

# **FIELD NOTES, EVIDENCE, And RESEARCH**

## **A LOST ART**

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Definition:

- Field notes are written record, arranged in a manner peculiar to surveying, showing pertinent information, measurements and observations made by someone in the field during the course of a survey, to be used and interpreted by a person having some knowledge of surveying.
- Assume the person using your notes:
  - 1) Has poor eyesight
  - 2) Is not clairvoyant (ESP)
  - 3) Will blame the notes/note taker if anything is wrong

To protect ones self your notes must be:

- A) Neat, legible and clear
  - B) Complete and self-explanatory
  - C) Honest and self checking
- Note keeping is the most important of the operations
  - Poor field notes lead to:
    - 1) Lost time and additional cost to decipher them
    - 2) Returning to job to clarify
    - 3) Erroneous information placed on maps
- Gen. requirements for good note keeping
  - 1) Sharp pencil.
  - 2) Liberal use of enlarged details; avoid crowding.
  - 3) Keep lettering parallel with or at right angles to the features.
  - 4) Before sketching, decide what it is to be shown and organize it.  
(Do not try to make the best of a bad start)
  - 5) Keep the book clean and dry.
  - 6) Use a straight edge to draw.
  - 7) Use symbols and codes to keep notes compact.
  - 8) When possible place north at top of page.
  - 9) Start a new page when starting a new day.
  - 10) Place a zero in front of numbers less than one (0.32).
  - 11) Be consistent in your note keeping.
  - 12) Date/crew/weather/equipment.
  - 13) Review your notes before leaving the job site.
  - 14) Make notes of things that are left out on purpose.
  - 15) Index in front of your book.
  - 16) Always cross reference. When work is continued on next page, state this. Do not leave it to someone to guess.

- 17) Honesty- Record what you did-do not try to do it later from memory.
- 18) DO NOT ERASE. If an error exist cross a line thru it.

- Field Book set up
  - On the inside cover of the book (in ink)
    - A) Company name address and phone number (minimum)
    - B) Number the pages
    - C) Use the first two or three pages for index and stat that in your book
    - D) Job name on the field book and location and book number (Asbuilts)
- Abbreviation, symbols, and codes

Symbols-use special care when using symbols to make sure the correct message is conveyed to the person reading the notes

Usually are based on company or software being used

When noting monuments and or BM's- Be specific, use physical characteristics and exact location of the monument and its accessories.

Make sure to note FD/Set

- Support Data
- General comments
- Procedures, observations, conclusions and situations
- Oaths
- Adjustments/Calibrations
- Photography

### Basic Survey Procedures

Research:

- Plats, survey notes, land description = BASELINE EVIDENCE
- Instructions to Deputy Surveyors
- Subsequent surveys- county, private, etc.
- Adjacent landowners
- Aerial photos, maps

### Investigation - “Go on the Land”

- Find existent corners
- Seek witnesses and testimony
- Make measurements
- Gather collateral information
- Locate topography
- Trial mathematical proportions

### Evaluation:

Entails a thorough analysis of all the findings from the Research and Investigation in order to make professional decisions to determine the corner point positions according to the best available evidence. Decisions must be based on statute law, common law principles of evidence and approved survey practices.

### Documentation:

Documentation of the elements of evidence and survey procedures that defined the corner points is prepared in the form of survey notes and boundary plat. Decisions must be defended against challenges.

### Evidence:

In law, evidence is material that is legally presented at a trial as a means of ascertaining the truth or falsity of any alleged matter of fact under investigation before it.

In the case for corner recovery, it is any information that surveyors utilize to form the basis for their decisions about the correct location of boundaries.

*“Evidence includes testimony, physical objects, marks, traces of former objects or relationship between any of these, which may furnish proof or part of a proof of a corner location or line location.”*

*From BLM Glossary of Surveying & Mapping Terms.*

### General Categories of Evidence

1. Real Evidence
2. Written Evidence
3. Oral Evidence
4. Judicial Notice

## Evaluation of Corner Evidence

The surveyor should value and *weigh* the available evidence in order to come to conclusions of proof from that evidence that would place the corner in its original location, and be prepared to convince a court of law.

The evaluation of evidence is *unique* for each corner point, in each different township, in each different geographical area.

There are no formulas, only professional judgment.

\*Local knowledge is priceless\*  
Existent, Obliterated or Lost?

Terms of evidentiary “classification” for a corner point based on the *relative amount and quality* of available evidence that are used by the courts in boundary matters.

