



Ministry for Home Affairs

Government Property Division

Land and Estate Management Information System

Business Study

Version 2.0

November 1999

This document was part of a 1999 invitation to tender for Analysis & Design of the Land & Estate Management Information System. The A&D Report is currently being finalised. Some requirements may have undergone modification – GPD, September 2002

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04. Synopsis

The document contains a definition of the business functional areas which will be automated; a definition of the data which will reside on the new system; an outline plan for the project and costings.

05. Document control

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06. Authorisation

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08. Modification history

Version	Date	Comments
Version 0.1	November 1998	First draft for internal quality review
Version 0.2	November 1998	Second draft for client review
Version 1.0	February 1999	First release to Project Steering Committee
Version 2.0	November 1999	Second release as part of Invitation to Tender. Chapters 6, 7, 8 and Appendix C, D removed.

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1. Executive Summary

At the request of Mr John Sciberras, Director General, Government Property Division (GPD), Ministry for Home Affairs, the Malta Information Technology & Training Services Limited (MITTS) was, in May 1998, directed to carry out a business study of various operations, processes and practices of the Land and Estate Management Departments. The aim of this study was to define high-level business and technical requirements for a comprehensive and integrated GIS-based information system for the Land and Estate Management Departments.

Between June and November 1998, MITTS personnel studied the Land and Estate Management Departments business functions and carried out a number of interviews and workshops with representatives of the GPD. These investigatory sessions have resulted in a better understanding of the business and technical requirements for the new Land and Estate Management Information System (LEMIS).

The proposed computer system will automate various functions carried out in the Land and Estate Management Departments. These functions will include automatic parcel update and map generation, the administration of registered properties, revenue collection, administration of requests for acquisitions and management reporting. It was agreed that data residing in the current systems is converted and transferred to the new system.

This project will also focus on the integration with other corporate GIS initiatives in hand to assure effective communication with other key cadastral players.

Section 2 of this document will describe the project's background and document scope. Section 3 presents the current situation and the new requirements. Section 4 is a definition of the business area and information needs. Section 5 will describe the project implementation and integration strategy. Section 6 contains the list of references.

Appendices A and B are diagrams defining the business area and the related information needs, respectively.

2. Introduction

2.1 Background

In May 1998, Mr John Sciberras, Director General of the Government Property Division within Ministry for Home Affairs, commissioned Malta Information Technology and Training Services Ltd (MITTS) to carry out a Business Study for the development of a new GIS-based computer system for the Land and Estate Management Departments.

Between June and November 1998, MITTS personnel studied the Land and Estate Management Departments business functions and carried out a number of interviews and workshops with representatives of the Government Property Division (GPD). These investigatory sessions have resulted in a better understanding of the business and technical requirements for the new Land and Estate Management Information System (LEMIS).

2.2 Scope of this Document

The scope of this document is to present a proposal for the development and implementation of a Land and Estate Management Information System. It describes the business processes and associated information that will be supported by the proposed system; it presents the proposed way forward. If this proposal is accepted, this document will form the agreed basis upon which MITTS will embark upon the next phase of the project.

2.3 Terms of Reference

The terms of reference established for this business study were as follows:

- to scope the business functions to be supported by the proposed new system;
- to prioritise the functionality of the proposed system. This exercise will define the order by which the functionality will eventually be developed and implemented;
- to recommend the roles and responsibilities required during the development and implementation of the new system;
- to manage the project to ensure that the products are delivered within the agreed time scales, quality and budget.

2.4 Validity and Conditions of this Document

This document is valid for a period of 3 (three) months from the date of submission.

It is understood and accepted that details of this document shall remain a confidential matter between MITTS and the Government Property Division.

2.5 Acknowledgments

The authors would like to thank the Land and Estate Management Departments' personnel for their continued assistance during the business study.

3. Current Situation

3.1 Business

The main business functions of the Land and Estate Management Departments are:

- management of Government lands and immovables;
- revenue collection and enforcement;
- acquisition of property.

3.2 Current Computer Systems

The business of the Land and Estate Management Departments is currently based largely on manual procedures, although some limited automation had been achieved following the implementation of the following computer based systems:

- **Land Management System (LMS)** – Automated Rent Collection system. Keeps records of Tenants, Tenements and Lease details.
- **Cheque Printing System** – Generates cheque payments of acquisition rents to private owners whose property is held by government under possession and use or public tenure.
- **Document Registry System** – Keeps records of File details, Correspondence, File Movements and Bring Ups.
- **Property Drawing System** – Generates Property drawings.

Appendix A is a set of diagrams defining the Land Acquisition business area.

3.3 Problems

The problems encountered with the current situation are the following:

3.3.1 Current Computer System - LMS

The current computer system does not support the following functionality¹:

- Interest Charges
- Off-Site Payments of Rent
- Status-Tracking
- Administration of Property With Unknown Owners
- Instalment Arrangements
- Spatial Property Data
- Thematic Mapping
- Scenario Analysis
- Process flow automation

3.3.2 Current State of Property

The current state of a property is laboriously obtained by cycling through a number of separate paper records, kept in different locations, and by merging the historical data obtained from each record set. This is a time-consuming process and establishing the current position of a typical property may take anywhere between a few minutes to a number of weeks, particularly where researches in non-departmental records (e.g. National Library, Works Department, Santo Spirito) are required.

¹ Letter from Mr. J. Caruana to Mr. J. Grima, Chairman, MITTS, 02 February 1998.

3.3.3 Acquisition

There is no steady number of cases handled by the department over a particular period of time. This number is directly related to the number of projects undertaken by the Government and Parastatal companies. The underlying nature of the particular projects carried out will to some extent determine the complexity and issues that have to be addressed within each project. Typically, the number of new acquisition cases in any one year is a low one. However new projects could involve huge numbers of owners making the whole process seemingly interminable.

A major issue within the department is the backlog. Currently, there are hundreds of pending cases. The exact stage of these pending cases is practically unknown and can only be determined following laborious scrutiny, of a multitude of files, by experienced and technically oriented staff. This considerable amount of backlog has been linked to the particular nature of property ownership patterns in Malta and the lack of a centralised depository of property ownership records².

