# Cadastral and Spatial Information Systems in Local Government: From Maps and Tables to eSystems

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## ABSTRACT

*Local New South Wales councils deal in rafts of information relating to land parcels and, as in all cases for government authorities, the quantum of information, and demand for immediate access to accurate data, have increased significantly over the last two decades. This information is essential for a range of processes and services including rating, property transactions, development approvals and strategic planning. Up to the late 1980s this information was sourced from hard copy maps and simple textual databases. Maps were chronically out of date and hard to read, and the textual databases notoriously inaccurate. While early Geographic Information Systems (GIS) were available to larger councils, these were user-unfriendly and significantly lacking in functionality. In the 1990s, the ready availability of the state-wide electronic cadastre and the desktop computer revolution, accompanied by the advent of user-friendly and functional GIS software, provided an opportunity for Local Government to significantly improve its land information systems and services. Post 2000, growing acceptability of the internet for provision of information and services, coupled with a cultural change in government bureaucracies towards an "open door" approach to information, provided further opportunities for councils to offer information services over the internet. Since 1995, Pittwater Council has been a leader in the development of reliable and accurate cadastral and spatial information data sets and provision of planning and land information and services via the internet. Fundamental to Pittwater Council's development of these systems and services was a clear understanding of the cadastre, map projections, and accuracy and precision requirements for spatial information, all fundamental skills for a surveyor but significantly lacking in the conventional Local Government skill set. This paper provides a light-hearted case study of the evolution of Pittwater Council's land and planning information systems and services from a set of unreliable maps and databases to an integrated electronic internet available platform.*

**KEYWORDS**: *Cadastre, council, GIS, spatial, planning, surveyor.*

## 1 IN THE BEGINNING

Pittwater Council (Pittwater) was the last new council to be created in New South Wales (other than through amalgamation). Pittwater came into being in 2003 as a result of considerable community pressure related to inequitable expenditure of rate income and poor planning decisions by Warringah Shire Council (Warringah). It is interesting to note that Warringah had been "sacked" on a number of occasions previous to the secession and has since had a period under administration.

A key element of the secession process was the "Declaration" by the Governor which included a "meets and bounds" description of the new local government area expressed as:

*"Land taken from the Shire of Warringah and constituted as a separate municipality known named the Municipality of Pittwater."*

*"Area about 125.02 square kilometres: Commencing at the intersection of the generally northern shore of Narrabeen Lakes and the shore of the South Pacific Ocean and bounded thence by the latter shore generally northerly to the eastern extremity of Barrenjoey Head; by that head generally westerly to its western extremity; by a line westerly to West Head; by the right banks of Hawkesbury River and Cowan Creek upwards to its confluence with Coal and Candle Creek; by that creek, Akuna Bay and an unnamed creek flowing into Akuna Bay upwards to Coal and Candle Creek Drive; by that drive generally south-easterly, West Head Road generally south-westerly and McCarrs Creek Road generally south-easterly to Wirreanda Creek; by that creek upwards to the generally western boundary of Portion 83, Parish of Narrabeen, County of Cumberland; by that boundary and its prolongation generally southerly to Mona Vale Road; by that road generally north-easterly and Powder Works Road generally south-easterly to the northern prolongation of the generally eastern boundary of Lot 2, D.P. 233351; by that boundary generally southerly, a line, part of the northern and the easternmost eastern boundaries of Portion 76 easterly and southerly, a line, and part of the generally northern boundary of Portion 77 and its prolongation generally easterly to Deep Creek; by that creek downwards to the generally northern shore of Narrabeen Lakes, aforesaid, and by that shore generally north-easterly to the point of commencement."* (Governor's Declaration, 24th April 1992, Local Government Act 1919 – Proclamation *New South Wales Government Gazette No.51*)

This "Declaration" leads to some interesting questions:

1. What exactly is the "shore of the South Pacific Ocean"? Is it high water mark, does it include the bays, where does the State's responsibility for administration begin and end?
2. What precisely is "the northern shore of Narrabeen Lakes"? Narrabeen Lagoon is clearly a non-tidal lake intermittently open to the sea. Is the boundary the shoreline at the date of grant or the edge of the water?

As a result of the Governor's "Declaration" 250, odd staff from a broad cross-section of Warringah Council packed up their goods and chattels, relevant documents and personal equipment one Friday afternoon in May 1992, and moved into premises at Warriewood with a view to the commencement of operations the following Monday. The only premises available were a warehouse in an industrial area within which temporary customer service and office facilities had been provided. All the new Council's corporate information was either accessible through a "link" to an old "green screen" mainframe system at Warringah, or documents, maps, plans and hard copy files shipped up to the new offices as part of the secession process. Cooperation levels between staff at the new Council and Warringah staff were low to say the least, and the general consensus in local government circles was that the new council would quickly fail.

