

***MAPPING DESCRIPTIONS
AND DRAFTING
PARCEL BOUNDARIES
FOR CADASTRAL MAPPING***

Chapter 6

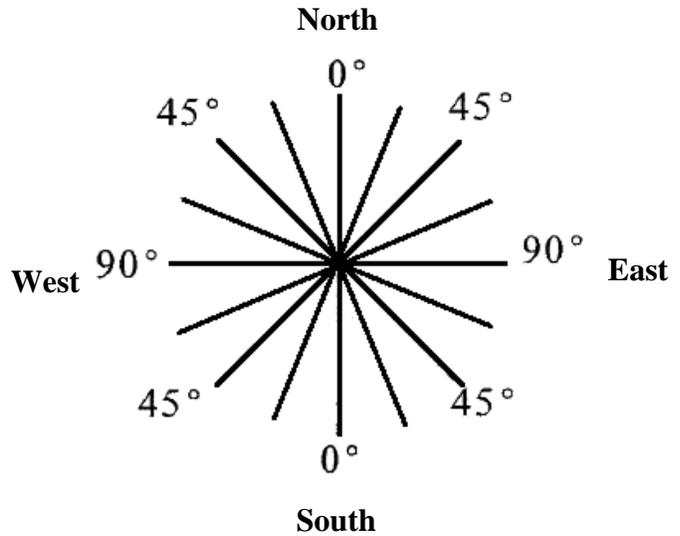
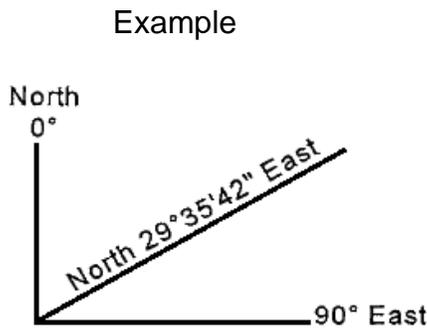
2015 Cadastral Mapping Manual

Another method of describing land, aside from the fractional section method, is called the "Metes and Bounds" method.

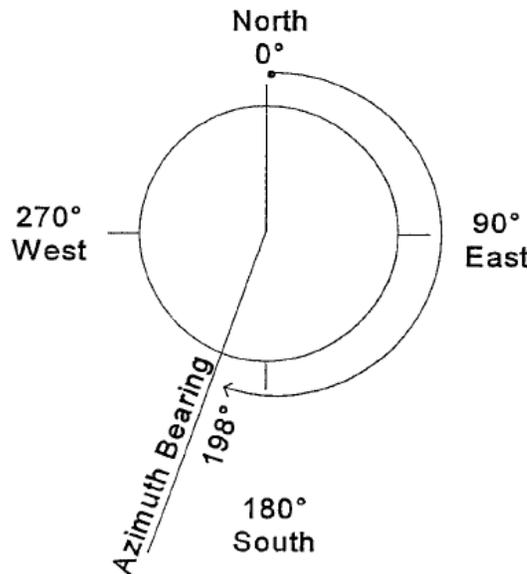
Metes and Bounds: a description beginning at a point and following all the boundary lines of a parcel of land around the perimeter and back to the point of beginning, by the use of a bearing and distance for each line of the boundary with the beginning point described and tied to a permanent known location such as a section corner.

Bearings are determined as follows:

- There are 90 degrees from North to East
- There are 60 minutes in 1 degree
- There are 60 seconds in 1 minute



Another type of bearing use in cadastral mapping is the Azimuth bearing. The Azimuth bearing is determined in angular degrees in a clockwise direction from north point being zero degrees to 360 degrees. Although this type of bearing is rarely used in property descriptions, it is very useful in computer programming with mapping applications because it is always in relation to the same point (North).



Measurements are normally given in feet and 100th of a foot, the symbol for feet is '.

Example of bearing and dimension of a line

N. 27°15'59" E. 261.82'

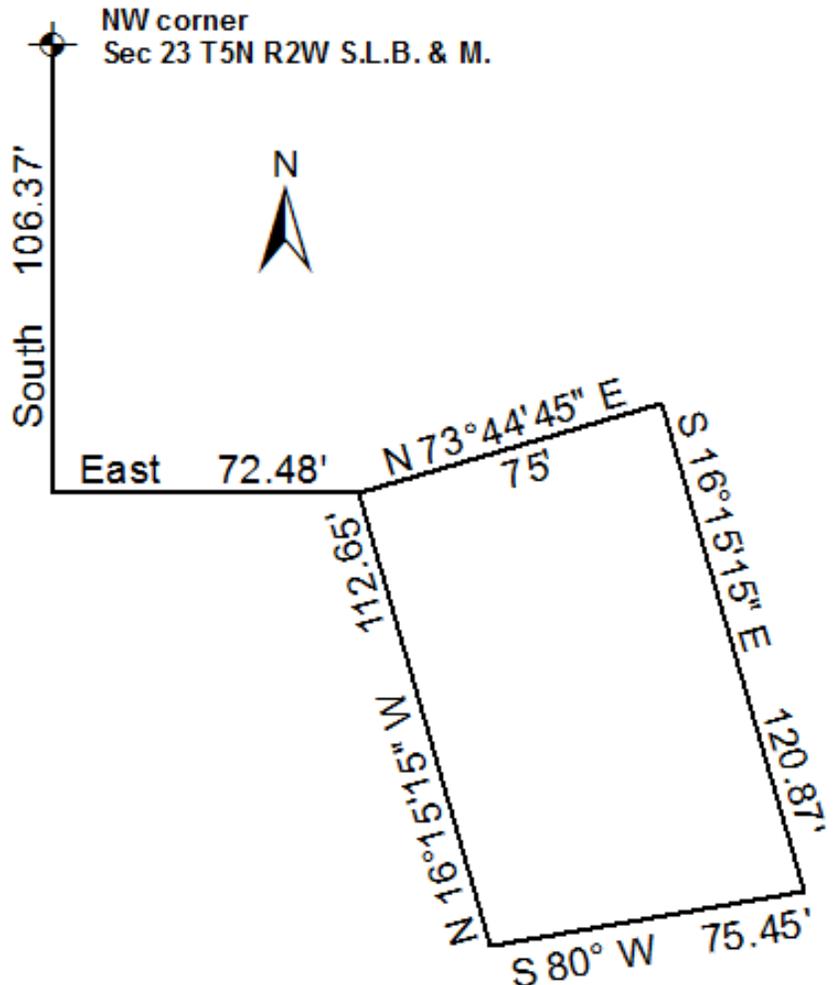
Other measurements that may be used.

1 Link = .66'	1 Perch = 16.5'	1 Furlong = 660'
1 Chain = 66'	1 Vara = 2.78'	1 Mile = 5280'
1 Rod = 16.5'	1 Yard = 3.00'	1 Meter = 3.2808'

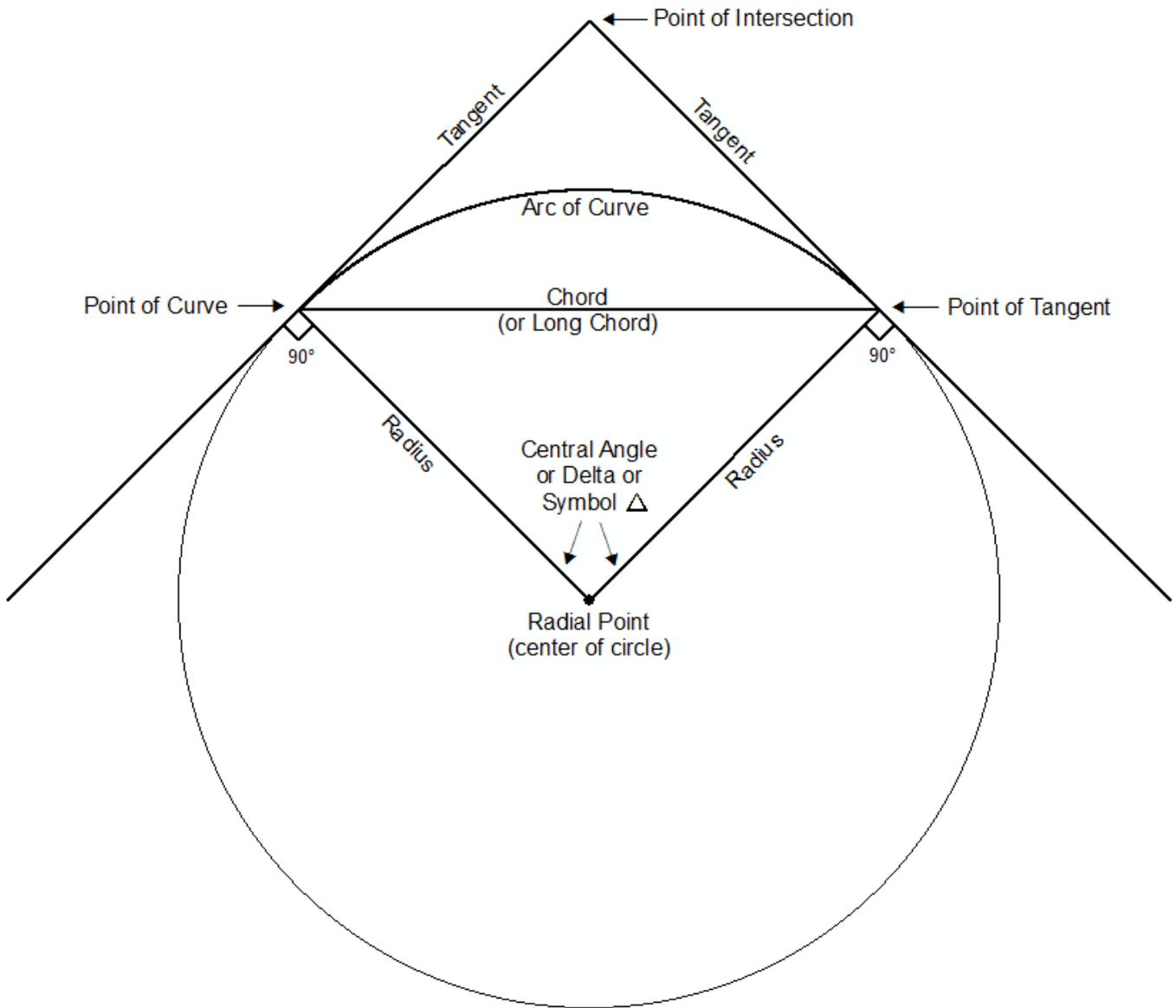
Example of Metes and Bounds Description

Example 1

Part of the NW quarter of Section 23, Township 5 North, Range 2 West, Salt Lake Base and Meridian. Beginning at a point South 106.37 feet and East 72.48 feet from the Northwest corner of said section. Running thence North 73°44'45" East 75 feet; thence South 16°15'15" East 120.87 feet; thence South 80° West 75.45 feet; thence North 16°15'15" West 112.65 feet' to the point of beginning.