In view that all Acquisition information resides in thousands of manual files, the departments are currently not in a position to systematically apply prioritisation criteria in the manner they choose to address pending cases. Priority is very often decided in an ad-hoc almost arbitrary manner. Priorities can be based upon location (land in Swieqi is more expensive than land in Marsascala), vicinity to building schemes etc.

Another major issue within the Department is the time span required to finalise a case. To a large extent, this time-span is heavily dependent on circumstances that are beyond the departments' control. Such factors include the availability or otherwise of ownership information, external research work and also work carried out by private architects and lawyers. A case may take from a minimum of 1-2 years to, in some cases, a period exceeding 20 years.

3.3.4 Gozo Land Section

The Gozo Land Section falls within the ambit of the Ministry of Gozo and is responsible for the management of Government lands in Gozo including revenue collection thereon.

Land and Estate Management Departments in Malta do not have any records of tenements and rent collection in Gozo as this information exists only in manual files at the Land Section, Gozo.

² This problem is being tackled by the Land Registry Department through a property registration programme spanning some 25 years.

3.3.5 Land and Estate Management Departments' Files

The Land and Estate Management Departments' operations are mainly based on a large volume of manual files. The number of files presently existing at the departments is in the region of 70,000 and this is increasing with an average of 400 more files yearly. This underscores the departments' dependability on laborious manual processes. These files contain large amounts of information that may need to be accessed concurrently by different officers. In general there is only one copy - the original - of the files. This creates a bottleneck effect extending considerably the amount of time needed to finalise different transactions and processes.

3.3.6 Document Back-up

Because of the incomplete level of security afforded by the continual use of files, the original hard copy of the most important departmental records (lease agreements etc.) is kept separately within apposite folders maintained by the Records Section. Access to such records is evidently slow apart from causing the physical deterioration of important original documents. Security-wise an electronic copy of such documents would be advantageous.

3.3.7 Speed of Map productions

Land Department (LD) drawings and plans are drawn up manually and laboriously taking somewhere between 2 man-hours to a number of days to be completed, depending on the complexity involved.

3.3.8 Rent Arrears & Budgetary Reporting

Rent Arrears and Budgeting reports are semi-automated, in that, they are based on computer generated information reports. All analytical work is however carried out on excel-based worksheets which are filled out manually. Cash-flow forecasts and budgetary commitments are also not facilitated by the current computer system. Status-tracking possibilities, whereby the arrears follow-up process is computer automated, are also not supported.

3.3.9 Customer Service

Assistance to the public is provided in a necessarily ad-hoc manner. Furthermore information may be spread throughout the departments' sections and, depending on the information needed, the public may be required to go from one section to another to be fully accommodated. Clearly this also disrupts the departments' normal activities since a typical query by the public may take anywhere between ½ an hour to 2 hours to be responded.

3.4 New requirements

To overcome the problems identified above, the proposed computer system must, at its core, make use of powerful GIS-based database management systems to capture, store, manage, retrieve, process, report, and display property related information, including graphic maps and images. Such information is typically required by the Land and Estate Management Departments for their day-to-day running as well as by other departments and organisations (e.g. Housing Authority, Lands Registry) or the general public. Under the proposed system the core components would be supported by a series of software sub-systems that would interact with the data and management functions to provide specific query, display, and analysis capabilities to cater for the departments' various requirements.

The computer system needs to support decision making at the strategic, tactical, and operational levels; assist the performance of administrative operations; and serve as a repository of and index to the various departmental records.

3.4.1 Geographic Information System (GIS)

A Geographic Information System is needed to properly manage property parcels, subdivisions etc. It would provide the capability to convert graphic maps into digital format, store them in a central database, conduct spatial queries on such database, and would also provide the tools for necessary analyses, displays, and maps generation.

The mapping capability in the system enables the Departments to automate its parcel update and map generation and to realise substantial gains in mapping productivity for drawing office personnel.

The GIS data will be also stored in one central database and linked with other property information-sets to support data sharing and various possibilities of spatial queries on the property database. The linkage between the non-spatial and spatial data greatly expands the functionality of the computer system and provides a powerful and sophisticated opportunity to improve productivity and effectiveness in the operations of the Land and Estate Management Departments.

If the maximum gain is to be achieved, the new computer systems must be accompanied by business process-re-engineering in areas that lend themselves to such opportunities. The opportunity should be taken to improve operational productivity and effectiveness through business process re-engineering exercises. The LEMIS is envisaged as incorporating such changes so as to ensure a marked improvement in the way government property is managed.

Presently, the current state of a property can only be obtained by cycling through a number of separate paper records (of various origins and resolutions) and by merging the historical data obtained from each record set. In contrast, the implementation of GIS technology will make possible the creation and maintenance of one property database always depicting the current state of affairs but with facilities for obtaining all pertinent historical data. Furthermore controlled access to such information can be made available across the departments or even wider, through existing network infrastructure.

3.4.2 Electronic Document Management (EDM)

The proposed computer system will provide Electronic Document Management (EDM) functionality. Using high quality scanning devices this component would enable users to convert into digital images such documents as emphyteutical contracts, lease agreements, recognition letters, forms etc.; as well as property site-photos, plans and drawings. These images would be stored in a central database, and could then be accessed and downloaded by simultaneous users according to user-defined indexes. The image files require high capacity, mass storage media.

The computer system will record and manage any kind of document – photograph, scanned image, video-clips, Microsoft Word Document, Microsoft Excel Spreadsheet, CAD file, etc.

The EDM has to be integrated within the Geographic Information System (GIS). This kind of linkage provides capabilities of combined processing and intelligent queries on image documents. On the other hand, these linkages expand the capabilities to other applications as well. The integration of imaging technology provides the opportunity for the Land and Estate Management Departments to reduce the volume of paper documents, to manage image documents efficiently and safely, and to drastically shorten process turnaround time by enabling quick and intelligent simultaneous retrieval of documents.

