



FIG Working Week 2024

19-24 May

Accra, Ghana

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Improving Data Quality of Cadastre Parcels Using Parcel Fabric Case Study: UQ Campus/Australia

Presented at the FIG Working Week 2024,
19-24 May 2024 in Accra, Ghana



Sumeyye EBRAHIMI

M.Sc. Engineer

General Directorate of Land
Registry and Cadastre

tk46534@tkgm.gov.tr

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PRESENTATION OUTLINE

- Study Objective
- Problem
- Methodology
- Results
- Discussion





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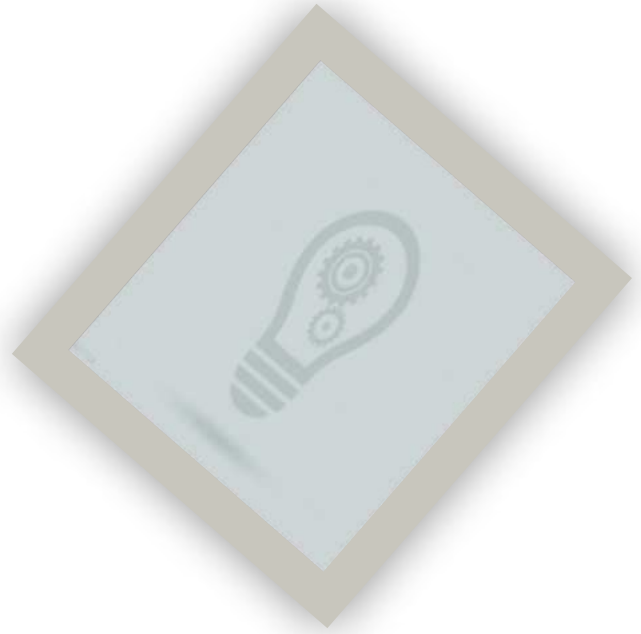
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□ Overview of the Study Objective

- To answer the question “Can better maps be produced with lower cost and effort ?“
- To test Parcel Fabric Module to improve cadastre map accuracy



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❑ Problem

- ❖ Study area: St Lucia Campus of The University of Queensland /Australia
- ❖ Positional accuracy:
 - Cadastre map: ± 2.5 m
 - Ortophoto map: ± 0.3 m
- ❖ Parcel boundaries and border fences do not match in 2 imagery
- ❖ Spatial accuracy varies in DCDB
- ❖ Incompatibility misleads the relevant authorities

Resource: Pullar D.&,Donaldson S.,2022



a. Cadastre map (0.5 m res.) b. Ortophoto map(2015)(0.1 m res)

Fig 1. Comparison of UQ Ortophoto map and cadastre map



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Methodology

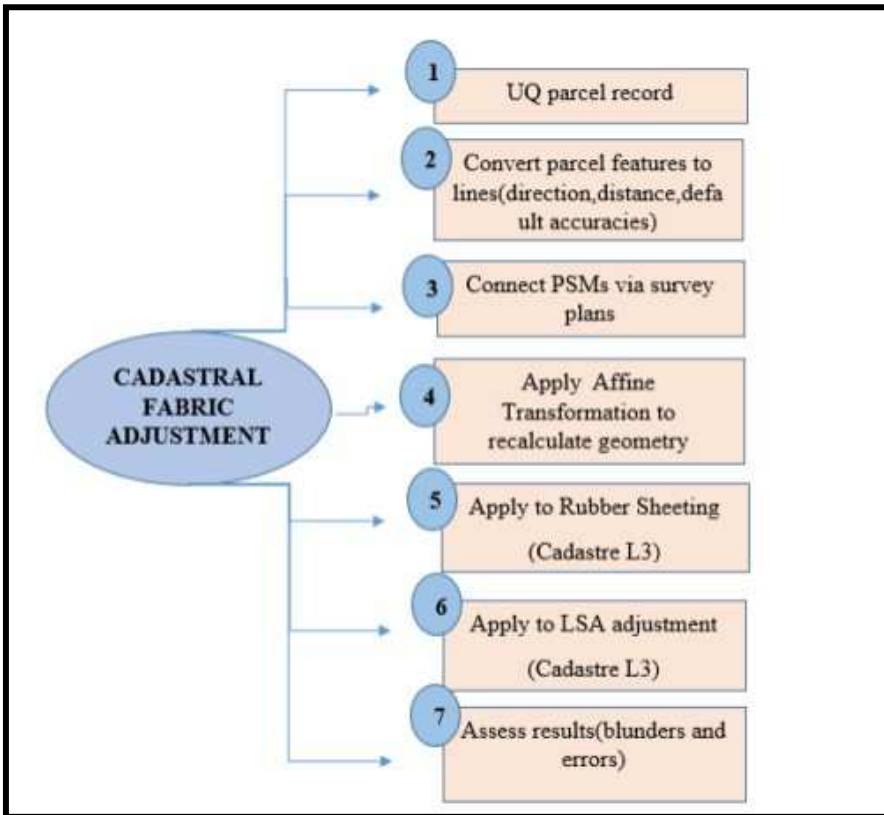


Fig 2. Project workflow

- ★ Software: ArcGIS Pro 2.8 Parcel Fabric
- ★ Scenario1: Unevenly distributed survey controls
- ★ Scenario2: Uniformly distributed survey controls
- ★ Scenario3: Unevenly distributed survey controls + support with reliable midpoint connections along the line.