Curves are also often used in metes and bounds descriptions. Below is an example of the elements of a curve used in mapping. Elements of a curve are identified as parts of a sector of a circle.

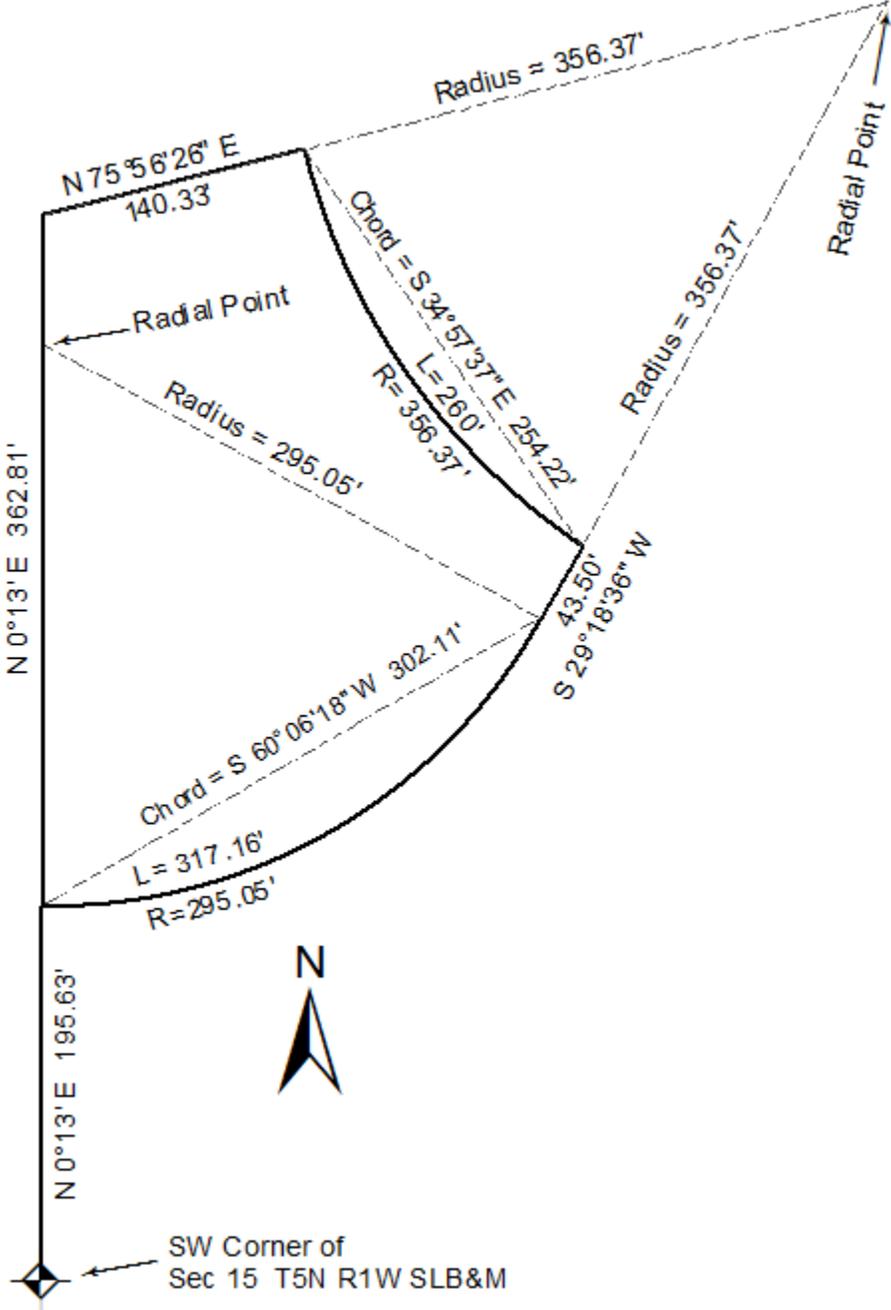


Examples of Curves in Metes and Bounds Descriptions

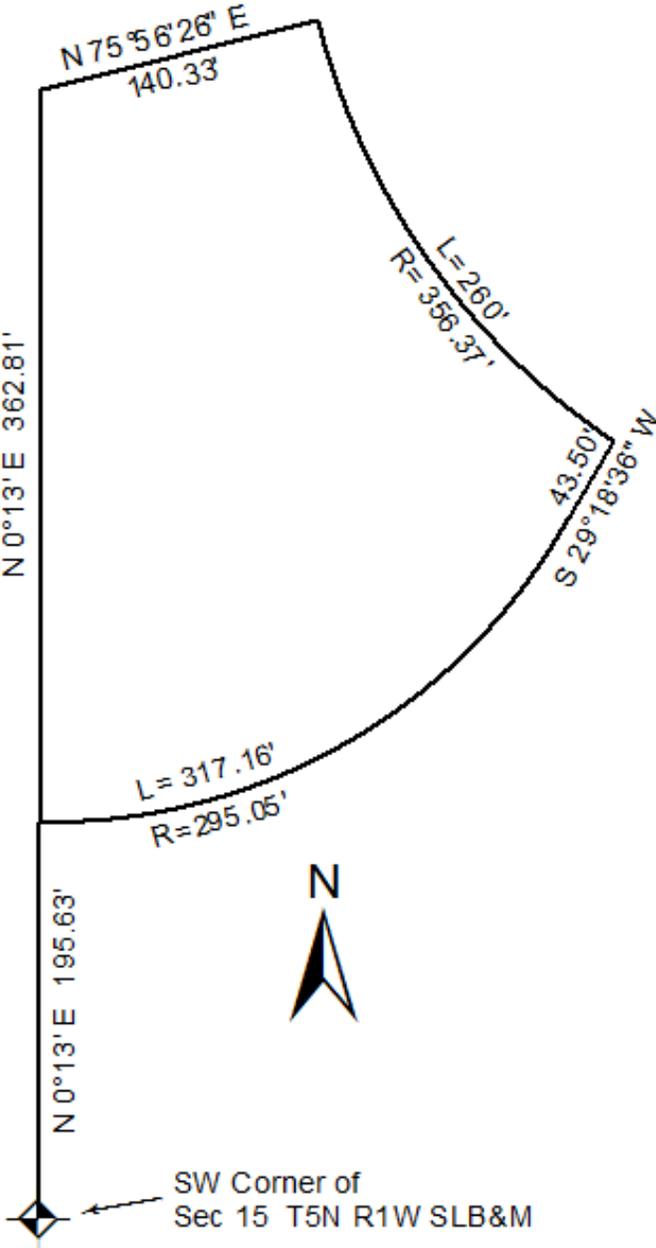
Example 2

Beginning at point North 0°13' East 195.63 feet along the section line from the Southwest corner of Section 15, Township 5 North, Range 1 West, Salt Lake Base and Meridian. Running thence North 0°13' East 362.81 feet; thence North 75°56'26" East 140.33 feet; thence to the left 260 feet along the arc of a curve whose radius is 356.37 feet whose chord bears South 34°57'37" East 254.22 feet; thence South 29°18'36" West 43.50 feet; thence to the right 317.16 feet along the arc of a curve whose radius is 295.05 feet and whose chord bears South 60°06'18" West 302.11 feet to the point of beginning.

Example of Construction Phase of Description with Curves.



Here is the completed drawing of the same description with curves.

