



Survey Strategic Context

**New Zealand Institute of Surveyors
&
Land Information New Zealand**

Joint Working Group

2009

Working Paper One

Proposal for Tomorrow's Cadastral Survey Industry

Contents

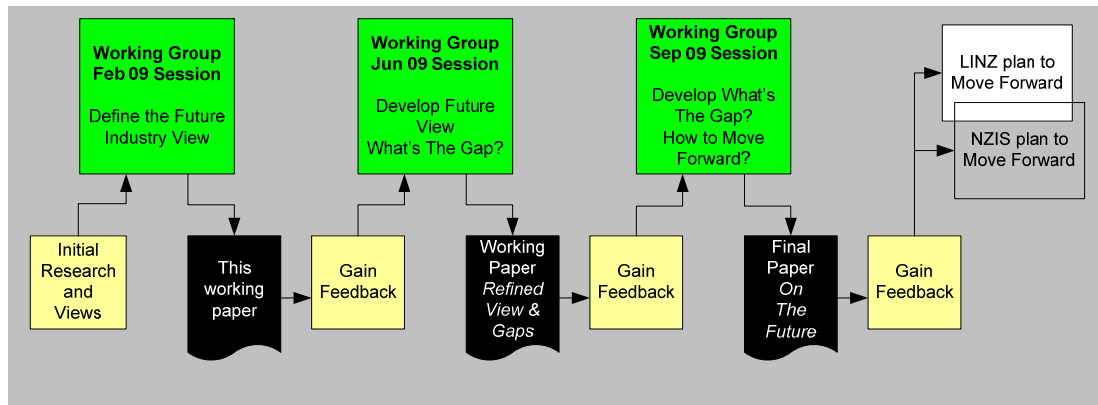
1	Introduction.....	3
2	What will shape tomorrow's industry?.....	4
2.1	International benchmark.....	4
2.2	Legislative & regulatory.....	5
2.3	Context of New Zealand markets.....	5
2.4	Industry demands.....	6
3	Tomorrow's proposed cadastral environment.....	8
3.1	Principles.....	8
3.2	Future information flow.....	10
4	Participant roles.....	11
4.1	Land Information New Zealand.....	11
4.2	Central and local government.....	12
4.3	New Zealand Cadastral Survey Licensing Board...	13
4.4	Professional bodies (NZIS/ ICS).....	13
4.5	Surveyors.....	14
4.6	Survey school & survey training establishments...	14
4.7	Conveyancing practitioners.....	14
4.8	Crown companies & private sector.....	15
5	Conclusion.....	15

1 Introduction

- 1.1 Given recent developments with 100% e-lodgement and the pending change to the Cadastral Survey Rules, LINZ and NZIS have established the Survey Strategic Context Joint Working Group. The Working Group aims to examine the future of the cadastral survey industry to form a shared view of tomorrow's state of the cadastral survey industry in New Zealand; how key players contribute and what it will take to get there.

*'today' covers 3-5 years,
'tomorrow' looks out 6-10 years.*

- 1.2 To meet this aim the Working Group is applying the process below:



- 1.3 The influences considered by the working group as shaping tomorrow's industry are:

- **The international benchmark.** This focused on the *Cadastre 2014, A Vision for a Future Cadastral System* (FIG Commission 7) along with other associated papers and the Australian environment described in papers by Professor Williamson.
- **New Zealand legislative and regulatory factors.** This focused on the Cadastral Survey Act (2002), and the risk-based approach and their likely application in future.
- **Context of New Zealand markets.** The working group focused on the involvement of surveyors in markets other than traditional land development, looking at the wider land administration and land information markets.
- **Industry demands.** The working group asked for feedback from the industry and received 18 submissions on various issues. While many of these concerned today's issues, some of which were already under remedial action, the Working Group focused on the underlying causes (see para 2.4) and applied those to the future where relevant.

- 1.4 The Working Group therefore considered:
- What is the shape of the future environment cadastral surveyors will operate within?
 - Who are the key participants; and what are their roles?
- 1.5 Within the context of the Working Group process, this paper represents the Group's initial thoughts that are subject to change and development after further consideration and feedback. If you have any comment or feedback, please send it to jointworkinggroup@linz.govt.nz before 31 May 2009.

This paper conveys the initial thinking of the Working Group as to what the future industry may look like, who will be involved and what their roles are.