### Existent Corner

*Manual 5-5.* An existent corner is one whose position can be identified by verifying the evidence of the monument or its accessories, by reference to the description in the field notes, or located by an acceptable *supplemental survey record*, some *physical evidence*, or *testimony*. Even though its physical evidence may have entirely disappeared, a corner will not be regarded as lost if its position can be recovered through the *testimony* of one or more witnesses who have a dependable knowledge of the original location.

### Obliterated Corner

*Manual 5-9.* An obliterated corner is one at whose point there are no remaining traces of the monument or its accessories, but whose location has been perpetuated, or the point for which may be recovered beyond reasonable doubt by the *acts and testimony of the interested landowners, competent surveyors*, other qualified local authorities, or witnesses, or by some acceptable *record evidence*. A position that depends upon the use of collateral evidence can be accepted only as duly supported, generally through proper relation to known corners, and agreement with the field notes regarding *distances* to natural objects, stream crossings, line trees, and off-line tree blazes, etc., or *unquestionable testimony*.

### Lost Corner

*Manual 5-20.* A lost corner is a point of a survey whose position cannot

be determined, beyond reasonable doubt, either from traces of the original marks or from acceptable evidence or testimony that bears upon the original position, and whose location can be restored only by reference to one or more interdependent corners.

*Restoration of Lost and Obliterated Corners & Subdivision of Sections (suppl. to Manual):* If there is SOME acceptable evidence of the original location of the corner, that position will be employed.

The decision that a corner is lost should not be made until every means has been exercised that might aid in identifying its true original position.

U.S. v Doyle 468 F.2nd. 633 (1972):

*For corners to be lost, they must be so completely lost that they cannot be replaced by reference to any existing data or other sources of information, and before courses and distances can determine boundary, ALL MEANS for ascertaining location of the lost monuments must first be exhausted)*

### Collateral Evidence

The primary evidence of a corner point is the actual monument and its accessories. Collateral evidence is any other form of evidence that is in addition to the primary evidence and which supports or reinforces the location of the original corner. When the primary evidence is missing or destroyed, the other remaining forms of evidence, considered “*collaterally*”, may be the best indication of the original corner position.

Collateral evidence may be in the form of acts or testimony of interested landowners, competent surveyors, other qualified local authorities, an acceptable record or any other indicia that leads to the original corner position.

Manual 5-21. *The rules for the restoration of lost corners should not be applied until all original and collateral evidence has been developed*

- Measurements, by revealing relationships to other elements of evidence and the original record, generally play an important role in the decision to utilize collateral evidence to prove a corner point.
- Corners should be restored by the nearest and most reliable of the available collateral evidence.
- Collateral evidence in surveying might be similar to circumstantial evidence in law - *by itself it may seem insignificant; but an abundance of it could be convincing*

## Testimony

The original location of a corner may be restored at a position pointed out by a person who saw the original corner or has reason to know its location. The evidence testified to should be given no more weight than would be given in court.

Weight will be given to testimony according to its completeness, its agreement with the original survey, and the steps taken to preserve the original location. Such evidence must be tested and confirmed by relating it to known original corners and other calls of the original field notes (Manual 5-1 1).

Guidelines (Manual 5-1 1):

- 1) Witness must be duly qualified - information should be first hand, complete, and *not personal opinion*.
- 2) Testimony should stand appropriate test of its bona fide character, i.e. it is honest, in good faith, genuine, without fraud. *Testimonial evidence given by disinterested parties is often more reliable than that which is given the adjacent landowners.*
- 3) Must be sufficiently accurate for what is required in normal surveying practice.

Corroborative evidence is necessary in direct proportion to the uncertainty of the statements advanced.

Include the following information when obtaining data from a witness concerning a corner point location:

- Name.
  - Age.
  - Address.
  - How long at that residence.
  - When they first acquired knowledge of the corner position.
  - A photograph, showing the corner point and the witness, with the date, photographer and witnesses signatures.
  - An actual signed statement from the witness.
- 
- Cannot overcome the original monument or its accessories as to the location of the original corner.
  - If strong enough, can be used alone to determine the original corner point.

*however, it....*

- Most often is used to corroborate other collateral evidence to support your determination of the original corner point.
- Must generally be related to other calls and corners of the original record.
- Best when based on personal recollections.
- *however,*
- Hearsay is sometimes allowed in boundary cases.
- If you do not accept a testimony to locate the corner and use another location, be prepared to impeach it!!
- *Caution:* The witness may mistakenly confuse evidence of a property boundary or unwritten right with evidence of the original survey (or written title line). Surveyor has to distinguish between the two.

