survey, the current survey is by definition, a Resurvey.

(2) Resurvey:

A Resurvey is a survey of property lines made when the surveyor has previously surveyed, or has found a prior survey which presents another surveyor's property/boundary opinion, of the subject property. After evaluation of the prior survey, within the context of field and record information, the Resurvey may or may not agree with the prior survey. As applicable, the title, scale, date and surveyor of the prior survey or the volume and page for the deed containing the metes and bounds description shall be noted.

If the surveyor has found another surveyor's survey which presents said surveyor's property/boundary opinion and, in the surveyor's professional opinion, determines it to be sufficient for reliance and update, the term Dependent Resurvey shall be used. Identifying the survey as a Dependent Resurvey indicates reliance on the prior survey and the property/boundary opinion of another surveyor while updating same to reflect current conditions. As applicable, the title, scale, date and prior surveyor shall be noted.

(3) Original Survey:

An Original Survey is a survey indicating proposed property lines, easement lines and/or parcels of land. The Boundary Determination Category of existing boundaries shall be indicated.

Sec. 20-300b-3. Control Surveys

(a) Horizontal Control Survey

A Horizontal Control Survey is a type of survey intended to establish points on a horizontal coordinate system, such as latitude and longitude, state, municipal, or arbitrary coordinates. The horizontal control net shall comply with one of the Classes of Horizontal Accuracy defined in Section 20-300b-11 of these regulations.

(b) Vertical Control Survey

A Vertical Control Survey is a type of survey intended to establish bench marks in relation to an appropriate vertical datum. Vertical measurements shall comply with one of the Classes of Vertical Accuracy defined in Section 20-300b-11 of these regulations.

Sec. 20-300b-4. Topographic Survey

(a) A Topographic Survey is a type of survey intended to depict the configuration (relief) of the earth's surface (ground) and the location of natural and artificial objects thereon. The Topographic and Vertical Classes of Accuracy as defined in Section 20-300b-11 of these regulations. shall be noted. Bench marks shall be depicted or noted on all Class T-1, T-2 and T-3 Surveys. Survey datum and contour interval shall be depicted or noted.

(b) If property lines depicted do not present a surveyor's property/boundary opinion, there shall be a note clearly indicating this fact.

Sec. 20-300b-5. Right of Way Survey

(a) A Right of Way Survey is a type of survey intended to map the limits of existing or proposed highways or public utility transmission easements, including the mapping of parcels to be acquired for such purpose(s), as referenced to an established baseline. The baseline to which the highway, easement or acquisition lines are referenced shall be a traverse line, project centerline or construction baseline, any of which shall be monumented or specifically tied to permanent reference markers and shall comply at a minimum with Horizontal Accuracy Class A-2 as defined in Section 20-300b-11 of these regulations and monumentation requirements defined in Article III of these regulations.

(b) Highway or easement lines may be deed, occupation, notification or acquisition lines; shall be noted accordingly; and may be monumented.

(c) The features depicted on the mapping may be the result of aerial photogrammetric or field location surveys performed for project planning purposes or may be compiled from various sources. All pertinent sources shall be noted. The method of determining the position of property lines depicted shall be noted as shall the appropriate Horizontal Accuracy Class.

Sec. 20-300b-6. General Location Survey

(a) A General Location Survey is a type of survey intended to roughly depict a parcel of land and particular improvements based on record research and compilation of data supplemented by limited field measurements. The specific content is a matter to be agreed upon between the client and the surveyor and clearly noted on the map.

(b) If property lines depicted do not present a surveyor's property/boundary opinion, there shall be a note clearly indicating this fact.

(c) Note #1 on the map shall include: "This map was prepared from record research, other maps, limited field measurements and other sources. It is not to be construed as a Property/Boundary or Limited Property/Boundary Survey and is subject to such facts as said surveys may disclose. "

Sec. 20-300b-7. Data Accumulation Plan

(a) A Data Accumulation Plan is a type of plan intended to depict collected and correlated data of a particular type (or types) within a given area. Data Accumulation Plans may be depicted on a previously prepared map. The horizontal and/or vertical accuracy classes used in the preparation, and the specific scope of the matters being addressed, shall be noted.

(b) If property lines depicted do not present a surveyor's property/boundary opinion, there shall be a note clearly indicating this fact.

Sec. 20-300b-8. Compilation Plan

(a) A Compilation Plan is a type of plan based on land record research and other sources of information intended to show the approximate size and shape of a parcel of land. This plan is intended to be derived from records only and not as a result of a field survey or measurements by the surveyor. The accuracy of this plan may vary with the quality of the data from which it has been compiled. All pertinent sources utilized shall be noted on the plan. Where said plan is created for a specific purpose, it shall be so noted.

(b) Note #1 on this plan shall include: "This plan was compiled from other maps, record research or other sources of information. It is not to be construed as having been obtained as the result of a field survey, and is subject to such change as an accurate field survey may disclose."

