

Paperless e-surveying with Mr Laptop Surveyor

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SUMMARY

The South Australian surveying consultant is fortunate in his professional career to have hung ten riding the greatest technological survey wave ever experienced by land surveyors.

Now able to combine e-field and office technology and e-integrate with the South Australian state government departments, to divide a parcel of land with out the use of a single sheet of paper.

Partake in the laptop e-journey from the first email from a client requesting a land division, using the online state government facilities to assess feasibility, before preparing a CAD plan and lodging with the State's Planning Authority for assessment by the appropriate authorities.

Then after gaining conditional approval complying with the conditions, the electronic field surveying, using plans downloaded from the Lands Titles Office (LTO), preparing a CAD survey plan for electronic lodging in the LTO for examination and approval and finally the issue of the electronic title by the LTO.

Yes, all possible without the use of a single sheet of paper. Well, perhaps just one....

(The presentation will be on the eve of the 32nd anniversary of the author becoming a Licensed Surveyor.)



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1. INTRODUCTION

This e-journey has its origins in 1829, within the walls of England's Newgate Prison, where Edward Gibbon Wakefield conceived his principles for colonisation of South Australia.

His four principles were,

- Uniform disposition by grant, instead of by gift, or reward for services performed.
- Absolute freehold of the land to be granted, on condition of an uniform rate of deposit to an emigration fund.
- Such rate of deposit to be determined by the cost of conveyance to the colony of the number of mechanics and labourers required for the cultivation of the land granted, and for the general purposes of the community.
- The emigration fund so raised to be expended in the conveyance to the province, from Great Britain or Ireland, of young healthy poor persons of both sexes, in equal proportions. (Gouger 1837)

The planned colonisation of South Australia enabled orderly settlement with land boundaries surveyed and the survey plans prepared before the land was occupied by pioneering settlers.

As a consequence of colonisation, the capital city of South Australia, Adelaide became the second city in the world to be planned and surveyed before occupation. The first Surveyor General, Colonel William Light selected the site of the capital city adjacent to one of the state's few watercourses. With a team of 10 assistant surveyors and 30 labourers they surveyed 1,042, one-acre city allotments in a uniquely distinctive grid pattern in a period of two months before surveying rural sections of virgin land for settlers undertaking agricultural pursuits.

The new state adopted the traditional English system of land conveyancing, where land ownership was established by the production of validated deeds tracing the chain of ownership documents to the person who wished to dispose their interest.

<http://adbonline.anu.edu.au/biogs/A020510b.htm>

2. THE BIRTH OF THE TORRENS TITLE.

As a result of significant fraudulent land ownership documentation, expensive legal costs and delays associated with the transfer of land, Dr Ulrich Hubbe, a Doctor of Civil and Canon Laws from the Kiel University in Germany, saw merit in the introduction of a simplified system of land conveyancing. In July 1856 Robert Richard Torrens, a Master of Arts graduate from Dublin University proposed to the South Australian Parliament a land reform measure based in part on the English Merchant Shipping Act 1854, for ship registration.

In 1857, following unprecedented public pressure the South Australian State Government passed the Real Property Act (RPA).

This revolutionary method of recording and registering freehold title in land introduced a system for

- the issue of government certificates, which provides a conclusive indefeasible title
- the establishment of a central register to provide legal certainty to the registered ownership and
- a state-guaranteed registration, evidenced by a certificate, which reflects the exact state of the title at any moment in time, with all relevant interests noted sequentially.

The RPA established the Lands Titles Office (LTO) with public access, as a central registry office for survey plan lodgement (filing) and land title production. This resulted in the reduction of dispute litigation, avoided the consequences of lost certificates, and greatly reduced the costs of land sale transfer.

The recording and registering of land transactions was quickly named the Torrens Title System, making title to land depend upon registration and not upon the execution of documents. The execution of title deeds (for example, transfers, leases and mortgages) was to be merely the means of obtaining registration and was not intended to affect the land or pass any estate or interest until registration. Problems caused by fraud, mistake or error are resolved by reliance on an assurance fund.

The first certificate to issue for a free hold land parcel of land was the Land Grant which alienated the land from the Crown.

