



Collaboration, Innovation and Resilience: Championing a Digital Generation

Brisbane, Australia 6-10 April

# Automating Measurement Extraction from Deeds

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## Automating Measurement Extraction from Deeds

- Metes-and-Bounds Deed Descriptions
  - Characteristics & Limitations
- Introducing an ArcGIS Pro Automated Approach
  - COGO Reader



## Metes-and-Bounds Deed Descriptions

- Used for parcel boundary delineation in deeds

COMMENCING at the West Right-of-Way line of Reddleshire Lane 50' wide, said point being the most Southerly cutback point of Lot 1, Block 5 as originally platted in Westwick Section 1 as recorded in Volume 258, Page 143 of the Harris County Map Records;

THENCE S 87° 30' 01" W, a distance of 14.60 feet to the POINT OF BEGINNING of the herein described tract;

THENCE, S 03° 25' 14" E, a distance of 3.17 feet to a point for corner;

THENCE, N 86° 35' 46" E, a distance of 4.00 feet to a point for corner;

THENCE, S 03° 25' 14" E, a distance of 6.00 feet to a point for corner;

THENCE, S 86° 34' 46" W, a distance of 4.00 feet to a point for corner;

THENCE, S 03° 25' 14" E, a distance of 18.42 feet to a point for corner;

THENCE, S 86° 34' 46" W, a distance of 57.73 feet to a point for corner;

THENCE, N 01° 21' 30" W, a distance of 27.60 feet to a point for corner;

THENCE, N 86° 34' 46" E, a distance of 56.74 feet to the POINT OF BEGINNING and containing 1602 square feet of land, more or less.



**NOTICE OF CONFIDENTIALITY RIGHTS:** IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

**DEED WITH LIMITED WARRANTY OF TITLE**

STATE OF TEXAS           §  
                                     §                                   KNOW ALL BY THESE PRESENTS:  
COUNTY OF HARRIS     §

THAT DRH LAND OPPORTUNITIES I, INC., a Delaware corporation ("**Grantor**"), for and in consideration of certain good and valuable consideration, received from **D.R. HORTON - TEXAS, LTD.**, a Texas limited partnership ("**Grantee**"), whose address is 400 Carriage Hills Blvd., Conroe, Texas 77684, the receipt and sufficiency of which consideration is hereby acknowledged by Grantor, has **GRANTED, BARGAINED AND CONVEYED**, and by these presents does hereby **GRANT, BARGAIN AND CONVEY** unto Grantee all of the land ("**Land**") located in Harris County, Texas, which is more particularly described in Exhibit A attached hereto and made a part hereof for all purposes, together with all improvements and fixtures thereon and all rights and appurtenances pertaining thereto, together with all right, title and interest of Grantor, if any, in and to all streets, alleys, or rights-of-way adjacent to said Land, water wells, strips and gores, and easement rights benefiting said Land, entitlements, water rights, sanitary sewer rights and capacity, access rights, rebates, credits, refunds, licenses, certificates, warranties and guarantees affecting or relating to the Land or any of the above-referenced property or property rights (hereinafter collectively referred to as the "**Property**");

SUBJECT, HOWEVER, TO taxes for the year 2017 and subsequent years, and SUBJECT MOREOVER, TO all restrictions, covenants, conditions, rights-of-way, assessments, outstanding mineral and royalty reservations, easements, and other matters affecting the Property that are valid, existing, and properly of record, to the extent same are listed as exceptions in the Policy (hereafter defined) or expressly entered into by Grantor after the date of the Policy (the "Permitted Exceptions").

TO HAVE AND TO HOLD the Property, subject to the Permitted Exceptions, unto Grantee, Grantee's successors and assigns, forever; and Grantor does hereby bind Grantor and Grantor's successors and assigns to WARRANT AND FOREVER DEFEND the Property, subject to the Permitted Exceptions, unto Grantee, Grantee's successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof IN ACCORDANCE WITH, AND STRICTLY LIMITED BY, THE FOLLOWING SPECIFIC LIMITED WARRANTY OF TITLE AND NOT OTHERWISE, SUCH SPECIFIC LIMITED WARRANTY, AS HEREINAFTER SET FORTH, BEING THE ONLY WARRANTY OF TITLE MADE HEREUNDER BY GRANTOR.



