



**Office of
General Services**



Standards & Procedures for Surveying and Mapping

October 2014



STANDARDS AND PROCEDURES

FOR

SURVEYING AND MAPPING

October 2014

As written by the New York State Department of Environmental Conservation,
amended by New York State Office of Parks, Recreation & Historic Preservation
and amended for use by the New York State Office of General Services

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I. FORWARD

The New York State Office of General Services (OGS) is responsible for many programs that require the services of professional land surveyors. Quite often these services include surveying, mapping and boundary marking for the conveyance of land or land rights from private individuals to the State. Frequently, there is also a need for mapping for planning or design purposes; re-survey and re-marking of old boundaries; and other specialized services consistent with programs within this office. Surveying staff in the Bureau of Land Management are generally responsible for the surveying and mapping.

The purpose of this manual is to provide a standardized guide for land surveyors in the performance of surveying and mapping projects. All survey and mapping performed for the OGS becomes part of the permanent records of the OGS. It is considered public record and will be kept in perpetuity for use by the OGS, other state and local agencies and the public. All survey notes, computations, maps, tracings, and other documents and data in written and/or digital form pertaining to the work or to the project shall at all times be the property of the OGS.

The type of surveying or mapping required for a project will be outlined in the contract with each consultant. Within this manual are standards and procedures for most of the services that might be required. When specified, these standards and procedures are to be considered a part of the contract. When there is a conflict between these standards and contract specifications, the contract shall prevail.

Boundary surveys will include research, field survey, field notes, computations, monumentation and marking of all state boundaries (including jurisdictional boundaries), a survey map, legal descriptions and a surveyor's report.

The standards and procedures for the preparation of maps and surveys are outlined in this booklet. Diagrams and samples illustrating some of the procedures described herein will be found in the Addenda.

II. RESEARCH

OGS will supply whatever material is readily available for the project from their files. This may include deeds, maps, abstracts of title, etc. In some cases little or no information is available. Abstracts or certificates of title are ordered by the OGS for all acquisition projects but are frequently not delivered until the project is well underway, or in some cases after the survey is completed.

IT IS THE RESPONSIBILITY OF THE SURVEYOR to perform sufficient research to provide the basis for a complete and accurate survey. All rights-of-way, easements, boundary line agreements, exceptions or reservations that affect the property must show on the map with their correct location and dimensions. Copies of research material used to make these determinations shall be provided to the OGS at the completion of the project.

Research is not necessarily limited to data filed or recorded in the County Clerk's office. It is often necessary to conduct research at the offices of state agencies, town or county offices, utility companies, archives, or other offices where records may reveal data that affects the ownership or boundaries of the property. Interviews with owners and adjacent owners frequently reveal data that is valuable to the surveyor.

Laws affecting Real Property

While the majority of acquisitions completed by OGS are straightforward, on occasion the surveyor may encounter situations that will require additional knowledge of laws affecting real property. The following is a list a just a few:

- Real Property Law
- Education Law
- Eminent Domain Procedure Law

Other situations that may arise could be:

1) Adverse Possession

The courts generally hold that land owned by the State for a public purpose is NOT subject to adverse possession by others. Similarly, the State cannot obtain private land by adverse possession. That is not to say that a deeded conveyance to the State extinguishes adverse possession rights that were matured prior to the State acquisition. A State acquisition would, however, stop the time clock and extinguish any rights that were in the process of maturing but had not completed the statutory time limits at the time the State acquires.

Adverse possession claims are, of course, problems to be decided by a court of law. Knowledge of some of the basic rules can, however, prevent the surveyor from reaching erroneous conclusions.

In considering possible adverse possession situations the surveyor should make he/she aware of the date of the State's acquisition and the statutory time limits in effect immediately prior to the acquisition.

2) Easements by Prescription

The courts have generally applied the same rules for easement by prescription over State land as they have to adverse possession. That is, an individual generally CANNOT obtain an easement by prescription over State land, nor can the State obtain an easement by prescription over private land.

III. STANDARDS AND PROCEDURES FOR FIELD SURVEYS

A. Field Surveys in General

The following items are standard for all field surveys conducted for the OGS unless specifically exempted by contractual specifications. When using GPS data collection methods OGS refers to the NYS Department of Transportation (DOT) Spatial Accuracy Standards as defined in the DOT Land Surveying Standards and Procedures Manual.

- 1) The New York State Plane Coordinate System shall be used on all surveys unless specifically instructed not to by the OGS.
- 2) Before commencing any field survey, every attempt should be made to contact all owners of property adjoining the parcel to be surveyed. Unless confidential, the nature of the survey should be explained to the adjoiner. The surveyor should request permission to enter upon the lands of the adjoiner for purposes of making the survey.
- 3) It is the OGS's policy that, on both public and private lands, surveys be conducted in a manner which minimizes damage to the property or environment. Care and discretion should be used in all survey procedures including cutting, witnessing, marking and monumentation. Where painting is necessary, lead-free paint shall be used.
- 4) It is expected that consultant surveyors shall comply with existing regulations for the State land area being surveyed unless specific exemption is granted.
- 5) All angles will be turned to the right or clockwise unless otherwise approved. Angular measurements will be performed with transits, theodolites or total stations with a least reading (direct) as shown in the table on page 12.
- 6) Distance measurements will be made with Electronic Distance Meters (EDM), total stations, or steel tape utilizing procedures consistent with the standards shown in the table on page 13.
- 7) All EDM's or total stations will be calibrated regularly (suggested schedule at least annually) against a standardized base line. A copy of the latest report of calibration shall be included in the *Report of Survey*.
- 8) If steel tapes are utilized for traverse measurement they shall be standardized against a tape calibrated by the National Bureau of Standards. A copy of the *Length Calibration Report* and standardization form shall be included in the *Report of Survey*.
- 9) All traverses which are utilized in locating evidence or determining boundary shall be closed in nature. A closed traverse may be a loop off a single point or start from one point of known location and close on another point of known location. Loop closure off a single point is not permitted for Primary traverses in Urban Class

surveys.

