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Case Study
Queensland Spatial Cadastre

Summary

The Department of Resources is the government agency responsible for the management of natural, physical and data resources in Queensland. Australian Spatial Analytics (ASA) partnered with the team responsible for the maintenance, update and upgrade of the Queensland Spatial Cadastre, colloquially known as the Digital Cadastral Database – the graphic representation of the land parcel boundaries in Queensland.

Queensland Government

Why ASA?

Resources chose ASA for this project given their experience with and knowledge of the Queensland Spatial Cadastre after work with Energy Queensland on the ‘Real World’ Spatial Cadastre. ASA has also successfully delivered several other high profile spatial and digitisation projects with other state government agencies (QPS, NSW Mines). They boast an experienced team of staff with high-level spatial capture, rectification, and analysis capabilities.

ASA’s convenient location, only 1.5km from Resource’s offices, local workforce and an engaged leadership team made communication on time-bound projects both easy and timely.

Close proximity facilitated the rapid prototyping and testing of what may become a more longstanding collaborative effort between government and ASA. ASA aims to become a service provider, supporting future digital transformation activities within government. As a local service enterprise, offering data processing and transformation services, this relationship will have a positive impact on the development of neurodivergent data analysts across the State.

The Challenge

Cadastral fabrics are land parcel boundaries that denote the ownership of a bounded area of land. They are maintained as ‘related features’, sharing boundaries with other adjacent parcels in a large contiguous geometric fabric. These fabrics require continual updating and upgrading. State cadastres are comprised of plans and lots captured across various decades.

Maintaining accuracy across such a large interrelated mesh of property boundaries is a large task, ensuring remediation, improvement and updating is ongoing.

Australia’s tectonic plate has moved on average, 7cm per year. This, combined with decades of varying surveying methods and inaccuracies in changing datums, means the cadastre requires steadfast management and ongoing updating with newly registered plans.

Many land administration custodians across Australia are upgrading their technologies to meet the needs of these large datasets and the growing demand from vertical industries on their known accuracy and currency is widespread. The review of current cadastral process and underlying architectures is known as cadastral modernisation.

There are considerable digital transformation projects in action across government. This means that the amount of data assets that need to be processed, transformed, migrated or upgraded is huge!

Why is this task important?

The cadastral fabric will form part of a collection of authoritative data sets foundational to planning and decision making across infrastructure projects and developments.

This dataset is key to development opportunities in many other sectors including planning, construction and utilities. Land parcel and property data will form part of a collection of authoritative datasets that underpin the development of the SEQ digital twin workbench and 4D spatial digital twin.

Improving the accuracy of the SEQ cadastre as part of a federated data workbench contributes to supporting the planning and development undertaken in the leadup to the 2032 Olympic Games.

Pictured: one of the maps created.

The Approach

ASA was engaged to support the testing and piloting of new maintenance approaches for the updating and adjustment of the current spatial cadastre; meeting the needs of a future enhanced cadastral model. This work will support the modernisation roadmap for the Queensland cadastre and provide valuable information for assessing the benefits, pitfalls and workflows required to onboard a new parcel fabric maintenance environment.

Eight analysts worked in a complex GIS interface environment, ensuring that survey plans were digitised accurately. Plan reading and interpretation was required to extract information from a static paper plan into a digital geometry feature with associated data schemas.

Survey parcels include boundary features constructed of bearings, distances, and orientations. They require exact interpretation and extraction to mathematically align with their neighbouring property parcels in a contiguous manner appropriate for mathematical adjustments.

ASA recreated 281 plan records and updated the geometries of 1766 parcel lots and 310 easements.

Point data features were created and information from the face of the plan collected. and added to the data model, helping to support the piloting of a potentially new feature dataset that supports cadastral maintenance and historical survey date collection. During this project, ASA developed automation processes and tools using ESRI model builder and python scripts. This accelerate the speed of data aggregation, data cleansing and team processing tasks.

The cadastral editing and digitisation of this project took over 1225 hours!