

# Reforms in the Regulation of Surveying in New Zealand

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## ABSTRACT

As a result of recent government policy, organisational changes and technological developments, the regulation of cadastral surveying in New Zealand has undergone significant changes. Major initiatives have been:

- Reform of the survey regulations;
- Reduction in plan examination procedures;
- Introduction of survey accreditation and auditing;
- Licensing of surveyors.

The paper discusses the drivers and issues involved in the reforms, the risks analysed, the options considered and evaluated, the implementation of the changes, and expected outcomes.

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## 1. INTRODUCTION

From the very early days of civilisation surveying has played a key role in the development of societies. Surveying has been the means by which societies identify, define, allocate and develop land resources, and communication.

Because surveying uniquely allocates and determines rights or competing interests in land between persons, the surveyor has always had to balance the interests of several land owners, as well as measuring and documenting accurately the extent of the land. It is difficult for a landowner to know if a surveyor has got it wrong. For these reasons most societies have regulated surveying in one way or another, including by setting standards for survey and for surveyors. The absence of a good administrative system, and standards invariably leads to a state of unsatisfactory surveys, fraud, dispute, financial loss and loss of land and associated fixed chattels.

## 2. BACKGROUND

In common with most countries with an organised system of land ownership New Zealand has a well developed cadastral system, underpinned by a well educated and competent survey profession and effective administrative system (Hawkey 1977). The history of surveying is relatively new in New Zealand, starting in the 1840s with the British colonisation of the country. Until about the 1870s there was, in the general survey situation, a laissez-faire system of no qualification or test of a person's competence to carry out surveys. There was some requirement to satisfy the provincial Chief Surveyors of competence to carry out contract surveys of Crown Land, but tests were evidently quite rudimentary (McRae 1989).

With the rapidly expanding settlement of the country by British immigrants and development of a land market there arose a growing concern at the poor state of surveys and their effect on the operation of the Land Registry Act. From the mid 1870s to the 1900s there were a number of reviews and initiatives to rectify this poor state of affairs. The key outcomes were:

- Unification of the provincial survey systems and development of a national system under the control of a Surveyor General in 1876 (Palmer 1875).
- Introduction of the Torrens system of land registration in 1873.
- The establishment of a Survey Board in 1901 (preceded by a Board of Examiners in 1896) that set examinations and standards for all cadastral surveyors and for surveying.
- The formation of the New Zealand Institute of Surveyors (NZIS) in 1888. In 1938 the role of the Institute was strengthened by legislation requiring all surveyors who wished to

practice cadastral surveying, to become members of the Institute (McRae 1989).

- Legislative requirements for surveys to subject to examination and approval by a Chief Surveyor before a survey could be used for any legal purpose, (e.g. issue of title).
- Recommendations for a geodetic survey of New Zealand and its commencement in 1909. For a number of reasons this was not completed until 1949 (Lee 1978). This also joined up many of the local triangulation systems already in use, and improved the integrity of surveys.

Accordingly the practice of surveying in New Zealand has been relatively well organised and highly regulated for the last 120 years or so. The result has been an integrated system of survey and mapping for all tenures - Crown land, public lands, Maori land (indigenous title) and general or private land (Torrens system), with very few boundary disputes. There have also been few cases of serious incompetency or error by surveyors. In addition the system has provided a comprehensive cadastral mapping system (digital since the 1990s) covering all land at scales appropriate to the density of settlement, that has been widely used for a variety of other mapping and administrative functions.

### **3. ACCREDITATION AND SURVEY REGULATIONS**

In 1998, in order to streamline the examination and approval of surveys, and to encourage a higher standard of surveys, Land Information New Zealand introduced a system of accreditation of cadastral surveyors based on the results of audits (OSG 1998). If a surveyor demonstrated a satisfactory level of quality, as specified in the accreditation standard, the level of examination was reduced, with a consequent reduction in fees, and faster processing of the plans. The system is voluntary with about 75% of plans currently received from accredited surveyors. In many respects this was seen as an interim measure, pending the expected reform of occupational licensing and the introduction of automation.

New survey regulations for the conduct of surveys were introduced in 1998. Instead of specifying methods of surveying, as had previously been the case, these regulations set out the requirements and accuracies to be achieved, leaving it to the surveyor to decide what technology or methods to use. They also foreshadowed the provision of digital data sets in lieu of conventional paper survey plans.