- 10) Distances measured by stadia, rangefinder, hip chain or like devices are not acceptable.
- 11) Where practical, existing, clearly defined property corner monuments that meet or exceed traverse station specifications should be occupied and observed as a traverse station.
- 12) The location and portrayal of improvements on the subject property will be required unless specifically exempted.
- 13) All improvements within 10 feet of an acquisition boundary, or a boundary being established by a resurvey, will be located and portrayed on the map with the offset distances from the boundary to the improvement.
- 14) All encroachment or evidence of trespass within the project area shall be located and portrayed as in item 12 above.
- 15) All evidence or indications of easements, rights-of-ways or use and occupancy by other than the reputed property owner shall be located and portrayed on the map. If location is not practical, a note explaining the circumstances should appear on the face of the map.
- 16) Wherever practical, the entire property from which a portion is to be acquired shall be portrayed on the map.

B. Field Survey Notes

The format of the field notes shall generally be at the discretion of the surveyor. It is, however, required that the notes be easily interpreted by other users. All entries should be clearly labeled and the use of sketches to graphically portray the contents of the notes is strongly recommended for surveys recorded manually and electronically.

For written notes, there should be no erasures or obliterations. If changes are necessary a single line should be made through the original entry so that it remains legible. Pages or portions of pages should be voided by drawing an X through the page or portion and writing "VOID" across the entries so that the original data is not obliterated.

Field notes may also be entered into electronic notebooks. Where changes are necessary, erroneous entries should be noted and correct data collected.

Field measurements, both angle and distance, should NOT be incorporated into the sketch, but should be separate entries. Dimensioning of improvements may be shown on the sketch.

Field notes should show all the data required to assure that the entire survey was performed to required specifications.

Written field notes should be in a standard bound field book or on loose-leaf sheets. The latter should be

assembled in order, page numbered and placed in an adequate binder. The field book shall be labeled to reflect the OGS survey and project names and numbers. The first inside page should contain the project name, survey number, number of pages, date and the seal and signature of the land surveyor. The next page(s) should contain a complete index of the notes contained therein.

Field notes recorded on data collectors should be supplied in printed and digital form. Digital field notes should be supplied in a format compatible with GPS, GIS, or AutoCAD (up to Version 2010) software.

AT THE COMPLETION OF THE PROJECT THE ORIGINAL FIELD NOTES WILL BECOME THE PROPERTY OF OGS and will be part of the preliminary submission of materials for review.

C. Horizontal Control Specifications

1) Survey Classifications

Each survey performed for OGS will be designated as one of the following four classes. Each class is meant to indicate a standard of land use but land use is not intended to be the sole determinant of class. For instance, there may be occasions when the OGS determines that an Urban Class standard is necessary for a project even though it is located in a rural area. The character and types of use of adjacent lands will usually help determine the class of survey, i.e. A Remote Class survey should not be used for lands adjacent to a subdivision or commercial use property.

The four classes of survey which are generally used by the OGS include:

- a) Remote Class - Surveys in generally remote areas. Usually lower value lands. Usually only one or a small number of parcels or owners. Frequently bounded on two or more sides by existing State land boundaries.
- b) Rural Class - Surveys of land in rural areas with land values in the low/medium price range. Projects in areas where land is generally used for agriculture or forestry with little likelihood of residential or commercial development in the near future. Usually relatively small projects adjacent to existing State lands on one or more sides.
- c) Suburban Class - Surveys of land in areas with residential or commercial development or a reasonable probability of such development occurring in the near future. Land values generally in the medium/high price range. Frequently used for new, multiple-parcel projects regardless of location. Generally used for waterfront acquisitions and surveys for projects that will result in construction activities.
- d) Urban Class - Surveys in urban areas or suburban areas with heavily developed, or likely to be in the near future, residential, commercial or industrial use. Usually high land values.

2) Primary Control Traverses

Surveys tied to the New York State Plan Coordinate System and most control surveys for photogrammetric mapping will require the establishment of a primary traverse through the project area. The major purpose of this primary traverse is to establish an accurate control network within the project from which secondary

traverses can be run to locate evidence and photo control, or to control construction activities, etc. The primary traverse shall begin at an existing control point, pass through the project area and, unless specifically permitted to the contrary, close to a different existing control point. The primary traverse within the project limits shall have traverse stations at intervals not to exceed 1,000 feet, but not less than 400 feet. A traverse station shall be located within 400 feet of each end of the project limits. Outside the project limits the traverse station spacing can be increased as deemed appropriate to tie to control monuments.

The control points to be utilized for starting and closing the primary traverse are subject to the approval of the OGS, as is the method of azimuth orientation of the traverse.