2 What will shape tomorrow's industry?

2.1 International benchmark. The Working Group considered the following international information relevant:

- The FIG Commission 7 work surrounding Cadastre 2014 provides a suitable reference point. However, the differences between the European and New Zealand situation needs to be considered – particularly their cadastral mapping practices and population densities.
- Of particular relevance is having a system that shows the 'complete legal situation of land', moving beyond tenure related parcels of land to 'land objects' that define an area affected by a statutory right, i.e. a forest defined for the purposes of the Emissions Trading Scheme or defining rights for mussel farming. Within this context, land also includes land covered by water, the air above and earth below.
- While achieving this complete view of the legal situation is the goal, internationally it is acknowledged that no single agency or database can hold the breadth and variety of information that would be required.
- The environment for surveyors is broadening well beyond the land development market. This expansion sees survey information supporting the land administration market and the even wider geospatial information markets.
- The role of the surveyor is therefore looking to encompass not only the pure cadastral/ land tenure aspects that the licensed cadastral surveyor (LCS) has to deal with but also defining the spatial extent of these land objects to the degree required by other statutes – such as the Resource Management Act. This also opens up the possibility of defining some land objects to levels achievable with less accurate technology, thereby expanding the role of collecting such information beyond that of qualified surveyors.

2.2 Legislative & regulatory frameworks

- Consideration of the Cadastral Survey Act 2002 (the Act) noted that the legal definition of the cadastre and cadastral information is only within the context of land tenure and not the full legal situation of the land.

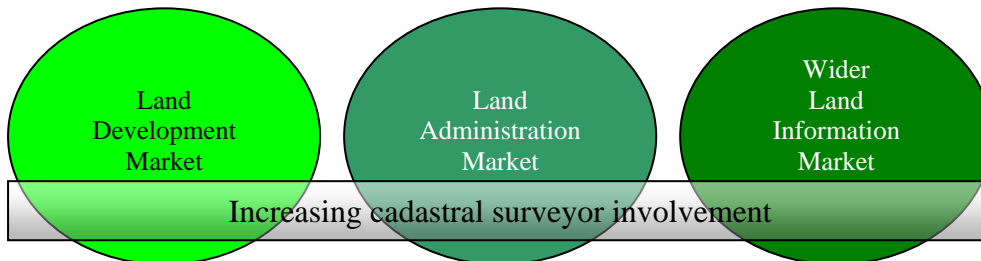
There is a fundamental difference between the NZ legislative definition of a 'cadastre' and the international benchmark.

- In the context of the international benchmark, there is the requirement to look wider than just the Act to ensure that spatial definition of land objects is suitable to support all land related legislation, e.g. how forested areas are defined to support the Emissions Trading Scheme.
- The Act does define land as including subsoil, airspace, water and marine areas and interests in or over land. This supports the international benchmark for a future cadastre.
- Optimal regulation models used by LINZ are likely to remain in future. Given the varied range of rights and privileges associated with land, and the varied consequences of spatial errors in the execution of these rights, correspondingly different degrees of regulation will be required.

2.3 Context of New Zealand markets. The Working Group considered that the overall future environment that cadastral surveyors are likely to operate in. In particular:

- The land development market will become more complex with surveyors required to interpret increasing number of land rights or privileges when planning development.
- The land administration market will also need to interpret increasing rights and restrictions associated with land management, including changing routines on the introduction of new rights or privileges.
- The land information market will develop as society becomes increasingly spatially aware and reliant. Technology will allow us to take for granted *knowing where things are* and this market will provide the information to enable that. While it is unlikely the collection of cadastral survey information will be solely for such a broad purpose, it can be used in this market once collected.

- 2.4 The working group believes that the involvement of cadastral surveyors, and the information they manage, will become increasingly important in the land administration and geospatial information markets as well as the traditional land development market.



2.5 Industry demands.

- The New Zealand industry echoes the international benchmark in seeking to establish a complete legal situation of land. There is an industry desire to have all New Zealand land rights information accessible and easily integrated to support sustainable land use, development and administration.
- **Four dimensional information.** The current 2-dimensional model, historically associated with paper plans, will not meet future needs.
 - With high-density living commonplace, the rights associated with the air above ground are likely to become more contentious and more relevant for non-cadastral purposes such as emergency management. Similarly, in the future there will likely be greater emphasis on the rights associated with mining, drilling, otherwise winning, or managing natural resources from the land or sea. These will require definition of the third dimension; the vertical datum.
 - The enduring nature of a cadastral system must be taken into account and allow a retrospective view of what rights and privileges were associated with the land at different times, how natural boundaries have moved over time, etc. Another example is the temporal aspects of district plan rules. When changes occurred in the past, they will have changed the permitted, controlled, discretionary or non-complying nature of possible activities. This adds the fourth dimension to the datum; showing changes over time.
- **Quality of information.** The quality of the information needs to be fit for purpose. However, the purpose for which the information is collected may not be the only purpose to which it is applied – especially by the ill informed. This can lead to incorrect land related decisions, e.g. investment, construction, planning or policy advice, where the purpose of the application of information is not what was intended or supported by the type of collection and processing. The future expectation is likely to be that the quality of the information is

