

Nations need national land administration infrastructures

Rohan BENNETT, The Netherlands; Abbas RAJABIFARD, Ian WILLIAMSON, Jude WALLACE, Australia

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SUMMARY

Many nations lack a coherent national approach to land administration. Instead, land information and processes are frequently disaggregated across states, provinces, cantons, counties, and municipalities. This is particularly the case in federated countries. The growing body of land administration theory often assumes or prescribes the need for national systems; however, the justification for this approach requires further explanation. Without justification, nations that maintain disaggregated systems lack the impetus to unlock the opportunities veiled by disparity in their land administration systems. Moreover, a nation's ability to respond effectively to emerging national and global issues such as climate change is greatly impeded. This paper aims to explain the need for national land administration infrastructures. Qualitative case studies of the Australian context and the method of triangulation inform the justification. The research reveals most drivers can be classified into six overarching subsets: adherence to international standards by national governments, better federal or central governance, improved shared governance, scale of economies for lower levels of government, opportunities and savings for business, and social inclusion for citizens. Unfortunately, specific drivers are found to be complex and changeable, as political, scientific and environmental debates raise policy issues: there is no single solution. As an alternative, nations must seize on the specific drivers relevant to their context. They must employ them to transform disparate land administration systems into multipurpose national land administration infrastructures that deliver benefits to all stakeholder groups. This paper summarizes a recently accepted submission to the Journal of Land Use Policy.

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1. INTRODUCTION

The administration of land is an essential component of any nation's administrative portfolios. Here, *land administration* is defined as the management of land tenure, land valuation, land use, and land development (Enemark *et al*, 2005). A *land administration infrastructure* is defined as the policy instruments, legal frameworks, institutional design, and technical tools that underpin the delivery of these four functions. The four broad functions are increasingly relevant to a nation's ability to organise itself. Without a national land administration infrastructure a nation will struggle to be governed holistically. Contemporary land administration literature supports this view (Dale and McLaughlin, 1999; UN-FIG, 1999; Enemark *et al*, 2005; Williamson *et al*, 2010).

The organization of national land information presents a challenge in countries where land is administered at lower levels such as states, provinces, zones, cantons, municipalities, counties and councils. National aggregation of lower level land administration systems is not a straightforward activity: a range of legal, institutional, and technical issues must be dealt with (Williamson, 2001). However, perhaps most difficult is stimulating political will to modify systems of land governance that are entrenched in national constitutions, cultures and collective psyches. Convincing reasons are needed. These reasons are not clearly articulated in the land administration and cadastral science literature.

Identification of compelling reasons for developing national land administration infrastructures will assist development of political will. In this paper, a systematic approach to articulating the reasons is applied. A background from contemporary land administration literature demonstrates the assumptions and gaps in knowledge relating to the drive for national approaches. The underlying research method for this work is then described. Results are then presented under six classes: adherence to international standards by national governments; improved federal or central governance; better shared governance; scale of economies for lower levels of government; opportunities and cost savings for business; and social inclusion for citizens. The discussion section focuses on synthesizing the results, outlining limitations, and describing how the generic drivers might be utilized within a country context. The conclusion summarises key points and outlines the future directions required in country contexts where national approaches are not yet evident.

2. BACKGROUND

The most influential contemporary land administration literature either asserts or implies a national approach (c.f. UN-FIG, 1999; Enemark *et al*, 2005; Williamson *et al*, 2010; Roberge and Kjellson's, 2009). This is understandable as the literature aims to articulate the high-level

paradigm shift of land administration systems towards delivering sustainability (Enemark 2010). The works do not aim to outline where and how land administration systems should sit within government.

Contemporary technical land administration literature also presupposes or ignores the issue of a national approach. The concepts of 3D cadastre (Stoter *et al*, 2003; Coors, 2002; Billen *et al*, 2003; Lemmen *et al*, 2003; van der Molen, 2003; Oosterom *et al*, 2006; Oosterom *et al*, 2006a), cadastral data models (van Oosterom, *et al*, 2006; Kalantari *et al*, 2008), survey-accurate cadastres (Buyong *et al*, 1991; Elfick, 1995; Spaziani, 2002; Fradkin and Doytsher, 2002; Rowe, 2003), and the inclusion of new property rights, restrictions and responsibilities into cadastres (Kaufmann and Steudler, 1998; Ting 2002; Bennett *et al*, 2007; Bennett *et al*, 2008) are important contributions. However, they tend to assume or ignore implementation at national scale.

