

NZIS (Canterbury Branch) Working Group

Proposed guidance for surveyors locating boundaries in areas affected by shallow surface movement caused by the Canterbury Earthquakes.

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Background:

1. On 19 February 2015 the Office of the Surveyor-General (Land Information New Zealand) released proposed guidance to assist cadastral surveyors working in the Canterbury region with correctly locating boundaries in areas affected by shallow surface movement.
2. The proposed guidance was stated by LINZ to be immediately in effect, although feedback was sought from Licensed Cadastral Surveyors by 25 February 2015 (subsequently extended to 11 March 2015).
3. The NZIS Canterbury Branch established a Working Group made up of experienced Licensed Cadastral Surveyors to review the proposed guidance, garner feedback from their colleagues, and consider the wider feedback from the LINZ initiated "survey monkey" responses.
4. Following initial feedback to LINZ citing significant concerns from many parties, the proposed guidance was withdrawn on 27 February 2015.
5. LINZ and the Surveyor-General also confirmed at this time that they would consult more widely and explore potential alternatives as they work toward releasing a new response.

Working Group Scope:

6. It was considered and agreed at the initial meetings of the Working Group that the Group's focus would be on providing general technical comments to LINZ on aspects of cadastral definitions within areas affected by shallow surface movement.
7. Such responses would take into account the actual circumstances being encountered within Christchurch and seek to identify pragmatic solutions so that the confidence in, and integrity of the cadastre can continue.
8. Additional wider issues relating to these suggestions would also be identified, and listed for the consideration of other parties.

9. The Working Group would establish communication links with the Consulting Surveyors of New Zealand (CSNZ), and also with NZIS Board and Council. It is noted that the Institute of Cadastral Surveyors (ICS) are also represented within the Working Group.

Working Group Resolutions (Response One):

10. Legal Remedies: It has been acknowledged (Ballantyne 2004; Smith et al 2011; Grant et al 2014) that the applicability of the current statutes and case law relating to re-defining parcel boundaries following a deformation event is inadequate, and that legislation to address the uncertain impact on property boundaries is recommended. The Working Group agrees. It is time to establish new law to account for the type of deformation evident within Christchurch so that the physical boundaries retain their relationships with the spatial boundaries of the cadastre as near as possible.

The law (and indeed any guideline) needs to be enduring and robust enough so that it can be applied to any location that may be impacted by a similar earthquake event.

11. Definitions: The terminology used within any guideline needs to be clear and unambiguous. Definitions need to be agreed for the following terms. The Working Group have attempted a first draft of definitions as follows:
- a. Lateral Spread – the extension of the land generally toward areas of lesser resistance or non-constrained boundaries (commonly rivers, estuaries and drains).
 - b. Non-linear shallow surface movement – an undefined area that has moved in a generally random direction and magnitude. Often unidentifiable to the observer and generally over large areas of land.
 - c. Areas of mass surface movement – specific areas (where land has moved independently to surrounding areas) that have been identified and recorded within published geotechnical reports.
 - d. Land slip – a defined area that has moved relative to its surrounding land mass. Often resulting in identifiable damage to the assets upon the land.
12. Boundaries to move with the land: The Working Group considers that the current LINZ view that boundaries do not move with the land following the Canterbury Earthquake events has been misinterpreted from legal precedents that relate primarily to land slip events.

Boundaries affected by non-linear shallow surface movement need to be recognised as moving with the land surface. This concept acknowledges the reality that all land assets on the parcel (dwelling; utility buildings; fences, driveways, gardens and underground services) would have generally moved in the same way as the physical boundary. The concept of boundaries not moving with the surface of the land is foreign to the landowner and only suits a (currently) legalistic viewpoint, and a questionable view that boundaries are somehow only tied to the underlying bedrock.

Locations subject to lateral spread may also be considered to move with the land. This type of movement is aligned with non-linear shallow surface movement and would eliminate the need to differentiate between the two areas. It is our experience that affected areas often have various levels of both categories of such movement.