The original certificates of title were handwritten on blue linen and produced in triplicate. The original certificates were stored in the LTO as a public record in bound register volume books. The duplicate certificate of title (CT) was provided to the registered proprietor if the land parcel was unencumbered or to the registered mortgagee. A third copy of the CT was stored off site in a different building in case of fire, loss or theft of the original. A series of volume books stored 999 folios, such that every created land parcel received a CT reference, uniquely identified by the book's volume and the folio number. (E.g. volume 234 folio 56.)

When a document affecting a CT, for example discharge of mortgage or registration of a new registered proprietor was lodged in the LTO the date and time was immediately recorded and entered into a sequential unique numbered journal. After the lodging of the documentation it was assessed and examined by a document examiner to ensure the registered conveyancer properly executed the document with correct terminology, spelling, consent signatures and ownership names. Once approved the document number and its purpose was then recorded on the three CTs. Initially the original documents were stored and available for public access. These documents were microfilmed in the 1970's

In the 1990's the information on the CT was captured electronically in what is called the Torrens Automated Title System (TATS). This is now the legal title register. The paper certificates were scanned to provide historical title information and are available at a fee as PDF files.

LAND SERVICES GROUP.

The adoption of the Torrens Title System established a central managing authority. Originally this was the Registrar-Generals Department and today is known as the Land Services Group (LSG), which is the key land administration agency within the South Australian Government. It is responsible for land titling, land and property valuation, cadastral and geodetic survey framework and the management and provision of land information.

The LSG in Adelaide has implemented standards of record keeping and a facility for the dissemination of that material. The central location, automation of land transactions, ownership and valuation information makes the South Australian land administration an extremely accurate and valuable information tool.

Services include the sale of

- electronic copies of approved survey plans recorded in the LTO for Licensed Surveyors (LS) to assist them in defining land parcels
- all property sales data for property valuation and tax purposes and
- digital cadastral database for land information systems.

Also included, is the work commenced in the 1960s by the far-sighted Surveyor General George Kennedy who proposed the introduction of a coordinated cadastre. Given that the electronic distance measuring (EDM) of the day was the cumbersome Tellurometer and that computers were in their bulky infancy the magnitude of the project was daunting.

Nevertheless, successive state governments have allocated funds to enable the integration of the cadastral and geodetic systems through permanent mark maintenance funds to enable the integration of the cadastral and geodetic systems.

The advent of the electronic era with the total station, global positioning system (GPS) equipment and desktop computer have revolutionised the coordination and recording processes. Today all boundary survey plans lodged for approval in the LTO tie into a minimum of three of these coordinated permanent marks so that the plan can be coordinated. Much of metropolitan Adelaide, especially the newer suburbs, could be declared a coordinated cadastre, where boundary coordinates by law provide *prima facie* evidence of the position of the boundary.

South Australia will not be the first place in the world to adopt a coordinated cadastre, but combined with its Torrens Title System of land registration it is arguably one of the best land registration and land information system in the world.

This central land registration system has enabled others associated with land development to utilise this resource to develop their own interactive land information systems.

Sadly for countries to change to this efficient land registration and transfer system it would be a mammoth task. Requiring both the land ownership documents to be proved and the physical definition of the described parcel to ensure that there are no overlaps of land parcels.

California for example, only 50 years after becoming a state endeavoured to introduce the Torrens Title System but found it too expensive and cumbersome to implement.

<http://www.landservices.sa.gov.au/AboutLSG.asp>

3. PLANNING IN SOUTH AUSTRALIA

In South Australia there is a central planning authority, the Department of Planning and Local Government that incorporates Planning SA, which is the State Government's advisory agency on land use planning, development policy and strategy, the building code, urban design and open space policy. This body makes recommendations to the Development Assessment Commission (DAC) on major developments. The DAC acts as the central registry authority for the lodging and coordination of all land division applications in South Australia.

The state of South Australia is divided into 74 local government areas, their size dependent on population density, such that the suburban local government areas are relatively small in area compared to their rural counterparts. Local governments, traditionally known as Councils raise revenue from property rates/taxes and government grants to pay for road maintenance, waste disposal, local public amenities and on-going local planning and development. They are responsible for implementing local development plans, assessing land division applications forwarded from DAC and the subsequent orderly development of the land.