### **4. REVIEW OF OCCUPATIONAL REGULATION 1990S**

In 1998 the government approved a policy framework for occupational regulation by Government. This framework was designed to minimise the risk of occupational regulation unnecessarily restricting competition or choice in the labour market.

The analysis of cadastral surveying identified that inaccuracies in the physical location of survey monuments, surveys or inputs into the cadastral database can result in loss to property owners and investors, and adversely affect other services. It was recognised that redress by litigation would be costly and may be ineffective. This is because errors may not be identified

for a considerable period by which time there may be nobody to sue. It was noted that third parties can also suffer loss and, although they bear no responsibility for choosing an incompetent surveyor, they may find it impossible to seek legal redress. It was recognised that a general loss of confidence in the accuracy of the definition of land parcels would have a significant adverse impact on investment in New Zealand, and land transaction costs would increase. Overseas experience indicated that loss of confidence in the cadastre can also undermine social cohesion. It was further recognised that the cadastral database supports a wide range of Government outcomes in land administration and resource management which would also be compromised by loss of confidence in the accuracy of the database.

These risks are currently managed through a combination of:

- i. a system of occupational regulation that ensures cadastral surveyors have a basic level of competence before they carry out cadastral surveys;
- ii. standards for cadastral surveying;
- iii. a system of office and field checks and audits of surveyors' work; and
- iv. maintenance of the cadastral record and network of reference marks.

The government agreed (NZ Government, 2000) that a system of licensing of cadastral surveyors was required, including the maintenance of a minimum level of competency. The policy review identified however that the current system could be improved by:

- making membership of the NZIS voluntary for all practising cadastral surveyors;
- removing unnecessary functions currently undertaken by the Survey Board;
- introducing an ability to require ongoing competency; and
- making the cost of running the system more transparent.

## **5. THIS REVIEW IDENTIFIED THREE OPTIONS FOR THE SYSTEM OF OCCUPATIONAL REGULATION OF CADASTRAL SURVEYORS**

### **5.1 The Surveyor-General to be Responsible for Accrediting Individuals who Meet Competency Standards**

This option would involve the Surveyor-General setting standards for competency and accrediting individuals who meet these standards. Individuals who do not meet the standards would be unable to carry out surveys and enter data into the cadastral database

### **5.2 The NZIS Certifies Individuals Competency**

In this option the NZIS, acting under statute, would set standards of competence and assess individuals against them. The Institute would certify that particular individuals had met the competency requirements which would be a prerequisite for practising as a cadastral surveyor. However, membership of the NZIS would not be a requirement for obtaining certification.

### 5.3 An Independent Board Certifies Competency

In this option a board independent but representative of both the Surveyor-General and the NZIS is established by statute to assess and certify surveyors' competence in cadastral surveying.

In all of the above cases costs of certification would be met by the surveyors.

The Government (NZ Government 2000) agreed that:

- an independent board known as the Cadastral Surveyors Licensing Board (the Board) acting under statute will have responsibility for licensing individuals to practice cadastral surveying;
- the board will be able to require ongoing competence as a condition for obtaining a license; and
- membership of a professional body will no longer be a requirement for obtaining a license.

## 6. IMPACT OF SURVEY AND TITLE AUTOMATION OR LANDONLINE

This major LINZ programme is designed to bring the current partially digital and paper based processes and information systems fully into the electronic age (Haanen et al 2002). It builds on a number of earlier initiatives, such as Digital Cadastral Data Base (DCDB) Survey System Strategy (Robertson 1995), the Auckland Land Information System<sup>1</sup> and Land Title Link<sup>2</sup>.

The key component of the automated system is the land parcel, with links to the spatial and observational data, and to the various tenures, attributes and rights associated with the parcel. The survey system already supports and integrates a variety of tenures and records, such as:

- Fee simple title, strata title and other interests registered under the Land Transfer system.
- Public or other Crown land holdings including reserves, public purposes land, roads and leases of Crown Land.
- Individually and multiply owned land held under the Maori Land Court.
- Other interests such as: cultural sites, protected area covenants, utility easements, mining and marine licences, hazardous and contaminated site restrictions.

**Landonline** has been designed to take into account these various interests and forms of ownership and land administration.

