# The Monroe County Monumentation Law: A Handbook for Surveyors and Engineers

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Revised: April 5, 1995

MONROE COUNTY'S NEW MONUMENTATION LAW-

ROCHESTER AND ENVIRONS

In 1875 four U.S. Lake survey Triangulation Stations were placed in Monroe County. During the depression years 1932 to 1941, 13 additional triangulation stations and some 1300 secondary traverse stations were placed. World War II brought an end to the program.

No legislation had been passed requiring the use of the network. Even though Monroe County then was among the best in distribution of horizontal and vertical control monuments in the United States, the control network was rarely used, except for vertical control. Often as not, the availability of vertical control was disregarded in favor of assumed elevations.

Since there was no legislation and no office directly responsible for the protection and maintenance of the network, an estimated third of the total network had been destroyed by 1969, when the county contracted with the U.S. Coast and Geodetic Survey (now the National Geodetic Survey) to install and triangulate a total of 90 stations, including those that still existed. While the USC&GS personnel occupied the observation towers, Monroe County and its consultant provided a total of eight people to tie in 211 easily accessible traverse stations which had been placed along the rights-of-way of roads nearby.

The newly created Monroe County Geodetic Survey Office was given the responsibility for maintenance and densification of the network. About 175 new and existing stations were traversed during the 1970 and 1971 seasons. This has been done by first-order, second-class standards and procedures to a precision of 1:50,000 or better. All field notes and office work are sent NGS for verification and eventual publication.

The Monroe County Geodetic Survey Monumentation Law was passed to assure the protection, use and maximum benefit of the system. All surveyors working in Monroe County are urgently requested to contact the office for the latest information.

As published in the American Congress of Surveying and Mapping BULLETIN, Summer Issue, 1972

Intro. No. 620

LOCAL LAW NO. 6 OF 1971

A LOCAL LAW REGULATING THE USE AND PROTECTION OF THE MONROE COUNTY GEODETIC SURVEY MONUMENTATION NETWORK

*Be it Enacted by the . ..'ature of the County of Monroe as follows::*

SECTION 1. SHORT TITLE

This local law shall be known as the "Monroe County Geodetic Survey Monumentation Law".

SECTION 2. TEXT

1. Purpose and Intent
2. Definitions
3. Scoped of Regulations
4. Preservation of Geodetic Monuments
5. Use of Geodetic Network
6. Rules and Regulations
7. Enforcement
8. Violations and Penalties
9. Appeals
10. Separability

**1 Purpose and In'**

The provisions here ontained are for the purpose of establishing standards for the use of the Monroe County Geodetic Su. ey Monumentation Network and for the purpose of maintaining monuments in such Network in order to insure their continued use as accurate survey markers.

**2. Definitions**

When used herein unless otherwise expressly stated, the following terms shall mean:

*Director* - The Monroe County Director of Public Works or his Duly authorized representative.

*Azimuth* - The horizontal direction of a line.

*Azimuth mark* - A point, usually a monument used primarily to establish the reference Azimuth from a Triangulation Station.

*Control or Geodetic Monument* - Any monument, the location of which has been established to a high degree of accuracy, and used as a control point to which surveys of lesser accuracy may be tied.

*Coordinates* - Values designating the location of a point relative to the location of all other points in a given frame of reference. In this law only the New York State Plane Coordinate System is intended as the frame of reference.

*Destruction of a monument* - Since any movement of a monument destroys its use fulness, disturbance of a monument shall be equated with destruction.

*Developer* - Any person, company, corporation, or governmental agency or authority who themselves undertake or who let contracts for, a building project, or provide public services in the areas of gas, electric, telephone, water, transportation, or sewers, whether by distribution or transmission.

*Geodetic Control Network* - The system of monumented, coordinated points established by the office of United States National Ocean Survey, formerly known as the United States Coast and Geodetic Survey, and by other governmental agencies and extended or maintained by the Monroe County Geodetic Survey Office.

*Horizontal Control* - The basic framework of points whose horizontal position and interrelationship have been accurately determined so that the location of subsidiary work may be precisely related to the network.

*Intersection Station* - A visible distant object, such as w nks, church spires, smoke stacks, whose Azimuth from a given monument has bee viously established.

*Referenced Markers* - Those monuments in the vicinity ot a triangulation station which are placed and carefully tied to theTriangulation Station for the purpose of protection and easy recovery of the Triangulation Station.

*Traverse Station or Monument* - A monumented point easily accessible to engineers and surveyors, and which is a part of the geodetic control network. The location of Traverse Stations can be expected to be determined to an accuracy of not less than 1 part in 50,000.

*Triangulation Station or Monument* - A point of permanent reference, usually a buried Portland cement concrete mass atop which is fixed an indexed brass marker, usually located in a relatively isolated, well-protected area, the location relative to the geodetic control network having been established by first-order methods to an accuracy of not less than 1 part in 100,000 by the United States National Ocean Survey, formerly known as the United States Coast and Geodetic Survey.

*Vertical Control* - Same as Horizontal Control except that its purpose is to establish elevation above a common datum (mean sea level) so that such information on all projects will be related.

**3. Scope Of Regulation**

The Director is empowered to and shall review, evaluate and rove all plans of proposed development, utility installations and construction within pu rights-of-way within the County of Monroe where a geodetic monument may be involved, or in any area within the county where a Triangulation Monument may be involved, for conformance with the stated purpose and intent of this law.

**4. Preservation Of Geodetic Monuments**

It shall be the responsibility of the Developer to request of the Director exact information as to the location of monuments in the vicinity of his project. All Traverse Monuments which are in or near the right-of-way encompassed by the project or Triangulation Monuments and their Reference Markers and Azimuth Marks anywhere within the project shall be shown on all plans of the project which shall be submitted to the Director for his approval.