4. CO-REGULATION SURVEYING SYSTEM

In South Australia only annually licensed, Licensed Surveyors can undertake cadastral surveys. A co-regulation surveying system has operated in South Australia since 1992, where the regulatory responsibility of the surveying profession is shared between government and industry.

The Surveyor's Board is a subcommittee of the Institution of Surveyors Australia, South Australia Division Inc. and is responsible for setting standards of accreditation for the licensing, registration and training of surveying graduates and any other obligations of the Division under the Survey Act. The Survey Act and legislation under the responsibility of the Minister for Department for Transport, Energy and Infrastructure and the Surveyor-General, who is responsible for issuing, monitoring and policing survey practice standards. The co-regulated survey system is financially independent as revenue is raised from a levy charged on all certified survey plans lodged at the LTO.

5. THE GOOD OLD DAYS

The "good old days" at the end of the sixties.....tedious, laborious, repetitive with simple proven tools of surveying such as the iconic Wild T1A, 5 chain invar, 300 foot invar, the spring balance, plumb bob, chaining arrow, pocket tape, two assistants, field book, lead pencil, six figure log tables, protractor, scales, Rapidograph pen and blue linen all combined to introduce a young graduate into the golden era of surveying.

6. THE LAPTOP e-JOURNEY

Now let us observe a modern solo practising cadastral Licensed Surveyor in the laptop e-journey from the first email from a client requesting a land division, using the online South Australian government facilities to assess feasibility before preparing a CAD plan and lodging with the planning authority for assessment by the appropriate authorities. Then after gaining conditional approval, complying with the conditions, the electronic field surveying, using plans downloaded from the LTO and preparing a cad certified survey plan of division. Applying for the land division approval, electronically lodging the certified survey plan of division in the LTO for examination and approval before the issue of new electronic titles.

All with out using a single sheet of paper... Well until the very end of the process, when it is past the surveyor's normal role.

7. THE MINOR LAND DIVISION PROCESS IN SOUTH AUSTRALIA

The minor land division creates a maximum of five allotments with out creating a road.

7.1. The land surveyor's role.

There are three stages in the minor land division process in South Australia

- Initial research, preparation and electronically lodging a planning application plan with the DAC and communicating with authorities.
- On gaining conditional approval, carry out field surveying and prepare a certified plan of land division and coordinate the implementation of the conditions imposed on the land division application and
- Electronically lodge the certified plan of division in the LTO for examination, approval and issue of the new CTs and liaise with conveyancer or solicitor to lodge appropriate ownership and mortgagee consents and if appropriate easement creation documentation.

Generally, there is a 6-month's minimum period from lodging the land division application to the issuing of new CTs.

7.2. Client request.

Initial client contact is generally by telephone or email, culminating in the client emailing property description details, instructions on the proposed land division and a request for costing purposes.

7.3. Access Internet servers on the laptop for preliminary investigation.

The e-era has enabled South Australian government departments to create their own specialised data base resource from the accurate plot of the individual parcels of land entered into the LSG's Digital Cadastral Database (DCDB).

The DCDB is a spatial representation of the legal land parcel boundaries within South Australia and comprises around 920,000 land parcels, together with their legal identifiers, which are generally an allotment in a deposited plan, a filed plan or a section in a Hundred plan. The later being the historical referencing of land, where originally a number of sections were created in a Hundred to enable 100 families to receive a viable income from agriculture.

The positional accuracy of the DCDB's boundary corners depends upon the original scale of the source maps and digitising process. Today, in selected areas the spatial integrity of the DCDB is progressively being improved by generating survey accurate boundary coordinates from coordinated permanent survey marks that are tied by measurement to the lodged and approved survey plan.

http://www.deh.sa.gov.au/mapland/pdfs/dcdb_factsheet.pdf

7.4. Government Agency databases.

The following agency sites are electronically accessed for preliminary information.

7.4.1. Property Assist.

The LSG's Property Assist provides land and property information via the internet necessary to process property transactions. Generally, the client supplies one or more property descriptions that include the CT reference, volume and folio, existing allotment number and plan reference and or street name and number. Accessing Property Assist confirms property description or enables property description to be obtained. It also contains a layer showing all coordinated reference marks and the abutting and adjacent plan and allotment references.

