REVIEW OF THE SURVEYING ACT 2002 (NSW)

A REPORT TO
THE DIRECTOR GENERAL, NSW DEPARTMENT OF LANDS

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40 Review of Act

(1) The Minister is to review this Act to determine whether the policy objectives of the Act remain valid and whether the terms of the Act remain appropriate for securing those objectives.

(2) The review is to be undertaken as soon as possible after the period of 5 years from the date of assent to this Act.

(3) A report on the outcome of the review is to be tabled in each House of Parliament within 12 months after the end of the period of 5 years.

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Executive summary

1. Background

Section 40 of the Surveying Act 2002 (the Act) requires the Minister to review whether the policy objectives of the Act remain valid and whether the terms of the Act remain appropriate for securing those objectives. To inform the Minister's review, the Department of Lands has requested an consultant to conduct an independent review of the Act.

2. Policy Objectives

Unlike some other recent NSW legislation, e.g. Architects Act 2003 No 89, the objectives are not explicitly stated in the Surveying Act 2002. In consultation with the regulating authority the policy objectives have been inferred to be:

1. To protect the public from unscrupulous or inadequately qualified persons undertaking survey work.

2. Produce, safeguard and maintain a state cadastre of spatially referenced information extending above and below the surface of the earth.

3. Coordination of surveys made by public authorities and the establishment of a State control survey.

4. Investigation and advice to Government on matters concerning the collection, collation and dissemination of spatial information other than surveys.

3. Consultation

Twelve key stakeholder organisations[1] were invited to make submissions to this review. Nine organisations have provided written responses[2]. These vary in scope and depth from a couple of paragraphs to 18 pages in length. This report relies heavily on those submissions but in most cases focuses on the outcome which stakeholders appear to be looking for rather than any specific amendment to the wording of the legislation which they may have proposed. In all cases the desires and aspirations of stakeholders have been tested against NSW policy for best practice legislation as expressed in the publication "*From Red Tape to Results, Government Regulation: A Guide to Best Practice, Inter-Governmental and Regulatory Reform Branch, The Cabinet Office, New South Wales, June 1997*".

[1] Attachment 1

[2] Attachment 3

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4. Summary of findings

Land and mining surveying are amongst the most regulated occupations in NSW. This level of regulation may appear to be out of step with current NSW policy on government regulation[3]. But surveyors are comfortable with this level of regulation and it has worked well as evidenced by the relatively low number of consumer complaints against *registered surveyors*. There is no evidence that the regulation of land and mining surveyors should change in any radical way.

If there is a shortcoming in the current regulatory regime it is that it only protects the public from unscrupulous or inadequately trained *land* and *mining* surveyors when the public engages with and relies upon the expertise of a whole range of surveyors. A voluntary system of registration for 'other' related survey disciplines would increase their visibility, create a better understanding of surveying and enable the public to make better informed decisions about the type of survey services they require. This report recommends, therefore, expanding the "registration" of surveyors to other surveying disciplines such as engineering, hydrographic and aerial surveying and to companies or firms as well as individuals. The prescriptive style of the current legislation reflects the unique role, and the history and heritage, of *land* and *mining* surveyors but for other surveying disciplines the recommendations are for a voluntary system of registration.

While the regulation of land and mining surveyors has been as successful as it is prescriptive, the current Act is far less prescriptive about spatial information. None the less, the Board of Surveying and Spatial Information (the board) has achieved a major milestone with the publication of the CS2i[4] strategic plan for spatial information. While other jurisdictions have developed their spatial strategies without similar legislation, senior staff of the Department of Lands are adamant that the Act was the major catalyst for the achievement of a cohesive spatial information strategy for NSW.

To facilitate successful implementation of the CS2i plan, this report recommends the objectives of the Act should be extended to the setting of standards for the collection and representation of spatial information. This objective could be achieved by mandating the use of national and international standards but these tend to be complex and are continuously evolving in line with the technology. The preferred alternative is to expand the role of *the register of public surveys*[5] to provide guidance on standards to public authorities and other suppliers of data to that register.

Expanding the role of the *register of public surveys*[6] may have resourcing issues for the Department of Lands but is seen as a powerful tool for the coordination of spatial

[3] From Red Tape to Results, Government Regulation: A Guide to Best Practice, Inter-Governmental and Regulatory Reform Branch, The Cabinet Office, New South Wales, June 1997

[4] CS2i Action Plan, BOSSI, June 2007

[5] Surveying Act 2002 Sec 7

information collection and its sharing across multiple government agencies. It is noted that a scoping study for an electronic register is currently being undertaken by the Department of Lands.

The next stage of this project is to present a report on findings to the Minister for Lands, and to government, in accordance with the requirements of section 40 of the *Surveying Act 2002.*

5. Conclusion

The policy objectives of the Act remain valid and the terms of the Act are largely appropriate for securing those objectives. Major changes to the Act are not therefore warranted.

Some of the issues raised by stakeholders would be more appropriately dealt with in the Surveying Regulation 2006 or other subordinate legislation rather than the Act itself. Strategies for such issues are discussed in Part 2 of this report.

6. Summary of Recommendations

Recommendation 1
In line with NSW Government policy the objectives of the legislation should be explicitly stated.

Recommendation 2
The objectives of the Act (Recommendation 1) should include the promulgation of quality standards for the collection and presentation of spatial information.

Recommendation 3
Policy objective 2 should be extended to a state cadastre of spatially referenced information extending above and below the surface of the Earth and the sea.

Recommendation 4
The current system of registration of land and mining surveyors should be made available, on a voluntary basis, to other surveying disciplines and to firms which provide surveying services.

Recommendation 5
An expanded register of public surveys should be a powerful tool for coordination and integration of spatial information collection and for the promulgation of quality standards.

Recommendation 6
The name of the Act should be reviewed to reflect the purpose and content of the legislation

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PART 1

Review of the Surveying Act 2002 against its policy objectives

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1. Background to this report

Section 40 of the Surveying Act 2002 (the Act) requires the Minister to review whether the policy objectives of the Act remain valid and whether the terms of the Act remain appropriate for securing those objectives. To inform the Minister's review, the Department of Lands has requested an independent consultant to conduct a review in two stages:

Stage 1 - *In consultation with the regulating authority, quantify the policy objectives of the Act.*

Stage 2 – *After consultation with a range of key stakeholders review and report on the validity of the policy objectives of the Act and make recommendations on which objectives are no longer valid and any additional objectives which should be considered.*

This report is the culmination of Stage 2 of the review.

2. Statement of policy objectives

Unlike some other recent NSW legislation, e.g. Architects Act 2003 No 89, the objectives are not explicitly stated in the Surveying Act 2002. In order to review the efficacy of the Act against its objectives it was first necessary to retrospectively quantify the original policy objectives. From an examination of Hansard, the Act itself, and its subordinate legislation and instruments, the policy objectives of the Surveying Act 2002 have been inferred to be:

1. To protect the public from unscrupulous or inadequately qualified persons undertaking survey work.

2. Produce, safeguard and maintain a state cadastre of spatially referenced information extending above and below the surface of the earth.

3. Coordination of surveys made by public authorities and the establishment of a State control survey.

4. Investigation and advice to Government on matters concerning the collection, collation and dissemination of spatial information other than surveys.

These objectives were agreed with representatives of the departmental steering committee[7] in December 2007 prior to commencement of the consultation process.

[7] Chief Surveyor; Manager, Strategic Policy and Reporting Unit; and Manager, Cadastral Integrity; NSW Department of Lands

To assist in future reviews and in the ongoing administration of the Act the policy objectives should be explicitly stated.

Recommendation 1

In line with NSW Government policy[8] the objectives of the legislation should be explicitly stated.

3. Consultation with key stakeholder organisations

Twelve key stakeholder organisations[9] were invited to make written submissions to this review. In order to focus stakeholders on the terms of reference of the review the policy objectives were stated and stakeholders were asked[10] to answer three specific questions:

1. Which, if any, of the policy objectives are no longer valid and why?

2. What, if any, additional policy objectives should the Surveying Act address?

3. Which, if any, terms of the Act are no longer appropriate for securing the policy objectives?

3.1. Responses from stakeholders

Nine organisations have provided written responses[11]. These vary in scope and in depth from a couple of paragraphs to 18 pages in length. Not unexpectedly, those organisations which represent land and engineering surveyors (IS NSW and IEMS) or firms with a large surveying component to their businesses (ACS/ASIBA) provided the most comprehensive responses. Organisations representing other spatial information practitioners offered less expansive views on the efficacy of the Act. This demonstrates the strong sense of ownership of the legislation by surveyors, even some not currently regulated by it. Conversely, organisations representing non-surveyor spatial information practitioners (SSI and GITA) had obviously had limited exposure to the legislation and offered considered but only generalised responses.

While land and engineering surveyors provided expansive and detailed responses, the mining surveyors (AIMS) submission[12] raised only one issue for consideration -

[8] From Red Tape to Results, Government Regulation: A Guide to Best Practice, Inter-Governmental and Regulatory Reform Branch, The Cabinet Office, New South Wales, June 1997 p5

[9] Attachment 1

[10] Attachment 2

[11] Attachment 3

[12] Attachment 3 A Australian Institute of Mine Surveyors Limited

supervision of non-registered surveyors. This would suggest general satisfaction with the Act amongst mining surveyors despite obvious emerging problems with recruitment and skills shortages in this surveying discipline.

In response to the three questions asked, none of the stakeholder organisations identified policy objectives which were no longer valid. Stakeholders identified one additional policy objective which the Act should address relating to quality standards for spatial information but several submissions related mostly to terms of the Act which those stakeholders perceived as no longer appropriate for securing the policy objectives. In several cases stakeholders felt that parts of the Act needed to be more prescriptive or the scope of the Act needed to be extended to achieve a given objective. Many suggestions for specific changes to the Act were, however, not in keeping with regulatory best practice[13]. Alternative strategies for achieving the goals of these stakeholders have been discussed in Part 2 of this report.