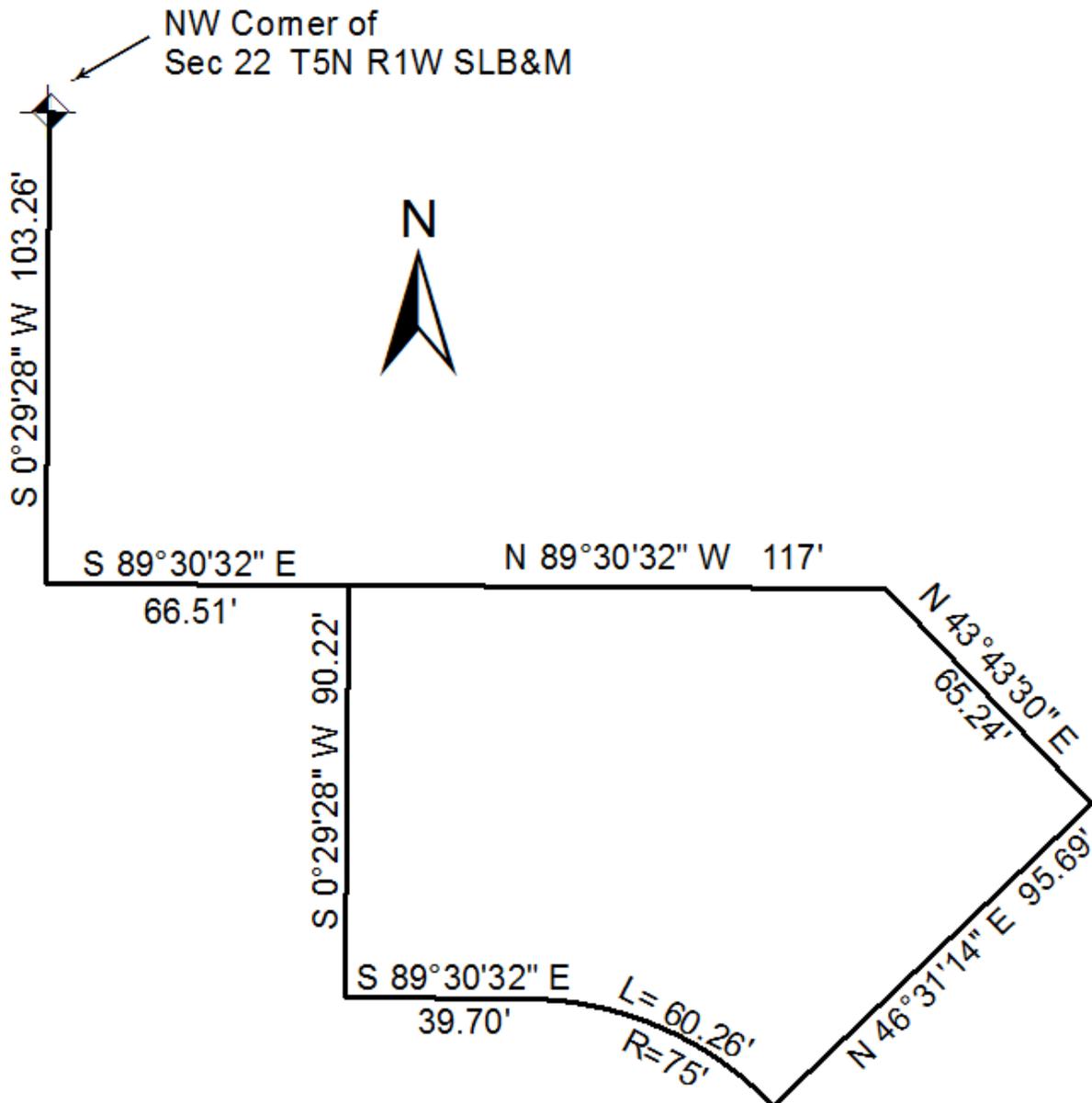


On some occasions a property description will not contain a chord, in this event it must be assumed, when totally void of all other information, that it is a regular curve with the radius being at a right angle (90°) to the last course given, and that it is tangent to the bearing of the previous line.

Example of Metes and Bounds Description without Chord

Example 3

Beginning at a point South 0°29'28" West 103.26 feet along the section line and South 89°30'32" East 66.51 feet from the Northwest corner of Section 22, Township 5 North, Range 1 West, Salt Lake Base and Meridian. Running thence South 0°29'28" West 90.22 feet; thence South 89°30'32" East 39.70 feet; thence along a 75 foot radius curve to the right 60.26 feet; thence North 46°31'14" East 95.69 feet; thence North 43°43'30" West 65.24 feet; thence North 89°30'32" West 117 feet to the point of beginning.



Drawing a Metes and Bounds Description by Hand

Traverse: To travel from one point to another. In mapping it means to move along the course of a legal description to define or trace a property boundary.

Drawing or traversing a legal description by hand requires four essential items or tools:

- 1) Engineers Scale
- 2) Pencil
- 3) Eraser
- 4) Protractor -or- Land Measure Compass

To draw a meets and bounds description, let's use the legal description from example 1.

Part of the NW quarter of Section 23, Township 5 North, Range 2 West, Salt Lake Base and Meridian. Beginning at a point South 106.37 feet and East 72.48 feet from the Northwest corner of said section. Running thence North $73^{\circ}44'45''$ East 75 feet; thence South $16^{\circ}15'15''$ East 120.87 feet; thence South 80° West 75.45 feet; thence North $16^{\circ}15'15''$ West 112.65 feet' to the point of beginning.

The description can be broken down into several parts and those parts are used in the following six steps to traverse or draw the legal description.

Step 1 The Defined Area

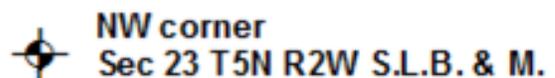
The first step is to determine what area you are working in. This could be the section township and range or it could be the lot, block and plat within a city or it could be another defined area in the description. For the example we are using the area is: *"Part of the NW quarter of Section 23, Township 5 North, Range 2 West, Salt Lake Base and Meridian."*

Step 2 Find the Reference Point

One purpose for monumenting section corners and quarter corners in a section is to provide a reasonably close point from which to survey various properties within a section. It is comparatively easy to understand the relationship of two descriptions when they both reference the same monument.

The reference point in the description is the section corner or other known point that the description uses to tie the parcel boundary to a specific location. It is usually two or three calls into the description before it is stated. In the above example the reference is:

"... from the Northwest corner of said section."



Step 3 Getting to the start

With a few exceptions, most legal descriptions give a set of bearings and distances from a known location such as a section corner to the starting point of the parcel being described.

In our example we have two bearings that take us from our section corner to the starting point.

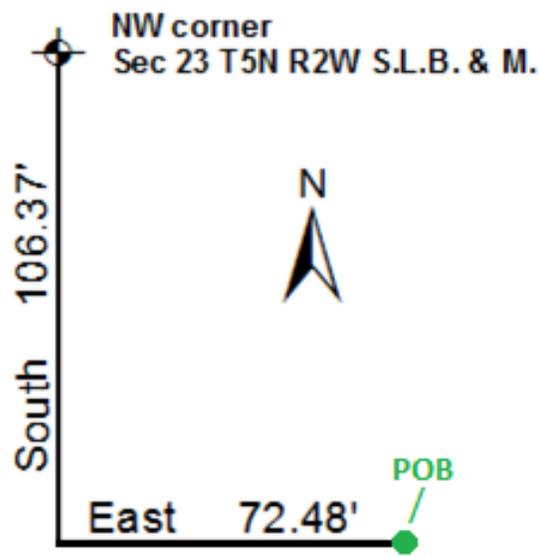
*"... a point South 106.37 feet ...
... and East 72.48 feet from..."*



Step 4 The Point of Beginning

The starting point is usually known as the point of beginning. If the description has no closing errors this starting point should also be the ending point for the parcel. Any bearings and distances prior to the starting point are references. They do not describe the boundary of the parcel but are used to define where the parcel boundary is in relation to a known location.

"Beginning at a point... ...to the point of beginning."



Step 5 The Property Boundaries

This is where we measure each of the angles or bearings in the description and draw a line along that bearing for the given distance. Each new bearing starts at the end of the previous bearing and distance.

“Running thence

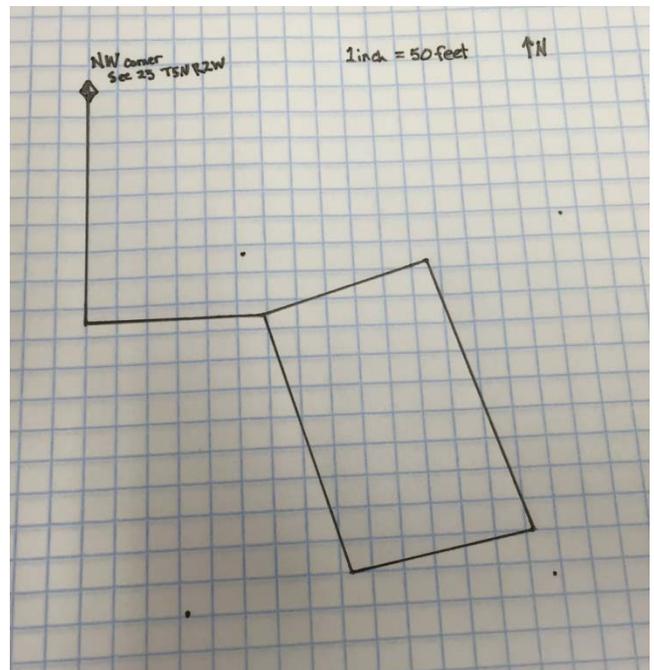
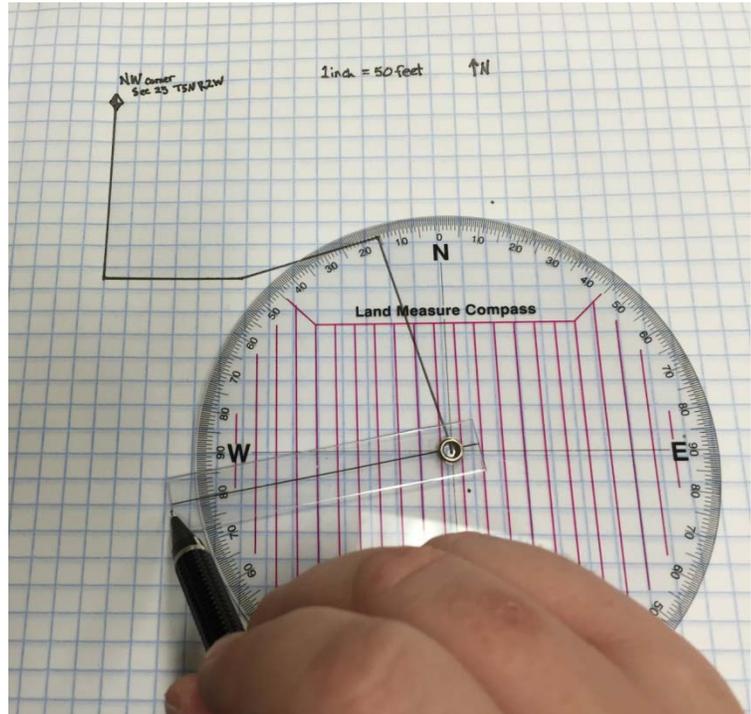
*North $73^{\circ}44'45''$ East
75 feet;*

*thence South $16^{\circ}15'15''$ East
120.87 feet;*

*thence South 80° West
75.45 feet;*

*thence North $16^{\circ}15'15''$ West
112.65 feet...”*

When we have drawn the entire perimeter of the parcel boundary lines from the legal description ending back at the point of beginning we have a completed parcel drawing.