### Records

Pertaining to records created subsequent to the original survey, which purport to document the location of an original corner in some way - such as a perpetuation or ties to other original corners or features. The records must be authentic in relation to the original notes and plat.

Where an acceptable map or plat shows the found location of the original corner, the corner, if obliterated, should be relocated by said map or plat. City, county, state, utility companies, railroads and private surveyors often have maps or plats which include vital information concerning the condition and location of an obliterated corner.

Records:

- Create a *chain of recovery history* by documenting the existence and location of a corner at the time the record was created.
- Document *new evidence* that is in addition to the original evidence, e.g. a new, more durable monument, or new ties to additional features or accessories, which can then be used to find an original corner point that has thus been perpetuated.

There must be a correlation between both the written records and the physical evidence so there is an uninterrupted *chain of evidence*.

Aerial Photos = Records, since they show:

- Lines of occupation (fences, hedgerows, fields).

- Roads, canals, ditches, power lines and other cultural features.
- Topographic features.
- *A chain of land use history*, such as a long history of occupation lines.

(*a few*) Records Sources

1. Private (local) surveyors.
2. Appropriate state agencies.
3. County Surveyor or County/City Engineer.
4. County Clerk and Recorder.
5. State and County Highway Depts.
6. Railroads.
7. Abstract and Title Companies.
8. Logging companies.
10. Historical societies and libraries.
11. Archives:
  - National Archives — Washington D.C.
  - Seattle
  - San Francisco
  - Denver
  - Kansas City
12. Federal agencies:
  - Forest Service Supervisor's and District Offices.
  - BLM State and District Offices (inc. Group Files).
  - Bureau of Indian Affairs
  - Geological Survey
  - National Park Service
  - Bureau of Reclamation
  - National Geodetic Survey
  - Fish & Wildlife Service
  - Army Corps of Engineers

Common Usage  
*a.k.a. Common Report*

Under certain conditions a corner location can be proved by common usage or *reputation* of a point.

In some locales, highways, fences or other cultural features were placed on section lines or property lines. Where a road or fence has been commonly accepted as the section line and there is no evidence to the contrary, the road or fence monuments the section line by common report. In the absence of other means, an obliterated section corner can

be restored at the centerline intersection of two such roads or intersection of fences that are commonly reported as being the section lines in question. In some situations, it may be better to accept a long-standing fence corner commonly accepted as the section corner than to establish a different position by proportionate measurement based on far-away positions.

The acceptance of these common usage corner points that are understood to be the corner point by adjacent landowners may provide the remaining evidence of the corner point. However, the location must in some way be reconciled by the original record.

An historical pattern of land use can often be seen on *aerial photos and maps*.

Caution: The *custom of the area* concerning how the fence lines were established and the value of the land should be considered.

Common Usage is generally used collaterally with other evidence, e.g. *testimony, measurements, records*.

The location must not be superseded by evidence of a higher order.

### Topographic Calls

The found topographic calls of the original field notes may fix the position of a line or corner beyond reasonable doubt. They *may also be used to fix a position of a missing corner in either latitude or departure*. Topographic calls in the vicinity of a corner can be the necessary support to prove otherwise meager corner evidence. When items of topography are found where described by the original surveyor in portions of a particular township, they may substantiate the reliability of similar calls for items of topography *by the same surveyor* elsewhere in the township.

To avoid misapplication in the utilization of a topographic call(s) to fix the position of a corner or line, 1) The determination should result in a definite locus within a small area, 2) It must not be contradicted by evidence of a higher order or by other topographic calls, and 3) *Should have only one reasonable interpretation (Manual 5-16)*. In the absence of other collateral evidence for support, it may be better practice to turn to suitable means of proportionate measurement when the specific topographic call is questionable.

Caution: Topographic calls may have been made on the random line rather than the true line between corners.

Generally, if the restoration of a corner is dependent upon items of topography alone *and appears to be questionable* - don't use it!!  
A check should be made to determine whether the results of restoring a corner from topographic calls are harmoniously related to the original and concurrent surveys.

Note the precision with which the calls were originally recorded, e.g. nearest whole or half-chain?

Distinct v. Indistinct features: "Enter swamp/marsh" - location could be subject to more than one interpretation, while "A rock ledge" is not.

Must be in the same location as the time of the original survey - rivers move and earthquakes change shoreline locations, e.g. Alaska.

### Occupation

Occupation, especially when long continued, *MAY* afford satisfactory evidence of the original boundary when no other evidence is attainable. The presumption could be that the occupation evidence was constructed upon some information or assumed knowledge of the actual line. The surveyor should inquire when the evidence of occupation (fence, tree line, hedge row, field, etc.) originated.

