



The Parcel Fabric:

A New Approach to
Horizontal Spatial Adjustment



ArcGIS Server

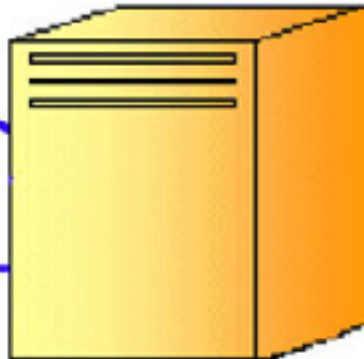
Web User (Surveyor)



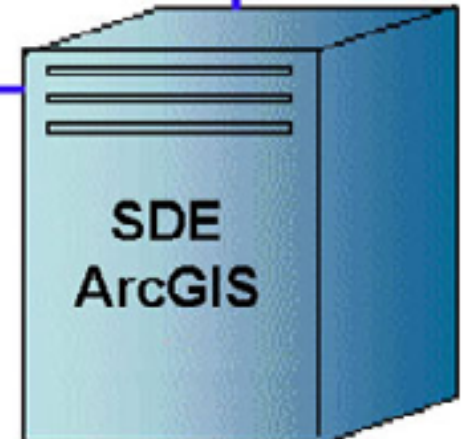
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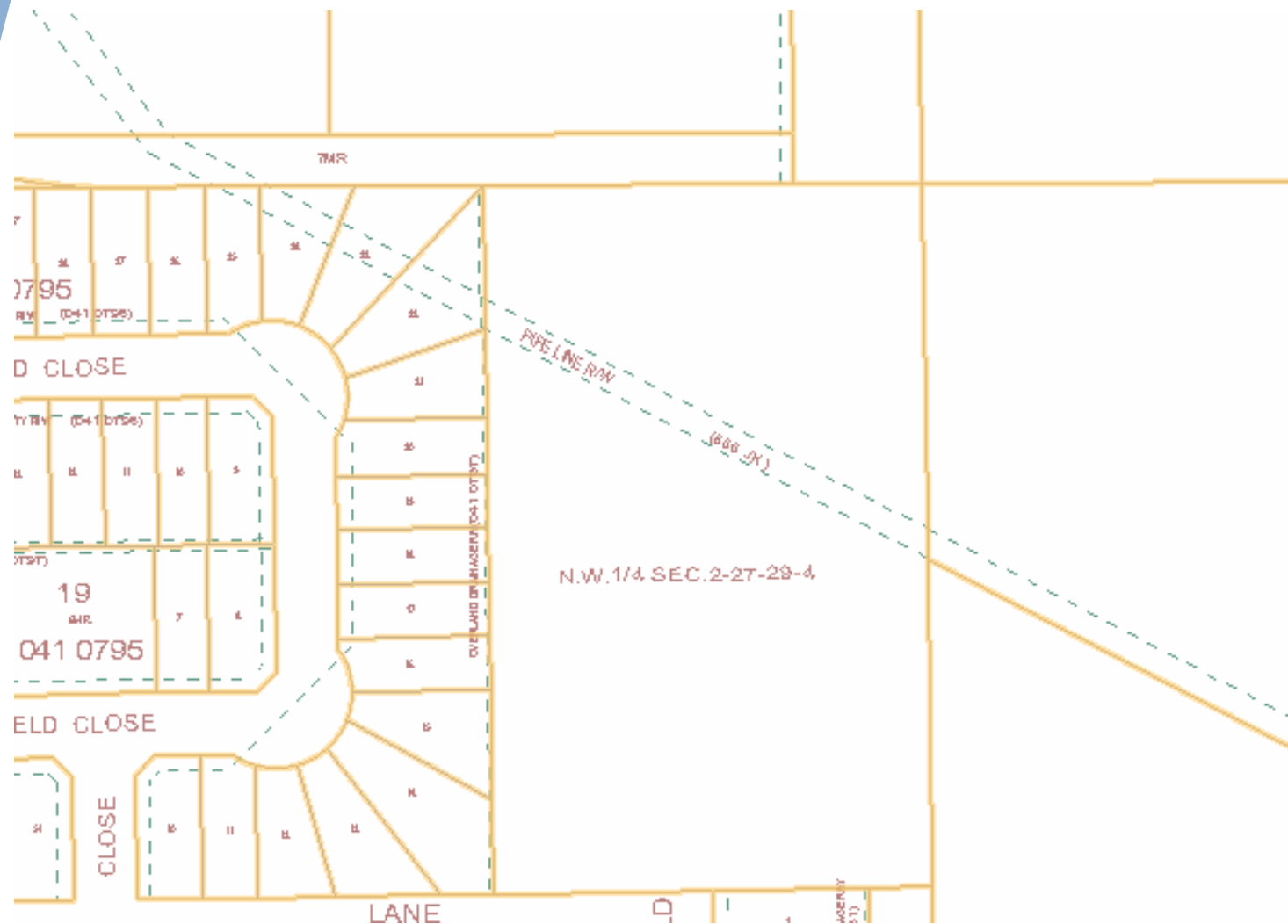


WEB SERVER



Desktop







14
PLAN 081101

14
PLAN 081101

5.51/4 REG.11
TWP.27, RGE.29, W.4W

CERTIFICATE: SECTION 43, SURVEYS ACT.

REGISTERED ON

AS NUMBER

On filing of this plan, the boundaries shown on this plan are not to be altered or changed in any way without the consent of the Registrar of Titles and the Registrar of Deeds.

REGISTRAR

REGISTRAR
LAND TITLES OFFICE
PLAN NO.
ENTERED AND REGISTERED
ON
INSTRUMENT NO.

J.L. ROBERTSON

PHASE 14

THORBURN ESTATES AIRDRIE, ALBERTA

PLAN SHOWING SUBDIVISION
OF PART OF THE

N.W.1/4 SEC.2, TWP.27, RGE.29, W.4W

SCALE 1:500 200M B.R. METTER, A.L.S.



NOTES:

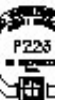
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LEGEND

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69. Subdivided lots	70. Subdivided lots	71. Subdivided lots	72. Subdivided lots
73. Subdivided lots	74. Subdivided lots	75. Subdivided lots	76. Subdivided lots
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SURVEYOR

NAME: BRIAN R. METTER, A.L.S.
DATE OF SURVEY: 10th day of April 19, 2008
and April 17, 2008.



REGISTERED ENGINEER
QUANICO DEVELOPMENTS WEST LTD.
AND BORIS CONSTRUCTION LTD.

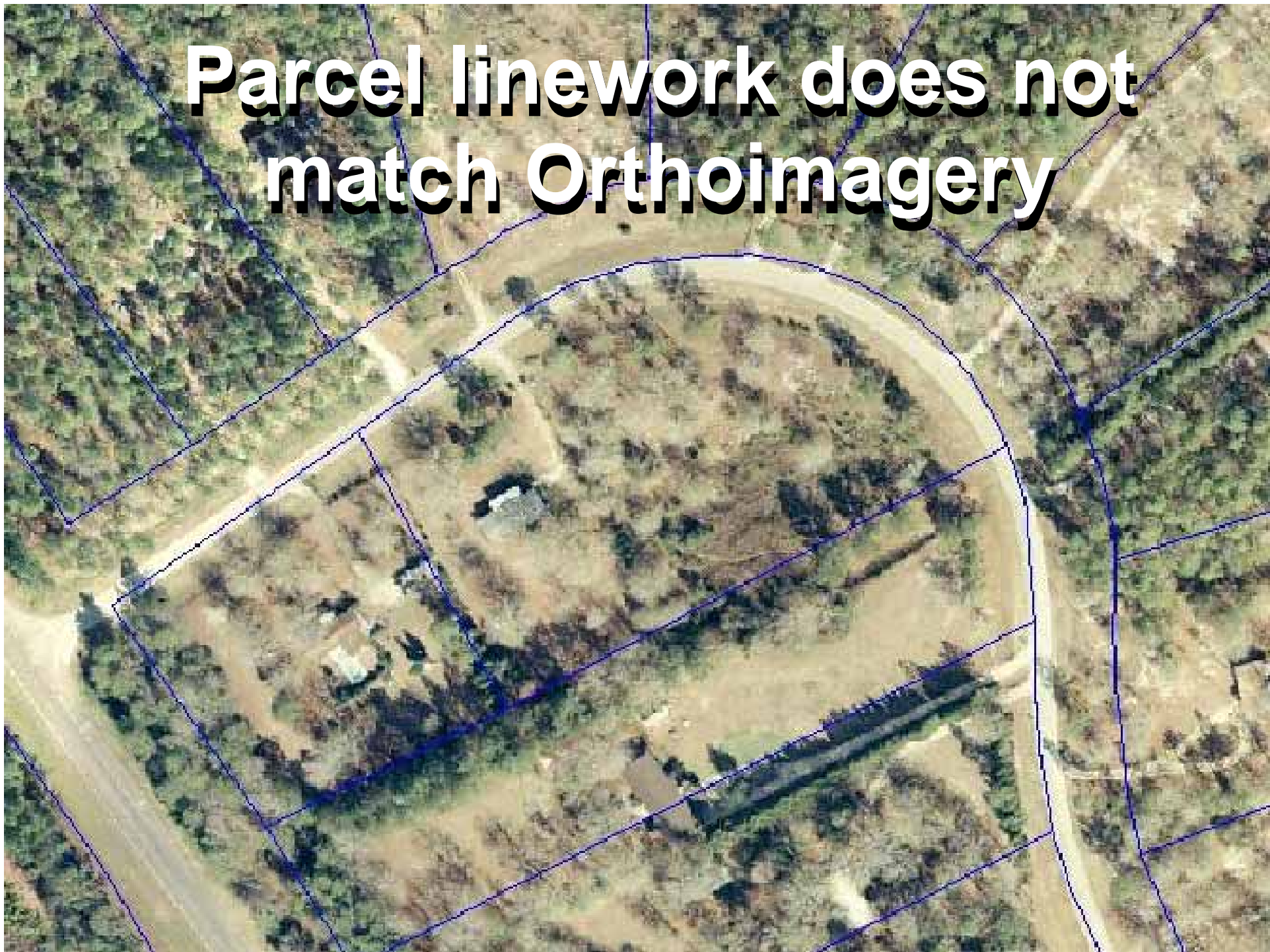
SUBDIVISION AUTHORITY
NAME: THE CITY OF AIRDRIE
FILE NO: BU-29-05 OWNERS P.L. No. 100-10

LAND TITLES OFFICE - AIRDRIE
FILE NO: 1-100-10-01

E CONTROL AND 47E POSITIONS

POINT	COORDINATES	HEIGHT	REMARKS
1	500000.000	100.000	Control Point
2	500000.000	100.000	Control Point
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**Parcel linework does not
match Orthoimagery**





Mapping Requirements

Expectations for a more complete product have been raised!

