Parish Map Preservation Project

The Use of Digital Photography, CD's and Computers to Copy, View (And Preserve) Old Maps

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GENERAL OVERVIEW

The Parish Map and other similar maps provide reference to Crown land dealings and to the basic fabric for land administration in New South Wales. The Parish Map Preservation Project is using the latest computer technology to help preserve over 35,000 of these valuable old maps from rapidly deteriorating and being lost as an historic record of land administration of the State. Colour photograph digital images of the remaining maps copied on CD's allow the District Office and Archives maps to be viewed in full colour at a number of locations for the first time. The availability of other copies on more permanent medium effectively eliminates the handling of the original maps thereby helping their preservation and their storage in archival conditions in the Government Archives at Kingswood.

The Surveyor-General's Department at Bathurst is using two Dicomed Digital cameras to photograph the maps. A master image will be stored on long life CD's as a duplicate historic record and copies will be cut on CD's for viewing through computers at twenty or more locations throughout the State. The use of digital cameras and the compression of images on CD's to increase their capacity was not possible a few years ago.

In general, either one or, at the most two, of these maps exist and some have already been lost. The remaining maps will continue to deteriorate and valuable information underpinning the integrity of our land title system will be lost unless something is done now. The Project provides for this to be done and other advantages by:

- providing a permanent digital photographic record of the old maps;
- then "cancelling" the old maps and preserving them in archival conditions;
- providing a complete collection of District Office, Archives and other maps on CD;
- provision for copies of CD's for viewing maps at many locations; and,
- for the first time, facility for colour prints of the maps.

ADMINISTRATIVE MAPS

Administration of the "waste lands" or Crown land of New South Wales was undertaken by the Surveyor General's Office from the first settlement (1788) to self Government (1856), then, by the Department of Lands until recently when Crown land administration became a function of the Department of Land and Water Conservation. The administrative function is the orderly management, conservation and disposition of Crown lands.

An administrative map is useful in providing reference to land dealings. However in the first 50 years of settlement, exploration, building roads and bridges, and trying to survey lands already granted took precedence over cadastral mapping by the small staff of surveyors. Following the 1819-1821 Bigge Inquiry, instructions were given to Governor Brisbane in 1825 to divide the colony into: -
- **Counties** being "about forty miles square"; and,
- **Hundreds**, being an area of about 100 square miles (which were never implemented);
- **Parishes** being "about twenty-five" square miles.

Where possible, regard was to be given to natural boundaries such as rivers, stream, highlands, etc. in determining the administrative boundaries,

Initially Land titles (old-system written descriptions up until the 1863 Real Property Act) and associated survey plans referred to the administrative areas without the necessity for a cadastral map.

In 1828, on instructions from Governor Darling, Major Thomas Mitchell commenced the first purpose-intended cadastral map, using "topographical triangulation" of an area from Moruya River in the south then westwards to Yass, Cowra, Orange, Wellington and Liverpool Ranges then east to the Manning River in the north. In three sheets, and at a scale of 8 3/4 miles to an inch (i.e, about 1:554,000), the Nineteen Counties Map was completed in 1833 and etched on copper. At the same time Mitchell and his staff did more surveys in 6 1/2 years than their predecessors did in 40 years.

Pastoral Holdings

Attempts to retain settlement within Mitchell's Nineteen Counties failed as squatters spread out beyond its boundaries in the 1820's and 30's. This was to affect land administration for the next 50 years. In 1835 grazing licences to manage "squatting" were introduced at a fee of ten pounds each but were difficult to enforce. In response to demands by "squatters" for more secure tenure, the 1847 Orders in Council allowed a Holder a pre-emptive right to purchase a homestead area with a pastoral licence of adjoining land in the settled districts (ie. the Nineteen Counties) and pastoral leases with terms up to 8 years in intermediate districts and 14 years in unsettled districts. There were 1277 Pastoral Holdings in the Eastern Division of the State, 907 in the Central Division and 357 in the Western Division, 2541 Runs in all. Maps of the State's 141 counties were prepared, as required.

After the 1850's Gold Rush there was a demand for land which was already taken up mainly by the "squatters". As a result, the 1861 "Free selection before survey" Act allowed selection over leased areas. It also allowed Conditional purchase and pastoral leases for one year in settled districts and five years in second-class settled districts or unsettled districts.