<http://www.propertyassist.sa.gov.au/plb/index.html>

http://www.landservices.sa.gov.au/5Publications/Brochures_and_Fact_Sheets/files/3_PropertyAssist.pdf

7.4.2. Atlas of South Australia.

The South Australian Government implemented a facility named the Atlas of South Australia to provide a common public access point to interactive maps and geographic information. Atlas has around 175 information layers about South Australia. Individual parcels are located by entering a township name, suburb name or area location and then zooming in to the particular subject land parcel.

For users associated with land division one layer is associated with local government development plans and displays associated local government area, appurtenant development plan map reference, land zoning, adjacent land divisions, property description and area and a facility to measure approximate boundary dimensions.

<http://www.atlas.sa.gov.au/>

7.4.3. Google Earth.

Google Earth is a useful resource for the land surveyor as it has enabled desktop visitation to the site. Generally while the photography is neither the latest or accurately scaled it still enables proposed allotment dimensions to be determined by measuring from existing features.

7.4.4. Council development plan for zoning policy.

With Atlas providing the zoning data the latest copy of the local government area's development plan in PDF format is downloaded from Planning SA website. The relevant zoning information is then checked to determine if the proposed subject allotment is suitable for land division. Relevant matters for the designated zone include minimum allotment dimensions of depth, width, area and future land use.

<http://www.planning.sa.gov.au/index.cfm?objectid=9508F3E3-96B8-CC2B-633BE6E12F125D23>

7.4.5. SA Water

SA Water provides and manages water and wastewater and associated infrastructure and for all land divisions provides new services where economically viable.

SA Water provides a restricted licensed website access to land surveyors, engineers, contractors and plumbers to access water and sewer mains records to determine if the subject land abuts and/or is connected to their existing services. Where mains exist this generally enables the immediate financial determination of standard charges for additional water and sewer main connections. The water and sewer records in PDF format for the subject parcel of able to be downloaded directly from their site.

7.5. Costing letter.

Utilising the above information enables the preparation of a standard minor land division costing sheet proposal for the client. Generally, an existing road and service infrastructure about the land, therefore compared to a major land division fewer services are required. The emailed PDF attachment proposal also includes terms and conditions of engagement and seeks email confirmation for the formal land division process to commence.

7.6. Order copy of the CT.

The latest copy of a CT is obtained from the LSG's online Property Assist site by entering the volume and folio reference, allotment and plan number, or street number and address. The selected CT purchased on an authorised account or online by credit card is then automatically emailed to the purchaser. Often the CT contains sufficient boundary data to enable the preliminary division plan outer boundary to be drawn.

<https://www.propertyassist.sa.gov.au/pa/pubquery.phtml>

7.7. Order Survey mark information.

The forward thinking LSG established an electronic survey mark data base, so that today the survey data base stores 170,000 permanent survey mark (PSM) coordinates, elevation values, accuracy statements and descriptive information about PSM location, together with cross references to connecting certified plans of surveys.

These recorded coordinates are adjusted into the Australian Map Grid. Generally, PSMs in suburban Adelaide (with 1.2 million of the state's total population of 1.6 million) have acceptable third order or higher accuracy.

The individual PSM numbers surrounding the land division allotment are obtained from the

LSG's Property Assist plot, which then enables accessing specific PSM record to obtain the plan numbers of the certified plans of survey that tied into the PSM.

These certified plans can then be viewed on the LSG's Plan Index, Enquiry and Retrieval System (PIERS) and ordered if relevant. If an authorised account holder or if electronically paying by credit card the ordered plans are then automatically emailed a TIFF formatted file.

http://www.landservices.sa.gov.au/1Online_Services/40Survey_Database/0default.asp

7.8. Preliminary fieldwork location levels and or features.

On occasion preliminary fieldwork is required to establish the proposed new boundary line. Significant trees, existing buildings, fences, natural physical features may be located and/or elevations of points determined in the Australian Height Datum and referenced to the proposed new division boundary.