Successful operation almost immediately was a survival imperative. This included the ability to be able to provide accurate and complete information to the staff and to the public at a time when every failure of the new Council in terms of service delivery and efficiency would be subject to the scrutiny of those people opposed to the secession itself.

## 2 THE CADASTRE – THE FUNDAMENTAL BASIS FOR LAND ADMINISTRATION SYSTEMS

The terms 'Cadastre' and 'Cadastral' were introduced to many of us (surveyors) in our first year of University by 'Henry' Werner and at that time, for those who understand surveying to be an applied mathematical concept of bearings, distances and heights above sea level, and (despite Henry's exhortations to understand that the Cadastre had a wider purpose) the term 'Cadastre' was a mathematical concept, rather than the basis of an administrative system for land.

Not generally recognised is the fact that local government is essentially a land manager of both private and public land, its functions relate in large part to administration of information and processes relating to land parcels. These processes rely on cadastral information and in many councils those professionals that have an understanding of the Cadastre are not generally involved in information management. While this is changing with the increasing trend towards comprehensive use of the electronic Cadastre, reliable land information databases did not exist in 1992.

In order to get up and running, the newly formed Pittwater relied on Cadastral information provided through a series of hard copies of maps from Warringah and land parcel and planning information relating to those land parcels contained in the mainframe computer system (which was located at Warringah and accessed by a "phone line link").

At its most fundamental level, the Cadastre provides a record of who owns what (land) and where it is, together with additional site information related to the individual parcel that might be relevant to the administrative authority, such as size and slope, land use and value. The reason for such records is pretty fundamental: taxation**.**

Forms of taxation have been applied to land and land owners throughout history. All substantive civilisations have imposed some forms of taxation relating to land ownership. Our society and its local councils are no different. The basis of Australian local government financial viability is a system of "taxing or rating" land parcels within their respective local government areas.

This fundamental use of the Cadastre is extended to many other purposes by councils and for each land parcel the following information is required:

**Legal and Land Description Information:**

- Lot and DP/parish and portion/volume and folio
- Valuer General's property details
- Ownership details
- Street address

**Planning Information:**

- Zones
- State Environmental Planning policies
- Local Environmental Plan information
- Development Control information

**Hazard Information:**
- Flood hazard
- Bushfire hazard
- Geotechnical hazard
- Coastal hazard
- Climate change impact

What do councils use this information for?

**Record Systems:**
- Property file
- Road file
- Some subject files (virtually all of these files relate to a property or land parcel)

**Rating and Ownership Details:**
- Billing and collection
- Transfer of ownership
- Registers – Council's Land Register

**Planning Information:**
- Development management
- Local Environmental Plan information
- Development Control Plan information
- Hazard information
- Planning certificates

Quite clearly within councils the vast majority of administrative processes rely on the underlying cadastral information. Systems are largely based on property or land parcel information with virtually every file document (file notes, approvals, etc.) at Council being able to be related to a single land parcel or group of land parcels with correspondence linked to a person, also linked to individual properties through ownership or address.

Additionally Asset Management Systems originally maintained in hard copy are now increasingly maintained as electronic systems which are spatially referenced, with property details being the link between the coordinate references and a "man in the street's" understanding of where things are. Imagine the response to the referencing of the location of a pothole outside No.46 Queens Road as a coordinate in a letter to a ratepayer.

## 3 THE RAPID EVOLUTION OF CADASTRAL (LAND INFORMATION SYSTEMS) IN LOCAL GOVERNMENT – PAPER TO GIS

The formation of Pittwater Council in 1992 provided a unique opportunity to obtain a snapshot of land information systems in local government at the time, for no other reason than the relevant information had to be identified and shifted to the new Council and made operational. Pittwater inherited from Warringah a series of property files, street files, DA files (Figure 1), slip maps (Figure 2), zoning maps (Figure 3), charting maps (Figure 4), flood maps, contour maps, air photos, engineering plans, as well as a 'mainframe' property database based on Valuer General information.

Figure 1: Old DA files.