On 22nd September, 1882 the Garden Palace Exhibition Building in the Botanic Gardens burnt down and with it nearly all the Crown land lease documents, plans and maps stored there while the Lands Department's Bridge Street building was being built. In a concentrated effort, Departmental staff reconstituted records from secondary information with maps showing the runs divided into leased and unleased areas pursuant to the 1883 Morris and Rankine Royal Commission and the subsequent 1884 Crown Lands Act. Only one copy of these fragile maps on paper and linen exist, and these are being photographed as part of the Project.

County Maps

County Maps usually cover an area of about 40 miles square at a scale of 4 miles to an inch (ie. about 1:250,000). At such a small scale, they are only useful as a cadastral map for showing major physical features and large portions with their numbers. Because surveys preceded most Parish Maps, the survey plan reference commenced with the first letter of the county name and ended with the county small number. There are 141 counties. (See map at page 10.)

Parish and Town Maps

The 1884 Act established Land Districts, Land Boards and Land Board Offices for decentralised administration. As a result there was a concerted effort to prepare Parish Maps over the Central and Eastern Divisions of the State with a set kept at the local Lands Office and a duplicate copy at Head Office in Bridge Street. Prints were used by Crown Land Agents, Councils and other Government Departments.

The Parish Maps were reproduced by lithography using flat bed printing on limestone slabs imported from Bavaria. Lithographic printing was believed to have commenced on a press imported into the Colony in 1821 and allotted to the Surveyor General's Office in 1828. The process continued in use in the Department of Lands until probably after 1947 when it was reported that the Department held about 1100 lithographic stones.

As a testament to the value of the Parish Map, they have continued in production for over 110 years and will continue to be charted until replaced by the Crown Land Information Data Base (CLID). Over this time old editions were superseded as it became difficult to chart or note further information and were cancelled when new editions replaced them. It is these past editions and the current editions that will be recorded in the Parish Map Preservation Project.

There are 7459 parishes and 1143 towns. (See map at page 11.) In general, Town Maps preceded Parish Maps in many counties. Parish Maps cover an area ranging from 15 to 25 square miles at a scale of 4 inches to a mile (ie. about 1:16,000) to fit a manageable map size of about 1000 mm by 700 mm.

The Parish Map has title, scale, north point, place names, notes and boundaries by legend and line coding. Spatially, it shows physical features, roads, etc., and also, by colour tint and notation, reserves, National Parks, State Forests, freehold, incomplete purchases, acquired lands, etc., or, by edging and notation, many of the 50 land tenures of the past. It shows portions (numbered with a sequential parish number) with area and original grantee or tenure by abbreviation and the survey plan reference. It also has the following schedules :

"**Reference to portions**" being Portion No., survey plan reference, location and CT reference and, in later editions, also, the grantee or tenure details. The **Survey Plans** referred to on the maps usually recorded dealings as notation plans as well as survey dimensions and property details. The smaller survey plans have been microfilmed and portions/allotments are now lots in the Parish Deposited Plan.

"**Reference Notes**" refer to sequential encircled numbers shown on the map and lists notes in relation to them.

Mining Surveys schedule mineral leases reference numbers, plan, area and purpose.

Classified Areas showing land reference, purpose and Gazette reference.

Town Maps have similar detail to the Parish Map but at a larger scale and with "**Reference to Allotments**" listing details of allotments in Sections of the Parish instead of Portions. When and as it became difficult to record further information on the Parish/Town Maps, they were cancelled and new editions issued to replace them.

About 35,000 past and current editions are proposed to be photographed. Of these about 3/4 are in District Offices, 1/8 (being the Head Office copy) are in Archives and the remaining 1/8 (or about 4000 maps) are either believed missing, destroyed, or damaged beyond repair.

Crown Land Information Data Base

The current edition of the administrative map will be replaced by computerised **Spatial Administration System** (SAS). This is a further development of the **Digital Cadastral Data Base** (DCDB) showing a Crown land layer and other spatial information usually found on a Parish/Town Map. SAS uses the Genasys GIS package called GenaMap, runs from local servers at District Offices with data updated overnight by the Surveyor-General's Department (SGD) at Bathurst.