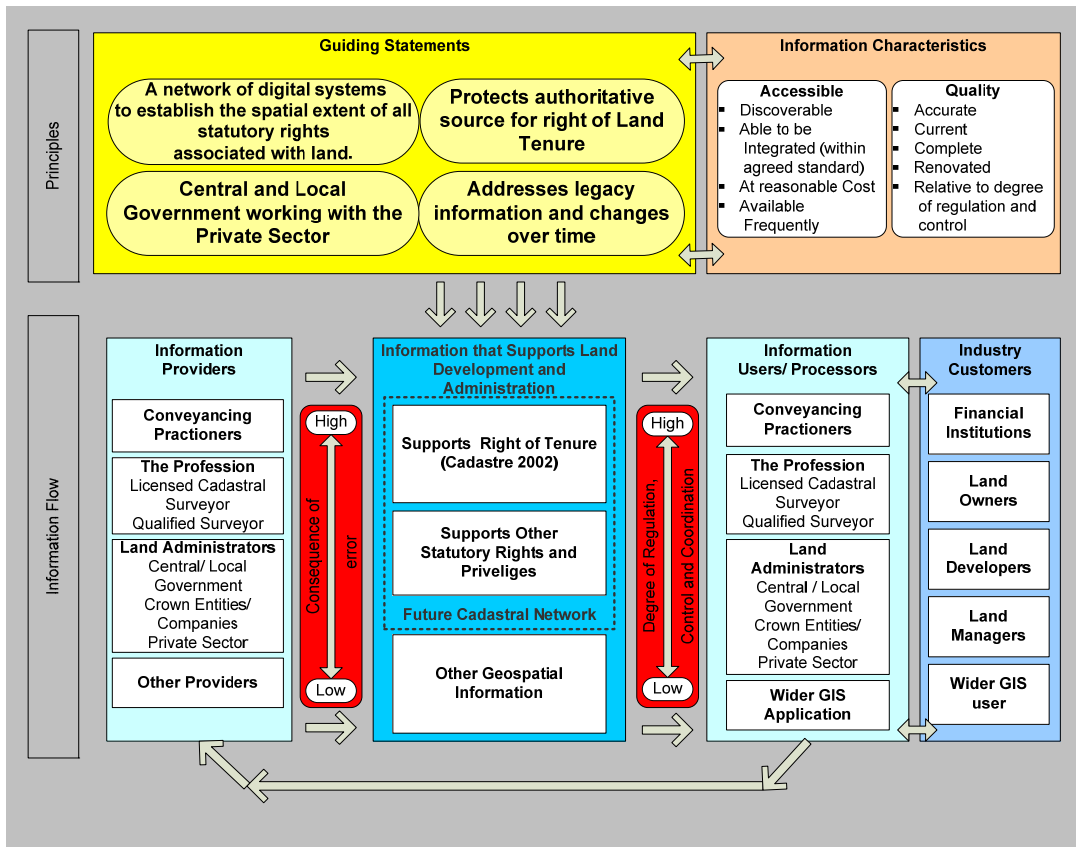
fit for purpose, depending on where it is on the scale of consequence of a spatial error. This covers the areas:

- **Accuracy.** Areas defined within respective information must match the degree of accuracy required by the consequence of spatial error.
- **Currency.** The areas defined are the most recent and able to be applied with certainty.
- **Completeness.** All aspects relating to the purpose of that information are included.
- **Description.** The information must have reliable metadata that describes its quality, source applicability etc.
- **Access to information.** Given the information age, the general expectation will be to have quality information:
 - easily discoverable;
 - accessible 24/7;
 - at low/ no cost; and
 - in a digital format that enables integration with other information or if already integrated, is able to be separated.
- Processing of information by those who hold respective Crown stewardship is transparent.
- Applications of the information beyond defining rights will be many and varied. These areas will not seek or require the highest levels of government legislation and regulation, but will rely on the ability to integrate the information with other data.
- Any change in the cadastral environment must, as a minimum, protect the outcomes supported by the current environment.