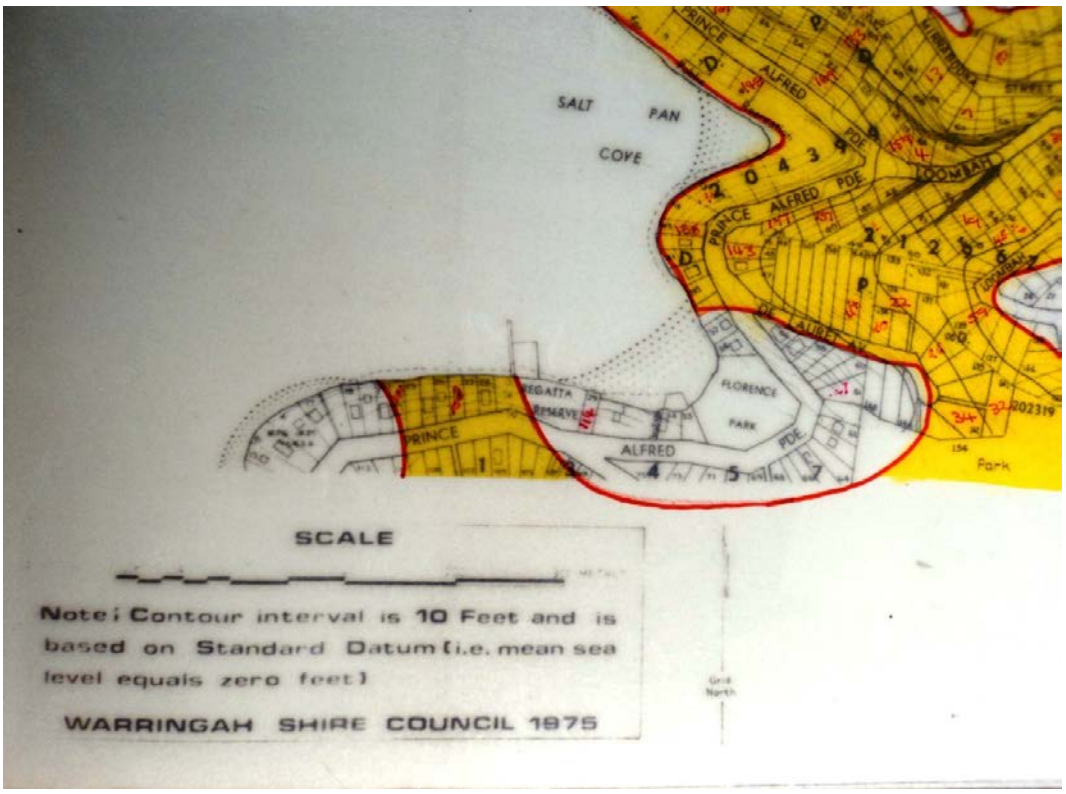


Figure 2: Slip map.


Figure 3: Zoning map.

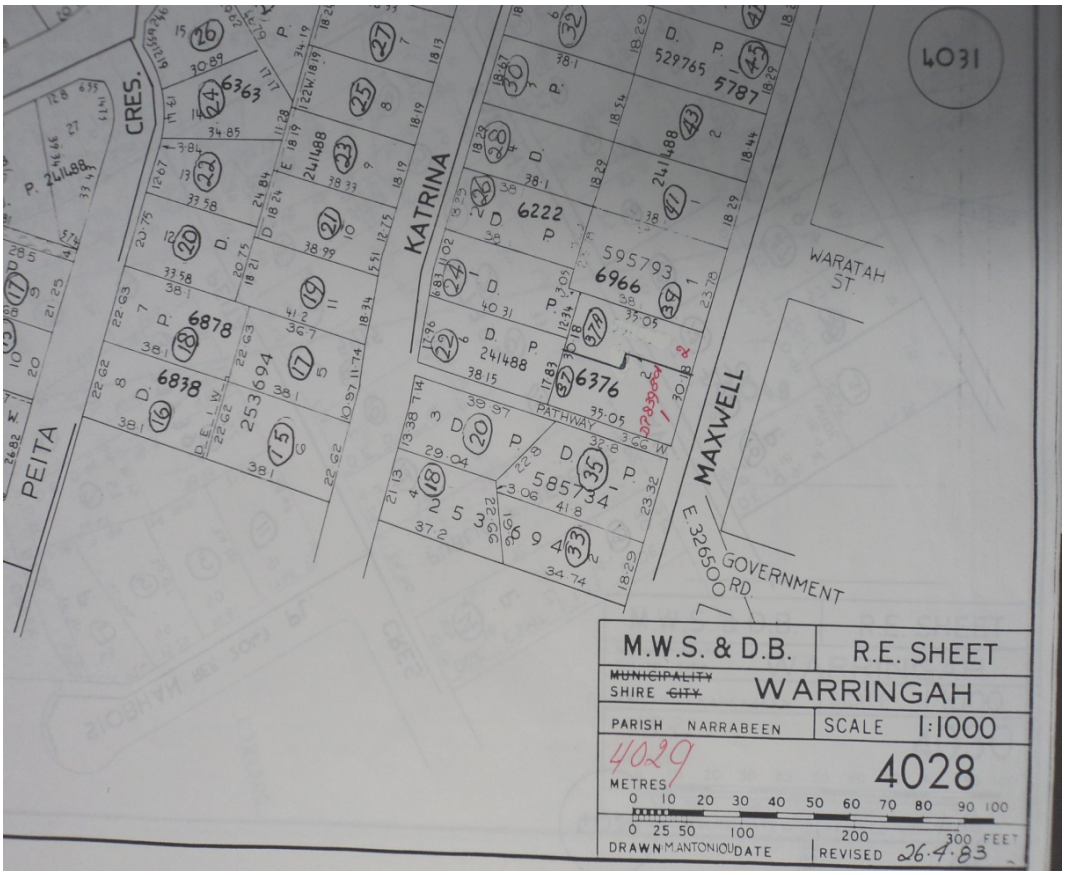



Figure 4: Charting maps.

