

National Parcel Data System: Feasibility Study and Business Case Final Report

Report to the Canadian Council on Geomatics (CCOG) by Quality Performance
Associates (QPA)

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1.0 Executive Summary

Objectives of the Study

Quality Performance Associates (QPA) was engaged to survey stakeholders as a prelude to delivering a Business Case addressing the need for a National Land Parcel Data System (NPDS) and, if justifiable, how such a service could feasibly be provided to meet the digital parcel data needs of users across Canada.

The concept was that improved and efficient access to parcel data would streamline operations providing measurable savings and prompt more extensive use of such data for many business purposes having measurable impacts on both efficiency and effectiveness.

Conduct of the Study

As part of the direction on this assignment QPA was to survey parcel data providers and data users to determine the possible value in the availability of a Canada-wide service that would facilitate parcel data provision and use.

The initial list provided of target stakeholders to survey consisted largely of “operatives” (those using parcel data for transactional purposes of a relatively routine and repetitive nature) in the provision and use of parcel data, primarily within the public sector. It was recognized early in the assignment that most local providers of data were able to meet operational needs effectively with good quality data, much of which was already in digital form.

In addition QPA surveyed a selection of data providers and users within the private sector. On balance and as a predefined orientation in the project mandate, the majority surveyed were involved in the most frequent day-to-day transactional use of digital parcel data. Most had a specific daily role that required data that was accurate, readily available, usable and reliable. Few surveyed had a policy role where parcel data would affect the development of policy and the execution of consequential and National programs with high (strategic) potential benefits. **It quickly became clear that there is not a justifiable business case for a new National Parcel Data System based upon such transactional needs currently largely addressed by local solutions.**

As a consequence the focus of the study was extended. QPA conducted stakeholder consultation with individuals responsible for policy and strategy in a wide range of organizations in Canada. We also undertook a high level survey of International jurisdictions. The intent was to identify how other nations used land parcel and other related data to develop policy, execute programs and improve economic performance throughout their individual jurisdictions. QPA analysed over 40 jurisdictions and spoke at length with national organizations, including federal jurisdictions, in Australia, Europe and the United States.

Outcomes of the Study

The combination of the stakeholder surveying in Canada and the review of International jurisdictions, clearly identified that the study being completed by QPA was not addressing the “National” needs for parcel data. Thus far the focus of the NPDS initiative seems to have been on efficient and timely use of such data at the local level when in fact the very high payout uses for digital data is in National issues (as outlined below) across the breadth of Canada.

Simply stated the ability to access land parcel data for its own value and then subsequently use parcel data as a window into other land related data can equip Canada to manage programs of national and international importance where meeting commitments responsively is vital to obtaining high payout benefits and maintaining a leadership position in e-government. The outcome from the cost-effective availability of such data will be improved policy, more timely decisions, quality responsiveness and the realization of big-ticket benefits including

significant savings in numerous program and business areas. Failure to build a capability equal to or better than that utilized extensively in International jurisdictions of all sizes and types will place Canada at a disadvantage that will diminish our effectiveness worldwide. We believe such a prospect is not acceptable.

Our analysis shows that there is both business case justification for a National Parcel Data System to address strategic and policy needs, and that there are a number of feasible options available for its implementation. The availability of a National land parcel data service can provide a clear and manageable focus for access to land based spatial data that can lead to considerable benefits to Canada with significant economic value. This value can be determined across a broad range of critical applications that add to Canada's capabilities both on the world stage and domestically.

There is further justification for such a system given that parcel data is used by many stakeholders as a fundamental and highly important window or point of entry to, and foundation for analysis of many other sets of data, such as economic and demographic. It is difficult to access, reconcile, analyse and report on data at the national level without such a national framework that would be provided by the NPDS.

Comprehending the use of digital data including land parcel data throughout the world provides a perspective on the value of the utilization of such data as understood in other jurisdictions. Importantly, worldwide priority applications where spatial data such as parcel data can be of great value include:

- Dealing with terrorism as a threat and as a reality quickly and effectively
- Preparing for natural disasters responsively and in a cost-effective manner
- Managing effective and timely disaster relief and revitalization activities
- Facilitating the drive to environmental understanding and improvement
- Streamlining the development of effective economic programs that enhance Canada's competitiveness internationally
- Improved understanding of how better land use can enhance the lives of all Canadians
- Reporting on international commitments and agreements in the environmental and economic spheres
- Intelligent understanding of land based opportunities that can lead to better fiscal management by all levels of government.

Parcel data must be published to meet national and local emergency response needs. The use of parcel information must be integrated into emergency response protocols.

US Federal Geographic Data Committee - Post Hurricane Isabel Review

There is little doubt that the ability to respond to a number of requirements across multiple jurisdictions demands the rapid and responsive availability of and access to large volumes of interconnected data. It is important to note that the decisions and actions required in each area listed above requires the coordinated involvement of ALL levels of government as the scope of the challenge in

certain circumstances can be well beyond the capacity of local governments in Canada . This can be best accomplished with a National focus providing a "Canadian" direction as to Geomatics standards including interoperability amongst multiple data sources, and support fostering the development and use of applications and tools across the many users in both the public and private

sectors. The participation of Canada in a wide range of International challenges will increasingly demand quick availability to comprehensive land data for understandable and effective response and decision making.

"... the more that private companies and governmental agencies adopt and work from a common cadastral fabric, the larger the communal benefits will be in reduced costs and interaction times (research, permitting, planning & design). Having good national baseline parcel data will also provide a foundation upon which more and better supplementary data sets will be built"

GIAC Member

in

Stakeholders within Canada have asserted a value in immediate and streamlined availability of parcel data. This value is primarily efficiency driven allowing users to more easily access the land data needed for many specific applications. While this value is measurable and consequential, it is worth noting that easy and streamlined accessibility is not sufficient to justify the costs associated with a National data availability methodology. **Consequently, the real value and delivery of high benefits will come from the extensive and intensive use of land data to deal with applications similar to those identified on a worldwide basis as outlined above.**

*"Oil and Gas is increasingly competitive worldwide. Any Oil and Gas firm worldwide (especially in Canada) needs to make decisions on where to operate regardless of where they are based. It is important for government to create an environment to facilitate the development and exploitation of oil and gas in Canada. This initiative is a good step towards that facilitation
This [NPDS] is very good news, and we certainly welcome the initiative. Yes, Canada's oil and gas industry would strongly support the development of a National Parcel Service, which would provide one-stop access to authoritative, up-to-date, properly referenced information about land parcels across Canada."
Executive - Oil and Gas Industry Association*

Recommendations

We recommend the provision of a **National Parcel Data System (NPDS)**, a web based portal providing access to multiple data providers including those providing parcel data. We have analysed a number of options for providing the initial functionality of NPDS and this can be relatively quickly and cost effectively put in place by utilizing existing infrastructure available within the federal government or from provincial or private service providers.

It will be important that the NPDS receives the appropriate care and feeding for ongoing success. While initially NPDS can report through a project-based organization such as GeoConnections, we recommend that it become institutionalized as part of the responsibility of a sustainable organization with permanent funding. Any supplementary revenue sources such as membership or access fees will not be significant enough to cover the ongoing operating costs. The immediate payback to users would be the elimination of waste and duplication that should result from an effective coordinated approach across all of Canada to land parcel data. The longer term value would be in the quality use of parcel data in applications related to terrorism, disaster planning and management, environmental improvements, more economic competitiveness and enhanced positive use of land assets throughout Canada.

The requirements of the stakeholder community for parcel data extend far beyond the traditional land management functions typically represented in the federal government by departments such as Natural Resources or Agriculture and Agri-Food. Indeed, Geomatic information, including parcel data, will increasingly be used by all manner of organizations in the public and private sectors to help meet strategic and policy planning needs. A number of stakeholders we contacted, without our prompting, identified the need for the federal government to take a leadership role in enabling access to Geomatics data from many sources. Indeed, this same point was made by stakeholders during Stakeholder Engagement Workshops conducted by GeoConnections in 2005:

- *"Canadian Geomatics needs leadership, a national focus*
- *Leadership: lack of a national geomatics vision..... is hindering uptake by senior decision makers*
- *Communication: lack of a communications strategy aimed at decision makers is resulting in little awareness of value and role of geospatial information"*

Furthermore, the consultation we undertook with other countries shows that there is an evolution occurring whereby national-level needs are starting to be addressed at a government-wide level as opposed to the more narrow departmental-interest level.

We believe that the federal government should take such a leadership role so that in due course there should be a “Canada Land Information Management Agency” with the following goals:

- Encourage data providers throughout Canada a set of standards, probably ISO based, that meet International expectations across a broad selection of jurisdictions
- Support all users in the development of tools, interoperability and data access
- Provide education and information that leads to the installation and improvement of data providers in multiple jurisdictions with the intent to streamline effective use of land based data
- Establish a National program for governance that involves data providers and users with the intent to manage a consistent improvement in the quality and availability of important land data
- Coordinate the various initiatives that are underway within the federal government to ensure that common national objectives are being addressed (this would include taking responsibility for the ongoing evolution of NPDS and similar national programs)
- Assist in problem solving and enhanced use of land data that prompts innovation and accomplishment in applications requiring land parcel data
- Provide the leadership that would serve to improve local capabilities while achieving the necessary inter-jurisdictional integration
- Represent the Geo-spatial community nationally to such organizations as the Federal Security/Emergency Management Structure and other national and international organizations.

Context and Commentary

It is important to note that these recommendations in no way diminish the role of local data providers, for example at the provincial level, who have constitutional responsibility for land parcel data for multiple local applications, such as land transfer and title registration. The use of a National capability facilitates consistency, communication and wide availability for data that leads to the interconnection of land parcels both within and across multiple jurisdictions. **Hence the well established role of local providers in data collection, land transfer and municipal planning continues and is enhanced.**

Indeed, we do not envisage the NPDS itself to be an owner of data, other than metadata: data will be made available, from the many providers of data that exist across the country, to users by an access infrastructure to be established for NPDS. It is inappropriate for the NPDS to have any role in pricing data made accessible through its web-portal. The pricing of data needs to be left to the data provider and the policies related to revenue and cost recovery adopted by each group.

We recognize that there will be some costs incurred by existing data providers to make data available to the NPDS. Consequently, GeoConnections and subsequently the proposed Canada Land Information Management Agency should work with data providers to address such incurred costs.

There is every opportunity to achieve the objectives of the National Agency without the expense and effort involved in building a new organization from scratch. There are already a number of organizations that are undertaking some aspect of what we recommend. However, such organizations cannot fully achieve what we are proposing because:

- They operate on a project-basis and consequently lack long-term sustainability (e.g. GeoConnections)
- Their mandate addresses specific sectoral needs (e.g. NLWIS addresses only agricultural needs)
- They are committees and hence have no delivery capabilities (e.g. CCOG, GIAC).

However, this offers the potential that by integrating with or amending the mandate of such organizations in an evolutionary manner, the objectives of the National Agency can be achieved.

We believe that in its evolution the proposed Canada Land Information Management Agency need not become a large organization, as it can operate partly in a “virtual mode”, taking advantage of the capabilities already available in other organizations both within the federal government and elsewhere. For example, several provincial organizations have offered their facilities to provide the technical infrastructure for data access across the country.

Effective and transparent governance mechanisms will be critical for the success of the Agency. We recommend a Board of Directors with wide membership from data providers and users, including both public, private and not for profit sector representation. Some existing bodies, such as CCOG, GIAC and IACG, should be represented on the Board.

While we recommend that some initial development of both initiatives is implemented as quickly as possible, **there is an evolutionary approach to implementation** that can be followed that may fit better with the decision making processes and timetables of the federal government. The first aspects of this approach would involve commencing a proof-of-concept project along with a Task Force involving selected data providers and users that have expressed support for developing NPDS. This would significantly assist in demonstrating value to other stakeholders and building their commitment.

Summary of the Business Case

The immediate payback to users would be the elimination of waste and duplication that should result from an effective coordinated approach across all of Canada to land parcel data. The longer term value would be in the quality use of parcel data in strategy and policy development, and response based applications related to terrorism, disaster planning and management, environmental improvements, more economic competitiveness and enhanced positive use of land assets throughout Canada

SECTION A: OBJECTIVES AND CONDUCT OF THE ASSIGNMENT

2.0 Original Objectives and Vision

The original objective of this project is the development of a business case (including a cost benefit analysis) for establishing and maintaining a National Parcel Data System (NPDS). The report is intended to serve as a guide to help various levels of government to determine the different options for the establishment of a National Parcel Data System.

2.1 Introduction

The concept for a NPDS stems from the Cadastral Taskforce of the Canadian Council on Geomatics (CCOG). The Taskforce – originally formed through the Geomatics Community of Practice for Real Property, was established to analyze the concept of a distributed, interoperable and accessible national parcel data system.

The preliminary analysis by the Taskforce determined that:

- Users required access to national standardized seamless parcel base data for program mandates, including urban, rural, agricultural, extents etc.
- The minimum baseline data would be sufficient to meet these needs
- Access to foundation parcel data will support improved policy decision-making
- The distributed model will allow the NPDS to integrate with other sources of data and communities of practice connected to real property and people – public safety, public health, environment issues, Aboriginal communities, sustainable land information and land management in Canada

2.1.1 Business Context

The business context under which the NPDS is envisioned is as follows:

- This process of establishing a NPDS has been under discussion for a number of years as indicated in the Sypher reports, but progress to date has been slow
- There was a narrow view taken of who are the “users” as they were seen primarily as the federal government
- Similarly, data providers were seen primarily to be at the provincial level
- The private sector was seen to have minimal interest
- This study sponsored by CCOG recognizes the need to move forward while attempting to cut across the “silos” within both the federal government and between the federal and secondary/tertiary levels of government
- Geomatics or geo-spatial information cuts across many business areas. However, geo-spatial initiatives have tended to be in vertical “silos” rather than horizontal across business areas. This has resulted in a number of initiatives in several departments that focus on their own business need. An example of such an initiative is NLWIS whose focus is Agriculture, but parcel data is pervasive (and includes agriculture)
- Many users driven by competition, international pressures and agreements are creating a sense of urgency for access to land information for numerous needs

- The rapid development of technologies in the private sector is quickly breaking down barriers to interoperability resulting in increased use of Geomatics for supporting land management decisions and policy development
- Even though the use of Geomatics is increasing there is still work to be done in educating policy makers on the impact and value of parcel data on land management and other decisions
- The national perspective requires a shifting of focus to those areas having a multi-jurisdictional aspect. These include the Environment, Public Safety, Economic Prosperity, International Agreements and Reporting, and International Trade,
- Google Earth is making data more accessible, driving competition and building expectations for easy to access and use spatial data.

2.1.2 Key Consultation Activities Undertaken

The key activities undertaken in conducting the assignment are:

- Reviewed several documents to determine what progress had been made to date, and confirm the business context
- Established, in conjunction with the project sponsor, a list of candidate users and providers in the federal and provincial governments
- Developed a questionnaire to capture information of a future vision for land information in Canada by the identified stakeholders
- Developed an initial vision statement for the NPDS (see section 2.1.3 below) for discussion with stakeholders
- Conducted interviews with the representatives (mainly technical operatives) of the “Federal family”
- Extended our consultations with the wider community outside of the Federal Family to include the private sector, non-government organizations, environmental organizations, First Nations communities, associations and utilities, among others
- Further extended our consultations with international jurisdictions.
- Conducted extensive internet research in Canada and internationally to effectively inform the study.

2.1.3. Original Vision

At the start of the assignment it quickly became obvious that a “clearer” vision of the intent of the NPDS as well as a consistent definition of baseline parcel data was required for discussion with stakeholders. The following vision statement was therefore drafted and approved.

The National Parcel Data System will provide a one-stop access to easy to use, accurate, up-to-date, geo-referenced baseline parcel data.

2.1.4 Clarification of the Vision

The intent of the NPDS is to partner with data owners to provide access, and not to own data.

One-stop access defines a technology-neutral web portal to any and all parcel data in Canada. Access will be open to any national and international client for the benefit of Canadians and the Canadian economy within the security and privacy framework established by the provider.

Easy-to-use means that access **will not necessarily** be dependent upon a proprietary format, a specific projection or datum, or a proprietary technology.