3.4.3 Application Modules

The computer based system need to provide modules/sub-systems that allow the various users to gain access to the databases and to perform functions they require. Such functions should include functionality not provided by the current computer based systems namely - Interest Charges, Off-Site Payments of Rent, Status-Tracking, Administration of Property With Unknown Owners, Instalment Arrangements, Scenario Analysis, Thematic mapping and Process Flow Automation.

In addition to the application modules, the system needs to provide capabilities for maintaining the integrity of the database and interfaces for casual access. The maintenance capability includes user groups and logins, audit trails, archiving, backup, and security for all software and data. Casual access should be gained through a report writer.

3.4.4 GIS that Satisfies the Bread & Butter Needs (and more)

The GIS must satisfy the "Bread & Butter" needs of the user community, that is the GIS needs to address the "everyday" functions.

In Land and Estate Management Departments, the "Bread" is the parcel information and the "Butter" is all the other information which might be overlaid on a parcel (i.e. valuation, lease and rent details, acquisition details).

Clearly a modern GIS-based computer system addresses such bread and butter needs and provides extensive additional capabilities. For instance, performing the "everyday" functions with a GIS also builds knowledge and confidence in the GIS, enabling staff to be better able to move onto the more complex analysis capabilities of GIS.

3.4.5 Performance Must Match Usage

The system must be fast enough to support the every day user needs. Careful attention should be given to the system and network performance at the Land and Estate Management Departments.

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3.4.6 Easy to Use System

The GIS system must be easy to use by even the most non-technical staff. In order to be widely accepted, the GIS must be "intuitively obvious" to everyone, not just "the computer guy in the back room".

3.4.7 Public Access

The network configuration used for the proposed computer system should be readily available for the eventual possible implementation of Public Access.

One could for instance envision a Public Access Computer System that would use web technology and Internet to develop user interface and to provide the public, at a cost, with the possibility of querying, displaying, and generating maps from a subset of the property records database.

3.5 Benefits

Clearly in this target-driven, complex business process environment there are many benefits to be gained from the introduction of a GIS application. The benefits explicitly sought by the departments are listed below:

- Increased productivity through more efficient map-updates and through quicker reports compilation;

The GIS will reduce the valuation process for the Drawing Office by reducing the information retrieval time. Easily obtaining graphic and textual information on parcels such as appraisal neighbourhoods, land types, and adjacent ownership and values, will improve quality control allowing the valuers to more consistently make equitable and realistic assessments of property values for the disposal of Government property. The GIS will also be very useful in preparing maps illustrating appraisal neighbourhoods and comparative sales.

- More up-to-date, accurate and reliable information resulting from standardisation and integration of data used throughout the Ministry will result in better management of Government property;

Property management as enabled by the new information system will result in significant cost benefit to the Departments in terms of better monitoring and control against misappropriation of all government property with particular emphasis on prime sites and properties.

- Reduced expropriation burden through the quicker identification of 'costly' expropriations that need to be given priority.

Proper management techniques offered by the new information system should also help the Departments to monitor and process at a quicker pace the settlements due for land acquisition. In particular, the system could prioritise in terms of the value and locality of the acquired property and related compensation.

- New geo-processing techniques will facilitate and improve spatial problem solving procedures.

The GIS will be able generate a report of existing land uses in the vicinity of a subject parcel. Currently, the parcels in the vicinity of rezoning have to be identified manually on a zoning map, then the tenement numbers would be entered into the Land Management system to determine the existing use. The time savings realised from the GIS will enable the Departments to accomplish tasks previously too man-time intensive to justify.

- Better service to Government users and public will result from more efficient information processing;

The Departments will be able to provide an "over the counter" and telephone service to provide the public information. The Departments will also be able to service an increasing number of public requests with faster more reliable information without increasing staff. Easily accessible information enables the Departments Staff to answer requests from walk-in customers "on-the-spot", and respond to telephone requests within minutes.

- Higher quality products will be produced from more reliable, more accurate data in a more timely, efficient and cost effective manner;

The Departments might recover some costs through the sale of information and products ranging from general purpose maps to specialised reports.

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- Better use of Government resources by reducing duplication of effort in manpower and computing resources;

The information system will greatly reduced the amount of time needed to locate information, allowing staff more time to analyse the information, so they have more time to do their jobs and spend less time looking things up. The Departments will realise benefits through longer term staff attrition.

- Information integrity through a single shared database ;
- Improved co-ordination between departments and Ministries facilitating the storing of data and maps;
- Improved staff morale.

4. Recommendations

4.1 Concepts

The Land and Estate Management Departments administers Government owned land and maintains *land records*. The term land records literally means records of land information, but the scope of land records is far more beyond the literal description. Land records can be thought of as records that describe parcel status and history, indexes that relate parcels to parcel characteristic data, and maps that geographically reference parcels to administrative data (tenements, lease, acquisition, etc). The information in each land record describes the spatial, historical, administrative, and economical characteristics of a parcel of land. With the parcel as the focus, land records identify social, political and administrative boundaries and market value of the land.

A land records system can be considered as an information system in general and a geographic information system (GIS) in particular.

An integrated land records system is a combination of integrated land data, new technologies (hardware and software), and well-trained people in a restructured institution. Figure 1 shows these components and their relationship in an integrated land records system.

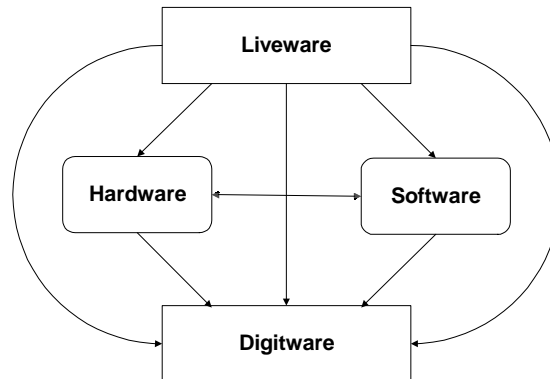


Figure 1 - Integrated Information System

Liveware used in *Maguire's* (1991) GIS definition includes well-trained individuals and well-structured institutions in the integrated land records system. Whether a land records system can be strategically and operationally functioning depends on the willingness, planning, and dedication of an organisation and common effort of all its sub-groups.