Step 6 Rotate the Description

Sometimes the description needs to be rotated to meet the section line. There is more than one way to rotate a description.

A. Rotating Mathematically (Method 1)

Remember the mathematically rotated description from the chapter on basic mathematics. We rotated the legal description 10° counter clockwise.

Original Legal Description

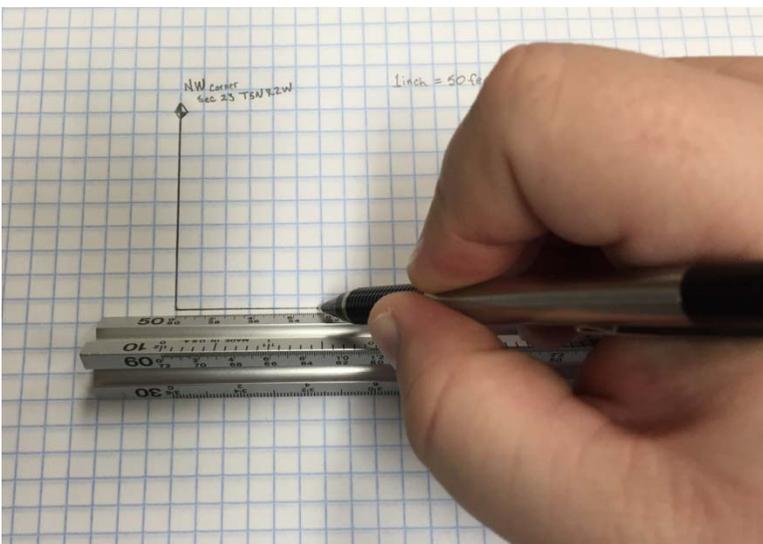
Part of the NW quarter of Section 23, Township 5 North, Range 2 West, Salt Lake Base and Meridian. Beginning at a point South 106.37 feet and East 72.48 feet from the Northwest corner of said section. Running thence North $73^\circ 44' 45''$ East 75 feet; thence South $16^\circ 15' 15''$ East 120.87 feet; thence South 80° West 75.45 feet; thence North $16^\circ 15' 15''$ West 112.65 feet' to the point of beginning.

Rotated Legal Description (10°)

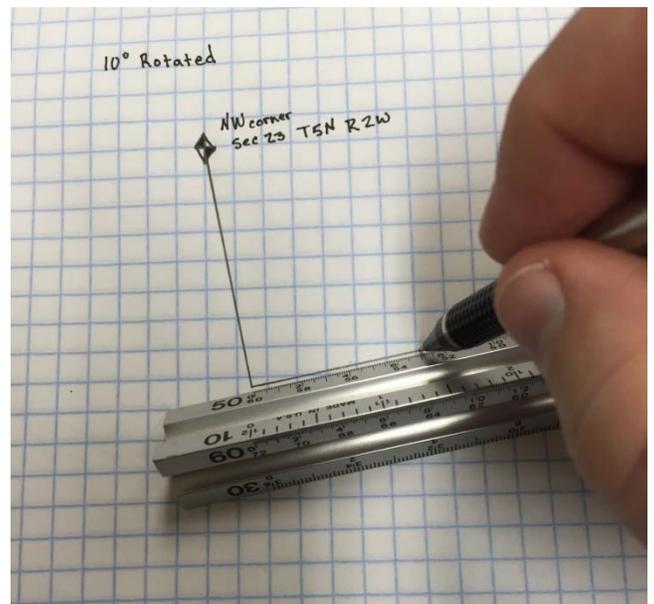
Part of the NW quarter of Section 23, Township 5 North, Range 2 West, Salt Lake Base and Meridian. Beginning at a point South 10° East 106.37 feet and North 80° East 72.48 feet from the Northwest corner of said section. Running thence North $63^\circ 44' 45''$ East 75 feet; thence South $26^\circ 15' 15''$ East 120.87 feet; thence South 70° West 75.45 feet; thence North $26^\circ 15' 15''$ West 112.65 feet' to the point of beginning.

We have mapped the original legal description, and we have the mathematically rotated description. If we draw that rotated description and compare it to the original description we have drawn we can see the difference.