Accuracy
Timeliness

Traditional Mapping Maintenance:

- Digitizing
- Precision Input Routine - COGO





“The surveyor’s plan is the best representation of the (surveyors’) observations to the defining monument in the ground.”



Over 10 years of experience in Alberta, British Columbia and Florida has proven that Surveyors' digital files can:

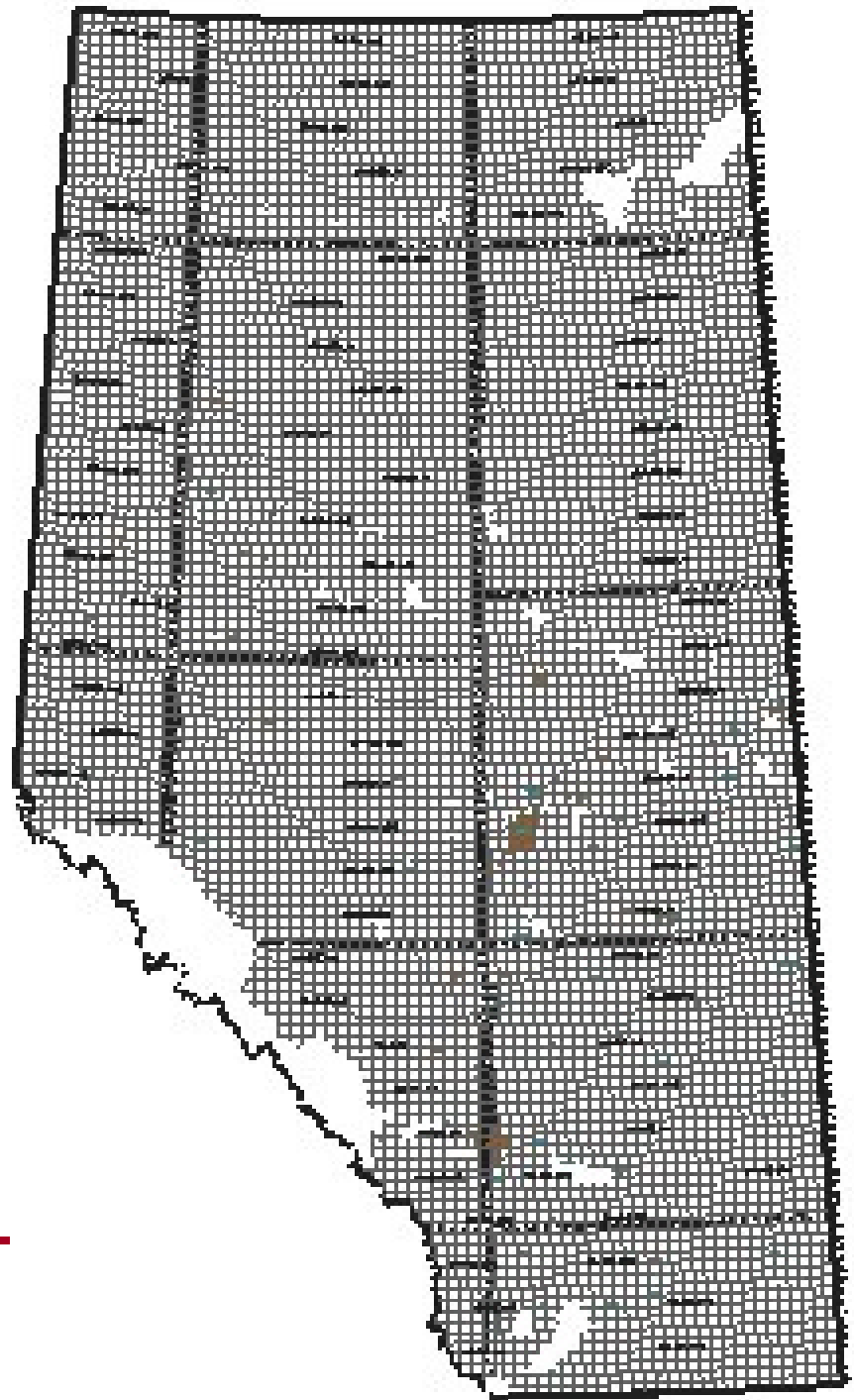
- maintain the mapping bases on a *near real time* basis
- *reduce mapping costs* significantly
- improve the *accuracy*

Province-wide Coverage
Wall-to-Wall Mapping
Every survey & ownership title
registered in the Land
Registry Offices

1.7 million parcels



**Maintained by a Public –
Private Partnership**

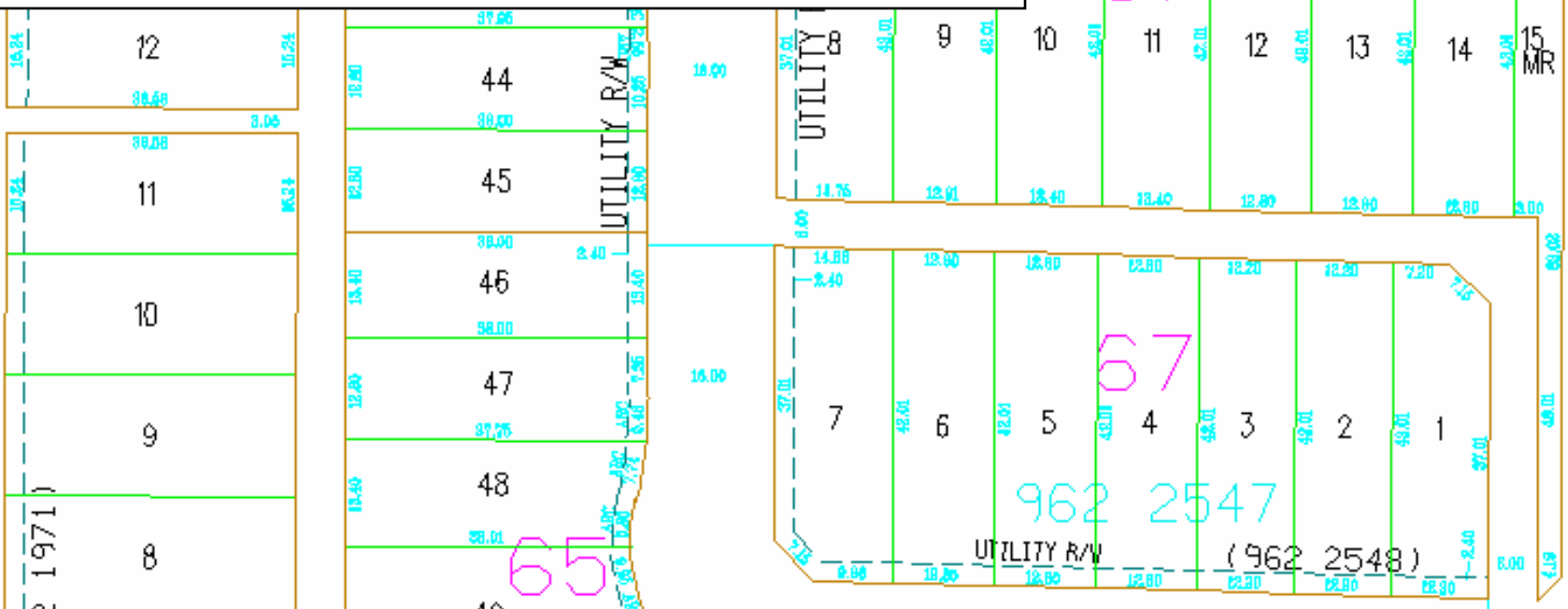


ACCURACY:

Urban ± 0.15 m (6")

Rural ± 1 to 3 m (3-9 ft)

53 AVE.





Accomplished with digital surveys and only 5 staff!

Maintenance of the primary datasets for the Province of Alberta:

- Approximately 1,000 surveys are integrated monthly
- Approximately 300 surveyors submit digital plans
- One of the most accurate survey bases in North America.
- Over 80,000 digital plans have been integrated.



Cadastral / parcel bases are maintained on a “near real-time” basis; over 85% of surveys are integrated within 24 hours of registration.

Mapping costs for parcel maintenance have been reduced by over 50%.

The accuracy of the mapping base has been improved!



Digital Submissions

Eliminated the “digital-paper-digital” process



Typically, approximately 50% of data entry time for parcel mapping was spent on text and attribute entry.

SADDLE CREEK MANOR

A REPLAT OF A PORTION OF LOT 3, SADDLEBROOK CORPORATE
CENTER PHASE 1-A, AS RECORDED IN PLAT BOOK 28, PAGES 34 THROUGH 44,
SECTION 12, TOWNSHIP 26 SOUTH, RANGE 19 EAST
PASCO COUNTY, FLORIDA

PLAT
BOOK

PAGE

SHEET 3 OF 6



LINE TABLE THIS SHEET ONLY		
LINE NO.	FROM	TO
1	0+00.00	0+100.00
2	0+100.00	0+200.00
3	0+200.00	0+300.00
4	0+300.00	0+400.00
5	0+400.00	0+500.00
6	0+500.00	0+600.00
7	0+600.00	0+700.00
8	0+700.00	0+800.00
9	0+800.00	0+900.00
10	0+900.00	1+000.00
11	1+000.00	1+100.00
12	1+100.00	1+200.00
13	1+200.00	1+300.00
14	1+300.00	1+400.00
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17	1+600.00	1+700.00
18	1+700.00	1+800.00
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27	2+600.00	2+700.00
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29	2+800.00	2+900.00
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37	3+600.00	3+700.00
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96	9+500.00	9+600.00
97	9+600.00	9+700.00
98	9+700.00	9+800.00
99	9+800.00	9+900.00
100	9+900.00	10+000.00