Accurate means:

- The geometry of the parcel truthfully reflects the boundaries as delineated on the ground and shown in official documents; and
- The parcel attributes are correct:
 - As to the uniqueness and correctness of the parcel identifier; and
 - Any other data is precisely linked, whether directly or indirectly, and its content is correct.

Up-to-date means that the data is as current as the data provider can provide. For instance, if the data provider updates its data nightly, the updated information is available next day.

Geo-referenced means the parcel is placed to its exact location by using a common referencing system.

2.1.5 Definition of Baseline Parcel Data

Baseline Parcel data is defined as a geographical representation of the geometry for the land parcel with a unique national identifier.

This vision and baseline parcel definition is non-restrictive as it is not the intent of the NPDS to own data. That is, additional digital mapping data and imagery (both satellite and ortho-rectified aerial photos) plus any parcel attributes and other geo-referenced data can be accessed through appropriate links to the baseline as they become necessary and available. Additional geo-referenced information that can take advantage of linkage to parcel data may include but are not limited to:

- Municipal address set:
 - Municipal number
 - Street name (includes street type and direction)
 - Municipality
 - Province
 - Postal Code
- Owner(s)
 - Legal
 - Operating name (business)
- Assessment information (typically assessment number which connects to assessment databases from which can access sale prices, structure information, etc.)
- Planning information
 - Zoning
 - Official Plan
 - Subdivision proposals
- Mineral rights;
- Hydrology.

2.2 Business Objectives

The key objective of The National Parcel Data System (NPDS) is to facilitate access, via a single source or channel, to land information between end users and the providers of such information. A main focus of this study was to determine the feasibility of providing baseline parcel data freely through a distributed, interoperable and accessible national parcel data system. Later in this report in Section 7 and Appendix 6 it is demonstrated how this objective can be feasibly and cost effectively achieved.

Quicker access to this information is important for users to efficiently carry out their mandated program and business responsibilities. Currently many of those who require land information typically must acquire that information from many different sources, requiring the melding of different data sets for information purposes. This is considered a costly and complex process, as in many cases the data has to be converted and verified for use. This can also lead to significant amount of redundant effort and data storage for both the Federal Departments and Private Sector organizations who struggle to work with this data.

It is anticipated that baseline parcel data and land information will be accessible through a distributed model. The objective of the NPDS is to have the data remain closest to source; it is not to replicate the data or create a data warehouse. Appropriate links will be provided to allow communities and people, connected to real property to integrate data from many sources to support effective land management decisions. Initially, at least, users will be accessing data as provided – they will still be required to undertake data conversion or verification activities they require.

A NPDS with baseline requirements of the parcel geometry and unique identifier will assist in eliminating barriers to data sharing across jurisdictions. It will also facilitate access to additional attribute data (such as ownership, assessment, legal description etc) held at source by others.

SECTION B: FINDINGS – RESULTS OF THE CONSULTATION

3.0 Market Setting

Baseline parcel data is seen as an essential entry point to a wealth of other land information needed to inform sound land management decisions and policy development; as well it addresses and supports a number of other national needs such as reporting on international commitments, public safety, environmental issues, international trade, land claim issues, border mapping among others.

At the international conference on Global Spatial Data Infrastructures (Santiago, Chile, November 2006) it was stated the "... *benefits of spatial enablement of core cadastral data are:*

- *Attachment of information to images of the parcel and property*
- *Identification of the 'place' in ways that are understandable by non-technical people*
- *Capacity of businesses and citizens to manipulate the information*
- *Inclusion of various layers of geo-referenced information*
- *Integration of government information systems and provision of seamless information to institutions and government*
- *Ultimately managing information through spatially enabled systems rather than databases*
- *Sharing of the core spatial information layer..."*

Much progress has been made in the use of Geomatics in the past ten years. Initially the biggest inhibitors to Geomatics were cost and technology. The "landscape" has changed as the technology has improved and costs have come down significantly. The introduction of services such as Google Earth has introduced a level of competition and increased access to free information. Google earth has resulted in considerable "ease of use" as it is simple and intuitive.

Over the past twenty years the development of land information systems progressed mainly within the provinces and municipalities as land information was viewed as a local responsibility mainly for land registry and assessment purposes. Its use however has exponentially increased in the last ten years with many users recognizing the need for a national perspective of parcel data.

3.1 Initial Findings from Our Consultations

One of the key elements in establishing any new business venture is to determine the extent of customer / user demand for that service or product. Unless there is a significant demand for the service or product there is no point in investing capital to develop that business. In order to establish the demand for access to baseline parcel data at a national level, we conducted a number of interviews with potential users. These included:

- User representatives from several Federal Departments' ("Federal Family") identified by the project sponsor plus others
- All provinces and selected municipalities
- Extended consultation to a much broader audience, including the private sector, non-governmental agencies, environmental groups, academics, utilities and First Nation communities among others
- Consultation was further extended to several international jurisdictions.

In addition we supplemented our consultations with an on-line questionnaire for those people with whom we were unable to schedule an interview. Appendix 2 is a list of organizations contacted.

The process involved extensive individual interviews with users and providers utilizing a structured questionnaire to guide the discussion. Interviewees were promised anonymity in order to encourage open and frank discussions.

3.1.1 Federal Family

This group of users needs land information to satisfy legislative requirements and to assist in program delivery. Based on the individuals we interviewed, most users of parcel data in the federal family are able to access the data needed to fulfill their responsibilities and do their jobs. Their needs are driven from a transactional perspective (i.e. limited to acquiring parcel data to fulfill relatively routine day to day work related activities of a repetitive nature) and not from the bigger picture of policy development and planning.

Many were unable to articulate the connectivity with respect to parcel data across functional business areas. For example, Health Canada's main use of parcel data is for fulfilling its obligation to report on its facilities to Public Services. However, as part of the Federal Security and Emergency Management Structure, Health Canada ought to be able to identify, in a coordinated manner all Health facilities nationally, including those located on First Nations reserves.

From this group's perspective, a National Parcel Data System is a "nice to have" and they will use it if it is available and easy to use, and does not cost them any more than their current budget.

Their work with program mandates will get done with or without a national parcel data system. In general, those interviewed, with the exception of Canada Forestry Services, did not express a significant demand for national level land information. What an NPDS will provide is some efficiency and cost savings by facilitating quicker access, but not any major break through.

3.1.2 Provinces and Municipalities

While Provinces are considered mainly data providers, we did inquire about their potential use of national level parcel data. They have no requirement for using land information at a national level. All of their needs can be satisfied locally. Notwithstanding, this situation may change in the future as the economic and political environment changes. For example there is discussion currently underway of developing a hydro corridor from Manitoba to Ontario. This will involve parcel data that crosses a number of jurisdictions including several First Nations communities plus other communities in both provinces.

Similarly the municipalities' current role is based on transactional use and their needs are fully met locally. It is worth noting however that the municipalities do have front line responsibilities for emergency response events. A report commissioned by the Federation of Canadian Municipalities identified that the scope of disaster management and terrorism response is so broad that both higher levels of government will inevitably be considerably involved. In large part this recognizes the inadequacy of resources at the local level to deal with the consequences of such events.

There is a variety of approaches and strategies currently used by the provinces and municipalities for supplying parcel data to users. These are discussed further in Appendix 3. A Summary is shown below.

Jurisdiction	% Coverage	Provider	Provincial Crown Lands	Public Lands other than Crown Land	Private Land	On-line Access Via
Newfoundland and Labrador	<10	None	YES			none
Prince Edward Island	100	Provincial Treasury	YES	YES	YES	GeoLinc Plus
Nova Scotia	100	Service Nova Scotia	YES	YES	YES	GeoNOVA
New Brunswick	100	Service New Brunswick	YES	YES	YES	Service New Brunswick
Quebec	> 60	Department of Natural Resources and Wildlife	YES	YES	YES	InfoLot
Ontario	90	Teranet	YES	YES	YES	GeoServer
Manitoba	77	Manitoba Land Initiative	YES	YES	YES	Manitoba Land Initiative
City of Winnipeg	100	Land Information Services Branch		YES	YES	e-CIS
Saskatchewan	100	Information Services Corp.	YES	YES	YES	LAND
Alberta	100	AltaLIS	YES	YES	YES	AltaLIS Virtual Order Desk (VOD)
City of Calgary	100	City of Calgary		YES	YES	Calgary eMaps
City of Edmonton	100	City of Edmonton		YES	YES	Edmonton Maps
British Columbia	> 90	Integrated Cadastral Information Society (ICIS)	YES	YES	YES	ICIS Public Web Map Site

3.1.3 Other Users

Consultations were extended to organizations outside of the Federal Family to include a number of potential users to determine the extent of demand for multi-jurisdictional parcel data. This group included forty-one private sector organizations, Non-government organizations, Environmental Groups, and First Nations communities among others. (Appendix 2)

In general most users can satisfy their *transactional* day to day working requirements for land information locally without a need for a national baseline parcel data system.

However, our consultations identified there are a number of strategic business needs at the policy development and planning level. These needs require multi-jurisdictional parcel data to be brought together, and integrated into a “continuous fabric” for decision support and other business processes. These needs include emergency response, economic development, environmental sustainability, public safety and disaster planning, transportation, resource explorations and pipeline development among

others. These business processes require parcel data be known, available and in a format that is usable and can be linked to other data sources.

However, satisfying these needs will require access to more than baseline parcel data. Baseline parcel data, the original focus of the NPDS is seen as a key entry point or window to other relevant data. In our consultations many have defined baseline parcel data in terms of attributes that go beyond our definition noted previously. This implies that most users have escalated their need for land information to exceed baseline parcel data and reflects the trend for integration of various data sets for information management purposes.

Many of these users indicated not knowing what data is available or if it is available where to get it. The NPDS can address this concern by providing a single source through which an end user can access the data. The NPDS with the baseline requirements of the parcel geometry and a unique identifier will:

- Facilitate the reduction of barriers for data sharing across multi-jurisdictions
- Provide access to additional attribute data held at source, such as ownership, legal description, property rights
- Provide a mechanism for data providers to market their products to a wider audience.

This group of users requires access to land information in order to:

- Improve their planning and decision making
- Generate some cost savings by improving efficiencies in accessing land information data
- Comply with legislative requirements, e.g Species At Risk Act requires access to parcel data to establish ownership of Critical Habitat areas which may cross jurisdictional boundaries.
- Improve competitiveness
- Influence land use policies.

The majority of users require data that extends beyond baseline parcel data. Most require additional attributes such as:

- Ownership (i.e. need to know with whom to negotiate)
- Legal description (i.e. how is the parcel legally described)
- Addresses (i.e. being able to physically locate parcels)
- Land use rights and /or restrictions (i.e. any rights or restrictions that may impede intended use)
- Others, based on individual need, including structures and type.

Many users of land information have indicated the need to know what data is available and where to get that data and would support a NPDS if it would provide a means to access that data. Users are essentially looking for:

- Accurate information on the condition of the land
- Consistency of data so that it can be used for business processes without further validation
- Single point of access to data
- Links to other data sets.

3.2 The International Context

We undertook a high level survey of international jurisdictions as an important component in identifying the Business Case for a possible National Land Parcel Data Service/System. The intent was to:

- Clarify what is happening elsewhere in the world
- Identify best practices throughout the professional community
- Establish realistic expectations for land parcel data services
- Bring the experience of others at this formative stage
- Define a basis for success and benefits measurement.

Over 40 jurisdictions were carefully reviewed. These are outlined in Appendix 4. Importantly telephone interviews were completed with several professionals within Australia, England, the European Union and the United States. The list of jurisdictions interviewed is also identified in Appendix 4.

In addition, a review of a large number of reports and analyses from International jurisdictions and International organizations was completed (included as Appendix 7). There is a considerable volume of such reports that add significantly to the structuring of land management requiring the use of land parcel data.

Certain conclusions have emerged from the combination of the survey, interviews and literature review. Key amongst these is the placement of parcel data which typically is directed by a National agency reporting at quite high levels within the federal or senior level of government in each jurisdiction. It seems that most jurisdictions appreciate that land parcel data needs to be understood at a national level so as to obtain important high value benefits while meeting International commitments. They see the National leadership as a clear focus for locally based data providers who make available extensive local data while meeting their responsibilities in managing property transfer utilizing quite specific digital data. In Canada, responsibility for land matters resides at the Provincial level, and there is no suggestion that this should change. What is clearly emerging is the need for leadership to make land information, based on parcel data, more readily available at the National level.

The United Nations has asserted a number of essential characteristics in good governance of spatially enabled land administration, including:

- Sustainability: Balancing social, economic and environmental needs while being responsive to the present and future needs of society
- Subsidiarity: Allocation of authority at the closest appropriate level consistent with efficient and cost-effective services
- Equity: Women and men must participate as equals in all decision making, priority setting, and resource allocation processes
- Efficiency: Public services and local economic development must be financially sound and cost-effective,
- Transparency and Accountability: Decisions taken and their enforcement follows rules and regulations,
- Information: Information must be freely available and directly accessible
- Civic Engagement and Citizenship: Citizens must be empowered to participate effectively in decision-making processes
- Security: All stakeholders must strive for prevention of crime and disasters. Security also implies freedom from persecution, forced evictions and provision of land tenure security.

Good e-Governance is needed by all governments as an essential element in e-democracy that uses the web to govern society for maximum participation in decision making. This requires digital spatial data that facilitates

important land management choices and optimizations. Spatial enablement is just one form of interoperability – the capacity for a computer to identify “where” something is. It is, however, far more energetic and offers opportunities for visualization, scalability, and user functionalities. The benefits of spatial enablement of the core cadastral layer include:

- Attachment of information to images of the parcel and property
- Identification of “the place” in ways that are understandable by non-technical people
- Capacity of businesses and citizens to manipulate the information thus adding value
- Inclusion of various layers of geo-referenced information
- Integration of government information systems and provision of seamless information to institutions and government
- Ultimately managing information through spatially enabled systems, rather than databases
- Sharing of the core spatial information layer.

This applies equally at the local level and with regard to regional and National choices/ issues where spatial land data facilitates better government and problem resolution.

The QPA consultations identified a significant number of extremely important applications where National parcel data is needed. Note that the geometric data itself does not solve any issues identified with each application below; rather digital spatial data provides information that speeds the response and problem solving needed for each application. The important applications include:

- Dealing with terrorism as a threat and as a reality quickly and effectively
- Preparing for natural disasters responsively and in a cost-effective manner
- Managing effective and timely disaster relief and revitalization activities
- Facilitating the drive to environmental understanding and improvement
- Streamlining the development of effective economic programs that enhance competitiveness internationally
- Improved understanding of how better land use can enhance the lives of all Citizens
- Intelligent understanding of land based opportunities that can lead to better fiscal management by all levels of government.

In obtaining the substantial benefits available through the use of land spatial data, a number of clear directions emerged from the review and research in the international jurisdictions. These directions include:

- The well identified need for interoperability of data, as opposed to a legislated requirement for universal datasets
- The choice to focus on 15-20 (examples shown in Appendix 5) common attributes that can be effectively used across multiple jurisdictions, as opposed to forcing the use of a typical long list of attributes in all jurisdictions
- The need to be able to link one parcel to another parcel when dealing with the important applications on a National/international level
- The utilization of standards articulated at a National level for all participants to embrace at a local level
- The setting in place of a common “digital” language to ease communication while fostering integration amongst all problem solvers
- The fostering of a unified attack on problems and challenges so as improve efficiency and speed in dealing with National and International issues

- The provision of a spatial platform that facilitates achieving the commercial value-add that sees spatial data influencing decision making throughout both the private and public sectors
- The provision of data capabilities that lead to e-Government and better fiscal management by governments
- The re-asserting of the important and independent role of secondary and tertiary levels of governments in the collection and maintenance of data that allows them to meet their land management objectives.

Most of the National Agencies and government departments providing National leadership are funded largely by grants from the governments within the jurisdiction. Some achieve their funding from memberships of data providers and users. Commercial entities typically acquire short-term or continuing licenses that provide access to data from multiple sources. On occasion "user" fees are employed for certain measurable services provided by the National Agency, although most are closer to a "nuisance" fee to discourage frivolous use of the Agency. All encourage local pricing of data services believing the processes in managing prices across a substantial number of jurisdictions to be too cumbersome and definitely distracting.