What do you think?

*Which of these is the most important influence on the future?
What else should we consider before moving forward?*

3 Tomorrow's proposed cadastral environment



3.1 Principles

- The Working Group could not define the details of the future cadastral environment, however propose developing the details within guiding statements:

1. *A network of digital systems to establish the spatial extent of all statutory rights associated with land.*

- The Working Group considers there is no single agency or database that will contain *all* cadastral-related information of the future. However, each different piece, or database, of this information contributes to the complete picture through a cadastral network.
- 'Associated statutory rights' is a dynamic statement allowing for information to support rights not yet established to be incorporated within the environment.
- The use of 'land' reflects the current legal definition including land covered with sea, what is above and below ground.

2. Central and local government working with the private sector.

- Building on the statement of networked digital systems, this acknowledges the extent of the network that will operate in the future cadastral environment. Administering statutes is a Crown responsibility and given the mandate of New Zealand local government, they share responsibility with central government.
- The private sector component includes:
 - As information providers and users delivering benefits to the industry customers and the country as a whole.
 - Providing capability, such as database or other IT services, to assist central and local government in delivering their information management.
 - Conducting roles that would be inappropriate or inefficient for central or local government to conduct.

3. Protects the authoritative source for right of tenure.

- This principle recognises that the future cadastral network will likely have an expanded scope, but requires that the cornerstone of certainty of ownership, underpinning much of the economy, remains paramount.
- The likely future cadastral environment will have information regulated, controlled or coordinated to varying degrees corresponding with the consequence of spatial error. For example, the level of current regulation applied to cadastral survey and land tenure is high, and will remain so, as the consequence of error in defining the spatial extent of tenure, in some cases within centimetres, can strike at the heart of our economy. Conversely, the consequence of being in error by several metres when defining the spatial extent of a public high country-walking track may be minimal and therefore does not warrant the same degree of regulation. In other situations, the consequence may warrant only voluntary adoption of standard or general coordination.
- Application of this principle will ensure the protection of tenure during any future expansion of the cadastral environment, and indeed this will remain at the highest degree of certainty in the future cadastral environment regardless of technology advances in other areas.

4. Addresses legacy information and changes over time.

- The future cadastral environment must not lose visibility of old rights or privileges. This will only lead to later redress and uncertainty of the spatial extent of complete statutory rights, thereby undermining the whole system.
- **Information characteristics.** Additionally, the future cadastral environment needs a foundation of information that reflects the characteristics of quality and access (refer para 2.5).

What do you think?

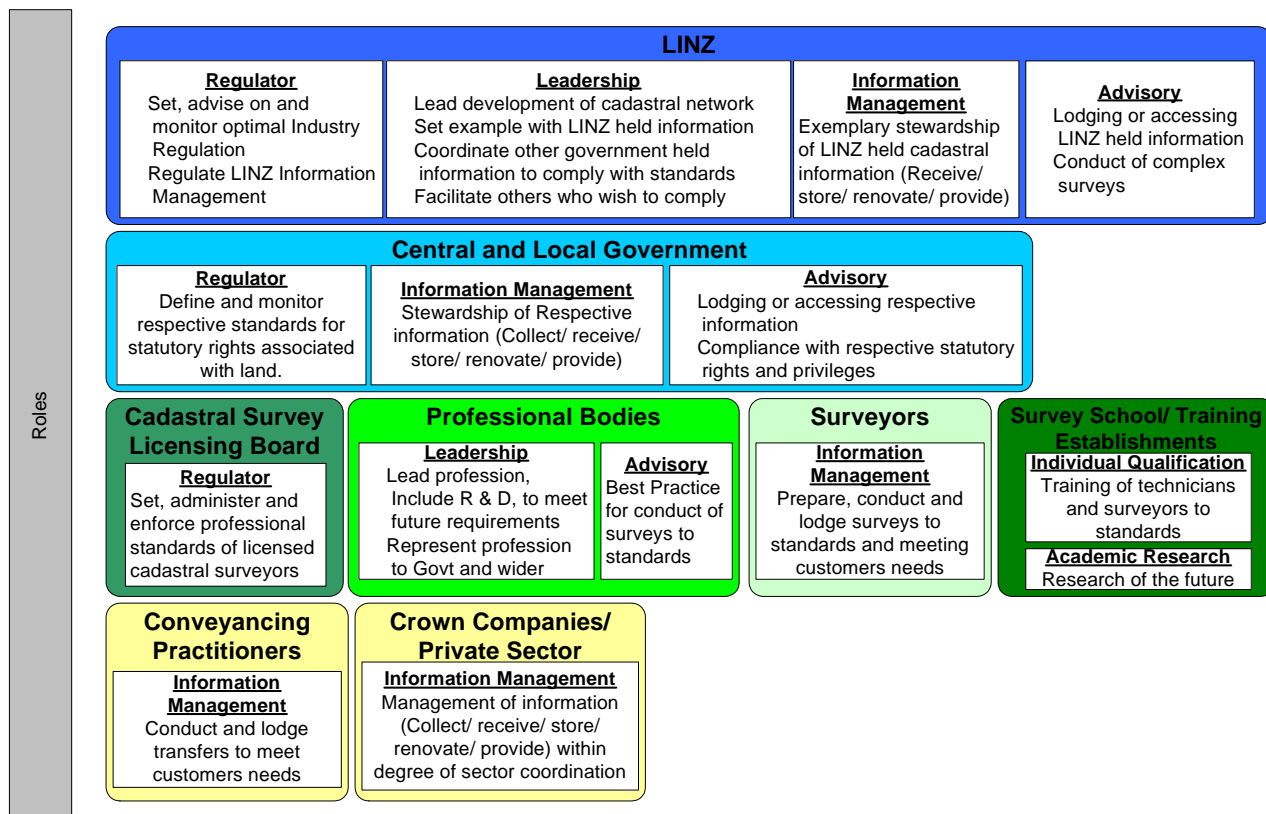
Which of these principles is most important?