The level of association with, and knowledge of, the legislation among surveyors is to be applauded. But surveyors must also be reminded that the Act is not there to perpetuate the traditional role of the professional surveyor nor can it provide a solution to all the quandaries and uncertainties which a surveyor encounters in the course of his or her professional duties. Surveyors, like everyone else in the community, must comply with many pieces of legislation and even an ideal Surveying Act will not necessarily take precedence over those other legislative frameworks.

The ACS[14] and IS NSW[15] submissions both raised a number of problems currently being experienced by registered surveyors which they felt could be ameliorated by changes to the Act. Whilst acknowledging the legitimacy of their complaints some of the problems raised have only a tenuous linkage to the Act or its subordinate legislation. Their root cause may lie in some other legislation or administrative process unrelated to the Act. As such they are beyond the scope of this review but none the less deserve to be noted. Any such issues have been listed in an issues register[16] for possible action outside of this review process.

4. Which policy objectives are no longer valid

None of the four inferred policy objectives have been identified as no longer relevant.

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[13] From Red Tape to Results, Government Regulation: A Guide to Best Practice, Inter-Governmental and Regulatory Reform Branch, The Cabinet Office, New South Wales, June 1997

[14] Attachment 3 G Association of Consulting Surveyors NSW Inc

[15] Attachment 3 F Institution of Surveyors NSW Inc

[16] Attachment 4 Issues Register

5. Additional policy objectives which the Surveying Act should address

An additional policy objective consistently identified by stakeholders is the setting of quality standards for spatial information. This objective goes beyond offering advice to government (policy objective 4) and requires intercession with the spatial information industry in NSW, possibly, but not necessarily, regulatory intervention.

5.1. Standards for spatial information

Mr Yeadon in the Second Reading of the Surveying Bill in 2002[17] felt that "*reliable and accurate spatial information is fundamental to efficient and effective communication, planning and co-ordination at all levels of society.*" He also made it clear that "*the board will not regulate the broader spatial information industry.*" There is, however, general acceptance of the need for a legislative "home" for spatial information and indeed a widely held view that the Act could go further in terms of providing a legislative framework for the spatial information industry.

There is a clear consensus amongst stakeholders on the need for the policy objectives of the Act to be extended to address quality standards for spatial information in NSW.

Recommendation 2

The objectives of the Act (see Recommendation 1) should include the promulgation of quality standards for the collection and presentation of spatial information.

5.2. The Marine Cadastre

An issue which has become much more prominent since the Act was passed in 2002 is the marine cadastre, i.e. the recording and charting of rights, obligations and restrictions over coastal and offshore waters.

Rights, obligations and restrictions in the maritime environment are created by myriad State and Commonwealth legislation and exposing them in any sort of systematic and conclusive way is extremely problematic. In an ideal world, rights obligations and restrictions, at least over NSW state waters, would be recorded in the land titles system in the same way that rights to dry land are recorded. However there are legal and resourcing issues to be addressed before NSW could reach that point. In the immediate future the priority should be to raise awareness of the marine cadastre and put structures in place which will allow its eventual integration with the land cadastre.

Integration of the marine cadastre could be seen as a policy objective additional to the four initially inferred but it is actually a natural extension of Objective 2.

[17] Hansard, Legislative Assembly, 17/09/2002

Recommendation 3

Policy objective 2 should be extended to a state cadastre of spatially referenced information extending above and below the surface of the Earth and the sea.

In this context the sea is all NSW coastal waters[18] including the sea bed, the water column and the air column above the water.

6. Terms of the Act which are no longer appropriate

The majority of stakeholder submissions support the policy objectives but highlight terms or provisions of the Act which they believe are not helping to achieve those objectives. These have been grouped against the policy objective to which they relate.

6.1. To protect the public from unscrupulous or inadequately qualified persons undertaking survey work

Several stakeholders expressed the view that the public is only protected from unscrupulous or inadequately qualified *land* and *mining* surveyors, but the public relies on the advice and services of several surveying disciplines currently not covered by the Act. By way of example, an erroneous survey of a parcel of land may cause inconvenience or even financial hardship for the surveyor's client or future purchasers of the land but an erroneous hydrographic survey could endanger peoples' lives.

In the 2006 Census of Population and Housing 2,348 people in NSW identified their occupation as professional surveyor and another 441 gave their occupation as surveying associate or technician surveyor[19], a total of 2,789 people who identified themselves as some sort of surveyor. At that time there were approximately 1,000 surveyors registered with the board. These figures show that un-registered "surveyors" in NSW outnumber *registered surveyors* by nearly two to one. These unregistered surveyors could be carrying out *land* or *mining* surveys illegally but checks and balances in the system ensure that this is unlikely. It is more likely that these surveyors are working under the supervision of a registered surveyor or practicing in a surveying discipline other than *land* or *mining* surveying.

Three stakeholder organisations have suggested that the public would be better protected if all these surveyors were subjected to the same level of regulation as registered *land* and *mining* surveyors.

[18] Coastal Waters (State Powers) Act 1980

[19] Australian Bureau of Statistics, Occupation by age by sex, 2006 Census of Population and Housing special data service.

There are precedents in South Australia, Tasmania and Queensland for the registration of these "other" surveyors. The benefits are:

- to surveyors who are currently not registered
    - increased visibility and better understanding by the public of the respective roles of their discipline versus *land* or *mining* surveying;
- to the public
    - better informed decisions about what type of surveyor to engage and resulting increase in competition among providers; and
- to the regulator
    - an opportunity to evaluate competencies for a section of the surveying workforce which would otherwise be unknown to it.

However it is not necessary to mandate registration or impose the same high level of regulation as that applied to *land* and *mining* surveyors. A voluntary system of registration for "other" surveyors would attain the same benefits without the need for major legislative change or a hugely increased burden on the regulator. While not all surveyors would choose to be registered the benefits to the individual in terms of employment and business opportunities will more than offset the financial and time implications of being registered.

To maintain national consistency and minimize the administrative burden on the board, eligibility for registration of surveyors, other than *land* and *mining* surveyors, could be based on the recognition of existing professional certification by an appropriate professional institute such as the Spatial Sciences Institute (SSI). The SSI currently administers national or international certification programs for GIS Professional, Remote Sensing Professional and Hydrographic Surveyor (Australasian Hydrographic Surveyors Certification Panel (AHSCP)[20]). These will in time be extended to Engineering Surveyors. The SSI also has a national Professional Land Surveyor certification however this is not an equivalent qualification to *registered land surveyor* in NSW. It is therefore recommended that the current system of competency testing by the board be retained for land and mining surveyors.

The ACS submission[21] also makes an argument for the registration of firms or business that provide surveying services. The ACS argues that the public engages and interacts with a firm not necessarily an individual registered surveyor.

There is an ongoing problem with the correction of errors on survey plans when the surveyor who signed the plan has since changed firms. The ACS proposal would go some way to solving this problem. The IS NSW submission supports this argument[22].

The most compelling argument in favour of registering firms is that it would assist the public to choose a firm that has skills and experience appropriate to the type of work.

[20] Attachment 5
[21] Attachment 3 G Sec 3.4
[22] Attachment 3 F Sec 3 (11)

The most compelling argument against is that it could represent a departure from the longstanding paradigm of the individual professional taking personal responsibility for a survey. But it does reflect how the public interacts with surveyors and the way business is done in the twenty first century.

The ACS submissions goes much further in recommending a consulting endorsement for firms and various financial and structural tests as prerequisites for registration. These would impose a substantive administrative burden on the board in an area of business and commerce in which it is not necessarily expert. Again to minimize the administrative burden on the board, eligibility for registration of firms should be based on assessment by some third party that is expert in business ethics and best practice as opposed to surveying best practice.

Recommendation 4

> ***The current system of registration of land and mining surveyors should be made available <u>on a voluntary basis</u> to other surveying disciplines and to firms which provide surveying services.***

6.2. Produce, safeguard and maintain a state cadastre of spatially referenced information extending above and below the surface of the Earth (including the sea).

It has already been recommended (Recommendation 3) that this objective be expanded to include spatially referenced information on rights, obligations and restrictions including the sea.

The contribution of registered *land* and *mining* surveyors to the achievement of this objective cannot be overstated. It is their role in producing, safeguarding and maintaining the state cadastre that justifies the prescriptive, command and control style of regulation imposed upon them, if not by the Act itself, then by its subordinate legislation. While the public might well be served by a lesser level of regulation, the current regulatory regime has the additional benefit of protecting the public by ensuring that the basic data underlying the cadastre is collected in a consistent manner to well understood standards of accuracy. <u>This objective, at least on the land, is being achieved</u>. As the cadastre potentially underpins most land information in the state the benefits to government and to the community are substantial.

There is however room for improvement. The spatial accuracy of the surveyor's plan is very often degraded during the process of integrating it into the statewide cadastral database (DCDB). To bring the DCDB up to a level of spatial accuracy which actually reflects the accuracy of the surveyor's original work, surveyors may have to be called upon to do a little more. This is however a technical issue which is best resolved in the Regulation or associated instruments rather than the Act itself. A strategy for upgrading the spatial accuracy of the DCDB is discussed further in Part 2 of this report.

6.3. Coordination of surveys made by public authorities and the establishment of a *State control survey*.

The Act charges the Surveyor General with responsibility for the *State control survey*[23] . No stakeholders have raised issues with the *State control survey* so it must be assumed that surveyors and others are satisfied with its progress and efficacy.

Sec 7 of the Act also requires the Surveyor-General to establish a register of *public surveys.* The register of public surveys was first established by the *Survey Co-ordination Act* which was passed in 1949 and gave the Surveyor-General powers to ensure that public authorities did not waste money and man power by duplicating effort on surveys. In those growth years after World War II surveyors were, like now, in short supply. If it was important to avoid duplication of effort then, how much more so now, when a public authority might spend hundreds of thousands of dollars on acquiring spatial information? Stakeholders strongly recommend[24] that the *register of public surveys* be extended to a register of public spatial information.