There was significant consistency in mind-set amongst the International jurisdictions surveyed. Key amongst these is the recognition that the availability of quality interoperable data will improve decisions and planning in the short-run with substantive value over the long-run. Extending this further identified a consistent view that digital spatial data will increasingly be needed and thus it will be very worthwhile to get on with providing accessibility to lots of land spatial data sooner rather than later. Importantly the development of local capabilities in Geomatics will improve land management and problem resolution and thus some modest funding should be available to stimulate the development of locally base capabilities. All need to be involved and aggressive in education which is valuable with high payout. Methodologies should be utilized that automate and speed transaction processing so as to facilitate substantive value-add. A note of warning: avoid any liability issues that would arise from correcting past data as the cost to resolve each is too high and unreliable. Lastly, seize the opportunity to provide fiscal leadership by governments in dealing with their substantial land assets.

Several of the research documents showed that much work has been put into finding ways to measure benefits from the use of geospatial data. Such studies have asserted that the benefits will be substantial and well more than the cost of providing National capabilities. Recognizing that it is difficult to measure cause and effect in the use of spatial data so directly, most studies yield savings that are hypothesized when determining quantifiable benefits. Intense studies have established that the cost of gathering precise data for assessment is extremely high and likely more than the cost to set in place National capabilities. No doubt the effort to establish precision in the measurement of benefits will continue worldwide as the professional ethic of both data providers and data users demands the search for ever improving analyses on the benefits side.

In summary, the attitude across International jurisdictions is that the benefits are so powerful and important that access to data and the data itself should be "free" and "freely" available. Further, National capabilities are needed to achieve the benefits possible across a number of key applications that can be identified at both the National and International level. Importantly, there is a requirement for tools to effectively use geospatial data and that the assertion of National standards and support for major applications with substantive benefits will facilitate education and tools development.

3.3 Key Business Drivers

A number of business drivers were identified in our consultations. These can be classified under three broad categories – Environment, Public Safety, and Economic Prosperity – Land and Resource Management.

Parcel data is the one element that crosses all of these business drivers and is a conduit or foundation to access a number of other data sets required for policy level decisions. As noted by Davis Etkin et al in a report for the Canadian Government (*An Assessment of Natural Hazards and Disasters in Canada – A Report for Decision-Makers and Practitioners*): Parcel data is seen as the “...base to all Geospatial enabled systems...”

3.3.1 Environment

Several areas within the context of the Environment have been identified as priority areas that cross multi-jurisdictional boundaries. These include:

- Management of infestation, specifically with the forestry and agriculture industries
- Management of Canada’s water resources
- Climate change and impact on Canada’s well being
- Management of vegetation
- Traditional land use by aboriginal communities

Users are seeking to:

- Be able to operate across jurisdictions and getting consistency across provincial boundaries, e.g. forest inventory, vegetation data, pipelines, utilities among others
- Improve accessibility and reduce the need to request data over and over again
- Understand the economic value of the work currently being done on a national scale
- Develop models to forecast the future and measure the real impact on society of the long term value of environmental land use decisions
- Fulfill Canada’s obligations for reporting on international commitments such as Sustainable Forest Management Practices, and Climate change.

3.3.2 Public Safety

Public safety and disaster management is becoming a critical issue. While Canada has not experienced a disaster of the same magnitude as in the United States recently with Katrina, nevertheless the general consensus is that should such a disaster occur Canada needs to be prepared. It is critical to ensure data accessibility now, and not wait until it is needed.

If any lessons can be learned from the Katrina experience, it is that multi-jurisdictional parcel data must be quickly available, useful and interoperable. Users have expressed the need to know not only what is on or above the ground, but also what is underground e.g. fiber optic cables, sewers etc. In an emergency, this data must be available in locations remote from the source of the data.

Public safety includes:

- Long term planning for responding to emergency events: Not a response to an emergency, but planning for an emergency should one occur, e.g. noxious gas from a train derailment, ice-storm, earthquake, forest fires, infectious disease outbreak (SARS) etc. Land parcel data would be used to identify critical structures, shelters, health facilities, transportation corridors etc.
- Emergency Preparedness for responding to a disaster – what agencies and resources need to be brought to bear to respond to the emergency: knowing what lies in the path of the emergency events; in the case of a forest fire what settlements, structures, lie in the path of the fire, who to contact for evacuation, what is the value should the structure be destroyed, what level of importance can be placed on the structures, occupancy, linking the properties together etc.
- Emergency response i.e. how well are the various agencies responding; quicker access to parcel data will allow the emergency team to contact affected citizens and key facilities much more effectively. A review of the Federal Security/Emergency Management Structure, 2005 indicates there are possibly twenty or more departments and agencies that are likely to become involved in responding to major emergency event. It seems clear that one of the issues is coordinating the effort of having everyone knowing what is on the ground. This effort would be significantly improved if everyone accessed the same source of parcel data. This would provide for a common language and ease of communication.

In a report of the federal government published in May 2004 by David Etkin, Emdad Haque, Lianne Bellisario and Ian Burton entitled “An Assessment of Natural Hazards and Disasters in Canada: A Report for Decisions-Makers and Practitioners” the authors examined the economic impact of natural disasters in Canada. They argue that given the impact on the economy of billions of dollars resulting from such disasters as the ice storm, flooding and other disasters that more emphasis should be placed on mitigation strategies. One of the key elements of the mitigation strategy is modifying and/or developing effective land use policies. Among the conclusions reached by the authors are:

- *“... institutions and/or networks that link hazard and disaster related researchers and practitioners from both the physical and social sciences should be strengthened and supported through the promotion of regular meetings, conferences and/or workshops*
- *...encourage and provide support for holistic and ecological approaches to mitigation. In order to accomplish this, there is a need for **baseline parcel data** to compare and assess the effectiveness of strategies and policies in amplifying or moderating vulnerabilities, exposure and risk. At present, this is a poorly addressed issue*
- *...support research and data collection initiatives that can lead to integrated or networked databases of impacts and costs...*
- *...science based organizations involved in hazard issues, such as Environment Canada and Natural Resources Canada should increasingly bring risk and vulnerability assessments into their research and practice...*
- *...develop an information system, accessible to all segments of society, through which Canadians will be informed of the risks they face from natural disaster in their everyday lives...*
- *...the application and development of new tools for natural hazard risk management, including Geographic Information Systems (GIS) and remote sensing.”*

3.3.3 Economic Prosperity – Land and Resource Management

Multi-jurisdictional parcel data has an impact on Canada’s economic prosperity. Identified reasons are:

- Negotiations: Many users requiring land information across provincial boundaries have indicated the requirement for ownership data that would allow them to identify with whom to conduct negotiations for access to land parcels. For example a mining company interviewed is expanding its operations into Quebec and the Territories. They indicated being able to get information from Quebec, but unable to obtain any information from the Territories.
- Influence policies on land use: Land use planning is seen mainly as a local issue. However, a Non-Government organization interviewed indicated that in order to develop sound land use proposals to influence land use policies there is a need to access data from other jurisdictions to develop comparisons with other jurisdictions and build economic models.
- Competitiveness: Industry competitiveness is seen by many as one of the key benefits of land parcel information. For example responding to international competitive pressures by understanding the Canadian forestry landscape better in order to develop sustainable management practices.
- Managing urban growth: The aggregation of local urban growth benefits the Canadian economy as a whole. Further being able to build local urban growth models and then comparing these to other similar centres across the nation improves the decision making process.
- Fulfill legislated responsibilities: There is a need to fulfill legislated responsibilities such as:
 - Species at Risk Act.
 - Canadian State of the Forest Report to parliament, which has both National and international implications
 - National level parcel data is required for both of these applications as they are not restricted by local boundaries
- International pressures: There is a requirement for example for mapping Canada's Sustainable Forest Management Practices to the standards developed by the International Union of Conservation of Nature and Natural Resources (IUCN) - UN Framework on Climate Change. Parcel data is used as the entry point to access other data sets such as ownership so that any regulatory agency can identify those responsible for managing the affected areas.

3.3.4 International Reporting

Canada is a party to a number of international agreements and initiatives. While our consultations did not include an exhaustive review of these agreements a number of interviewees did indicate the need for parcel data to satisfy the reporting requirements under these agreements. Such reporting must be available at the National level. Examples include reporting on forestry practices, security partnership agreements, food safety, and World Trade Organization and NAFTA agreements.

3.4 Expectations from the NPDS

There is an expectation that baseline parcel data is freely available. Most users expect to pay for additional attributes and applications, but payment is based on the value that user places on the data. Many are willing to share data in a manner that would provide a general good. Users of data will go to wherever the source of data can be found and the NPDS will make it easier for them to access that data.

The NPDS will only provide access to data made available by data providers through a web portal. To this extent there is an expectation that funding will be provided for development of the portal. In addition ongoing operating

funding will be required for administration of the operating entity. There is an expectation that this unit taking ownership of the NPDS would be a relatively small organization.

It is important to note that the NPDS is not expected to:

- Be an owner of data or to establish a data warehouse
- Develop tools and applications
- Be involved in transactional activities or the selling and marketing of data.

SECTION C: ADDRESSING THE EMERGING REQUIREMENTS

4.1 Longer Term Direction

In order to address national needs as identified above – including Environment, Public Safety and Economic Prosperity - a lead Geomatics agency (“Canada Land Information Management Agency”) should be established; either as a new one or by evolving an existing agency that takes on new responsibilities as outlined below. This agency should be of a permanent nature (unlike GeoConnections for example) and cut across the various departmental pillars of the federal government (unlike NILWIS for example).

This new organization model should be sustainable, by moving from project based to policy based to facilitate the coordination of all public sector activities and initiatives in the area of Geomatics. It is important to recognize that the coordination role is not one of “doing” but encouraging and facilitating the “doing” by others. This would be a body that encourages standards and facilitates development by others. The development of the NPDS portal is an excellent first step to establishing such an agency. In our consultations, we did not specifically ask interviewees about their support for a national agency, however some interviewees indicated the need for “... *a National Land Manager*” or a “... *National Geospatial Registry*.” One interviewee in the communications industry (and a member of GIAC) indicated “... *the more that private companies and governmental agencies adopt and work from a common cadastral fabric, the larger the communal benefits will be in reduced costs and interaction times (research, permitting, planning & design). Having good national baseline parcel data will also provide a foundation upon which more and better supplementary data sets will be built...*”

The major responsibilities for this agency would be to:

- Manage and administer a NPDS to enable quick access to geo-spatial data, information and tools
- Identify and facilitate access to multiple sources of data, information and tools
- Encourage data quality
- Maintain the metadata library
- Promote education in geo-spatial data, information tools and its impact on policy development and planning
- Establish and build relationships with stakeholders including both providers and users
- Support the development of policies and plans for departments and other users with geo-spatial information
- Over time coordinate GIS initiatives within the federal government
- Represent the Geo-spatial community nationally and internationally.

One of the initial activities of the agency would be to develop a strategy for moving the focus of Geomatics to a national level within government. Geomatics seems to not have as high a priority in Canada as in many other jurisdictions evidenced by the fact that responsibility for Geomatics in those jurisdictions lies at higher levels than in Canada. In presentations made by GeoConnections across the country (GIAC Policy Seminar 2006 Series), it was pointed out that the “... *Canadian Geomatics industry needs leadership; a national focus...*”. As a minimum the strategic plan for geomatics should define the linkages between NPDS and other initiatives and strategies and the impact on policy development and planning.

Another key activity would be to establish a dialogue with various stakeholder groups to find potential partners and to explore private-public partnerships with groups such as GIAC. These partnerships can lead to successful ventures that will demonstrate the importance of Geomatics to addressing the key business drivers noted previously.

A Governance Model has to be established for the agency. Some of the key characteristics for the governance model (discussed more fully in section 10.2) are:

- Having private sector, user, and provider involvement
- Integrating the activities of groups such as CCOG, GeoConnections, IACG and others
- Establishing a high level Board of Directors to lead in developing a strategy to take the “initiative” to a higher level
- Becoming a champion for the NPDS
- Addressing the need for sustainability through permanent funding from Treasury Board
- Developing a business plan for the NPDS.

The NPDS is seen as a first step in making data accessible. However, there is the risk of failure unless it is seen as part of an overriding strategy to create a national Geomatics strategy within a sustainable agency. The risk of failure results from:

- Having no identified “owner” or mechanism to institutionalize the NPDS
- Being a project without any measure of long term sustainability
- Being another project developed within a departmental “silo”.

4.2 Market Acceptance and Growth Possibilities

There is acceptance on the use of parcel data both as a basis for business planning and sound decision making in and of itself and also as a window to other important Geomatic information. In fact the market has progressed beyond parcel baseline parcel data and looks to additional attributes to meet their business needs. Many users continually develop added value products from baseline parcel data and in turn make those products available to others either for a fee or under a data exchange arrangements as these products have a commercial value.

Some of the factors contributing to the growth are:

- The expanding use of the internet is now allowing less sophisticated users to have access to more information, including land information (a good example being Google Earth)
- Technology improvements are serving to remove the barriers to use (data formats, interoperability etc) and facilitating the integration of datasets – we expect this trend to continue to point where this is no longer a major barrier
- A 2004 survey conducted by Statistic Canada indicated there are over 2000 firms involved in this industry with revenues of \$2.8 billion, an increase of 16% over the previous year
- As the industry matures the level of use increases and this in itself drives the need for accessibility.

SECTION D: ELABORATING ON THE SOLUTION

5.0 Business Fundamentals

It is important to define a clear and unmistakable set of business fundamentals to guide the unique mandate that should be assigned to the Agency. This should include a clear Vision with realistic Goals and the assertion of a unique and understandable Value Statement. The realization of these fundamentals will be instrumental in obtaining the commitment necessary for delivering the important and substantial benefits that should be expected through the effective use of the NPDS.

5.1 Vision

An initial vision was determined at a workshop undertaken with representatives of the Federal government. While this vision can act as a guide and starting point for the NPDS, it is recommended that the Board of Directors envisaged through the Governance structure for the Agency install as its first priority a vision with which all members can identify. Ultimately this vision will guide the direction for the NPDS and facilitate the achievement of important and valuable benefits.

The **initial vision** identified at the workshop is:

The NPDS will be a mechanism to provide rapid and reliable access to authoritative cadastral data in a standard interoperable manner to users across the country.

This vision is a starting point but will need to evolve to address the strategic imperatives noted in this report, as they become better understood.

Achievement of the vision will require a champion consistently articulating the need to utilize the NPDS as a major enhancement for Canada and Canadians that invites a high and continuing level of government commitment so as to deliver substantial benefits in many important ways.

5.2 Goals

The agency should establish a set of goals to be accomplished. The following is a recommended list of such goals.

- Encourage use by data providers throughout Canada of a set of standards, probably ISO based, that meet National and International expectations
- Support all users in the development of tools, interoperability and data access
- Provide education and information that leads to the installation and improvement of data providers in multiple jurisdictions with the intent to streamline effective use of land based data
- Establish a National program for governance that involves data providers and users with the intent to encourage consistent improvement in the quality and availability of important land data
- Coordinate the various initiatives that are underway within the federal government to ensure that common national objectives are being addressed
- Assist in problem solving and enhanced use of land data that prompts innovation and accomplishment in applications requiring land parcel data

- Provide the leadership that would serve to improve local capabilities while achieving the necessary inter-jurisdictional integration
- Represent the Geo-spatial community, including parcel data providers, nationally to such organizations as the Federal Security/Emergency Management Structure and other national and international organizations.

5.3 Value Statement

A proposed value statement for the agency would be:

Facilitate efficient access to timely and relevant digital land parcel and other land related geometric data that supports the development and execution of land linked policies and decision making so as to deliver big-ticket benefits in dealing with terrorism, disaster preparedness and management, environmental progress, enhanced economic performance and the use of land management in bettering the lives of citizens while stimulating improved fiscal management across all levels of government.

5.4 Organizational Direction

Providing access to baseline parcel data and other datasets is a good first step to meeting the needs of the user stakeholder communities. Based on the experience of other jurisdictions, this effort must be well coordinated with other geospatial data related initiatives of the federal, provincial and municipal levels of government.