CURVE TABLE THIS SHEET ONLY				
LINE NO.	FROM	TO	CHORD BEARING	CHORD DISTANCE
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3	0+200.00	0+300.00	N 0° 0' 0" E	100.00
4	0+300.00	0+400.00	N 0° 0' 0" E	100.00
5	0+400.00	0+500.00	N 0° 0' 0" E	100.00
6	0+500.00	0+600.00	N 0° 0' 0" E	100.00
7	0+600.00	0+700.00	N 0° 0' 0" E	100.00
8	0+700.00	0+800.00	N 0° 0' 0" E	100.00
9	0+800.00	0+900.00	N 0° 0' 0" E	100.00
10	0+900.00	1+000.00	N 0° 0' 0" E	100.00
11	1+000.00	1+100.00	N 0° 0' 0" E	100.00
12	1+100.00	1+200.00	N 0° 0' 0" E	100.00
13	1+200.00	1+300.00	N 0° 0' 0" E	100.00
14	1+300.00	1+400.00	N 0° 0' 0" E	100.00
15	1+400.00	1+500.00	N 0° 0' 0" E	100.00
16	1+500.00	1+600.00	N 0° 0' 0" E	100.00
17	1+600.00	1+700.00	N 0° 0' 0" E	100.00
18	1+700.00	1+800.00	N 0° 0' 0" E	100.00
19	1+800.00	1+900.00	N 0° 0' 0" E	100.00
20	1+900.00	2+000.00	N 0° 0' 0" E	100.00
21	2+000.00	2+100.00	N 0° 0' 0" E	100.00
22	2+100.00	2+200.00	N 0° 0' 0" E	100.00
23	2+200.00	2+300.00	N 0° 0' 0" E	100.00
24	2+300.00	2+400.00	N 0° 0' 0" E	100.00
25	2+400.00	2+500.00	N 0° 0' 0" E	100.00
26	2+500.00	2+600.00	N 0° 0' 0" E	100.00
27	2+600.00	2+700.00	N 0° 0' 0" E	100.00
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30	2+900.00	3+000.00	N 0° 0' 0" E	100.00
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40	3+900.00	4+000.00	N 0° 0' 0" E	100.00
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42	4+100.00	4+200.00	N 0° 0' 0" E	100.00
43	4+200.00	4+300.00	N 0° 0' 0" E	100.00
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60	5+900.00	6+000.00	N 0° 0' 0" E	100.00
61	6+000.00	6+100.00	N 0° 0' 0" E	100.00
62	6+100.00	6+200.00	N 0° 0' 0" E	100.00
63	6+200.00	6+300.00	N 0° 0' 0" E	100.00
64	6+300.00	6+400.00	N 0° 0' 0" E	100.00
65	6+400.00	6+500.00	N 0° 0' 0" E	100.00
66	6+500.00	6+600.00	N 0° 0' 0" E	100.00
67	6+600.00	6+700.00	N 0° 0' 0" E	100.00
68	6+700.00	6+800.00	N 0° 0' 0" E	100.00
69	6+800.00	6+900.00	N 0° 0' 0" E	100.00
70	6+900.00	7+000.00	N 0° 0' 0" E	100.00
71	7+000.00	7+100.00	N 0° 0' 0" E	100.00
72	7+100.00	7+200.00	N 0° 0' 0" E	100.00
73	7+200.00	7+300.00	N 0° 0' 0" E	100.00
74	7+300.00	7+400.00	N 0° 0' 0" E	100.00
75	7+400.00	7+500.00	N 0° 0' 0" E	100.00
76	7+500.00	7+600.00	N 0° 0' 0" E	100.00
77	7+600.00	7+700.00	N 0° 0' 0" E	100.00
78	7+700.00	7+800.00	N 0° 0' 0" E	100.00
79	7+800.00	7+900.00	N 0° 0' 0" E	100.00
80	7+900.00	8+000.00	N 0° 0' 0" E	100.00
81	8+000.00	8+100.00	N 0° 0' 0" E	100.00
82	8+100.00	8+200.00	N 0° 0' 0" E	100.00
83	8+200.00	8+300.00	N 0° 0' 0" E	100.00
84	8+300.00	8+400.00	N 0° 0' 0" E	100.00
85	8+400.00	8+500.00	N 0° 0' 0" E	100.00
86	8+500.00	8+600.00	N 0° 0' 0" E	100.00
87	8+600.00	8+700.00	N 0° 0' 0" E	100.00
88	8+700.00	8+800.00	N 0° 0' 0" E	100.00
89	8+800.00	8+900.00	N 0° 0' 0" E	100.00
90	8+900.00	9+000.00	N 0° 0' 0" E	100.00
91	9+000.00	9+100.00	N 0° 0' 0" E	100.00
92	9+100.00	9+200.00	N 0° 0' 0" E	100.00
93	9+200.00	9+300.00	N 0° 0' 0" E	100.00
94	9+300.00	9+400.00	N 0° 0' 0" E	100.00
95	9+400.00	9+500.00	N 0° 0' 0" E	100.00
96	9+500.00	9+600.00	N 0° 0' 0" E	100.00
97	9+600.00	9+700.00	N 0° 0' 0" E	100.00
98	9+700.00	9+800.00	N 0° 0' 0" E	100.00
99	9+800.00	9+900.00	N 0° 0' 0" E	100.00
100	9+900.00	10+000.00	N 0° 0' 0" E	100.00

100000
 P.O. POINT OF COMPOUND CURVATURE
 O.P. OFFICIAL RECORD BOOK
 U.S. U.S. ARMY CORPS OF ENGINEERS
 P.O. POINT OF CURVATURE
 P.O. POINT OF TANGENCY

This is a detailed plat map of Pleasure Tract B, showing 21 lots and various easements. The map includes lot numbers 1 through 21, with dimensions for each lot's boundaries. It also shows 'RIDE LOOP' and 'PRIVATE ROADWAY' with utility easements. The map is oriented with North at the top.

Lot Dimensions (Approximate):

- Lot 1: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 2: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 3: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 4: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 5: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 6: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 7: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 8: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 9: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 10: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 11: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 12: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 13: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 14: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 15: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 16: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 17: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 18: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 19: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 20: 23.67' x 25.00' x 27.67' x 48.67'
- Lot 21: 23.67' x 25.00' x 27.67' x 48.67'

Easements and Roadways:

- RIDE LOOP:** A curved roadway running through the center of the tract.
- PRIVATE ROADWAY:** A straight roadway running along the right side of the tract.
- UTILITY EASEMENTS:** Various easements for utility lines, including 'UTILITY ESMT.', 'UTILITY C32', 'UTILITY C33', 'UTILITY C34', 'UTILITY C35', 'UTILITY C36', 'UTILITY C37', 'UTILITY C38', 'UTILITY C39', 'UTILITY C40', 'UTILITY C41', 'UTILITY C42', 'UTILITY C43', 'UTILITY C44', 'UTILITY C45', 'UTILITY C46', 'UTILITY C47', 'UTILITY C48', 'UTILITY C49', 'UTILITY C50', 'UTILITY C51', 'UTILITY C52', 'UTILITY C53', 'UTILITY C54', 'UTILITY C55', 'UTILITY C56', 'UTILITY C57', 'UTILITY C58', 'UTILITY C59', 'UTILITY C60', 'UTILITY C61', 'UTILITY C62', 'UTILITY C63', 'UTILITY C64', 'UTILITY C65', 'UTILITY C66', 'UTILITY C67', 'UTILITY C68', 'UTILITY C69', 'UTILITY C70', 'UTILITY C71', 'UTILITY C72', 'UTILITY C73', 'UTILITY C74', 'UTILITY C75', 'UTILITY C76', 'UTILITY C77', 'UTILITY C78', 'UTILITY C79', 'UTILITY C80', 'UTILITY C81', 'UTILITY C82', 'UTILITY C83', 'UTILITY C84', 'UTILITY C85', 'UTILITY C86', 'UTILITY C87', 'UTILITY C88', 'UTILITY C89', 'UTILITY C90', 'UTILITY C91', 'UTILITY C92', 'UTILITY C93', 'UTILITY C94', 'UTILITY C95', 'UTILITY C96', 'UTILITY C97', 'UTILITY C98', 'UTILITY C99', 'UTILITY C100'.



Key Issues for Success:

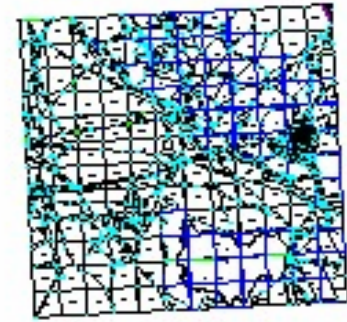
1. Standardized Layers
2. Spatial Plans
3. Cleaning Tools
4. CAD Integration Engine



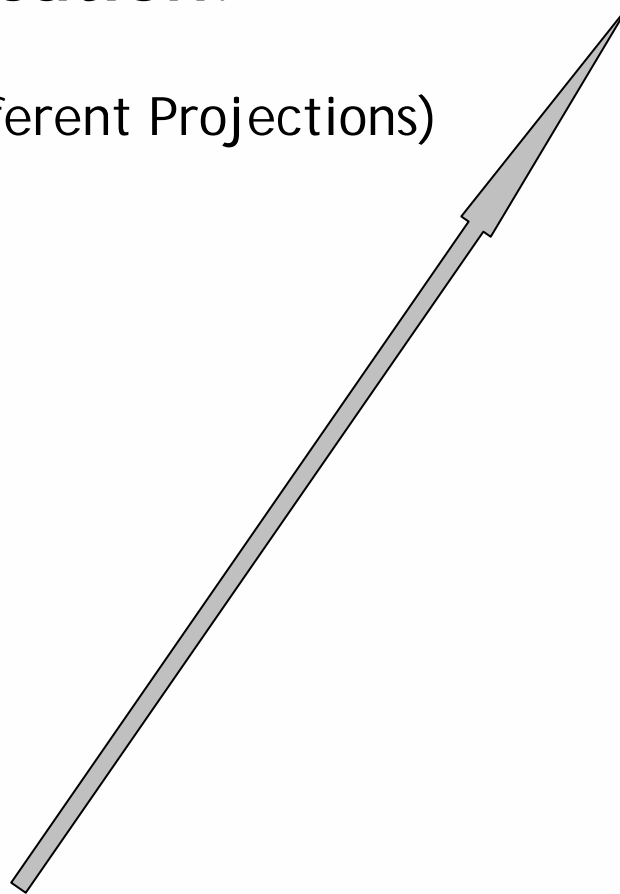
EXAMPLE OF FLORIDA MAPPING LAYER SPECIFICATIONS & DESCRIPTIONS		Level
Type Of Survey		1
Scale Bar And Scale Text,		2
Legend and North Arrow		3
Surveyors name and Registration / Identification Number / Date of Survey		4
Map Sheet Border, Company Name And Job Number		5
Location of Survey, Section, Township and Range,		6
Location of Survey Lot, Block, Subdivision, Unit Number and Section if applicable		7
Location of Survey, City/Town, County, Plat Book and Page		8
Deed number, plan number, PID, Job Number (to be unique identifier of survey)		9
Linework to Outline Area Of Interest (unbroken, continuous, coincident with block linework)		10
Property And URW Linework Outside Area Of Interest		11
Text for Linework Outside Area Of Interest (bearings distances, lot and block numbers, etc.)		12
Phantomized Linework and Text For Superseded Plans		13
Reference Monuments/Control Points text and symbols, tie linework and text (lines may be broken for plot purpose, not to scale)		14
Survey Control Symbols and Text Identifier at true coordinates or to scale		15
Symbols (Iron Rods, Drill Holes, etc.) and associated text		16
Section, Block Lines, Unbroken Within Area Of Interest		17
Block Numbers Within Area Of Interest		18
Lot Lines Unbroken Within Area Of Interest		19
Lot/Condo Unit Numbers Within Area Of Interest		20
Street Name, Lane, Road Allowance and Walkway Text Within Area Of Interest		21
Right-Of-Ways, Easements (dashed) and text descriptors - include assoc. lead lines, arrowheads and dimension linework Within Area of Interest		22
Distances, Lot Dimensions Within Area of Interest		23
Dimension Arrows and Lines (may not be required if used with associated text on other layers)		24
Arc, Radius, Chord Info B And E Of Curve, Delta (Text) Within Area of Interest and associated arrowheads and dimension leads		25
Bearings, lead lines, arrow heads, dimension linework Within Area Of Interest		26
Street And Lane Widths Within Area Of Interest		27
Hydrographic Features Linework and Feature Name Text		28
Traverses; linework and text		29
Metes & Bounds Linework		30
Improvements		
Building & Eave outline and corresponding dimensions and text		31
Edge of Road / Pavement; fences; poles etc. and corresponding dimensions and text		32
Linework and Text for Local Authority Approvals / Registration / Public Records		33
Misc. Information		34

Survey must be moved (if not already geo-referenced) to correct spatial location.