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## Metes-and-Bounds Deed Descriptions

- Characteristics

- Scanned in digital formats, TIFF, PDF, etcetera
- United States centric
  - direction units: Quadrant Bearing, degrees minutes seconds: *N45-59'50" E*
- No map no graphical elements, text only
- Large amount of text, many pages for relatively few parcels
- Key words, COMMENCING, POINT OF BEGINNING, THENCE, POB, etcetera.
- Multiple parcels (tracts) in a single document is possible

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## Metes-and-Bounds Deed Descriptions

- **Limitations of creating parcels from deeds**
  - No digital submission of original CAD
  - Manual entry by typing into a Traverse tool
- **Mistakes are common**
  - Transposed numbers
  - Missed /skipped courses
  - Wrong Quadrant
- **High misclosure? Difficult to find mistake(s)**



### Modify Features

Traverse

Lines

Closure

Layer

Tax : Tax\_Lines

Set Start
 Set Closing
 Trace Lines

	Direction ▾	Distance	Radius	Arc Length ▾
1	S1°32'57"E	50		
2	S88°27'30"W	105		
3	N1°32'57"W	50		
4	N88°27'00"E	105 ftUS ▾		
5				

Misclose Distance:

0.02 ftUS

Misclose Ratio:

1 : 20,299

Calculated Area:

5,250.01 sqFt

Closure Method:

Compass (default)

New

[Learn more about entering traverse dimensions](#)



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Introducing an ArcGIS Pro Automated approach

COGO Reader – ArcGIS Pro 3.5

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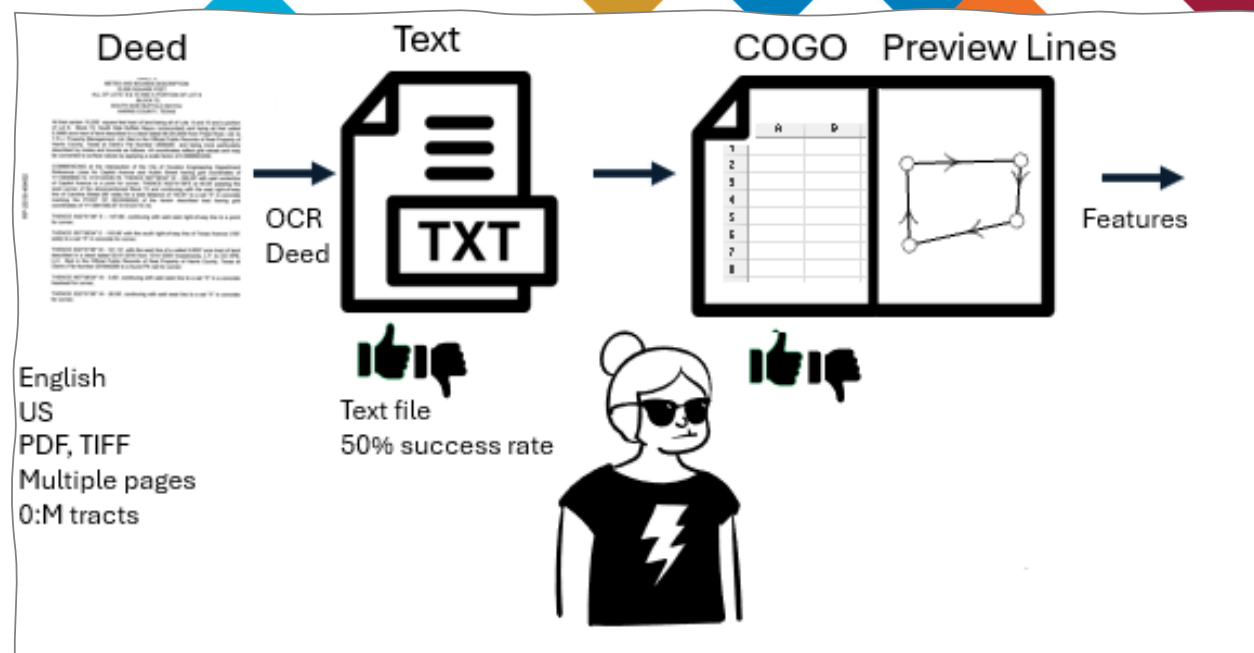
THE SCIENCE OF WHERE™