Its major features of relevance to the survey process are:

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<sup>1</sup> This was a pilot system established in Auckland to match and link the various descriptors of properties as used by government departments involved in land information, i.e. legal description or appellation of a parcel, street address, Certificate of Title Reference, Maori Land Title Reference, Valuation Roll Number.

<sup>2</sup> This is a remote access system developed by the former Land and Deeds Division of the Department of Justice to request and obtain search copies of titles and to search the Land Titles Index and the Journal.

- Integration of the survey<sup>3</sup> and title processes and information bases.
- Conversion of Survey Capture Areas, (SCAs) where all boundary parcel dimensions are captured from the survey plans, connected to the geodetic framework and systematically adjusted, to provide a fully co-ordinated cadastre in terms of the new geodetic datum (Bevin and Haanen 2000)<sup>4</sup>.
- Remote access to plan images, survey dimensions, co-ordinates, parcel and title data and geodetic data, including by spatial search.
- Ability to lodge all survey data digitally, eliminating the need to prepare a plan.
- Ability to remotely pre-validate new surveys against approved survey data and co-ordinate values.
- The establishment of a modern Geodetic datum (NZGD2000) in terms of the International Terrestrial Reference Frame (Grant et al 1999).

In summary **Landonline** will provide a continuous parcel based cadastral database over the country, containing survey observations, marks and boundary points, fully integrated with the geodetic framework in SCAs. It will also include Land Transfer records and other tenure information.

An important and very relevant feature of the automated system is the interdependency between efficient automation and the quality of surveys. To achieve optimum efficiency automated systems require good quality inputs. Accordingly LINZ is including in **Landonline** the ability for surveyors to prevalidate their surveys against the business rules, existing surveys and the data base, before lodging with LINZ. The alternative (not acceptable) would have been for LINZ to increase the level of its checking. Certainly the quality of surveys, as influenced by professional competency and regulation, has been a significant factor in the success of the survey and title automation (Haanen et al 2002). An important objective is to be able to use the **Landonline** capability, coupled with improved licensing, to further improve the quality of surveys and reduce government involvement in the process.

The **Landonline** system is not however able to prevalidate or to check the quality and completeness of the survey field work, which is of course fundamental to the integrity of land boundaries. Accordingly, the ability to comprehensively prevalidate raises the risk that an unscrupulous surveyor could modify or even fabricate survey results to fit the existing data base, hence the importance of a certain level of audit.

## 7. LEGISLATIVE PROPOSALS

Draft legislation has been prepared to implement these decisions, and is currently before Parliament. At the time of writing public submissions are being sought, with the final legislation expected to be passed in April 2002. Other major objective for the introduction of

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<sup>3</sup>

<sup>4</sup> Where the adjustment meets the tolerances set out in the Survey Regulations, these co-ordinates will be able to be used, in the absence of evidence to the contrary, to define boundaries, although old marks will still provide the primary evidence of definition of boundaries. Even where the adjustment does not meet Survey Regulations standards the co-ordinate data will be able to be used to search for old marks and to identify problem areas.

this legislation are provisions for digital submission of surveys and land title transactions and for electronic processing of these. In this situation the digital versions of the survey and the title register become authoritative, in lieu of the paper records.

A key principle of the proposed licensing regime is that a licence to practice cadastral surveying will be subject to regular renewal, like many other licences. Renewals will be administered by the new Cadastral Surveyors Licensing Board, and will be dependent on the demonstration of continuing competency in cadastral surveying. The Board may also require other evidence of competency, such as involvement in a Continuing Professional Development programme.

The setting of standards for cadastral surveying will be the responsibility of the Surveyor-General. These standards are largely in place with existing Survey Regulations, and Cadastral Survey Guidelines. However it is proposed that there will be more flexibility for the Surveyor-General to make rules for technical aspects, after consultation with the profession.

The Surveyor-General will also be responsible for monitoring the standards of surveys. Although details have yet to be worked out (once the final form of the legislation is known) it is expected that an important means of assessing this competency will be Cadastral Data Set (CSD – digital equivalent of a survey plan) validation and survey audits carried out by LINZ. This recognises that the primary purpose of licensing is to ensure the integrity of the cadastral survey process, land boundaries and the spatial database, and to minimise government's risk in providing this essential public service. This process will draw on the standards and process as defined in the current accreditation audit criteria and process. In other words, once licensing is in place, all licensed surveyors will be expected to maintain the standard set for currently accredited surveyors. In effect the accreditation system can be seen as having been a necessary precursor or preparatory stage to the digital lodgement and licensing regime.