There is a clear need expressed by many within the broader stakeholder community for greater leadership from the federal government. The proposed “Canadian Land Information Management Agency” should be required to achieve the following:

- Enable quick access to geo-spatial data, commencing with parcel data
- Identify and facilitate access to multiple sources of data, information and tools
- Support and drive efforts to improve data quality
- Maintain the metadata library for parcel data
- Promote education in geo-spatial data, information tools and its impact on policy development and planning, including providing leadership in the use of geo-spatial data, information, tools and expertise
- Establish and build relationships with stakeholders as both providers and users
- Support the development of policies and plans for departments and other users with geo-spatial information
- Over time coordinate GIS initiatives within the federal government, including GIS required for Emergency Preparedness.

While the NPDS can be initially established and supported on a project basis by an organization such as GeoConnections, organizational sustainability will require this agency to take ownership of the NPDS portal as one of its first objectives.

The implementation of the NPDS portal does not necessarily mean undertaking a development project. There are a number of existing infrastructures, such as the GeoConnections Discovery Portal and GeoNova, that provide

potential. These potential partnerships should be explored as a number of interviewees have indicated their willingness to discuss the opportunity of hosting the NPDS portal.

The agency's organizational direction must allow it to focus on providing access to land information that facilitates policy development and planning by others. It is important to avoid the risk of establishing an organization that focuses on technology and systems development as experienced with some other initiatives.

Some further information on the proposed agency is provided in Section 10 following.

6.0 POTENTIAL USERS

6.1 Identification of User Sectors

Our consultations were extended beyond the original federal users. A number of additional users of multi-jurisdictional parcel data have been identified. These users also see parcel data as an entry point or window to other data sets. This list resulted from our consultations and is not exhaustive. The following are examples of potential users identified.

Utilities

A major utility "...use parcel data for planning. Before going to the potential area we can estimate the cost of work to be done to build the network and connect with the potential customer. Furthermore we can estimate the financial impact on our organization. It is important to mention that parcel data is a cost-benefits tool considering that we minimize our work in the field and identify extra engineering work to be done."

Non-governmental organizations

An international NGO uses parcel data to develop models to allow them to decide where to concentrate their efforts and resources on habitat programs, managing projects and infrastructure, including Watershed Plan development.

One NGO interviewed, operating nationally and internationally, sees parcel data as being extremely useful for planning, targeting and monitoring landscape changes. They require parcel updates for watershed modeling, especially ownership, detailed elevation, soils, and water.

Oil and Gas

For example, the Canadian Association of Petroleum Producers members use parcel data to determine:

- The kind of surface and sub-surface access to land
- The current mineral rights and surface rights
- The ownership of land – crown vs. private
- The access for transportation of assets.

"Oil and Gas is increasingly competitive worldwide. Any Oil and Gas firm worldwide (especially in Canada) needs to make decisions on where to operate regardless of where they are based. Their decisions are based on the environment under which they must operate. Canada is becoming more important as a source of stable Oil and Gas on the worldwide stage and it is important for government to create an environment to facilitate the development and exploitation of oil and gas in Canada. This initiative is a good step towards that facilitation.

This [NPDS] is very good news, and we certainly welcome the initiative. Yes, Canada's oil and gas industry would strongly support the development of a National Parcel Service, which would provide one-stop access to authoritative, up-to-date, properly referenced information about land parcels across Canada. We think we could provide examples of how this initiative would assist our decision making and strategic choices. We think it would support our business processes."

Forestry-

Canada has a requirement to report both nationally and internationally on its sustainable forestry management practices, and for which parcel data is a key requirement. In addition the industry is very concerned about infestation control, recognizing there is no limitation to local or specific boundaries.

In terms of competitiveness parcel data is a key entry point to understanding the Canadian Forestry industry from several points of view, including sustainability, traditional use by First Nations, environmental concerns, and developing competitive strategies to compete with emerging suppliers from untapped European sources such as the former USSR.

Mining:

A gold mining company interviewed is currently expanding its operations into the provinces of Quebec and the Territories and is having difficulty in easily obtaining a source of parcel data from the Territories.

An international quarry company is looking to build an on-line mapping application visualizing their own data with base and context data. One of the base layers they are interested in finding is parcel data to show property limits around their quarries and plants. They want to map "nationally" to show their properties in North and eventually South America by using detailed base data around their sites. Finding all the data they need/want is the first step but putting it all together in one application will be quite a challenge.

Transportation

In the event of a train derailment usable land information is needed immediately by the emergency response team. There is a need to know if they are *"... encroaching on private property and therefore ownership information is required 24/7 off-line. Not knowing where municipal boundaries are in relation to the tracks makes ownership searching difficult."* Further there is a need to ameliorate collateral damage during maintenance and emergencies.

In a recent train derailment it took the emergency response team over 2 days to inform residents along a river in which coal was spilt not to consume fish caught in the area until further notice. The provincial Ministry of the Environment is responsible for steelhead and trout and the shoreline. Fisheries and Oceans Canada is responsible for salmon and fish habitat. Both agencies are working with other concerned parties to monitor the environmental conditions resulting from this derailment and its effect on fish and other wildlife. Quicker access to parcel information available through a NPDS would potentially have allowed for improved coordination and faster communication with the residents, as all parties would have access to the same data.

First Nations, including the Metis Nation

A First Nations community interviewed uses Geomatic information to *"... improve the decision making of the Council in Chief to balance life on the reserve in terms of tradition, economic development and cultural values"*

Quite apart from land claim issues some First Nation communities are using parcel data extensively while others, like the Metis Nation are looking to significantly improve their capabilities in this area. For

example, one of the First Nations interviewed has identified a number of business purposes for which parcel and related land information is used and has indicated a willingness to share their knowledge with other First Nations communities. These business purposes include:

- Transportation – defining the shortest bus routes
- Public Safety – Location of houses
- Emergency response -911
- Housing development
- Community development plans
- Archeological excavations
- Locating medicinal plants
- Infestation control
- Locating health facilities.

Another First Nations community is currently using parcel data to assist in drafting its community development plan and is in consultation with industry for locating industrial facilities on the reserve.

Environmentalists

World Wildlife Fund (WWF) is a major user of parcel data, and has been collecting parcel data at a national level for sometime. WWF considers itself an international organization without jurisdictional boundaries. WWF works collaboratively with a number of organizations including industry, First Nations, governments and other agencies on special projects such as High Conservation Value Forest management practices and Land Resource Management and Protection Policy

Engineers, Planners and Consultants

This group has indicated that “safety” is driving an emerging demand for their services. This demand is coming from several sources ranging from local school boards to oil and gas companies. Services include developing site plans, environmental plans, transportation, construction, health and safety, waste water all of which require access to parcel data. It is also important to know what is underground.

Many of the business needs outlined above argue for quick and reliable access to parcel data as an interoperable web service. A national or lead agency can facilitate this approach by:

- Promoting the appropriate technology standards
- Providing the data providers increased revenue opportunities from web services through a portal
- Providing financial incentives to encourage the data providers to make the necessary investments in technology.

7.0 STRATEGIES FOR OPERATING THE NPDS

Once the Vision, Goals and Value Statement are affirmed and specific User Sectors are established, it is appropriate to clarify the strategies that will guide the day to day functioning of the NPDS. It is important to note that strategies provide directions for major elements necessary to achieving the vision and goals. As such they will have a measurability that needs to be asserted by the operational group as it defines the Business Plan that directs its daily work. This can then lead to ongoing measurement of performance and the delivery of benefits.

7.1 Driving User Demand

Involvement is the key to ensuring considerable and growing user demand. This can best be accomplished by:

- Setting in place comprehensive Governance that involves all stakeholders and is structured for maximum input at both the policy and operational levels
- Stimulating usage of Geomatics data through widespread education to include the consequential importance of digital geometric data in policy formation and execution
- Developing continuous measurement programs and methodologies to measure financial and other benefits achieved through the use of digital geometric data
- Installing an aggressive communications program to expand the impact of utilizing parcel data in multiple applications in both policy formation and implementation.

7.2 Funding Options

The NPDS will provide accessibility to the data provided by others. Accordingly, its ability to generate sustainable revenue is limited and does not lend itself to cost recovery sufficient to operate effectively. It is recommended that the proposed agency, once established, assume responsibility for NPDS, and be institutionalized through permanent funding from Treasury Board.

The anticipated cost for the initial functionality NPDS is modest (as presented in 9.4 below). As the NPDS develops additional funding should come from “membership” fees for possible users based on their expected usage of the NPDS. It is anticipated that the membership fees will be reasonable so as to stimulate excellent usage and high value-add on the part of users. Success should lead to eventual self-funding through membership fees and other revenue sources as outlined below.

Notwithstanding this, core funding can be supplemented in a number of ways, but these should not be viewed as a means of fully funding the agency. Several supplementary revenue options are available and can be managed economically.

One option could be through Memberships Fees. Continual users would pay a “membership fee” that provided access to the data available through a portal. Fees could be geared to the number of users and the anticipated frequency of use. Hence the fees simulate a “usage” schedule that covers ongoing costs for access to the NPDS as a service.

Short-term licenses would also be available. The intent would be to eliminate the entry fee while a possible continual user establishes the value quotient sufficient to justify investment in a full membership. Also, short-term

memberships are useful for those users who have only a project need and are unlikely to have a requirement for continuous service and support.

In addition there should be a rate for academics where the provision of data availability is for educational purposes as opposed to being necessary for any value-added activity.

As the Agency and NPDS develops, project funding may be necessary and appropriate for innovation. The expectation is that such projects would be cooperatively funded by many different users and/or data providers in a consortium type process where the objectives and outcomes are planned to advance innovation in the effective and important use of digital geometric data. Specific budgetary controls and reporting would be applied to such project funding and grants.

It is possible the Agency will develop Specific Services where cost recovery will be appropriate. It is not visualized that this would be a significant activity leading to the costs associated with extensive service provision. Where such services are developed and/or demanded there could be a revenue source requiring revenue to be generated.

7.3 Pricing Alternatives

It is inappropriate for the NPDS to have any role in pricing data made accessible through its web-portal. The pricing of data needs to be left to the data provider and the policies related to revenue and cost recovery adopted by each group. It is simply too distracting and cumbersome to expect a lead agency to play a detailed role in pricing decisions and calculations over a substantial number of data providers across the country.

The NPDS should adopt a full cost recovery approach when pricing **specific projects and services** that it might provide. The price should reflect full cost recovery including a factor that covers overheads i.e. more than just direct costs.

7.4 Building Value and Delivering Benefits

The installation of a web portal will produce a number of benefits. It offers itself as a clear and available way to obtain digital parcel data. Methodologies for access become streamlined saving users considerable cost and time in acquiring data that would be interoperable. As well it provides a logical and clear point for obtaining parcel data that will prompt new users of parcel data to utilize the information in a myriad of applications. The streamlined availability and access will stimulate usage and the pursuit of improved decision making where factual data can demonstrate its value.

The use of the NPDS will facilitate widening in the number of data providers in both the public and private sectors. The utilization of an effective web portal diminishes the cost to a "new" data provider as it preempts the need for marketing dollars on the part of the data provider to inform possible users as to the availability of data. Further it minimizes the cost to distribute data to a wide array of possible users. Importantly it should lead to the development of application and tools on the part of both users and data providers as there would be a supportive mechanism that facilitated these developments.

A feature of an effective web portal is its availability on a 7/24/365 basis. Hence data is always available to support emergencies and work outside normal business hours. Combining this with 7/24 support in a CRM mode

helps ensure the best use of data in dealing with a variety of applications, some of which are likely to be time sensitive. Certainly the availability of skilled support in the use of parcel data will add considerable value when dealing with important land related challenges.

Ready access to reliable parcel data will stimulate innovation in the high payout usage of data. As well the Agency will encourage and possibly participate in funding innovative projects that lead to continual improvement in data quality and availability. There is little doubt that parcel data will improve the number and quality of decision making helping the achievement of consequential benefits from the use of such data.

In addition establishing the Agency and the NPDS will provide a focus for the assertion and use of standards for all data providers. Technology that is now widely available facilitates interoperability and diminishes the absolute need for a common standard. Nonetheless fostering the use of standards harmonizes data, facilitates interoperability, allows improving efficiency with less duplication, and encourages widespread consistent professionalism amongst data providers. Certainly it supports widespread involvement in continuous improvement methodologies that help ensure data quality is maintained and improved.

7.5 Achieving Buy-In

The Agency needs to have an overt program to achieve the buy-in needed. At the outset obtaining commitment will require intricate negotiations with multiple stakeholders. It is important that the Vision for the Agency be maintained consistently through the negotiations required. Understanding of the specific roles for data providers and value-add data users and the Agency itself can lead to effective negotiations and enhanced impact.

Certainly the key to achieving buy-in will be the definition and implementation of a Governance model that is acceptable to all. This has been extremely successful across Europe, in Australia/New Zealand and in the United States. The Governance needs to be participatory in its vision and operation. As well it needs to involve a wide spectrum of data providers, users and tool builders.

Through the governance process it will be necessary to articulate a specific well defined role for the Agency. This role ought not to be competitive with the role identified for any participant. Its role must be seen as supplementing and enhancing the roles of others thus adding measurably to the effective use of the data.

It will be necessary for the Agency to avoid any differentiating and policing type role in data availability and provision that is seen to be competitive to the roles of others. The Agency needs to be a facilitator streamlining accessibility. Hence its operating practices must enhance, not criticize or assert higher order.

Transparency is paramount. The Agency must be open, supportive and always available providing leading edge professionalism in the use of parcel data. History has demonstrated that the availability of easy transparency enhances commitment and leads to continual influence and use of the capability.

Stimulating innovation where the enhancements offer benefits that could not be obtained by individual data providers is a logical facilitator of buy-in. The notion is that widening the data pool and ways of using data effectively may well be beyond the scope of local data providers. The Agency can be a facilitator making available a cooperative funding model that helps ensure ever improving high payout usage of digital geometric data. The structure of the Agency will offer important opportunities that the Geomatics community will latch onto as a way of achieving important innovations.

As a point of information, certain International jurisdictions have determined that the provision of simple funding facilitates buy-in of data providers. Local data providers obtain funding at the rate of \$1.25-\$1.50 per parcel to digitize the data in their locale. While not recommended at this time, such possible funding could engage numerous local resources in building the base of data that can be effectively sourced through the NPDS portal.

7.6 Marketing and Communications

It will be important to set in place ongoing marketing and communications as an essential element in the pursuit of benefits from the Agency and the NPDS. Being available is simply not enough; being aggressive in the market is essential.

At the same time, it should be noted that the marketing and communications programs are NOT advertising related. Nor are they “promotionally” directed, and certainly they can not include “specials”.

Rather, the marketing and communications program must be about professionalism establishing a high level of integrity and quality in both the provision and use of parcel data. There needs to be a myriad of communications programs on multiple levels.

The portal should support college and university level programs in the use of Geomatics. This will add to the Geomatics capabilities across Canada. Further the portal should deliver specific education in Geomatics with a particular orientation to innovation and best practices.

The portal should allow access to extensive literature choices that help develop applications and professionalism. This should include making available white papers and reports from jurisdictions worldwide that encourage wider use of Geomatics in decision making.

The Agency should participate in Trade Shows and Conferences that support the use of Geomatics in numerous applications. Such venues encourage high impact and efficiency in the use of parcel data.

Trial/short-term access memberships should be employed to stimulate usage. This technique makes it easy for possible users to get engaged. Thereafter, there should be a program to up-sell these users to more permanent membership on a continuing basis.

Annually, as part of its transparency, the Agency must issue a comprehensive report that details progress, activity and results. The report should focus on measurable benefits through the use of parcel data. Equally so, minutes of all meetings through the governance model need to be promptly available so as to further assert the Agency's transparency.

7.7 Performance Criteria

Many stakeholders have asserted that the enhanced accessibility to and use of more parcel data will produce measurable results in a wide number of applications. In this spirit the Agency must have a demonstrable performance quotient.

At a simple level, the Agency must install web based measurement of usage that is objective and quantifiable. Simple web based counters can depict actual usage of the portal. This should be included in a quarterly type of

report that presents usage with cost measurement as part of a program that builds cost-effective usage methodologies.

It will also be important to ensure comprehensive and transparent reporting as to any programs or projects funded. Full accountability will be demonstrated with clear and comprehensive reporting.

The Agency should provide a complete annual reporting that quantifies performance and articulates immediate objectives and budgetary performance. This focus helps ensure a continual drive for enhanced impact and cost-effectiveness that is consistent with the investment being made.