All primary traverse stations shall be a semi-permanent monument of a material recoverable by magnetic locator. They should not be readily subject to frost movement or easily disturbed by snowplowing, vandalism, etc. and should be expected to last 5 to 10 years or more under normal conditions. PK nails, spikes, wooden hubs, etc. are NOT acceptable as primary traverse stations. A good example of a primary traverse monument would be a 5/8" diameter steel reinforcing rod (minimum length 36") with cap driven flush or slightly below flush with the ground. Control diagrams will be provided for each station. (See suggested format at Addendum A-2.) A minimum of three (3) swing ties will be established at each traverse station and for each outside control station utilized. Swing-tie measurements shall be horizontal. No primary traverse shall exceed 20 stations without an azimuth closure observation.

If trilateration or triangulation is proposed as part of the primary traverse the specifications will be those outlined for Second-Order surveys in the publication "Suggested Specifications for Local Horizontal Control Surveys" published by the American Congress on Surveying and Mapping, Control Surveys Division as Technical Monograph NO. CS-1.

A sample of field notes for a set (one direct and one reverse) of closed horizon observations can be found in Addenda A-3.

If GPS is proposed as part of the primary traverse, the specifications will be those outlined in Geometric Geodetic Accuracy Standards and Specifications for Using GPS relative Positioning Techniques, Federal Geodetic Control Committee, Version 5.0 dated May 11, 1998 and reprinted with corrections August 1, 1989.

3) Secondary Traverse

Secondary traverses shall be established where necessary within the project area to locate evidence, planimetric features or other data. These traverses shall be closed in nature, starting at one primary station and closing on another. Secondary traverse stations may be temporary in nature and no swing ties or control sketches are required.

4) Orientation to North

Each survey shall be oriented to Grid North or if different, shall have prior approval from OGS

Grid North - (By orientation to New York State Plane Coordinate System) For projects in which a tie into the State Plane Coordinate System (SPCS) is utilized, North orientation may be by use of azimuth markers, observation from a different SPCS monument or observation of towers, spires, or other features with published

coordinates or bearings. If such features are not available, azimuth orientation may be accomplished by Polaris observation. The relationship between Grid North and Magnetic North shall be shown on the map.

a) Magnetic North - Magnetic orientation may be permitted in Remote and some Rural Class surveys, particularly when adjacent to existing survey(s) referenced to a magnetic meridian. In these cases the North reference and source should be clearly labeled including the year of the Magnetic North reference.

b) Astronomic North - (By astronomic observation) North orientation by astronomic observation may be permitted or required in some cases. Acceptance of Solar observation in lieu of Polaris or other astronomic observation will be at the discretion of the OGS. The relationship between Astronomic and Magnetic North shall be shown on the map.

c) Local Control Network - Where a local control network exists the survey should be tied to the network if so prescribed by local statutes. If the local network is not tied to the State Plane Coordinate System, OGS may require dual coordinate data for projects on which the SPCS is a usual requirement.

5) Standards Charts

Following are charts showing generally accepted standards for Angular, Orientation, Distance and Closure requirements for each class of survey.

| ANGULAR AND ORIENTATION STANDARDS CLASSES | | | | | |
|--|------------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| | REMOTE | RURAL | SUBURBAN | | URBAN |
| | | | Secondary Traverse | Primary Traverse | Secondary Traverse |
| ANGULAR STANDARDS | | | | | |
| Instrument Least Reading (direct) | 1 min. | 20 sec. | 10 sec. | 6 sec. | 6 sec. |
| Repetitions Required (Angles) | 1 Dir. & 1 Rev. | 1 Dir. & 1 Rev. | 1 Dir. & 1 Rev. | 4 Dir. & 4 Rev. | 2 Dir. & 2 Rev. |
| Repetitions Required (Horizons) | 1 Dir. | 1 Dir. | 1 Dir. & 1 Rev. | 2 Dir. & 2 Rev. | 1 Dir. & 1 Rev. |
| Maximum spread between Direct & Reverse (Angles) | 30 sec. | 20 sec. | 10 sec. | 6 sec. | 6 sec. |
| Maximum failure of closure in horizon observation | 30 sec. | 20 sec. | 10 sec. | 6 sec. | 6 sec. |
| Acceptable angular closure | $2' \sqrt{N}$ or $30'' \times N_1$ | $40'' \sqrt{N}$ or $10'' \times N_2$ | $30'' \sqrt{N}$ or $8'' \times N_3$ | $10'' \sqrt{N}$ or $3'' \times N_4$ | $20'' \sqrt{N}$ or $8'' \times N_3$ |
| ORIENTATION STANDARDS PERMISSIBLE | | | | | |
| - Magnetic North | No ⁵ | No ⁵ | No ⁵ | No | No |
| - Astronomic North | No ⁵ | No ⁵ | No ⁵ | No | No |
| - Local Datum | No ⁵ | No ⁵ | No ⁶ | No ⁶ | No ⁶ |
| - State Plane Coordinate | Yes | Yes | Yes | Yes | Yes |
| Maximum number of stations between azimuth closure | No limit | 40 | 30 | 20 | 30 |

1

2 minutes times the square root of the number of stations or 30 seconds per station, whichever is smaller?

2

40 seconds times the square root of the number of stations or 10 seconds per station, whichever is smaller?

3

30 seconds times the square root of the number of stations or 8 seconds per station, whichever is smaller?

4

10 seconds times the square root of the number of stations or 3 seconds per station, whichever is smaller?

5

May be permitted as part of contractual specifications.

6

Where required by local statute the OGS may require data on both the local datum and State Plane Coordinate System.