As can be clearly seen, these maps were out of date and hard to read with the exception (perhaps) of the zoning map. The information on the maps and within the mainframe computer databases contained significant errors in relation to parcel identification, i.e. wrong lot numbers or DP numbers, incorrect dimensions and areas as well as errors in the planning attributes necessary for the production of planning certificates derived from hard copy maps. At that time, Council had placed little emphasis on the risk aspects of poor information management and poor cadastral and spatial information systems, relying on the experience of staff to identify problems and minimise errors. (Subsequently, it would be determined that errors existed in at least 70% of the land parcel information contained in the computer system.)

Additionally, the time taken to determine the information by inspection of records, checking and viewing hard copy maps was extensive. In 1992, a customer enquiry as to the factors one should take into account when making a Building or Development Application on a property required counter staff to examine a series of hard copy maps and gather other information from the mainframe computer system. This process (if it was carried out extensively) took approximately two hours to complete with a high likelihood that, during that process, an error either resulting from original information being incorrect, or misreading, would occur.

Likewise, in order to issue a Planning Certificate, each was printed on a draft based on the data contained on the mainframe computer and then laboriously checked by reference to hard copy maps. This process took several days and certainly did not provide a reasonable level of customer service. While highly experienced and expert staff members carried out the task of preparing a Planning Certificate, this process was still prone to error and there was and remains a history of significant damage cases in New South Wales as a result of inaccurate Planning Certificates being issued.

In short, the new Pittwater Council (as had been Warringah) was at risk because it had poor cadastral and planning information systems. Pity the new Manager who had to satisfy a 100.00% accuracy requirement as part of his performance agreement in the issue of Planning Certificates. As for Planning Certificates, provision of inaccurate information by staff in response to public enquiry (counter, telephone and letters) also exposed Council to risk and in fact legal actions were brought against Council on a number of occasions because of alleged inaccurate or incomplete information being provided by staff. If ever there was a reason to examine and develop a more effective cadastral and land information system, the levels of risk in providing incorrect information was it.

## 4 THE WINDS OF CHANGE

Prior to 1993 so-called Geographic Information Systems (GIS) were mainframe-based, complicated and user-unfriendly, however they were gaining recognition within the Local Government industry. The well publicised effective emergency application of GIS following the Newcastle earthquake did a lot to raise awareness. (It was perhaps no accident that a surveyor, Mr John McNoughton who was Mayor of Newcastle Council at that time, had championed the development of a GIS as an essential tool for local government.)

Coinciding with the formation of Pittwater Council was the “affordable” personal desktop computer (PC) revolution, which was accompanied by a proliferation of “off-the-shelf” user-friendly software packages. Rather than “stick” with a mainframe computer system so

prevalent in other councils, Pittwater Council quickly moved to a networked PC system, making software choices free of the information technology/mainframe "god" and the resultant decentralisation of data management. This freedom to use "off-the-shelf" software allowed Pittwater Council staff to invest in GIS systems for specific purposes. At the same time, the electronic cadastre became purchasable at a reasonable price from the State Government. Given the risks associated with the paper-based and inaccurate land information system Pittwater had inherited from Warringah, transition to a Land Information System based on an electronic cadastre, using desktop computer software systems was a logical step.

## 5 USING THE ELECTRONIC CADASTRE TO DEVELOP A COMPREHENSIVE LAND AND PLANNING INFORMATION SYSTEM

In 1994, Pittwater Council purchased the "Map Info" GIS software for a specific task associated with the Ingleside Warriewood Land Release Project. This was a joint project with the Department of Planning and involvement of State Government stakeholders. Notwithstanding the State's role in the process, it would not make the Cadastre, even for the land release area, available in electronic form and there remained resistance within Council to expenditure on something its higher level management did not understand. Rather than "stick" with the paper-based mapping systems so prevalent in the planning industry for the land release process, Council staff digitised the Cadastre for the land release area and used that as a basis for production of a series of environmental and planning maps which were printed in 1995 as the basis of the Planning Strategy. The public, government departments, Council's General Manager and the Councillors were impressed by the standard of mapping contained in the documents to an extent where, by 1995, funding had been made available for the purchase of the electronic Cadastre from State Government.

Up to this point in time, the term "Cadastre" was virtually unknown in the organisation with the closest the General Manager could get to an understanding, was to compare it with the cartoon character "Nasty Canasta". So, having bought the "nasty" Cadastre, Pittwater was able to start the process of developing a fully electronic cadastral land information and planning system.