Hardware and software, as *Dickinson and Calkins* (1988) indicated in their GIS definition, reflect modern technology incorporated into a geographical information system. The advancement of technologies including hardware, software and network has had a very important impact on the development of geographical information system. As more powerful and cheaper chips are invented, the more affordable a computing intensive GIS becomes. Increasing availability of computing power to developers and end users was instrumental in implementing more realistic spatial operations in GIS packages and a GIS in an organisation. The development of Internet and client/server technology made an integrated GIS become possible.

Digitware as *Tu and Massucci* (1996) indicated in their GIS definition contains a collection of spatial and non-spatial data sets and related procedures, standards, relationships that describe how the data sets are integrated with liveware and the real world.

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4.2 Proposed Information System Outline

The Land and Construction Division hired MITTS Ltd to help defining the Departments' requirements through a series of interviews and workshops. The information was analysed to identify the functions performed by each section within the department. A set of database, software, and hardware components were identified to support these functions. The system components were matched with the required functions to develop a series of information systems that provide the information and processing capabilities required by the Departments.

This system, the Land and Estate Management Information System (LEMIS) will have the necessary functionality to manage leased properties and ground leases, track rent, lease characteristics and conditions, notices and physical property characteristics. It will also have functionality to manage outright purchase, possession and use, public tenure, release, dismemberment, easement, survey and freezing of property. The system will enable the tracking of LAB Sessions, contracts, and cheque payments.

This project will also focus on the integration with other corporate GIS initiatives in hand to assure effective communication with other key cadastral players.

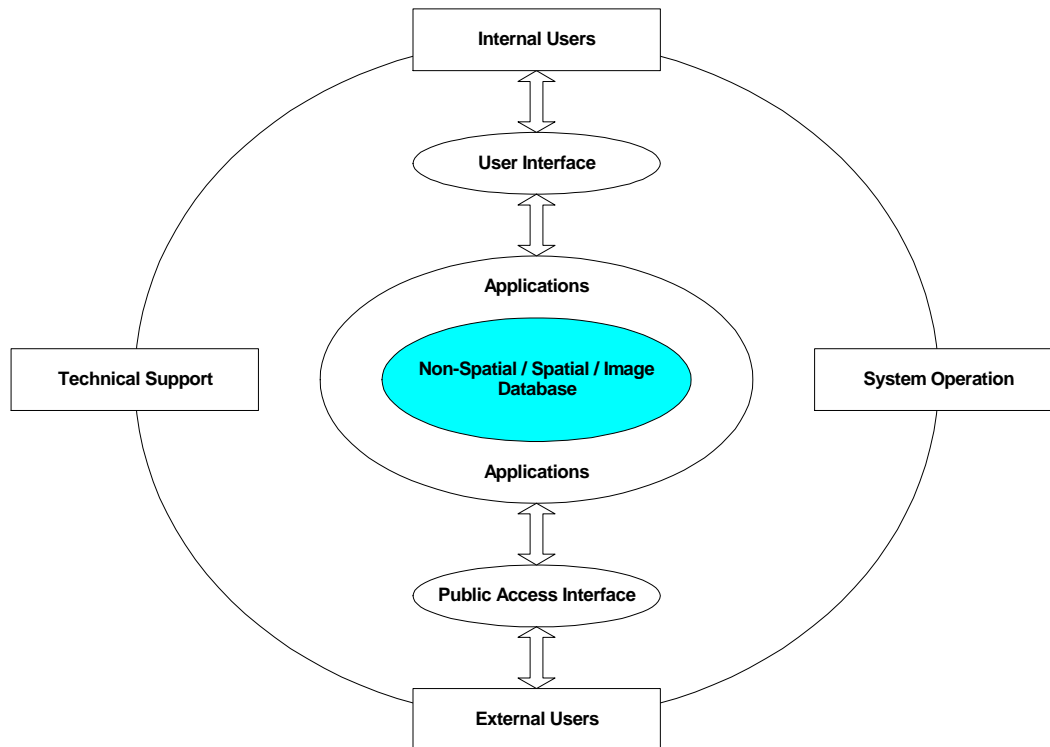


Figure 2 - Land and Estate Management Information System

The Land and Estate Management Information System will include the following subsystems:

1. Property Management GIS Subsystem
2. Revenue Management Subsystem
3. Acquisition Management GIS Subsystem
4. Electronic Document Management Subsystem
5. Additional Features such as
 - Data Conversion
 - Document Registry Link
 - Common Database

4.2.1 Property Management GIS Subsystem

The Property Management GIS Subsystem will include the following modules. Other modules could be identified during the Analysis and Design Phase.

Property / Asset Register

- To keep record of property/asset details.
- To generate and process property drawings.
- There could be cases where property has no recognised ownership or property is owned by organisations other than the Government.
- Information requirements of this module which will be supported by the proposed system include: Parcel (Internal), Parcel (External), Property, Property Type, Root of Title, Owner, Area, Area Type, File Reference, LD Drawing, Address History, Country, Local Councils, Locality, Street, Address, Plot, Plot_Link

Property Dismemberment / Amalgamation

- To keep record and process amalgamation and dismemberment.
- Information requirements of this module which will be supported by the proposed system include: Join_Split

Property / Asset Alteration / Valuation

- To keep record and process alterations and valuation of property / asset.
- Information requirements of this module which will be supported by the proposed system include: Alteration, Alteration Type, Value Revision

Property Permanent Disposal

- To keep record and process full or partial property disposals (sale, administrative transfer) and contract details pertaining to the disposal.
- To keep record and process tenders through to contracts.
- To keep record of market rates.
- Information requirements of this module which will be supported by the proposed system include: Sale, Administrative Transfer Contract, Agreement, Permit, Resolution, Policy, Government Department, Notary Public.

Property Temporary Disposal

- To keep record and process full or partial property disposals (use, under promise, transfer by law) and contract details pertaining to the disposal.
- To keep record and process tenders through to contracts.
- To keep record of market rates.
- Information requirements of this module which will be supported by the proposed system include: Use, Illegal Occupation, Under Promise, Transfer by Law, Booking, Contract, Agreement, Permit, Resolution, Policy, Government Department, Notary Public.