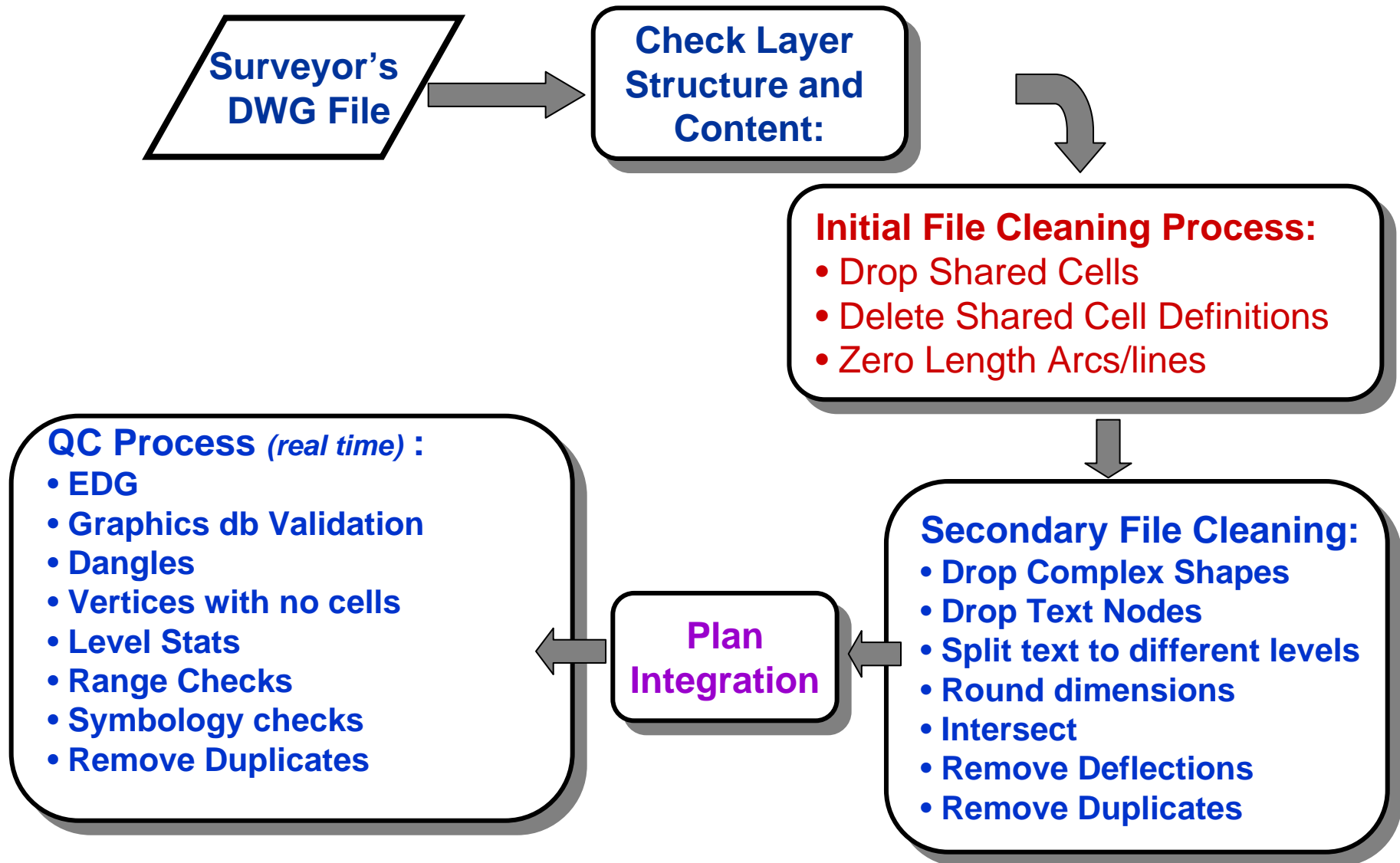
(Local Coordinates, Different Projections)



Base



Automated CAD File Checking & Cleaning:





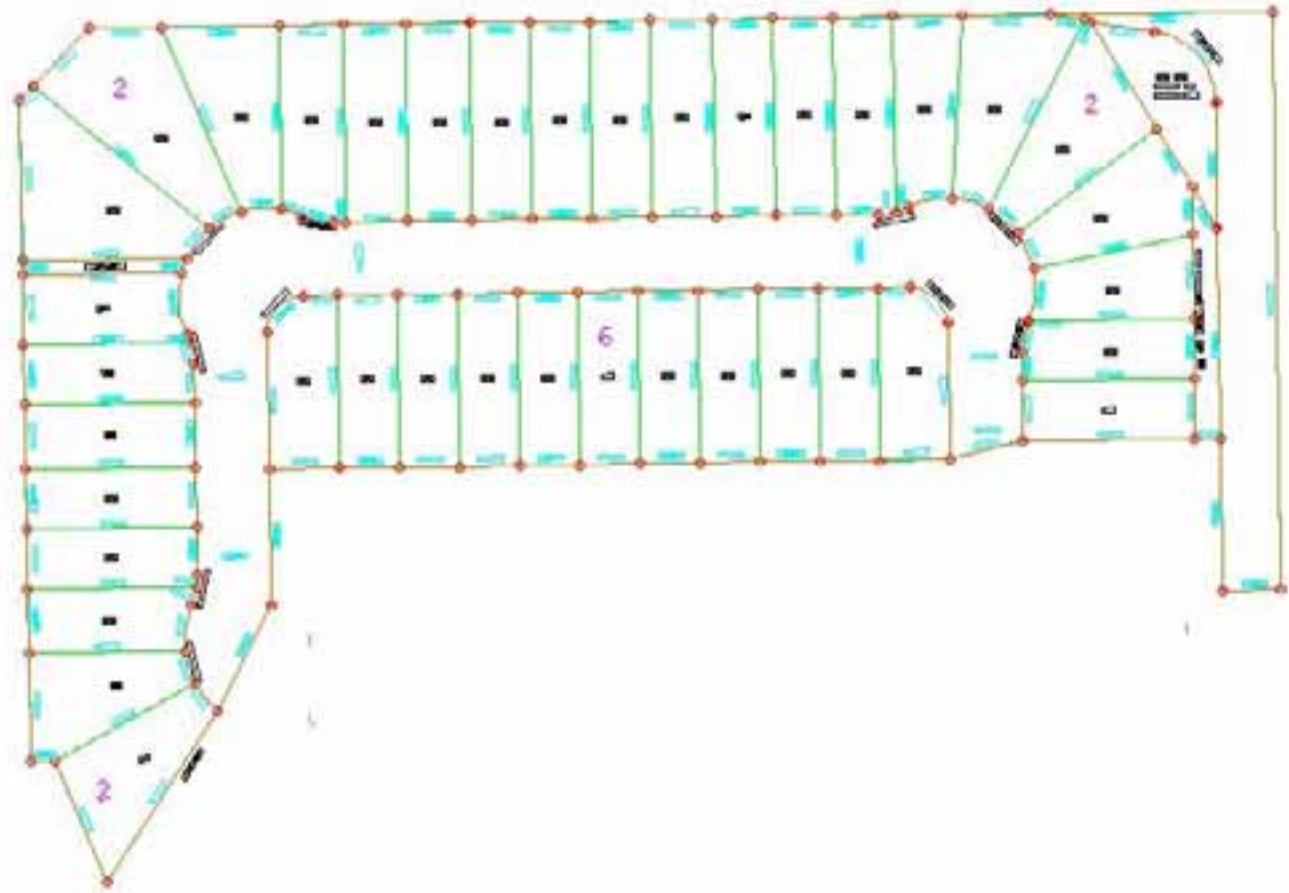
Sample Integration of Subdivision Survey



Integration Process:

- Interactive process
- Weighted “least-squares”
- Integrates new plan
- Re-adjusts surrounding fabric to maintain relative accuracy, improves absolute accuracy and eliminates “benches”

[illegible]