During 1995, two things happened which catalysed this GIS programme. A new General Manager arrived. Angus Gordon knew what the Cadastre was and why it was a fundamental building block for an electronic land and planning information system. Additionally, the land information management process was decentralised from the traditional owners of data (the information technology people) and placed in the hands of those responsible for data output, including Planning Certificates and planning information, these being the most vulnerable area for Council in terms of damage claims for provision of inaccurate information. The Manager of this area of operations was a surveyor and therefore had the required skills to develop the system.

## 6 JUST HOW MUCH INFORMATION ARE WE TALKING ABOUT?

In 1995 there were approximately 100 different characteristics that might, or might not, apply to a parcel of land required to be kept by Council for the provision of information to the public and for internal use. This has now expanded to approximately 500 possible characteristics per parcel. Not only was it necessary to get this information right in the first place, it needed to be maintained.

In 1995, two fundamental procedures were commenced:
1. **Validation** of property and parcel information.
2. **Mapping** of all relevant property-related data.

## 7 VALIDATION: WHAT AND WHY?

Council's electronic cadastral information contained in its databases was based on Valuer General information, lot/DP, parish/portion, etc. Additionally, owner and property details were attached to this. Council had 25,000 properties and, on initial comparison, only 70% were able to be precisely matched to parcel information contained in the electronic Cadastre. This was not unusual, with some councils in rural areas having more mismatched information.

Why was this information so poor? The Valuer General system was property-based and did not necessarily relate to individual land parcels. Much of the information was out of date and had certainly not been maintained, this not being considered important by the previous managers of the databases. Additionally, the Valuer General information did not contain any reference to most Council-owned and Government-owned land.

Council commenced the validation process based on prioritising privately owned land, then looking at Council and State owned land. The initial phases of this were completed by 1998, with all privately owned land in the local government area being clearly linked between the electronic Cadastre and the textual database systems. During this process, a system for maintaining the database was also implemented, to ensure that information remained 100% correct.

It is interesting to note that the validation process is still going with some 25 parcels (generally small residues) still remaining to be identified. This process identified a number of land parcels that Council thought it owned but in fact it did not. Most of this land was in drainage reserves or public reserves, some of it extremely valuable land (just how much is a 1,000 m² lot overlooking Bilgola Beach worth). An off-shoot of the validation process was Council began a process of applying through the various mechanisms open to it, to become the owners of that land. Some 1.6 ha of land, not previously formally "owned" by Council, has thus been transferred to its ownership. It is hard to imagine the public uproar that would have occurred if these parcels of land (which form an important part of Council's reserve system) had been lost from public ownership.

## 8 MAPPING

Rather than wait for the validation process to be completed, in 1995 Council simultaneously commenced the mapping of all relevant spatially based land data. This includes:
- Zoning
- Hazards
- Local Environmental Plan (LEP) clauses
- Development Control Plans (DCP)
- Biodiversity data

By 1996, there were runs on the board. In the simple "work space" created by overlaying these map layers over the electronic Cadastre, staff could "interrogate" any land parcel in Pittwater to determine its zoning, the hazards that affected it and the planning information which related to it. Associated with this information set was a printout of the zoning map.

This process could now be achieved by staff at their desk, or at the counter, in response to an enquiry in less than two minutes, achieving a considerable reduction from the 2-hour process that previously existed. Customer satisfaction was immediate. Local valuers and architects began to provide comments to Councillors and the General Manager as to just how effective this system was. Customer service had made a huge leap forward as rapid and accurate supply of information was now available.

## 9 A NEW SYSTEM BASED ON THE CADASTRAL DATABASE

In 1997, Pittwater Council installed the "Proclaim" system which significantly increased the capacity to electronically utilise land parcel database or cadastral information in various applications including automatic production of Section 149 Planning Certificates, building and development processes and planning processes, and links to record systems.

## 10 DIGITAL AIR PHOTOGRAPHY WITH A CADASTRAL OVERLAY

In 1998, Council received the first digital rectified aerial photography which could be utilised in conjunction with the Cadastre for a range of purposes. As has subsequently been demonstrated by the success of Google Earth and Google Map, staff and the general public had no trouble at all relating to an aerial photograph and, when overlaid with Cadastral information with a reasonable degree of accuracy, this becomes a really useful tool, both within Council and for its external customers.

## 11 AN ELECTRONIC ZONING MAP IS GAZETTED

By 1999, Council had produced an electronic version of its Local Environmental Plan (LEP) map and had that gazetted, thus replacing the original pencil and coloured-in map that it produced in a hurry in 1993 and had relied on since.

## 12 ELECTRONIC PLANNING CERTIFICATES, FILES AND INTERNET MAPPING

By early 2000-2001, Pittwater was producing Planning Certificates totally reliant on electronic data with no manual checking or input. Electronic file management had commenced. "Encounter" was introduced, making GIS mapping publicly available via the internet. Valuers, architects and the like did not even have to come into the Council to obtain accurate land and planning information on a parcel by parcel basis. All of these systems relied on the underlying electronic Cadastre.