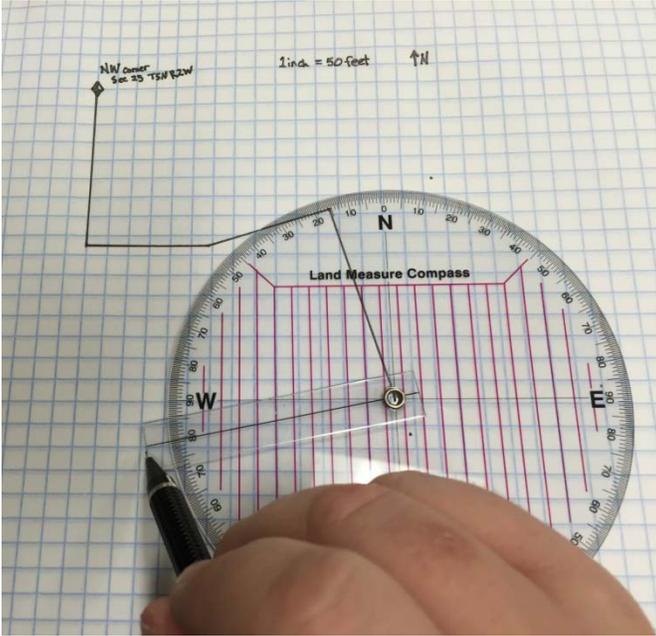
Original



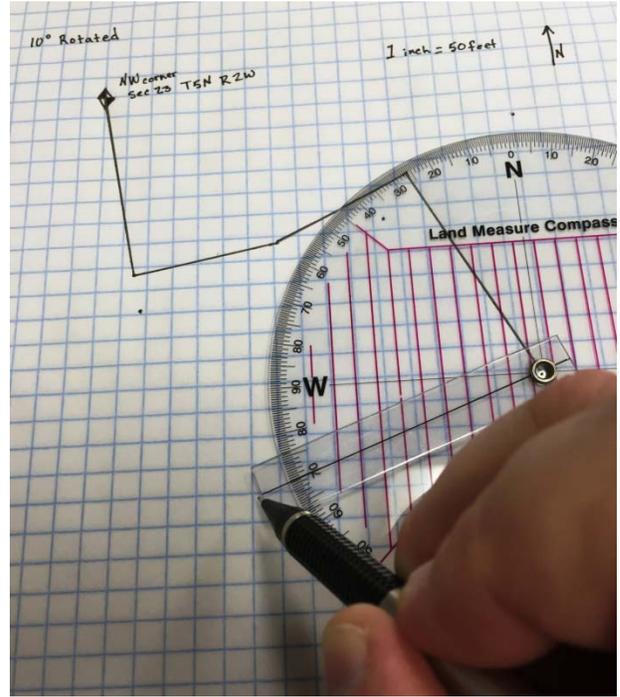
Rotated



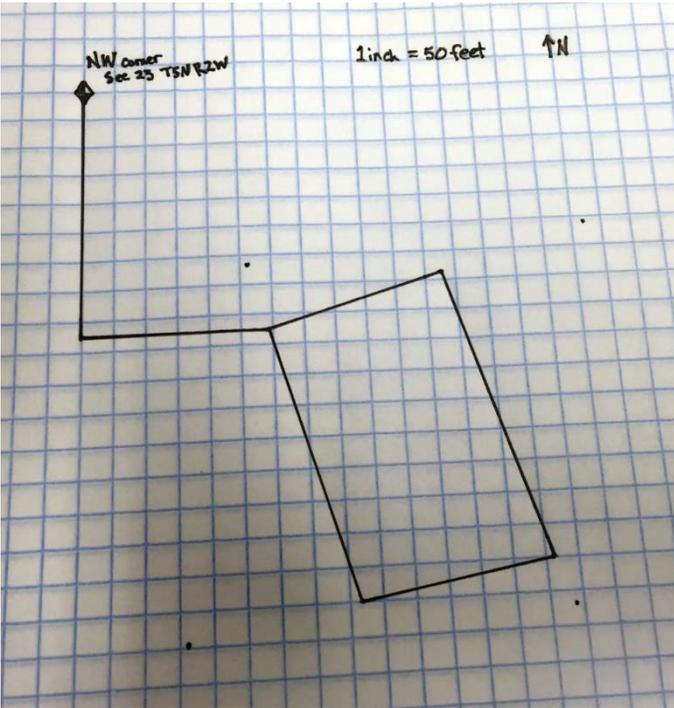
Original



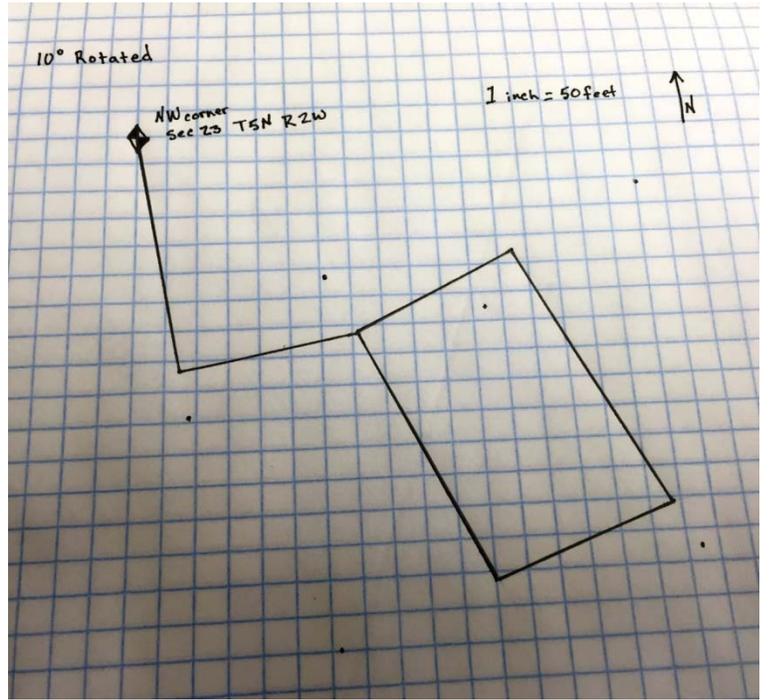
Rotated



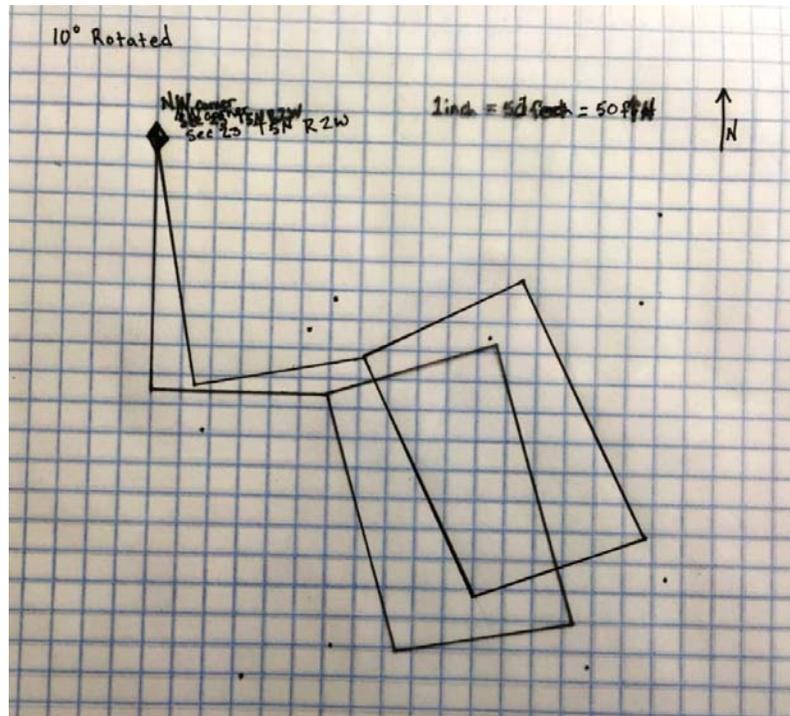
Original



Rotated



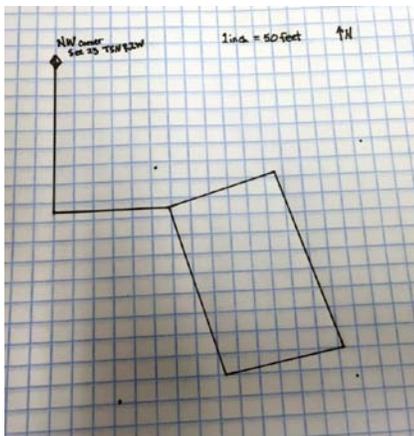
Now if we take both the original and the rotated descriptions and lay them on top of each other, we can see how much 10° makes a difference in how the description sits.



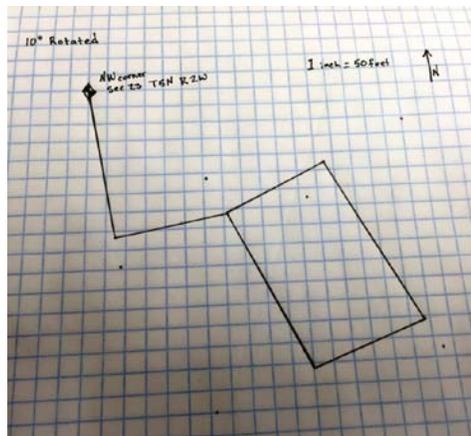
B. Rotating Manually (Method 2)

For this rotation example we are going to use the same two descriptions used in the above example. This is Method 2 as mentioned in the basic mathematics chapter.

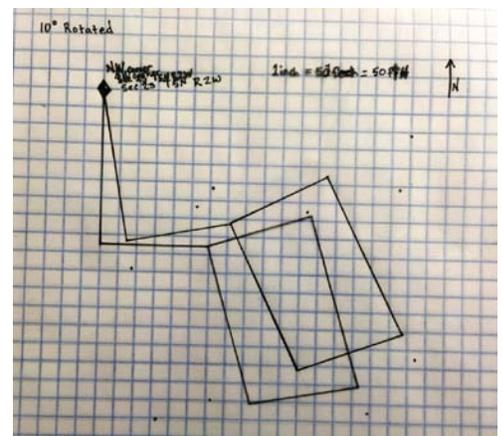
Original



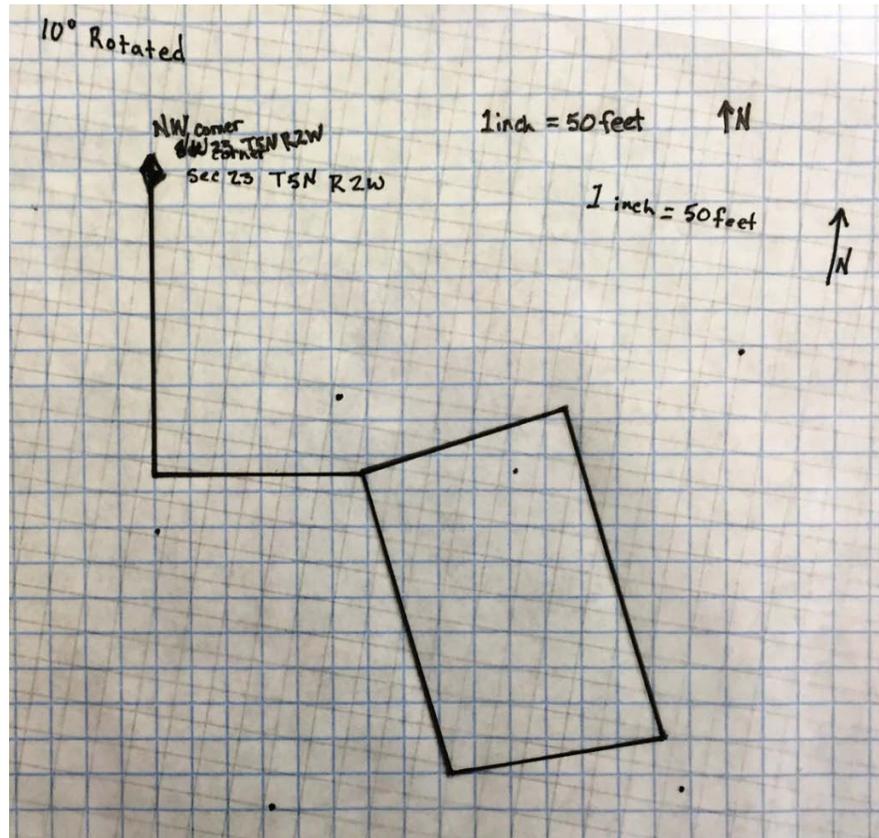
Rotated



Overlapping



The grid lines of the graph paper that run through our section corner as our section lines. We physically rotate the adjusted description using the section corner as the axis of the rotation, and rotate until our first bearing line matches up with the section line. These two descriptions now line up exactly the same.

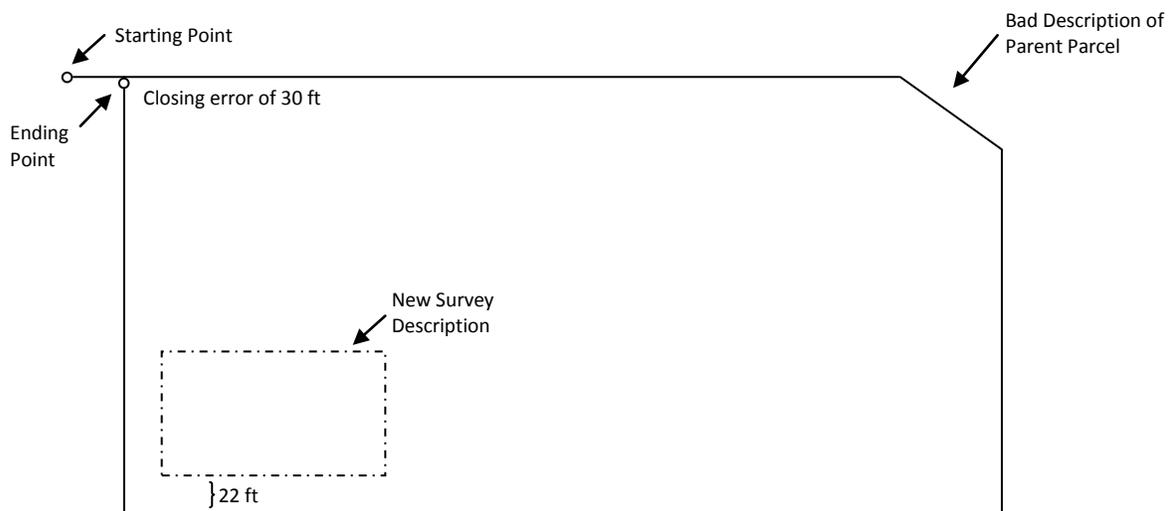


We see that a property description can be rotated mathematically to line up with the rest of the section drawings, and it can also be physically rotated without doing the math, and the result is the same.