Having electronically recorded all surveys since 1990, I have developed systems to do away with traditional data recording in a field book, so that years after the survey the field data file can be accessed and point coding and numbering confidently examined. While the paper is written to say that it is possible to not use a sheet of paper in the part played by the LS in the land division normally a sheet is used to sketch traverse points and note point codes and complex boundary corner occupations.

If the land division is known to meet planning requirements and initial fieldwork is required then it is economically prudent to extend the initial fieldwork to locate all the information to enable the final certified division plan of survey to be produced.

The LS ties the surveyed data into a minimum of 3 PSMs. Today the total station enables feature coding to be stored onboard and accessed by menu selection, so that instant point location and feature line strings are visible on screen.

On completion of the field surveying the data is electronically transferred to the laptop computer and accessed from a surveying software package, such as Liscad. The surveying package has features to enable, data transfer, editing of the raw data, verification of coding format, traverse adjustment and reduction of the formatted data to coded coordinates points and strings.

Existing CT and certified survey plan point data is then added manually in the calculations module. That existing data is rotated to and adjusted to Australian Map Grid (AMG), 1994 PSM Coordinates. The plane /grid distance comparison is a simple exercise. The field data is then rotated with the LS nominating either adjusting the fieldwork to fit the network control PSM or selecting one PSM for origin and a second for orientation. While coordinates are grid, cadastral plan data is derived from ground coordinates.

The LS then redefines the existing road and allotment boundaries from the located coordinated and coded evidence in accordance with the principles of boundary definition.

The surveying software allows the plan data to be compiled and output to CAD where the line work and text are a meaningful plan. That plan is then pasted into a template sheet to produce a certified plan of division diagram sheet, all in accordance with the LSG guidelines, available in two electronic volumes, the Plan Presentation Guidelines and Cadastral Survey Guidelines.

If there is uncertainty in gaining approval and the division does not require accurate initial fieldwork then a proposal plan is a simple CAD produced sheet with basic information suitable for seeking conditional planning approval and field surveying. Either way, the plan is referred to as the land division proposal plan. The proposal plan is then output as a PDF document and a textual sheet generated from property data entered on the LSG's electronic plan lodgement server (this is covered later) to form the land division planning application.

The client is then forwarded an email with attachments containing a PDF copy of the proposal application, an invoice and request for the DAC lodging fee.

http://www.landservices.sa.gov.au/5Publications/Surveying-Drafting_Manuals_and_Guidelines/0default.asp

8. THE EDALA SITE.

Access to the DAC's Electronic Land Division Lodgement website (EDALA) is restricted to approved lodging parties who can add and review documentation placed by the authorities associated in the land division process.

EDALA has a web access link to all lodged land divisions to enable the public to review the progress of applications. The public are restricted from viewing all communications and plan details.

<https://www.edala.sa.gov.au/edala/EDALAView.aspx?PageMode=ApplicationDisplayView&ApplicationId=30074>

8.1. Upload property and applicant information, plan and subject CT

On opening the EDALA site the "new application" menu opens 6 pages to enter data for, type of land division, lodging agent details, applicant, landowner, property and title description, development description, total land area, number of existing and new allotments to be added, so that it then appears in a view like the public access link.

A PDF file of the land division plan, certificate(s) of title and accompanying supporting information are selected from the laptop job file and uploaded. The data fields are then automatically verified to insure they all contain information. The entered CT reference is automatically cross-referenced with Piers and Property Assist records to verify the entered allotment and plan data is correct.

To enable site access to the proposed land division application prior to submitting to formal lodgement an unique identification number is generated.

8.2. Electronic transfer funds

EDALA have a designated site where direct debit or credit card payments of the lodgement and handling fees are made after the lodgement verification. On receipt of payment a development application number is automatically generated which signifies the land division application is formally lodged. This number is composed of three sections, the local government authority (LGA) reference number, the sequential application number for that particular LGA and the year lodged. (E.g. 312/D007/09).

Notification of new application to authorities.

After the application is lodged the DAC electronically forward notice of the new application to the lodging surveyor, SA Water, the LGA and if the subject land is affected by significant matters such as aboriginal heritage and or native vegetation, to their respective authorities. Notified authorities then electronically access the application on EDALA to down load a copy of the proposed application plan and the relevant information lodged.