By this time all privately owned land was 100% validated in both the textual and GIS systems, electronic record systems were linked to properties and the organisation had learned to trust its electronic Cadastre and land information system.

## 13 CATHARSIS IN PLANNING

Just after the beginning of the new millennium, there was a considerable dissatisfaction arising at Pittwater and across the State with the NSW Planning System. Planning departments were being termed "toxic environments", there was a shortage of planners and turnover was high. Average employment periods for planners was less than two years and the current belief was that a new Town Planner would take at least six months to become operational. Why?

Many reasons were provided as to why the planning system was failing and the environment for planners unacceptable, however my view is that the complexity and inability to easily access planning information was a major contributor. In Pittwater, there were 25,000 parcels upon which a landowner might be able to do some of 100 possible development types. For each land parcel (depending on where it was) State and Council planning controls and hazards applied up to 400 controls that may or may not apply to a particular development on a particular site. This matrix gives a range of approximately one billion possibilities. Planners were expected to be able, without error, to assess and determine a development on a parcel of land taking into account these factors. Clearly, an almost impossible task resulting in errors, delay, frustration and dissatisfaction.

Additionally, councils held planning and development information close to their chest for years, often preferring to sell hard copies of planning controls in an effort to recover the cost of their productions rather than make them readily available. With the tools that it had amassed through the validation and mapping processes, Pittwater Council realised that it had the opportunity to develop what is now referred to as "e-Planning Systems". It was simply a matter of finding a software provider.

## 14 DA TRACKING

In 2003, Council met and formed a relationship with "Infomaster" and, within five months, had an internet-based development application tracking system available on the internet (Figure 5).

This system was a "first" (Figure 6) and is now considered best practice in local government but, at the time, was a brave step with Council criticised for making available information that should, in some people's minds, remain behind locked doors.

The immediate benefits of this system were:

- Reduced telephone calls.
- Improved performance by staff who now were transparently responsible for the process.
- Better liaison between applicants and their neighbours: With applicants now knowing that their neighbours could easily scrutinise their development, there was far more likelihood that there would be consultation prior to, or in the early stages of, the application leading to a reduced number of objections and better overall customer satisfaction.

