



# Institute of Cadastral Surveying (Inc)

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Mark Dyer  
Surveyor-General  
Land Information New Zealand  
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Dear Sir,

## **REVIEW OF THE RULES FOR CADASTRAL SURVEY 2010 ISSUES AND OPPORTUNITIES PAPER**

ICS welcomes the tone of the Issues and Opportunities paper, the opportunity to provide a contribution, while our collated feedback is presented in terms of the Review Paper section numbers as follows.

### **Forward**

While it is not your intention to undertake a 'zero based' review of the RCS 2010, ICS believes the review will need to be more than a refining and reorganising exercise to achieve concise, comprehensive, up to date, reasonable, nationally consistent, and easily interpreted rules. If this is achieved, then no LINZ interpretation guidelines should be necessary.

### **1.1 What is the purpose of reviewing the Rules?**

The key words are indeed "practically applied" and "fit-for-purpose", while we would suggest the term "pragmatic" is also applicable.

### **1.2 Overview of the Rules review process**

ICS welcomes the establishment of a Reference Group to assist you in undertaking your review. We look forward to receiving a copy of the terms of reference for this group, particularly in view our discussion of 21 September 2017 where you indicated this will comprise members representative of the profession rather than representing the profession.

### **2.1 What is the cadastral survey system trying to achieve?**

ICS notes that many of the end outcomes for the cadastre expressed are unrelated to cadastral surveying requirements, and would highlight your responsibility to apportion cost between the parties in terms of s7(2)(c) of the CSA 2002 in this regard.

### **2.2 The place of the Rules in the cadastral system**

There is a perception that the current RCS 2010 were developed to support the requirements of the Landonline system. ICS would encourage you to make the best rules possible, and then have the appropriate computer system utilised by LINZ in the processing, storage and retrieval of cadastral survey data work to support those best rules.

Items 2.1 and 2.2 of the paper have a heavy concentration on the requirements of the cadastral survey system, while ICS believes it would be prudent to add similar sections concentrating specifically on the cadastral survey for balance.

To this end ICS suggests two further items be added to this section, namely;

## **2.3 What is the cadastral survey trying to achieve?**

Section 4 of the CSA 2002 defines a cadastral survey as "means the determination and description of the spatial extent (including boundaries) of interests under a tenure system", and so a cadastral survey is limited to defining and describing the spatial extent of interests.

This is further borne out in s49(1)(a) of the CSA 2002, which limits itself to items associated with the cadastral survey, while s49(1)(b) is the relevant section regarding the wider CSD.

## **2.4 The place of rules in the cadastral survey**

Rules for cadastral survey are there to ensure and support cadastral surveys are undertaken to such standards as are required to allow for the issue of rights by the Crown, or, other purposes of the Crown in terms of s7(2)(d) of the CSA 2002. With this dual function in preparing rules under s7(1)(c), there is the associated necessity for you to consider the apportionment of costs between the parties in terms of s7(2)(c), while cost benefit analysis for such rules is of course also required under s49(3)(d) of the CSA 2002.

### **3.1.1 Confusion about water and irregular boundaries**

As with many issues, it will only be possible to make good rules about water and irregular boundaries once the concepts involved have first been identified. For example, can erosion completely destroy an original parcel, can accretion against a parcel extend past the original river centreline, or, under what circumstances can such a boundary be converted to a right line boundary.

### **3.1.2 Lack of completeness for non-primary parcels**

ICS agrees that there is much confusion regarding non-primary parcels, and much to be done to clarify many of these issues.

For example, for the creation of new non-primary irregular boundaries where they coincide with irregular boundaries of primary parcels or marginal strips, it needs to be made clear that the non-primary boundaries are not ambulatory.

### **3.1.3 Lack of completeness for the marine cadastre**

The comments made highlight issues associated with the marine cadastre, while it may be possible to be more inclusive, and consider all areas of the cadastre covered by water.

### **3.1.4 Compliance cost for simple boundary redefinitions**

There is little risk to the cadastre from a simple boundary point redefinition, current costs are onerous for the public, meaning non traditional "boundary marking" is taking place.