Integrated textual data with SAS are :

- **Tenure Administration System** (TAS) encompassing details of about 96,000 Crown holdings.
- **Reserves Administration System** (RAS) containing details of about 34,000 Reserves.
- **Land Revenue System** (LRS) processing all financial transactions involving 50 different account types and interfacing with the Department's SAP financial system.

These Data Bases use Oracle RDBMS written in Oracle Forms 3.0 and run from a central production computer located in the Bridge Street Office.

The Parish Map Preservation Project will digitally photograph the current Parish/Town Maps as the CLID system replaces them. They will then be able to be viewed on CD, as required, to verify CLID data. The maps will be placed in Archives.

The CLID Oracle Data Base and viewing computer equipment is being used by the Parish Map Preservation Project.

PROJECT FORMATION AND ESTABLISHMENT

In 1995, with the appreciation that Pastoral Holding Maps and Parish/Town Maps refer to past administrative acts that extinguish native title pursuant to the Native Title Act (CTH) 1993, it was realised that, in addition to their historic context, these maps should be preserved for use in investigating native title claims. Initially, photo-transparencies, as then used by the Mitchell Library, were proposed by the Department of Land and Water Conservation in seeking and obtaining Treasury funding.

In September, 1995, a further investigation was undertaken with the knowledge that images could be compressed on CD to contain seven to ten times their previous capacity. This was found to be financially viable with the advantage of easier management compared to aperture cards and, once a master was cut, multiple copies on CD could be made.

In November, 1995, a large flat bed scanner was trialed but could not handle the size and thickness of the maps. A trial was then done with a digital camera and, although photocopies at the time were poor, the computer screen image and photographic reproduction from the CD image was excellent.

A Steering Committee was established to run the Project under an Agreement made between State Land Services (now, part of the Department of Land and Water Conservation), the Archives Office (now, State Records Authority), and the Land Information Centre (now, Surveyor-General's Department). After further testing, approval was given in April, 1996, to proceed with the Project and purchase the cameras.

In the latter part of 1996 consideration was given to using a central server and optical disc, which was rejected mainly due to difficulty networking sizeable images. A database was established using the CLID Oracle database and Expressions of Interest called for Viewer Software driven by it. This was not viable and, having regard to the incidental, irregular and comparatively low user-access and the incapacity of the network to handle large images with other traffic, it was decided to return to the simpler system of indexed CD's and stand alone PC's. This is also a better option for other users such as Archives, Mitchell Library, etc.

PRODUCTION

Production commenced in mid 1997 with one camera and all the Pastoral Holding Maps in the Eastern and Central Division have been photographed. After the Wik "High Court decision that Pastoral Holdings may no longer extinguish native title, priority in production switched to Parish Maps.

It is intended to progressively copy the past editions of Parish/Town maps first pending the commissioning of the CLID system, at which time the current maps will be copied. This will take an estimated three years.

The District Office maps contain information not recorded on Head Office versions and have priority for copying. Any Head Office copy of maps not held in the District Offices will be provided by the State Records Authority for copying. Inquiry will be made from Mitchell Library, Historical Societies, Universities etc. to find any maps not already collected. The aim is to record a complete set of any and all maps that exist.

CD's will be cut and made available to the State Records Authority, Head Office and District Offices immediately after capture. Maps will be given to the State Records Authority for preservation in archival condition. District Offices will then have a set of CD's covering, firstly, historic maps and then the current maps.

Upon completion of the photography it is proposed to create a State set of about 200-300 CD's. This will be in about three years time and, in the meantime, technological improvement in recording medium could result in use of higher capacity, double sided CD's, thereby reducing the number of CD's required.

It is also proposed to create an Index Map of Pastoral Holdings and Parish/Town Maps relative to the current map of NSW to make it easier for the searcher to identify the relevant holding, map and CD.

TECHNICAL INFORMATION

The Parish Map Preservation Project would not have been possible in its present form two to three years ago. Scanners available at the time were comparatively costly and incapable of scanning large thick mounted maps. Digital cameras do not have these constraints and can provide high resolution images without the use of traditional film and transparencies.

It was also fortunate that computer and Compact Disk (CD) technology had advanced to the extent that the images could be viewed on and printed from the latest generation of Personal Computer (P.C.) and printers. Also the computer software was available for processing the digital images and for viewing on computer. The deciding feature, however, was the use of JPEG (and subsequently, Mr.Sid.) for compressing (and uncompressing) images, so that the capacity of CD's could increase seven to ten times.