The issue of national approaches to land administration receives more attention in the literature focused on practical implementation or management of systems (Williamson, 2001; Dale and McLaughlin, 1999; Enemark and Williamson, 2004). Similarly, literature focused on developing countries explores the need for national capacity building coincidental in large-scale land administration projects. Often, there exists a strong drive to decentralize land administration systems and empower local participants. Projects over the last thirty years across South America, South-East Asia, and Africa provide examples (c.f. Wily, 2003; Ntsebezal, 2004; Skinner 2001). However, the drive for decentralization is countered by the need to build national institutions and memory. This balancing act remains an ongoing challenge.

Perhaps the most directed research towards national land administration systems comes from constitutional federations. These nations make up 40% of the world's population (Forum of Federations, 2011). The contemporary push for aggregation emanates from work undertaken by McLaughlin (1975), Williamson (1985) and the National Research Council (NRC) on multipurpose cadastres (NRC, 1980; 1982; 1983). Most recently this translated into "National Land Parcel Data: A Vision for the Future" (NRC, 2007).

Buhler and Cowen (2010) provide more specific drivers in the context of the United States, particularly those emerging from the Global Financial Crisis (GFC). They outlined plans to include parcel identification as part of the *Home Mortgage Disclosure Act* and the inclusion of parcel level information into new banking regulations under review by The House of Representatives. President Barack Obama passed these amendments into law in the *Dodd-Frank Wall Street Reform Consumer Protection Act* on July 21 2010.

Canada has also tentatively explored the notion of a national approach to land administration (c.f. Williamson and Ting, 2001), however, there exists no national parcel database or aggregated land administration regime. Though, through GeoConnections and GeoBase a number of fundamental national datasets are available.

Australia's land administration systems are inherently state based, however, the economic

constraints of a small population and cooperation among senior land administrators drove collaboration between mapping and surveying agencies since the 1980s (Grant and Hedberg, 2001). This occurred primarily through PSMA Australia Limited, a company with state and national government shareholders that delivers national datasets to national businesses, federal agencies, and any other interested parties (Paull and Bower, 2003; Paull, 2003).

In Europe, the constitutional arrangements of the federations of Germany and Switzerland enable national approaches to land administration. In Germany, the federal constitution places responsibility for the land register with the Federal Republic, while the states make laws concerning the property cadastre. Interstate bodies are used to ensure the property cadastre is uniform (Hawerk, 2001). In Switzerland, constitutional authority for the cadastre lies between federal and cantonal levels (Stuedler and Williamson, 2005). The federal levels supervise the cadastral activities of the cantonal agencies. For registration, activities and competence largely lie at the cantonal level.

In summary, already many nations have the groundwork in place and there are various options for implementation. However, a clear articulation of the reasons underpinning these national transformations is still wanting.

3. METHODOLOGY

The research design concept of triangulation was utilized (c.f. Mathison, 1988; Barbour, 1998; Healy and Perry, 2000; Golafshani, 2003) to explore and better articulate the reasons for building a national approach to land administration. First, a broad literature synthesis was undertaken. The summarized results of this review were provided in the previous section. Second, case study approach was used to identify specific drivers for national land administration¹ (c.f. Feagin et al., 1991; Evans and Gruba, 2002; Williamson and Fourie, 1998). Australia and the states of New South Wales, Western Australia, and Victoria were the chosen case study jurisdictions (Figure 1). In Australia, the federal government deals with defence, monetary policy, fiscal policy, industrial relations, and trade. The state and federal governments jointly manage a number issues including education, health, and primary industries. The remaining roles of government are the responsibilities of the six states, two territories and the hundreds of local level governments.

The Australian case study was divided into three subsidiary studies: the perspectives of key stakeholders: governments (federal and state), business, and individuals. This was a similar approach used by the National Research Council (1980; 2007) in the United States. All studies were conducted between December 2009 and July 2010.

¹ A more complete approach would involve studying the land information arrangements and drivers of all nations: 192 (UN, 2006), or between 189 and 196 depending on the source used. The Central Intelligence Agency's (CIA) World Fact Book (CIA, 2010) provides data on all the land cover and use, of all nations; however, it is at only at a cursory level. The 'Cadastral Template' project (Rajabifard *et al*, 2007) provides the necessary analytical framework, however, it is limited to 42 respondent countries. Consequently, it was concluded that a complete snapshot of all national land administration systems is not currently available.