951 0863

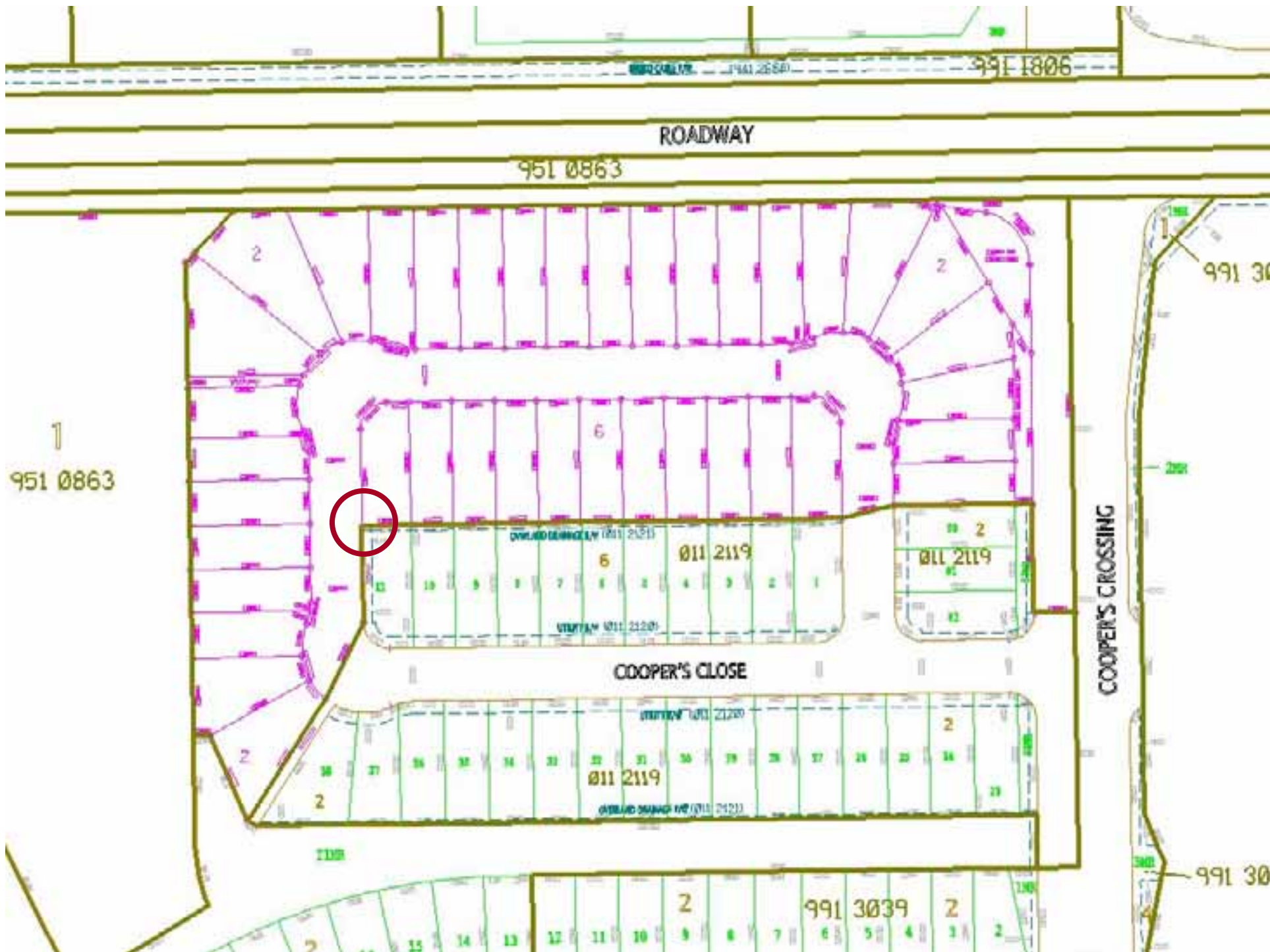
PARENT POLYGON

951 0863

COOPER'S CROSSING

COOPER'S CLOSE

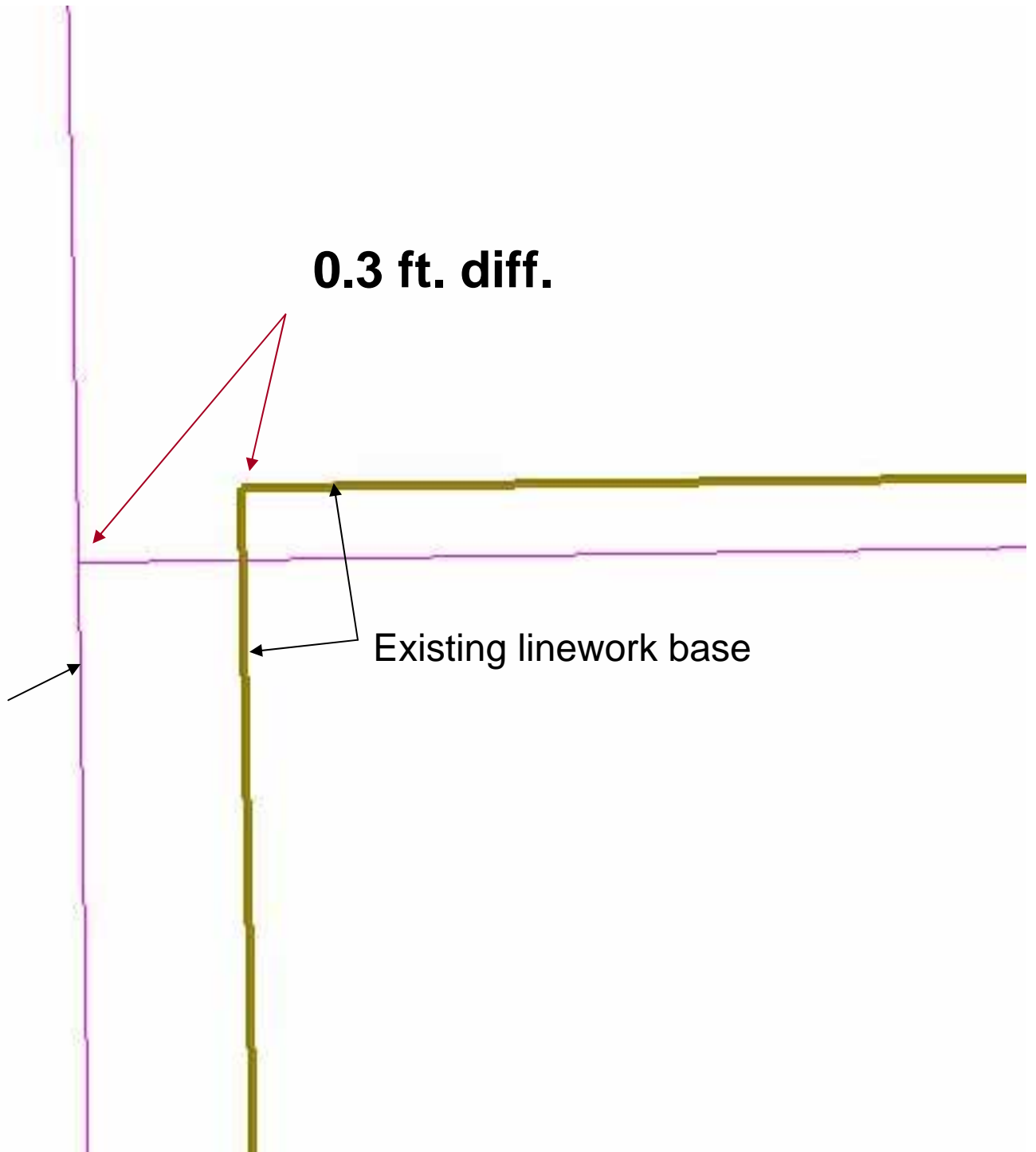
COOPER'S DRIVE



New Linework

0.3 ft. diff.

Existing linework base



ROADWAY

951 0863

1
951 0863

OVERLAND DRAINAGE R/W

(021 2973)

2
021 2971

UTILITY R/W (021 2972)

COOPER'S CLOSE

UTILITY R/W (021 2972)

6
021 2971

OVERLAND DRAINAGE R/W

(021 2973)

OVERLAND DRAINAGE R/W (011 2121)

6
011 2119

UTILITY R/W (011 2120)

COOPER'S CLOSE

UTILITY R/W (011 2120)

2
011 2119

OVERLAND DRAINAGE R/W (011 2121)