It shall be the responsibility of the Developer to protect said monuments in a manner which shall insure their protection against damage or destruction in a manner acceptable to the Director.

Where the design of a project is such that a Control Monument must be destroyed, a note to that effect shall appear on the plans submitted for approval to the Director, who shall cause such monuments to be reset by the Monroe County Geodetic Survey Office in such a place or manner as to insure their preservation and future usefulness.

**5. Use Of Geodetic Network**

It shall be the responsibility of the Developer to determine if at least one of two more intervisible monuments, or one monument with azimuths of record to intersection stations, is within 2,500 feet of

his project, except that where the entire project involves not more than five residential lots the distance shall be 1200 feet. If such survey control exists, he shall tie his boundaries into the horizontal control as established by said monuments. The acceptable error in the accuracy of the field work necessary to establish the boundaries and the ties shall be better than one part in 10,000 (1:10,000). A certification statement to that effect shall appear on the plat of the survey. All angle points of the boundaries of the project shall show the coordinates of said points as reduced to sea level. The coordinates shall be in the New York State Plane Coordinate System, West Zone, as established by the United States Coast and Geodetic Survey and expanded by the Monroe County Geodetic Survey. Datum used for vertical control shall be identified on the plat.

Where a project involves easements and/or the installation of underground facilities, the easement boundaries shall be coordinated in the same manner as property boundaries. "As built maps" shall include coordinates of the beginning, the end and all points where a change of direction occurs in the underground facility, and shall be of sufficient accuracy to assure maximum safety to those facilities when additional facilities are installed nearby. Where a project includes the building of internal roads, all monumented corners of the right-of-way shall be coordinated and shown on the plat.

**6. Rules And Regulations**

The director shall prescribe orders of procedure, rules, regulations and issue technical criteria to carry out the purpose and intent of this law. A copy of such order, rules, regulations and criteria shall be filed with the clerk of the county legislature and shall be available for inspection to the public.

**7. Enforcement**

Wherever it appears, in accordance with the provisions of this law, that geodetic survey monuments installed or employed by the County of Monroe are in danger of being damaged, destroyed or remove by a Developer, the Director may require a performance bond in the amount of OneThousand Dollars ($1,000) per monument to be posted with and approved by the Director, said bond to be subject to forfeiture if in the opinion of the Director there is adequate proof that the provisions of this law have been violated. The Director may issue notices and stop-work orders with respect to acts of violation during the progress of the project. No plot shall be filed in the Office of the Monroe County Clerk unless the provisions of this law have been complied with and such compliance is noted in writing by the Director.

**8. Violations And Penalties**

(a) Any violation of or nonconformance with any provision of this law, or of any rule, regulation, order or special direction duly made thereunder, shall constitute an offense punishable for each offense by a fine not exceeding $150.00 or by imprisonment for each offense not exceeding one hundred fifty (150) days, or by both such fine and imprisonment.

(b) Any Developer violating or failing to comply with any provision of this law or any order made pursant thereto shall be responsible for any damages resulting therefrom to geodetic survey monuments installed or employed by the County of Monroe. This money may be collected by civil action in the City Court of the City of Rochester, the County Court of the County of Monroe or the Supreme Court of the State of New York. Obedience to the law may also be enforced by injunction. Every day of such violation or failure may be held to constitute a separate offense. Nothing herein contained shall be construed to exempt an offender from any other prosecution or penalty provided by law.

**9. Appeals**

There shall be created a Board of Appeals to consist of three members who shall be appointed by the County Manager and who shall serve at his pleasure. Such members shall be either surveyors duly registered to practice land-surveying or engineer-surveyors duly registered to practice professional engineering and land-surveying within the State of New York.

Any decision made by the Director pursuant to this law shall be submitted to review by the Board of Appeals upon written petition filed by the aggrieved party. Such petition shall be served on the Director and the Clerk of the County Legislature within thirty (30) days of receipt of the disputed decision. The Board is empowered to establish rules of order and regulations pursuant to which it will carry out its functions as a review board.

**10. Separability**

If any section or provision of this law shall be adjudged by any court of jurisdiction to be invalid, such judgement shall not affect, impair or invalidate the remainder of this law, but shall be confined in its application to the work, clause, section, or provision directly involved on which such judgement shall have been rendered.

SECTION 3.

This local law shall take effect upon filing in the Office of the Secretary of State as provided by Section 27 of the Municipal Home Rule Law.

Ways and Means Committee

December 23, 1971
File No. 71-859

# MONROE COUNTY MONUMENTATION LAW
# RULES & REGULATIONS OUTLINE

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   - B. Revision of Rules & Regulations
   - C. Intent of System & uses

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## I. INTRODUCTION

The intent of these rules and regulations is to set forth criteria to enable the Director to adequately administer Local Law No. 6 of 1971 regulating the use and protection of the Monroe County Geodetic Survey Monumentation Network in the best interest of the public at large.

No statement made herein shall be interpreted to preclude or limit the professional prerogatives of the surveyor or engineer. What is intended is that the public control base survey, where available, be protected and used as a professional tool to aid the community in orderly growth.

The base control survey system as further described herein is of sufficient accuracy that when properly used as reference, future land measurement inconsistencies will be greatly reduced. The general requirement for recording in the coordinate system will facilitate reproducible land survey. Future public benefits in tax mapping, determination of political boundaries, greater usage of photogrammetry and increased safety of underground installations are also expected.