In the Act, the definition of *public survey* in turn relies on the definition of *survey*[25]. The latter is very broad and includes any form of measurement of distance, height, depth, level or direction. Thus *survey* includes not just surveys conducted on the ground using theodolites and measuring tapes (or these days electronic total stations) but also surveys utilising the emerging technologies of digital aerial photography, high resolution satellite imagery and light detection and ranging (LiDAR). However even this broad definition does not cover the full gamut of spatial information. Figure 1 below illustrates the relationship between *surveys* and *spatial information* as defined in the Act.

[23] Surveying Act 2002 Sec 4
[24] Attachment 3 B Attachment 3, 3D (i), and 3H
[25] Surveying Act 2002 Sec 3

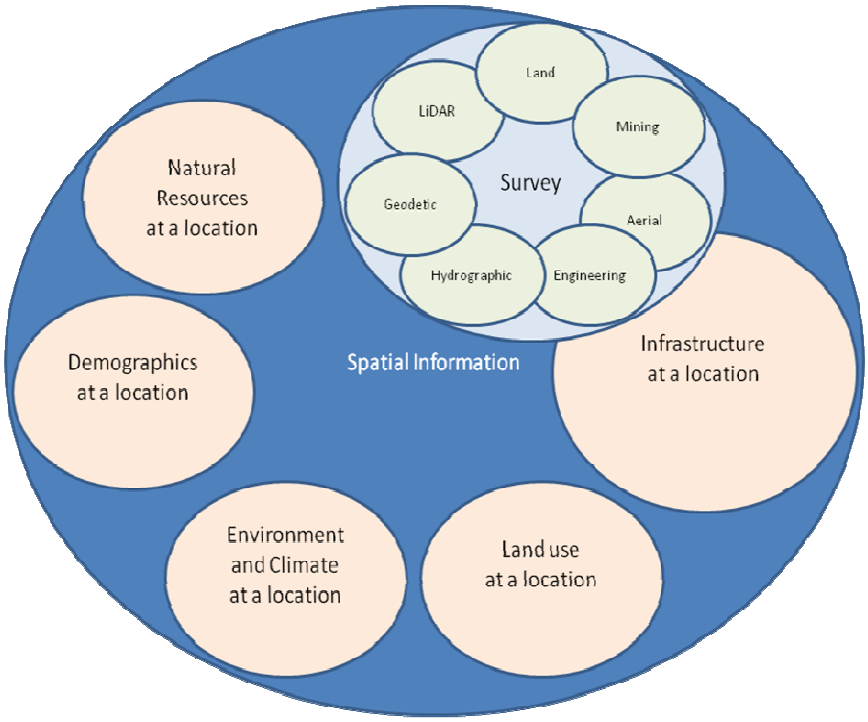

Figure 1

Expanding the register of public surveys to a register of public spatial information would provide a much more powerful tool for coordination of effort across public authorities and for the discovery and sharing of valuable spatial information across agencies.

An expanded register could also play a major role in the promulgation of quality standards for spatial information – the only additional policy objective identified by stakeholders (Recommendation 2). The Act already enables the Surveyor-General to direct a public authority to provide information as to *surveys* carried out by the authority[26]. If this power was extended to all *spatial information* the Surveyor-General could then stipulate minimum quality standards for any *spatial information* which is to be added to the register. This approach provides a good balance of direction versus incentive.

Recommendation 5

> ***An expanded register of public surveys should be a powerful tool for coordination and integration of spatial information collection and for the promulgation of quality standards***.

[26] Surveying Act 2002 Sec 6

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6.4. Investigation and advice to Government on matters concerning the collection, collation and dissemination of spatial information other than surveys

The Surveying Act 2002 may have encompassed spatial information for largely pragmatic reasons. There was obviously a need back in 2002 to identify an authoritative source of advice to government on the collection, collation and dissemination of spatial information. Even as recently as 2002, however, the current massive expansion of the spatial information industry into the mass consumer market had not been fully anticipated. While registered *land* and *mining* surveyors represent only part of the spatial information industry, appending spatial information to the Surveying Act was an attractive strategy compared to establishing a separate legislative framework. While they may not have appreciated the implications at the time, six years on, none of the key stakeholders have expressed any objection to this marriage of convenience.

Furthermore the board has been very active in the development of strategies for spatial information in NSW and has promulgated a vision for spatial information across all of NSW government i.e. CS2i[27]. Policy Objective 4 is another objective which is clearly being achieved.

However, the consultation process revealed that non-surveyor spatial information practitioners do not look to the Act or to the board for guidance because they do not associate their business with surveying. To fully engage with and inform the broader spatial information industry the name of the Act should be changed to "*Surveying and Spatial Information*".

Recommendation 6

The name of the Act should be reviewed to reflect the purpose and content of the legislation

Stakeholders have raised some questions about whether the board has the right balance of representation of surveyors versus other spatial professionals and private versus public sector representatives. The Act (via the Regulation) rightly specifies representation from organisations representing *land*[28] and *mining*[29] surveyors as these two groups have a special role in achieving the Act's objectives and are, as a result, more explicitly regulated. There is some flexibility, however, in what organisations nominate, for membershipof the board, persons involved in the spatial information industry. Consideration should be given to nominees of industry associations as well as professional associations.

[27] CS2i Action Plan, BOSSI, June 2007
[28] Surveying Act 2002 Sec 27 (c)
[29] Surveying Act 2002 Sec 27 (d)

7. Conclusion

Land and mining surveying are amongst the most regulated occupations in NSW. This level of regulation is difficult to justify given NSW policy on government regulation[30] but, based on the low number of consumer complaints, it has worked well. From a reviewer's perspective there is no evidence that the regulation of land and mining surveyors should change in any radical way.

Apart from being very prescriptive, the only shortcoming in the current regulatory regime for surveying is that it only protects the public from unscrupulous or inadequately trained *land* and *mining* surveyors when the public also relies on advice and services from other surveying disciplines. This report recommends, therefore, the extension of the influence of the board to other surveying disciplines such as engineering, hydrographic and aerial surveying and to companies or firms that provide surveying services. But the recommended level of regulation is not the prescriptive command-and-control style regulation currently applied to *land* and *mining* surveyors. The recommendations are for a voluntary system of registration which provides benefits to:

- surveyors
    - increased visibility and better understanding by the public of the respective roles of their discipline versus land surveying;
- the public
    - better informed decisions about what type of surveyor to engage and resulting increase in competition among providers; and
- the regulator
    - an opportunity to evaluate and influence competencies at least among those surveyors who choose to be registered.

The current Act is less prescriptive about spatial information than it is surveying but the board has taken seriously its obligation to provide leadership in this area. Responding to its obligations under the Act, it has achieved a major milestone with the publication of the CS2i Action Plan. This report recommends that the objectives of the Act be extended to include not only advice to government but also the broader promulgation of quality standards for spatial information. An expanded *register of public surveys* is seen as the most appropriate tool for promulgating standards and for the coordination and integration of spatial information beyond the surveys already covered by the register.

Any expansion in the role of the *register of public surveys* may have considerable resourcing issues for the Department of Lands. Investigations are, however, already underway into technological solutions for an expanded, digital register.

[30] From Red Tape to Results, Government Regulation: A Guide to Best Practice, Inter-Governmental and Regulatory Reform Branch, The Cabinet Office, New South Wales, June 1997

As the policy objectives of the Act remain valid and the terms of the Act are largely appropriate for securing those objectives major changes to the Act are not warranted. It is anticipated, however, that some changes to the Act or its subordinate legislation may be required to better achieve the current objectives and the one proposed objective.

To fully engage and inform non-surveyor spatial information practitioners the name of the Act should change to better reflect the purpose and content of the legislation.

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PART 2

Context of the recommendations and response to stakeholders

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1. Context of the Recommendations

The terms of reference for this review are quite specific. Sec 40 of the Act requires a review of whether the policy objectives of the Act remain valid and whether the terms of the Act remain appropriate for securing those objectives. A consultant confronted with these terms of reference can logically make recommendations somewhere on the following continuum:

1) The problem or need which caused the Act to be implemented has passed, the policy objectives are therefore no longer valid and the Act should be repealed.
2) A need still exists but the policy objectives have changed and the Act needs major amendment.
3) Most of the policy objectives are still valid but some are not and there are new policy objectives which need to be encompassed.
4) The policy objectives are still valid but the terms of the Act – the things it actual stipulates – are not achieving those objectives.
5) The objectives are mostly valid and the terms are generally effective but both need some amendment.
6) Nothing needs to change.

Sec 40 requires the Act to be reviewed. It does not require it to be revised. The NSW and indeed all Australian governments are seeking to minimize red tape and only too regulate where there is a clear problem to be addressed[31]. Similarly, while regular review of legislation is encouraged, government will not embark on a major process of legislative amendment unless there is a clear failure in existing regulation. The primary purpose of a Sec 40 review therefore is not to determine what changes should occur but whether a program of revision is required. Realistically, only a finding of 1, 2, 3 or at most 4 on the above continuum would necessitate revision of the legislation and then only if government agreed with that finding. The recommendations in Part 1 of this report come in around about 5 on the above continuum.

While stakeholders have been invited to recommend improvements to the legislation, a long list of small or incremental changes will not in itself trigger revision of the Act. Part 1 of the report therefore focuses on the objectives and whether they are being achieved rather than any specific changes to the Act recommended by stakeholders, regardless of the merits of those changes. The task was made more difficult because the objectives had not previously been articulated. The first and arguably most important task was to determine just what are the objectives of this legislation.

[31] From Red Tape to Results, Government Regulation: A Guide to Best Practice, Inter-Governmental and Regulatory Reform Branch, The Cabinet Office, New South Wales, June 1997 p.8

2. How were the Policy Objectives of the Surveying Act 2002 determined

In order to retrospectively quantify the original policy objectives the following sources were examined:

- the Surveying Act 2002;
- the Surveying Regulation; and
- Hansard Speeches – Surveying Bill – Legislative Assembly and Legislative Council.