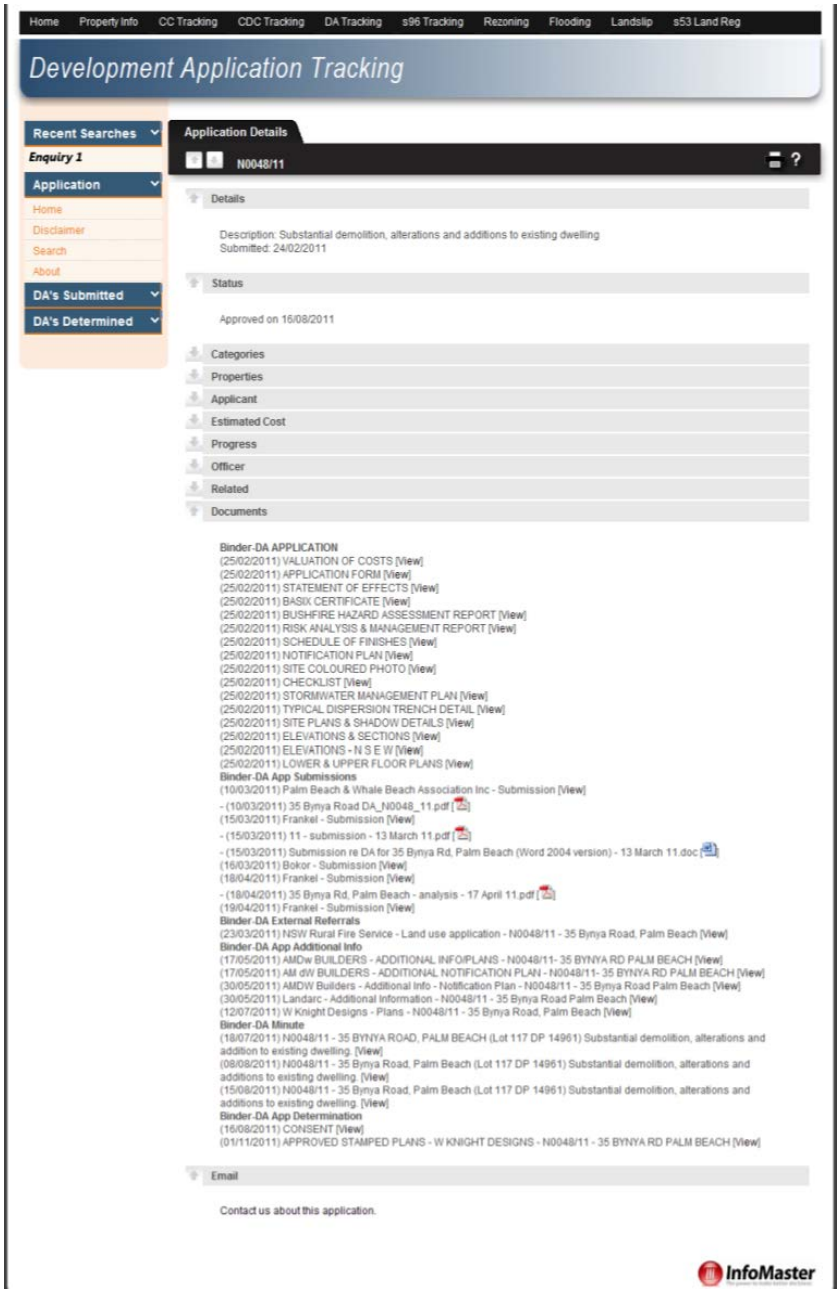


Figure 5: DA tracking.

It is no secret, however, that various people tried to have this system pulled down on the basis of privacy legislation. Whilst steps were taken to overcome this, there remained significant disparity between obligations to Council under various Acts including the Environmental Planning & Assessment Act which requires development information to be public, the Local Government Act and privacy legislation which place embargoes on provision of information. It was a matter for State Government surely to recognise that the e-world has arrived, and refresh its legislation accordingly (I am still waiting).


Figure 6: API award to Pittwater Council.

## 15 PLANNING CERTIFICATES ONLINE

Simultaneously, and utilising other internal systems, Council made its Planning Certificates available in real time by internet application. Pittwater Council was the first to do so and, within a relatively short period, over 50% of 149 Certificates were being issued in real time over the internet. As of this date, 70% of Certificates are issued in this way with not a single action being taken against Council in relation to the issue of a single Certificate on the basis of inaccurate information. Each of these Certificates is issued in relation to an individual lot and a Deposited Plan, again reinforcing the fundamental basis that the Cadastre performs in these electronic services.

It is interesting to note that on commencing the process, a person from another council rang up and asked “how could we sleep at night” knowing that certificates were not being manually checked prior to issue? That council still has not developed the capacity to issue electronic certificates and relies on manual checking. The response is clear. How can they “sleep at night” taking the risks they do with record systems so inaccurate that they have to manually check the certificates prior to issue, sometimes taking two to three days, and surely far more susceptible to error than certificates electronically produced using information systems which are well maintained?

## 16 INTERACTIVE PLANNING INFORMATION (ENQUIRER)

The other major complaint about planning was that no one could ever find out what information they needed to take into account in lodging an application. In February 2004, Pittwater Council launched its internet "Enquirer" service whereby an applicant could nominate a property by lot number and DP number or address, select the development type that they wished to carry out from a list, and receive a property/development specific list of the controls that applied together with the information they needed to submit with the application. Again, this was a "first" in e-Planning Systems (Figure 7).

The 'toxic environment' was starting to break down as not only did the applicant receive this information, the same information source was used by staff who would carry out the assessment: a level playing field between applicant and Council assessment staff was in place.


Figure 7: PIA award to Pittwater Council.

The concept of a planner having to spend six months learning "rafts" of paper-based planning information prior to becoming effective had been "put to bed". New planning staff were now able to rely immediately on the electronic system in terms of the controls that they had to take into account in an assessment and did not have to learn "reams" of hard copy Development Control Plans. Additionally, all staff could be certain that, if they addressed the controls specified for the site/development specific application, they had not missed anything out. This significantly reduced the "toxicity" of their work environment and, together with the improved customer satisfaction and communication provided by the DA tracking services, the enmity between Council staff and customers was decreasing, making the work environment significantly more pleasant.

## 17 QUALITY ASSURED ELECTRONIC ASSESSMENT

In 2005, Council carried e-Planning a step further. It introduced a complete electronic assessment process for use by staff whereby the controls that applied were generated for each specific development and staff could work through a sequence of "screens" to complete their assessment. At the end of this process, staff could readily check that they had addressed all relevant issues and a report and conditions, and consent (or refusal) was automatically produced. This electronic process was in fact a quality assurance system which could never be equalled in the manual systems (Figure 8). This system has been working effectively for approaching seven years and, again, significantly improved the work environment of staff.