DISTANCE STANDARDS CLASSES

| ACCEPTABLE MEASURING DEVICES | REMOTE | RURAL | SUBURBAN | | URBAN | |
|---|---------|----------|--------------------|---------------------|---------------------|--|
| | | | Secondary Traverse | Primary Traverse | Secondary Traverse | |
| Total Station (TS) | Yes | Yes | Yes | Yes | Yes | |
| Electronic Distance Meter (EDM) | Yes | Yes | Yes | Yes | Yes | |
| Standardized Steel Tape | Yes | Yes | Yes | No | No | |
| If TS or EDM: | | | | | | |
| Double measure? | No | No | No | Yes | Yes | |
| Forward & Back? | No | No | No | Yes | No | |
| Maximum distance between stations (within project area) | N/A | N/A | N/A | 1,000 ft. | N/A | |
| Minimum distance between stations | N/A | N/A | N/A | 400 ft. | N/A | |
| Maximum spread in double measure | N/A | N/A | N/A | 1:50,000 +±0.01' | 1:50,000 +±0.01' | |
| Traverse closure (after angular adj) | 1:5,000 | 1:10,000 | 1:15,000 | 1:25,000 | 1:20,000 | |

D. Vertical Control Specifications

On all topographic mapping projects, and on all projects where photogrammetric or orthophotographic methods are used, a vertical control network shall be established.

1) Primary Level Lines

Primary bench marks of a semi-permanent nature will be established within the project area at intervals not to exceed 1,000 feet. Elevations will be established for each bench mark based on NGVD83 Datum or approved alternate. The primary bench level line shall originate on one government bench mark and preferably close to a different one using the following criteria:

Error of closure shall not exceed 0.035 feet times the square root of the length of the line as expressed in miles.

Stadia measurements should be taken (for the purpose of balancing the distance between backsight and foresight) along with each rod reading and recorded. A separate column should show the accumulated algebraic difference. The length of the line in miles will be determined from the sum of the stadia readings for backsights and foresights. No sighting should exceed 200 feet in length. The distance of the backsight and foresight should be reasonably balanced at each set-up. At no point should the accumulated stadia imbalance exceed 25 feet. Efforts should be made to avoid rod readings lower than 1 foot or higher than 10 feet. Rod levels should be used.

2) Supplemental Level Lines

Supplemental level lines may be used for vertical photo control, spot elevations, inverts, etc. These lines should start at one primary bench mark and close to another. No stadia measurements or other special requirements exist. The allowable error of closure for these lines is one tenth of the contour interval for the project. If contours are not required the following contour intervals are considered standard for the map scales shown:

| Map Scale | Typical Contour Interval | Max Vertical Error of Closure |
|-----------|--------------------------|-------------------------------|
| 1" = 40' | 1' | 0.1' |
| 1:500 | 0.5 M | 0.05 M |
| 1" = 50' | 2' | 0.2' |
| 1:1,000 | 1 M | 0.1 M |
| 1" = 200' | 5' | 0.5* |

* Maximum allowable error of closure for supplemental level lines regardless of scale of map.

E. Computations

The consultant must furnish the OGS with a complete set of computations and plot sheets showing all work of reducing the field notes to the data shown on the final map.

The form of the computations and the methods of reduction and balancing are at the discretion of the consultant. However, the computations should be organized so that a person unfamiliar with the survey can identify and understand the work.

All final horizontal points should be reduced to plane coordinates. If the coordinates relate to any established net, a statement to this effect should be included. Vertical points should be reduced to an approved datum. If the origin is selected at random, this should be clearly labeled to indicate the parcels involved.

Computer printout sheets are excellent if thoroughly labeled and keyed to the notes. If computer files are included, they should be in manageable form and labeled for identification.

F. Boundary Monumentation

The corners, angle points and road crossings of boundaries of state land resulting from the survey must be plainly marked and permanently monumented.

It is generally the responsibility of the surveyor to provide the monumentation materials required; however, OGS may furnish marking caps for the consultant's use.

It is recognized, because of terrain and soil conditions, that a variety of corner materials may be necessary. For any proposed substitution from the required monuments the proposed monumentation must be approved by the OGS in advance. It is recommended that the consultant include in his/her proposal the type of monumentation he/she proposes to set for the particular project if it differs from the normal standards. When no particular monumentation is specified the following are considered standard:

1) Remote & Rural Classes

- a) 1¼" galvanized iron pipe (new), capped and placed securely in the ground. Pipe should protrude at least 6" and stones placed around it; OR
- b) 1" copper bolt with ½" shank set firmly in a ½" drill hole in bedrock or in a large upright boulder; OR
- c) Minimum 5/8" capped re-rod 36" long set in concrete and stones. (Recommended)
- d) Pre-approved substitute

2) Suburban Class

- a) 1¼" iron pipe as in 1) a) above MAY, in some cases be required to be set flush; OR

- b) Precast (with center re-bar) concrete monument (minimum length 42"); OR
 - c) Berntsen (Model A1NB30) type monument, set flush with the ground; OR
 - d) Berntsen C35F 3 ½" flat concrete marker (aluminum) set flush on flat semi-permanent, stable concrete surface; OR
 - e) Pre-approved substitute
- 3) *Urban Class*

OGS shall determine required boundary monumentation.