2.1. The Legislation as intended by the Legislators

Hansard gives a valuable insight into the intent of the legislators, whether or not that intent has been captured in the resulting law. When amendments to the Act were debated in 2005, the Hon. Tony Kelly (Minister for Rural Affairs, Minister for Local Government, Minister for Emergency Services, and Minister for Lands) stated in the Legislative Council[32] that the main objects of the Act are to:

1. regulate the conduct of surveys carried out by the Surveyor-General and other public authorities;
2. provide for the establishment and maintenance of a register of public surveys;
3. provide for the registration of land surveyors and mining surveyors;
4. confer powers of entry on the Surveyor-General and registered surveyors;
5. create offences with respect to the conduct of surveying and the protection of survey marks; and
6. provide for the constitution and functions of the Board of Surveying and Spatial Information.

Mr. Kelly further stated

"*Whilst the Act is a great improvement on the earlier legislation, this bill contains a number of further reforms. The first proposed change includes a definition of "spatial information" in section 3A of the Surveying Act, to give legal certainty to the use of that term in the legislation*."

The need to define spatial information in the amendment demonstrates that the objectives of the legislation reach beyond those stated by Mr. Kelly to, in some way, encompass spatial information. Indeed at the Second Reading of the Surveying Bill in 2002[33] Mr. Yeadon (Granville-Minister for Information Technology, Minister for Energy, Minister for Forestry, and Minister for Western Sydney) said

"*The functions of the board will be enhanced to include investigation and advice on matters concerning the collection, collation and dissemination of spatial information other than surveys*."

[32] Hansard, Legislative Council, 08/06/2005

[33] Hansard, Legislative Assembly, 17/09/2002

It is clear that an objective of the 2002 legislation was to provide government with an authoritative source of advice on the collection, collation and dissemination of spatial information.

In the same speech Mr. Yeadon said

"The registration, professional education requirements and disciplinary processes (of surveyors) are overseen by the Board of Surveyors to ensure consistency and quality of service delivery. Without the protection of these regulatory measures, the public may be vulnerable to unscrupulous or inadequately qualified persons undertaking survey work."

The legislators obviously intended to protect the public from unscrupulous or incompetent practitioners and many provisions of the Act and its instruments are designed to do this.

The extension of the board's powers to the registration of mining surveyors is widely attributed to the Gretley Coal Mine disaster of 1996. The government response to the Gretley Inquiry[34] states"

"*Therefore, Department of Mineral Resources will immediately confer with the Coal Mines Qualification Board, the Australian Institute of Mining Surveyors and the Mining Industry Training Advisory Body to review mining surveyor examinations and curricula. Continuing professional education programs for existing surveyors will address the topic.*"

While there is no mention of Gretley in the debate in either House in 2002 it can be assumed that the objective was to protect the public from unscrupulous or incompetent practitioners by '*regulation and qualification'* of mining surveyors. In this case the public to be protected includes, but is not restricted to, mine workers.

The Second reading of the Bill also reveals another important objective. Mr. Anderson (Londonderry)[35] in his speech to the Legislative Assembly said

".. *the current bill embodies the intention "to produce, safeguard and maintain a state cadastre of spatially referenced information through the regulation and qualification of cadastral surveyors". Although this objective has not been specifically stated, it is inherent in the terms of the bill.*"

The Assembly had earlier had an explanation of the cadastre and its importance from Mr. West (Campbelltown). It appears that the legislators had appreciated the significance of the cadastre and the contribution that surveyors make to it. It is also reasonable to assume that the legislators understood that the cadastre extends

[34] Government's Response to the Report on the Gretley Coal Mine Public Inquiry: August 1998

[35] Hansard, Legislative Assembly, 25/09/2002

above and below the surface of the Earth and that mining surveyors as well as land surveyors are key to its efficacy and maintenance.

The debate of the legislation reveals that the national competition policy [NCP] review process recommended that the system of registration of the survey profession be retained in the public interest. Other requirements of the 1929 legislation were also retained and in fact Mr. Yeadon saw the Act as consolidating ".. *existing land survey legislation in New South Wales including the Surveyors Act 1929, the Survey Marks Act 1902, the Survey Co-ordination Act 1949 and the Survey (Geocentric Datum of Australia) Act 1999"*. Thus the policy objectives of the Surveying Act 2002 must be taken to include the objectives of earlier legislation.

2.2. The Legislation as Implemented

While the Act contains no explicit statement of objectives, the purpose of the legislation is stated in the preamble[36] as:

"*An Act to make provision with respect to the functions of the Surveyor-General, the registration of surveyors, the control of surveys and the constitution and functions of the Board of Surveyors and Spatial Information; to repeal the Surveyors Act 1929, the Survey Co-ordination Act 1949 and certain other Acts and instruments; to make consequential amendments to certain other Acts and instruments; and for other purposes*."

The objectives of the legislation can therefore be inferred to a great extent from the functions given to the Surveyor-General and the Board of Surveying and Spatial Information (the board).

The principal functions of the board include[37]:

1. the registration of surveyors,
2. the investigation of surveyors' registration and licensing schemes in other States and Territories, and the provision of advice to the Minister in connection with the recognition of the qualifications and experience of surveyors registered or licensed under such schemes,
3. the investigation of complaints against registered surveyors,
4. the taking of disciplinary action against registered surveyors,
5. the investigation of matters referred to it by the Minister for advice or report in relation to surveying or any other aspect of the spatial information industry,
6. the investigation of, and the provision of advice to the Minister with respect to, the practice to be followed in the conduct of surveys or in the collection, collation and dissemination of any other kinds of spatial information,
7. the provision of advice to the Minister with respect to any other matter in connection with the administration of this Act.

[36] Surveying Act 2002

[37] Surveying Act 2002 Sec 28

Functions conferred on the Surveyor-General are closely aligned to the objectives of the former *Survey Marks Act 1902, the Survey Co-ordination Act 1949 and the Survey (Geocentric Datum of Australia) Act 1999* and include:

1. establish a State control survey.[38]

2. carry out surveys in connection with the State control survey and, for that purpose, establish permanent survey marks throughout the State

3. direct a public authority to provide the Surveyor-General with information as to surveys carried out by that authority[39]

4. establish and maintain a register of public surveys[40]

5. adjust any public survey so as to ensure that it is consistent with the State control survey and with other public surveys with respect to the same or any adjacent locality[41]

6. cause notice to be given to any public authority of the location of any permanent survey marks that are located on land that is subject to the authority's control or management[42]

7. require a registered surveyor to correct within the time specified any error in a survey made by that surveyor[43]

2.3. Subordinate legislation and associated instruments

The Surveying Regulation 2006 sets out in great detail the duties of a *land* surveyor and how *land surveys* are to be conducted. It also empowers the Surveyor-General to make similar orders in respect of mining surveys. In this respect the Regulation confirms that an objective of the Act is *"to produce, safeguard and maintain a state cadastre of spatially referenced information through the regulation and qualification of .. surveyors"* with a similar level of regulation to apply to both land and mining surveying. However the Regulation tells us little about the policy objectives for the wider spatial information industry and how these will be achieved.

The Act is also supported by Surveyor-General's Directions, Registrar-General's Directions and Determinations of the board. These generally address specific technical issues such as plan presentation, lodgement procedures and clarification on best practice. They also implement policy decisions such as the boards

[38] Surveying Act 2002 Sec 4
[39] Surveying Act 2002 Sec 6
[40] Surveying Act 2002 Sec 7
[41] Surveying Act 2002 Sec 8
[42] Surveying Act 2002 Sec 9
[43] Surveying Act 2002 Sec 9A

Determination on Continuing Professional Development. Directions and Determinations are in fact a technical response to a policy objective and can often, by reverse osmosis, articulate the original objective.

2.4. Statement of policy objectives

The policy objectives that were inferred from this process are stated in Part 1 of this report (Part1 Section 2). Regardless of what objectives stakeholders would like a Surveying Act to achieve these are the objectives against which the Act has been reviewed.

3. Outcomes for Stakeholders

Throughout the consultation process, every effort was made to focus stakeholders on the policy objectives and whether the terms of the Act are meeting those objectives. It was obvious from the more detailed responses, however, that some stakeholders were intent on an ideal Surveying Act rather than the specific objectives which government expects this Act to achieve. While some stakeholders made genuine attempts to link suggested changes to a policy objective the links were at times tenuous. None the less many of the suggestions came out of the collective experience of some very professional people. Such ideas have value even if they are not easily reconciled with the terms of reference of this review.

Stakeholders will immediately note that Part 1 of this report does not recommend any specific amendments to the wording of the legislation. To do so would be an inappropriate response to the terms of reference of this review. The authors of the more detailed submissions may therefore find it difficult to reconcile the Recommendations with their submissions. While the report may appear to have ignored suggestions for specific changes, it does focus on the outcomes which stakeholders are looking for from those changes. The recommendations, if accepted, will achieve many of those outcomes. The following sections of this report will place the very general recommendations of Part 1 in the context of the very specific suggestions made by particular stakeholders.

Not all the outcomes sought by all stakeholders will be achieved by either the Recommendations or the additional strategies suggested in Sec 4 below. In some cases the recommendations deliberately do not go as far as a stakeholder would have them go. In a very few cases the recommendations are actually contrary to the stakeholder's desired outcome, i.e. the consultant disagrees with the stakeholder's suggestion. Other suggestions are simply not within the scope of the Surveying Act or are clearly at odds with regulatory best practice[44]. Attachment 4 lists a number of outcomes that the recommendations and other strategies identified in this report will

[44] From Red Tape to Results, Government Regulation: A Guide to Best Practice, Inter-Governmental and Regulatory Reform Branch, The Cabinet Office, New South Wales, June 1997

not achieve. These are listed so that the regulating authority can consider them on their merits outside of this review process.