### **3.1.5 Other issues**

- Review of extensive rural boundary point

There should be no relaxation of standards for extensive rural boundary points, these introduce additional risk to the cadastre.

- Merging of PRM and witness mark requirements

ICS views vary from no concerns with current requirements, to agreeing with merging.

- The applicability of accuracy classes to water boundaries

Water boundaries are generally subject to movement. The only class that can sensibly be attributed to them is Class D.

- Requiring reduced levels to be in terms of the NZ Vertical Datum 2016

This is felt to be unnecessary. As for the Greater Christchurch situation, national datum's may be advantageous for record / GIS purposes, but have little value in the definition of rights in the cadastral survey sense.

- Requirement for posts to be physically marked

Not required. A post is generally more physically evident than a boundary peg, while corner posts can suffer movement over time as a result of straining the attached wires.

- Sufficient vectors to verify accuracy between points

ICS views vary from no concerns with current requirements, to finding these mainly calculated vectors redundant (many are hidden on the diagrams).

- New arc boundaries

These should be avoided. It is problematic for the public to fence or build to circular boundaries.

- Occupation information requirements

As outlined below, ICS believes an observation record should be required as part of the dataset of cadastral survey integrated into the cadastre, and this record should include occupation, which is part of the hierarchy of evidence used for definition purposes.

- Recording date of field work

This should be included in the observation record.

ICS has initially identified another eight issues that need to be added to this list, namely;

- Good survey practise

The removal of a requirement to undertake cadastral surveys in terms of good survey practise in the RCS 2010 was as a result of the Surveyor-General being unable to have certainty when making complaints to the CSLB, while the CSLB still has a requirement for good survey practise within its standards

As a result of the cadastral survey failures associated with the Canterbury earthquake sequence, the ICS / NZIS working party established to give LINZ advice on this issue published guidance notes, and ICS has initiated a project to codify good survey practice based on the guidelines developed by that group.

- Origin of survey

The RCS 2010 dispensed with a requirement for an origin of survey based on the false premise that the orientation requirements of the RCS 2010 replaced origin requirements. We need only look at the minimum requirements of each item (2 marks for orientation, 3 marks for an origin) to highlight these items are not equivalent.

In fact the origin of survey is a test for rotation and scale discrepancies in underlying surveys, while the orientation requirement is solely a mechanism for GIS record purposes.

- Hierarchy of evidence

The hierarchy of evidence is used by all Cadastral Surveyors in the definition phase of every cadastral survey. With the recent Canterbury earthquake sequence, the profession as a whole appeared to lose sight of the importance of this concept, and it is therefore appropriate for the hierarchy of evidence to be included in the RCS to avoid future doubt of its importance.

At this point it is perhaps appropriate to note that if an origin of survey identifies a conflict in scale or rotation, it is the hierarchy of evidence which is applied to resolve the conflict.

- National consistency

There are currently three sets of survey regulation in force in New Zealand. Sections 1 - 19 of the RCS 2010 are in force nationally, section 20 of the RCS 2010 specifically apply to the Greater Christchurch area, and the Napier Alignment Regulations of 1932 specifically apply in the Napier region.

New Zealand is a tectonically active country in which ground movement is "common" in a geological context, and a single nationally consistent set of rules is achievable in line with good survey practise and the hierarchy of evidence.

- Conflict resolution

It is apparent that after the Canterbury earthquake sequence, the survey profession forgot how to correctly resolve conflicts between the field and the documentary record held in the cadastre. This being the case, it is appropriate that the relearning of conflict resolution using good survey practise and the hierarchy of evidence be codified in regulation for the benefit of the future.

- Observation record

An observation record is an essential part of a cadastral survey and should be included in the dataset of cadastral survey integrated into the cadastre. The benefit of this practise is more apparent in the future, where it makes for an easy resolution of a number of errors which can be detected in no other way than by reference to the observation record.

We need to be mindful that there are a number of methods of recording observations (eg. manually, by data recorders attached to GNSS and total station equipment, remote imaging) and the file formats of each of these systems need to be able to be archived and retrieved in the future.