- Reference Marks

In those locations where the monuments to be placed will not be readily visible, cannot physically be set (i.e. corner tree in the way) or where they are in a vulnerable position and likely to be disrupted, reference marks or line markers of a permanent nature should be placed. It is often desirable to set a permanent reference mark to a corner for use as orientation in extending the survey from that corner at some future date. The bearing and distance to this point should be clearly show in the field notes and on the map.

- Unacceptable Materials

The following are not considered acceptable materials for monumentation: wooden stakes, used iron pipe, thin walled conduit pipe, reinforcing bars less than 5/8" diameter, nails, spikes, etc.

- Monument Swing Ties

Swing ties to monuments or reference marks are required. They may be made to building foundation corners, hydrants, large trees and other more or less permanent fixtures. The ties to these fixtures and the reference marks should be clearly shown in the field notes in order that the corner can be recovered or reset. Measurements to swing ties should be plumbed horizontal.

G. Boundary Marking

Where property lines cross highways or where the actual property is in the centerline of a highway, line markers of material similar to those listed in section F above must be set. A monument should be placed at the point of intersection of the right-of-way line with the property line. It is desirable to place line markers in the vicinity of trail or woods road crossings. In all cases, the position and location of line markers will be shown on the final map.

When the final lines have been determined, they must be established on the ground. This can be done by

offsets from the traverse or by running the actual line by instrument.

Option A: Wooded Areas

In wooded areas, the line must be identified by marking (blazing) the trees along the final line as follows:

- a) If the boundary line strikes a tree, it will be marked as a line tree with blazes on the opposite sides of the tree in the direction of the line.
- b) Trees off line but whose faces are within one foot (1') of the line will be marked with both line blazes and a side blaze facing the line.
- c) Trees whose faces are more than one foot (1') but less than three feet (3') from the line will be side blazed on the side facing the line.
- d) In very lightly wooded areas where the above marking standards result in a distance of 200 feet or more between markings, a line post may be required.

- Witnessing Corners

All corners shall be witnessed from adjacent trees in the immediate vicinity of the corner. Witness trees shall be marked with three blazes facing the corner. These witness marks should be placed on the trees at a height of at least three feet above the ground surface so as to be visible during the winter months when snow has accumulated. Care and discretion should be exercised in marking so as not to damage private property or impair the aesthetic values of public lands.

Option B: Non-Wooded & Suburban Areas

In non-wooded rural, suburban or urban areas where painting and blazing may damage or impair the aesthetic values of public lands the surveyor may be required to mark the corners and lines with fiberglass line posts. Corners to be marked with Carsonite Fiberglass Witness Posts (Berntsen CBM72SM110) and lines to be marked with (Bernsten TLP6), set firmly in the ground, at intervals to be determined by OGS.

IV. MAPPING

A. Size and Form

Maps shall be submitted in standard sizes as follows: 8½" x 11", 8½" x 14", 11" x 17", 17" x 22", 18" x 24", 22" x 34" or 24" x 36". A variance to these sizes may be necessary to conform to requirements of certain county clerk offices. Under no circumstances shall a map exceed 24" x 36" in outside dimensions.

If it is not practical to perform the mapping to the 22" x 34" or 24" x 36" size, it should be drawn on two (2) or more sheets of 22" x 34" or 24" x 36". When more than one sheet is utilized, the following procedure is to be followed:

- 1) Each sheet is to be labeled with the map number, sheet number and the number of sheets. (Example: Sheet 1 of 3)
- 2) Each sheet will have match lines indicating the position of adjoining sheets. The lines will be labeled with "MATCH LINE" and the adjoining sheet number. The ends of the match line should have perpendiculars on them so that the adjoining sheets may be properly positioned. Each sheet is to match horizontally and vertically with all adjoining sheets.
- 3) A separate title sheet may be required for all maps made on more than one sheet. A location map keyed to the project area portraying the positions of each sheet shall be shown on the title sheet.
- 4) Each sheet will include a separate title block and all required certifications, endorsements, notes, legends, etc. A minimum 1½" binding edge will be left along the left-hand side of the map. (Place the map in the position in which it will be filed and the binding edge will be on the left side.) This will hold true for maps of more than one sheet.

B. Material

Maps will be drafted on a stable base polyester drafting film with a minimum thickness of .004". (Example DuPont cronaflex or equal.) All drafting will be with black waterproof ink. Rub-on symbols, transfer lettering or similar make-up materials will not be accepted.

C. Location Sketch

A tracing from a United States Geological Survey (USGS) or New York State Department of Transportation (NYSDOT) quadrangle showing the location of the land surveyed should be placed in the upper right-hand corner of the map. The quadrangle name and size, in minutes, should be shown under the location sketch. (Example: Peekamoose Mt., NY 7½ minute Quadrangle.)

D. Title

The title block will be placed in the lower right-hand corner of the map and will include the following information:

- 1) The words "State of New York, Office of General Services" should appear at the top of the title block with the name of the consulting firm directly below.
- 2) Project Number(s) and/or Proposal Number(s) assigned to the survey. In some cases, more than one set of

numbers will be assigned.

3) Name of the reputed owner or owners.

5) The location of the project land shown on the map by: Sub-lot number, Lot number, Great Lot, Tract, Township, Patent, etc. and by City, Village, Town, County and State.

6) State land use designation and jurisdiction. (Supplied by OGS)

7) The scale of the map by numeric notation and by graphic representation. The numeric representation shall be in both the standard inches to feet scale and the appropriate ratio; i.e., 1" = 200' and 1:2400. The graphic scale shall be a bar scale with feet represented along the top of the scale.