4. Main issues raised by stakeholders

There was considerable commonality in both approach and content between the submissions from IS NSW, ACS and IEMS. The AIMS submission also raised an issue common to the other three. All stakeholder submissions supported the stated policy objectives but highlighted terms or provisions of the Act which they believe are not helping to achieve those objectives. One new objective was identified.

Most stakeholder suggestions fitted into one of two categories:

- particular terms of the Act were not sufficiently prescriptive to achieve the objective; or
- some provisions needed to be extended to people, corporations or disciplines not currently regulated by the Act.

In only one case[45] does a submission suggest that the Act, or in this case its subordinate legislation, should be amended to make compliance easier. This apparent desire for more, rather than less, regulation is not surprising given that surveying has been regulated in one form or another in NSW for over two hundred years. It cannot be assumed however that surveyors' enthusiasm for regulation is shared by other sectors of the spatial information industry.

4.1. Standards for spatial information

There appears to be a consensus amongst stake holders that the policy objectives of the Act need to be extended to address standards for spatial information in NSW. However this apparent consensus must be seen in the light of very different understandings of what constitutes standards and indeed what constitutes spatial information.

4.1.1. Different understandings of what is spatial information

NSW was the first, and to date the only, Australian jurisdiction to define spatial information in legislation[46]. This was a necessary step given the diversity of understanding amongst the various spatial information disciplines much less the legislators and the general public.

Different interpretations of what is spatial information still, however, persist. One needs to allow for these differences when interpreting the submissions from key stake holders. For example the IEMS submission[47] would maintain that spatial

[45] Attachment 3 E Chief Inspector of Mines and Coal Mines, Department of Primary Industries
[46] Surveying Act 2002 Sec 3A
[47] Attachment 3 B NSW Institution of Engineering and Mining Surveyors Inc p16

information cannot exist without "some form of surveying". The Act's definition of spatial information, however, includes the demography and climate at a location. The definitive collection of demographic information in Australia – the Census of Population and Housing – does not involve survey in the sense in which IEMS uses the term. IEMS's focus is very much on the XYZ coordinates of spatial information and this focus is shared by the other surveying disciplines. The IS NSW and ACS submissions, in respect to standards[48], actually refer to "survey data" rather than "spatial information" and when the IEMS submission says "spatial information" it appears to refer more accurately to "survey data". Although "survey" is used in a broader sense than the definition provided in the Act[49] it does not encompass the full range of spatial information. IS NSW also makes this distinction in Sec 3 (12) of its submission[50]. To the surveyors, spatial information is all about the size, shape and position (XYZ coordinate) of an object or location.

The current definition of survey[51] already encompasses the full gamut of surveying whether it is done on the ground, with a total station, or from the air, by photography or other air-born sensors such as LiDAR. The current definition, however, excludes any activity involved in mapping or the preparation of navigational charts. The definition appears to have been designed to exclude the activities of Commonwealth Government agencies involved in national scale mapping and hydrographic charting. However the current wording could be interpreted as also excluding the mapping activities of NSW public authorities. If an opportunity arises to make minor amendments to the Act this ambiguity should be resolved. Even when mapping and hydrographic charting are included, however, *survey* is not synonymous with *spatial information*.

The spatial information industry sees spatial information as much more than size, shape and position. The SSI submission[52] for example suggests that the definition in the Act is not broad enough and "does not do justice to the breadth and depth of spatial information actually in use in NSW". Similarly the submission from LPI[53] refers to "spatial information" in a much broader sense than "survey data" and recommends a more encompassing definition of spatial information which in turn would extend the scope of some provisions of the Act.

An understanding of the relationship between *survey* and *spatial information* is important to how standards can be implemented and also to other provisions of the Act which cover *public surveys*[54]. Figure 1 in Part 1 illustrates the relationship between spatial information, surveys and *land* and *mining* surveys as they are currently defined in the Act. Figure 2 below illustrates the same relationship but with a broader definition of spatial information which anticipates some of the

[48] Attachment 3 F Institution of Surveyors NSW Inc Sec 2
[49] Surveying Act 2002 Sec 3
[50] Attachment 3 F Institution of Surveyors NSW Inc Sec 3 (12)
[51] Surveying Act 2002 Sec 3
[52] Attachment 3 H Spatial Sciences Institute NSW Region
[53] Attachment 3D (i) Acting Deputy Director General and General Manager LPI
[54] Surveying Act 2002 Sec 3

developments likely to occur in the near future in the rapidly evolving spatial sciences.

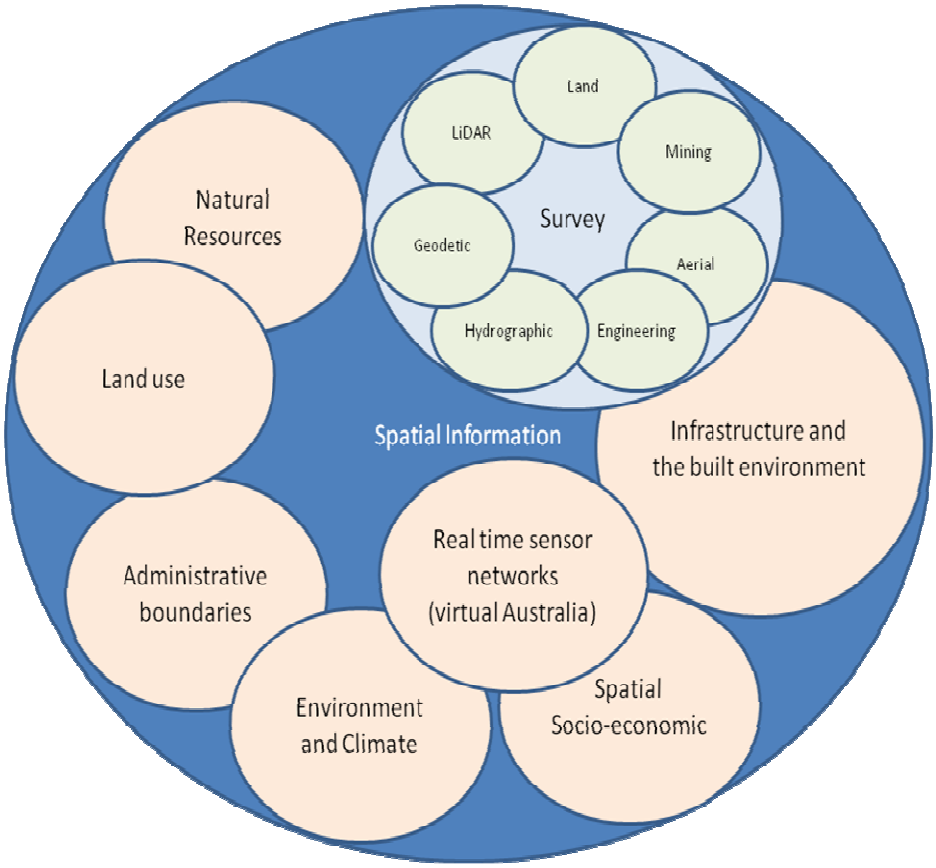

Figure 2

While there is clear demand for "standards" to extend beyond *land* and *mining surveys*[55], some stakeholders would have such standards extend to all spatial information while others are concerned only with "survey data".

4.1.2. Different perceptions of standards

Standards for *land* and *mining* surveys in NSW are prescribed in the Surveying Regulation 2006 and the Survey and Drafting Directions for Mine Surveyors (2000) and the Survey and Drafting Directions for Mining Surveyors (2001) respectively. These set out in some detail how the surveyor is to go about his or her work, how the survey is to be presented, what standards of accuracy are to be achieved and even

[55] Surveying Act 2002 Sec 3

the size and shape of the survey marks to be used. It is only possible to make such regulations and directions in respect of surveys carried out for a specific, designated purpose. It may be possible to apply such "command-and-control" style regulation to other types of *survey*, e.g. engineering, geodetic and hydrographic, by first defining a purpose or range of purposes for a range of surveys. However, legislative best practice would favour the specification of performance standards rather than command-and-control style regulation[56]. Modern day legislators are more likely to question the need for the current Survey Regulation than they are to agree to impose similar levels of command and control on other surveying disciplines.

The case against Surveying Regulation style standards for *spatial information* as opposed to *survey* data is even clearer. It is definitely not possible, or desirable, to apply such "how to" style standards to *spatial information* as it would stifle innovation in how *spatial information* is collected and represented.

In the spatial information industry standards generally refer to Australian (AS) or increasingly International Standards Organisation (ISO) standards. A Standards Australia working group (IT 4) has developed spatial information standards for many years. A search of the Standards Australia website located 207 AS, AS/NZS or ISO standards pertaining to geographical information. In addition to Standards Australia the Intergovernmental Committee for Surveying and Mapping (ICSM) regularly develops standards some of which have become AS/NZ standards. ICSM is currently finalising a standard for all hazards symbology and developing a national roads classification system. ANZLIC, the Spatial Information Council, has also, from time to time, developed or endorsed standards for spatial information, notably the ANZLIC metadata standard which has now become an Australian/New Zealand Profile of AS/NZS ISO 19115:2005.

In short, standards for spatial information are as complex and diverse as spatial information itself. It would be ludicrous for NSW to develop its own standards and impossible to describe meaningful standards for all spatial information (as opposed to survey data) in a Surveying Regulation "how to" approach. Mandating the use of national and international (AS/ISO) standards is also problematic where new types of spatial information for new purposes, and consequently new standards, are continually evolving.

The preferred approach to promulgating standards for all spatial information, including survey data, is to make use of an expanded *register of public surveys*. (See Recommendation 5 Sec 6.3 of Part 1.) This strategy will allow the promulgation of standards throughout public authorities including local government. Unfortunately it will not, as suggested by IEMS, give the public recourse to BOSSI where a survey (other than a *land* or *mining* survey) is defective, but other strategies (Recommendation 4) will go some way to achieving that outcome.