Unless it can be proven otherwise, and lacking evidence of a higher order, occupation evidence which could have originated when knowledge of the original corners still existed should be considered as *possible* evidence of the location of original corners that have become obliterated. This evidence should be accepted only when it can be reasonably reconciled with the original record and other evidence of the original survey.

Caution: It is often the case that occupation evidence was placed for convenience and does not conform to original survey lines, e.g. fences may have only been approximated.

The challenge to the surveyor is to distinguish when occupation is *merely* evidence of a potential unwritten right (e.g. adverse possession) versus evidence of the original survey line.

*"Land lawfully gained by unwritten means extinguishes the old written title, but does not alter the position of the original survey lines."*  
(therefore)

*“Title lines and survey lines are not necessarily coincident.”* - Curtis M. Brown, in “Fence Lines and Written Title Lines”, 1972.

### Measurements

Measurements are a specialty of the surveyor, and *knowledge of their use as evidence* is as important as making and analyzing them. In ranking conflicting evidence for boundary determination, the courts have generally relegated measurements below more tangible elements such as monuments. However, surveyors commonly use measurements to assist in proving the validity of collateral evidence at a corner point by its *relationship* to other original corners. Measurements are evidence that can be used to determine a corner is obliterated rather than lost. They are the method of “linking” (tying) the “footsteps” (collateral evidence) of the original surveyor.

Measurements:

- Yield the relationship of all record calls and corners of the original record, as well as elements of any subsequent record. They demonstrate good vs. poor relationships when evaluating conflicting evidence.
- Show characteristics and “trends” of the original survey and facilitate the development of patterns and “indexes”.
- Enable the development of trial proportions, i.e. one, two, three and four point control solutions.

A position based on collateral evidence should be duly supported by measured relationships that reveal agreement with known corners and other elements of the original record.

Caution: Although technology makes it simpler to “create” a mathematical position for a corner point than to search and evaluate physical evidence, measurements are incompetent to supercede an undisturbed original monument. When called for in a deed, evidence must prove where the monument was as of the date of the deed, *not where the measurements say it ought to have been set.*

GPS is merely a measurement tool and coordinates are measurement derivatives. GPS does not find monuments, evaluate evidence or make any surveying decision. It does not change or enlarge any legal boundary principle.

Hierarchy of Called-For Elements  
When  
Conflicting Evidence and Ambiguous Circumstances Occur

The following hierarchy of called-for elements in a description is derived from a long history of *boundary location principles* and provides general guidelines to the surveyor locating land descriptions (i.e. written title) on the ground and to the person who writes descriptions. The *principles are flexible* because all the conditions and facts relating to the location of a piece of described land must be considered.

1. Actual survey plat upon which a description is based (if publicly available), e.g.:
  - GLO plat — for Public Land Survey System descriptions.
  - A recorded survey conducted under proper authority.
2. Natural monuments.
3. Artificial monuments.
4. Call for an adjoiner.
5. Measurements for distance and direction.
6. Acreage.

The above list relates to how a surveyor might evaluate those elements when a survey of a land description reveals conflicts on the ground. As to matters of ownership (vs. written title), those elements could be superseded by *Senior Rights or Unwritten Rights*.

Role of the Land Surveyor? in  
Unwritten Rights

1. Determine Record Title Boundary (*if necessary*)
  - Collect pertinent survey data, including deeds, other surveys, maps, agency records, corner information and any other pertinent documents.
  - Distinguish between the record line and unwritten claim.
2. Note any encroachments, occupation or use that *MAY* contribute to an unwritten right or trespass.

- Discussion with claimant and their surveyor, relatives, neighbors, etc. who may have knowledge regarding the conflict and history of the area. Request information that supports their claim.

- Visit with county or state personnel.

- On-the-ground inspection of the corners and survey, if any, affecting the claim, including observations of the effect (use) of the claimed (encroached) area on the adjoiners.

3. Prepare and offer a qualified opinion and recommendation.

- Evaluate all the data and information and then provide an opinion which includes a recommendation on how to resolve.

- If claim is believed to be legitimate, continue to assist in the resolution - including assistance in providing a description of the new property line.