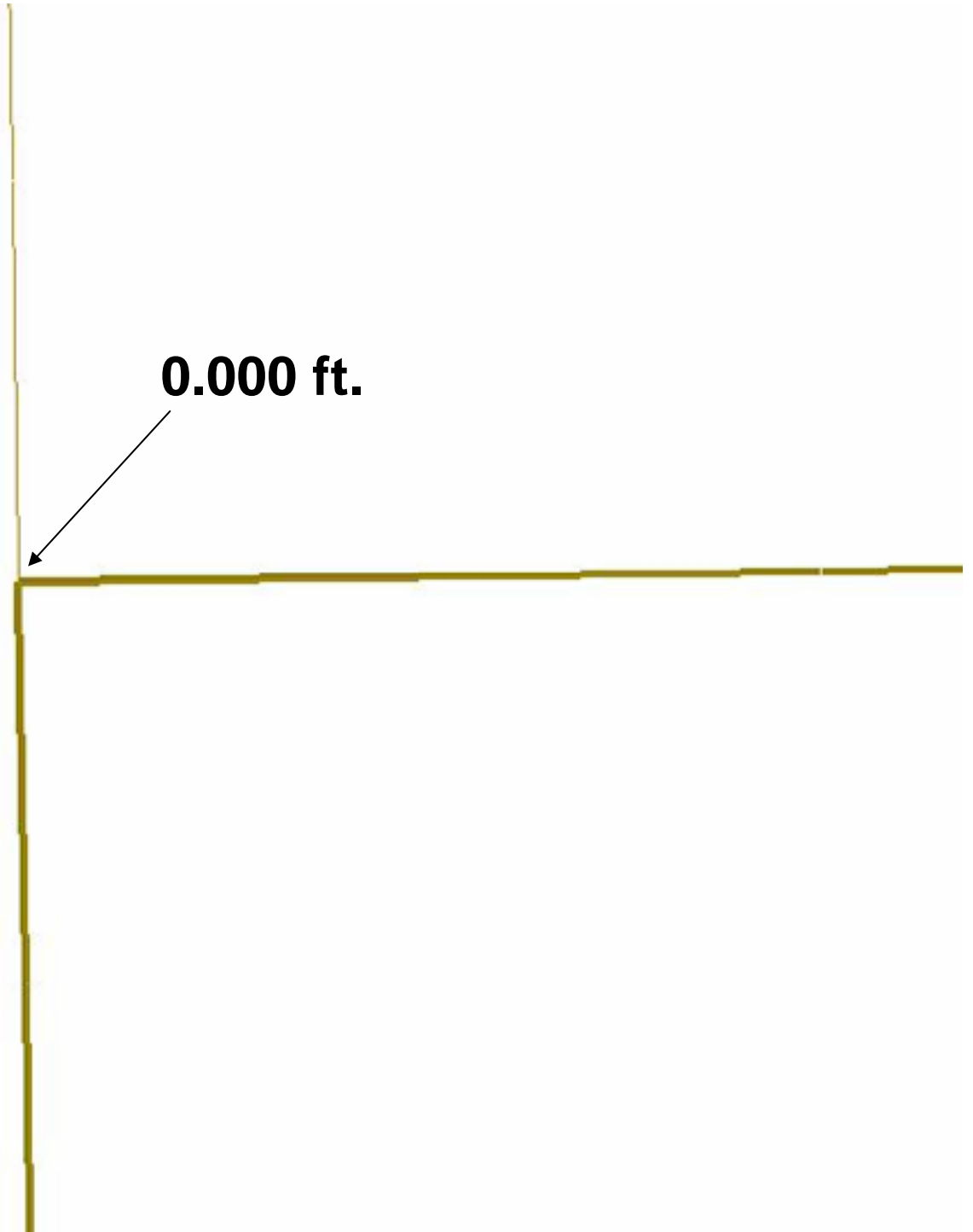
21MP

991 3039

UTILITY R/W

991 3040

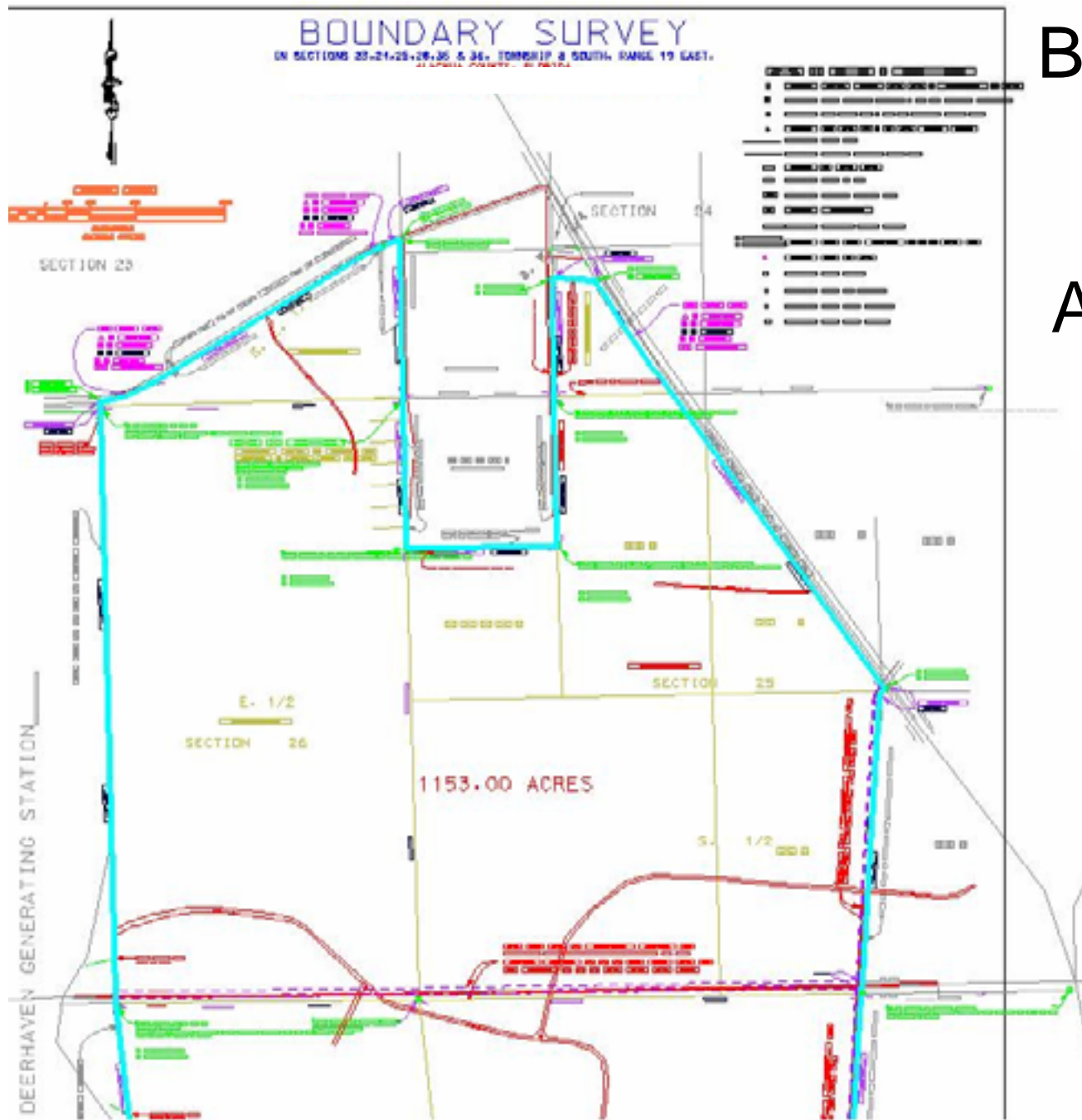
COOPER'S CROSSING



0.000 ft.

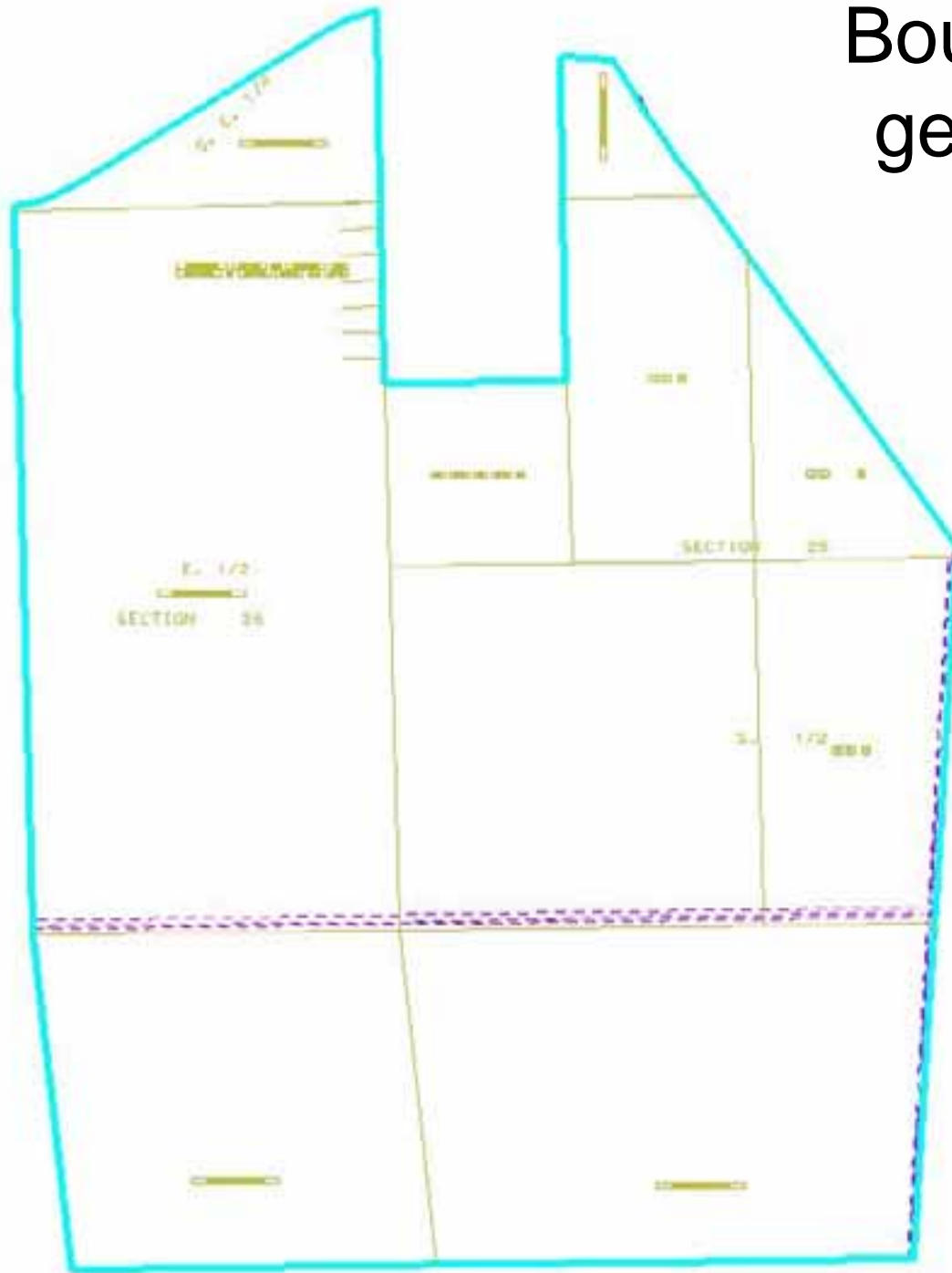


Sample Integration of Boundary Survey: Accuracy Improvement



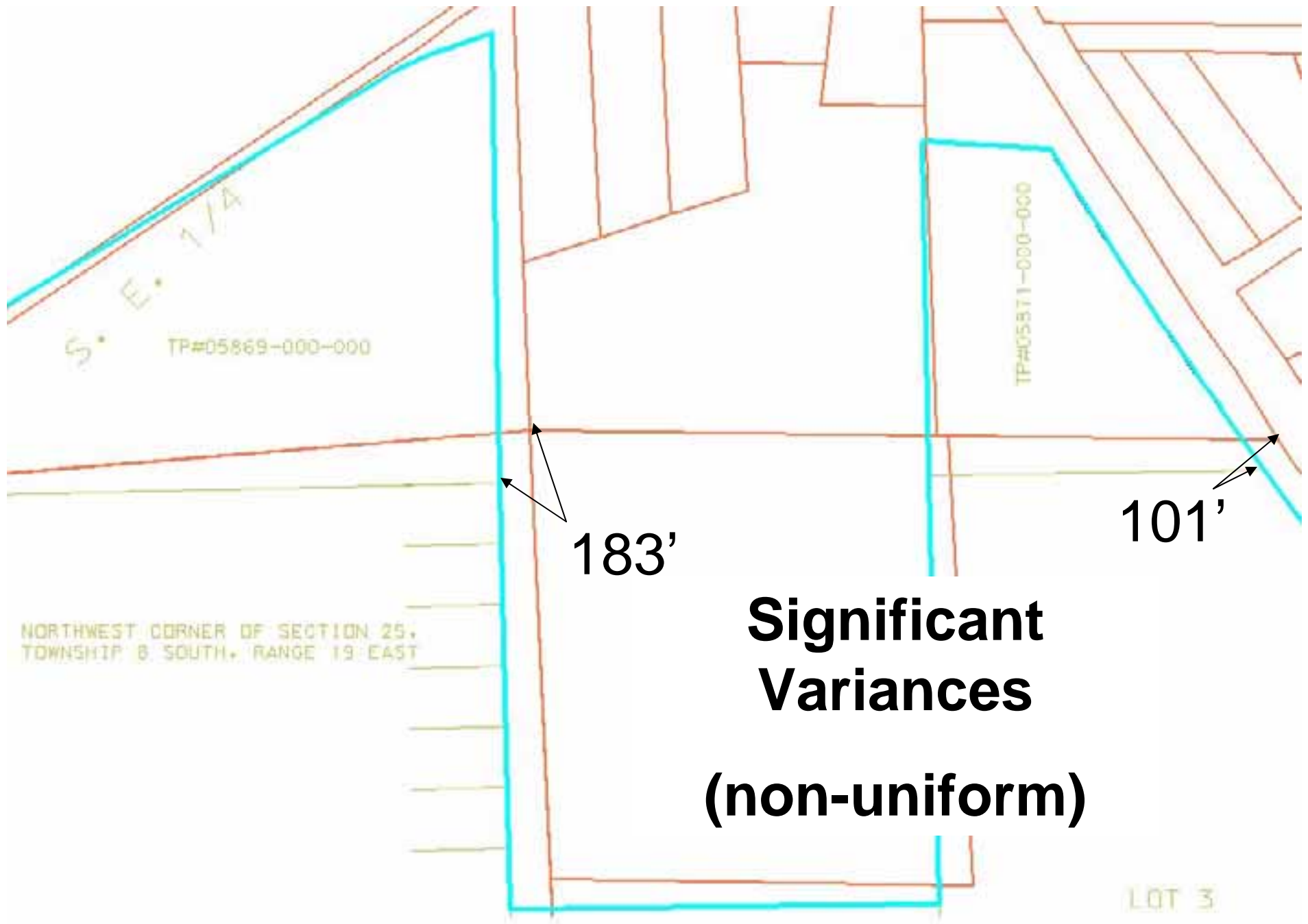
Boundary Survey
provided by
Surveyor in
AutoCAD format