Precision of Legal Descriptions

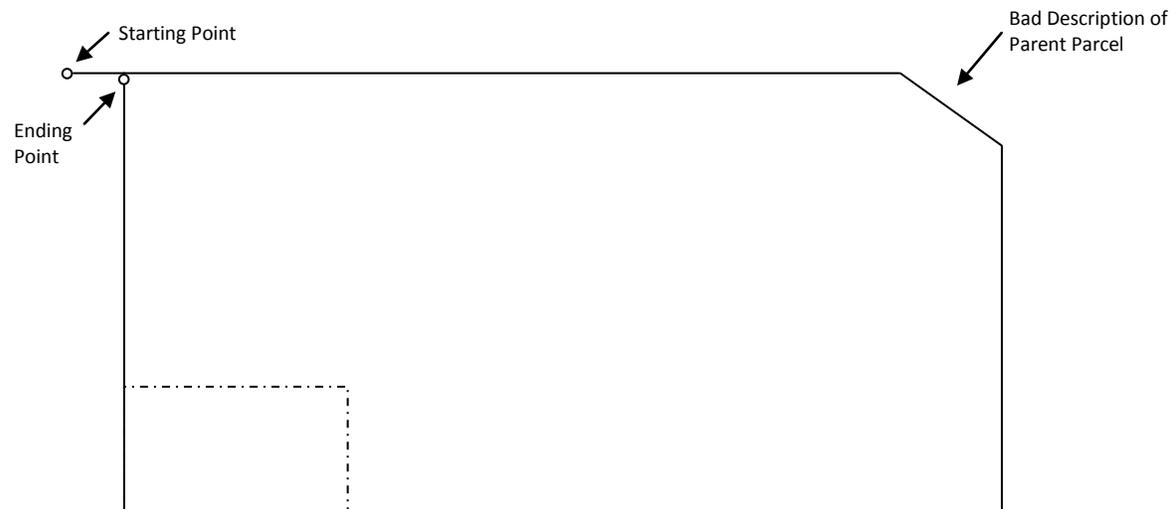
Because of various problems, some legal descriptions are not precise and may have a problem closing perfectly. In order to make the reference in this context brief, we could refer to such inaccurate descriptions as “bad” descriptions. If traversing a “bad” description starting from the place of beginning and going through all courses and the last course, and it does not return to the place of beginning, it is said that the description does not close. The error(s) may have been created in any course(s) of the description. There is nothing the mapper can do to improve the legal description reflected on the recorded document. Assume that a party owns a parcel of real property conveyed to him by a “bad” description and he conveys a parcel reflecting a current survey description which closes. It is impossible to locate precisely the new description on a plat with reference to the “bad” description. The “bad” description can be shifted to fit the new description only to the extent that the “bad” description misses closure. The remnant description will miss closure just as far as the Original description did before the new parcel was conveyed.

Example 1:



The illustration mapped is a representation of two parcels. The larger solid lined parcel represents the parent parcel with a “bad” description. The smaller parcel represented by broken lines in the southwest corner is a good survey description of a parcel being segregated or split off.

For all practical purposes, the two parcels in some instances can be represented as shown in the drawing below.

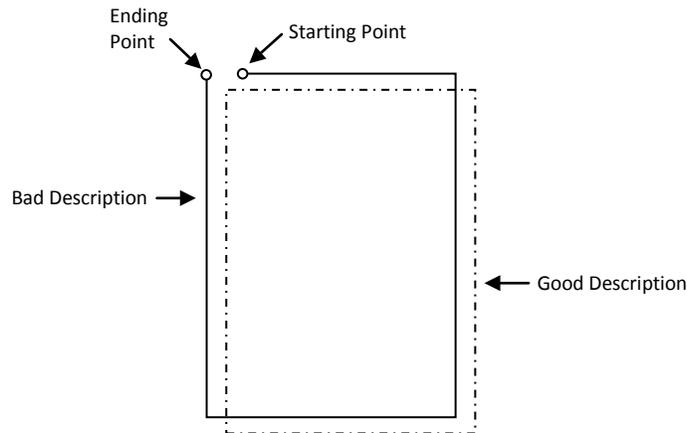


** Consideration should be given to the following:

- A. Boundaries of adjacent parcels
- B. Natural or physical boundaries called out by documents for both parcels, such as roads, streams, canals, railroad right-of-ways, fences, ditches, etc ...
- C. Recitation of boundaries called out on previous conveying documents.

Since the larger parcel doesn't close by 30 feet, we have that much latitude to locate the smaller parcel as good judgment would dictate. Note the "bad" description is not improved by this arrangement. The same principle may apply to direct changes.

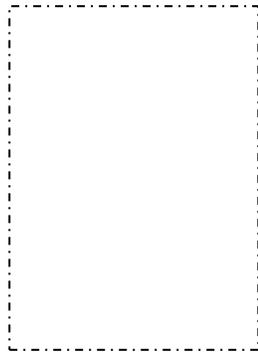
Example 2:



Solid line represents a bad description owned by party A.

Party A sells to Party B via a new description which closes and is represented by the broken line.

It would seem reasonable to show party B as the new owner and also change the old description to the new correct description on the tax rolls. ***



Doing away with the old lines, we would show only the new description with party B as owner.

*** Careful consideration should be given to:

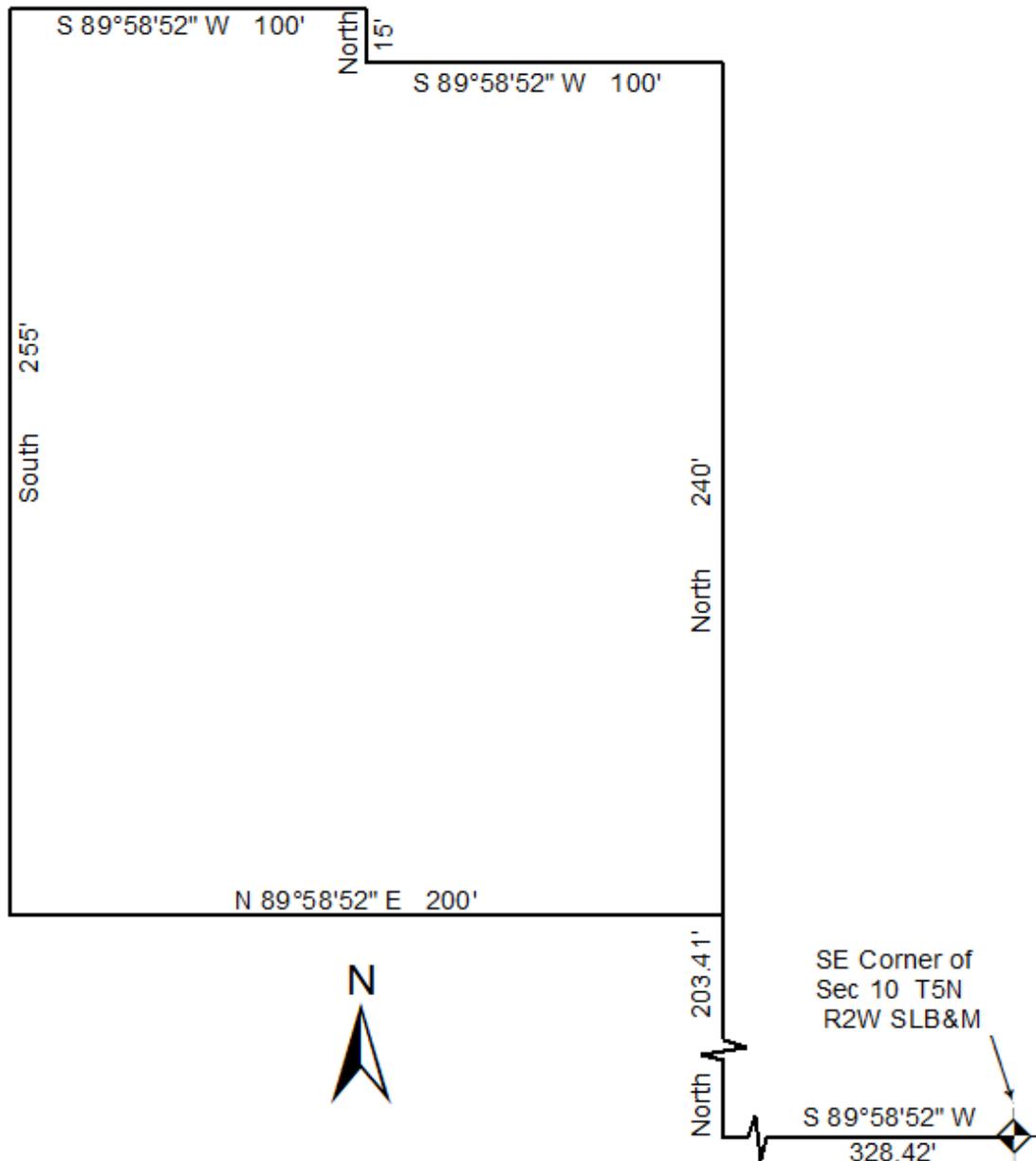
- A. Boundaries of adjacent parcels. The "bad" description may follow exactly the title lines of adjoining properties for part of the description. Those lines must be honored. In such a case, the new description may encroach on other parties and (or) result in a remnant description for party A.
- B. Natural or physical boundaries.
- C. Recitation of boundaries.