Figure 1. The case study jurisdictions

The final phase involved drawing together the results of the three case studies and the specific drivers they uncovered. During this process validation took place by determining overlapping interests and drivers, identifying recurring problems, and drawing out key themes. The drivers were organized into a generic model. Final validation and refinement was undertaken by testing the generic drivers against the respondent data from the 42 countries involved with the Cadastral Template (Rajabifard *et al*, 2007).

4. RESULTS

The outcomes of the research method revealed drivers for a national land information infrastructure are complex and adapt to policy issues raised in political, scientific and environmental debates. Various approaches could be used to categorize different drivers, each method dependant on some underlying aim. To explain the rationale for national approaches to land administration to various stakeholder groups, the drivers were arranged under specific benefit categories, each category then being attached to a particular stakeholder group. These groups are discussed in sequence below. Together, the broad categories can be considered the complete set of drivers underpinning national land administration information and services.

4.1 Adherence to international standards by national governments

International or regional standards, treaties and protocols require nations to commit and adhere to agreed standards. Examples include the Convention on Biological Diversity (UN, 1992), the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UN, 1992a), and accession requirements for countries wishing to join the European Union (Bogaerts *et al*, 2002). While public policy instruments, such as new laws and regulations, are a popular method for upholding these standards at the national level (*c.f. Building Energy Efficiency Disclosure Act 2010 (Cth)*), adherence can only be measured and vindicated with nationally aggregated land information. Another example includes calls for the development of better national statistics for international adherence (ABS, 2010).

4.2 Better federal or central governance

One of the strongest drivers for a national infrastructure for land administration is improved governance by federal or central governments. This is particularly relevant where custodians of land information are at lower levels of government. The Australian Government case study revealed a considerable number of examples where land information would improve or enable more effective federal governance. Examples include: enhanced monetary policy and setting the national cash rate (West, 2010; RBA, 2004); improved fiscal management (e.g. collecting national property taxes such as capital gains tax); and enablement of federal land administration. Other examples can be cited of how national land information would improve or enable better governance across federal departments. In both federated and unitary nations there is an undeniable requirement for the central government to have access to information about all land tenures, values, land use, and addresses. Without this information, good governance at the federal level is greatly impeded.

4.3 Improved shared governance

Improved shared governance differs to improved federal or central governance. Improved federal governance refers specifically to enhancing the functions and activities of the central, unitary, or federal government. Improved shared governance is about bettering the activities and functions that are shared between different levels of government. For example, the activities shared between Australia's federal, state and local governments. In these cases, harmonization is often goal. An ongoing aim is to reduce legal complexities and generate savings by eliminating administrative overlap (SCLCA, 2006; SCLCA, 2008). The case studies of the federal and state governments provided a number of examples where a national land administration infrastructure would assist shared governance. Examples included: provision of national assessment and responses to climate change (*c.f.* IPCC, 2007; Allison *et al*, 2009; DCC, 2009; SCCCWEA, 2009; COAG, 2009); contributing to effective national property markets (Wallace and Williamson, 2006); assisting disaster relief and management on a national scale; aiding infrastructure decisions for cities of national significance (*c.f.* COAG, 2009); support for an authoritative approach to street addresses (Winter *et al*, 2010); establishing and measuring food security (*c.f.* Cotula *et al*, 2009; Robertson, 2010); facilitation of national law enforcement, and disaster management and emergency response.

4.4 Economies of Scale for Lower Levels of Government

In countries where custodianship of land information is at state or provincial level, the motivation for national approaches might appear minimal. These lower levels of government are only responsible to the people and land within the jurisdiction's boundaries. As demonstrated in 4.3, shared governance can drive shared approaches towards land information. However, there is another driver for the states, cantons, provinces and municipalities. This driver relates to the cost of building infrastructure and tools for managing information. Whilst the raw cost of new technology continues to decrease, the life cycle of information systems is short when compared with other physical infrastructure. In developed countries, many of the legacy systems delivered in the 1980s and 1990s are now dating and will soon need to be re-engineered to make better use of the opportunities offered by Web 2.0 and beyond. Moreover, implementation of change is always encumbered with some form of transaction cost. In federations or nations where land information is disaggregated to lower

levels, union among surrounding jurisdictions can generate scale of economies for a new information infrastructure implementation. Moreover, a collaborative approach creates a critical mass and united front for lobbying central or federal governments for funding contributions.