- Accepted boundaries

Accepted boundaries are in fact boundaries captured to class D standards, and simply restating these as class D boundaries will be more consistent with the balance of the RCS.

- CSD & Title Plans

The CSD and Title Plans of the RCS 2010 are an anachronism within the current RCS 2010. They are a compilation of information copied from various components of the CSD, and in themselves contain no unique information.

The previous Surveyor-General described these plans as a product of Landonline in his evidence to the High Court on 1 March 2012, while the Registrar General of Land in a letter to ICS in July 2013 highlighted he only needs a graphic in terms of section 10.4 of the RCS 2010 for his s167 LTA 1952 graphical requirements.

ICS believes that by limiting a dataset of cadastral survey's graphical requirements to the Diagrams of Survey and Diagram of Parcels, rules for the dataset certified by the Cadastral Surveyor can be considerably simplified without adverse effect on the CSD or risk to the cadastre.

### **3.2.2 Lack of flexibility**

Each cadastral survey has a high level of uniqueness and requires a corresponding high level of flexibility. Unfortunately computers function best where there are low levels of uniqueness and flexibility, and LINZ's use of computer systems to manage their cadastral survey data requirements will always be subject to high levels of human intervention.

### **3.2.3 Poor structure and cross-referencing**

ICS wholly agrees with the sentiment expressed in this item, the current structure of the RCS 2010 is shambolic. ICS suggests that any future rules for cadastral survey be written in a logical sequence following the sequence in which a cadastral survey is undertaken.

An example of this approach has previously been provided (and is available on the ICS website at: [www.ics.org.nz](http://www.ics.org.nz), along with supporting documentation), and includes the necessary ICS simplifications, expansions, additions and deletions identified in 3.1.5 above.

### **3.2.4 Unclear terminology**

There is a lot of frustration with terms such as "defined by survey", "defined by adoption", and "accepted", which have no context in the cadastral surveying process, but are terms utilised by the Landonline system for its CSD requirements. With reference to 3.3.2 below, it is possible that rules developed respecting the separation of the three main component parts of the CSD envisaged by the CSA 2002 will alleviate this frustration.

### **3.3.1 Survey Office CSD to record boundary conflicts**

It is believed that the use of SO datasets to redefine boundary points and boundaries that are in conflict should be the exception, rather than as allowed for in Rule 20 of the RCS 2010.

### **3.3.2 Legal structure of the Rules**

The legal structure of rules must be consistent with the requirements of the CSA 2002. On 1 March 2012 the then Surveyor-General (Don Grant) in evidence to the High Court (CIV-2010-476-000624) set out the categorisation of the CSD structure, which ICS subsequently expanded upon to show the relationship between the cadastral survey and the CSD for a subdivision in terms of s218 of the RMA 1991 (previously forwarded, and available from the ICS website).

The separation of the three significant component parts of the CSD envisaged by the CSA 2002 (ie. cadastral survey, cadastral survey related information, and integration), allows for the different component parts to each have a differing focus. For example those rules associated with the cadastral survey can be specified independent of technology, while allowing cadastral survey related information and integration issues to be specified dependant on technology (eg. Landonline or ASaTS).

Such a separation also simplifies the future alteration of rules regarding each of the significant component parts of the CSD, in that only the relevant portion requiring alteration need be addressed. An example of this would be the future change over from Landonline to ASaTS, which need have no effect on the cadastral survey components rules.

### **3.3.3 Issues with data quality**

The removal of a requirement to follow good survey practise and the current over emphasis LINZ places on its integration processes, means that the quality of cadastral surveying appears to be falling. This trend means the profession needs to refocus on the important issues or there will be increased risk to the cadastre over time.

In addition, the current Landonline spatial fabric (predominantly in rural areas) can be grossly in conflict with modern survey definition, and LINZ need to introduce better methods to resolve what are essentially integration issues at an early stage of CSD processing.

