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Dear Mr. Gonski:

I am embarrassed to say that I actually dabbled in real property law when still in private practice and had no idea that chains and links actually had real meaning. Luckily, I realized that practicing law wasn't my strength and that this job would be much better!

I really enjoyed reading your article, "When Surveyors Differ, Whose Is the 'Accurate Survey'?", which was published in the Law Journal's autumn Real Estate supplement in this week's issue.

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Sincerely yours,



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REAL ESTATE & TITLE INSURANCE

By DENNIS M. GONSKI

When Surveyors Differ, Whose Is the 'Accurate Survey'?

Absent some blatant technical error, an accurate survey is a matter of professional opinion

Title insurance binders generally contain a standard preprinted policy exception denying coverage to any "encroachments, overlaps, boundary line disputes and other matters" that "would be disclosed by an accurate survey." Curiously, this insurer use of the term "accurate survey" brings with it the specter that more than one survey result may occur. And, when two surveys do differ in result, how does one determine which is the accurate survey?

Mathematics Is Only Part of the Picture

Land surveying is believed by some to be an exact science. This simplistic perception is largely based on the belief that a survey is nothing more than a rote application of mathematical principles. To support this view, one need look no further than the Egyptian surveyors, who, using only their skill in geometry and the crudest of surveying tools, were

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able to lay out great pyramids having equal sides that vary only by mere millimeters.

A modern survey, however, is much more than a mere rote application of mathematics. A surveyor is regularly called upon to make difficult choices and decisions, oftentimes based only on fragmentary and sometimes inconsistent information.

Surveyors must act the role of a detective, in that they are required to investigate, interpret and oftentimes justify the results of someone else's labors. For example, it is not uncommon for a surveyor to be confronted with a title document whose descriptive calls are substantially inconsistent with the actual on-the-ground location of referenced monuments or physical occupation. In such a circumstance, the surveyor must detect not only why such a discrepancy exists, but must also reconcile that difference.

A surveyor's function can be likened to assembling pieces in a life-size jigsaw puzzle. The piece comprising the surveyed land must be neatly fitted into a ground location in relation to the common boundaries shared with adjoining lands. Assemblage of each piece in the land puzzle will often require a surveyor to determine both if and where adjoining pieces are properly located. Title lines to adjoining lands

must be established to assure against overlaps or gores. Competing bearings, monuments, and distances must all be reconciled.

Rote mathematics is of little assistance when, for example, a title instrument calls to a monument that can no longer be found.

Frequent Sources for Survey Variation

The most frequent cause of survey variations comes from the translation of earlier acquired field data into contemporary use. Sophistication in modern survey technology allows greater survey precision than was ever possible. However, a precise measurement made today does little to enhance earlier and less precise land measurements obtained by using older techniques. For example, imagine two surveyors each conducting a survey of the same land: one using a compass and chain, the other using the latest satellite technology. Is there any doubt that these two surveyors will differ in their respective measurements?

Not too many years ago, surveyors indeed made survey measurements using only a compass and an iron or steel chain (sometimes called a Gunter's chain). When brand new, a survey chain measures 66 feet in length and is comprised of 100 links. The con-

version from chain and link measurement into feet and inches is:

- 1 link = 0.66 feet, or 7.92 inches (sometimes rounded to 8 inches)
- 1 rod = 25 links = 16.5 feet
- 1 chain = 4 rods = 66.0 feet.
- 1 furlong = 10 chains = 660 feet

The acceptable margin of error for a chain and link measurement is considered to be one link (called a surveyor's foot) for every length of chain used.

Errors in linear measurements were endemic because of the unwieldy nature of a survey chain. Chains were heavy, and often kinked. The links became bent with frequent use. When draping a chain across uneven terrain, errors in excess of a surveyor's foot were both common and expected. With repeated use, the chain links would eventually wear upon each other and actually cause the chain to lengthen. Sometimes surveyors would compensate for such lengthening by removing a link or two, in an attempt to maintain, as nearly as possible, the standard chain length of 66 feet.

As technology progressed, chains gave way to more user-friendly tape measures and optical transits. However, these new and improved survey instruments provided a means to enhance measurement precision only on a prospective basis. Reliance upon earlier collected data remained hostage to earlier measurement techniques. With each advance in survey technology, a surveyor must still go back and decide the degree of reliance to be accorded to earlier reported field data.

The traditional compass used by early surveyors was also a source of error. The compass needle was attracted to magnetic north, and enjoyed an acceptable accuracy of only 1/2 degree in either direction. Greater variations in compass direction could easily occur due to fluctuations in the surrounding magnetic fields — possibly even resulting from the proximity of the compass to the surveyor's own metal chain. By way of example, a one-degree variation in a survey bearing running 100 feet

will cause an arc line variation of 1.75 feet. A 1/2-degree variation in a survey bearing running 500 feet will cause an arc line variation of 4.36 feet. Such error potential, when multiplied by the number of course bearings found in many larger tracts of land, gives one pause to wonder why survey variations are not more common than they actually are.

Lawyer Versus Surveyor

Another cause of survey variation is traceable to lawyers. A lawyer's purpose in drafting a title instrument is to describe a particular parcel of land, with sufficient specificity to give notice of the interest being affected. The specificity needed to satisfy a lawyer's purpose is far less than the specificity needed by a surveyor to accomplish a physical location of land upon the ground. A lawyer may properly describe a parcel of land without ever making reference to the metes and bounds of the land itself. Land may be conveyed by making reference to prior deeds, or by a description calling only to neighboring lands. Deeds may also describe land by using only a street address or a "Block and Lot" designation (as is sometimes done in deeds resulting from foreclosures in rem).