Since little precedent has been established in this area, the rules and regulations must be considered as being subject to periodic revision as directed by experience with the program. Revision of Rules and Regulations may be recommended by the Director but authority for making revision is vested in the Office of the County Manager upon advise of the Board of Appeals. Should it become necessary to amend Local Law No. 6 of 1971, the authority for same rests entirely with the Monroe County Legislature.

II. GLOSSARY OF TERMSII GLOSSARY OF TERMS (CON'T)

In addition to definitions given in the law the following terms are used in the Rules and Regulations as defined below:

"The Law" - Namely Local Law No. 6 of 1971, adopted by the Monroe County Legislature December 23, 1971, known by the short title as "Monroe County Geodetic Survey Monumentation Law".

"Of Record" - Information on file with the Director, County Clerk or other public office or agency

"Parcel" - Any land which . ¬ surveyed for detmination of boundaries, easements, rights-of-way or public or p: . . utility underground facilities.

"MCGSO" - Namely the "Monroe County Geodetic Survey Office", an office of the Division of Engineering, Monroe County Department of Public Works.

"Director" - The Monroe County Director of Public Works or his duly authorized representative.

"Developer" - Any person, company, corporation or governmental agency or authority who themselves undertake or who let contracts for, a building project, or provide public services in the areas of gas, electric, telephone, water, transportation, or sewers, whether by distribution or transmission.

"Emergency" - Only those projects which call for immediate action to prevent loss of life or property.

III. SYSTEM SCOPE AND AVAILABLE DATA

(A) MONUMENT AVAILABILITY

At the time of Legislative adoption of the monumentation law, approximately 2000 control monuments existed in Monroe County. These include First Order Triangulation Stations placed by the U. S. Coast & Geodetic Survey, Second and Third Order Traverse Stations placed during the mid to late 1930's and early 1940's, First and Secord Order leveling stations placed by the U. S. Coast & Geodetic Survey, Second Order S· ns placed by the Corps of Engineers, Highway Control survey monuments placed along major roa· . / the N.Y. State Dept. of Transportation and monuments recently placed by the Monroe Cou. , Geodetic Survey Office (MCGSO). For full county-wide utilization purposes, assumed at 50% development, it is estimated that an additional 2000 monuments will be required to enable all developable land to meet requirements set forth in the law and derive the benefit therefrom. It is the intent of the Director through MCGSO to actively pursue the setting and survey of additional monuments and making resultant control data available to the public in this densification effort as funds permit.

The Director will schedule monumentation densification on a public benefit priority basis. In general, priority will be established with greatest consideration given to areas of most rapid development and pending public works projects.

The Director or his authorized representative may upon receipt of resolution, petition or other request modify this schedule to extend control survey to an area of interest to others. Such requests would be considered on the basis of public benefit derived thereby and would include magnitude and complexity of the proposed project, public or private project funding and scope work involved by MCGSO to provide service.

(B) AVAILABLE DATA

MCGSO will maintain a current map to the scale of 1" = 5000" showing general location of all monuments of record which may be used by the public to determine approximate availability of monuments to the project or general susceptibility of monument endangerment by the project.

MCGSO will maintain a separate file of each monument of record on data sheets. These data sheets will give specific information on location of monument and available current information on horizontal position and elevation above vertical datum all referenced to date of survey.

MCGSO will maintain a current map of each town to the scale of 1" = 800' or 1" = 1000' showing general location of all monuments of record with regard to general topography as determined by the most recent photogrammetric map as made available by the Monroe County Planning Council.

MCGSO will maintain the most recent federal map to the Scale of 1-1/4" = 1 mile. This map shows USC&GS Triangulation and Intersection Stations of record.

The public may obtain information from MCGSO during regular County of Monroe business hours without charge. The director does, however, reserve the right to charge a nominal fee for printing and other costs associated with making copies of material available.

IV. PROTECTION OF MONUMENTS

Since the continued existence of every monument is of importance to the value of the entire network, no monument may be destroyed except at the discretion of the Director.

Where monuments exist in or near proposed construction areas, they shall be protected by substantial fencing, sheeted trench and/or other suitable means to insure their preservation. If a monument is disturbed or destroyed without written permission from the Director, the developer shall be liable under the provisions of the law.

Where a monument is, or may be threatened with disturbance or destruction in the course of construction of a project, but the plans of said project call for its preservation, the Director may require a performance bond as referred to in Paragraph 7 of the Monumentation Law.

The developer may, on completion of the project request return of his fee after verification by the Director that the monument has not been disturbed.

The Director shall, within 30 days after receipt of the request:

1. Verify that the monument in question has not been disturbed or destroyed, and authorize return of the fee to the Developer.

2. Find that the monument has been disturbed or destroyed, in which case the developers fee is forfeit.

The developer may request permission to replace and/or recoordinate a monument which has been disturbed or destoryed in the course of construction.

Permission may be granted by the Director, subject to replacement and/or recoordination of the monument being accomplished under the supervision of a land surveyor licensed by the State of New York, by field and office procedures acceptable to the Director, and subject to checking by the MCGSO under the supervision of a land surveyor licensed by the State of New York.

Triangulation Stations and their Reference and Azimuth marks shall be replaced and recoordinated only by MCGSO or the National Geodetic Survey at the discretion of the Director or NGS. The Developer

shall be liable for the cost to the County and/or the cost charged by the NGS for the replacement and/or recoordination of these disturbed or destroyed monuments.
Since the network of survey control monuments follow state, county and town roads and the law makes no distinctions relative to their location, all such monuments are within the purview of the Law and these Rules and Regulations.

When emergency work is done, these rules and regulations do not apply except that the Developer shall report to the MCGSO, exposure, disturbance or destruction of a monument.

No penalties shall be imposed for damage caused by emergency work.