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[56] From Red Tape to Results, Government Regulation: A Guide to Best Practice, Inter-Governmental and Regulatory Reform Branch, The Cabinet Office, New South Wales, June 1997 p13

4.2. Coordination of spatial information across public authorities

SSI and IEMS both raised the issues of coordination of spatial information across public authorities, particularly local government. While IEMS was clearly focused on *survey* data as opposed to *spatial information* the argument still applies. The IEMS submission recommends a very ambitious program of integrating and archiving all *survey* data. This goes beyond the concept of a register to a warehouse of *survey* data for the entire state. A digital register designed for data discovery rather than data delivery is more achievable.

Despite national initiatives, such as the Australian Spatial Data Directory, discovery of spatial information in NSW is still problematic. In today's world of digital aerial photography, high resolution satellite imagery and light detection and ranging (LiDAR) it is quite feasible, even probable, that a public authority could commission say digital aerial photography of the whole state to a particular specification. While another authority might commission the same coverage, for an entirely different purpose, to some slightly different specification. The advantages to government and the tax payer of coordinating a whole of government purchase are obvious. There are examples of where this level of coordination has occurred. A recent example is the whole of government purchase of a medium resolution mosaic of satellite imagery for the whole state. One-off arrangements and bilateral agreements will not, however, guarantee that valuable spatial information is collected once and used many times.

Provision already exists in the Act for the Surveyor-General to direct a public authority to provide information as to *surveys* carried out by the authority[57]. To ensure real coordination of all types of *spatial information* across the state, however, the term *survey* should be replaced with *spatial information*. See Recommendation 5.

The register already exists in hard copy and is maintained by LPI. The content of the register is largely limited to control surveys carried out by public authorities ie surveys where permanent marks have been placed and connected to the State Control Survey. Stakeholders strongly recommend[58] that the *register of public surveys* be extended to a register of public *spatial information*. There may be resourcing issues within the Department of Lands if this recommendation is to proceed. A broad definition of spatial information would cover everything from an as-constructed-survey of a single sewer line, to an aerial photograph of the Sydney CBD, to LiDAR mapping of the entire state, or even to a study of the health of school aged children. There is a clear demand among stakeholders for increased coordination and increased discoverability of public spatial information. But if public authorities are to be required to declare their spatial information acquisitions to the Surveyor-General then the existing register will need to be re-engineered and considerably scaled up. Investigations are already underway into technological solutions for an expanded, digital register.

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[57] Surveying Act 2002 Sec 6

[58] Attachment 3 B Attachment 3, 3D (i), and 3H

4.3. Registration or endorsement of individual surveyors

ACS, IS NSW and IEMS all recommend some form of registration or endorsement of surveyors other than *land* and *mining* surveyors. This position has also been supported, with reservations, by the Hydrographic Commission of the SSI (NSW), in discussions with the consultant.

The motivation of these stakeholders varies. IS NSW argues[59] that a registered surveyor could be liable to disciplinary action even when undertaking a *survey* which is not a *land* survey in terms of the Act. Certainly the current grounds for disciplinary action[60] refer to "conduct of a *survey*" not a *land* or *mining survey*. IS NSW argues that some form of registration or endorsement of other disciplines would create a more level playing field and provide an opportunity to monitor and enhance the competency of, in particular, technician surveyors.

The IEMS submission recommends registration or endorsement, based on competency assessment, of geodetic, engineering and hydrographic surveyors and remote sensors/photogrammetrists. IEMS argues that this would allow customers to identify the most suitable person to undertake a particular type of survey. At the moment customers, including government authorities, tend to engage registered *land* surveyors without understanding that their expertise does not necessarily extend to engineering, hydrographic surveys, etc.

The Hydrographer of Australia (R. NAIRN Commodore, RAN) also supports a system of certification to assist customers in selecting a suitably qualified hydrographic surveyor[61] but strongly advocates national and international rather than state based certification systems.

In the 2006 Census of Population and Housing 2,348 people in NSW identified their occupation as professional surveyor and another 441 gave their occupation as surveying associate or technician surveyor[62]. In 2006 there were approximately 1,000 surveyors registered with the board and not all of these are resident in NSW. While the Australian Bureau of Statistics (ABS) classification of occupations[63] places surveyors in the professional category the low number of people identified as technician or associate surveyors suggests that the ABS may have coded many technicians to the professional surveyor category. None the less these figures show that un-registered "surveyors" in NSW outnumber *registered surveyors* by nearly two to one.

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[59] Attachment 3 F Institution of Surveyors NSW Inc Sec 3 (3)

[60] Surveying Act 2002 Sec 12 and 13

[61] Attachment 5 Letters from the Australian Hydrographer to ICSM and Maritime Authoities.

[62] Australian Bureau of Statistics, Occupation by age by sex, 2006 Census of Population and Housing special data service.

[63] Australian Standard Classification of Occupations (ASCO) 1996, Australian Bureau of Statistics

There are precedents for the registration of other surveyors and these have been widely quoted by stakeholders. In Tasmania registration of surveyors practising other disciplines (eg. engineering or hydrographic) is voluntary and restricted to surveyors who are members of a relevant professional institution, or who have competency accreditation recognised by a relevant institution as satisfying national competency standards[64].

In South Australia surveyors can be registered if they have demonstrated competency in Cadastral, Engineering, Geodetic, Hydrographic or Topographic surveying, Land Information or Project Management. It is obligatory to be licensed (i.e. a cadastral endorsement) to place a survey mark or carry out a cadastral survey for payment or reward. It is also an offence for an individual to hold out to be a registered or licensed surveyor if they are not. But, like Tasmania, there appears to be no requirement to be registered to carry out surveys other than cadastral surveys[65].

In Queensland there are different levels of registration –surveyor, surveying graduate, surveying associate and emeritus surveyor – based on different levels of competency. Registered surveyors can have endorsements in various surveying disciples. Endorsement based on demonstrated competency is available for consulting, cadastral, engineering, hydrographic and mining surveying. A consulting surveyor endorsement is required, when a surveyor wishes to operate as a business that provides cadastral surveying services to the public[66]. All registered surveyors are required to adhere to a code of ethics and to maintain their skills through continuing professional development. However, as in Tasmania and SA, the (Qld) Surveyors Act 2003 makes registration (with a cadastral endorsement) manadatory only for the practice of cadastral surveying[67]. In addition only registered surveyors with a consulting endorsement can charge a fee for a cadastral survey. While in the case of mining there is a requirement stipulated in the Coal Mining Safety & Health Act 1999 and the Mining & Quarrying Safety & Health Act 1999, the Surveyors Act itself does not stipulate that a surveyor must have a mining surveying endorsement to carry out mining surveys or a hydrographic endorsement to carry out hydrographic surveys, etc.

So while there are precedents in other jurisdictions for the registration of surveyors, other than land and mining surveyors, legislation in other jurisdictions is not as prescriptive as some NSW stakeholders may believe. Even non-mandatory registration does, however, help to protect the public particularly when eligibility is linked to appropriate national competency certification programs. Once registered, surveyors would be bound by the same code of practice as land and mining surveyors and subject to the scrutiny of the board. By engaging a registered surveyor

[64] Register of Tasmanian Surveyors, Application for Annual Registration, Office of the Surveyor-General Tasmania

[65] Survey Act 1992 (SA) Sec 14 and 15

[66] Surveyors Board of Queensland Annual Report 2006-2007

[67] Surveyors Act 2003 (QLD) Sec 75

with an endorsement relevant to the type of survey required the public would be more likely to choose a suitably qualified and experienced surveyor rather than a registered *land* surveyor whose expertise may not extend to the particular type of survey.

A feature of the Queensland Surveyors Act 2003 is that not only professional surveyors are registered. Graduate surveyors who may or may not be in transition towards professional certification and associates or technician surveyors are also registered. This has the major advantage of bringing into the "system", at an appropriate level of responsibility, a large part of the workforce which would otherwise be unknown to the regulating authority. The regulator can then look to the training needs of these para-professionals who professional surveyors increasingly rely on to carry out field measurement and office processing of survey data. Several submissions strongly support the registration of technician surveyors particularly those who may work just outside the scope of the Act i.e. doing surveys which are not a *land survey* as defined in the Act but can impact the cadastre.

The other group which stakeholders have recommended for registration is the senior group of surveyors who may be retired or semi-retired but due to the length and breadth of their experience still have much to offer. Knowing who these people are and where they are offers opportunities for skills transfer and even for filling burst capacity skills shortages.

Recommendation 4 (See Sec 6.1 of Part 1) recommends that the current system of registration of land and mining surveyors should be made available to other surveying disciplines but should only be mandatory for *land* and *mining* surveyors.

The system could allow for four levels of competency – technician, graduate, surveyor and surveyor emeritus. The surveyor level could incorporate endorsements for land (cadastral), mining, engineering, hydrographic, geodetic and aerial surveying. Where it exists, certification at professional level, by the professional institute most relevant to the particular discipline, should be the prerequisite for endorsement.

The Spatial Sciences Institute (SSI) currently administers national or international certification programs for GIS Professional, Remote Sensing Professional and Hydrographic Surveyor (Australasian Hydrographic Surveyors Certification Panel (AHSCP)[68]). These will shortly be extended to Engineering Surveyors. The SSI also has a national Land Surveyor certification but this is not intended to be an equivalent qualification to state based registration of land surveyors. While all land surveyors currently registered in NSW would qualify for this certification, not all SSI certified Professional Land Surveyors are conversely qualified to be NSW registered surveyors. It is therefore recommended that the current system of competency testing by the board be retained for *land* and *mining* surveyors.

[68] Attachment 5

4.4. Registration or endorsement of companies

In Queensland and South Australia companies or firms which offer a surveying service can also be registered. Registration of companies is largely used as a mechanism to ensure that the public is protected through adequate professional indemnity insurance. The ACS submission[69] makes an argument for the registration of firms or business in NSW. The ACS argues that the public engages and interacts with a firm not necessarily an individual registered surveyor.