9. THE CONSULTATION PERIOD.

The LGAs and the relevant authorities have 90 days to determine their conditions for supporting a conditional planning approval or a refusal.

9.1. DAC communicate requirement to LGA.

After the application is lodged, the DAC email the LGA requesting as a condition of their approval that the applicant pay a prescribed open space contribution for each additional new allotment created under one hectare in area.

9.2. SA Water assesses feasibility and determination fee.

SA Water requires a standard fee contribution for each additional water and sewer connection and if the existing mains require extension, it is then a determined share of construction cost. Should internal sewer and water pipes cross a proposed new boundary, then SA Water require that they be severed. SA Water simultaneously email the cost information and any additional requirements to the lodging surveyor and access the application on EDALA to state that they will clear the land division when the requested fees are paid and all conditions met.

9.3. LGA supporting information.

On occasions, the LGA or other authorities require additional supporting information or request variation to proposed boundaries. The lodging surveyor is advised by email and emails a response to the relevant authority. If boundary information is changed an amended plan is uploaded on EDALA. DAC then notifies the authorities to access the amended plan.

9.4. Responses.

All authorities receiving the application then electronically submit their report to the application on EDALA site with required conditions or alternatively propose that the LGA refuse the application. DAC notifies the LGA by email to access the application on EDALA and down load the reports.

10. LGA ARE DECISION MAKERS.

The LGA have a planning department to assess and coordinate land divisions. If the application is complying with the development plan then the appointed planner has delegated power to grant conditional approval for the land division.

If other authorities express concerns for approving the land division and/or the land division applications is at variance with the development plan, then a development assessment panel that consists of elected LGA members and local independent planning professionals assess the application.

If a land division application is refused or the applicant aggrieved over the conditions an appeal can be made to the Environment Resources and Development Court for the LGA decision to be reversed.

10.1. Attend to conditions.

The applicant has three years to complete the land division conditions before applying for the DAC certificate of approval. Generally applicants are eager to minimise the time delay between conditional approval and the certificate of approval. The normal conditions associated with minor land divisions include those imposed by SA Water, the open space financial contribution for additional parcels created under 1 hectare and the LGA for allotment compliance.

11. PREPARE CERTIFIED PLAN OF DIVISION.

The certified plan of division is normally carried out after conditional approval because of uncertainty of gaining conditional approval. (See **8.8 Preliminary fieldwork location levels and or features.**)

11.1. Upload onto Electronic Plan Lodgement site.

In 2008 the LSG introduced Electronic Plan Lodgement (EPL) in South Australia. This replaced the long-standing method of physically lodging survey plans hand drafted or plotted on a film sheet. As the film sheet was approximately twice the size of A3, it required scanning to A3 size TIFF file for practical data transfer and reproduction. These survey plans combined the diagram, textual data and certification on a single sheet.

LSG's electronic plan lodgement server enables the Licensed Surveyor to compile survey plans for lodgement and PDF file for distribution to DAC and client.

The electronic plan consists of two components the textual sheet(s) containing tabulated data and the diagram sheet(s) containing the plan, making electronic plans a minimum of two sheets. The sheet size if printed to scale fits A3 paper.

http://www.landservices.sa.gov.au/1Online_Services/35Electronic_Plan_Lodgement/0default.asp

11.2. Textual sheet.

The textual sheet contains the narrative text associated with the plan. This information is added by accessing the nominated EPL web site and following the menu prompts. The required information includes: plan purpose, area name, map sheet reference, Council (LGA), subject land's last plan reference(s), development application number, sheet of total sheets, version number, agent details, surveyors certification, subject land title reference(s), other title(s) affected, easement details and annotations.

The two most significant changes are the replacement of the reproduction of complex easement notes with a simplified tabulation of easement information and plan certification without a signature. For the LS to certify plans the LSG initially required the LS to sign a security document confirming they are a Licensed Surveyor before authorising and issuing a unique access code and password to initiate plan certification.