In Australia there are numerous examples where state land administration agencies have collaborated to develop shared products and initiatives. These are most evident through ANZLIC the Land Information Council (the peak strategic council for land information) and the Intergovernment Committee on Survey and Mapping (ICSM) (the collection of technical committees that drive at national tools and approaches for surveying and spatial issues). Recent examples include: the development of ePlan standards - a national approach for the digital lodgement of survey plans (Kalantari et al, 2009); the Harmonized Data Model - a nationally harmonized UML data model for organizing and cadastral data and topographic data (Priebbenow, 2010); a business case for Survey Accurate Cadastres (ICSM, 2003); National Address Management Framework (NAMF) (ANZLIC, 2008); and work on a national approach for managing property rights, restrictions and responsibilities (ANZLIC, 2004).

4.5 Opportunities and Cost Savings for Business

The private sector can gain considerably from a national land administration infrastructure. A national approach enables businesses that operate nationally to undertake their land related activities more seamlessly. Moreover, those businesses in the spatial and land information sectors can build and deliver value added products for national audiences at lower cost through licensing arrangements with a single national land information coordinator. Examples include: creation of a seamless or harmonized economy (COAG Reform Council, 2009; OECD, 2010; SIBA, 2009; SIBA, 2005); implementation national eConveyancing systems; delivery of a national market for retail leases (Australian Government Productivity Commission, 2008); simplification of the land development process for national businesses (SIBA-API, 2010); and generating value added products and services (SIBA, 2008; SIBA, 2010; 2010b).

4.6 Social Inclusion for Citizens

Citizens and individuals stand to gain much from services directly and indirectly delivered by a national infrastructure for land administration. The infrastructure will radically improve social inclusion by providing better awareness and service delivery for citizens. However, advocates for a citizen driven system are not apparent. Citizens are not interested in the underlying structures or functions of government: citizens are interested in service delivery. The public good nature of a national land administration infrastructure is yet to be fully understood by citizens. Meanwhile, the importance of improving services to citizens is apparent in GeoScience Australia's Commonwealth Spatial Data Infrastructure (CSDI) Pilot Project that focuses specifically on social inclusion (Abhayaratna, 2010).

5. DISCUSSION

The common view that nations require national land administration infrastructures irrespective of the administrative level with custodianship of this information is confirmed. The six categories of drivers identified provide a starting point. They are useful for isolating the benefits of aggregation to the diverse range of stakeholder groups. However, specific drivers will differ in each country context. Table 1 summarizes the generic drivers and specific examples identified in the Australian context. It also shows the required land administration functions for each driver.

Table 1. National land administration systems: drivers, examples, and requirements

Drivers	Examples	Requirements (core data and/or services needed)			
		Tenure	Value	Use	Development
1. Adherence to international treatise by national governments	- Adherence to the Kyoto Protocol: disclosing the energy efficiency of buildings	X		X	X
2. Better federal or central governance	- Development of better national statistics for adherence	X	X	X	X
	- Enhanced monetary policy: setting the national cash rate	X	X		X
	Improved fiscal management: collecting national property taxes	X	X		
3. Improved shared governance	- Enablement of federal land administration	X	X	X	X
	Provision of national assessment and responses to climate change	X	X	X	X
	- Contributing to effective national property markets	X	X		X
	- Assisting disaster relief and management on a national scale	X	X	X	X
	- Aiding infrastructure decisions for cities of national significance	X	X	X	X
	- Support for an authoritative approach to street addresses	X			
	- Measuring food security	X	X	X	
4. Economies of scale for lower levels of government	- Facilitation of national law enforcement, disaster management and emergency response	X			
	- ePlan standards	X			X
	- Harmonized Data Model	X			
	- Survey Accurate Cadastres	X			
	- National Address Management Framework	X		X	
5. Opportunities and cost savings for business	- Framework for managing property rights, restrictions, and responsibilities	X		X	
	- Creation a seamless or harmonized economy	X	X	X	X
	- Implementation of a national eConveyancing systems	X	X		
	- Delivery of a national market for retail leases	X	X	X	
7. Social inclusion for citizens	- Simplification of the land development process for national businesses	X		X	X
	- Generation of value added products and services	X	X	X	X
	- Generation of "Social Inclusion": The CSDI Pilot Project	X		X	

A number of points can be made from the table. First, the list is not exhaustive: only selected drivers from the study were included. Further analysis of stakeholder groups will reveal a considerable number of further opportunities. Moreover, in other countries different drivers will drive implementation. There is no silver bullet common to all countries. For example, the 2008/09 global financial crises renewed political impetus to deliver a national parcel data file for the United States, something various groups had been trying to achieve for almost thirty years.