V. RULES ON USE

The administration of the law will be accomplished by the Director through his Division of Engineering via coordinated effort between the Urban Development and MCGSO sections of that Bureau.

All development parcels prior to being filed with the County Clerk shall be reviewed by the Director and he shall attest by his signature, on that plat of survey to be filed, that the conditions of the Law have been satisfied. The developer shall give the following information on his plat of survey:

(A) NO MONUMENT OF RECORD WITHIN REQUIRED DISTANCE:

Where distance from the nearest corner of the parcel to the monument of record exceeds the requirement distance set forth in the law and the developer declines to extend his survey in order to report the parcel in the prescribed horizontal coordinate system, he shall attest to this on the plat of survey by notation and no coordinates of any kind shall appear on said plat.

Where vertical base datum reference monumentation is beyond the distance prescribed by law and the developer declines availing himself of vertical control from beyond said prescribed distance, a base reference above mean sea level shall be assumed from data taken from U. S. Geological Survey Quadrangle Maps, County of Monroe Photogrammetric Maps or bench marks supplied by private or government offices or similar reference. A notation of such assumption shall appear on the appropriate map for filing giving the location of said assumed mark, date of survey and source of reference. In no case will an arbitrarily assumed datum reference be accepted.

(B) MONUMENTS OF RECORD WITHIN REQUIRED DISTANCE:

Where monuments of record are within the prescribed maximum distance set by law, plat of survey shall, in addition to reporting horizontal control as required therein, report the source of reference. If a monument of record falls within the normal scale distance delineated by the plat of survey, this source of reference shall be plotted and identified thereon.

(1) Recordation Format:

The following, or similar format shall be used to give the source of reference outside the bounds of the normal scale distance of plat of survey:

"The stations used to establish the horizontal & vertical coordinate data shown on this plat are:"

| | | |
|---|---|---|
| ODGERS (G&GS) 1969 | N = 1,123,456.78 | E = 576,548.21 |
| 567-8 (NYGS) 1936,1971 | N = 1,135,791.35 | E = 642,066.42 |
| 1936 | Elevation = 473.82 (NGVD 1929) | |

| | | |
|---|---|---|
| 6240 (MCGS) 1972 | N = 1,132,680.04 | E = 247,997.73 |
| Intersection Station TIS No. 575: Radio Antenna Station WMOM | N = 1,164,882.75 | E = 247,997.73 |

The coordinates of the project shown on the plat shall be calculated with consideration for reduction to sea level and grid scale: however, distances shown shall be reduced to horizontal at the elevation of the project, as is presently customary.

In all cases where a parcel is to be tied into the network, a closed traverse shall be run between the control monuments and the pracel.

(2) One Monument & Intersection Station

Where a monument of record is used, and an intersection Station of record is visible both from the monument and from one or more corners of the parcel, the intersection station may be used for traverse closure.

(3) One Monument of Record

Where a monument of record is within the prescribed distance from a parcel, and no other monument of intersection station is available for a back azimuth, the surveyor shall choose the best available point for a back azimuth and describe it on the plat with sufficient detail to assure reproduceability of his work.

(4) Use of Monuments of Record Having Limited Information

Where a non-coordinated monument is the only monument within the prescribed distances, the procedures used shall be at the discretion of the surveyor, but shall be such that his work is reproducible and coordinates can be calculated for his project when coordinates have been established for the monument.

(5) Special Cases:

(a) Where a plat delineates a parcel or tract which is beyond the maximum distance from the nearest monument, as defined in the law and these Rules and Regulations, but is a part or section of a parcel or tract of land in the same ownership, a corner of which is with the prescribed distances from the nearest monument, the parcel delineated by the plat shall be tied in as though it were within the prescribed distances.

(b) Resurveys:

(1) Parcels within subdivisions tied into the County Monument ation Network:

Where a resurvey is to be made of a parcel, or a combination of adjoining parcels, with an existing subdivision on which coordinates have been established in accordance with the law and these Rules and Regulations, the surveyor may elect to accept the customary evidence within that subdivision as his control, and disregard the requirement to tie into the network directly.

(2) Subdivisions established prior to the Monroe County Monumenation Law:

Where a resurvey is to be made of a parcel, or any combination of adjoining parcels within an existing subdivision which was established before the implementation of the law and these regulations, or after their implementation, but was exempt because of distance from then existing monuments or for any any other

reason, the maximum distance requirements shall apply only to the parcel or combination of adjoining parcels, to be surveyed. The distance from the nearest monument shall be the shortest practical route along rights-of-way or through other public properties.

(C) Underground Facilities:

The Rules and Regulations for this section have not been implemented yet.

$\sqrt{N}$ From: "Suggested Specifications for Local Horizontal Control Surveys"
ACSM - Control Surveys Division Technical Monograph No. CS-1
By Joseph F. Dracup, March 1969

## TRAVERSE

Traverse is a method of surveying in which the lengths and angles between the adjacent points of the network are measured in the field with orientation provided by azimuths determined from previous surveys or by astronomical means.

Checks are obtained by closing the traverse on itself or, as is most preferable, on another previously determined point.