The Surveyor-General's Department at Bathurst has provided the camera lenses and infrastructure (vacuum frames, lights, etc). Project funds were used to purchase the two digital cameras, computer and associated equipment.

Camera

- Dicomed Digital 7520 camera.
- Trilinear scanning head with a 90 mm x 72 mm scanning magazine capable of recording 45 million pixels of information.
- Each pixel can have a range of about a million colours. However, tests show that 256 colours are sufficient to depict mapping colours, provide better contrast of linework and reduce the size of the image.

- The scanner is capable of capturing a 130 mega byte (Mb) image in approximately 150 seconds with a single pass. An A1 image (594mm x 841 mm) can be captured in one shot.
- There can be a small loss of resolution with increased compression/decompression of images. A trade-off was needed between the dpi of resolution, compression and capacity on CD. Viewer survey adopted 200 dpi as being more than adequate. With 256 colours and compression with JPEG or Mr. Sid of seven to ten times, 250 to 300 maps can be contained on a 650 Mb CD.

Processing

- The camera comes complete with its own windows-based software and it uses a Macintosh computer to support that software. (It could alternatively be supported by an IBM computer).

The image is downloaded from the camera hard drive and opened into "Photoshop" software on the Macintosh 9500 computer. This computer has a 360 megahertz (MHz) dual processor and 512 Mb of RAM. The scanned image can be manipulated to any degree but, for accurate reproduction, the only adjustments made to the images are :

- setting the maximum and minimum desired densities;
- cropping to actual map image to reduce file size;
- unsharp masking to make lettering and lines sharper;
- saving the file as a PC Tiff image on DLT.

As it is intended that the maps will be photographed once only and copied on the CD at 225 dpi.

100 BASE T is used to transfer the very large files on the Surveyor-General's Department's computer network for editing and the cutting of CD's.

The Surveyor-General's Department can also process the digital image to produce quality coloured photocopies at a reasonable cost. Alternatively, a quality Colour Printer can be used.

Computer Disks

Currently 650 Mb CD's are being used as Kodak cannot guarantee the long life of a 9Gb CD (or 18Gb, double sided). Also, Optical Disk, another option, has a limited 10 year guaranteed life. If the longer life of higher capacity CD's can be guaranteed within 18 months, it is possible that 9Gb CD's may be used for the State-wide set of CD's.

Viewing Computers

The computers being used are modified DLWC computers minimum specification being :

- IPEX P200 Desktop P.C. with Intel pentium 200 MHz processor;
- 32Mb RAM, 256Kb cache modified to 64Mb RAM;
- 2.1 Gb HDD;
- replacement of standard monitor with an Hitachi 20" monitor;

- 12 x CD ROM;
- Honeywell 101 Keyboard;
- 2Mb V RAM modified to 4Mb V RAM;
- MS Windows '95 or upgrade to NT WORKSTATION.

Viewing Software

The software chosen for viewing images is Mr.Sid available from Resource Industry Associates, North Fitzroy, Victoria. It is on the CD and features :

- display of FULL MAP IMAGE by clicking the selected map on the index;
- ZOOM capability from the image;
- PAN to other parts of the image;
- two WINDOWS on the screen;
- PRINT with map-specific header and a footer statement;
- COLOUR ENHANCEMENT is intended later.

Viewing Maps on Computers

The Oracle database (or Hardcopy) can be used to identify the CD containing the map sought. Upon loading the CD, selection can be made from the index and viewed using the Mr. Sid program.

Like CLID, the use of computers to view administrative maps will require a change of culture. No longer will it be a relatively simple matter of getting the map and finding the information you want on it. It will require a computer and familiarity with computer processes. This will take a bit of getting used to.

However, there are advantages also. Multiple sets, computer technology and colour printers allow the maps to be viewed and copied in colour at a number of locations at any one time. And, the greater accessibility of the information on CD means that the past administrative maps can now be put away in archival conditions to be preserved for those rare occasions, if any, when they may be needed.