There is an ongoing problem with the correction of errors on survey plans when the surveyor who signed the plan has since changed firms. The ACS proposal would go some way to solving this problem. The IS NSW submission supports this argument[70].

The most compelling argument in favour of registering firms is that it would assist the public to choose a firm that has skills and experience appropriate to the type of work. The most compelling argument against is that it could represent a departure from the longstanding paradigm of the individual professional taking personal responsibility for a survey. But it does reflect how the public interacts with surveyors and the way business is done in the twenty first century.

In a voluntary system of registration a firm would be eligible for registration if one of its Directors or employees was a registered surveyor who was endorsed in the discipline of surveying in which the firm wished to provide services. The ACS submissions goes much further in recommending a consulting endorsement for firms and various financial and structural tests as prerequisites for registration. These would impose a substantive administrative burden on the board in an area of business and commerce in which it is not necessarily expert. To be eligible firms would have to demonstrate that they are financially viable and provide services in a competent and ethical fashion but this should be assessed by some third party that is expert in business ethics and best practice as opposed to surveying best practice.

Registration of firms also has relevance to spatial information. Spatial information services usually involve a collaboration of very different skills. For example, a firm might produce a map of Koala habitat across NSW. The process would involve a number of professionals and technicians working in a multi-disciplinary team. It would not be reasonable for an individual to certify or sign off on the end product. If there is a need to protect the public from inadequately qualified or incompetent persons providing spatial information services then it would be more effective to register or endorse spatial information firms rather than individual professionals. The proposed voluntary system of registration should, therefore, be made available to spatial information firms rather than individual GIS professionals.

[69] Attachment 3 G Sec 3.4

[70] Attachment 3 F Sec 3 (11)

4.5. Supervision of surveys

Several stakeholders raised the issue of supervision of unregistered people carrying out surveys. Obviously registering *land* and *mining* surveyors and making very prescriptive regulations only protects the public to the extent that those registered surveyors take full responsibility for the surveys that they certify. Stakeholders have not suggested that the registered surveyor be relieved of any of that personal responsibility but they are seeking clarification on just what involvement the registered person must have in the conduct of the survey before he or she can claim to have "supervised" it.

The only reference to supervision in the Act is in sections 21 and 22 which exempt:

- survey drafters preparing plans for a surveyor,
- survey students and survey assistants working under the general supervision of a surveyor; and
- other persons working under the immediate supervision of surveyor

from the offence prescribed in sections 21 and 22.

Sections 21 and 22 only allow the board to prosecute unregistered persons carrying out surveys. They do not say anything about the concept of supervision. In fact much of the wording of the Act and the Regulation appears to assume that the surveyor personally carries out, in particular, the field measurement and computation components. The reality is that registered *land* and *mining* surveyors increasingly rely on technicians, students or draftspersons to carry out various components of a survey. Use of the undefined terms "general", "immediate" and "supervision" in sections 21 and 22 only encourages registered surveyors to think they have some form of diminished responsibility where work is done by a student, an assistant or a drafter. The adoption of Recommendation 4 could also further dilute the sense of personal responsibility which a registered land or mining surveyors embraces. This is not the intention.

The concept of supervision needs to be introduced in a way which recognizes the realities and practicalities of modern survey practices but still makes clear the personal responsibility of the registered person who signs the plan. Supervision could be defined in the Act if a program of legislative amendments ensues from this report. Alternatively it could be the subject of a board Determination.

The Act or a Determination should require the registered surveyor to exercise sufficient supervision to ensure the survey is in accordance with the relevant Acts and Regulations. If the Act is amended, reference to general and immediate supervision should be deleted from sections 21 and 22 along with reference to students, assistants and drafters. Even if a system of voluntary registration of technicians, graduates and other surveying disciplines is adopted, the registered land or mining surveyor must still take full responsibility for the survey he or she certifies.

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4.6. Ensuring a supply of scrupulous and adequately qualified persons

Surprisingly only one stakeholder raised this issue which to the consultant is the single largest threat to the continuing achievement of the Act's objectives.

Land surveyors in NSW, and other jurisdictions, are amongst the most regulated professionals in Australia. To enter the workforce they must complete a very specific four year university degree, then undertake a period of up to two years of supervised work experience, then prove their competency to the board before being allowed to take responsibility for a *survey*. When they then do a *land survey* they must adhere to a very prescriptive Regulation[71] which tells them how to do the survey, what equipment may be used, how the plan must be presented etc, etc. Then just to make sure, the end plan is examined for compliance before being registered at the Land Titles Office. *Mining* surveyors are regulated at a similar level.

There is no doubt that the current regulatory system does protect the public. The level of disputation on land boundaries in NSW is minimal, complaints against surveyors are few. Only four complaints were received by the Registrar in 2007, two of these turned out to be against people who are not registered. One of the other two complaints has since been withdrawn. The LPI submission[72] confirms that the current legislation provides no "*impediment to LPI achieving its business objectives in land titling matters*." The same result may be achievable with a good deal less regulation but none the less the current system works and works well. Would it work, however, if there was not an adequate supply of registered *land* and *mining* surveyors?

The age profile of registered land surveyors is such that the board must register 33 new land surveyors every year for the next 20 years if NSW is to have the same number of registered land surveyors in 2028 as it has in 2008[73]. With great commitment and some innovative approaches to dealing with bottlenecks the board achieved that target in 2006 and 2007. However the pool of graduates is diminishing and the numbers entering the two NSW surveying undergraduate courses is also decreasing. The University of Newcastle has graduated on average 15 students per year over the last four years. That was achieved with an intake of around 25 students per year. With a considerably lowered UAI cutoff, intake has now increased to about 42 per year but it remains to be seen whether this results in more graduates. The University of NSW used to graduate a similar number of students per year (15) but, apart from an unusually large number expected in 2009 (25), University of NSW now averages about 12 graduates per year. There is considerable conjecture about the sustainability of two university courses with this number of undergraduates. There will come a time when there will not be 33 surveying students graduating in a given year.

[71] Surveying Regulation 2006

[72] Attachment 3D (ii) Acting Deputy Director General and General Manager LPI

[73] Blanchfield FJ and Elfick M, Legal coordinates as a solution to an irreversible shortage of surveyors, Fifth Trans Tasman Survey Conference, Cairns 2006

Mine surveying is even more challenged. Only two new mining surveyors were registered in 2007 while two mining surveyors left the register in the same period. But at the same time the *recognised qualification*[74] for a mining surveyor is about to be increased from a two year TAFE diploma to a three year degree. The only three year surveying degree currently available in Australia is at the University of Southern Queensland. Presumably some potential mining surveyors will complete a four year degree rather than relocate to southern Queensland.

Obviously the current regulatory system will cease to protect the public when skills shortages reach the point that there are not enough registered surveyors to do the required work or adequately supervise the work. At that point some alternative, and very likely inferior, system will have to be instituted.

For *mining* surveyors, the Chief Inspector of Mines and Coal Mines has recommended[75] a solution at least for the short term. He recommends that the *Surveying Regulation 2006* be amended to allow for the registration of surveyors restricted to metalliferous mines as well as the current unrestricted and restricted to open cut categories. As this recommendation applies to the Regulation not to the Act it has not been included in the Recommendations in Part 1 but the board should act upon this recommendation at the earliest possible time.

This relatively simple amendment will enable competent underground metalliferous mining surveyors, recruited from interstate, to be registered for that purpose without undergoing the very demanding requirements for unrestricted registration. But will there be enough mining surveyors to sustain the current system 10 years hence?

The natural reaction to a shortage of people in a particular occupation is to examine the barriers to entry to that occupation. As described above the barriers for entry to land and mining surveying in NSW are substantial. The time is fast approaching where the regulating authority must consider, if not a lowering of the bar, then at least alternative pathways into *land* and *mining* surveying. For example, if land and mining surveyors are required to undertake supervised post graduate work experience and then prove their competency to the board what does it matter what degree they have to start with?

The recognised qualification for mining surveyors should be left at the current two year TAFE diploma, or at most only increased to a three year TAFE diploma rather than a three year bachelor degree. The recognised qualification for land surveyors should be broadened to include a three year surveying degree or any three year mathematics or science based degree plus a graduate diploma in surveying. Again as these qualifications are determined by the Regulation or by Determinations they have not been stated as a Recommendation in Part 1.

The surveying profession will resist any perceived lowering of standards for entry to the profession but perhaps the time has come to separate the concept of registration

[74] Surveying Regulation 2006 Reg 77

[75] Attachment 3 E Chief Inspector of Mines and Coal Mines, Department of Primary Industries

from the concept of professionalism. Licensed plumbers have their name on a register but that does not make them professionals. Similarly in Queensland technician surveyors are registered but as technicians. Registration does not elevate them to professional status. Entry to a profession should require appropriate tertiary qualifications but registration should only require proof of competency in the type of work which is the subject of regulation. In any case it is the regulating authority, not the profession, which will be held to account if the current system collapses for lack of a workforce.

4.7. Safeguarding survey marks

The cadastre of NSW has come a long way since the days when surveyors such as James Meehan (1774 – 1826)[76] measured each grant of land virtually in isolation. Measurement was difficult and crude and only aimed at getting a reasonable estimate of area. Only rudimentary efforts were made, and not always successfully, to ensure that grants did not overlap each other. The monuments, either natural or manmade, that marked the perimeter were of primary importance.

In the first half of the twentieth century measurement technology was improving and efforts first started to link cadastral surveys to the control (or geodetic) network (the State control survey) so they could be integrated into a cohesive whole for the state. In the last half of the twentieth century the improvement in technology accelerated and so too did the integration of *land* or cadastral surveys into a cohesive whole for the state. At the same time the system primarily used for charting *land* surveys was digitized and rapidly evolved into what is now the digital cadastral database (DCDB) which according to GITA[77] "*is the prime component of spatial information*" in NSW.