The proposed regime introduces a clear separation of responsibilities between the Board, which will set standards for surveyor's competencies, and the Surveyor-General, who will set and monitor standards by which surveys will be conducted. This situation could potentially lead to tensions between the Board and the Surveyor-General over the application of these standards by surveyors. Accordingly there will need to be a clear understanding between the Board and the Surveyor-General on how the Board would respond to notification by the Surveyor-General that CSDs from a surveyor are not acceptable because they do not meet the standards set. The Surveyor-General's standards will need to set not only standards for individual cadastral survey datasets (CSDs), but also standards for consistency over time, and the consequences of non-compliance. These principles are already incorporated in the current accreditation process, but may need modification to align with the new regulatory regime.

In the event that individual audits or validations show that the required standards are not being met, LINZ may need to introduce an additional level of validation or audit, to minimise risk from deficient surveys being entered into the survey system. This will incur extra fees and possible time delays, with a transparent process for determining when any such extra checking or audits and extra fees should be imposed. Any continuing pattern of deficient surveys would be reported to the Board for its action. In the meantime LINZ need to would

continue with extra checking and audits. If, after a specified period of time, there is no sufficient improvement in the quality of CSDs from that surveyor, and the Board does not take action, the Surveyor-General may need to have the ability to refuse to accept CSDs from that surveyor.

At about the same time as we move into the licensing regime, digital lodgement and prevalidation processes will become available to surveyors (Haanen et al 2002). This should reduce the potential for errors in lodged surveys, thus streamlining the survey validation process. LINZ processes will instead be able to concentrate on resolving conflicts with the survey records, managing the network, addressing dispensations and exemptions, updating standards, and in carrying out field and office audits.

The post digital lodgement process will make available to surveyors the capability to prevalidate their surveys in terms of the Surveyor-General's standards or business rules and the official data base, before lodgement. Surveyors will still have the opportunity to identify problem definitions and errors in the official data base for correction by LINZ, reinforced by the opportunity to validate their own work first. This approach will also enable the earlier identification of problem areas, allowing these to be discussed and resolved prior to lodgement.

## **8. EXPECTED OUTCOMES**

When fully implemented, **Landonline** will automate many of the checks as part of the input data validation to ensure the database retains its integrity and reliability, particularly for future applications. The audit process thus becomes a key component of the automated system by complementing the internal checks to provide comprehensive assurance as to the overall quality of the survey process and the data submitted.

The expected outcome of these changes is that surveyors will be able to more effectively maintain and demonstrate their professionalism and competence in providing the public of New Zealand with quality surveys, and in contributing to the provision of a spatial reference system of high integrity and capability. A corresponding outcome will be to reduce the level of Government's involvement in the process and improve cadastral survey dataset processing and approval. A further outcome of more consistent quality of surveys will be the ability to streamline and further automate the processing and approval of CSDs. In effect it may be possible for surveys that fully comply with the business rules and that do not identify any conflict or problem with existing surveys to be automatically approved complemented by random post approval audits.

The system thus can become substantially self-regulating, with surveyors operating within an overall regulatory framework of Surveyor General's standards, survey network, database business rules and audit, and the determination of competencies by the Board.



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## **BIOGRAPHICAL NOTES**

**Tony Bevin** has worked in various field, administrative and regulatory capacities in the New Zealand government's survey offices for 40 years. He was deputy Surveyor General in the Department of Survey and Land Information from 1989 to 1996, and is currently Surveyor General in Land Information New Zealand. He is also the chair of the New Zealand Survey Board and currently chair of the Council of Reciprocating Surveyors Boards of Australia and New Zealand. He is a registered surveyor and a fellow of the New Zealand Institute of Surveyors, and was a vice-president of the Institute from 1987 to 1989. He has published a number of papers on geodetic surveying, electromagnetic distance measurement, automation and cadastral survey reforms.

**Anselm Haanen** has worked in various capacities in government's cadastral offices for 20 years. He was Advisor to the Fiji Land Information System for 2 years and since 1996 has been the Survey Database Advisor to the Surveyor General. He was recently seconded to the Survey Conversion Project as the LINZ Survey Business Expert. He holds a Master of Surveying degree from Otago University.