4. Educate the adjoiners and/or claimants

The CSI (Crime Scene Investigation) television series provides an excellent example of attention to detail. Surveying professionals and subordinates working with them must learn to apply the same degree of detail. The investigative elements may not follow the same sequence but important similarities exist throughout the investigative process. The most significant sequence difference is the gathering of pertinent documents. Customarily, the surveyor goes to the corner search site armed with a written description of the corner monument and its accessories. Crime scene investigators usually begin their document search after the site has been examined and local evidence has been documented, secured and preserved. Notwithstanding the sequence difference, document research and analysis is an indispensable element of the whole investigation process.

Just as the crime scene site is carefully secured, the corner search site must be carefully preserved, allowing for minimal ground and potential corner evidence disturbance during the initial search phase. A crime scene site is thoroughly examined so as to reconstruct earlier activities that took place – as chronologically correct as possible. Similar, corner evidence often changes over time and it is important to know the circumstances and events that affect said evidence. Corner posts will deteriorate but identifiable portions often remain just below ground level. Corner stones may erode or the markings may have weathered or broken off – if actually marked at all. Iron pipe corner

posts may have rusted and broken off but can easily be recovered using a metal detector. Corner monuments may have been inaccurately described or replaced with a different material by subsequent surveyors. Similar events often affect corner accessories. A good rule of thumb is: *“When customary corner search efforts fail to yield evidence of the original corner or its accessories, think beyond the corner description and look for any corner evidence.”*

Often times, hidden or badly deteriorated corner evidence requires a more extensive examination of the corner search site. Ground disturbance and cutting into potential bearing trees may be necessary. When displacing stones, digging for posts or cutting into trees, be careful to place each potential piece of evidence in its original location (and orientation) to allow a subsequent surveyor to examine the potential evidence independently. It is not uncommon for later (sometimes more experienced) surveyors to identify valid corner evidence and/or markings that were missed during earlier examinations. Sometimes a later discovery of corner evidence is mere luck, aided by different light conditions or affects of weathering.

Crime scene evidence samples are analyzed on site and in laboratories much the same as corner site evidence is examined in the field or in a tree-ring laboratory. The skilled surveyor uses an increment bore to count tree rings on living trees, thereby age dating a potential bearing tree without actually cutting into the tree with axe or chainsaw. This degree of care protects the tree if proven not to be a potential accessory. If a suspect bearing tree is dead, a sample cross-section can be sent to a tree-ring laboratory (with appropriate samples from local living trees of the same species), for precise age dating.

Investigation sites can become contaminated through actions of careless visitors. Inexperienced survey technicians and surveyors may carelessly roll stones down a hillside, disturb fragile bearing tree scribing beyond future recognition and dismantle mounds of stone that may have had a definite “man-made” appearance prior to disturbance.

Narrowing down the area to be searched is dependent on many factors. Crime scene evidence may indicate pertinent activities took place some distance from the site being investigated. Likewise, survey calls, line trees and correlation to nearby corners may provide the link to uncovering or verifying the corner evidence at the corner search site. Researching, securing and analyzing all pertinent documents are essential process in support of weak or sketchy corner evidence. Testimony of persons having knowledge of prior existing evidence, at the site, is another key element of both crime and corner site investigations.

Proof of the findings at an investigation site is often challenged in court. If the initial search is careless, done in haste or biased by unrelated comparisons the results are usually disastrous when challenged in court. Chain or title (possession), proper procedures, protocol and clear/concise exhibits will favorably assist the investigator when evidence is being examined by a court. There is no room for shortcuts.

## FORENSICS OF SURVEYING

### Pros & Cons

Enough has been said comparing crime scene investigation to corner site investigation. Attention is now focused on the question – “What makes a good surveyor?” Buzzwords of the day are, in no particular order:

- Responsible Charge
- GPS vs. Conventional
- Urban vs. Rural Surveying
- State Exams and the NCEES
- GIS/LIS and Surveying Standards
- The Model Law and Surveyor Identity
- Apprenticeship vs. Continuing Education
- Experienced-Based Qualifications vs. Degree in Surveying

### TO MENTION JUST A FEW

#### Responsible Charge

Everyone knows what “responsible charge” is – RIGHT!?!?

Surveyors have varying opinions as to what amount of personal oversight constitutes responsible charge of a survey project. As expected, the amount of time spent in “responsible charge” varies greatly. It is a well known, and seemingly accepted practice within our profession, that “responsible charge” varies from total control of a survey project to total absence (except for final stamping/signing). Decisions as to the degree of responsible charge are usually based on trust in subordinates, number of crews being supervised, size and number of assigned projects, professional attitude and degree of anticipated liability. Responsible charge, for the most part, is infrequently discussed but lingers in the back of most surveyors’ daily thoughts.

Let your conscience be your guide!