8) Date of the completion of the survey and signature of the surveyor.

9) Date of the completion of the drafting and the signature of the draftsman.

E. Certification

A Licensed Land Surveyor currently registered in New York State must certify every map submitted. Such certification must indicate the source of the information shown on the map; i.e., from an accurate survey, by compilation from deed information, by compilation from survey maps, by tracing from another map or tracing, etc.

An example of a certification follows:

"I Hereby Certify that this is an accurate map prepared by me or under my direction, from an actual field survey, dated _____, performed in accordance with the standards and procedures adopted by the New York State Office of General Services"

(Signature) _____ (Date) _____

Name and N.Y.S. License Number

Required OGS signature line.

Reviewed by:

_____, date: _____

XXXXXXXX, L.S., No. XXXXX
Public Lands Surveyor Examiner
New York State Office of General Services

The original mylar tracing of the map shall bear the inked, in black ink, Seal of the Land Surveyor in close proximity to the certification.

A warning as prescribed in paragraph 2, Section 7209, Chapter 987 of the Laws of New York 1971 is to be affixed to each map or map section submitted to the OGS.

F. Survey Map Requirements

All information shown on submitted maps should be indicated as follows:

- 1) Lines actually run should be shown as solid lines. **NO BOUNDARY OR PARCEL LINES SHOULD BE IN SOLID FORM UNLESS THEY HAVE ACTUALLY BEEN RUN ON THE GROUND.**
- 2) Bearings and distances should be shown on all perimeter and parcel lines of the survey. Computed bearings and distances should be so indicated. Bearings shall be shown to the least reading of the instrument. Distances shall be shown to the nearest hundredth of a foot.
- 3) Clear and precise locations and descriptions of all corners, corner monuments and other physical and control features located in the field (i.e., buildings, poles, fences, marked lines, line markers, hedgerows, stonewalls, witness trees, etc.) affecting the determination or position of lines should be given.
- 4) All improvements within ten (10) feet of a boundary or property line located as a result of the acquisition survey or boundary re-survey shall be portrayed on the map with the offset distance from the line to the improvement.
- 5) All Lot numbers and all Townships, Tract, Patent, Purchase and other location data should appear on the body of the map.
- 6) The location and identification of all city, village, town and county lines that cross or bound the project parcel, where such lines have been located by survey, should be shown. In cases where such lines have not been surveyed, the approximate location shall be shown and labeled as such, with reference given to the source.
- 7) Where necessary, to clarify the determination of the location of a particular line, the reference used, whether it be a filed map, deed description or otherwise, shall appear on the survey map.
- 8) A North arrow should be shown and should always point as near as possible to the top of the map. It shall be designated as Astronomic, Grid or Magnetic as the case may be and, in all instances, the declination between Magnetic North and the meridian used shall be shown. On surveys performed on the State Plane Coordinate System, Grid North will be identified as being at the Central Meridian of the Zone utilized for the survey.
- 9) No copyright symbol may be affixed or delineated on the map.

NOTE: Since, as provided in the OGS standard contract and this standard and procedures manual, survey notes, computation, maps, tracings and other documents and data pertaining to the survey are at all times the property of the OGS. The title to and right to determine the disposition of any copyrights or copyrightable

material first produced or created in the performance of this work shall remain with the OGS.

10) In ALL cases roads (traveled path) shall be shown as double-line, both edges. The width and type of the surface shall be noted.

11) The bounds of ALL highways shall be shown with courses and distances. On highways by user, the bounds of the highway easement shall be located and shown with courses and distances.

12) All maps shall be submitted in hardcopy and digital format. Hardcopy maps shall be printed with black ink. For digital format, boundary lines must be on a separate layer, separate from the text. The files must be compatible with OGS's CAD software.

V. REPORT OF SURVEY

The land surveyor shall submit a preliminary report of each project survey with the preliminary map submission. This report shall include copies of all pertinent information, such as deeds, maps, etc. that have a bearing on the survey.

The Report of Survey shall also include an errata report for each parcel which will consist of a narrative, and where necessary, sketch(es) for clarification of controlling factors in positioning lines as well as discrepancies between deed and surveyed linear, angular and area measurements. All encroachments, disputed boundaries, overlaps, disputed ownership and occupation that violates record documents shall be clearly presented and brought to the attention of the OGS in this report and will be reviewed prior to the preparation of the final map and legal description.

The surveyor's opinions, conclusions and recommendations should be given. The final report should be bound in a suitable binder with the title of the survey shown on the outside cover. The final report shall be dated and signed by the land surveyor and the surveyor's seal shall be affixed near his signature.

When required, EDM and/or standardized steel tape calibration reports shall be a part of the *Report of Survey*. When a primary traverse and/or Vertical Control Network is utilized in the survey the Horizontal and/or Vertical Control Diagrams shall be a part of the *Report of Survey*.

Other required elements of a *Report of Survey* are:

TITLE:

- 1) Project, survey #, location, town, county, lots, etc.
- 2) Description of need and reason for survey.

FIELD WORK:

- 1) Members of the survey party.
- 2) Date(s) of survey.
- 3) Weather conditions (including such things as snow cover).
- 4) Instrument(s) used.
- 5) Survey procedure(s) used: i.e., closed traverse, triangulation, side shots, # of sets of angles, etc.
- 6) Data gathered: Types of data, include any special observations, problems encountered, evidence of occupation, utility lines with owners names, etc.
- 7) Return trips: Check on data, setting corners or marking lines. State members, date(s), weather, instrument(s), procedures, etc.
- 8) Title research: Who, when, where. Explain problems, gaps in the title, etc. Maps found, etc.
- 9) Tie sheets of all primary baseline.