Tenant Register

- To keep record of person / organisation details.
- User definable organisational structure which allows for the creation of one to many relationships.
- Information requirements of this module which will be supported by the proposed system include: Tenant, Tenant Type.

Property Management Reports

Any report can take the form of a printed report, displayed on screen, comma separated file or Microsoft Excel spreadsheet.

- Tenant Report (Detailed / Summary)
- Property Report (Detailed / Summary)
- Tenant - Property - Tenancy Report (Detailed / Summary)
- Tenant - Property - Tenancy Report (History)
- Multiple Tenants
- Other reports could be identified during the Analysis and Design Phase

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4.2.2 Revenue Management Subsystem

The Revenue Management Subsystem will include the following modules. Other modules could be identified during the Analysis and Design Phase.

Tenancy Register

- To keep record and process the lease / emphyteusis, lease revision, lease termination, non renewal of lease and recognition information for each tenant.
- To keep record of market rates.
- Information requirements of this module which will be supported by the proposed system include: Tenancy, Lease Type, Conditions, Use Type, Recognition, Revision.

Tenant Rent Receivable

- Manages the rental income, interest on late payment of rent, retrospective rents and status tracking.
- The system will handle flexible rent periods, from 4 weeks to 3 years and calculates the effects of rent reviews and fixed increases even those falling within a demand period.
- Rent demands are produced automatically. The system examines all current tenant leases and identifies those where rent is due. Each lease may specify rent to be due in advance or arrears, and at any period from 4 weeks to 3 years.
- A report is produced prior to, demands being issued, which shows the amounts due from each tenant. Warnings and errors are flagged against individual demands where appropriate. The report also identifies rent reviews and fixed increases falling within the next demand period, providing a further degree of advance notice.
- A demand editor allows demands to be amended, withheld or issued "Without Prejudice".
- The financial systems are updated fully automatically as part of the demand process.
- Having reviewed the calculated demands and made any necessary changes, it is a simple matter to issue actual demands. The process is entirely automatic. Demands will be posted directly to tenant accounts.
- Information requirements of this module which will be supported by the proposed system include: Ledger, Invoice, Interest Rate, Interest, Inflation Index, Warning.

Accounts Receivable

- Manages the procedures and payments of rent for the tenant of property.
- The system will provide up-to-date information for each tenant account. Printed reports will provide full audit trail for all transactions posted in the ledger.
- Rent demands automatically update the tenant ledger. Demands can be printed on the stationary currently used by the GPD.
- Transactions include invoice, credit note, debit note - a common routine will be used for the mentioned transactions thus the system will be easier to use.
- Payments received can be applied to one or more demands from same or different accounts. Part payments will be also accepted and a receipt will be issued. Batch posting of payments will also be available to speed bank payments reconciliation.
- It is envisaged that certain procedures (e.g. payments of rent) could be effected through remote sites (e.g. Banks, Local Councils and Internet).
- Information requirements of this module which will be supported by the proposed system include: Receipt, Cheque, Bank, Payment Method, Deposit, Revenue Head.

Budget / Forecasting

- To keep record of budgets / forecasts / scenario analysis held against properties / leases.

Diary

- The diary captures details of important events and future actions as changes are made to the database. Each rent review, lease renewal is entered into the diary as soon as the database is changed. Individual entries can also be made into the diary. Each diary entry can be marked as pending or completed to enable close monitoring of events.
- Information requirements of this module which will be supported by the proposed system include: User Group, User, Event, Event Type

Portfolio Analysis and Performance Reporting

Any report can take the form of a printed report, displayed on screen, comma separated file or Microsoft Excel spreadsheet.

- Analysis of Portfolio by Location/Type/Tenure by Client
- Portfolio Analysis by Market Value by Location/Type/Tenure by Client
- Estimated Property Income
- Rental Income Flow
- Loss of Income due to unoccupied Properties
- Other reports could be identified during the Analysis and Design Phase

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Revenue Management Reports

Any report can take the form of a printed report, displayed on screen, comma separated file or Microsoft Excel spreadsheet.

- Tenancy Report (Detailed / Summary)
- Tenancy - Property Report (Detailed / Summary)
- Tenancy - Tenant Report (Detailed / Summary)
- Tenants with more than one tenancy
- Property with more than one tenancy
- Balance due
- Balance against Last Payment
- Pre-reminder report
- Reminders
- Further reminders
- Rent Arrears
- Aged Rent Arrears
- Arrears Collection Report
- Arrears by Date of Last Payment
- Payment Report
- Deposit Report
- Demand/Credit Register
- Cash receipts Register
- Tenant Statements
- Revenue Potentials
- Cash Flow Forecasts
- Instalments Report
- Arrears Follow-up
- Instalment Follow-up
- Diary - Lease Expiry
- Diary - Rent Review
- Other reports could be identified during the Analysis and Design Phase

4.2.3 Acquisition Management GIS Subsystem

The Acquisition Management GIS Subsystem will include the following modules. Other modules could be identified during the Analysis and Design Phase.

Acquisition Management

- To keep record and manage requests for full or partial acquisitions.
- To keep record and process tenders through to contracts.
- To generate and process property drawings.
- Information requirements of this module which will be supported by the proposed system include: Parcel (Internal), Parcel (External), Request, Request Type, Purpose, Minister, Government Department, File, File Relation, President Declaration, Government Gazette, Newspaper Advert, LAB Sessions.

Accounts Payable

- To keep record of accounts, amounts to be paid to previous owners for possession and use and public tenure, and amounts to be paid for loss of crops.
- Information requirements of this module which will be supported by the proposed system include: Person, Person_Relation, Contract, Account, Payment, Cheque, Loss of Crops.

Acquisition Management Reports

Any report can take the form of a printed report, displayed on screen, comma separated file or Microsoft Excel spreadsheet.

- Reports will be identified during the Analysis and Design Phase.

4.2.4 Electronic Document Management

The Electronic Document Management will include the following modules. Other modules could be identified during the Analysis and Design Phase.