## GPS vs. Conventional

We've come a long way in a relatively short time! There is still a definite place for GPS and conventional surveying equipment. Most arguments are based on personal bias and lack of knowledge of both systems. A skilled conventional survey crew can usually gather field survey information, on small survey sites, quicker and with equal precision, than a GPS crew. When acceptable control points are readily available within a short distance of the survey site, a conventional crew is not burdened with set up/dismantle of a base station, delays from satellite anomalies and overhead obstructions that plague a GPS crew more often than desirable. On larger projects, however, GPS can usually outpace conventional methods by large margins. Line of sight challenges are eliminated, inclement weather has much less impact and mobility is greatly increased with GPS applications. Most successful, diversified survey firms have learned how to integrate GPS and conventional survey methods to the financial and growth based advantage.

## Urban vs. Rural Surveying

The above term might infer an adversarial element between urban and rural surveying (city and country if you like). To the contrary, it is merely an expression of two extremes in our surveying profession. Though many striking similarities exist in these two realms of surveying, the differences are just as striking.

City and country surveying is not as strictly defined as the above title infers. Between these two extremes are sub-urban, ranchettes, farming communities, desert lands, bodies of water and a combination of each. The far extremes, however, present unique challenges that demand careful attention and preparation by surveyors. Mental attitude plays a major role in one's ability to adapt to the remote, steep, brush and timber-covered terrain found in most "West of Denver" states. Couple this with lost corner evidence from range/timber fires, floods, erosion and poorly executed original surveys. Lands "East of Denver" may not have nearly as much "rugged" terrain but surveys are older and original corner evidence is less frequently recovered.

City surveyors have to be skilled in locating sub-surface monuments reestablishing destroyed lot corners from conflicting adjoining survey records, dodging irate drivers and enduring "asphalt jungle" temperatures often in the low 100's (F). Mountain surveying requires significant physical stamina, ability to correlate survey notes with terrain features, skill at recognizing deteriorated man-made marks on wood or stone and the patience to spend hours (or days) searching for such evidence – often buried below the surface.

Sometimes, the blacktop, rebar-oriented, least-squares-slave “city surveyor” is not equipped with the experience and insight to search/understand/evaluate General Land Office (GLO) records and deteriorating field evidence when assigned to a survey project outside the “urban” environment. Likewise, the “country” wood-sniffing, stone-gathering, chainsaw-crazed GLO guru may be ill-equipped to negotiate with the title companies, county planning commissions, and overhead-surface-subsurface urban rights-of-way/easement surveys. A number of surveyors do, however, fall comfortably into both categories.

Though each “specialist” deals with striking different work locations and conditions, they have several common responsibilities.

In this age of specialty we find the profession of “Land Surveying” (Geomatics if you prefer) becoming increasingly diversified and specialized. Historically, the seasoned “local surveyor” would survey the back 40 for a farmer, mark off a town block into lots for “urban sprawl”, lay out a ditch for crop irrigation, pioneer a route to a logging operation in remote mountain terrain, stake out a location for the general store and at least a dozen other related survey processes for the purpose of land sales, home construction, utility expansion, new transportation routes and an occasional boundary line dispute. Those were the good old days – that are still alive and well today – with the major differences being land values, equipment choices, and increasingly litigious society, endless municipal regulations, more equipment choices and constantly emerging survey specialties.

GIS, LIS, spatial data, GPS, digital data, demographics, reflectorless EDM, robotics and on and on – present a constant need to “keep pace” as our survey technology changes. However, there are constants in our profession – whether surveying in the city or the country – such as descriptions, plats, monuments, title, research, communication and mentorship - just to name a few.

A few significant conditions do separate city and country surveying, but overall, there are four basic skills common to both:

RESEARCH  
RECOVERY  
RESTORATION  
RECORDATION- of monuments and lines

Our clients deserve nothing less

## State Exams and the NCESS

An ever-increasing number of states are converting three-quarters (more or less) of their state exam to the NCESS exam process. With this decision, states are then challenged with preparation of a “state specific” exam suitable to test the minimum entry-level knowledge of qualified examinees. It is a well-known fact that subtle survey history and retracement differences exist from stat to stats, and sometimes even within state boundaries. This fact is one reason that the NCEES exam is more generic and universal in its format and question content. A metes-and-bounds surveyor from Maine would not be expected to know the intricacies of the PLSS rectangular system in California, and visa-versa.