It is acknowledged that the concept of boundaries moving with land may result in a parcel of land being reduced or enlarged in area or dimension. Any “loss” if considered to cause a ‘diminution of value’ may need to be remedied – potentially by compensation.

13. Boundaries not to move with the land: Boundaries within mass surface movement areas should not move with the land. This situation is more akin to a land slip zone (or avulsion with respect to water boundaries) in that the area of movement is generally limited in extent and can be spatially defined in a consistent direction. In these cases boundaries can be defined relative to unaffected survey control outside the affected area.

This aspect needs to be considered further. If the movement is also coupled with property damage then the concept of boundaries not moving with the land is clear. If the area is large and movement imperceptible to occupiers and infrastructure (including occupation), then it could also be considered the same as non-linear shallow surface movement.

14. Block surveys: A special project to re-survey the residential blocks within areas that have been identified as affected would provide surety of definition going forward in the short and long-term. The project would need to be managed and funded by LINZ. Blocks could be allocated to survey firms who would be responsible to connect their single Survey Office definition survey to the Order5 control; connect with existing cadastral survey marks including boundary pegs as well as occupation; analyse the information gathered; ascertain the road boundary frontage alignment and total dimension (identifying any shortage or excess compared with the pre-quake title sum); and consider the post-quake integrity of the individual parcel frontage dimensions compared with title (as there may be localised compression or extension within the block frontage). The definition of the rear boundaries need not be a priority – any subsequent definition will be able to utilise the frontage definition with some surety and therefore extend the work to the rear of the properties.

One benefit of undertaking this work in the short term is to take advantage of the existing remaining physical evidence before it is destroyed by rebuilds and street works. The economic feasibility of this special project needs to be calculated – weighing the cost of the bulk survey definitions now against the costs of many isolated future boundary definitions with conflicts long into the future.

A survey prescription would specify the requirements for each survey so that the data collected and presented will be consistent across all surveys. Red Zone areas can be excluded. There may be priority areas that should be undertaken first (ie: zones of known conflicts).

15. Good Survey Practice: The importance of gathering all evidence and providing a full analysis which is detailed within a comprehensive survey report needs to be re-emphasised. The survey report should break down the analysis of ground movement and its justification as the basis of definition decisions made.
16. CSD Approval Process: More emphasis on the survey definition should be part of the CSD approval process within LINZ. Given the scale and nature of the current complexities of definition in Christchurch, a rigorous review of the presented definition by experienced Licensed Cadastral Surveyors is beneficial.
17. Disturbed Marks: Marks should not be automatically considered as disturbed solely because they are within an area of non-linear shallow surface movement. If the mark is vertical; resides in the same relationship to any adjoining survey mark and/or occupation as it did before the event; and appears to be undisturbed (or there is no identifiable evidence that it has been substantially and individually affected) then it can be considered undisturbed.

18. Hierarchy of Evidence: The long established and accepted principles of the definition hierarchy of evidence needs to be retained and honoured – notwithstanding the impact of an earthquake event that has resulted in areas of non-linear shallow surface movement and lateral spreading. We as a group see the only real solution to this issue as being a law change or declaratory judgement to reflect that boundaries that are subject to shallow surface movement move with the evidence of the boundary locations – that is to say that the hierarchy of evidence be maintained and the pragmatic definitions, as has been conducted in the past, continue.
19. SDC Coordinates used for definition: The application of SDC coordinates only to define cadastral boundaries would create a mismatch with any existing monumentation and occupation. There is uncertainty as to the absolute accuracy and integrity of coordinates that are based on a mathematical model; have an estimated 95% confidence standard error of 90mm; and are fixed at a certain epoch. Such coordinates should only be used as a tool of last resort, and where all definition evidence has been destroyed.

The NZIS Working Group will continue to monitor this issue and look forward to further communications with LINZ and from other parties on the definition of boundaries in Christchurch following the 2010-11 Canterbury Earthquakes.