Deed descriptions may be legally sufficient to allow a transfer of title, yet be totally insufficient to permit an actual survey location of the land upon the ground. In such circumstances, the surveyor is put to resources beyond the title instrument a lawyer drafts. It is not infrequently that a surveyor will need to uncover reliable survey evidence at a location considerably distant from the tract of land described in a lawyer drafted title instrument.

Lawyers have been known to draft title documents containing scrivener's errors. Such errors may be as simple as a course reversal, or a typographical error in a call. Worse may be the omission of an entire property course. Such errors generally, however, will not defeat a title conveyance, but are a major headache for a surveyor. When a

title description does not close mathematically — i.e. return a surveyor geometrically to a stated beginning point — the surveyor must first determine what has gone wrong, and then, if practicable, determine what was intended by the conveyancing instrument, all before a ground location for the intended conveyance can even begin.

Sometimes lawyers draft title instruments that contain less obvious defects, such as a call made to the sideline of a street followed by a call from the centerline of the same street; or a call made to a meandering stream, or to a pond prone to periodic shoreline changes. Some title instruments may even contain two or more irreconcilable descriptions; each resulting from recitations made to prior deeds, and copied into successive title instruments.

Older deeds may even contain an omnibus conveyance of "all of the grantor's land," putting the surveyor to a quest for any extrinsic evidence (even his own interpretation of historic title records) as a prelude to any physical ground location of the conveyed land.

In each of these instances, a surveyor is faced with a host of formidable issues, most of which were likely not considered by a lawyer.

One of the surveyor's most difficult decisions is determining what a lawyer may have intended in light of the surrounding circumstances in effect when a title conveyance took place.

Cost is Always a Factor

Surveys are traditionally performed under private contract. Cost is always a factor. When as today, the value of land is high, the cost of a survey by comparison is relatively low. However, when the cost of purchasing land was small — as in earlier decades — the cost of a proper survey was not always a welcomed expense. For example, an individual intending to purchase 500 acres of cheap land might have been unwilling to pay for the cost of a proper survey, preferring instead to chance the loss (or gain) of an acre or two from his bargain.

Speed in closing a deal has also, at times, been deemed more desirable than survey accuracy. Land descriptions have occasionally been drawn based upon "more or less" measurements, or even based upon distances and directions — sometimes estimated rather than measured. Property descriptions have sometimes been drawn based upon imprecise or crude maps, conveniently depicting straight property lines, when in reality those same property lines were anything but straight when laid out upon the ground. Maps approximating neighboring tracts all too often are the cause of overlaps or gores.

A common cost-saving practice employed, even sometimes today, is to blindly repeat an inconsistent property description, by recopying it from one deed to the next, whether or not a survey has been performed, and occasionally with a lesser degree of accuracy than the relying parties might hope for.

Monuments Are Paramount To a Survey Location

Given all of the possible variables inherent in paper descriptions, it is no surprise that a more reliable (but not infallible) survey reference system developed. Such is the survey monument. The practice of setting and relying upon survey monuments is attributable to the Egyptians and Babylonians, and is also referenced in the Bible, Genesis 31:45-48.

Surveys along the Nile River were repeatedly needed because of the river's annual flood cycle. It is popularly believed that the persistent need to resurvey the same lands, over and over,

again and again after each successive flood, directly led to the practice of installing immovable monuments, intended to survive the floods and thereby reduce the expense of repeated surveys. So important became early survey monuments that the severest of civil and religious penalties, including death, were exacted against anyone found to have disturbed or removed a boundary stone.

One of the first textbooks devoted to land surveying, *The Corpus*, was devoted in large part to setting forth standardized rules concerning survey monumentation. In *The Corpus*, the Roman surveyors established a series of practical rules developed from years of experience in relying upon various types of survey monuments.

Many of those early rules are still employed by surveyors today:

- Calls to natural monuments pre-
side over all other calls; calls to artificial monuments rank second; calls to adjoining rank third; courses and distances rank fourth; and calls to area or quantity rank last.
- A call for the line of another tract of land is generally considered to be a natural monument.
- A call to a map stands on the same footing as calls expressed in words and yields to natural and artificial monuments.
- A "well established line" of an adjacent survey is a natural monument within the rule that course and distance give way to natural monuments.
- The rules of construction do not prohibit the use of discretion, especially where contrary quantitative data is exact and precise.

It is fitting that this last cited rule — i.e., use of discretion by the surveyor — be deemed the one rule that qualifies all other rules. Indeed, the need for surveyor discretion is the theme of the instant discussion as to why survey variations are apt to occur. For an in-depth treatment of these and other rules of surveying, the reader is referred to *Clark on Surveying and Boundaries* (The Mitchie Company Law Publishers, 5th Ed.), and *The Legal Elements of Boundaries & Adjacent Properties* (R. Skelton, Lexis Law Publishing, 2nd Ed.).

Conclusion

Lawyers and title companies concern themselves with paper titles. A surveyor, is concerned with the physical location of land upon the ground.

Because land exists on the ground (and not on paper), title companies regularly require a survey. When no survey is forthcoming, the title company will then insist upon an insurance exception, made to those matters an accurate survey would disclose.

However, what constitutes an accurate survey is not always a simple matter, and will depend upon such variables as interpretation and discretion. Surveyors make many decisions, which in turn provide many opportunities for disagreement.

As long as surveyor's are called upon to make decisions as a part of the surveying process — surveyors can be expected to disagree, and their surveys to differ. Absent some blatant technical error, the choice as to what constitutes an accurate survey must remain a matter of professional opinion. ■