Electronic Document Management

- To keep record and manage any kind of document – photograph, scanned image, video-clips, Microsoft Word Document, Microsoft Excel Spreadsheet, CAD file, etc.
- The system will print barcode onto labels. The printed label will be attached to the plan / document and sent for scanning. The scanner will read both the plan / document and barcode affixed to it. The barcode will serve as a link between the images produced and their related data records in the LEMIS database tables.
- Information requirements of this module which will be supported by the proposed system include: Document, Document Type.
- Provide automation possibilities for the drawing up of lease agreements and contracts.

EDM Reports

Any report can take the form of a printed report, displayed on screen, comma separated file or Microsoft Excel spreadsheet.

- Reports will be identified during the Analysis and Design Phase.

4.2.5 Additional Features

The Additional Features will include the following modules. Other modules could be identified during the Analysis and Design Phase.

Insurance

- To keep record and process property's insurance policy.

Bank Guarantee

- To keep record and process bank guarantees details.

Request

- To keep record and process requests being made by general public.

Prospect

- To keep record and process prospective tenants.

Permit Account

- To keep record and process issuing of permits, permit fees and payments for each person.
- To be integrated with the Accounts Receivable.

Other Account

- To keep record and process legal fees and payments for each person.
- To be integrated with the Accounts Receivable.

Energy Management

- To keep record and process meter recordings, statistics, monitoring and cost comparison analysis.

Condition Survey

- To keep record and provide structured management of condition surveys for a variety of classifications of property.

Planned Maintenance / Inspections

- To keep full control of cyclic maintenance and inspections.

System Maintenance

- To keep record and maintain user groups and logins, archiving, audit trails, backup, and security for all software and data.

Additional Features Reports

Any report can take the form of a printed report, displayed on screen, comma separated file or Microsoft Excel spreadsheet.

- Bank Guarantee Renewal
- Bank Guarantees - Renewal Notice
- Insurance Renewal
- Insurance - Renewal Notice
- Request Report
- Prospective Tenants Report
- Other reports could be identified during the Analysis and Design Phase

4.2.6 Data Conversion

A separate module will be developed to convert and transfer data residing in all existing systems into the new system. The systems currently in place in the Land and Estate Management Departments are Land Management System, Cheque Printing System, Document Registry System and Property Drawing System.

Extra effort will be made to reduce user intervention during data conversion. It is anticipated that GPD personnel have to enter the addresses, since the current addresses are not stored in a reference table. The amount of time needed for the capturing of address information will be further reduced by the use of the Common Database (CdB). GPD personnel would only have to type in the addresses not found in the CdB.

4.2.7 Document Registry Link

A separate module will be developed in order to integrate the new LEMIS with the new Document Registry system.

4.2.8 Common Database

A separate module will be developed in order to enable GPD personnel to automatically check the list of dead persons supplied from magnetic media from the Common Database (CdB). This module will also cater for the validation and periodic update of data residing in the LEMIS against the data supplied from the CdB.

4.3 Hardware and Network Configuration

The backbone of the LEMIS is hardware and network. It will consist of servers and PCs connected through a local area network. The Gozo Land Department is one of the remote sites identified.

The major components in LEMIS will be servers, PCs, and peripheral devices. The servers include file/database server and print server. File/Database server manages user accounts and system access rights and provides capabilities for LEMIS to store, access, and process databases. The Print server provides output services including print job queuing, scheduling, and processing. PCs include digitising workstation, graphic display workstation and mass storage devices. Peripheral devices include scanners, printers, plotters, and multi-media devices.

4.4 System Support and Operation

This is the human component of the LEMIS. It consists of technical support, operation, maintenance, and end-users.

5. Project Implementation and Integration

The Lands Information System is very complex, and will require a number of years of development and integration; the involvement of several Land and Estate Management Departments sections, and significant funding. This section discusses the major implementation processes and issues involved in integration.

5.1 Implementation Strategy and Procedures

There are three basic strategies used in implementing LEMIS:

- **Institutional re-structure :**

A ready organisational structure is the guarantee for the successful implementation of the system. In particular, the organisation restructuring brought about by the business process re-engineering implied by the new system needs to be monitored as the department gradually migrates from manual to automated operations.

- **Allocation of resources based on priority :**

Given the multitude of tasks required in implementing such a complex system, it is crucial to prioritise the development of applications and to allocate resources based on the importance of the tasks. In this regard it is imperative for the Land and Estate Management Departments to allocate an effective level of resources at the various stages of the project.

- **Structured and phased implementation approaches :**

The implementation process can be divided into discrete development tasks which are followed by a phased implementation activity as the Land and Estate Management Departments deploys specific LEMIS modules to gradually migrate from manual to fully automated operations.

This structured and phased implementation entails these top-level primary tasks:

- ♦ Staggered systems analysis, design, development, testing and roll-out sequences for the primary GIS and Revenue Management subsystems.
- ♦ On commissioning of the GIS subsystem, a gradual (map sheet or tile by tile) data capture, conversion and integration process will be initiated. In this phase, manual operations are still performed on the unconverted map sheet or tile areas while the GIS LEMIS subsystem will be deployed within those geographic areas covered by the converted map tiles. The Land and Estate Management Departments will be fully automated when all map sheet tiles are processed thus allowing all business processing to be done through LEMIS.

5.2 Data Capture, Data Conversion and Database Integration

Data capture and conversion is one of the most time-consuming process in the implementation of the lands information system. The duration of this phase can be set by the Land and Estate Management Departments and will depend upon the allocated resources and the actual complexity of the data recorded in the individual map sheets being converted.

5.2.1 Data Capture and Conversion

Land and Estate Management Departments (Malta) have 7 data sets as follows:

- Malta - Government Tenements (1900) - 150 maps (static)
- Malta - Government Tenements (1968) - 150 maps (working copy)
- Malta - Ex-Services, Surrender and Sales (1968) - 150 maps (working copy)
- Malta - Acquisitions (1968) - 150 maps (working copy)
- Malta - Acquisitions (1957) - 50 maps (static, and currently being transferred to Acquisitions (1968))
- Gozo - Acquisitions (1957) - 45 maps (working copy)
- Gozo - Government Tenements (1957) - 45 maps (working copy) (*)

Land Department (Gozo) have 1 data set as follows:

- Gozo - Government Tenements (1957) - 45 maps (working copy) (*)

(*) Reconciliation between the 2 versions needs to be done before data conversion is initiated.