Parcel Splits

Very often, in the course of cadastral mapping, the mapper is required to prepare property descriptions for remaining parcels, created when the entire parcel does not change ownership.

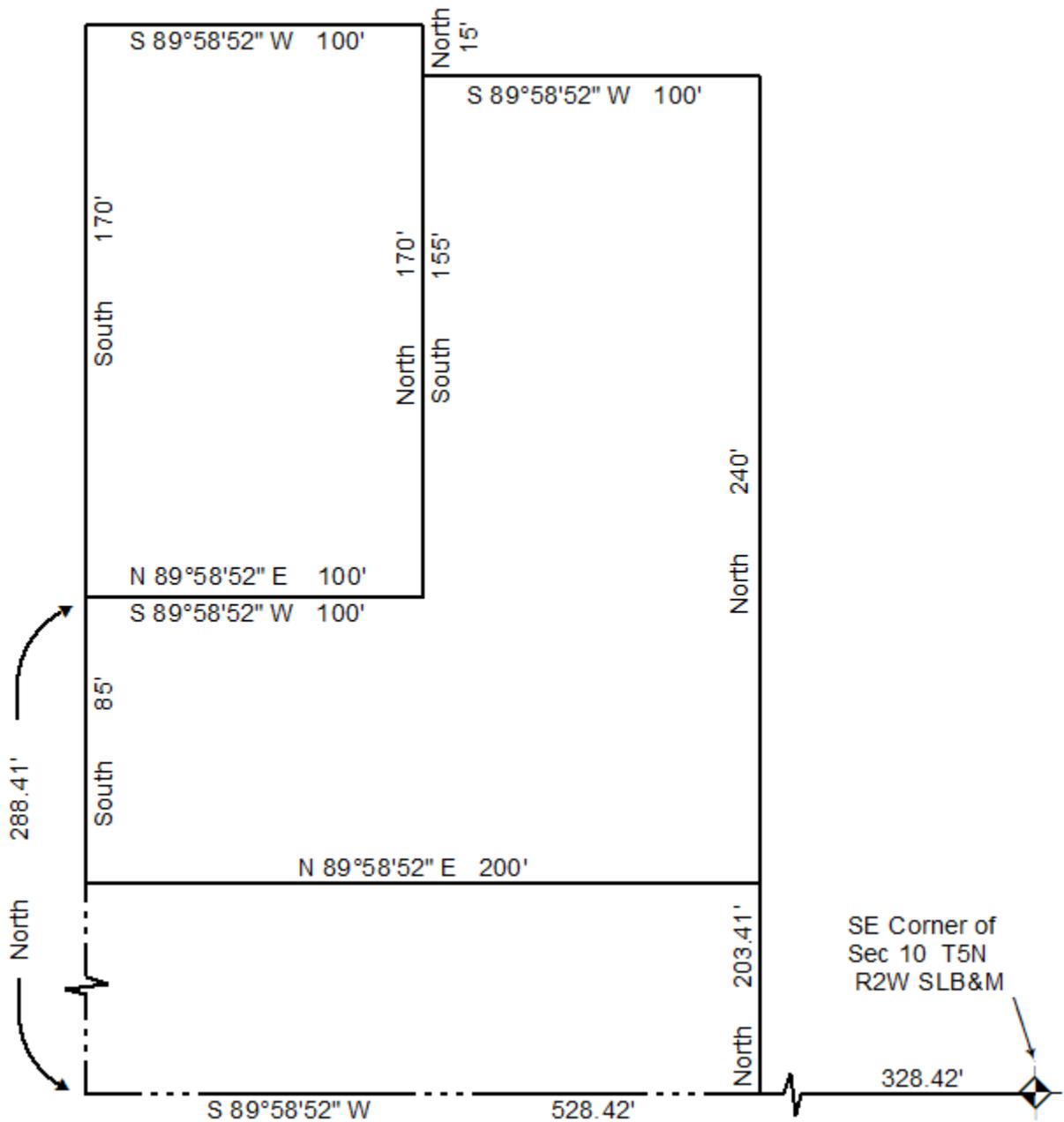
Example: Party "A" is the owner of the following described property:

Beginning at a point South $89^{\circ}58'52''$ West 328.42 feet along the $1/4$ section line and North 203.41' from the Southeast corner of section 10 Township 5 North Range 2 West, Salt Lake Base and Meridian. Running thence North 240 feet; thence South $89^{\circ}58'52''$ West 100 feet; thence North 15 feet; thence South $89^{\circ}58'52''$ West 100 feet; thence South 255 feet; thence North $89^{\circ}58'52''$ East 200 feet to the point of beginning.



Party "A" sells to Party "B" the following described property:

Beginning at a point South 89°58'52" West 528.42 feet along the quarter section line and North 288.41' from the Southeast corner of Section 10 Township 5 North Range 2 West, Salt Lake Base and Meridian. Running thence North 89°58'52" East 100 feet; thence North 170 feet; thence South 89°58'52" West 100 feet; thence South 170 feet to the point of beginning.



The remaining parcel is retained by Party "A"

There are two common ways to describe a remainder parcel. The first way to describe the remainder parcel is to use the original description from before the split and less out the new description. The second way is to calculate the distances based on the differences between the two descriptions and write a new remainder description.

Beginning at a point South 89°58'52" West 328.42 feet along the 1/4 section line and North 203.41' from the Southeast corner of section 10 Township 5 North Range 2 West, Salt Lake Base and Meridian. Running thence North 240 feet; thence South 89°58'52" West 100 feet; thence North 15 feet; thence South 89°58'52" West 100 feet; thence South 255 feet; thence North 89°58'52" East 200 feet to the point of beginning.

Less Beginning at a point South 89°58'52" West 528.42 feet along the quarter section line and North 288.41' from the Southeast corner of Section 10 Township 5 North Range 2 West, Salt Lake Base and Meridian. Running thence North 89°58'52" East 100 feet; thence North 170 feet; thence South 89°58'52" West 100 feet; thence South 170 feet to the point of beginning.

Or

Beginning at a point South 89°58'52" West 328.42 feet along the quarter section line and North 203.41 Feet from the Southeast corner of Section 10 Township 5 North Range 2 West, Salt Lake Base and Meridian. Running thence North 240 feet; thence South 89°58'52" West 100 feet; thence South 155 feet; thence South 89°58'52" West 100 feet; thence South 155 feet; thence South 89°58'52" West 100 feet; thence South 85 feet; thence North 89°58'52" East 200 feet to the point of beginning.

Subdivisions

Utah State Code, titles 10-9-601 thru 611, and 17-27-601 thru 811 provide for the subdivision of land.

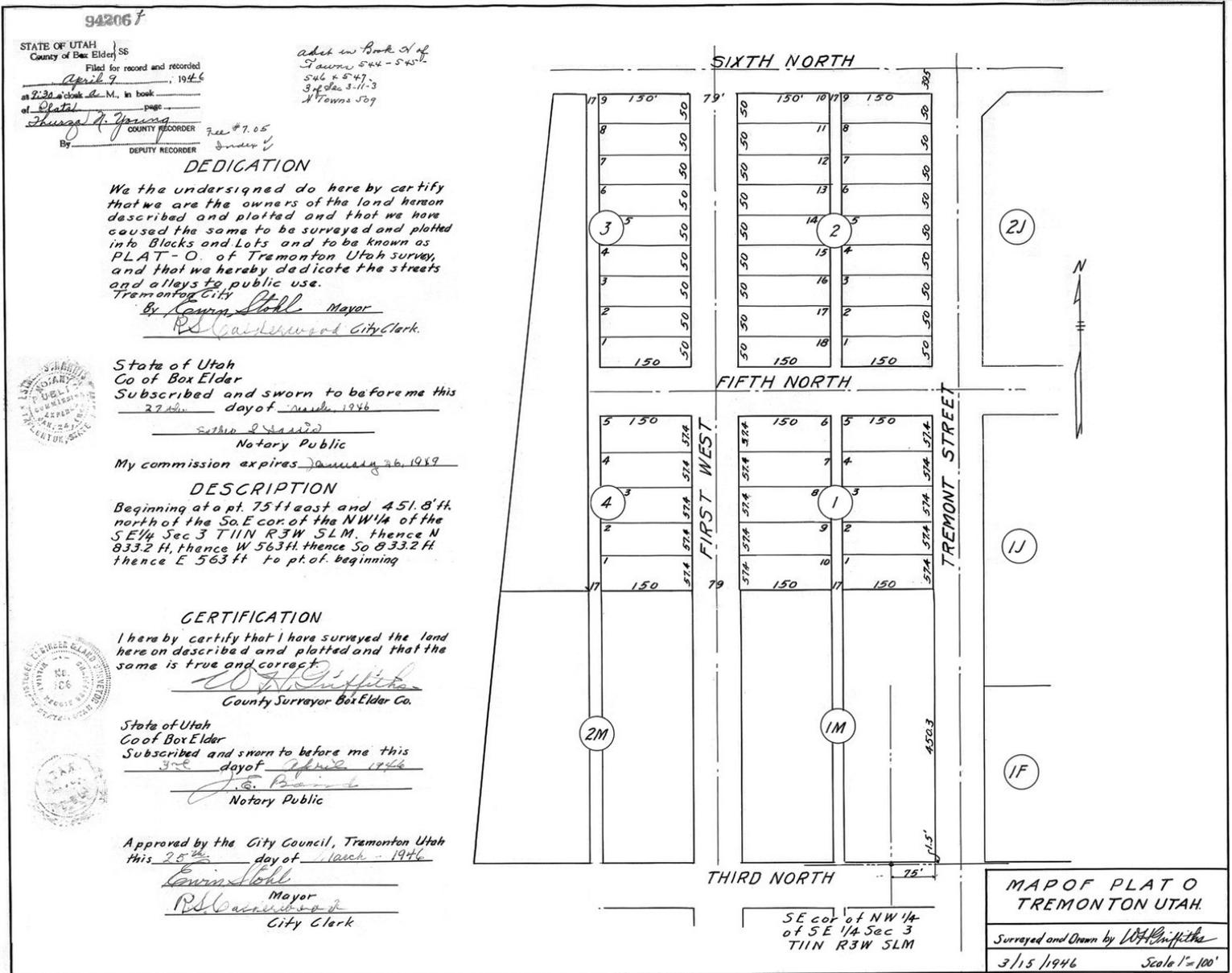
When a subdivision of land is made, the owner must have an accurate map made of the subdivision in compliance with the Utah State code and Local Ordinances. Upon approval by the governing body, the subdivision map shall be recorded with the County Recorder.