11.3. Plan sheet.

The plan sheet contains the diagram of the survey CAD drafted in accordance with plan presentation guidelines. (PPG) this includes, but is not limited to, allotments, dimensions, easement data, area, boundary occupation, abutting plan references, reference marks and table, bearing datum, text size, line weight and north point. The final plan CAD sheet is, generated from my Liscad format is printed as a TIFF file and uploaded on the EPL plan lodgement site.

11.4. Provide draft plan of division and marks placed.

Once uploaded the combined electronic plan is certified from the EPL site. This enables the downloading of a draft unapproved PDF file combining the textual and plan diagram sheet.

The generated EPL plan does not require the depiction of placed boundary marks, so to assist with site development, the type and position of boundary or offset marks is included on a composite PDF plan. This plan is forwarded to the client with an email requesting the prescribed EPL lodging fee.

12. GAIN CERTIFICATE OF APPROVAL.

The EPL site's PDF generated copy of the plan is then electronically uploaded to the application on EDALA to initiate the DAC certificate of approval for the land division.

When all authorities respond that their conditions are met DAC issue the land division's certificate of approval by electronically stamping each sheet of the uploaded plan with a signed certificate including date and time to the minute. They simultaneously electronically notify the lodging surveyor and the LTO of the certificate of approval. The stamped plan is then available for down load from the EDALA website.

The surveyor has 12 months to have the plan electronically lodged and approved in the LTO.

13. LODGE EPL FINAL PLAN

Upon electronic payment of the EPL plan lodging fee the loaded division plan is electronically lodged in the LTO by the authorised LS entering their unique identification code and password.

13.1. Receive requisition notice.

All lodged plans of survey are examined to insure prepared in accordance with the plan presentation guidelines. The diagram plan sheet is examined to insure that

- All allotment figures mathematically close within prescribed tolerance. This closures check is made using a program PC Plans developed in the 1990s by the LTO to simultaneously generate plane "AMG coordinates" for all boundary corners.
- The plan presented in accordance with the PPG e.g. plan orientation, line weights, text size and orientation, appropriate symbols, tables filled out, north point orientation.
- The outer boundary and external survey data shown on the certified plan is appropriately defined in accordance with principles of boundary definition and
- Any variations from previous approved survey plans are substantiated.

The textual plan sheet is examined to insure that the required historic data is correct, proposed easements are properly formatted and that supporting reports and checks were uploaded.

If there are no requisitions then the division plan is approved for data. If the examiner identifies requisitions they are recorded on the EPL site and the lodging LS emailed a PDF requisition file. While the LS has the right to discuss and debate any suggested outer boundary redefinition, all other amendments are made in accordance with the PPG.

Textual sheet requisitions are made by directly accessing the appropriate menu for the job ID on the EPL site to alter, remove or add text. Plan amendments are made to the original CAD plan and a TIFF plan regenerated for EPL upload to substitute the original diagram plan sheet. The plan is then electronically recertified and re lodged. The amended sheets are re-examined and the plan approved for data.

On approval of the plan data the LTO document examiner then examine documents contained signed consent by the registered proprietor(s), mortgagees and encumbrances to the issue of new titles, these are usually lodged by a conveyancer or lawyer. For a simple land division where there are no transactions, such as land transfer, creation of rights of way or discharge of mortgage then the lodging LS can down load from the LTO site the appropriate RTU form.

The downloading and double side printing of this RTU form **requires one sheet of paper** for ownership signature consent, provided that the subject land is unencumbered i.e. with out registered mortgagees as that requires an additional sheet. The signed RTU document is lodged in the LTO with the prescribed fee examined and approved.

http://www.landservices.sa.gov.au/1Online_Services/65LTO_Forms_Online/0default.asp

13.2. Plan deposited.

Upon approval of the RTU, the Registrar General in the LTO then deposits the plan of division and an order made for the issue of electronic titles.

14. ELECTRONIC TITLES ISSUED.

The information on the deposited plan of division is then used in the production of the electronic CT.

The front page of the CT contains the ownership details and registered mortgage(s), carried forward from the parent title, unless appropriate transfer documentation were concurrently lodged with new ownership details. Encumbrance information, such as, existing, proposed or varied easements, rights of way and liens are obtained from the textual sheet. Each registration contains the unique number associated with the registered creation document filed in the LTO, so that a searching party interested in a particular encumbrance can order an electronic copy of the document.