Above all the Agency needs to facilitate the development of measurement processes and methodologies that establish accurately the benefits achieved through the use of parcel data across a broad spectrum of applications. It is not sufficient to preach the good message; it is necessary to demonstrate that the use of the NPDS delivers very specific measurable benefits. The professionalism across the Geomatics community seems to demand a clear presentation of the actual results obtained through the support provided by the Agency. Measurement is possible, albeit challenging. Still it is absolutely necessary to accurately establish the benefits obtained through the use of digital geometric data. Only a lead agency such as the proposed Canadian Land Information Management Agency can effectively conduct such an analysis which will ultimately be the key to building its influence on applications and opportunities that are enhanced through the use of parcel data.

There is an opportunity for Canada, through the Agency, to provide leadership in the international arena. We noted earlier in this report that many jurisdictions have not been able to cost-effectively implement a performance measurement system that quantifiably captures the benefits resulting from the use of parcel and other spatial data. The agency could work in cooperation with other jurisdictions to develop such a mechanism for performance reporting at the national level.

8.0 BUSINESS SYSTEMS ARCHITECTURE

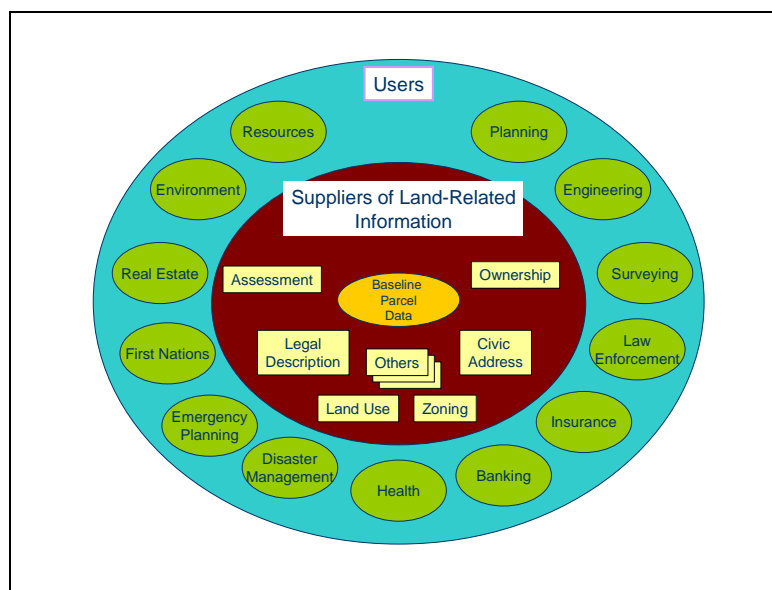
The system proposed and analyzed in Appendix 6 is meant to be the first step toward the realization of a larger vision for making parcel data readily accessible at the national level. It is intended to provide utility in and of itself as a standalone system. This “directory system”, as part of the longer term vision, is intended to:

- Identify data sets that could be included in the National Parcel Data System
- Collect metadata about that data, and thus identify issues and problems with its ultimate integration
- Provide an up-to-date and accurate inventory of parcel data across the country
- Identify gaps in the data and/or data quality required for a National Parcel Data System
- Build the necessary relationships between the proposed Agency and the parcel data providers
- Build the necessary relationships between the “Canadian Land Information Management Agency” and its user base
- Identify and refine the priority of requirements for an evolving National Parcel Data System
- Be a relatively easy and cheap first step towards the admittedly large and expensive task of building a true National Parcel Data System; and thus be a “quick win” that can build credibility with stakeholders and funding decision-makers.

As part of a stand-alone system useful in itself, it is intended to allow users or potential users of parcel data to quickly and easily:

- Identify sources of that data for a given area
- Identify the types of parcel data available for a given area
- Evaluate the quality of a given source of parcel data
- Access and order parcel data they are interested in from the provider.

The system is based on a “virtual shopping mall” conceptual model designed to bring together providers of data and users of data to a single location. The shopping mall concept allows the providers to occupy space in the mall through an appropriate link in order to display their products and services. User can access the mall via the internet and “browse” or “shop” for parcel data and any other related land information that may be available.



The conceptual model will provide for:

- A “public information counter” displaying:
 - any information that is freely available, and requiring little or no maintenance;
 - conversion technologies
- Providers to “rent” space in the mall to provide parcel data and other value added services they wish to offer to the public in general
- Users to access providers through appropriate web links
- The protection of providers revenues as NPDS is not involved in price setting
- Users and providers to mutually decide on the value of the products and what to pay.

Pros of the shopping mall model:

- Protects provider revenues as it does not dictate any pricing policies
- Providers are free to participate or not
- Those who provide data free do not have to “pay to play” (% of sales is zero)
- Customers decide
- Provides a one-stop source to data (over time)
- Avoids the costly warehouse concept, as it provides access to data owned by others
- Opens the possibility of creating a national perspective
- Gives providers additional exposure to market their products.

Cons

- Will have to sell the concept to data providers
- Some investment required to make data available
- Keeping customers: need to provide enough of a value add and ease of use within the NPDS to ensure customer needs continue to be met
- May require a “conversion” tool on the portal that makes the data usable.

“Functional” perspective:

The key functional benefits are:

- Rapid Access to data
- Integration of datasets
- Improved usability of data
- Parcel data provides a key “gateway” or window into other data sets and important attributes such as ownership, assessment, environmental liability, and demographics.

Rapid access to usable, integrated data may require the development of tools to harmonize the data models of various data providers (at least in geographically contiguous areas).

Appendix 6 provides an analysis of a number of potential technical solutions for the NPDS. This analysis specifically focused on how basic/initial NPDS functionality could be quickly and cost effectively implemented, and was consequently based on utilizing existing infrastructure potentially available within Canada.

There are a number of existing systems within both the federal and provincial governments, and in the private sector, that can be considered for adoption. Indeed, during our stakeholder consultation several organizations expressed their willingness to provide such service. This approach has the advantages of rapid delivery of initial functionality at minimal cost.

8.1 Operational Components and Access Methodologies

The directory system proposed is a *Metadata* or *Data Discovery* system that allows users to find information about the data they are looking for. If they find what they want, the user can then be connected to the appropriate data providers' system for downloading or ordering the data. Delivery of that data is entirely in the hands of the data provider (an exception to this is for "free data" or "data samples"). The directory system proposed does not provide for "on-the-fly" access to parcel data. This approach – of a "simple" directory system – facilitates a rapid implementation and an early realization of benefits.

Two architectural options for providing the metadata and data discovery functionality are proposed:

- A full-function search based system architecture and
- A simplistic "quick and easy" list and browse architecture.

With respect to each architectural option, an analysis the pros and cons of custom development or the modification of existing systems is discussed fully in Appendix 6.

A Full Function Search Based System

This option will handle a large number of data sets and data providers, and does not assume any rational or hierarchical organization of geographic jurisdictions of data providers, or the data sets they offer. While the spatial resolution of a data set is not defined by the system architecture, it is hoped that (and the agency should encourage) providers will enter separate metadata records for each "tile" / "unit of delivery" which they offer, rather than a single record to describe their entire operation.

The search model allows the user to define a query and is presented with a list of candidate data sets. Each candidate data set will have a short description, as well as links that allow the user to read a fuller description or to proceed to order or download that data set from the appropriate data provider.

Creation and maintenance of the metadata (the records describing each parcel data set) is done by the data providers themselves through interactive forms, or other online means. This allows for dynamic change of metadata, allows metadata to easily be kept current, and requires minimal work for Agency staff.

A "Quick and Easy" List and Browse Based System

This option provides for a simple and limited functionality system dedicated to the discovery of and access to parcel data. This approach will not effectively handle a large number of data sets or data providers. It assumes a rational, clear and ideally hierarchal set of geographical-areas-of-responsibility for data providers. It requires that the names used to define these areas of responsibility be well known and well understood (e.g. "City of Calgary", and not "GTA" or "Assessment District 26"). While the spatial resolution of a data set is not defined by the system architecture, it is assumed that each data provider will provide only a single metadata record for each data set type (e.g. assessment parcel boundaries) they offer. (Further investigation of the state of individual "tiles" / "units of delivery" will happen by users interacting with the provider's system.)

Access is based on a list and browse model. Data sets and data providers are listed, and the user browses the list to find what they want. The list is organized in a way that facilitates easy and efficient browsing. Hierarchical categories are used: for example, first the user is presented with a list of Provinces, then for each province a list of municipalities or other sub provincial geographical areas, then with each municipality or sub area, further geographical subdivision (if appropriate) or a list of themes (e.g. Land-use, Ownership, etc.), and finally within

each theme as list of data sets or data set types. Each data set or data set type listed, will have a short description, as well as links that allow the user to read a fuller description or to proceed to order or download that data set.

Creation and maintenance of the metadata is done by the Agency staff (under instructions from the data providers) by editing HTML or text files. This assumes that metadata is relatively static, as its update is labour intensive and potentially error prone.

Assumptions

In developing the architectural options above the following assumptions have been made:

- The NPDS will be owned and managed by the Agency
- The Agency and by extension the NPDS will not own any parcel data, but will negotiate the rights to maintain and distribute metadata
- The system will not process orders, but will provide appropriate links to providers
- The system will not provide for a revenue model.

Keys to Success

The identified keys to success are:

- Metadata accuracy, completeness and ease of use
- Using baseline parcel data as a conduit to other datasets that are correct, flexible, nested and thesaurus based thematically classified
- Flexible and accurate classification system of datasets that facilitates user queries and avoids frustrations
- Accurate geographic boundary representation.

8.2 Data Sourcing Strategy

The NPDS is designed to provide only access to data. Therefore the strategy for sourcing data should be:

- Data should remain close to source
- Data should not be replicated
- There should be a mechanism for feedback and maintaining data currency
- As many providers as are willing can “apply” to be a supplier on the NPDS web portal, e.g. these can include all provincial providers, federal suppliers, First Nations, other private sector sources etc.
- Each provider will determine their own “pricing strategy”.

Key attributes identified:

The NPDS should start with the minimal content needed to be useful and then let demand drive the inclusion of additional content.

At the Workshop we conducted with federal government representatives it was indicated that in the United States a number of key attributes associated with parcel data were identified as shown in Appendix 5. Participants were therefore asked to identify those key attributes considered important to be linked to parcel data in fullness of time. The following list of key attributes was generated:

- Ownership
- Address
- Postal Code
- Type of land use
- Location of facilities for public safety applications (hospitals, community centres) – i.e. does the parcel have such a facility on it
- Assessment
- Easements
- Rights of Way.

Once the NPDS is up and running this list of initial attributes identified should be revisited and compared to the 15-20 potential attributes identified in Appendix 5 to determine whether it is still appropriate.

9.0 COSTS AND BENEFITS

The consultations completed by QPA with data providers and users did not provide for the quantification of benefits at the detailed level of a traditional business case. Many stakeholders surveyed indicated there had been no definitive effort to establish any exactness as to the benefits or costs. All were certain of the likelihood that there were substantial benefits that exceeded the costs significantly. A number of European studies documented an effective financially positive case for the installation of a National Spatial Data Infrastructure. These are outlined below. Applying this same thinking to Canada would suggest significant return on investment that fully justifies the investment needed for NPDS.

As a relevant assessment, it is worth noting that investments are frequently made in information based infrastructure that are likely to produce benefits well beyond the cost to install and operate the infrastructure. Statistics Canada is a good example where an infrastructure exists to provide demographic type data where the specific return obtained is circumspect and not subject to traditional cost/benefit analysis. It is equally important to provide a land based information/data capability as it is to provide a statistical and demographics oriented capability for the use by all with the intent to generate value-add benefits for Canada and Canadians.

9.1 Quantifiable Benefits

It is important to note that the provision of parcel data can not solve any particular problem directly. Rather, the timely availability of such data provides superb background support that can lead to more effective decision making and confident action programs. The quantification of these benefits would first require a careful understanding of the costs incurred in the scenario prior to the use of parcel data. Such analysis and quantification is typically not available. Hence we are left to assess the ‘before” and “after” scenarios.

Typical problems experienced prior to access and the use of parcel data include:

- Cannot find the correct data when needed
- Maps and data are out of date, incomplete or inaccurate
- Different data sets and maps have incompatible formats, definitions and scale
- Need to create and maintain redundant data and maps on individual units
- Number of maps produced is limited by the person-time required
- The number of alternatives evaluated is limited due to the time and cost required
- Combining data and maps for a specific study or event is time-consuming and difficult
- Typically any response program overly relies on personal knowledge and memory of similar challenges.

The use of parcel data can deal with the above problems and significantly minimize their effect, thus generating important benefits that include:

- Improvements in existing operations
- Providing additional capabilities not previously available
- Improved response to unexpected, non-planned or emergency situations
- Intangible improvements, as outlined below
- Facilitating the generation of revenue through the sale of data, tools and products.

9.1.1 European Study

A European Study sponsored by the European Commission's Joint Research Centre as to the quantifiable benefits of providing a spatial data infrastructure that influences decision making throughout Europe identified the costs and benefits as outlined below. The study measured the financial impact of spatial data infrastructures on the public sector with the expectation that the private sector would obtain major benefits at little additional cost.

Costs on an annual basis were determined as follows:

Categories	Definitions/Inclusions	Costs at The European Union (EU) level plus the National level, plus the local level
Harmonization	Use of generic specifications with constant refining every 18 months or so	5,5 million Euros
Metadata	Use of relevant data by multiple agencies for mapping, cadastral, geology and environmental	72-76 million Euros
Policy Development	Support for policy development	.5 million Euros
Coordination	Cost effective Coordination portals and processes	124-194 million Euros
Total Annual Cost		202-276 million Euros

Quantifying the benefits was quite challenging. The study identified the following benefits:

Benefits Area	Definitions/Inclusions	Annual Value in Euros
Finding Data	Study of organizations searching for data	100-200million Euros
Environmental Monitoring and Assessment	Anticipated annual cost across Europe is upwards of 1billion Euros; Savings calculated at 10%	100-300million Euros
Improved efficiency and timely reporting	Reporting of European Union Directives related to the cross border environmental challenges	300million Euros
Cost of Hazards (an example of <u>one</u> real life hazard experienced)	5-10% Savings based on mitigating the costs incurred during the 2002 flood in Germany, Austria, Czech Rep., and Slovakia	100-300million Euros
Improved Health Delivery policies	Policy improvements resulting from improved and more reliable data availability	\$350million Euros
Conservative overall estimate 1.2 to 1.8 billion Euros		

On completion of the above analysis, the Joint Research Centre applied some conservative factors that discounted the costs and the benefits. Still their conclusion was the savings were 7-9 times the cost to have a European-wide consistent capability.

9.1.2 The Netherlands Example

Interestingly, the Netherlands conducted a comprehensive study to determine the benefits expected from a National Spatial Data Infrastructure (NSDI) to include a cadastral register, population register, building register, a base map, topographic data set and addresses. This country of 16,500,000 people covering 41,500 sq km determined it was worth a 27million Euro investment to establish the NSDI in 1992. Cost measurement with benefits calculations indicated a 425% return with costs across the nation at 84million Euros and benefits of 356million Euros. The benefits calculation determined for the Netherlands focus on improved government operations, efficiency, better quality planning and property based taxation collections and did not include the substantial benefits available with enhanced disaster planning and management nor environmental improvements.

9.1.3 Quantifying Benefits

The stakeholder interviews completed by QPA did not establish a quantifiable number for any of the above benefits. Thus far there has been no meaningful effort to determine the contribution made or possible through the availability of easy quality geospatial data including land parcel data as would be accessible through a NPDS portal. Still, based on the experience of other nations, we are certain that these benefits are significant and considerably greater than the costs anticipated for NPDS as outlined below. As a consequence of this history, it is strongly recommended that the Agency establish measurement processes that quantify the benefits actually achieved through the use of NPDS.

In summary the benefits can be quantified as to:

- Improved efficiency in obtaining needed data
- Time and money savings in implementing programs
- Planning savings through improved policy conceptualization and execution
- Reducing/eliminating duplication and waste
- Provision of a common digitally based data language for communications
- Better planning for and response to emergencies and disasters
- Simpler and more accurate reporting relative to International obligations and requirements.

9.1.4 Quantifiable Benefits from NPDS Capability

The use of a NPDS will deliver considerable benefits to Canada as the table below demonstrates. This table is based on an assessment of benefits measurements that have been completed and discussed in International conferences and jurisdictions. They clearly present a range of high value benefits that should be targeted for Canada's NPDS.