OFFICE WORK:

- 1) Results of computations: Error of closure, etc.
- 2) Plotting of deeds: If there are discrepancies, explain each. Was abstract of title available and used?
- 3) Plotting of field data: Explain problems, if any.
- 4) Analysis and Conclusions: Explain discrepancies and why some evidence may have been given more weight than others. Include such factors as elements of evidence, senior title. Etc.
- 5) Drafted Map: Who, when, map#.
- 6) Completed Report of Physical Inspection. See Addenda A-4.
- 7) Completed Survey Check Sheet: See Addenda A-5.
- 8) Legal descriptions (metes and bounds) for the parcel(s) surveyed.
- 9) Upon completion of the project a Completed Survey Deliverable Check Sheet: See Addenda A-6.

VI. CONTRACTING FOR SURVEY WORK

A. Proposals

OGS term contracts that are administered by OGS Design and Construction. OGS can also request bids for survey projects. A minimum of five survey companies shall be canvased and bids received based on the scope, timeframe and deliverables. The lowest bidder shall receive the project.

B. Liquidated Damages

The OGS works on many projects involving important time scheduling. Delays in obtaining title to acquisition projects or in obtaining rights of entry often have costly results. Delays can result in a threat to public health or welfare, increased project costs, loss of Federal or other funding or loss of the project.

Consequently, on some projects there will be a liquidated damages clause in the survey contract. In these cases liquidated damages will be assessed against the payment due to the surveyor for every calendar day, or portion thereof, the project is late in meeting contractual deadlines.

When in effect the daily liquidated damages generally amount to \$50 or 1% of the gross contract amount, whichever is larger? The amount of damages may however vary from contract to contract.

C. Partial Payments

On larger survey contracts (usually over \$10,000) the OGS may include provisions for partial payments. Such partial payments will be computed based on a percentage of work completed. Payments may be broken down by research, fieldwork, computations, monumentation, mapping and reports or any appropriate combination. The breakdown and the percentage of partial payment for each payment step should be indicated in the initial contract. When partial payments are requested the OGS may request documentation to prove that the work was satisfactorily completed.

A percent retainage may be deducted from the partial payments to cover contingencies. In contracts with both a Liquidated Damages clause and Partial Payment provisions, the total of partial payments in advance of completion shall not exceed 50% of the gross contract amount.

D. Materials to Be Submitted

Following is a listing of the minimum materials required to be submitted as part of a survey contract:

- 1) Original field survey notes
- 2) Original computations and plotting sheets
- 3) Original ink on mylar survey map
- 4) Five (5) paper prints of the survey map
- 5) Original Report of Survey
- 6) Copies of all deeds, maps, etc. used in performing the survey
- 7) Return of all materials such as abstract of title, aerial photographs, etc. provided to the consultant by the OGS
- 8) Digital formats of the survey and survey map and legal descriptions
- 9) Legal descriptions (metes and bounds) for the parcel(s) surveyed.
- 10) Any other material that may be specifically required.
- 11) Digital list of coordinates of all points.

VII. ADDITIONAL REQUIREMENTS

A. At any time during the term of the survey contract or extension thereto, the OGS reserves the right to visit, and to observe the performance of work under contract, either in the field or in the office of the consultant or any subcontractor thereof.

No subcontractor shall be utilized without the prior approval of the OGS of the subcontractor and/or procedures proposed. Approval of and utilization of a subcontractor shall in no way lessen the liability of the consultant for performance of this contract.

B. The OGS further reserves the right to perform, or have performed by an outside consultant, a survey or surveys to verify the accuracy of the mapping prepared under this agreement. A verification survey must be performed within two (2) years after the completion of this contract. In the event a verification survey is deemed necessary and the results of this survey prove that the accuracy of the mapping is not in compliance with the specifications of this contract, the consultant shall be liable for any resurvey, correction and/or remapping necessary to cause the mapping to conform with the specifications, including costs incurred by the State for the verification survey.

C. If the procedures or instrumentation to be utilized by the consultant are of a nature that special instruments, software, etc. are required for verification of data, and if the OGS does not have the needed materials, the consultant may be required to furnish the OGS with those materials as part of the consultant contract.

D. Unless otherwise specified, all planimetric, and/or topographic mapping prepared for the OGS shall conform to National Map Accuracy Standards.

On each such map there shall be a note stating "This map conforms to National Map Accuracy Standards for maps at a scale of ."

National Map Accuracy Standards are defined as follows: Horizontal Ninety percent (90%) of all well-defined planimetric features will be located within 1/40 of an inch at map scale from their actual relative positions. The remaining 10% of the features shall be within 1/20 of an inch at map scale.

Vertical Ninety percent (90%) of all contours shall be within ½ of a contour interval of their correct position. The remaining 10% shall not be in error by more than one (1) contour interval.