What else needs to guide us moving forward?

3.2 Future Information flow. The Working Group sees the future environment functioning with the following:

- Information is the central component. This includes information that defines the spatial extent of statutory rights and privileges but also acknowledges dependency and linkages with other geospatial information used for land administration and wider GIS application.
- Regulation, control and coordination applied to the information as warranted by the consequence of spatial error.
- Cyclical information flow. This flow is from those who access the information and in some way process it to meet industry customer needs. Then, once processed, the information can be, and in some cases must be, provided back into the cadastral network, building on the picture over time.

- 4 **Participant roles.** The future environment may mean some changes or development in the roles of participants, including new participants and new roles.



- 4.1 **LINZ.** The Working Group considers the following roles may apply to LINZ in the future environment:

- **Regulator role.** Building on the current regulating role for land information, LINZ would define, manage and enforce, as appropriate, optimal regulation and control of the cadastral network.
- **Leadership role.** This has several aspects:
 - Lead the future cadastral network. The leadership role accepts that many of the resources required for the future cadastral environment to function are not contained within LINZ. Furthermore, some land information is not held by organisations that are obligated to follow LINZ direction, but their involvement is mutually beneficial. This role would therefore include providing advice to central government on policy, legislative and regulatory requirements (including legislative reform if necessary), negotiating and exercising mandate from the Minister, coordination of the government sector, and the softer facilitation of those who volunteer to join the network including advice on data structures etc.
 - Leadership by example through LINZ conduct of its information management role. (see below)

- **Information management role.** LINZ will continue to be New Zealand's steward for the important cadastral survey and title information and other land information required by the future cadastral environment. LINZ's role would include:
 - Receiving information through established digital systems as part of the future cadastral network.
 - Storage that safeguards from loss or corruption.
 - Renovating information to optimise. The term '*renovate*' goes beyond maintenance of data to include active improvement, updating and integration of the underlying data to give completeness and accuracy.
 - Provision of information as part of the future cadastral network.
- **Advisory role.** This has several aspects:
 - Advice to information users or providers of LINZ held cadastral information on how to interact with the LINZ management processes – such as user guides, help lines for lodging or access to the Landonline system, and on LINZ expectations to complete survey documentation.
 - Building understanding of LINZ regulatory requirements.
 - For rare and complex transactions, advice on what legislation and common law may be applicable. There needs to be clear boundaries between this LINZ role and the professional body advisory role for best practice for the conduct of surveys. (see below)

What do you think?

What should LINZ focus on for effective operation within the future environment?

4.2 Central and local government. The Working Group considers the following roles may apply in the future:

- **Regulator role.** Government departments or territorial authorities will need to exercise their statutory rights and privileges as appropriate – for example the Resource Management Act for territorial authorities. Under LINZ sector leadership and with the scales of regulation, control and coordination, these bodies will establish and maintain the required standards.
- **Information management role.** For central and local government the information management role can have two areas:
 - Being the steward of respective information, and allowing other access to that as part of the cadastral network.
 - Using the information themselves (where the government department or territorial authority is also a land manager).
- **Advisory role.** This includes:
 - Advising others that are lodging or accessing the information they hold on their respective system.
 - Advising on the regulatory framework that supports that information.