Sec. 20-300b-9. Construction Stake-Out Services

Construction Stake-Out Services are types of surveys intended to control the horizontal or vertical positions of proposed improvements. No plan need be prepared; however, documentation with respect to the position of points placed shall be maintained as a permanent record.

Sec. 20-300b-10. Geographic Information System (GIS)

A Geographic Information System (GIS) is a complex spatial information system used to capture, store, analyze, display, manage, share, and present data linked to geographic locations. The GIS may be for an area as small as a single property or as large as the nation, and it may contain information of disparate quality and accuracy from many sources outside the GIS itself. The GIS may contain Authoritative Data which can be displayed and presented along with Non-Authoritative Data. Care must be taken to differentiate between the Authoritative and Non-Authoritative data to protect the public from misuse of the different types of data and their varying spatial accuracies.

Authoritative Data are data that have been created by, or under the direct supervision of a Licensed Land Surveyor and depending upon the accuracy, may be deemed suitable for use for engineering design, determination of property boundaries and/or the locations of fixed works and topography. The data suitable for use in an official capacity for the enforcement of regulations that pertain to the location of improvements and fixed works is Authoritative Data.

The applicable horizontal reference system, vertical reference system, and Class or Classes of Accuracy, of the Authoritative spatial and/or boundary data shall be clearly stated. Any features or spatial data depicted on a GIS map that are stated to meet positional accuracies, standards or tolerances (i.e. map coordinate location or elevation versus field coordinates or elevation) shall be considered Authoritative Data.

ARTICLE II CLASSES OF ACCURACY

Sec. 20-300b-11

(a) Conversions to and from the metric system shall use the U.S. Survey Foot which is defined as one meter = 39.37 inches. When converting meters to feet the conversion is exactly 3937/1200 which, when expressed to twelve places, is 3.28083333333333.

(b) Horizontal Accuracy

Each survey depicting horizontal locations shall conform to a Horizontal Accuracy Class the tolerance of which is defined as follows:

Class	Relative Positional Accuracy	Linear		Angular
		Feet	(Use ratio for D>...)	
AA	1: 15,000	± 0.01'	1:22,500 @ D > 225'	± 8"
A-1	1: 10,000	± 0.01'	1:15,000 @ D > 150'	± 10"
A-2	1: 5,000	± 0.02'	1:7,500 @ D > 150'	± 20"
B	1: 1,000	± 0.5'	1:1,500 @ D > 750'	± 2'
C	± 2'	± 2'		± 30'
D	compilation of existing data-NOT A FIELD SURVEY			

Linear accuracies expressed as "±" apply to distances less than (<) those prescribed as a ratio.

Additional accuracy standards for measurements made using Global Navigation Satellite Systems (GNSS) are defined as follows:

GNSS - Global Relative Positional Accuracy (95% Confidence Level)			
Class	Accuracy		Minimum Spacing
	Feet	Meters	
G-A	0.033' + 1 PPM	1.0 cm + 1 PPM	500'
G-1	0.049' + 2 PPM	1.5 cm + 2 PPM	500'
G-2	0.067' + 3 PPM	2.0 cm + 3 PPM	335'
G-B	0.33' + 10 PPM	0.10 m + 10 PPM	N/A

(c) Vertical Survey Accuracy

Each survey depicting vertical location shall conform to a Vertical Accuracy Class the tolerance of which is defined as follows:

Class	Level Loop Closure Greater Than One Mile (in Feet)	Level Loop Closure Less Than One Mile (in Feet)	GNSS Vertical Accuracy (95% Confidence Level) (in Feet)
V-1	± .02√M	± .006√N	
V-2	± .035√M	± .010√N	
V-3	± .05√M	± .020√N	
V-4*			0.066'
V-5*			0.164'

M = The length of the level loop in miles

N = The number of instrument setups in the level loop

* GNSS Only. The surveyor expresses his opinion that the differences between heights resulting from repeat observations would not exceed the stated accuracy levels.

(d) Topographic Survey Accuracy

Each Topographic Survey shall conform to a Topographic Accuracy Class the tolerance of which is defined as follows:

<u>Class</u>	<u>Horizontal Position</u>	<u>Contour Interval Test</u>
T-1	1/40 of map scale	90% within 1/2 contour interval
T-2	1/40 of map scale	80% within 1/2 contour interval

Classes T-1 and T-2 are to be used for ground survey procedures.

T-3 This class of topographic map applies to photogrammetric maps for which the surveyor provides the horizontal and vertical control. Refer to the "National Map Standards for Photogrammetric Mapping" for requirements.

T-D This class of map standard applies to a topographic map compiled from various sources of information not necessarily verified by the surveyor.

In using Topographic Accuracy Class T-1 or T-2, the surveyor is expressing confidence that should a test profile be run in the field, a plotted comparison with a profile scaled from the map shall be in agreement with the above criteria and the remainder shall be within the contour interval.

ARTICLE III MONUMENTATION

Sec. 20-300b-12. Boundary Monuments and Reference Markers

- (a) **Boundary Monument**
An object found or set on a boundary line intended to preserve and identify the location of the boundary line on the ground.
- (b) **Reference Marker**
A permanent supplementary marker found or set close to a boundary with its position with respect thereto indicated.

