

Memorandum

To: The Planning Commissioners
From: Malcolm Archbold
Date: 21st October 2011
Our Ref: 4213629
Subject: The Accuracy of the Land Information NZ Digital Cadastre

1 Introduction

I, Malcolm James Archbold, am a Licenced Cadastral Surveyor and have 30 years surveying experience. I graduated from the University of Otago with a Bachelor of Surveying degree in 1980. I am a Corporate Member of the NZ Institute of Surveyors. I am currently the General Manager Geospatial for Beca Infrastructure Ltd and an Executive Committee member of the Spatial Industries Business Association.

I have been engaged by Kaipara District Council to provide technical advice regarding issues with the national digital cadastre. The purpose of this memorandum is to provide background information of the accuracy of the New Zealand digital cadastre model and to outline recent improvements made to the accuracy of the digital cadastre at Baylys.

2 Land Information New Zealand (LINZ) Digital Cadastre

The LINZ Digital Cadastre Model is the computer based set of lines and polygons (closed shapes) that describe the New Zealand property boundaries (parcels), often used in Geographic Information Systems (GIS). The Digital Cadastre Parcel Layer (Digital Cadastre) is produced and maintained by Land Information New Zealand (LINZ) and is a component of the information in the Government's Land Information System - Landonline.

The Digital Cadastre is a national digital spatial (map) model representation the parcel land boundaries. These are accurately defined by approved land transfer and survey plans lodged with LINZ. The digital cadastre is used by many organisations including government departments, local authorities, and private sector organisations utilising GIS and land information systems. During the past 10-20 years many local authority organisations commenced using high resolution aerial photography or satellite imagery as a "backdrop" to the spatial information in their GIS systems. As part of the digital mapping process the distortions on the raw aerial photography caused by non-vertical camera angle, differences in ground height and difference in flying heights are removed through a process called ortho-rectification. The result of this process is the production of an accurately positioned, true to scale aerial photo called an "orthophoto". Council organisations often have an annual programme to update and renew their orthophotography particularly in areas of frequent land development. Situations sometimes occur where differences between the digital cadastre and the orthophotography became apparent especially in the rural areas. In the majority of cases the position of the recent orthophotography highlights the inaccuracies of the Digital Cadastre.

The origin of the Digital Cadastre started in the mid 1980s with the computerisation of hard copy cadastral record maps held by the then Department of Lands and Survey. These hard copy maps were created at various scales depending sometimes on the intensity of land use. These scales

ranged from approximately 1:400 in some urban areas to 1:50,000 in remote rural areas. As an example of the accuracy limitations of these cadastral record maps, a 1mm error on a 1:50,000 scale map corresponds to a 50m error in the plotted positions of the digital cadastre. From the mid-1980s the cadastral record maps were digitised to form the Digital Cadastre and work was carried out to address some of the worst errors in the cadastral record maps, but many remained. Some errors were also introduced by the digitisation process. As new survey information was submitted through the land transfer subdivision process, improvements were made to the positional accuracy of the Digital Cadastre.

Between 2000 -2002 Landonline was developed to manage New Zealand's survey and titles system. As part of the development of the Landonline system most urban areas of the Digital Cadastre were progressively captured to increase the accuracy of the Digital Cadastre. However the accuracy of approximately 30% of the cadastre, predominantly in the rural areas, is largely unchanged from the original cadastral record maps.

In mid-2010 LINZ began a two year pilot project to improve the accuracy of the digital cadastre in rural areas. The objective of the Spatial Improvement Project (SPI) is to develop methodologies to improve the spatial accuracy of the digital cadastre to 2-3 metres throughout the country. In the meantime plans showing Council GIS system land information layers overlaid on to accurate orthophotography and the Digital Cadastre might highlight some areas where the Digital Cadastre is in error by several tens of metres.

LINZ has produced an Information Sheet titled "Accuracy of the Digital Cadastre". It is able to be viewed and downloaded from the LINZ website.

Recently LINZ at the request of Beca and Kaipara District Council redirected their SPI team resources to improve the accuracy of the Digital Cadastre in the Bayllys area by using LINZ approved Survey Plan information to "move" the Digital Cadastre to the correct position. Beca and Kaipara District Council have download the updated Digital Cadastre from the LINZ Landonline system and used the improved Digital Cadastre "boundaries" in the Kaipara District Council planning maps.