Category	Applicability in Canada
Efficiency: Allowing access to data that reduces user time to acquire and analyze and helps preclude the risk of duplicate data costs while improving customer service	NPDS will allow existing and additional users easy access to multiple datasets that are interoperable and ready for immediate application thus streamlining considerably the cost of acquiring and sharing parcel data that crosses multiple jurisdictions
Use of Standards: Encouraging a clear standard for parcel data will minimize any cost duplication in collecting data while facilitating new users and providers	NPDS will set quality expectations that will facilitate new users' and providers' work in both the public and private sectors that should yield additional applications that deliver high value-add
Clarity: Providing data in consistent formats with easy availability produces high clarity thus facilitating the development of applications by an ever increasing range of data users	NPDS will make accessible data that is immediately usable in the speedy development of applications that provide high value benefits including improved operations throughout society
Cross-Jurisdictional: Allows analysis and communications thus facilitating policy development and decision making, as well as improving operations where specific projects involve multiple jurisdictions	NPDS will facilitate access to land parcel data needs across multiple jurisdictions thus enabling more effective communications and analyses that will lead to more and better operations and other value-add products
Disaster Planning and Management: Land parcel data is essential as disaster mitigation plans are assembled, and with rapid data needs once a disaster is happening followed by disaster management during an event and disaster relief after the event	NPDS will provide access to wide ranging parcel data that is valuable in handling disasters with particular emphasis on safety and risk minimization that can be managed before, during and after the event
Terrorism: High impact events such as terrorism attacks require instantaneous availability of information for immediate and effective response with a confidence inviting approach that quickly re-establishes citizen certainty	NPDS makes accessible large amounts of digital data that facilitates rapid response to a terrorist attack thus allowing quality effective reaction without the time-lost and distractions that could result from non-availability of needed data
Environmental Programs: The availability of parcel data and other important data as to land use will foster the pursuit of high payback applications for improvement in the environment	NPDS will deliver access to extensive data that will allow the pursuit of specific environmental programs that can readily identify improvement opportunities that are precise with rapid payback
Economic Improvement: The use of cross-jurisdictional data simplifies the processes in getting needed information that facilitates decision making improving a wide range of economic possibilities	NPDS will make land parcel data easily available thus supporting more and better economic planning. The confidence that users will have in the data helps ensure better economic decision making devoid of the distractions involved in obtaining data from multiple jurisdictions
Government: Most international jurisdictions identify many opportunities to improve government in both the asset management area and in quality policy development, decisions and execution	NPDS will provide significant easy clarity in data such that government assets can be better managed and a clearer data base is available for many policy areas and action programs

The International Federation of Surveyors (FIG) stated the importance of a land information system for social and economic development. Specifically "...*In land development, the Cadastre forms an essential part of the information required by the private developer, land owners and public authorities to ensure that benefits are maximized and costs (economic, social and environmental) are minimized...*" (FIG Statement on the Cadastre).

The Statement went on to assert the following characteristics to ensure benefits realization:

- Clarity and simplicity of understanding and use
- Timeliness with up-to-date and timely information
- Fairness in development and operation
- Accessibility that is efficient and effective while dealing with privacy constraints
- Costs that is low without undue burdens
- Sustainability that maintains quality and availability.

In the over arching theme from FIG, the importance of land information is so consequential that it must be publicly funded as an important resource for land management that can be easily accessed by all. As noted, parcel data is both an important aspect of overall land information and a key window to other related data sets.

9.1.5 Canadian Context – Disaster Management Example

It is possible to identify an order-of-magnitude savings determination by analyzing the cost of certain disasters that have occurred across Canada. During the 1990's major natural disasters cost the Canadian Economy \$12.7billion and included the ice storm in Quebec and Ontario, hail in Calgary, flooding of the Saguenay River in Quebec, tornados in Edmonton and Barrie areas, flooding in Winnipeg and snowstorms in southern Ontario. Based on the European experience quoted above, it is reasonable to believe that the quick and responsive availability of spatial data could well yield savings equivalent to 5-10% of the costs above, or \$600million to \$1.2billion. Further the "insured" loss for disasters across Canada for 2000 through 2005 is estimated at \$2.5billion with an estimated total cost to Canada of at least double that amount. Thus it can be seen that the costs for natural disasters are high and expected to escalate as the environment changes and additional challenges arise.

The important conclusion is that there are substantial quantifiable benefits that can be realized with the use of spatial data, of which parcel data is a fundamental component. Such potential benefits vastly outweigh the cost of establishing a service such as NPDS. The size of the disasters is so broad that the Federal government will definitely be involved and there will be a requirement for data that is readily accessible, interoperable and interconnected.

9.2 Intangible Benefits

It is important that methodologies be set in place to continually identify and measure quantifiable benefits as described above; this is a normal part of business management. At the same time, it should be recognized that there are a number of intangible benefits that need to be understood. It is likely that many of these intangible benefits could be measured, albeit likely at some considerable cost. These are noted here with the expectation that a National Agency would see, as part of its responsibilities, a requirement to develop and utilize measurement

processes geared to identifying specific benefits and results from using parcel data on an ongoing basis. The intangible benefits identified include:

- The creation of more effective public policy
- Measuring urban growth against plan with comparison across multiple other centres
- Supporting business investment decisions that include trans-border determinations
- Reducing duplication, and creating greater value added products with everyone using the same baseline data
- Support International obligations where ongoing statistical and factual reporting allows Canada to meet obligations agreed to by the Federal government
- Improving public and private decision making in both quantity and timeliness
- Providing communication consistency with opportunities to link with other agencies
- Building better applications as for example with route planning, flood and disaster management, among others
- Better resource utilization including saving time and money as for example in locating schools to minimize transportation costs
- Provision of a one-stop portal concept to additional federal agencies and departments
- Build partnerships with other land information users and managers in all sectors
- Facilitate moving to a common standard to enhance and simplify communications.

One of the key benefits a National Agency can provide is strengthening local capabilities. Given the appropriate mandate, governance and funding this agency can strengthen and provide support to local initiatives without infringing on local responsibilities. The national agency can provide the leadership that would serve to improve local capabilities while achieving the necessary inter-jurisdictional integration.

9.3 Cost Estimates

There are three major components to assess for establishing cost parameters:

- Systems development and implementation
- Getting the proposed agency up and running, and
- Ongoing operational costs for the agency.

It is important to recognize the real value of this initiative lies in the benefits to Canadians and the economy. The benefits far outweigh the cost as demonstrated above from other jurisdictions. Providing such a framework as an easily accessible parcel data can be seen as akin to other framework initiatives such as Statistical Information. It is often elusive to assess the true cost benefit of statistical data, but one intuitively knows that it is valuable, and that value is different for each stakeholder. It is critical therefore that any decisions to move ahead on this initiative be based on value and not be subject to a "traditional" cost benefits analysis. The cost estimates presented below are sensible compared to the overall benefit to the Canadian economy.

There are a number of options available to fund the systems development and implementation costs. For example it was suggested rather than requesting new funding, the NPDS development could be started by allocating some existing program resources (cash and in-kind) from the NPDS stakeholders.

9.3.1 Systems Development Cost Estimates

Initial cost estimates were developed for the two architectural options for the NPDS:

- A full-function search based system architecture and
- A simplistic “quick and easy” list and browse architecture.

With respect to each architectural option, we estimated the cost for custom development or the modification of existing systems. These costs estimates are presented in the table below.

	Full Function		List and Browse	
	Low	High	Low	High
<i>Custom</i>				
Development	\$136,000	\$170,000	\$40,000	\$50,000
Infrastructure access	12,000	15,000		
Infrastructure	50,000	50,000	50,000	50,000
Internal Resource	75,000	75,000	50,000	50,000
Contingency 25%	68,000	77,000	35,000	37,500
	\$341,000	\$387,000	\$175,000	\$187,500
<i>Modification</i>				
Development	\$ 75,000	\$136,000	\$ 40,000	\$ 50,000
Infrastructure access	12,000	15,000		
Infrastructure	50,000	50,000	50,000	50,000
Internal Resource	75,000	75,000	50,000	50,000
Contingency25%	62,000	69,000	35,000	37,500
	\$310,000	\$375,000	\$175,000	\$187,500

These costs will have to be further defined once the complete systems specification and functionalities are fully determined in the eventual business plan. The above cost estimates do not include any providers' costs for making data available to the NPDS.

9.3.2 Implementation Costs

There are number of activities associated with the implementation of the proposed Agency as discussed in Section 10 below. The majority of the implementation costs are related to staffing. We anticipate an eight to ten month implementation period, with up to a staff complement of 12 in the first year. Our study did not include developing a detailed implementation plan and therefore this cost is estimated to be approximately to \$1.4 million, incurred in the first year.

9.3.3 Operational Costs

Ongoing operational cost for the Agency includes estimates for staffing resources required and other operational costs needed to run the agency and the NPDS. The staffing resources are based on the proposed organization as discussed in Section 10 below. The estimate is based on a “virtual model” where staffing is limited and resources are brought in as needed on a project to project basis.

The estimate of the ongoing operating costs ('000's) for the first five years is shown in the table below:

	1	2	3	4	5
Total FTE (1)	12	14	17	19	20
Salary: Based on an average of \$100,000 per employee (60% in year 1)	\$720	\$1,400	\$1,700	\$1,900	\$2,000
Operating costs based on 35% of salary costs	250	490	595	665	700
Project Funding (2)	250	350	350	350	350
Incentive funding (3)	180.	300	300	300	300
Total	\$1,400	\$2,540	\$2,945	\$3,215	\$3,350

Note 1: The increase in FTE's is based on the anticipated growth in service delivery and the number of provider partners.
 Note 2: It is anticipated the Agency will be involved in special projects from time to time and may be required to provide a financial contribution cooperatively with its partners.
 Note 3: The Agency may have to provide some incentive funding to providers to make their products and services available to the NPDS.

As discussed earlier in Section 7 there are some revenue generating opportunities available to the Agency that may be used to offset some of these costs or fund additional projects. No estimates have been made of these revenue items at this time as there are a number of policy components yet to be defined.

A summary of the estimated cost over five years is:

	Estimate ('000)
System Development	\$ 387
Agency Operating cost over 5 years	\$13,450
Total	\$13,837

SECTION E: MOVING FORWARD

10.0 THE IMPLEMENTATION CONTEXT

As noted we are recommending two important initiatives:

- Implementation of a National Parcel Data System (NPDS) to make parcel data accessible to a wide range of users to particularly support their strategic and policy related needs
- Establishment of a sustainable National Agency (“the Canadian Land Information Management Agency”) within the federal government, to provide national-level leadership and coordination for information pertaining to one of Canada’s most fundamental assets – its land.

While we recommend that some initial development of both initiatives is implemented as quickly as possible, there is an evolutionary process to implementation that can be followed that may fit better with the decision making processes and timetables of the federal government. Some of the key aspects of this evolutionary approach are addressed in Section 10.3 following.

10.1 Organizational Functions and Structure

The following section provides a guide to get the National Agency up and running. It is not intended to be a detailed implementation plan or a business plan. The focus of this section is to provide some essential thoughts on the organizational and governance structure of the Agency. Also highlighted later in this section are some of barriers noted from our consultations that ought to be addressed as well as some of the keys to success.

The proposed new agency would be required to achieve the following:

- Enable, through NPDS, quick access to parcel data, information and tools
- Identify and facilitate access to multiple sources of data, information and tools
- Promote and encourage data quality
- Maintain the metadata library for parcel data
- Promote education in parcel and subsequently other geo-spatial data, information tools and their impact on policy development and planning, including providing leadership in the use of geo-spatial data, information, tools and expertise within the federal government
- Establish and build relationships with stakeholders as both providers and users of parcel and other data
- Support the development of policies and plans for departments and other users with geo-spatial information
- Over time coordinate GIS initiatives within the federal government.

There is every opportunity to achieve the objectives of the National Agency without the expense and effort involved in building a new organization from scratch. There are already a number of organizations that are undertaking some aspect of what we recommend. However, such organizations cannot fully achieve what we are proposing because:

- They operate on a project-basis and consequently lack long-term sustainability (e.g. GeoConnections)
- Their mandate addresses specific sectoral needs (e.g. NLWIS addresses only agricultural needs)
- They are committees and hence have no delivery capabilities (e.g. CCOG, GIAC).

This offers the potential that by integrating with or evolving the mandate of such organizations, the objectives of the National Agency can be achieved.

Note: The following organizational information is not intended to provide definitive recommendations regarding organizational development options – that is beyond our terms of reference. It is provided to give the reader a better understanding of the functions and potential structuring of the proposed new agency, and, in the following section of this report, some key governance considerations.

Functions Required to Achieve Objectives

The achievement of the objectives identified for the agency requires the following ten major functions:

1. Provide infrastructure for accessibility to parcel data sources
2. Promote the use of standards
3. Apply quality management
4. Identify service needs and gaps
5. Source and acquire access to parcel data, including potential seed funding to support data access
6. Develop policies and processes to support sharing of data, and related services and tools
7. Develop and maintain multiple strategic relations
8. Monitor progress and evaluate service effectiveness
9. Promotion (Marketing) and communications
10. Build a high response service for stakeholder/customer use.

Some **commentary** on each of these functions follows.

1. Provide infrastructure for accessibility to parcel data sources:
 - Best potential provider of infrastructure may be elsewhere within federal government, or outside the federal government on a service provider basis (see Appendix 6)
 - Provide basic design and updates to specifications on an ongoing basis to deliver accessibility for all users
 - Provide content input for subsequent development and execution
 - Monitor effectiveness of access infrastructure through stakeholder satisfaction analysis
2. Promote the use of data standards:
 - Utilizing open standards can be encouraged through many other partner organizations and through industry in general
 - Build self regulation practices into strategic relationships
 - Following GeoConnections lead in Geomatics standards for Canada
 - Play a lead role in ensuring that data conform to a single consistent industry standard that facilitates usability and interoperability.
 - Establish policies for the consistent use of standards
 - Build the requirement for the use of standards into strategic relationship agreements and any related Service Level Agreements (SLA's)
 - Monitor to encourage consistent application of standards by data and tools providers
 - Participate proactively in forums that develop standards around geospatial parcel information
3. Apply quality management:

- The data owner is the best provider of quality assurance as the Agency will not own any data (other than metadata)
 - Build quality obligations and quality assurance self-regulation into any SLA that is part of all strategic relationship agreements for data providers
 - Verify application of quality standards and assurance by owners of data. However, we do not envisage the Agency playing the role of policing data quality
4. Identify service needs and gaps:
 - Resources assigned in response to priorities provided through Agency governance processes
 - Coordinate and support activities of the all groups that make recommendations as to needs and priorities.
 - Monitor portal for requirements and assist needs analysis
 - Attend industry events to maintain grass roots connections
 5. Source and acquire access to parcel data:
 - Partnership Office responds to proposals and requirements as identified by multiple sources (including using outreach programs)
 - Direct the acquisition and gathering of data in keeping with NPDS objectives and priorities as approved through the governance processes
 - Negotiate required strategic partnership agreements and related SLA's with data providers
 - Consider participating in possible funding of data gathering projects particularly to fill innovative priorities (actually delivered by partners)
 6. Develop policies and processes to support sharing of data:
 - Advocate and encourage policies for sharing of data, information, and, tools by others
 - Build into strategic relationships and any related SLA's
 - Provide possible funding to innovation
 7. Develop and maintain multiple strategic relations:
 - Identify high potential strategic relationships
 - Consistently strengthen and promote the notion of strategic relationships throughout the federal family
 - Negotiate specific strategic relationship agreements and related SLA's
 - Monitor performance of negotiated agreements while constantly seeking improvements
 8. Monitor progress and evaluate service effectiveness:
 - Utilizing assessment methods that are authorized through the Agency's governance processes and normal federal government management principles
 - Develop performance measures that support and communicate the accomplishment of objectives
 - Ensure measurement systems are in place
 - Specifically monitor performance against negotiated agreements and SLA's
 - Report periodically as required
 9. Promotion (Marketing) and communications:
 - Develop workshops and other structured presentations
 - Marketing service provider enterprises available in the private sector

- Design integrated marketing and communications program to promote the usability of parcel and other geomatics data in achieving business objectives
- Determine best mechanism for delivery of specific marketing programs
- Execute different elements as detailed in the programs
- Measure the results obtained from each marketing element

10. Build a high response data service for customer use:

- Encourage the inclusion of Customer Relationship Management (CRM) philosophy, processes, controls and reporting to facilitate the provision and development of the best service possible with continually growing use by all stakeholders.