## COGO Reader in ArcGIS Pro

- Optical character recognition (OCR)
  - Converts PDF and scanned image to text
- Extracts COGO measurements from text
- Human-in-the-loop: Review and fix extracted measurements





RP-2018-45452

0.8455 acre tract of land described in a deed  
Y.R.J. Property Management, Ltd. filed in t  
Harris County, Texas at Clerk's File Num  
described by metes and bounds as follows  
be converted to surface values by applying

COMMENCING at the intersection of the  
Reference Lines for Capitol Avenue and  
Y=13840805.72, X=3123335.76; THENCE  
of Capitol Avenue to a point for corner; T  
west corner of the aforementioned Block  
line of Caroline Street (80' wide) for a tota  
marking the POINT OF BEGINNING c  
coordinates of Y=13841083.87 X=3123170

THENCE N32°51'36" E - 147.69', continu  
for corner;

THENCE S57°08'24" E - 103.60' with the s  
wide) to a set "X" in concrete for corner;

THENCE S32°51'36" W - 121.10', with the  
described in a deed dated 02-01-2016 from  
LLC filed in the Official Public Records c  
Clerk's File Number 201645285 to a found

THENCE N57°08'24" W - 3.60', continuing  
headwall for corner;

THENCE S32°51'36" W - 26.59', continuin  
for corner;

Property Management, Ltd. filed in the Official Public Records of Real Property of  
Harris County, Texas at Clerk's File Number U608290 and being more particularly  
described by metes and bounds as follows. All coordinates reflect grid values and may  
be converted to surface values by applying a scale factor of 0.9998923259.

COMMENCING at the intersection of the City of Houston Engineering Department  
Reference Lines for Capitol Avenue and Austin Street having grid coordinates of  
tA Y=13840805.72, X=3123335.76; THENCE N57°08'24" W - 290.00' with said centerline  
Tt of Capitol Avenue to a point for corner; THENCE N32°51'36" E at 40.00' passing the  
2 west corner of the aforementioned Block 72 and continuing with the east right-of-way  
© line of Caroline Street (80' wide) for a total distance of 143.81' to a set "X" in concrete  
S marking the POINT OF BEGINNING of the herein described tract having grid  
Cl coordinates of Y=13841083.87 X=3123170.19;  
oO

Y THENCE N32°51'36" E - 147.69', continuing with said east right-of-way line to a point  
for corner;

THENCE S57°08'24" E - 103.60' with the south right-of-way line of Texas Avenue (100'  
wide) to a set "X" in concrete for corner;

THENCE S32°51'36" W - 121.10', with the west line of a called 0.8557 acre tract of land  
described in a deed dated 02-01-2016 from 1314 GSW Investments, L.P. to CS HPB,  
LLC filed in the Official Public Records of Real Property of Harris County, Texas at  
Clerk's File Number 201645285 to a found PK nail for corner;

THENCE N57°08'24" W - 3.60', continuing with said west line to a set "X" in a concrete  
headwall for corner;

THENCE S32°51'36" W - 26.59', continuing with said west line to a set "X" in concrete  
for corner;

490009,0007 WEST 209609923 v1 6

THENCE N57°08'24" W - 100.00', with the north line of a called 5.000 square feet tract

Parcel 1

Set Start 3,123,335.76E 13,840,805.72N ftUS

Connection lines

Template << Lines

	Direction	Distance	Radius	Arc Length
1	N57°08'24"W	290		
2	N32°51'36"E	143.81		

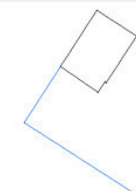
Parcel courses

Template << ParcelLines

	Direction	Distance	Radius	Arc Length
1	N32°51'36"E	147.69		
2	S57°08'24"E	103.6		
3	S32°51'36"W	121.1		
4	N57°08'24"W	3.6		
5	S32°51'36"W	26.59		
6	N57°08'24"W	100		