Some states, after converting to the NCEES exam process, are then awakened to the possibility that a four-hour state specific exam may not be sufficient to test the minimum knowledge level necessary for examinees to be licensed in their state. The solution maybe a six or eight hour state specific exam. Examinees may cringe at the thought of extra hours of examination but professional boards of examiners are charged with protection of public safety and welfare. Time will have a way of working out the rough spots.

## The Model Law and Surveyor Identity

One of the most fiercely debated subjects of recent years has been the NCEES Model Law. The Model Law will likely be viewed, at some future date, as an important item “Whose time had come”. Our surveying profession might be compared to our nation’s railroad system, stretching throughout our country, more concentrated in populated areas and less evident in remote areas. The railroads have large terminals, sidings and spurs. Our profession has developed large databases (terminals), frequently adapted new technologies to emerging challenges (sidings) and is always eager to venture into new uncharted territories (spurs).

Our land surveying skills have expanded, the GIS environment has become well established and populated with GIS professionals and clients of surveying and GIS products are benefiting from the variety of services we offer. The key to success, and protection of public interests and safety, is the level of cooperation we develop between surveying and GIS professionals. A small portion of both professions will continue to practice “outside of their expertise” – always have and always will have. Eventually, bargain-shopping clients will discover the shortcomings of their “cheap” products and seek more reliable sources. Any profession that remains successful is self-policed and will take appropriate

measures to insure that its members practice within their level of expertise.

Finally, each state has the opportunity and obligation to evaluate the NCEES Model Law to determine if all, parts or nor of the document is suitable for adoption within the individual state statutes. Likewise, registered land surveyors have the opportunity and obligation to voice their opinion and affect the decision within their individual states. Many surveyors are concerned about “losing their identity”. Presently, we are known as Surveyors, Land Surveyors, Professional Land Surveyors or Registered Land Surveyors. Our identity is mostly within our own minds. What percentages of our clients can define what surveying really is, explain how we produce our products or understand why so much time is spent preparing a one-page plat whit a few descriptions?

If you really want to make a difference in our profession, and influence your future and our image, network with other surveyors, constantly improve your individual skills and knowledge, seek good mentors and develop mentor skills, keep your surveying standards high and don't accept survey projects you are not fully capable or qualified to do. Remember the time proven phrase, “There is strength in numbers”, and consider becoming an active member of you local and national surveying associations.

### Apprenticeship vs. Continuing Education

Very few land surveyors have become knowledgeable and successful without a good apprenticeship experience and some form of regular continuing education. Disciplined students of land surveying may acquire their continuing education through self-study whereas others may regularly attend society sponsored continuing education opportunities. Either way, the goal must be to remain in a “constant” state or learning about the profession of land surveying. Changes in our profession are constant, making it nearly impossible to remain successful if stagnation becomes routine.

Many survey technicians eagerly seek advice and guidance from their supervisors and fellow workers. A two-way relationship must exist for an apprenticeship environment to be successful. The apprentice must be willing to follow directions and be confident enough to ask questions. Supervisors, on the other hand, must learn to trust an apprentice and be willing to share some responsibility with them through ever increasing responsible assignments. An apprentice surveyor, if not enrolled in any formal surveying course of study, will often rely heavily on the advice and direction of a supervisor. It becomes the responsibility of said supervisor to provide a variety of survey experiences that will

challenge and maintain the interest of an apprentice. An attentive survey supervisor does not lose sight of where they began, the mentors that helped them along the way and their responsibility to contribute to the surveying profession through becoming a mentor.

### Experienced Based Qualifications vs. Degrees in Surveying (Geomatics?)

Another hot topic among surveyors is the changing face of “qualifications for examination”. Traditionally, our profession has been populated mostly with “apprenticeship” trained surveyors. In the past, six to eight years of constant surveying experience, under the direct supervision of a professional land surveyor, has provided sufficient qualifying experience to be allowed to sit for the LS exams. Qualification requirements are changing!

Several states already require a four-year surveying degree from an accredited college or university and many are considering similar legislation. This may seem unfair to those in mid-stream on their way to the exam process. To others, a degree requirement is seen as a firm foundation to establish the land surveying profession as “real professionals” in the eyes of legislators, kindred professions an “of most importance” the public at large (our clients).

Advancements in specialized survey equipment and expanded applications of surveying processes has greatly expanded the quantity of knowledge and skills required to be a versatile land surveyor in today’s world. A well-balanced academic surveying program can provide the basics needed for entry-level surveyors. At risk, is the decline of knowledgeable mentors to “supplement” the training process needed to round out the new “degreed surveyor trainee”. Most four-year surveying curriculums are sorely lacking in comprehensive boundary law and corner evidence/retracement courses. A lifetime of training remains for the new graduate. But is this really any different in other professions?