The following page is an example of such a recorded subdivision.

Platted areas of town sites, meander lines, river banks and other platted areas can also be described by the lot and block method when the map is recorded.

Below is an example of a platted town site.

Plat O Tremonton City Survey



Some Lots in the above platted area may be described as:
Lot 3, Block 2, Plat O, Tremonton City Survey, Box Elder County, Utah

Below is an example of a County Recorder's ownership map developed using elements of drafting and elements of surveying and mapping.

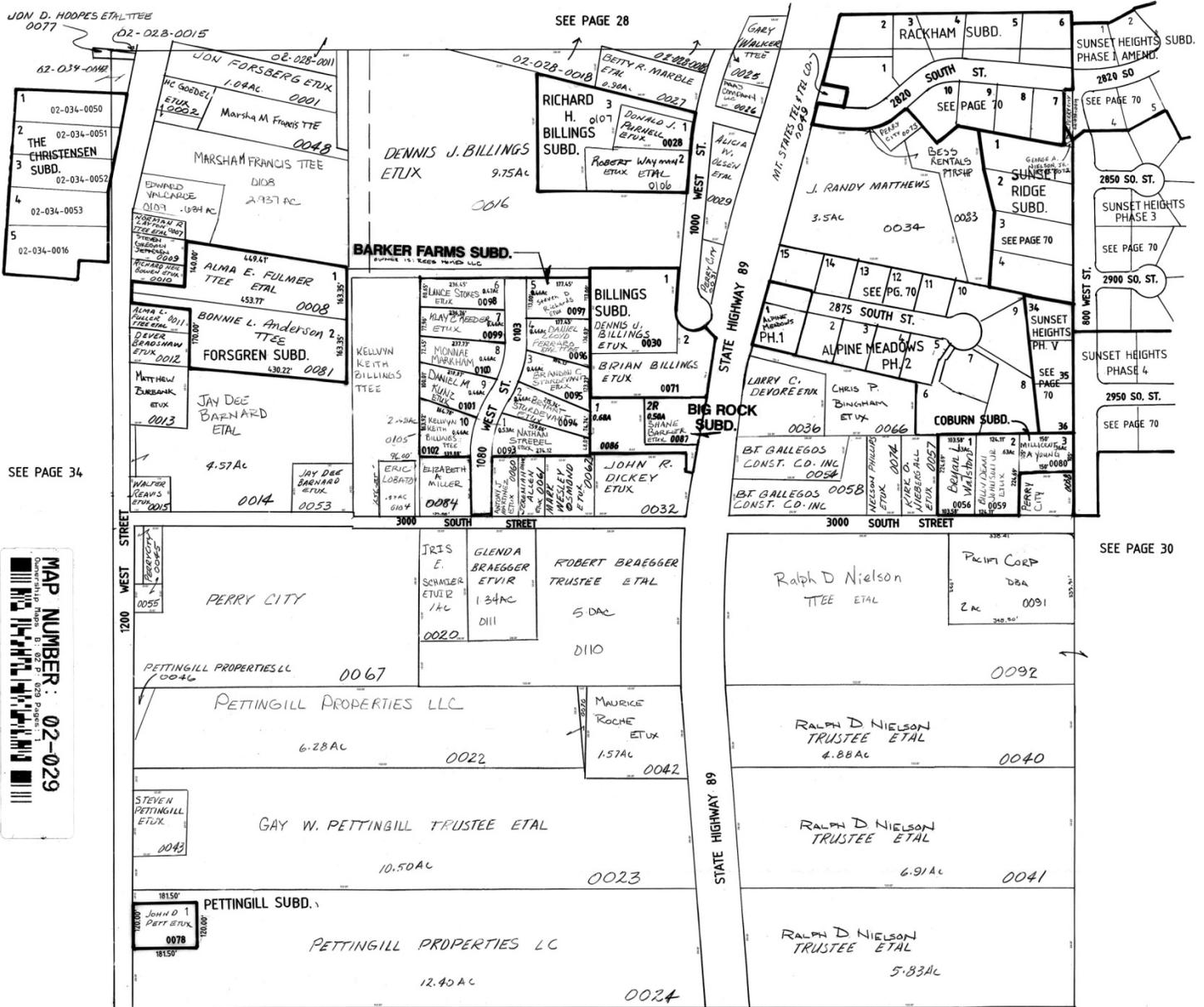
SW1/4 OF SECTION 2 TOWNSHIP 8N RANGE 2W

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S.L.B.&M.
SCALE 1" = 200'

PERRY CITY SURVEY

PREFIX 02-029 TAX UNIT 22
THIS PLAT IS A REFERENCE ONLY
AND NO LIABILITY IS ASSUMED
FOR ACCURACY OR VARIATIONS
WITH THE ACTUAL SURVEY.



SEE PAGE 34

MAP NUMBER: 02-029

Comprehensive Map B-02-P-029 Page 11

SEE PAGE 37

Utah State Code Section 59-2-1335 provides for the following permitted abbreviations of property descriptions when related to the County Tax Roll.

a., ac.	acre, acres
add.	addition
ave.	avenue
beg.	beginning
blk.	block
bet.	between
bdy., bdrs.	boundary, boundaries
ch., chs.	chain, chains
com.	commencing
cont.	containing
deg. or degree symbol	degree, degrees
dist.	distance
E.	east
E'ly	easterly
ft.	foot, feet
frac.	fractional
in., ins.	inch, inches
lk., lks.	link, links
lt., lts.	lot, lots
m., min., or '	minute, minutes
m. or l.	more or less
N.	north
NE.	northeast
NE'ly.	northeasterly
N'ly.	northerly
NW.	northwest
NW'ly.	northwesterly
pt.	point
1/4 sec.	quarter section
r., rs.	range, ranges
rd., rds.	rod, rods
R. of W.	right-of-way
s. or "	second, seconds
S.	south
SE.	southeast
SE'ly.	southeasterly
S'ly.	southerly
st.	street
sub.	subdivision
S.L.M.	Salt Lake Meridian
SW.	southwest
t., tp., tps.	township, townships
th.	thence
U.S. sur.	United State Survey
U.S.M.	Uintah Special Meridian
W.	west
W'ly.	westerly

Utah State Code Section 59-2-1335 also allows for commonly accepted initial letters, abbreviations, symbols, of railroads and other locally significant figures to be used if they are first approved by the commission.

LAND MEASUREMENT CONVERSION GUIDE

1 Acre = 43,560 square feet	1 Meter Square = 10.764 square feet
1 Acre = 160 square rods	1 Mile = 5,280 feet
1 Acre = 10 square chains	1 Mile = 8 furlongs
1 Acre = 160 square rods	1 Mile = 320 rods
1 Acre = 160 perches	1 Mile = 80 chains
1 Acre = 160 poles	1 Mile = 1.60935 kilometers
1 Acre = .4047 hectare	1 Mile = 320 perches
1 Acre = 4047 square meters	1 Mile = 320 poles
1 Acre = is about 208 3/4 feet square	1 Mile = 8000 links
1 Centimeter = .3937 inches	1 Mile = 1,609.2655 meters
1 Centimeter = .032808 feet	1 Mile Square = a regular Section of land
1 Chain = 66 feet	1 Mile Square = 27,878,400 square feet
1 Chain = 4 rods	1 Mile Square = 640 acres
1 Chain = 4 perches	1 Mile Square = 259 hectares
1 Chain = 4 poles	1 Mile Square = 2.59 square hectares
1 Chain = 100 links	1 Perch = 25 links
1 Chain = 20.1168 meters	1 Perch = 1 pole
1 Foot = 12 inches	1 Perch = 1 rod
1 Furlong = 660 feet	1 Perch = 16.5 feet
1 Furlong = 40 rods	1 Pole = 16.5 feet
1 Foot = 0.3048006 meter	1 Pole = 1 perch
1 Hectare = 10,000 square meters	1 Pole = 1 Rod
1 Hectare = 2.471 acres	1 Rod = 1 pole
1 Inch = .0254 meter	1 Rod = 1 perch
1 Kilometer = 3280.83 feet	1 Rod = 16.5 feet
1 Kilometer = .62 mile	1 Section = 1 mile long, by 1 mile wide
1 Knot = 6080.2 feet	1 Section = 640 acres
1 Labor = 177.136 acres	1 Township = 6 miles long, by 6 miles wide
1 League = 4428.4 acres	1 Township = 36 sections
1 Link = 7.92 inches	1 Township = 36 square miles
1 Link = .66 feet	1 Yard = 36 inches
1 Link = .2017 meter	1 Yard = 3 feet
1 Meter = 3.280833 feet	1 Yard Square = 9 square feet
1 Meter = 39.37 inches	