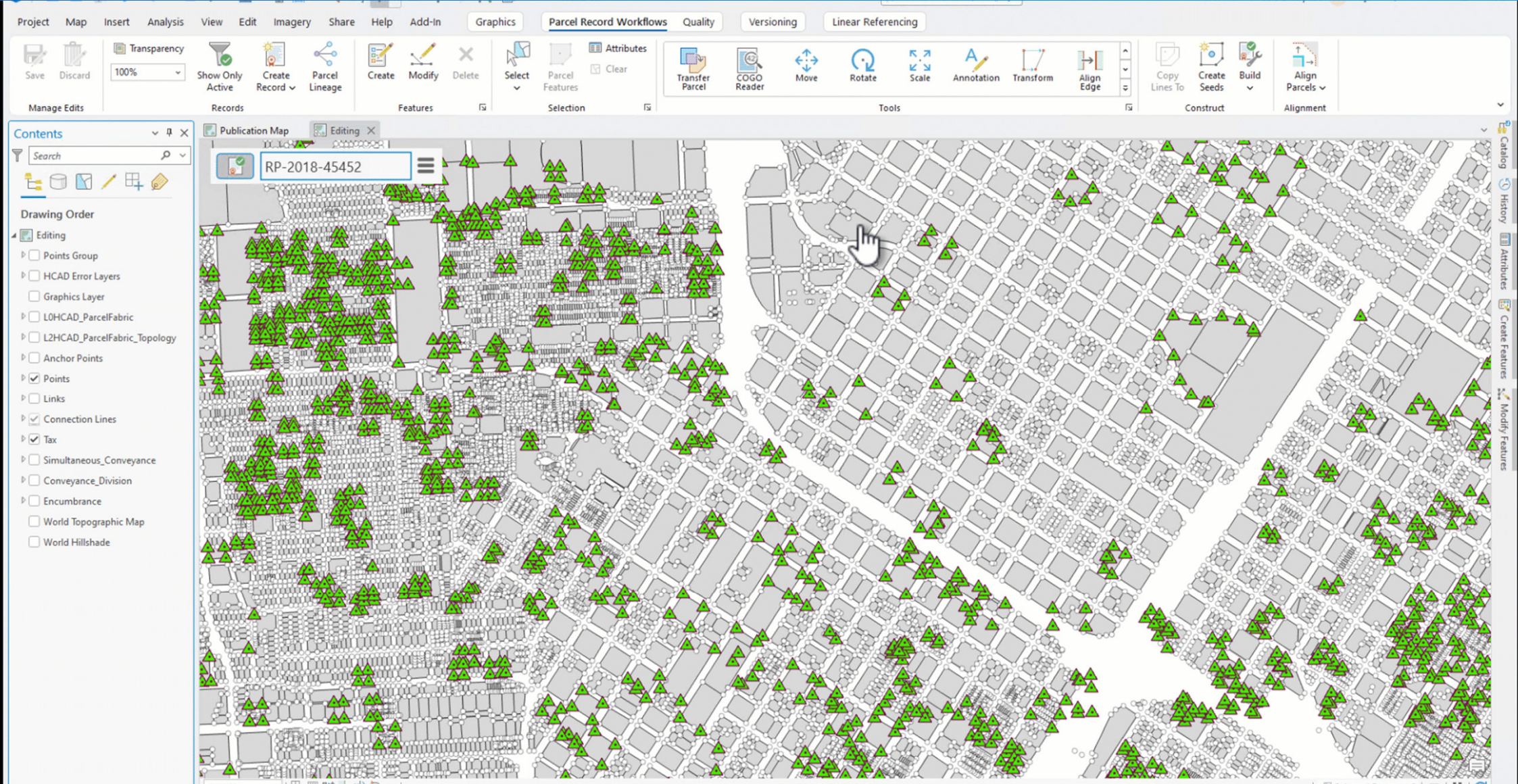
Misclose Distance: 0  
Misclose Ratio: Exceeds 1:100,000

Add to Map



Learn more about using COGO Reader







## COGO Reader - 01015170.pdf

Job No. 107005

Exhibit "A"

DESCRIPTION of a 222,247 square foot (5.1020 Acres) tract of land being Lot 29 of Crosby Meadows, an unrecorded subdivision of 349.226 Acres in the Absolom Reeves Survey, Abstract No. 60 and the W. R. Baker Survey, Abstract No. 144, Harris County, Texas and being more particularly described by metes and bounds as follows,

COMMENCING at the Northeast corner of said 349.226 Acre tract and being the intersection of the South Right of Way of Reid Road and the West Right of Way of Miller-Wilson Road,