GITA also highlights the emergence of GPS (the broader term is GNSS) technology which now allows surveyors, and many non-surveyors, to locate a point on the surface of the Earth to within a few centre metres. Measurement not only of relative distance and direction but also three dimensional position has become relatively easy and cheap. It may surprise the non-surveyor reader, however, that surveyors still rely, like Mr Meehan did 200 years ago, on monuments to define and redefine the boundaries of parcels of land.

The IS NSW submission[78] provides, in great detail, suggestions for the safeguarding of these monuments. The IS NSW recommends the extension of the Surveyor General's powers to maintain and repair[79] *permanent survey marks*[80] to include all *survey marks*[81]. It also recommends changes to Section 24 of the Act that appear to

[76] Dawson Tony, James Meehan a Most Excellent Surveyor, Crossing Press Sydney
[77] Attachment 3 C Geospatial Information Technology Association (Australia and New Zealand)
[78] Attachment 3 F Institution of Surveyors NSW Inc Sec 3 (4 and 5)
[79] Surveying Act 2002 Sec 9
[80] Surveying Act 2002 Sec 3
[81] Surveying Act 2002 Sec 3

be aimed at a more prescriptive approach to safeguarding *survey marks*. Unfortunately some of the *survey marks* to which IS NSW refers are fairly obscure chisel marks or pieces of metal inserted into a very crowded and ever changing built environment. Proving knowledge or recklessness is problematic in many cases where such marks have been removed or damaged. The educational campaign recommended by IS NSW is a more practical and more outcome oriented approach to the protection of *survey marks*. It is recommended that the board develop and implement an educational program based on the New Zealand model sited by IS NSW.

In contrast to IS NSW, GITA questions the need for monuments in the satellite age. At this point in time the monuments are important but in the longer term an alternative way to maintain and safeguard the cadastre is to improve its spatial accuracy. That is, to achieve a point where boundaries can be reestablished from the XY coordinates in the DCDB instead of relying on bits of iron and brass precariously buried in the ground or otherwise inserted into an ever changing built environment. To get to that point the spatial accuracy of the DCDB could be improved to reflect the precision and accuracy of urban and rural *land* surveys. This process is already underway but can be greatly accelerated by mandating the connection of land surveys to the Geocentric Datum of Australia (GDA).

Provisions already exist in the Surveying Regulation 2006[82] which require surveyors to provide MGA coordinates for any *permanent survey marks* they find or any new *permanent survey marks* they place but there is no stipulation of the required accuracy of the coordinates. Coordinates may in fact be simply scaled off a map at very low precision. A surveyor is only required to accurately connect to the *State control survey* if there is an existing *permanent survey mark within 300 metres in an urban area of 1,000 metres in a rural area*[83].

To accelerate the development of a spatially accurate cadastre, surveyors could be required to connect all surveys to the State control survey and provide an MGA coordinate of prescribed accuracy, for at least two survey marks included in the survey. This could be achieved by amendment of the Regulation or by a board Determination.

Improved spatial accuracy in the land cadastre is imperative to the eventual integration of the land and marine cadastres. Fortunately MGA coordinates are already stipulated for *mining* surveys and GDA latitudes and longitudes are generally used to define maritime boundaries. It is the *land* surveys which need to catch up.

A requirement to connect every survey to the State control survey could lead to demand for densification of permanent survey marks at public expense. However the Department of Lands is already well advanced with a Continuously Operating Reference System (CORS) network covering the state. This will allow surveyors who have suitable GNSS equipment to determine GDA coordinates accurate to a few

[82] Surveying Regulation 2006 Regs 35 and 44

[83] Surveying Regulation 2006 Reg 12

centimetres virtually anywhere in the state without having to measure to the nearest available *permanent survey mark*. With such technology becoming increasingly affordable it is difficult to argue for densification of the *State control survey*. As is the case in Tasmania[84], a service could be provided to surveyors, who are not equipped to do the work themselves, to coordinate the survey marks on their behalf, at cost to the surveyor.

4.8. Representation of spatial information in BOSSI

The IEMS submission[85] suggests that to better engage all sectors of the spatial information industry the legislation should establish a Spatial Information Council made up of government and non-government representatives drawn from a much broader cross section of the industry. The inference is that the board, despite its two spatial information representatives, is dominated by registered *land* surveyors who do not necessarily understand spatial information.

CS2i has already addressed this issue[86] with a recommendation that the BOSSI Spatial Information Committee be dissolved and a new NSW Spatial information Council be established in parallel with BOSSI but not reporting to it. It does not appear necessary to legislate for such a Council.

4.9. Representation of the private sector

Another issue raised concerning the makeup of the board is whether there should be specific private sector representation. The ACS submission[87] not surprisingly suggests that there should be adequate representation of the private sector in recognition of the percentage of individuals employed in the private sector versus the public.

The Act (via the Regulation) rightly specifies representation from organisations representing *land*[88] and *mining*[89] surveyors as these two groups have a special role in achieving the Act's objectives and are, as a result, more explicitly regulated. There is some flexibility, however, in what organisations nominate persons involved in the spatial information industry. Consideration should be given to nominees of industry associations as well as professional associations.

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[84] Circular Memorandum 4/2004, Department of Primary Industries, Water and Environment (Tasmania)
[85] Attachment 3 B Attachment 4.1
[86] CS2i Action Plan, BOSSI, June 2007 p21, 22
[87] Attachment 3 G Sec 3.3
[88] Surveying Act 2002 Sec 27 (c)
[89] Surveying Act 2002 Sec 27 (d)

4.10. Membership and Operation of the board

The IS NSW points out[90] that the operation of the board is put in jeopardy if an organisation fails to nominate its representative in the required time frame. More flexibility is needed in constituting the board including the ability to call for nominations from industry as well as, or instead of, professional associations as discussed in section 4.9 above. It may be possible to achieve this through the process of the Minister determining which *professional associations of persons*[91] are to nominate.

4.11. Readability of the Act

Sections 9A and 9B of the Act appear to be in the wrong Part, i.e. Part 2 Public Surveys. These provisions apply to all surveys by a registered surveyor not just public surveys. If amendments are made to the Act Sections 9A and 9B should be relocated to Part 3.

4.12. Definitions of registered surveyor and survey

Both the IS NSW submission[92] and the ACS submission[93] express a desire to align the definition of survey with the type of work usually performed by a registered land surveyor, particularly one working in the private sector. One of the arguments given is that the board tests the competency of surveyors in town planning and engineering design but these are not reflected in the definition of *survey*, *land survey* or *registered surveyor*. There is an anomaly here given that nowhere does the Act or the Regulation exercise any control over, or regulation of, engineering design or town planning. However many surveyors do design subdivisions or employ planners or landscape architects to do so. The quality of these designs is important to sustainable development in NSW. There appears to be a disconnect between the day to day work of a registered surveyor in private practice and what the Act actually regulates. But the Act is not intended to define or perpetuate the role of the professional surveyor. Nor can it provide a solution to all the quandaries and uncertainties which a surveyor encounters in the course of his or her professional duties.

The argument for including town planning and engineering design in the board examinations is that the certificate of competency conferred on surveyors by the board includes competency in these areas and this in turn entitles registered surveyors to practice in these disciplines. This has not been disputed for subdivision design. Municipal authorities, however, argue that the required qualification for someone submitting a civil engineering design for development and building approval is listing in the National Professional Engineers Register Section 3 (NPER – 3) or

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[90] Attachment 3 F Institution of Surveyors NSW Inc Sec 3 (8)
[91] Surveying Act 2002 Sec 27 (2) (e)
[92] Attachment 3 F Institution of Surveyors NSW Inc Sec 3 (1)
[93] Attachment 3 G Sec 3.1

eligibility for membership of Engineers Australia. Ironically surveyors who have completed a degree in Geomatic Engineering are eligible for membership of Engineers Australia but those who have completed an identical degree in Surveying are not. As the Act now stands, changing the definition of *land survey* to include town planning and engineering design would exclude civil engineers from doing this work – not an acceptable outcome. Expanding the definition of *survey* as suggested by ACS and IS NSW would not achieve their goals unless the Act also stipulated that only certain people can perform a survey. Again civil engineers could not reasonably be excluded from doing engineering design.

Another solution proposed to this and other issues is to change the definition of *registered surveyor*. A *registered surveyor* is by definition a person registered under the Act. The Act cannot confer on a *registered surveyor* rights or obligations which are unrelated to the policy objectives of the Act. There is no evidence that those objectives should include the regulation of town planning and civil engineering design.

Possible solutions to this very real problem for those surveyors affected is to:

- change the local government legislation;
- negotiate eligibility for listing in the NPER-3 for *registered land* surveyors; or
- have Engineers Australia acknowledge that *registered surveyors* are eligible for membership of that institute.

5. Response to stakeholders

Regulatory practices in NSW are very much in tune with regulatory best practice in other Australian jurisdictions which advocate less regulation rather than more. The guide to best practice[94] states at page 5

"*To achieve best practice, government should employ regulations more selectively and explore other means to accomplish their goals, such as providing more consumer information or commercial incentives*."

Any proposal for amendment of the Surveying Act 2002 must acknowledge this regulatory environment.

The Surveying Act 2002 is not intended to define or perpetuate the role of the professional surveyor. Nor, in this regulatory environment, can it provide a solution to all the quandaries and uncertainties which a surveyor encounters in the course of his or her professional duties. The Act is there to achieve just four objectives, with the possible addition of a fifth as a result of this report.

[94] From Red Tape to Results, Government Regulation: A Guide to Best Practice, Inter-Governmental and Regulatory Reform Branch, The Cabinet Office, New South Wales, June 1997

This review of the Surveying Act does not guarantee that any revision will occur. Stakeholders should certainly not expect to see their particular wording for proposed new provisions immediately reflected in a revised Act. The six Recommendations of this report will, if adopted however, trigger a process of legislative revision which will ensure that the Act and its subordinate legislation continue to achieve positive outcomes for surveying and spatial information in NSW.

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