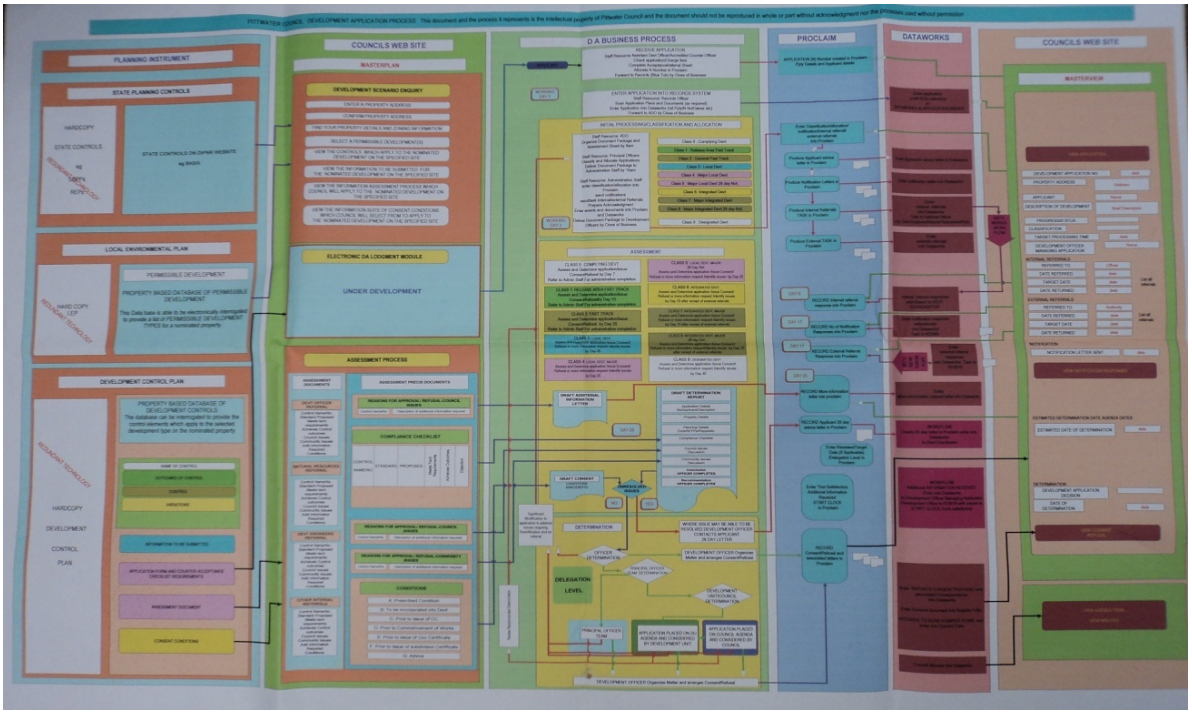


Figure 8: Old manual system.

## 18 ELECTRONIC LODGEMENT

In 2006, Council introduced an electronic application system which allowed applicants to in fact forward an electronic application into Council for a particular development.

## 19 THE ROLE OF SURVEYORS

All of these e-Planning Systems as well as many other Council functions rely on the underlying cadastral and land information systems. From inception in the mid-1990s to present, management of the development of these processes and maintenance of the information has been overseen by a surveyor and specialised staff under direct management. Without a comprehensive understanding of what constitutes the Cadastre and how it needs to be maintained, these systems would quickly become unreliable. It is not difficult to imagine the consequences of *not* having a surveyor involved in these processes.

## 20 CONCLUDING REMARKS: WHERE TO FROM HERE?

With increasing State involvement in planning through Exempt and Complying Development provisions, a raft of State Environmental Planning policies and other statutory requirements, together with a clear need to improve the planning system including the introduction of new legislation, it is clear that refined electronic planning systems should be available across the State. This cannot be achieved without an agreed Cadastre commonly available through a variety of portals.

With possibly hundreds of planning attributes applying to each parcel of land in NSW, the concept of a fully maintained centralised system is simply not achievable. However, if one accepts the concept of data being managed in a variety of sites and viewable through a common "window", it is simply a matter of organising access to various information layers and establishing a way that those responsible for creating and maintaining that information can do so at their site while making it available through an overall portal(s).

The SIX system (LPI, 2012) already provides such an avenue. Individual councils could elect to use whatever layers of the SIX database they wish, and then provide other layers of information into a single State Planning suite of layers. Anyone wishing to view the information would obtain that information, regardless of where in the State it lay. Using such a system, one could enter property details (lot number and DP number or address) and obtain a list of the land and planning characteristics for the land together with a range of development options, either State specified or locally Council specified. On choosing the development type in which they are interested, they could then determine the appropriate controls and requirements and progress to an electronic lodgement system.

Post approval management and recording could likewise be achieved. A basis for such a system would be an agreed "State Planning Cadastre" and an appropriate administration process. Various sections of the Cadastre could be administered by the State at local council level, depending on the level of attached information Planning "layers" administered by the relevant authority, for example:

- Rural Fire Services NSW would administer the Bushfire Hazard layer.
- Department of Planning & Infrastructure would administer State Policy layers.
- Councils would administer layers applying to their local area.

The benefits of such a system go well beyond planning development, but that's a good starting point.

## REFERENCES

Governor's Declaration, 24th April, 1992, Local Government Act 1919 – Proclamation *New South Wales Government Gazette No.51*.

LPI (2012) SIX – Spatial Information Exchange, http://six/wps/portal/ (accessed Feb 2012).