Boundary Survey – geo-referenced & ready for Integration





Boundary
Survey
referenced
to base



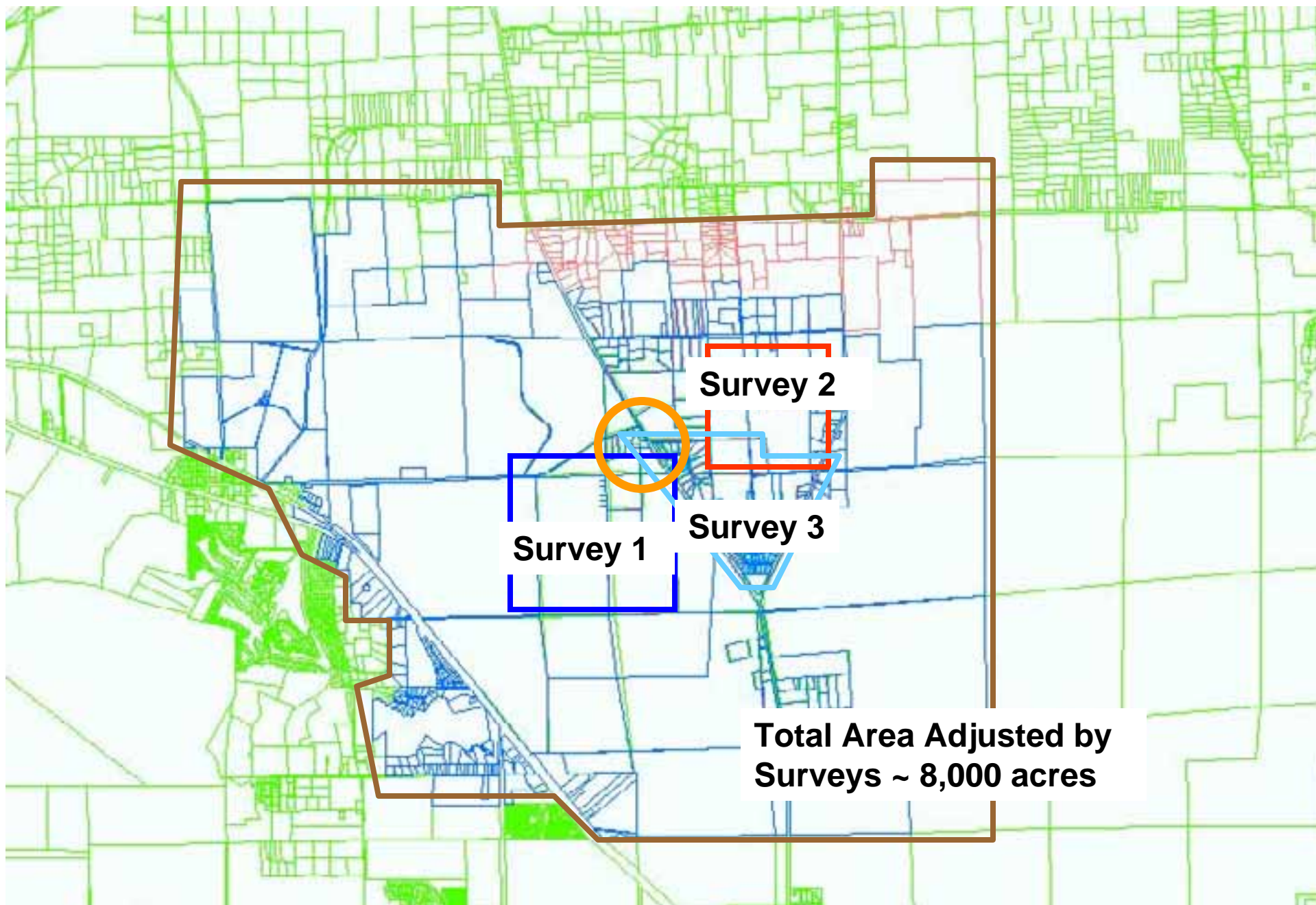


Base after integration (shown in green)



Updated base (green) shown with original base (orange)

Note ripple effect.









With CAD files, the quality of the mapping base *improves most rapidly* in areas of *highest activity*.



How Do You Start?

- Standardize digital file specifications
- Improve accuracy of base
 - **Adjust base (as a whole or incrementally as areas are updated with new surveys)**
 - **Collect additional ties to survey fabric**



Where can we go?

On-Line Digital Plan Submissions

- Metadata
- QC layer structure
- QC Geo-referencing
- Review against the existing fabric
- Move, Scale and Rotate plan into place

14
PLAN DEHLSTON

5.61/4 FEB 11
[REDACTED] 27. [REDACTED] 28. [REDACTED] 29.

REGULATORY SECTION 42, BUSINESS ACT.

8.04-41320-72

AB NUMBER
 DerWJag that all Military Members
 were present at one time or another in a
 strike of ... and
 and were prohibited to communicate with
 co-workers about the strike or the
 the union as per management's policy
 to be a ...

REF ID: A8

REGISTRAR

LAND TITLE DEEDS

END TITLE &
BLANK

PLAN NO. _____

ENTERED AND REENTERED

HW _____

INSTRUMENT NO. _____

18.000.000.000

PHASE 14

THORBURN ESTATES
AIRDRIE, ALBERTA

PLAN SHOWING SUBDIVISION

PLAN SHOWING S
OF PART OF THE

N.W.1/4 SEC.2, TWP.27, RGE.29, W.4W

SCALE 1-500 300M B.L.P. NETTER, O.J.S.

0 100 200

NOTES:

- [illegible]

LEAD

[illegible]

SUMMARY

WALDO BRUCE R. BENTON, A.K.A.
DATED OF BIRTH is between the dates of April 18, 1938
and April 21, 1938.

P223

REGISTERED OWNERS
QUILICO DEVELOPMENTS WEST LTD.
M&P HOLDING CORPORATION LTD.

SUBCOMMITTEE AUTHORITY

NAME: THE CITY OF AUBRE
FILE NO: BU-22-DE CIVIL PL. No. THO-140

LANE TYLE-GYEC - BENTON SEC. 10, T. 2N, R. 10E	BY INSTRUMENT NO. _____ AND THE SIGNATURE OF _____, J.L.S. ON _____
---	---

CAD File Submission

MNC Surveys

CAD File Upload

CAD File Name:

PDF File Name:

User Name:

Survey Type:

Disposition

Projection:

10TM

Legal Description

Qtr.

Sec.

Twp.

Rge.

Mer.

Add

☐ Place CAD at Legal Land Description

Sections Pertaining
to Plan:

Clear

Clear All

FileUpload - Microsoft Internet Explorer

Select a CAD file

Z:\MNOOffice\Marketing\SERUG_2

Browse...

Select the associated PDF file:

Z:\MNOOffice\Marketing\SERUG_2

Browse...



CAD Submission



CAD Query Edit Image

- Move CAD File
- Rotate CAD File
- Show Full CAD
- Show Submission only
- Locate CAD File
- Commit CAD

CAD Move/Rotate Values

Twp: Rge: Mer:

MNC Surveys

USER: Wendy Amy

CAD: Thorburn_27-29-4_m.DGN

PDF: [Thorburn.PDF](#)

Region check passed

Layer40 text in: NE2 27-29-4

Layer #9: 247 Line and Text Elements

Layer #10: 443 Text Elements

Layer #17: 5 Line Elements

Layer #28: 120 Line Elements

Layer #40: 1 Text Elements

[Log Out](#)

[New CAD Upload](#)





- Move CAD File
- Rotate CAD File
- Show Full CAD
- Show Submission only
- Locate CAD File
- Commit CAD

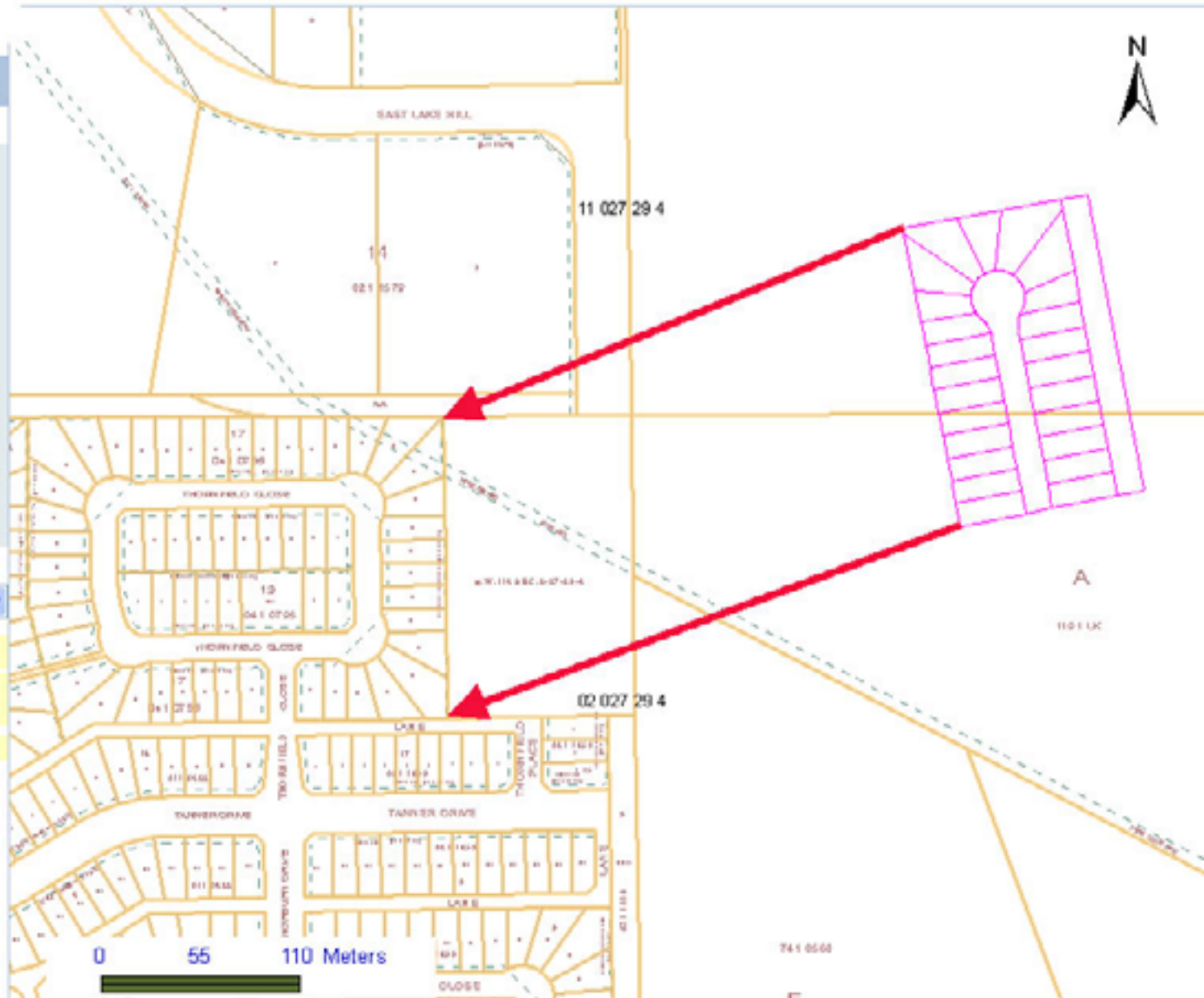
➡ Twp: 1 Rge: 1 Mer: 4

USER: Wendy Amy
CAD: Thorburn 27-29-4 m.DGN

Region check passed
Layer40 text in: NE2 27-29-4

Layer #9: 247 Line and Text Elements
Layer #10: 443 Text Elements
Layer #17: 5 Line Elements
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Layer #40: 1 Text Elements