THENCE, S 89° 48' 13" W, along the South Right of Way of Reid Road, a distance of 734.68 feet to a point for corner,

THENCE, S 00° 21' 18" E, a distance of 1826.17 feet to a point in the centerline of Sundown Meadow (60' R/W) for the Northeast corner of the tract herein described and the POINT OF BEGINNING,

THENCE, S 00° 21' 18" E, along the common line of those tracts described in Clerk's File No. U-578466 and U-661964, passing at 30.00 feet a found 1" iron pipe in the South Right of Way of Sundown Meadow, and continuing a total distance of 600.03 feet to a found 1" iron pipe for the Southeast corner of the tract herein described,

THENCE, S 89° 57' 15" W, along the common line of that tract described in Clerk's File No. P-894553, passing at 337.56 feet a found 1" iron pipe in the East Right of Way of Sunnyview Way (60' R/W) and continuing a total distance of 367.56 feet to a point in the centerline of said Sunnyview Way for the Southwest corner of the tract herein described,

THENCE, N 00° 53' 53" W, along the centerline of Sunnyview Way, a distance of 600.07 feet to the Northwest corner of the tract herein described,

THENCE, N 89° 57' 05" E, along the centerline of Sundown Meadow, a distance of 373.25 feet to the POINT OF BEGINNING and containing 5.1020 Acres.

*F. G. Huffman*  
F. G. Huffman, RPLS No. 1682

8302 CHESWICK \* HOUSTON, TEXAS 77037

JUL 20 2001

*County Clerk*  
COUNTY CLERK  
HARRIS COUNTY, TEXAS

THENCE, S 00° 21' 18" E, along the common line of those tracts described in Clerk's File No. U-578466 and U-661964, passing at 30.00 feet a found 1" iron pipe in the South Right of Way of Sundown Meadow, and continuing a total distance of 600.03 feet to a found 1" iron pipe for the Southeast corner of the tract herein described,

THENCE, S 89° 57' 15" W, along the common line of that tract described in Clerk's File No. P-894553, passing at 337.56 feet a found 1" iron pipe in the East Right of Way of Sunnyview Way (60' R/W) and continuing a total distance of 367.56 feet to a point in the centerline of said Sunnyview Way for the Southwest corner of the tract herein described,

THENCE, N 00° 53' 53" W, along the centerline of Sunnyview Way, a distance of 600.07 feet to the Northwest corner of the tract herein described,

THENCE, N 89° 57' 05" E, along the centerline of Sundown Meadow, a distance of 373.25 feet to the POINT OF BEGINNING and containing 5.1020 Acres.

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F. G. Huffman, RP . 1682 AM G\atEptity

Huffman S No. 168 Bye \ Se \

Ye 7

5302 CHESWICK \* HOUSTON, TEXAS 77037 Sc

ANY PROWISHOH HEREWH WHICH RESTRICTS THE SALE, RENTAL, OR USE OF THE DESCRIBED REAL PROPERTY BECAUSE OF COLOR OR RACE IS VALID AKD UEMFORCEARLE UNDER FEDERAL LAW,

Set the commencement point.

Parcel 1

Set Start XY not set

Connection lines

Template >< Lines

Direction	Distance	Radius	Arc Length
1 S89°48'13"W	734.68		
2 S0°21'18"E	1,826.17		

Parcel courses

Template >< ParcelLines

Direction	Distance	Radius	Arc Length
1 N0°53'53"W	600.07		

Misclose Distance: 600.07

Misclose Ratio: 1:1

Add to Map

Learn more about using COGO Reader





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## Why not use AI?

- **Experiments with Chat bots**
  - Not reliable – occasional nonsensical result (“hallucination”)
- **Current models have weaknesses and need further enhancement to interpret:**
  - specialized language & keywords with contextual meaning (example circular arcs & tangency)
  - variety of ways to record the same description, regional differences, age of document, etc.
- **FUTURE:**
  - Outputs generated over time by COGO Reader can be used to develop training models
  - Using AI to remove watermarks and enhance image before OCR

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## Summary

- **Optical Character Recognition (OCR)**
  - Converts PDF and scanned image to text
- **Extracts COGO measurements from text**
- **Hours of manual entry reduced to a few minutes**
- **Even with a non-perfect OCR result**
  - User intervention to review & correct is faster than manual entry (human-in-the-loop)