Standards for Traverse:

| | First-Order | Second-Order | Third-Order |
|---|---|---|---|
| Azimuth closure: not to exceed* | 2 sec $\sqrt{N}$ or 1.0 sec per station | 10 sec $\sqrt{N}$ or 3.0 sec per station | 30 sec $\sqrt{N}$ or 8.0 sec per station |
| Position closure: after azimuth adjustment not to exceed* | 0.66 ft $\sqrt{N}$ or 1 in 25,000 | 1.67 ft $\sqrt{N}$ or 1 in 10,000 | 3.34 ft $\sqrt{N}$ or 1 in 5,000 |
| Distance measurements accurate within | 1 in 35,000 | 1 in 15,000 | 1 in 7,500 |
| Number of repetitions of measurements between points | 2 | 1 | 1 |
| Minimum distance to be measured: | | | |
| Microwave inst. | 1 mile | 0.3 mile | 0.2 mile |
| Electro-optical inst. | 0.25 mile | 0.1 mile | 0.05 mile |
| Number of Angle Obs | 12 | 8 | 4 |

N is the number of stations for carrying azimuth
M is the distance in miles.

* The expressions for closing errors in traverse surveys are given in twoforms. The expression containing the square root is designed for longer lines (those in excess of 20 miles) where higher proportional accuracy is required. The formula which gives the smaller permissible closure should be used.

Traverse is the most commonly used method of horizontal surveying for it is usually easy to meander a line through difficult or wooded terrain without resorting to observing towers. Its use in primary geodetic

networks is limited because it lacks the geometric strength of triangulation that results from the redundant observations inherent to that method. In addition, the orientation weaknesses require that checks with known azimuth values or the observation of astronomical azimuths be made at rather frequent intervals. Other drawbacks to its use are: checks are not available until ties are made which makes it difficult to locate errors, and there is always the possibility that compensating blunders can occur. Despite these deficiencies, traverse properly executed is an efficient and accurate surveying method.

Again it must be emphasized these (the previous table) are minimum standards. The average position closure should seldom be less than 1:50,000 for first-order traverse and for second and third-order work 1:20,000 and 1:10:000 respectively.

Azimuth Closure

This is the difference between an azimuth at a point that has been computed from a know azimuth using the field observed angles of the traverse and an azimuth at the point that has been previously determined . The known azimuths may have resulted from previous surveys or may have been determined astronomically.

In some instances if the traverse is to be computed on the state plane coordinate system, the second term correction should be applied to the angles. An excellent reference, in addition to those given previously, for information concerning this correction is found in a paper entitled, "A Practical Use of the Oregon State Plane Coordinate System," by B. K. Meade, Chief, Triangulation Branch, USC&GS, and available at that Bureau. This paper also explains adjustments procedures not found elsewhere.

Position Closure

In a complicated traverse network, the position closure is not available until an adjustment has distributed the azimuth closures. A good evaluation can be obtained however by distributing the azimuth closing errors on the angles in some logical manner and using the resulting corrected azimuths in a computation with the field measured lengths reduced to horizontal sea-level grid distances. The position closure is the distance between the computed and fixed position for the terminal point as determined in the following fomula:

$$\sqrt{(Xc - Xf)^2 + (Yc - Yf)^2}$$

The "c's" indicate the computed values and the "f's" the fixed coordinates. The proportional part accuracy is computed by dividing the position closure by the sum of the measured lengths used in the computation.

Minimum Distance to be Measured

These specifications are based on two considerations. First is the distance accuracy requirement; the second is the accuracy evaluations of such instruments that have been made under various atmospheric coniditions over a long period of time. In some instances they may not be in accordance with the manufacturers' advertised accuracy or that experienced by individuals in some parts of the country. But in the overall picture they are considered reasonable.

In order to obtain the required accuracy for the minimum distances specified, however, the instruments must be well calibrated, and in good operating condition, and extreme care must be exercised in making the observations. As a general rule, the minimum distance measured should seldom be less than twice that specified.

## LINEAR CORRECTIONS TO SEA LEVEL DATUM

| ELEV. (ft.) | ELEVATION FACTOR | ELEV (ft.) | ELEVATION FACTOR |
|---|---|---|---|
| Sea Level | 1.000 000 0 | 620 | 0.999 970 4 |
| 240 | 0.999 988 5 | 640 | 0.999 969 4 |
| 260 | 0.999 987 6 | 660 | 0.999 968 5 |
| 280 | 0.999 986 6 | 680 | 0.999 967 5 |
| 300 | 0.999 985 7 | 700 | 0.999 966 5 |
| 320 | 0.999 984 7 | 720 | 0.999 965 6 |
| 340 | 0.999 983 8 | 740 | 0.999 964 6 |
| 360 | 0.999 982 8 | 760 | 0.999 963 7 |
| 380 | 0.999 981 8 | 780 | 0.999 962 7 |
| 400 | 0.999 980 9 | 800 | 0.999 961 8 |
| 420 | 0.999 979 9 | 820 | 0.999 960 8 |
| 440 | 0.999 979 0 | 840 | 0.999 959 9 |
| 460 | 0.999 978 0 | 860 | 0.999 958 9 |
| 480 | 0.999 977 1 | 880 | 0.999 957 9 |
| 500 | 0.999 976 1 | 900 | 0.999 957 0 |
| 520 | 0.999 975 1 | 920 | 0.999 956 0 |
| 540 | 0.999 974 2 | 960 | 0.999 955 1 |
| 560 | 0.999 974 2 | 980 | 0.999 954 1 |
| 580 | 0.999 972 3 | 980 | 0.999 953 2 |
| 600 | 0.999 971 3 | 1000 | 0.990 952 2 |

Information interpolated from USC&GS Special Publication No 195, "Manual of Traverse Computation of the Transverse Mercator Grid"

An approximate formula for computing this factor is:

$$\frac{\textit{Radius of Earth (ft)}}{\textit{Radius of Earth (ft)} + \textit{Elevation (ft)}} = \textit{Elevation Factor}$$

Where the radius of Earth (ft) = 20,906,000 ft (approximate)