Overall, the Land and Estate Management Departments have about 28,000 parcels (tenements), and an unknown number of unregistered areas and wasteland. This excludes government property in Gozo.

One common aspect among all these datasets is the map sheet tiling scheme used. The total national coverage for every data set is divided into about 200 map sheets or tiles each representing a physical area 2 Km long by 1 Km wide.

The data conversion processes will be applied to the same geographic tile across all data sets. Every map sheet is converted by cycling through:

- A **Scanning** process to create a raster image of the map sheet or tile,
- A **Registration** process to fix the raster image in geographic space by assigning map coordinates matching the underlying digital map base,
- An **Annotation** process to capture in digital form all annotations on the map sheets which have by time and use degraded to a fair degree in some datasets, and
- A **Digitising** process to convert the parcel boundaries on the mapsheets into 'intelligent' digital polygon coverages which integrate non-spatial attribute data through the use of unique parcel identifiers. This process is applied only to selected datasets namely the tenements and the acquisitions layers.

5.2.2 Database Integration

The components and processes driving the integrated LEMIS database is shown in figure 3. The functionality of the proposed lands information system is derived from the seamless and totally integrated manner in which both spatial and non-spatial data is stored in the database.

Spatial Datasets

As already depicted above, the spatial datasets include both the static raster data sets and also the dynamic, 'intelligent' vector based datasets.

Apart from the raster and vector datasets produced from the conversion process, the collection of spatial datasets will also include the following common strategic datasets:

- The digital vector map base of the Maltese islands as created by the Planning Authority. This data will be available at a resolution of 1m throughout the national coverage (as already available at the Land Department) while most urban areas will also be available at 0.3m resolution.
- A raster orthophoto national coverage with a pixel resolution of around 0.3m, also compiled by the planning authority, will be used to complement the digital base map data.
- A vector historical parcel dataset which will record all changes by implementing the concept of child and parent properties.
- A vector based set of address data layers which include island, council locality boundaries, streets and address-point data. This will enable the standardisation of textual addresses and also allows person/address link information to be obtained through interfacing with the Common Database (CdB) initiative.

In addition, other department specific vector data-sets will also be integrated such as a Valuation Zoning layer depicting the relative value of property depending on its location.

Non-spatial Datasets

The current Land Management System (LMS) contains property details, lease details, billing addresses and details, and property history. The LMS data resides in Dataflex tables on the Novell server, and all the tables will be downloaded and converted into ASCII data sets. All data sets will be loaded into temporary Informix tables, data will be processed and then transferred to the central Informix database.

In addition, scanned images of contracts, documents, and drawings will also be stored as non-spatial data. This information is however matched or indexed with Informix data sets through parcel identifiers and integrated with spatial data sets.

5.3 System Maintenance and Upgrade Stage

After accepting the system, an organisation will start its production period. The system will be primarily operated by the staff and maintained and supported by the project team. The GIS design and implementation processes do not stop here. The system upgrade occurs when system refinement requests and system expansion requests have been placed. Refinements may come from the advancement of technologies (software and hardware) and new knowledge gained in the operation of the system. Expansions arise out of incorporation of new users and functions (e.g. public access through Internet) initially impossible to be implemented.