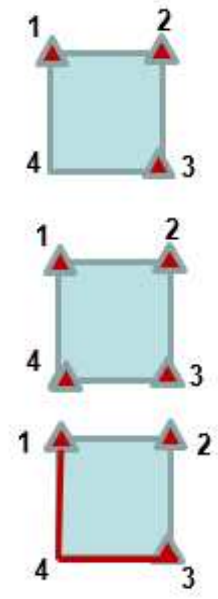




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Results

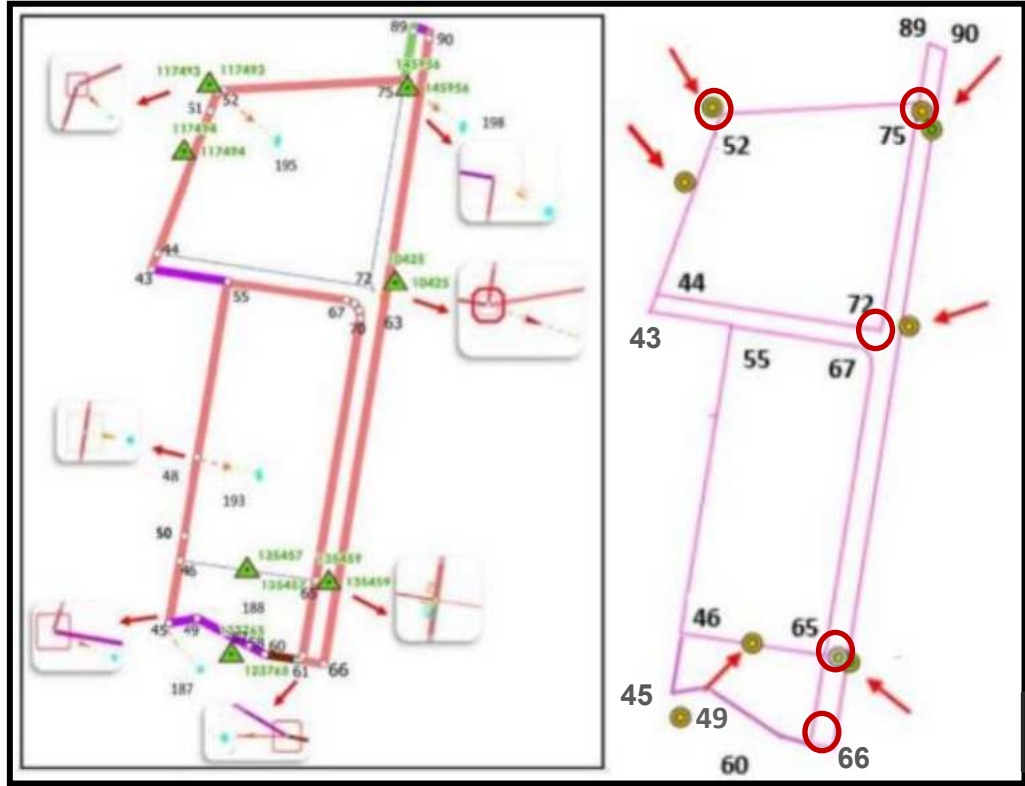


Fig 3. Measurement corrections of lines

Fig 4. Parcel geometry and control points

- ✓ Average distance correction :1 m
- ✓ Positional uncertainty(XY) ranges from 0.93 m to 1.15 m.
- ✓ Highest standart deviation(line): 0.4 m for the lines 45-49, 43-55, 89-90 shown with purple, average: 0.3 m
- ✓ More deformation on bottom left side
- ✓ Highest standart deviation(for point): 0.5 m for point 45



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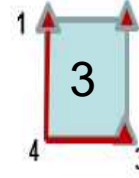
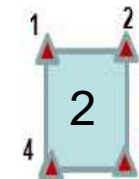
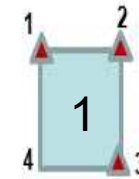
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Discussion

- ✓ Lack of reliable control points in the selected area affects the result in Scenario 1(1). 2 ways to improve map quality:
 - More control points in an extended area as in scenario 2.
 - Reliable connections from original survey plan for the lines with higher outliers as in scenario 3.
- ✓ Save time and reduce effort(no back-capture)
- ✓ Map accuracy was evaluated regionally and more precisely for parcel elements in the parcel network thanks to Parcel Fabric Module.



Rubber Sheetin
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Results in uniform adjustment
• No difference with 3 control points

LSA

Skewed adjustment with 3 control points(add connections to bottom left corner)
• More sensitive in calculation of middle points

Pullar, D., & Donaldson, S. (2022). Accuracy issues for spatial update of digital cadastral maps. *ISPRS International Journal of Geo-Information*, 11(4), 221.



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SUSTAINABLE DEVELOPMENT GOALS

International Federation of Surveyors supports the Sustainable Development Goals

Commission 7

Cadastral Data Quality, Openness and Methods

Serving Society for the Benefit of People and Planet



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Thank You



Address
Ankara/Türkiye



Contact Number
+(90)3125514698



Email Address
tk46534@tkgm.gov.tr



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