## Transverse Mercator Projection for New York Central and West Zones
## Table for Reduction of Distance to Grid

| X' (feet) | Grid Scale Expressed as a ratio | X' (feet) | Grid Scale Expressed as a ratio |
|---|---|---|---|
| 0 | 0.999 937 5 | 175,000 | 0.999 972 5 |
| 5,000 | 0.999 937 5 | 180,000 | 0.999 974 5 |
| 10,000 | 0.999 937 8 | 185,000 | 0.999 976 6 |
| 15,000 | 0.999 937 8 | 190,000 | 0.999 978 7 |
| 20,000 | 0.999 938 0 | 195,000 | 0.999 981 0 |
| 25,000 | 0.999 938 2 | 200,000 | 0.999 983 2 |
| 30,000 | 0.999 938 5 | 205,000 | 0.999 985 5 |
| 35,000 | 0.999 938 9 | 210,000 | 0.999 987 9 |
| 40,000 | 0.999 939 3 | 215,000 | 0.999 990 3 |
| 45,000 | 0.999 939 8 | 220,000 | 0.999 992 8 |
| 50,000 | 0.999 940 4 | 225,000 | 0.999 995 3 |
| 55,000 | 0.999 941 0 | 230,000 | 0.999 998 0 |
| 60,000 | 0.999 941 6 | 235,000 | 1.000 000 6 |
| 65,000 | 0.999 942 3 | 240,000 | 1.000 003 3 |
| 70,000 | 0.999 943 1 | 245,000 | 1.000 006 1 |
| 75,000 | 0.999 943 9 | 250,000 | 1.000 008 9 |
| 80,000 | 0.999 944 8 | 255,000 | 1.000 011 8 |
| 85,000 | 0.999 945 8 | 260,000 | 1.000 014 7 |
| 90,000 | 0.999 946 8 | 265,000 | 1.000 017 7 |
| 95,000 | 0.999 947 8 | 270,000 | 1.000 020 8 |
| 100,000 | 0.999 948 9 | 275,000 | 1.000 023 9 |
| 105,000 | 0.999 950 1 | 280,000 | 1.000 027 1 |
| 110,000 | 0.999 951 3 | 285,000 | 1.000 030 3 |
| 115,000 | 0.999 952 6 | 290,000 | 1.000 033 6 |
| 120,000 | 0.999 953 9 | 295,000 | 1.000 036 9 |
| 125,000 | 0.999 955 4 | 300,000 | 1.000 040 3 |
| 130,000 | 0.999 956 8 | 305,000 | 1.000 043 8 |
| 135,000 | 0.999 958 3 | 310,000 | 1.000 047 3 |
| 140,000 | 0.999 959 9 | 315,000 | 1.000 050 9 |
| 145,000 | 0.999 961 5 | 320,000 | 1.000 054 5 |
| 150,000 | 0.999 963 2 | 325,000 | 1.000 058 2 |
| 155,000 | 0.999 965 0 | 330,000 | 1.000 061 9 |
| 160,000 | 0.999 966 8 | 335,000 | 1.000 065 7 |
| 165,000 | 0.999 968 6 | 340,000 | 1.000 069 6 |
| 170,000 | 0.999 970 5 | 345,000 | 1.000 073 5 |

From: Department of Commerce, Coast & Geodetic Survey, Plane Coordinate Projection Tables
New York Special Publication No. 323

To reduce a line to grid distance:
Absolute Value(Mean of the project Eastings - 500,000) = X'

Interpolate in table as necessary

Grid Scale Factor * Sea Level Distance = Grid Distance

## Acceptable Formats for Showing Geodetic Control Used in Tying a Project into the Monroe County Monumentation Network

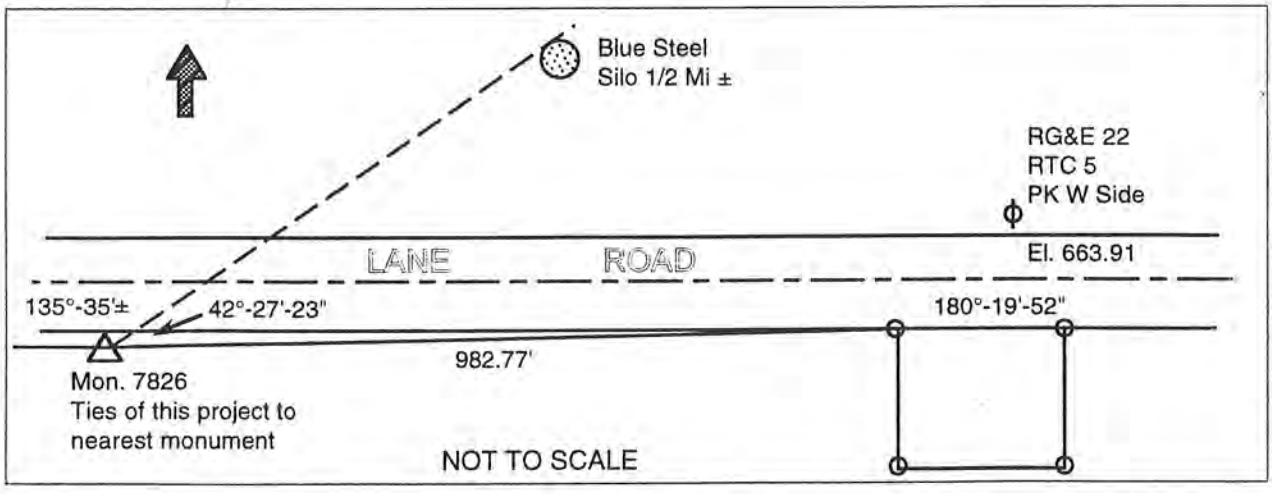
| MONUMENT | ELEVATION | NORTH (Y) | EAST (X) |
|---|---|---|---|
| (1) 275-3 (NYGS) 1937, 1972<br>TIS No 245 (C&GS) 1969 | 375.27 | 1,123,546.33<br>1,133,382.04 | 725,853.82<br>804,321.98 |
| 6240 (MCGS) 1972 | | 1,152,680.75 | 247,997.75 |
| (2) 6241 (MCGS) 1972<br>X-ion pavm'ts Routes 65 & 19<br>Info. from MCGSO | 675 | 1,152,860.40 | 245,249.21 |
| 7826 (MCGS) | | No Information of Record | |
| (3) NW side of silo about 1/2 mi. NE at 133°-35' from approx. direction of pavement of Lane Road west from 7826 (MCGS) | | | |

The first monument listed should always be the one nearest the Project.