### **3.4.1 The need for a CSD plan**

The paper again raises the possibility of removing the Diagram of Survey from the dataset of cadastral survey certified by the Cadastral Surveyor. It is the belief of ICS that such a diagram is an integral part of the dataset, and that the removal of this from that dataset will significantly increase costs of future cadastral surveys to the public.



James Mowat of the LINZ ASaTS group recently indicated it would be possible to extract a complete dataset of cadastral survey from the ASaTS system, and a Cadastral Surveyor could "compile" a "Diagram of Survey" from that information. That being the case, it would be even simpler if such a diagram were included in the lodged dataset of cadastral survey, in which case LINZ would not then find itself in the position of maintaining legacy software (and potentially legacy hardware) to undertake this function.

#### **3.4.2 3D CSD's**

It is presumed that when discussing a 3D reference system that LINZ is assuming height to be the third dimension. This is contrary to historic cadastral survey practise, where time has been considered the third dimension, height being the fourth dimension. ICS believes it would be foolish to make all CSD's height inclusive, the complexity and cost of such a situation would be considerable, and as in 3.2.2 above, would reduce the ability of LINZ to automate it's processing of CSD's.

#### **3.4.3 Non-traditional data types and sources**

ICS supports the concept of integrating non-traditional data types into the cadastre, but highlights the need for LINZ systems to be able to retrieve whatever data formats are utilised, on an ongoing basis.

#### **3.4.4 Collection, storage, and production of cadastral data**

There are a number of items that have been recognised by the cadastral survey profession after the Canterbury earthquake sequence, and it is worth recording these. The first is that the use of vector measurement, ground marking, and the hierarchy of evidence delivered a robust survey system to the New Zealand public. Secondly, that the coordinate cadastre delivered a robust record system, but thirdly, where it was proposed that the coordinate system utilised by the cadastre be included in the hierarchy of evidence, this was emphatically rejected by cadastral surveyors.

#### **3.4.5 Ongoing automation**

The concept of ongoing automation is acknowledged, however there are very real costs associated with automation in terms of hardware, software and training, while there is also the requirement to be able to retrieve data associated with specific file types into the future, which could require the maintenance of legacy software and hardware by LINZ.

#### **3.4.6 A changing physical environment**

The definition of rights for the changing physical environment of New Zealand is able to be accommodated within the existing hierarchy of evidence, those changes highlighted in the paper appearing to be for the third time dimension of traditional cadastral surveying.

#### **3.4.7 More accurate cadastre**

ICS has serious concern with the first paragraph of this item, which refers to the public achieving survey accuracy using GNSS enabled and emerging technologies. It is the ICS view that the public is unlikely to ever have sufficient understanding of cadastral survey accuracies and the limitations of technology to be able to achieve the survey accurate determination of rights.

In terms of the second paragraph, could ICS suggest that if there is a demand for survey accurate data in rural areas from non cadastral users, that those non cadastral users be charged sufficient costs to access such data as to enable the Surveyor-General to capture such information in terms his responsibilities set out in s7(1)(a) & 7(1)(b) of the CSA 2002.

#### **4.1.1 ASaTS**

There is no need for the review to concern itself with ASaTS development. It would be more appropriate to concentrate on integration rules associated with the current Landonline system, and change those integration rules when ASaTS is ready for introduction.

#### **4.1.2 A dynamic cadastre**

A dynamic cadastre sounds great, but it needs to be remembered that the cadastre is the sum of the documentary record of cadastral survey data, and may not accurately reflect the physical definition of rights in a tectonically active country such as New Zealand.

#### **4.1.3 Data use and reuse**

Section 7(2)(d) of the CSA 2002 supports the broader Crown use of cadastral survey information in CSD's, but this is of course subject to s7(2)(c) of the Act, and the assessments associated with the apportionment of costs between the parties needs to be clearly set out.

#### **4.1.4 Ability to accommodate legal innovations and the broader cadastre**

When considering the legal innovation and the broader cadastre, there needs to be assessment in terms of the requirements of s7(2)(c) and s49(3)(d) of the CSA 2002.

Yours faithfully



**B W Speirs**

Chairperson  
Legislation Sub-committee