New CAD Upload





CAD Submission



CAD Query Edit Image

- Move CAD File
- Rotate CAD File
- Show Full CAD
- Show Submission only
- Locate CAD File
- Commit CAD

CAD Move/Rotate Values

→ Twp: 1 Rge: 1 Mer: 4

MNC Surveys

USER: Wendy Amy
CAD: Thorburn_27-29-4_m.DGN

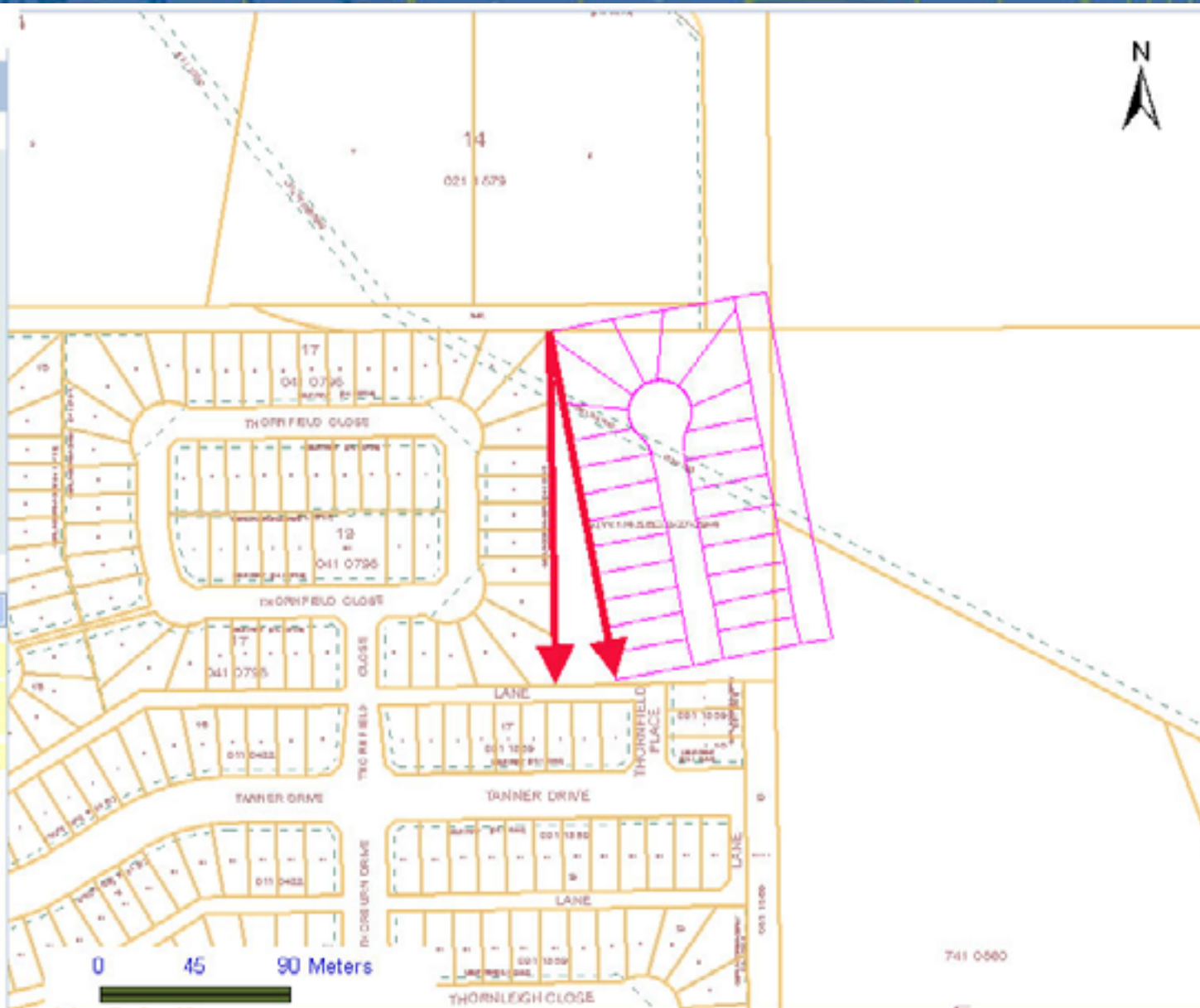
PDF: [Thorburn.PDF](#)

Region check passed
Layer40 text in: NE2 27-29-4

Layer #9: 247 Line and Text Elements
Layer #10: 443 Text Elements
Layer #17: 5 Line Elements
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Layer #40: 1 Text Elements

Log Out

New CAD Upload





CAD Submission



CAD Query Edit Image

- Move CAD File
- Rotate CAD File
- Show Full CAD
- Show Submission only
- Locate CAD File
- Commit CAD

CAD Move/Rotate Values

→ Twp: 1 Rge: 1 Mer: 4

MNC Surveys

USER: Wendy Army

CAD: Thorburn_27-29-4.DGN

PDF: [Thorburn.PDF](#)

Region check passed

Layer40 text in: NW2 27-29-4

Layer #9: 247 Line and Text Elements

Layer #10: 443 Text Elements

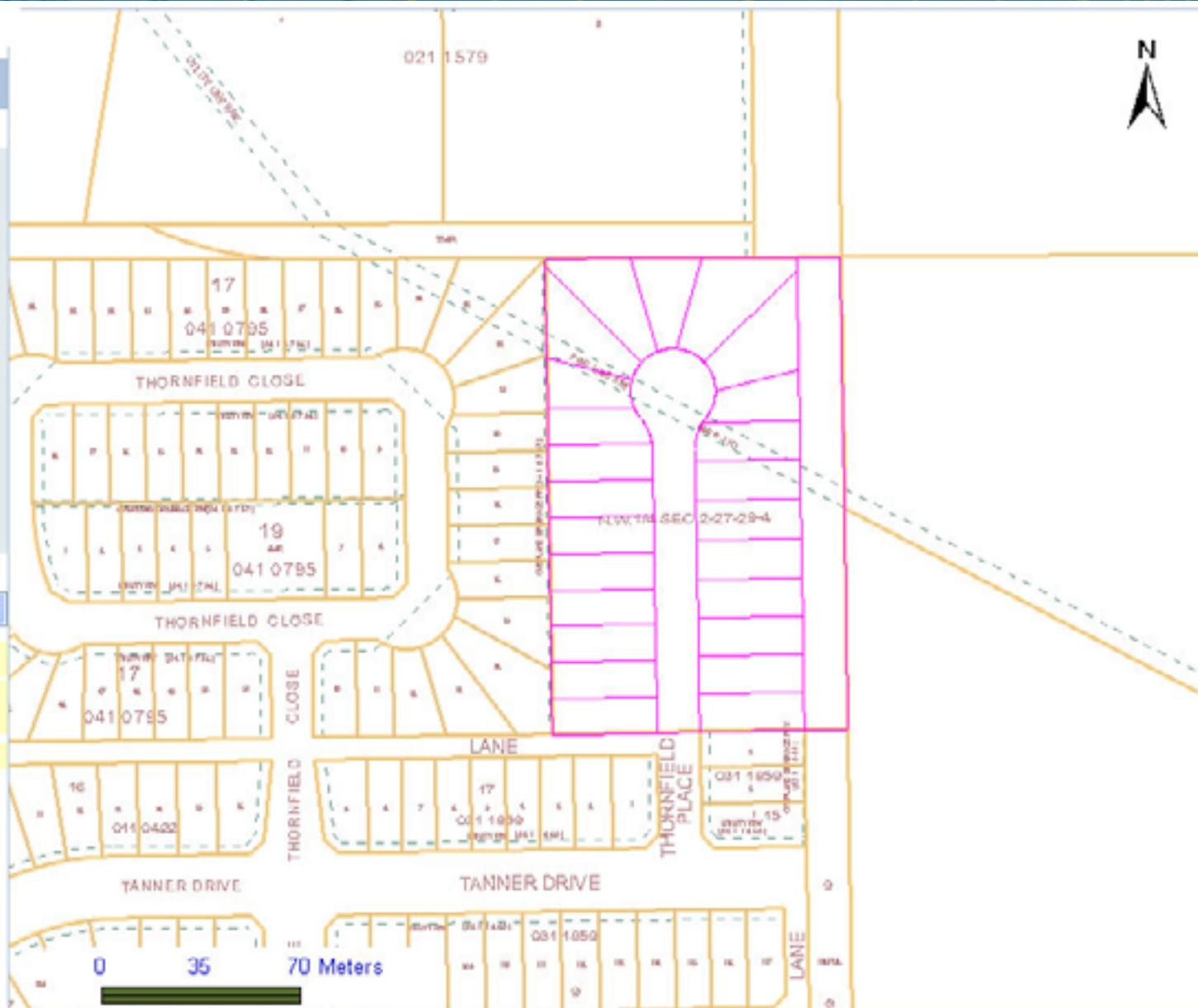
Layer #17: 5 Line Elements

Layer #28: 120 Line Elements

Layer #40: 1 Text Elements

Log Out

New CAD Upload





Where does that bring us?

- CAD Submissions
- Collecting Metadata
- QA checks—layers and spatial
- Ability to move non-geo-referenced plans into place
- BUT** manual effort still required to integrate



Coming soon.....
On-line Integration



Message?

- There is a proven, more efficient and cost effective way to maintain mapping and GIS datasets:
 - CAD files
 - Harness the technology to facilitate the submission of the CAD files and metadata

The slide features a blue background with a yellow grid pattern. In the top left corner, there is a logo consisting of the letters 'MNC' in a stylized font, enclosed within a blue oval shape. A large, light blue diagonal shape cuts across the left side of the slide. The word 'Questions?' is centered in the white area.

Questions?

Wendy Amy
wendy@martinnewby.com