The second page contains a copy of the certified plan of division boundary diagram which shows the title boundary data, allotment identification number, area and if appropriate data for locating and identifying easements.

15. IN AN IDEAL WORLD.

Efficient, friendly paperless e-surveying will save trees, however it does come at an environmental cost in manufacturing, distributing and operating the e-equipment. That said the great asset of e-surveying is having the entire job file within convenient laptop reach to facilitate e-interaction with clients, authorities and surveying equipment.

The South Australian system of land surveying, land division and land title has evolved from the orderly colonization and subsequent forward planning associated with the development of technology. The pioneers could never have envisaged the magnitude of their contribution to e-surveying. The government guaranteed land ownership, the central plan register, coordinated reference marks, emphasis on education, the e-planning procedure system, e-plan lodgement, the advent of the laptop computer, internet and electronic surveying equipment have provided an ideal base for today's GIS world.

I yearn for the establishment of a single site to access the LTO database and execute the planning procedure currently undertaken on the EDALA site. So that by simply submitting a CT reference when lodging a land division proposal plan all associated information for the land parcel and an interactive boundary plan are available. Then after the approval of the land division to then be able to lodge a certified electronic CAD drawing with interactive AMG coordinates for the surveyed boundary corners and reference marks.

In the almost 40 years since graduation the writer, has been extremely fortunate in his professional career to have "hung ten" riding the greatest technological survey wave ever experienced by land surveyors.

I suspect that in another 40 years that today's yearning will be as archaic as surveying in 2010 with a Gunter chain.

REFERENCES

About Atlas online. <http://www.atlas.sa.gov.au/go/about>

Australian Dictionary of Biography online edition.

<http://adbonline.anu.edu.au/biogs/A020510b.htm>

Development plan index. <http://www.planning.sa.gov.au/index.cfm?objectid=9508F3E3-96B8-CC2B-633BE6E12F125D23>

Digital Cadastral Database online fact sheet.

http://www.deh.sa.gov.au/mapland/pdfs/dcdb_factsheet.pdf

EDALA public access site.

<https://www.edala.sa.gov.au/edala/EDALAView.aspx?PageMode=ApplicationDisplayView&ApplicationId=30074>

Electronic Plan Lodgement.

http://www.landservices.sa.gov.au/1Online_Services/35Electronic_Plan_Lodgement/0default.asp

Land Services Group web site. <http://www.landservices.sa.gov.au/AboutLSG.asp>

LTO Forms Online.

http://www.landservices.sa.gov.au/1Online_Services/65LTO_Forms_Online/0default.asp

Piers online purchases.

http://www.landservices.sa.gov.au/1Online_Services/30PIERS_Online/0default.asp

Property Assist - Property Search. <https://www.propertyassist.sa.gov.au/pa/pubquery.phtml>

Property Assist online fact sheet.

http://www.landservices.sa.gov.au/5Publications/Brochures_and_Fact_Sheets/_files/3_PropertyAssist.pdf

Robert Gouger. South Australia in 1837.

Survey Database.

http://www.landservices.sa.gov.au/1Online_Services/40Survey_Database/0default.asp

Surveying-Drafting Manuals and Guidelines.

http://www.landservices.sa.gov.au/5Publications/Surveying-Drafting_Manuals_and_Guidelines/0default.asp

BIOGRAPHICAL NOTES

1971 Bachelor of Technology in Surveying, University of Adelaide.

1978 Licensed Surveyor.

1978 Established Richard Abbott Surveyors, specialising in land division, cadastral and engineering surveying.

1994-1995 Board Member, Institution of Surveyors (South Australia) Surveyors Board. Proposing the system to formally train graduate surveyors for Registration and Licensing.

1995 Organising committee member for 5th SE Asian and Australian Surveyors conference, Singapore.

1999 Developed a system for efficient cadastral solo robotic surveying.

2004 PLSO conference, Redmond, Oregon presented *Surveying Down Under*.

2005 ACSM conference, Las Vegas presented *Surveying Down Under*.

2009 ACSM conference, Salt Lake City presented *Training the South Australian graduate surveyor. Could the model be adopted for training the US Surveyor?*

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