COSTS AND PRICE

The major project cost is photographing the maps which would be much the same for colour transparencies as for digital images. This can vary depending on the size of the map and the number of scans required. For instance, a map A1 size or larger can require two or more scans. Considering this, an average indicative production cost / parish or town map is about $15 (internal charge out rate) or $30 (commercial rate) to copy. On this basis and the limited market for the product, a CD of 200 maps would cost commercially about $6,000 for one copy but would be reduced proportionally depending on the number of CD's cut (and paid for...)

THE FUTURE

The Project is a good example of adaptation of the new technology of the future to solve an old problem from the past. There is little doubt that this technology will improve and there is already some indications that local servers and 9Gb CD's will probably be used when the State set of maps become available. However, irrespective of technological change, the use of digital cameras and compression software will remain current for some time in the future, thereby justifying their use to copy the many maps that need preservation now.

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Acknowledgements

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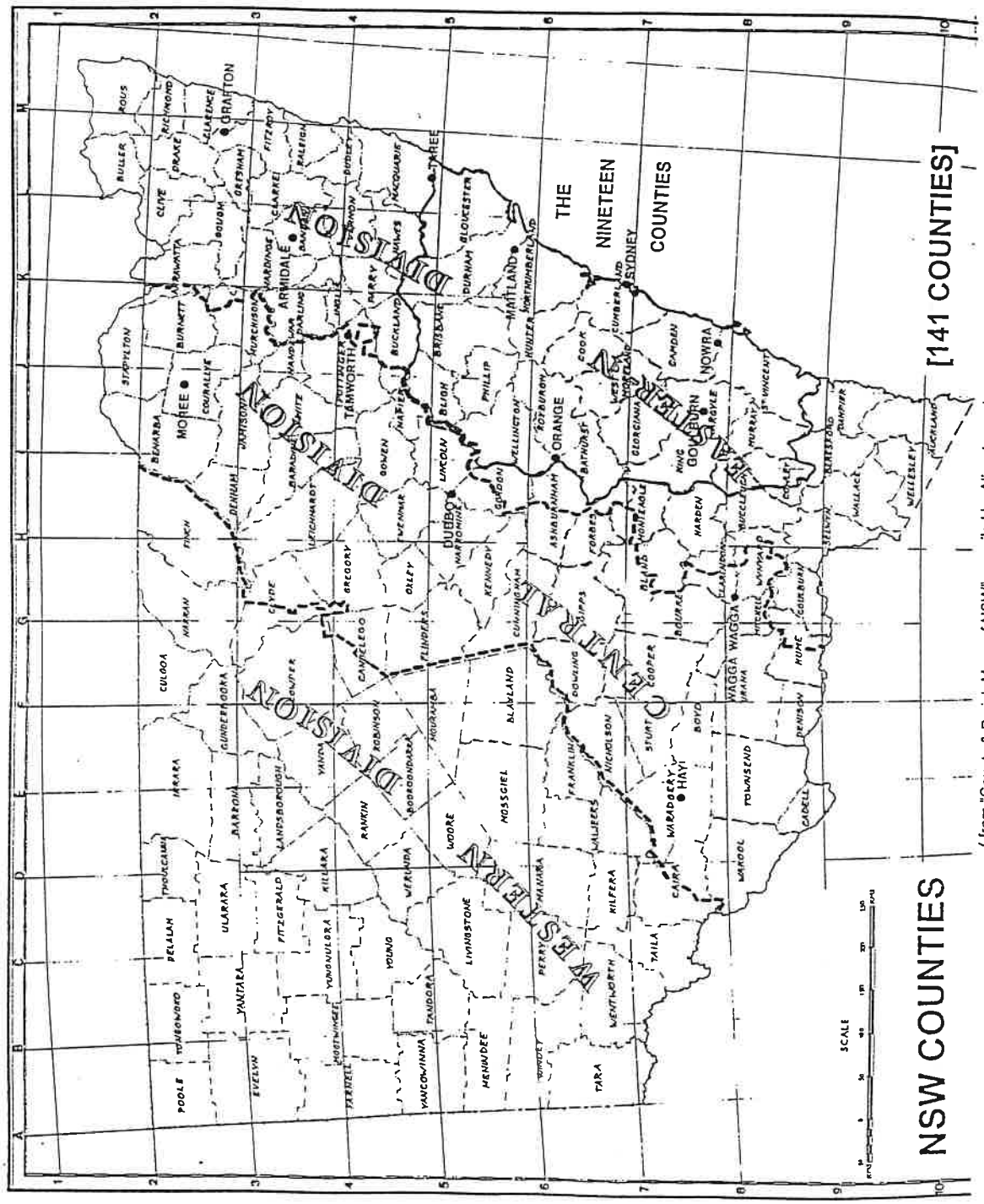
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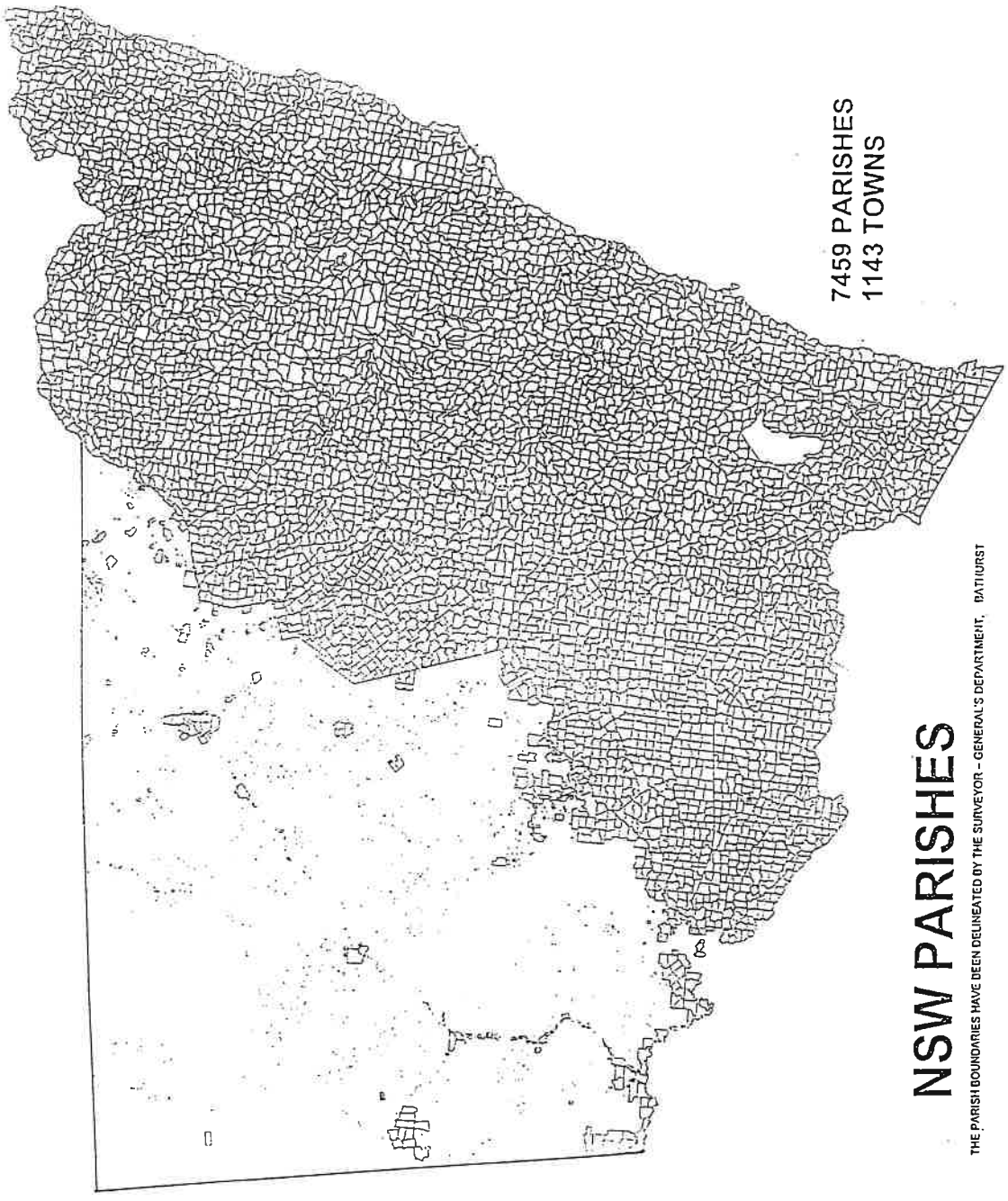
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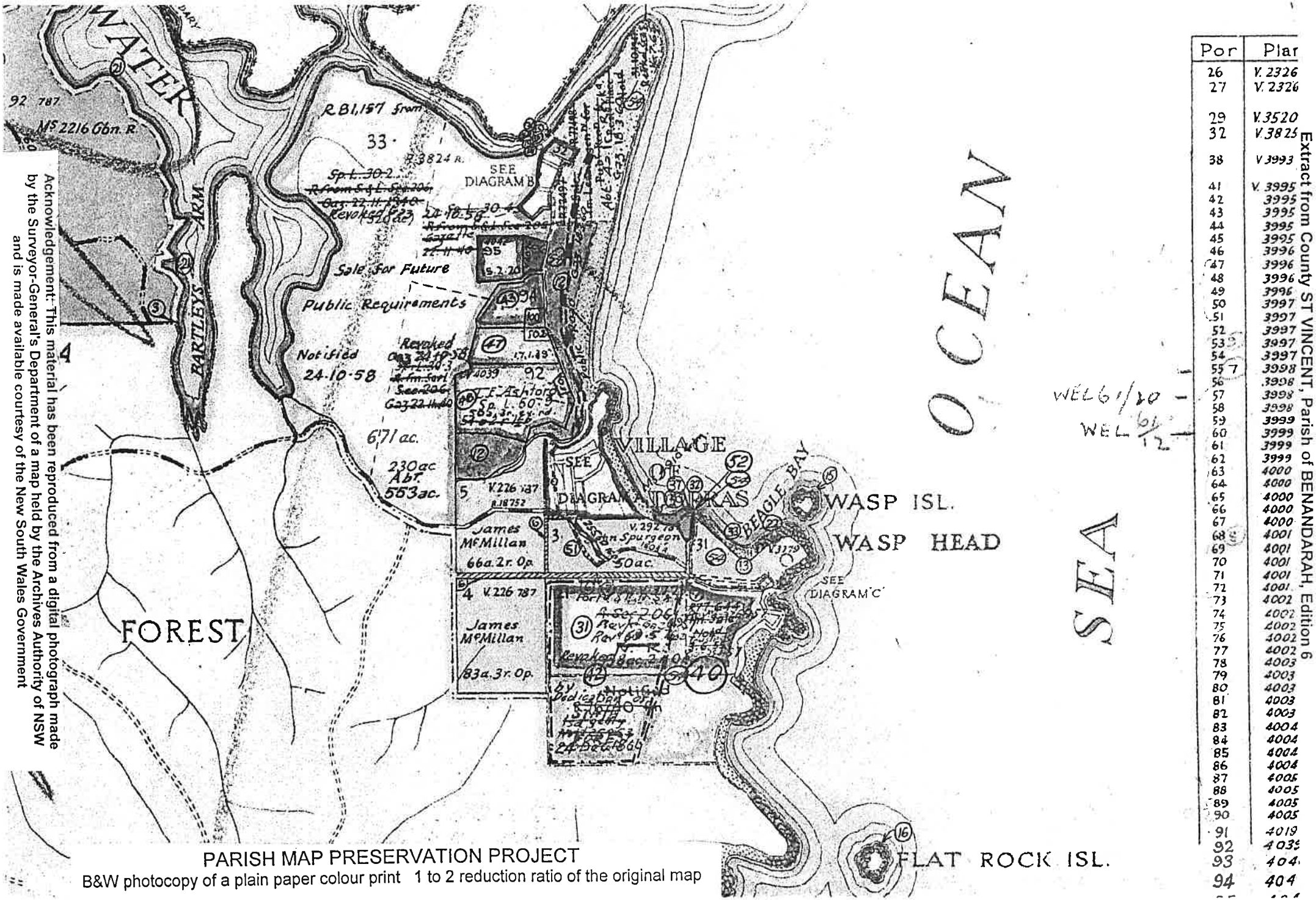

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New South Wales Crown Land Administrative Maps

Extract from County ST VINCENT, Parish of BENANDARAH, Edition 6

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PARISH MAP PRESERVATION PROJECT

B&W photocopy of a plain paper colour print 1 to 2 reduction ratio of the original map