What do you think?

How important is it to have this information included in a cadastral network?

4.3 **New Zealand Cadastral Survey Licensing Board (NZCSLB).**

Regulatory role. The Working Group considers it appropriate that the NZCSLB maintain the statutory role that regulates the individuals who support the information with the greatest consequence of error - the current cadastral surveys.

What do you think?

For the future environment, are there any other individuals that the NZCSLB, or another body like them, should regulate the individual competency of?

4.4 **Professional bodies (NZIS/ ICS).** The Working Group considers the following roles may apply in the future

- **Leadership role.** This has two areas:
 - **Lead the profession within the future cadastral environment.** Define, guide and optimise the conduct of professional surveyors.
 - **Ongoing development of the profession.** This is defining the future of surveyors within the cadastral environment to ensure they remain relevant despite developments in other areas, be it legislation, technology or other industry demands. In exercising this role the professional bodies will use robust research and development, other professional education processes and development forums such as conferences.
 - For both these functions, the professional bodies will represent the profession as required by the interests of their members within the future cadastral environment and any ongoing development. This can be lobbying central or local government or wider industry players to ensure that members of the professional bodies are correctly and widely recognised as having the expertise and professionalism that the wider survey industry needs.
- **Advisory role.** Coupled with the leadership role is recognition that the professional bodies hold the font of professional best practice for core business – the conduct of surveys. This advisory role is complementary, with well-defined parameters, with the more specific and complex LINZ advisory role.

What do you think?

*How important is it to have these roles in the future?
What other roles should or could the professional bodies play in future?*

4.5 Surveyors. Surveyor possible roles are:

- **Information management role.** Be it cadastral or otherwise qualified surveyors, their role is to use the information, and conduct and lodge surveys to respective standards as required to meet customers' and regulatory requirements. From the customer point of view, the surveyor is the information broker - the single initial point of contact that can access, interpret and advise on all future cadastral information that defines all rights and privileges associated with the land in question.

What do you think?

What other roles could surveyors have in the future?

4.6 Survey School and survey training establishments. Possible roles in the future environment are:

- **Individual qualification role.** Meeting the expectations of the NZCSLB surveyor competence standards and taking guidance from professional bodies for best practice, the Survey School and other training establishments would work within the National Qualifications Framework to deliver individual qualifications aligned to the needs of the survey industry.
- **Academic research.** The Survey School has a role with providing academic research that would provide a basis for LINZ research supporting its policy advice and for professional bodies' research to support best practice. In many ways, this role will underpin the future-proofing of industry development.

What do you think?

Why is an academic research role important?

4.7 Conveyancing practitioners. The possible future role is:

- **Information management role.** Fundamental to supporting the legal right of land tenure are actions by the conveyancing practitioners in accessing, processing and lodging land tenure information as required by customers and the regulatory framework.

What do you think?

Does there need to be greater interaction with the conveyancing practitioners in future?

4.8 Crown companies and private sector.

- **Information management role.** This is a wide and varied group with roles including:
 - Collecting and providing land information that defines the spatial extent of rights or privileges associated with lesser consequences of error. This may include storing the information themselves, or lodging it with the appropriate steward.
 - Accessing information they collected themselves or gained via the cadastral network (possibly through a surveyor) to support respective land development or administration.
 - Accessing the cadastral network to gain information for value adding or some other application.
 - Regardless, this role would be conducted under the coordination at, or facilitated by, LINZ with the relevant degree of regulation, control or coordination.

What do you think?

What are examples of land information that define the spatial extent of rights or privileges that could be collected or accessed by a non - surveyor?

5 Conclusion

- 5.1 The Survey Strategic Context Joint Working Group developed this paper to provide some initial thoughts on the shape of the future cadastral survey industry. This was after consideration of international benchmarks, legislation and regulation, the context of New Zealand markets and the likely future industry demand.
- 5.2 The paper proposes a future cadastral environment with a network of digital systems to support land development and administration in the future by giving the complete picture of rights and privileges associated with land. It also supports the wider application of this information in the land information market.
- 5.3 You can have your say by providing feedback on what you think of this initial view. In addition, the Working Group is interested in how you think any of the participants match up to their future role. Please email your feedback to jointworkinggroup@linz.govt.nz or submit it through an NZIS Branch before 31 May 2009.