(1) - Monument of record and a Triangulation Intersection Station of record are used for control.

(2) - Two monuments of record, neither one of which has an elevation of record, are used as control. Elevation used was provided by MCGSO.

(3) - Only one monument of record available. Intial (backsight) taken to best available object, which should be described so that it can be used by others to reproduce the work. No horizontal coordinates shall be shown on the plat even if monument has coordinates. However, a schematic drawing of ties to the existing monument and object used for a backsight shall be shown on the plat:




An acceptable statement regarding a project being beyond the maximum distance requirements of the Monumentation Law, would be the following or similar wording:

"This project is more than 2500 ft. (or 1200 ft.) from the nearest Survey Control Monument and therefore is not tied into the Monroe County Monumentation Network."

An example of a reasonable format for showing geodetic control used in a project:

## General Survey Notes

The Developer's and Contractor's attention is directed to Local Law No 6 of 1971 regarding liability incurred through disturbance or destruction of Geodetic Survey Monuments.

The Contractor shall locate, mark, safeguard, and preserve all survey control monuments & Right-of-Way monuments in the areas of construction. For descriptive and survey data on control monuments, call the Monroe County Geodetic Survey Office.

Elevations are referenced to the National Geodetic Vertical Datum of 1929 through control ties to the following Bench Marks:

1215 (N.Y.G.S.) Elev. 583.508 Ft.
1216 (N.Y.G.S.) Elev. 619.769 Ft.

The Horizontal datum is referenced to the New York State Plane Coordinate System, western Zone, Transverse Mercator Projection, through control ties to the following monuments with an indicated accuracy of 1:10,000 or better:

| | | |
|---|---|---|
| 1004 (M.C.G.S.) 1969 | N = 1,096,952.20 | E = 783,139.21 |
| 1061 (M.C.G.S.) 1969 | N = 1,093,492.54 | E = 783,293.14 |
| LONE (U.S.C.&G.S.) 1969 | N = 1,093,421.38 | E = 789,120.73 |

By _____ Date _____
Robert R. Prescott, N.Y.S.L.S. License No 047419

# Monroe County Surveyor's Office Map Review

Map Title: _____ Date: _____

Consultant: _____ Town: _____

Road: _____

The consultant shall submit a completed copy of this check list with the proposed plat to facilitate in processing. Legend of comments as filled in by county: **OK** - item is complete as shown on map. **NA** - item is not applicable to this map. **DO** - item must be completed by Surveyor or Engineer before this map can be approved - see comments for more details. Include ~~three (3) copies of plat with submittal.~~ No Copies Required

| Conslt. | County | |
|---|---|---|
| _____ | _____ | (1) This map is of correct size and material for filing in the Monroe County Clerks Office (17" by 22", 22" by 34", or 34" by 44" and Mylar or Linen ) |
| _____ | _____ | (2) This project is more than 1200 ft (2500 ft if more than 5 lots) from the nearest Monroe County Monumentation. A statement is on the map to that effect. |
| | | (3) This project is less than 1200 ft (2500 ft if more than 5 lots) from the nearest Monroe County Monumentation and this project is tied into Monroe County Monuments |
| _____ | _____ | 1. Full nomenclature as shown on Data Sheets supplied by the Monroe County Surveyor's Office. |
| _____ | _____ | 2. Coordinates, if used in Project. |
| _____ | _____ | 3. Elevations, if used in Project. |
| _____ | _____ | (4) A statement is on the plat that the perimeter and/or ties to control monuments were accomplished by procedures necessary to achieve a horizontal accuracy of 1 part in 10,000 (1:10,000) or better. |

(see: *The Monroe County Monumentation Law: A Handbook for Surveyors and Engineers* for examples).

**Survey Plats must show the following items as a minimum:**

| | | |
|---|---|---|
| | | (5) The R.O.W. width of record must be clearly indicated. |
| _____ | _____ | 1. The R.O.W. record width of existing roads must be clearly indicated. ("width varies" is not acceptable without additional information) |
| _____ | _____ | 2. The width of all existing internal and proposed road(s) shall be clearly shown. |
| _____ | _____ | 3. The State or County Route number shall be shown on State or County Roads. |
| _____ | _____ | (6) A tie distance to the nearest public R.O.W. |
| _____ | _____ | (7) North Arrow |
| _____ | _____ | (8) State the proportional scale (example: 1" = 20') and show a bar scale . |
| _____ | _____ | (9) Date |
| _____ | _____ | (10) Location Sketch (including name of Town) |
| _____ | _____ | (11) Surveyor's Seal or Stamp (must clearly show and be legible on prints made from original). |
| _____ | _____ | (12) Surveyor's Certification |
| _____ | _____ | (13) Surveyor's signature and license number |
| _____ | _____ | (14) Town Lot, Tract, Township and Range, Town, County, and State where parcel(s) is (are) located shall be shown. |
| _____ | _____ | (15) Highway Reservation(s) (80 ft. for county roads) |
| _____ | _____ | (16) Show distances on all lines. Where the plat has been tied into the State Plane Coordinate System, there shall be a statement as to whether "Grid" or "Ground" distances are shown |
| _____ | _____ | (17) Angles/Bearings/Azimuths on all lines. Note! On coordinated plats, only azimuths or bearings referenced to the coordinate system shall be accepted. |
| _____ | _____ | (18) For azimuths and bearings a reference datum and a statement of supporting data for that datum shall be shown. Examples of acceptable datums: Grid, assumed, magnetic, deed reference, or true. |
| _____ | _____ | (19) On coordinated Plats, a minimum of three pairs of coordinates Shall be shown |
| _____ | _____ | (20) On coordinated Plats tied to the State Plane Coordinate system, a grid and elevation factor or a combined factor shall be shown |