Sec. 20-300b-13. Location Requirements

The following standards shall apply to location requirements:

- (1) there shall be a minimum of three monuments, markers or a combination thereof;
- (2) each monument or marker found or set shall be adequately described and noted;
- (3) of the three minimum monuments or markers, two shall be within 600 feet of the boundary and each other; and
- (4) each Boundary Monument shall be within 600 feet of two other Boundary Monuments or a Boundary Monument and a Reference Marker. Meander lines need not be monumented.

Sec. 20-300b-14. Acceptable Monuments and Markers

The following shall be acceptable forms of Monuments and Markers:

- (1) disks or plugs, made of durable material set in ledge or concrete and marked with a hole or cross;
- (2) monuments 4" square by 30" long (minimum) of stone or reinforced concrete and marked with a hole or a cross. Some ferrous material shall be placed adjacent to the stone monuments as an aid to recovery;
- (3) drill holes 3/8" diameter by 1/2" deep (minimum) or cross cuts 3/8" deep (minimum) in ledge, concrete or the base stones of walls;
- (4) metal rods 1/2" O.D. (minimum) or metal pipes 1/2" I.D. (minimum) or bar stock of equivalent cross sectional area, having sufficient length to be deemed permanent;
- (5) nails and spikes that are sufficient in size and are set in pavement in a manner so as to be deemed permanent;
- (6) foundation corners; and
- (7) other materials or objects deemed permanent by the surveyor.

ARTICLE IV RESEARCH

Sec. 20-300b-15. General

On surveys where the surveyor expresses a property/boundary opinion, the surveyor assumes responsibility for appropriate research. An appropriate examination of the land records and other sources is one which, in the surveyor's professional opinion, reveals the intended boundary locations and other related matters.

Sec. 20-300b-16. Land Records Research

(a) Land Records Research shall include, but not be limited to, the following:

- (1) an examination of the record descriptions of the property being surveyed;
- (2) an examination of the record descriptions of the adjoining parcels;
- (3) an examination of record surveys and subdivision maps of the land being surveyed and of adjoining parcels;
- (4) an examination of tax assessor's plats and records;
- (5) an examination of pertinent easements and other documents; and
- (6) an examination of Probate Court records, when applicable.

(b) All surveys presenting the surveyor's property/boundary opinion, except Dependent Resurveys, shall include a record search of the surveyed property's chain of title, with deeds going back not less than 40 years. Dependent Resurveys shall include a record search of the surveyed property's chain of title with deeds going back at least as old as the date of the survey relied upon.

(c) The 40-year minimum requirement is not to be construed as a flat period of title to be searched. To determine the original intended boundary locations, most surveys require research well beyond the statutory 40 year period.

(d) Identifying the owner of the property on the survey shall not constitute a certification as to the absolute ownership of the property. It shall, however, indicate a record name or names in which the property stood at the time of the survey, without stating other interests which may pertain to the ownership of the property.

Sec. 20-300b-17. Additional Research

(a) In cases where the surveyor finds: 1) evidence of an unrecorded map; 2) vagueness or conflict of boundary location; or 3) physical evidence of easements not found of record, the surveyor shall pursue such additional sources of information as the surveyor considers appropriate.

(b) The additional research required is that which, in the surveyor's professional opinion, is sufficient to reveal the location of the boundaries of the subject property and other related matters pertaining to the land. Where properties are poorly described or where the location of the boundaries has become lost or uncertain, the surveyor may contact adjacent owners or other persons for their knowledge as to the locations of boundary lines.

ARTICLE V
MAP DRAFTING and RECORDS

Sec. 20-300b-18. Map Drafting Standards

The following standards shall apply to all survey maps and plans:

- (1) the surveyor shall use map-making materials of a durable nature;
- (2) all lettering shall be legible when reproduced;
- (3) whenever more than one sheet is used, each sheet shall contain clearly labeled match lines and indicate both the number of each sheet and the total number of sheets;
- (4) both a word scale and a graphic scale shall be depicted;
- (5) a North arrow (with appropriate source reference) shall be depicted on every sheet;
- (6) the first note shall state the standards to which the survey was prepared, the applicable Class or Classes of Accuracy, the Type or Types of Survey, and the Boundary Determination Category or Categories;
- (7) when applicable, horizontal datum and vertical datum shall be noted;
- (8) mapped features shall be depicted to an accuracy of 1/40 of map scale for surveys; and
- (9) when applicable, documents used in preparation shall be noted.

Sec. 20-300b-19. Field and Office Records

The field notes, original maps, research material and computations shall be retained as a permanent record.

ARTICLE VI
SIGNING and SEALING

Sec. 20-300b-20

(a) The signature and embossed seal of the surveyor shall be placed in accordance with Section 20-300-10 of The Regulations of Connecticut State Agencies.

(b) Maps and plans shall include the statement: "To my knowledge and belief, this map is substantially correct as noted hereon" above the signature and the printed name and license number of the surveyor below the signature.