Potential Organization Structure

The structuring of any organization should be undertaken while considering certain principles. These include:

- Organization structure must meet objectives set for the service
- It must satisfy needs identified by stakeholders
- Structure should be cost-effective
- It must focus on service delivery to customers
- The structure should be levered by using the existing capabilities of others within government, as well as capabilities outside government
- Importantly, it must embody the principles that influence Governance as outlined in the next section.

Three basic alternative options have been evaluated for an organization to deliver the envisioned Agency services:

1. The establishment of a stand-alone and self-sufficient organization that could take on an “Agency type” structure
2. The use of a set of “virtual” service delivery processes that would depend on others to achieve the objectives set for the Agency,
3. A blended structure that would utilize the strengths of others while allowing an accountability focus within a more limited Agency organization.

The analysis can be summarized as follows:

Structure Option	Pro	Con
Stand Alone	<ul style="list-style-type: none"> • Easy to manage • Strong focus on service delivery • Easily understood • Strong motivations 	<ul style="list-style-type: none"> • High cost structure • Not easy to leverage existing resources • Could duplicate existing capabilities
Virtual Delivery	<ul style="list-style-type: none"> • Likely cost-effective • Highly adaptable • Can easily fit existing structures 	<ul style="list-style-type: none"> • Confusing to customers • May not receive required support to achieve objectives • Produces numerous SLA's and extensive need for monitoring • Difficult to cost and control • Diminished direct accountability

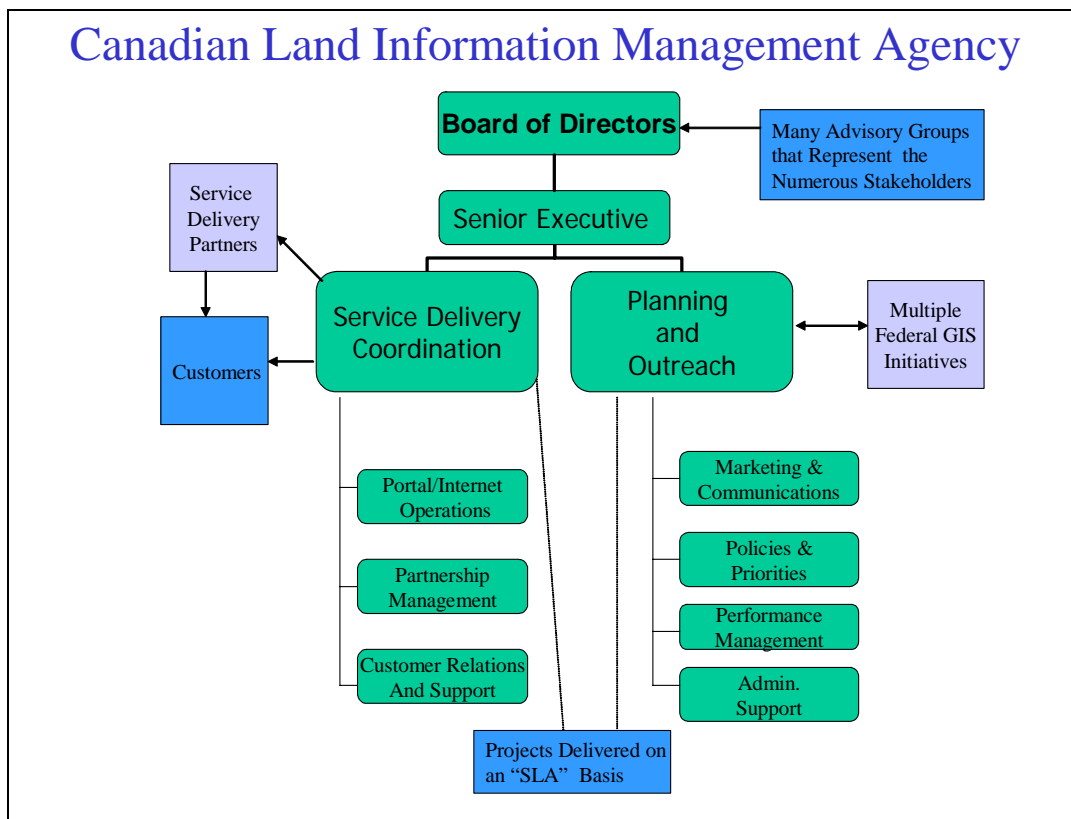
Structure Option	Pro	Con
Blended Structure	<ul style="list-style-type: none"> • Utilizes resources already directed to customer needs • Focuses on those activities that achieve specific objectives • High accountability • Easily costed and controlled 	<ul style="list-style-type: none"> • Adds to overheads • Requires careful structuring and clear job descriptions • Requires strong Governance

It is recommended that a “Blended Structure” be used. Such a structure:

- Places emphasis on the commitment to building a strong service orientation
- Exploits the strengths of others within the federal government and elsewhere such as the data providers, consequently reducing the likelihood of duplication and divided focus
- Engages outside resources in achieving positive influences available from use of geomatics data
- Has a high accountability quotient
- Encourages the development of innovative services and skills to bring the best to parcel and other geospatial data provision
- Is easily costed in relationship to achievement of well identified objectives
- Does not add significantly to costs– it recognizes that much capability to undertake the identified function already exists in other organizations both within and outside the federal government
- Would require the type of Governance that attracts stakeholder support and engagement.

The ‘blended structure” must fulfill the roles for which the Agency is accountable. This will require a minimum staffing level structured in logical operating units. The numbers of staff are “best estimates” at this time based on our understanding of the stakeholder community and their needs, and the level of complexity involved in the functions.

Below is a pictorial presentation of the organization structure that is an appropriate initial target to be developed.



Proposed Staffing within a Blended Organization Structure

The “blended structure” must fulfill the roles for which the Agency is accountable. This will require a minimum staffing level structured in logical operating units similar to the grouping of functions described earlier. This leads to the following staffing assignments with highlights of the job responsibilities for each position. The numbers of staff are “best estimates” at this time based on our understanding of the stakeholder community and their needs, and the level of complexity involved in the functions. Based on this there will initially be 12 staff required in the Agency in the first year. We expect that this number will rise as service provision expands with an anticipated high of about 20 staff.

During transition to the Agency every effort should be made to further refine both the responsibilities and the duties to be undertaken and the numbers of staff required - this will require service levels to be established and workloads to be monitored, amongst other activities.

In addition, comprehensive position specifications should be developed with the guidance of Human Resources.

Organizational Unit	Job Function	Staff	Key Responsibilities
	Senior Executive	1	Leadership Governance Policies and priorities Federal Family Programs
Planning and Outreach	Marketing and Communications	2	Promotion Program Communications
	Administration Support	1	Administration Coordination Performance Program -Analysis and Reporting Maintain Service Level Agreements

Organizational Unit	Job Function	Staff	Key Responsibilities
	Policy and Priorities	1	Policies, Privacy Board Activities Advisory Groups Mandates.
	Performance Management	1	Consolidate performance reports Report results
Service Delivery Coordination	Management	1	Coordinate all activities re. service delivery
	Portal/Internet Operations	2	Portal Design/Specifications Portal Content Portal Analysis
	Partnership Management	1	Identification of sources of service (data, tools etc) - partners Integration into "portfolio" of services
	Customer Relationship Management	1	Methods, Procedures, Daily Analysis, Facilitate Support, Reporting
	Standards	1	Monitor partner performance against SLA's and standards
Total FTE's		12	

The above outlines the estimated FTEs to be phased in over year 1. This number is likely to rise as the Agency develops over the next five years. In any event we would not expect numbers to exceed 20 FTEs.

10.2 Governance Needs and Methodologies

The Agency will flourish when it engages stakeholders and obtains their support as demonstrated by frequent use of the Agency's services. The stakeholder community is extensive and varied. It needs to be turned into "customers" that regularly use geo-spatial data, information, tools and expertise. All stakeholders have competing demands to make of the service and need to be committed to, engaged with and supportive of the extensive use of Geomatics in their operations. Turning stakeholders into enthusiastic customers and facilitators of the service will be essential to achieving the identified vision.

Governance Principles

Success requires good Governance that embodies the following principles:

- Must ensure that business objectives are met such that the vision is achieved
- Must facilitate the measurement of performance with related analysis and reporting of results
- Must identify customer needs and focus on getting these needs satisfied
- Should attract continual stakeholder support while actively engage stakeholders in the development and influence of the service
- Must have a fiscal responsibility component that is easily understood by stakeholders.

Governance Activities

Governance will be effective when it sets in place processes that:

- Balance activities to achieve objectives within available resources
- Establish priorities that allow choice amongst competing demands for services
- Facilitate funding from multiple sources that supports priorities
- Ensure the achievement of objectives for the Agency
- Understand the needs and capabilities of stakeholders such that the service always provides the latest capabilities that trigger the best in utilization of geospatial data
- Measure progress in achieving objectives so as to monitor success and allow effective reporting of results.

Elements in Good Governance

There are a number of elements that need to be embraced in order to achieve good governance within the Agency. These elements build on the principles detailed above and include:

- A need for a “decision” making process (likely using a “board”) that includes representatives of many stakeholders with the intention of:
 - Ensuring wide stakeholder support
 - Balancing needs effectively so as to optimize results
 - Engaging stakeholders as service providers and aids in developing the Agency and its services and its influence
 - Attracting additional resources and funding participation as the service develops and achieves the benefits possible through wider use of geo-spatial data, information, tools and expertise.
- Utilization of a number of “Advisory” groups that provide input to the decision process. Such Advisory groups should focus on service development that:
 - Provides recommendations as to service development
 - Reflects the service provision possibilities of stakeholders
 - Could yield additional funding possibilities for service development and innovation
 - Provides a forum for involving stakeholders so as to maintain a high degree of relevance for land use planning.
- Examples of groups that need to be represented at the Board level (either as Board members or Advisory Groups), include:
 - Existing federal initiatives such as GeoConnections
 - Representatives of federal organizations with direct accountability for emergency preparedness, disaster management, economic policy – including those required to report internationally on Canada’s progress in meeting its international commitments
 - Data providers at the provincial/municipal level. Existing membership of CCOG is a basis for this representation
 - The private sector. While existing GIAC membership can be a basis for initial representation, it is vital that representation from the resource sector (e.g. oil and gas, forestry), transportation (e.g. pipelines, railroads), energy (including transmission) and the financial sector (particularly insurance) is achieved. These are key sectors interested in parcel data at the national level.
 - NGO’s, academics and others with keen interest in land information.
- Leadership through a single senior executive for the Agency capable of and responsible for:
 - Supplying entrepreneurial and championing leadership that is driven by immediacy and the regular accomplishment of meaningful results
 - Leading the substantive culture change that ensures all aspects of daily work needed to deliver the “service” wanted by customers
 - Attracting skilled resources and capabilities to consistently deliver results that foster stakeholder and customer involvement

- A commitment to meeting the identified needs of all users of geo-spatial parcel and other data with full support of all within the federal government and elsewhere
- Ensuring the best use of resources and the timely accomplishment of objectives.

10.3 Broad Action Plan

As noted, we believe that the two main recommendations, implementation of a National Parcel Data System and establishment of a sustainable National Agency (“the Canadian Land Information Management Agency”) can be achieved in an evolutionary manner that will provide for early achievement of benefit and consequently demonstrate value to build the support of the many stakeholders who expressed support for this initiative, in particular the end-user community of stakeholders.

While this evolutionary approach is based on a pragmatic view of current organizational realities in the federal government, and is designed to maximize buy-in of the many parties, there are some risks involved. In particular that implementation may be excessively lengthy – both initiatives could fail if they “run out of steam”.

We recommend the following as a sound basis for moving forward:

- Immediately commence a “proof-of-concept” project that will include collaborators in both the end-user and data provider communities. This project and the Task Force noted below would, we believe, provide a significant impetus to making NPDS a reality.
- Establish of Task Force with broad membership to both oversee the proof-of-concept project and form the foundation for appropriate on-going governance.
- Appointment of a Lead Organization to champion the initiatives.

Proof-of-Concept Project

Following our stakeholder consultation we are aware of a number of organizations, data providers, end-users, or both, that would be interested in involvement in such a project. While we obviously cannot provide any confirmation or commitment on their behalf, we believe the following organizations would be interested in initial discussions at the very least:

Parcel Data Providers	End Users
Nova Scotia	Oil & Gas Companies such as Nexxen (through the Canadian Association of Petroleum Producers)
Manitoba	Del Cho Land Use Planning
Quebec	World Wildlife Fund
Ontario - Teranet	NLWIS (Agriculture Canada)
	Statistics Canada

Choice of a particular proof-of-concept project should be left to the involved stakeholders. Our only comment at this stage is that ideally it should demonstrate value to as wide a range of stakeholders as possible as away of building further interest and commitment.

Establishment of a Task Force

We recommend that a Task Force is established to provide both oversight and input to the proof-of-concept project. This Task Force should be comprised of both data providers and users of the specific project selected. Consequently, we would expect membership to include at a minimum provincial government representatives (as data providers and also potential end users), the private sector (and others such as NGO's) as end-users, and federal government representatives with an interest in the broader aspects of successful implementation of NPDS. We recommend actively engaging with groups such as GIAC and CAPP to involve the private sector.

In the longer term, once the proof-of-concept project is showing results, there will be the need to focus on the development and implementation of the other broader aspects of NPDS. As previously noted, It will be important to ensure that governance of the NPDS implementation project includes broad representation from both parcel data providers and users, from the public and private and other sectors. This will further engage stakeholder interest and commitment.

Lead Organization for Initial Activities

Within the current organizational context of the federal government, we believe that GeoConnections is the most appropriate organization to take federal-level leadership for the development and implementation of the proof-of-concept project and other initial development and implementation activities of NPDS. This fits well with GeoConnections project-based mandate, (although we would restate that this same project-based mandate is not appropriate for an on-going role).

Address the Organizational Positioning of the Agency

While the foregoing recommendations on organizational structuring and governance provide a framework for moving forward, one major question remains: where within the federal bureaucracy, and to whom, should the Agency report in the longer term. Without further analysis, beyond the scope of this assignment, it is inappropriate for us to answer such questions, other than to address factors we believe relevant to the Agency's on-going sustainable success:

- Needs to be able to engage the involvement of many interests currently residing in a number of different departments or Agencies such as:
 - Agriculture and Agri-Food
 - Natural Resources
 - Defence
 - International Trade
 - Transport
 - Environment
 - Public Works
 - Statistics Canada
 - Elections Canada.
- This points to the need to ensure the Agency is not captive to the agenda of any single department
- Requirement to balance competing interests through the effectiveness of its Board of Directors
- Requirement for sustainable funding, potentially contributions from numerous organizations.

Once the proof-of-concept project of NPDS is underway, commence the process of developing the proposed National Agency. In addition to traditional organizational development activities, this will involve working with

existing organizations that have an interest in its successful implementation. Such organizations include GIAC, CCOG, IACG and NLWIS. Commitment from such organizations is required to ensure that a truly sustainable national service is achieved, cutting across the traditional departmental pillars or silos.

Integration of the responsibilities of other federal agencies with similar objectives, as this becomes recognized, under the umbrella of the National Agency (note: this may not necessarily mean disbanding such agencies. Integration can occur in a virtual sense, assuming appropriate coordination and cooperation).

Finally, and perhaps most importantly, is to find and engage an individual who will provide the leadership and vision necessary to drive the success of the initiatives over the long-term. We would note that this individual does not need to be from the federal government, but could be from an organization, preferably end-user, that is committed to the success of NPDS.

Business Plan

Develop a full Business Plan to address the many activities of a tactical nature that will be required to move NPDS and the National Agency from project to permanent status.

Provide Initial Funding

Start the process of establishing permanent funding (as opposed to project funding) for the sustainability of the National Agency

Establish a budget for \$14,000,000 (subject to refinement in the Business Plan) over 5 years to get the NPDS operational and to undertake establishment of the National Agency. The Agency must be sustainable and consequently part of this budget must be permanent funding through Treasury Board.