Don’t always rely on prior surveys (except the original)

Acquire all readily available survey records (and search for unrecorded documents)

Follow accepted procedures for subdivision of sections

Don’t hesitate to contact prior surveyors when questions arise – private or federal!

### RESOURCES:

General Land Office/BLM Records

USGS topographic maps

Division of Water Resources

Aerial photographs – historical progression – ASCS and Archives

Soil Conservation Services  
Army Corps of Engineers – Levee – location, dates of construction, modifications  
Deeds – Title search for subject lands and adjoiningers  
Parol evidence – adjoiningers, owners  
Riparian – accretion, erosion, avulsion  
Navigability  
Surveys of record  
County Recorder/Assessor maps  
Similar deeds

## RESPONSIBILITIES OF THE SURVEYOR

The problems of boundary lie at the foundation of all surveying, for one must know where a line is before he can measure it, and the solution of these problems calls for the same powers of accurate observation and of consecutive and logical thought that are demanded for successful work in any branch of modern science. It is needless to say that the successful surveyor must be accurate in his instrument work and in his computation; yet, if he would really succeed, he must go beyond this. He must add to this the patience to collect all the evidence which can be found bearing upon the case in hand, together with the ability to weight this evidence to a nicety and to determine clearly the course pointed out by the balance of probability. If, in addition, he possesses enough imagination to cast pleasant light across the desert of dry details, he should be successful indeed.

The watchwords of the surveyor are Patience and Common Sense.  
(Emphasis added)

The vocation of the Civil Engineer has always been invested with a dignity of its own. But it seems to me that of late years, in paying him the honor which is his just due, we are apt to fix a little too wide a gap between him and his humbler brother, the Surveyor. We give engineering the chief attention in our technical schools, but surveying we want to relegate to the freshmen class. Yet the profession of the Surveyor deals with one of the oldest and most fundamental facts of human society—the possession and inheritance of land. Fire, flood and earthquake wipe out the greatest works of the engineer, but the land continueth forever.

Curiously enough the Surveyor is isolated in his calling, and therein lie his responsibility and his temptations. The lawyer comes nearest to understanding the work, yet of the actual details of a survey most lawyers are woefully ignorant. The business man who can judge to a hair the fulfillment of a contract has no eye for the shortened line or

the shifted landmark. To the skilled accountant of the bank of traverse sheet is a closed book. Dishonesty in ordinary business life cannot long be hid and errors in accounts quickly come to light, but the false or faulty survey may pass unchallenged through the years, for few but the Surveyor himself are qualified to judge it. I maintain that in the hands of the Surveyor, to an exceptional degree, lie the honor of the generations past and the welfare of the generations to come; in his keeping is the Doomsday Book of his community, and who shall know if he is false to his trust? Therefore I believe that to every Surveyor who values his honor and has a full sense of his duty the fear of error is a perpetual shadow that darkens the sunlight.

Yet it seems to me that to a man of active mind and high ideals the profession is singularly suited; for to the reasonable certainty of a modest income must be added the intellectual satisfaction of problems solved, a sense of knowledge and power increasing with the years, the respect of the community, the consciousness of responsibility met and work well done. It is a profession for men who believe that man is measured by his work, not by his purse, and to such I commend it.

What you should have and be able to locate at the drop of a hat.

- A) Essential Record Documents of Design Professionals
  - 1. Contracts
  - 2. Client & Professional Correspondence
  - 3. Professional Work Product
  - 4. Intra Office Memoranda-Professional/Support
  - 5. Billing
  
- B) Communications
  - 1. Written
  - 2. Verbal
  - 3. Recorded Verbal

Communication Defined:

A Statement of any form, constituting an exchange or memorialization of information and or ideas, weather written or oral

Best Evidence is a Writing at or about the time of the event.

- 1. Client/Professional Correspondence
  
- 2. Work Product/Office

- A) Research/Data Retrieval
- B) Office Calculations
- C) Technical Drawings/Maps  
Hard copy/digital  
Revisions

### 3. Field Work

- \*Digital, written
- \*field change orders
- \*Field Authorizations
- \*Photography/forensics
- \*Technical Drawings/Maps Hard copy/digital Revisions

Ask yourself what do I need and why?

\*What is the anticipated nature and character of the project?

\*What records can I reasonably expect to generate or have generated for or at me that must be maintained to insure integrity of the project and my interactions (communications) during the course of the project.

What are the anticipated resources necessary to perform the project?

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