**Survey Plats must show the following items as a minimum (continued)**

_____ _____ (21) The minimum curve information required shall be curve length and radius. Where the delta angle is not directly apparent from other information on the map or plat, or where the extension(s) of the curve is (are) not tangent, or the PC or PT of the curve is not shown, additional information shall be shown so that a closed mathematical figure can be independently verified.

_____ _____ (22) Show Adjoiners names and tax account number(s).

_____ _____ (23) Show Map References and legal sources of deeds.

_____ _____ (24) Area of parcels shall be made from a computable closed figure as shown on the plat. Where a parcel fronts on a body of water, the area between the closing line and the edge of water may be scaled and added to the computed area. Areas shall be shown in feet and/or acres (acres must be shown to a minimum of 3 decimal places).

_____ _____ (25) If the Plat is a townhouse project, then lot and/or block locations must conform to the recommendations as stated in the letter to the Monroe County Surveyors Office from the Genesee Valley Land Surveyors Association dated May 4, 1987 which address filing requirements for Townhouses and Condominiums (see: The *Monroe County Monumentation Law: A Handbook for Surveyors and Engineers* for a copy of this letter).

_____ _____ (26) If a monument exists within the scope of this plat, then a statement must be shown concerning responsibility for its preservation. A letter of credit or other arrangements may be necessary where, in the Monroe County Surveyor's judgment, an existing monument maybe in danger of destruction.

_____ _____ (27) If elevations are shown, a project bench mark along with its elevation and the reference datum used in establishing the project bench mark shall be shown.

_____ _____ (28) Survey points and monuments found or set, or to be set.

_____ _____ (29) Final Map to be signed by City, Town , or Village planning Board.

**Additional Requirements for Mapping in the City of Rochester:**

_____ _____ (30) Map must be signed by the City of Rochester Maps and Surveys Office prior to review by the Monroe County Surveyors Office.

Name of Person completing check list for consultant: _____

Telephone Number:_____ Date reviewed : _____

Name of Person completing check list for county : _____

Telephone Number (716) 274-7693 or 274-7694 Date reviewed : _____

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Genesee Valley Land Surveyors Association
170 MT. READ BLVD. • ROCHESTER, N.Y. 14611 • PHONE (716) 328-2310
Reply to

May 4, 1987

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**Affiliated With:**
New York State Association of Professional Land Surveyors

American Congress on Surveying and Mapping

Rochester Engineering Society

Monroe County Surveyors Office
Department of Engineering
350 East Henrietta Road
Rochester, New York, 14620

Attention: Mr. Robert R. Prescott, L.S.

RE: FILING REQUIREMENTS FOR TOWNHOUSES AND CONDOMINIUMS

Dear Bob:

We would like to make the following comments and recommendations pertaining to townhouse and condominium maps and applicable requirements for filing of these maps.

In a condominium, an individual purchases the 'right' to occupy a specified, or exclusive, space a long with a proportional interest in the remaining common areas. The key element here is the fact that one purchases a 'right' to occupy a specified space. There isn't any transfer of real property, nor is there any subdivision of real property. While some states have filing requirements for condominium maps, to our knowledge, New York State does not. The only regulations are relative to the submittals required by the State Attorney General's office for the homeowners association.

A townhouse project differs from a condo project in one very significant manner. In a townhouse development, an individual receives fee title to a subdivision lot on which the townhouse is situated. The fact that title to real property is transferred, thereby creating a realty subdivision, clearly places this type of project under the Monroe County Monumentation Law and map review checklist.

As there are a couple of different methods to show proposed townhouse lots on a subdivision map, we would recommend that the existing map review checklist be utilized with a modification which addresses townhouse mapping. This modification would basically require that at least two exterior corners of each block, building or group of contiguous lots be 'tied down' with either state plane coordinates, right angle ties to exterior boundaries or phases lines, station and offset to centerline of roads or private drives.

Along with the above, each lot should be clearly dimensioned either along the property lines, in a tabular method clearly referenced to the site plan, or by showing a standard lot or building 'footprint'.

In summary, townhouse projects are a realty subdivision and subject to the same rules and regulations as a conventional single family subdivision. Condominiums are not a realty subdivision and there no requirements for filing at the County Clerk's office. However, if there is a request to file a condo site plan with the County Clerk, I would recommend that the "Minimum Standards of Residential Surveys", which the Bar Association and Genesee Valley have jointly adopted, be used as a review criteria.

If you have any questions or wish to discuss this further, please contact me.

Very truly yours,

GENESEE VALLEY LAND SURVEYORS ASSOCIATION

By: James L. Mueller

James L. Mueller, L.S.
Vice President

JLM:bsw

cc: A. English, Pres. GVLSA
F. Russell
W. Gillette