Marketing and Communications

Implementation of a complete communication and marketing program involves close coordination of the process to negotiate with data providers while attracting data users, particularly at the inception of the Agency. It is important to NOT over-promise but rather to set in place a framework that stimulates easy and frequent access while detailing a methodology for collecting benefits. This orientation will facilitate the accomplishment of benefits on a continuing basis across all users. As well it will highlight the importance on the part of users to the installation and utilization of innovative spatial data practices for addressing their core responsibilities and accomplishing benefits delivery objectives.

The market opportunity for spatial data is immense and changing in ways where the use of spatial data will enhance land related decision making. This requires that the Marketing and Communications program be structured to inform and attract additional users of geospatial data. Certainly the provision of easy methods for attracting data providers will be important; however the largest benefits are through more use of digital geometric data.

Hence the program needs to have a substantial education orientation to inform and train as to the use of baseline data and the effective utilization of tools for interoperability and benefits realization. This will include web based education, support for third party educational programs, trade show involvement and a substantial publishing component in terms of reports, white papers and studies. Such a program is manageable, cost-effective and engages professionals positively.

The marketing program should build on high quality Customer Relationship Management (CRM). The installation of such processes will provide a feedback methodology that will lead to continuous improvement programs. The web site will get better and better as the CRM yields complete feedback on data needs, data use and real life stories of benefits accomplishment.

Parcel Data Access Infrastructure Provision

Further research is required to establish the strategy to achieve the access infrastructure for the NPDS by elaborating on the analysis shown in Appendix 6. It will be necessary to negotiate with potential infrastructure providers and to firm up and commit to the funding of activities to deliver infrastructure. The development of partnership arrangements, SLA's and so forth will be required as part of infrastructure implementation.

Further Organizational Development Refining to Support Agency Establishment

During transition to the new Agency every effort should be made to further refine both the responsibilities and the duties to be undertaken and the numbers of staff required - this will require service levels to be established and workloads to be monitored, amongst other activities.

In addition, comprehensive position specifications should be developed with the guidance of Human Resources staff.

The exact detailing of the proposed "blended" structure should be finalized as part of implementation planning. It is expected that the final structure would mirror the grouping of functions described earlier. This would include:

- Structuring of service delivery to meet identified customer service needs
- Development of the Agency to have an ever-growing influence on using parcel and other geospatial data
- Skilled Governance and management focused on cost effectiveness and results.

10.4 Potential Barriers and Obstacles to Overcome

The establishments of any new National level capability, particularly one involving new and sustainable organizational capacity, will inevitably have a number of obstacles or barriers that will require thoughtful management on the part of the champion recommended earlier. The interesting element about obstacles and barriers is that careful attention to them directs substantial organizational energy to ensuring a high level of success for the NPDS initially and the National Agency in the longer term.

Perceived Organizational Threats

As noted, there are a number of existing organizations that address some aspects of the identified responsibilities of the proposed National Agency. However, it is important to note that none of these organizations, as currently mandated, can fully address the needs to be addressed by the Agency. Consequently, individuals within such organizations could perceive what is being proposed as a threat, and actively create barriers to its establishment.

The option we identify to evolve the new Agency by building on and integrating such other organizations, either as "delivery partners" or as part of the governance of the Agency, can help to address such barriers. It will be important for the champion of the Agency to address such barriers in a positive and forthright fashion

Disinterest and Uncertainty

It is likely that the NPDS will be greeted with possible disinterest and uncertainty. This ambivalence will arise as a consequence of the newness and start-up nature of the NPDS. Many data users will continue to use their traditional sources for data until they see NPDS demonstrate its capabilities.

It will be vital for the NPDS to provide a high quality service in order to invite the confidence of and use by many. There is little doubt that speedy and effective access to multiple data providers can attract the confidence and use wanted so long as users feel their needs can be effectively met through NPDS. Education and outreach marketing will need careful planning. As well, determined customer support is needed to attract continual usage and full acceptance by both data providers and data users.

An important component of obtaining acceptance will be the availability of free membership in NPDS' initial year. In this way there is no cost decision required on the part of users that might limit use. As well such memberships will encourage tolerance during the challenging start-up period.

Certainly this obstacle can be overcome through the installation of solid and involving Governance processes. People will be attracted to NPDS when they feel involved in developing this most important capability for Canada.

Recovering Operating Cost

There is a cost associated with developing a web portal that provides access to the parcel and other land information on a national or multi-jurisdictional level. Early expectations have been that the NPDS components of the Agency would recover its full cost thus diminishing the demand for major funds. Such cost recovery is proving to be problematic as the expectation of the Geomatics community is that such data will be free and freely available. With this in mind it is important to accept that there is no cost recovery model that can be set in place for a portal that will not own data.

At the same time the longer term direction should be to have membership fees related to the amount of services delivered. The intent is for NPDS to continually deliver high levels of service that will lead to the willingness to pay membership fees. These fees can then be used to either offset the costs of the NPDS or to fund additional innovation that will lead to even greater benefits delivery.

There is a willingness to pay for value added products. That value however is based on the user's own individual need rather than supplier costs. Different users may value the same product or service differently and inclined to seek alternative sources if the supplier cost exceeds their perceived value. Where NPDS develops products or coordinates cooperative development activities that should attract funding from data providers and data users that offsets such costs.

The NPDS is a portal only. The funding required is minimal and therefore there is no real need to generate revenue. Yes revenue options exist, but the NPDS is not in the business of selling data. There core business is to provide access to data to facilitate good policy development and planning. Operating cost should be through permanent funding from Treasury Board.

Governance Model

Ownership of the NPDS and the reporting relationship of the Agency have not been established, and consequently the governance model necessary for the success of this initiative will require important thoughtful development. As previously noted, It is absolutely imperative that the governance model be quite embracing

including public and private sector representation. It must be high level with real power to determine the best methodologies for accomplishing solid far-reaching objectives.

This will attract the confidence that ensures issues of Governance do not become obstacles to success.

Negotiating Agreements with Provincial and Other Providers

Agreements will have to be negotiated with data providers to make their data available through the NPDS. There will have to be individual agreements as providers have varying delivery mechanisms and pricing models. Further, without clear ownership, it is difficult to establish who negotiates on behalf of the NPDS.

This barrier can be overcome by ensuring the Agency takes a neutral role in data functioning primarily as the lead agency for access to digital geometric data. Eschewing any role as to possible policing of data quality or in mundane pricing decisions and calculations will help ensure that simple access agreements are speedily negotiated. The end result should be effective timely negotiation that allows service quality to be the major ongoing activity for the NPDS.

Protecting Provider Revenues

Data products are a source of revenue and providers wish to preserve this source of revenue. The NPDS should not be involved in price setting. It is up to each provider to maintain their own pricing policy. Such an approach guarantees that this never surfaces as an obstacle to success.

Privacy

Many users have raised privacy as an issue to be possibly addressed within the NPDS. The NPDS will make available the data of others and as such will rely on data providers to deal with all privacy issues with policies established in their own jurisdictions. It is possible that the Agency may provide technical "advice" as to privacy; still responsibility will always be the responsibility of each data provider. Simply stated this should not be an issue for NPDS as it does not own any data.

Restrictions on Use of Data

Many users have indicated that restrictions on the use of the data hamper their ability to use the information effectively, and would prefer to see a mechanism that eases those restrictions. The NPDS will facilitate access thus helping concerns related to restrictions. Still any restrictions that may be in place need to be addressed by the data providers and not the Agency.

Liability

Concerns were raised as to the possible liability for data quality and accuracy and as to who will provide indemnification for the misuse of the data. Such a risk needs to be completely avoided by the Agency as it places full responsibility on each data provider through agreements between data providers and the Agency.

The Agency does not own data and as such can not be held liable in any way for the quality or effectiveness of data.

10.5 Enabling Success

There are certain keys to delivering success including:

- NPDS will not be a threat to the autonomy and revenue for local data and service providers
- It is expected that NPDS will allow additional opportunities for enhanced income for data providers and tool creators
- As stated previously solid good governance should encourage participation by the many users/providers worldwide
- Encourage use and the obtaining of high value benefits will facilitate success and the impact possible
- Success needs to come from moving up the hierarchy within government with senior level attention that recognizes the NPDS and the use of digital geometric data is a fundamental resource after all
- It will be important to deliver early success with substantial service oriented deliverable so as to avoid the possible fear of empire building
- Over the long run installing effective measurement processes and methodologies that identifies the benefits accurately and with confidence will attract the funding, memberships, use and impact that others are experiencing across the worldwide Geomatics community.

11.0 RISK ASSESSMENT

In general, future work should adhere to Treasury Board's Enhanced Management Framework, including the following project management practices:

- Integration Management – processes required to ensure that the various elements of the future project are properly coordinated. The key processes include project plan development, execution and change control
- Scope Management – processes required ensuring that the project includes all the work that is required, and only the work required, to complete the project successfully. The key processes include initiation of work and scope planning, definition, verification and change control
- Time Management – processes required to ensure timely completion of the project. The key processes include activity/schedule development and control
- Cost Management – processes required to ensure that the project is completed within the approved budget. The key processes include resource planning, cost estimating, cost budgeting and cost control
- Human Resource Management – processes required to make the most effective use of people on the project. The key processes include organizational planning, staff acquisition and team development
- Information/Communication Management – processes required to ensure timely and appropriate generation, collection, dissemination, storage and disposition of project information. The key processes include communication and information planning and distribution, performance reporting and administrative closure
- Quality Management – processes required to ensure that the project will satisfy the needs for which it was undertaken. The key processes are quality planning, assurance and control
- Risk/Issue/Problem Management – processes for the identification, analysis, and response to project risks, issues and problems
- Procurement Management – processes to ensure that contracts and procurements are conducted in a timely, cost effective, and professional manner.

11.1 Key Requirements

The objective is to:

- Ensure that risks are identified, clearly stated, and documented. We believe that the initial risks to be addressed include those noted in the previous section as barriers to be overcome.
- Ensure that risks are evaluated.
- Ensure that mitigation responses are developed for significant risks.
- Ensure that risks are effectively managed.

11.2 Risk Identification, Mitigation and Management

The future project(s) to establish the Agency and its initial deliverables such as the NPDS will maintain a record of risks that may threaten the success of the project. These risks will be reviewed and reassessed at the beginning of each major phase. In addition, the project should conduct on-going risk management to identify and manage

risks on a regular basis. Weekly and monthly project status reporting processes will assist the timely identification, analysis and mitigation of risks.

A number of different techniques can be used to identify the risks, such as risk identification sessions and interviews with project team members and stakeholders.

When a risk is identified, it should be analyzed to determine the level of severity. Risk analysis should assess the potential impact and the probability that the risk should occur. In order to be able to analyze and manage risks effectively, risks should be assessed using a project-focused Impact Assessment Scale and Probability Scale.

Once a risk has been assessed, the Project Manager should determine the response to the risk and should identify the key activities to mitigate the risk. Mitigation should minimize the impact or decrease the probability. The mitigation activities should be tracked, and communicated to the project team. The risks should be reassessed on a monthly basis to determine the success of the mitigation activities and to indicate if the mitigation approach should be changed.

The Project Manager should undertake ongoing risk management activities and should monitor the progress of mitigation activities and should reassess risks on a weekly basis. The Project Manager should report on the risk status at weekly progress meetings.

Project staff should identify new risks and update existing risk information on a regular basis. The Project Manager may decide to change the response to risks as a result of inter-team analysis and scrutiny. All updates to risks should be communicated to the project team members accordingly. The Project Manager closes risks in response to successful mitigation activities or the achievement of milestones.

12.0 BUSINESS CASE SUMMARY

The original objective of the NPDS as outlined in Section 2 was to provide users with access to baseline parcel data at the national level. The major intended users were the Federal Family in order to satisfy their program mandates. The system was also intended to integrate with other data sources to provide a more robust information pool for making informed land management decision.

Based on our consultations as outlined in section 3 the demand for access to data goes beyond baseline parcel data for day-to-day transactional purposes. Most users can already satisfy their need for parcel data to meet their transactional needs locally. However, there is a demand from a number of users for access to national baseline parcel data both because it is of value to them in itself, and also because it is seen as the “doorway” to other land information. This demand is being driven from a strategic point of view in order to facilitate better business decision and policies for land management. Our review of the international jurisdictions adds further support to the need for the NPDS.

During our consultations the need for a national agency for Geomatics in Canada became obvious. The need for such an agency was not specifically queried in our questionnaire, but a number of interviewees indicated that such an agency is needed. This view was further supported by our review of the international jurisdictions. Furthermore, in a presentation made in Regina, April 2006 at the GIAC Policy Seminar 2006 Series following from GeoConnections Stakeholder Engagement Workshops in 2005 it was noted that stakeholders had pointed out “...*Canadian Geomatics industry needs leadership; a national focus...*”. The agency being proposed in this report can provide that sustainable national focus and leadership role. Section 4 outlines the major responsibilities of the proposed Agency within the context of a growing market acceptance for the usefulness of geospatial data. One of the first tasks of the proposed Agency is to establish the NPDS.

In Section 5 we outlined the business fundamentals of the new Agency. This would include revisiting the original vision and goals originally established the “system” in light of the emerging responsibilities of the new Agency.

Our consultations identified a number of potential users of the NPDS as Outlined in Section 6. This is not an exhaustive list as there are no doubt there are other users we were unable to contact.

A number of strategic policy decision need to be developed in order for the NPDS to be successful. We have outlined in Section 7 a number of strategies for achieving success. Key among these is the need to achieve buy-in from all stakeholders by establishing strong and transparent governance processes for the Agency.

The NPDS will provide the users with the needed access to baseline parcel data and other land information held at source by providers of such data. Section 8 outlines two alternative options for the systems architecture for establishing the web portal. The first provides for full-function search based system, while the second option is simpler and easier to implement as it only allows for list and browse features. As indicated in Appendix 6, the selected option is dependent upon the number of possible data providers and data sets.

The estimated cost to custom-develop a fully functional system as described in Appendix 6 ranges from \$340K to \$387K. Modifying existing systems to achieve the same functionality is estimated to cost between \$310K and \$375K. In addition to the above the start up costs to establish the Agency is estimated at \$1.4 million.

During our consultations we were unable to obtain any information that would allow us to quantify benefits precisely. However, extensive and costly studies have been conducted in many other jurisdictions that clearly

demonstrate significant returns on investment. There is no doubt that the similar significant and diverse benefits can be obtained in Canada by making parcel data easily accessible through the NPDS. However, there needs to be a concerted effort to set in place the processes to capture the data that would facilitate the measurements required to demonstrate the value of the investment. In section 9 we have outlined a number of benefits that could be provided through the NPDS.

One of the challenges in moving forward with this initiative is setting up the Agency. We have outlined on Section 10 a guide to get the Agency operational. This guide is not intended to be a business or implementation plan. It is an outline of the Agency's organization's responsibilities, functions and structure. Based on the proposed responsibilities and functions we estimate that approximately 20 staff may be required over five years, with an initial complement in the first year of 12 positions. These are not definitive and will have to be finalized once a business plan is put in place. There are two options to delivering the functionality of the Agency: build from scratch or integrate with other organizations with related mandates.

In Section 10 we have also outlined a number of potential barriers and obstacles to overcome. These are not insurmountable barriers, but do require the "political" will to address each. Success can be achieved by paying careful attention to eliminating these barriers.

The NPDS should be developed in conjunction with a central Agency as is proposed in this report. The NPDS must be seen as part of an overall strategy for Geomatics in Canada otherwise there is a risk failure. On its own the NPDS will:

- Have no identified owner or mechanism to institutionalize the NPDS
- Be a project with a limited life cycle and not have long term sustainability
- Become another project developed within a "silo."

Should CCOG decide to go forward with this initiative, the best mechanism to achieve this would be to:

- Obtain buy-in of the concept from the stakeholders, including the private sector
- Develop a detailed business and implementation plan for the Agency
- Seek budget approval for the business plan for the Agency
- Develop detailed specifications for the NPDS
- Determine a clear Governance methodology
- Establish provider partnerships.

Appendices

1. Acronyms
2. Stakeholder Organizations Contacted
3. Current State of Parcel Data Across Canada
4. Results of Survey of International Jurisdictions
5. Examples of Additional Attributes for Land Data
6. Proposal/Technical Analysis of a Canadian National Directory of Parcel Data
7. List of Reference Material