Second, in Australia, the current drivers for a national land administration infrastructure are weighted towards the top-down requirements of the federal and state governments, rather than bottom-up demands of the business and individual citizens. The federal and state governments are increasingly seeing the value and necessity for collaboration. The work of PSMA Australia, ANZLIC, ICSM, and Council of Australian Governments (COAG) provides strong examples. Citizens and business are more focused on individual needs and activities: the concept of a national land administration infrastructure is intangible and most likely outside their scope of interest. This presents a major challenge in Australia: how can a national infrastructure for land administration be implemented if the citizens do not recognize its benefits? To garner political will for a national infrastructure initiative, visionary leadership from executive and administrative arms of government is required.

Third, the greater majority of drivers require data and services relating to more than one of the four land administration functions. Indeed, a national tenure dataset and associated services is a requirement in every example. Presented in this format, the categorization scheme coupled with the land administration functions demonstrates the overwhelming requirement for a national land administration infrastructure.

Finally, the Australian context also highlights the need for multiple business cases, different cases for the different stakeholders involved with the infrastructure. This is particularly the case in state jurisdictions where land administration organizations are setup as statutory authorities or government business enterprises. Collaborative instruments such as councils, committees, working groups and workshops can only go so far: unless the stakeholders can see ongoing gains from a national approach, their support will be transitory. A change in organizational mindset is required: state and federal organizations must start acting together as agencies with cumulative national coverage rather than agencies aligned to a particular government.

Taking the above into account, a model for how the generic drivers could be further utilized in practice is illustrated in Figure 5. Enemark *et al's* (2005) land management paradigm is used to illustrate the utility. The paradigm describes the way in which the arrangement of the four land administration functions of tenure, valuation, land use, and development is dependant on a country context. A single land policy and organized land information infrastructure must feed into these functions. Combined the elements will enable sustainable development. Figure 5 extends the model. Country context remains central. Following this determination of key drivers, ones with sustainable business cases and contemporary political will, are essential. The six categories of drivers can be used to isolate the benefits for particular stakeholders; only then can an appropriate national approach be initiated and designed. A working example of this process can be found in Western Australia where the drivers of emergency response management, natural resource management, land use and development, and publication of land interests, were used to underpin the development of the state's Shared Land Information Platform or SLIP (Searle and Britton, 2006). This state-based infrastructure now has much broader application, however, the identification of the strategic drivers was essential to the initial development and implementation.