APPENDIX

| | |
|-------------------------------------|-----|
| Report of Physical Inspection | A-1 |
| Survey Check List | A-2 |
| Survey Deliverable Check List | A-3 |

REPORT OF PHYSICAL INSPECTION OF PROPERTY

FACILITY NAME _____

PROJECT NO. _____

COUNTY (IES) _____

TAX MAP NO(S) _____

DATE OF INSPECTION _____

VILLAGE/CITY/TOWN _____

REPUTED OWNER(S) _____

ADDRESS _____

PROPERTY ADDRESS _____

1. Title to property was acquired by owner(s):

a) By deed _____ to _____
Dated _____ Recorded _____
Liber _____ Page _____

b) As devisee/distributee under Last Will & Testament:
Estate of _____ admitted to probate _____
County _____ File: _____

c) Other/Additional Source(s) of title:

2. Is the land: improved _____ wild _____ timber _____ swamp _____

State general conditions and nature of improvements, if any:

3. Is the land occupied? Yes _____ No _____

If occupied, set forth names and addresses of occupants, nature and extent of occupancy and interest claimed.

4. Is the land enclosed (i.e., fenced, walls)? Yes _____ No _____

If enclosed, state nature, extent and condition of enclosure. _____

5. All utilities, signs, other land improvements: on, under, over/across the property:

Table with 4 columns: Description of Item, Entire Property (Yes or No), If Yes, give full name & address of owner(s) of the items, Approximate Location. Rows include Poles, Wire, Towers, Conduits, Pipelines, Sewer Lines, Springs, Water Wells, Gas Wells, Oils Wells.

5. (Cont'd) all utilities, signs, other land improvements: on, under, over/across the entire property

| <u>Description of Item</u> | <u>Entire Property (Yes or No)</u> | <u>If Yes, give full name & address of owner(s) of the items</u> | <u>Approximate Location</u> |
|----------------------------|------------------------------------|--|-----------------------------|
| Mines | | | |
| Billboards | | | |
| Signs | | | |
| Buildings | | | |
| Other (Specify) | | | |

6. Land Conditions: On, under over or across any portion of the property:

| <u>Description of Item</u> | <u>Public/Private (Check One)</u> | <u>If PRIVATE, give full name & address of adjacent Owners of the Items</u> | <u>Approximate Location</u> |
|----------------------------|-----------------------------------|---|-----------------------------|
| Stream | () PUB () PRI | | |
| Lake | () PUB () PRI | | |
| Street | () PUB () PRI | | |
| Highway | () PUB () PRI | | |
| Road | () PUB () PRI | | |
| Right-of-Way | () PUB () PRI | | |
| Springs | () PUB () PRI | | |
| Driveways | () PUB () PRI | | |

7. Ascertain if there are any other easement rights in favor of property or adjacent owners which affect the parcel. Give particulars.

8. State any other facts respecting the physical condition of the land inspected, especially insofar as they may affect the title.

9. Are there any boundary line agreements between adjoining owners?

10. Person(s) Interviewed: _____

 NAME (Print)

 TITLE

 SIGNATURE

DATE: _____, 2004

NEW YORK STATE OFFICE OF GENERAL SERVICES
Survey Check List

Project No. _____ Name _____ Map # _____

Reputed Owner: _____

Title Block Check List

- a. Proper Location _____
- b. Department or Agency Shown _____
- c. Consultant Name _____
- d. Appropriation Law _____
- e. Project(s) & Parcel(s) _____
- f. Name of Reputed Owner(s) _____
- g. Patent, Tract, or Purchase _____
- h. Range or Township _____
- i. Great Lot, Lot, or Sublot _____
- j. Town, County, State _____
- k. State Park & Proposal _____
- l. Scale by Number Notation & Graphic Representation _____
- m. Proper Certification _____
- n. Surveyor's Acknowledgement, Date of Survey _____
- o. Draftsman's Acknowledgement, Date of Map Completion _____
- p. Map Number Assigned _____
- q. Survey Reference Number _____
- r. Field Book Number and Pages _____

Map Body Check List

- a. Geometry Check For Closure _____
- b. Map Scale of All Lines _____
- c. Licensed Surveyor's Stamp and Signature _____
- d. Corners Correctly Labeled and Described _____
- e. All Exceptions, Reservations, Right of Ways or Easements Shown _____
- f. Political Boundaries Shown _____
- g. Patent, Tract, Township, Range, Great Lot, Lot, Sublot Shown _____
- h. Proposals Identified _____
- i. Reputed Owner(s) Shown Including Adjoiner(s) _____
- j. Deed and Map References _____
- k. Point of Beginning Identified _____
- l. Date and Description of Reference Meridian _____
- m. Declination Shown _____
- n. Acreage Shown – Breakdown by Lot, Township, Tract, Patent, Town & County, Proposal, Project _____
- o. Location Map Provided With Proper Reference _____
- p. Legend Provided for Feature Identification _____

Reviewed by: _____ Title: _____ Date: _____

NEW YORK STATE OFFICE OF GENERAL SERVICES
Survey Deliverable Check List

Project No. _____ Name _____ Map # _____

Materials to Be Submitted

- 1. Original field survey notes _____
- 2. Original computations and plotting sheets _____
- 3. Original ink on mylar survey map _____
- 4. Five (5) paper prints of the survey map _____
- 5. Original Report of Survey _____
- 6. Copies of all deeds, maps, etc. used in performing the survey _____
- 7. Return of all materials such as abstract of title, aerial photographs, etc. loaned to the consultant by the OGS _____
- 8. Digital formats (CD) of the survey and survey map and legal descriptions. _____
- 9. Legal descriptions (metes and bounds) for the parcel(s) surveyed. _____
- 10. Any other material that may be specifically required. _____
- 11. Digital list of coordinates of all points. _____

Submitted by: _____ Title: _____ Date: _____