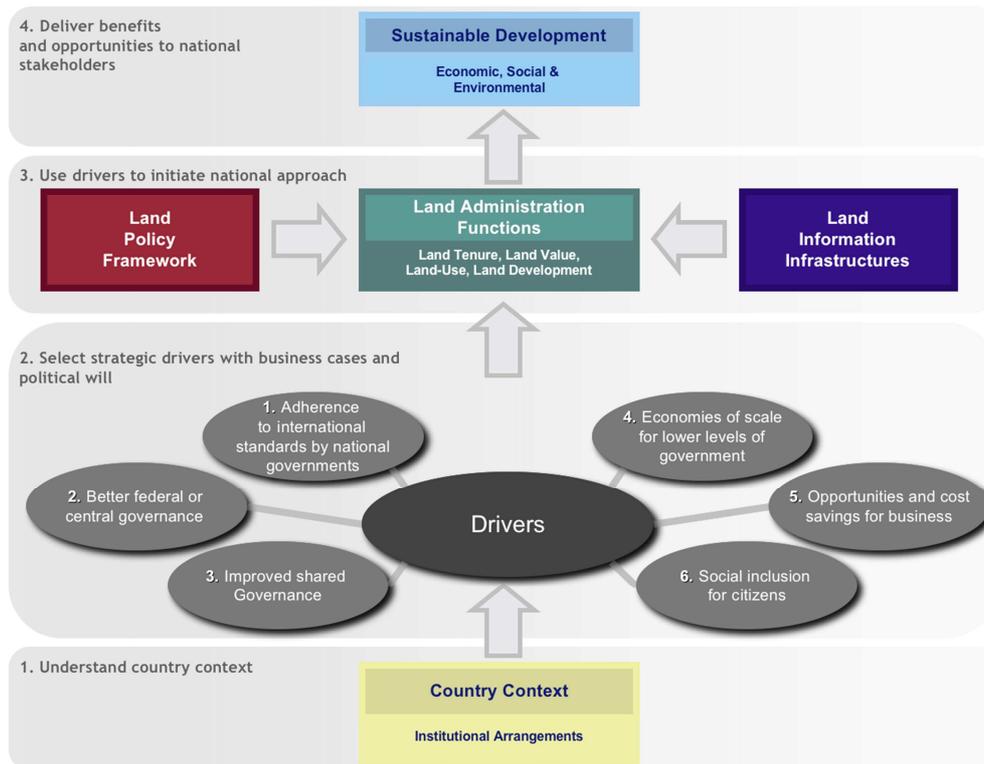


Figure 5. The role of drivers in delivering a national land administration infrastructure (adapted from Enemark *et al*, 2005)

6. CONCLUSIONS

This paper documents the need for national land administration infrastructures. Many nations lack a coherent national approach to land administration: land information and processes are frequently disaggregated across states, provinces, cantons, counties, or municipalities. Land administration theory either assumes or prescribes the need for national systems; however, the motivation for this approach required further explanation.

The results from a number of Australian case studies were synthesized to form the key findings. The research revealed all drivers can be classified into six overarching subsets: adherence to international standards by national governments, better federal or central governance, improved shared governance, scale of economies for states, opportunities and savings for business, and social inclusion for citizens. Unfortunately, more specific drivers were found to be complex and changeable, as political, scientific and environmental debates raise policy issues: there is no single solution for any country and no shared drivers across countries. Instead, nations must seize on a set of specific drivers relevant to their context to unlock the opportunities veiled within their disparate land administration systems. These must have business cases for each stakeholder group and command the political will of the day. The specific drivers should be employed to transform disparate land administration systems into an aggregated national land administration infrastructure. Once achieved, multiple purposes and benefits, some yet undiscovered, will emerge for this public good infrastructure.

These will be at local, national, and global scales. In the meantime, the role of technology in stimulating opportunities and the dynamism of the private sector needs to be further explored. The distance between countries with technical and governance capacity and those without also needs to be highlighted. Whatever the case, the challenge is for land administrators to undertake driver analysis and determine those issues driving change within their context.

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BIOGRAPHICAL NOTES

Rohan Bennett is an Assistant Professor at the UNU School of Land Administration Studies at the University of Twente. He holds Bachelors degrees in Geomatics and Information Systems, and completed his PhD (Land Administration) in 2007.

Abbas Rajabifard is a professional land surveyor and chartered engineer. He is a Professor and Director of the Centre for Spatial Data Infrastructures and Land Administration, University of Melbourne, Australia. He is President of the Global Spatial Data Infrastructure Association.

Ian Williamson is both a professional land surveyor and chartered engineer who is Professor of Surveying and Land Information at the Centre for Spatial Data Infrastructures and Land Administration, Department of Geomatics, University of Melbourne, Australia. His expertise is the cadastre, land administration, and spatial data infrastructures.

Jude Wallace is a land policy lawyer who is a senior research fellow at the Centre for Spatial Data Infrastructures and Land Administration, University of Melbourne, Australia. Her specialties range from improving the most modern land administration systems to developing pro-poor land strategies.

CONTACTS

Rohan Bennett (Corresponding Author)

UNU School of Land Administration Studies

ITC, The University of Twente

Enschede 7500 AE

The Netherlands

Tel. +31 (0)53 4874 339

Fax +31 (0)53 4874 575

Email: bennett@itc.nl

Web site: http://www.itc.nl/about_itc/resumes/bennett.aspx

Abbas Rajabifard

Centre for SDIs and Land Administration

University of Melbourne

Parkville

Victoria

Australia 3010

Tel. +61 3 8344 0234

abbas.r@unimelb.edu.au

<http://www.csdila.unimelb.edu.au/people/rteam/abbas.html>

Prof. Ian Williamson
Centre for SDIs and Land Administration
University of Melbourne
Parkville
Victoria
Australia 3010
Tel. +61 3 8344 5597
Email: ianpw@unimelb.edu.au
<http://www.csdila.unimelb.edu.au/>

Jude Wallace
Centre for SDIs and Land Administration
University of Melbourne
Parkville
Victoria
Australia 3010
Tel. +61 3 8344 3427
j.wallace@unimelb.edu.au
<http://www.csdila.unimelb.edu.au/people/rteam/jude.html>