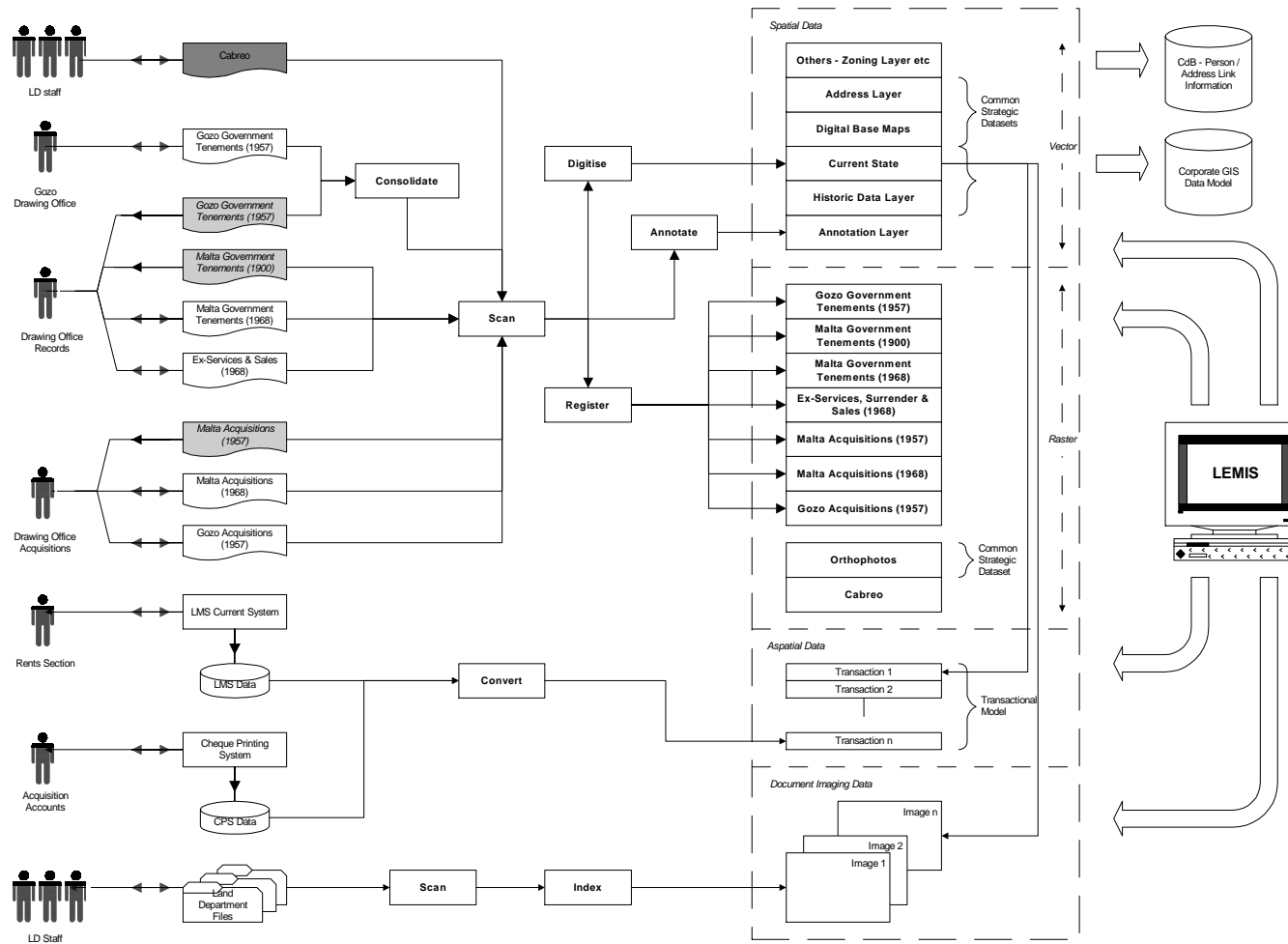


Figure 3 - Database Integration Flow Chart

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6. References

Dickinson, H., Calkins, H. W., 1988, "*The economic evaluation of implementing a GIS*," International Journal of Geographical Information Systems, 2: 307-27.

Maguire, D. J., 1991, "*An overview and definition of GIS*" Geographical Information Systems Principles and Applications, Volume 1: 9-20, Longman Scientific & Technical.

Tu, H., Massucci, M, 1996, "*An integrated Land Records System: Its Conceptual Design and System Implementation*"

7. Appendix A - Acquisition Process Flow Diagrams

7.1 Land Acquisition Ordinance

The Land Acquisition Ordinance provides that the President of Malta may declare, through an apposite declaration published in the Government Gazette, land to be:

- Required for public purpose, and/or
- Subject to clearance or subsoil rights.

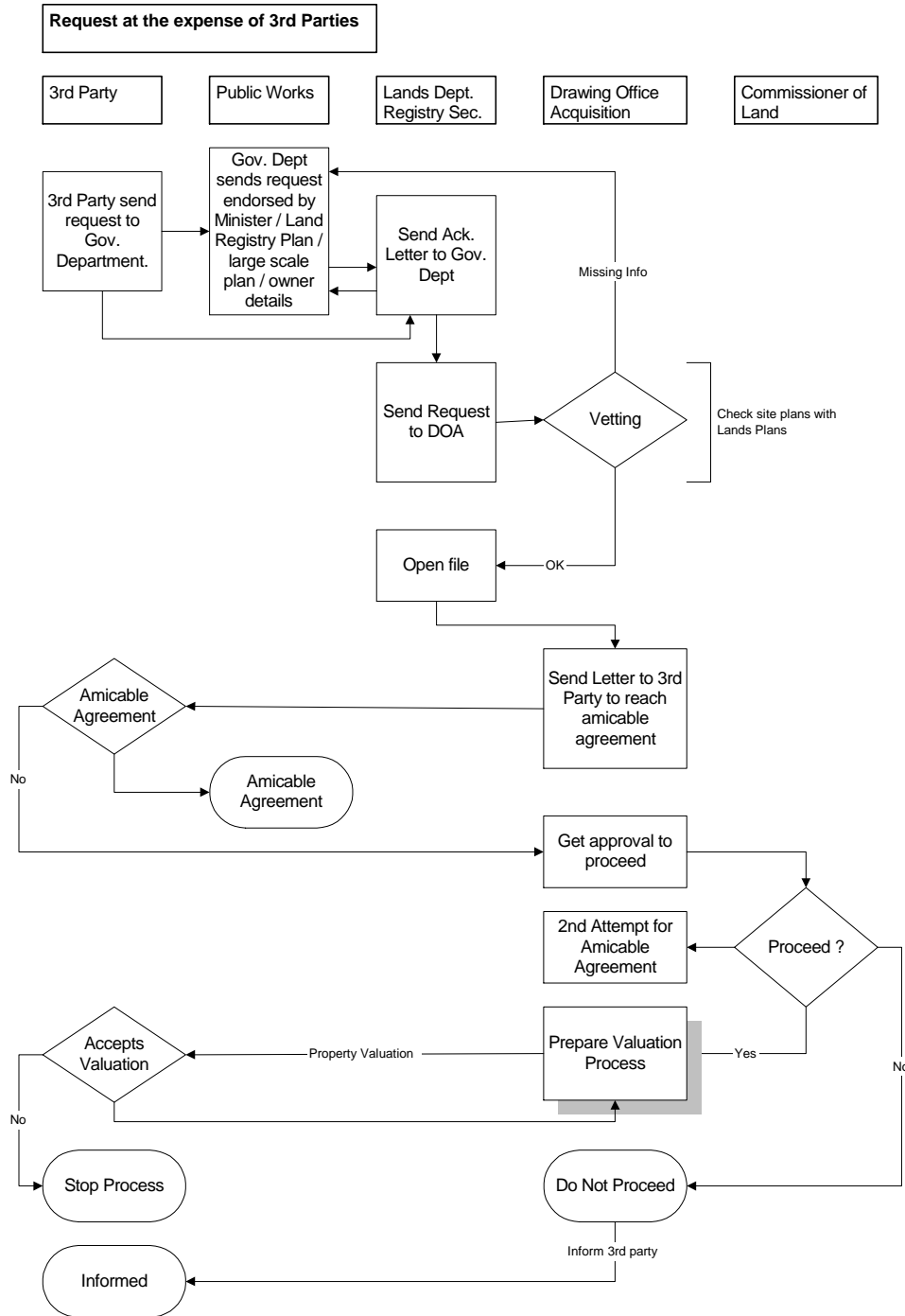
Furthermore, land may be acquired for any public purpose, either

- by absolute purchase; or
- on possession and use terms; or
- on public tenure

7.2 Absolute Purchase

Land may be acquired for any public purpose by absolute purchase.

7.2.1 Request at the expense of 3rd parties

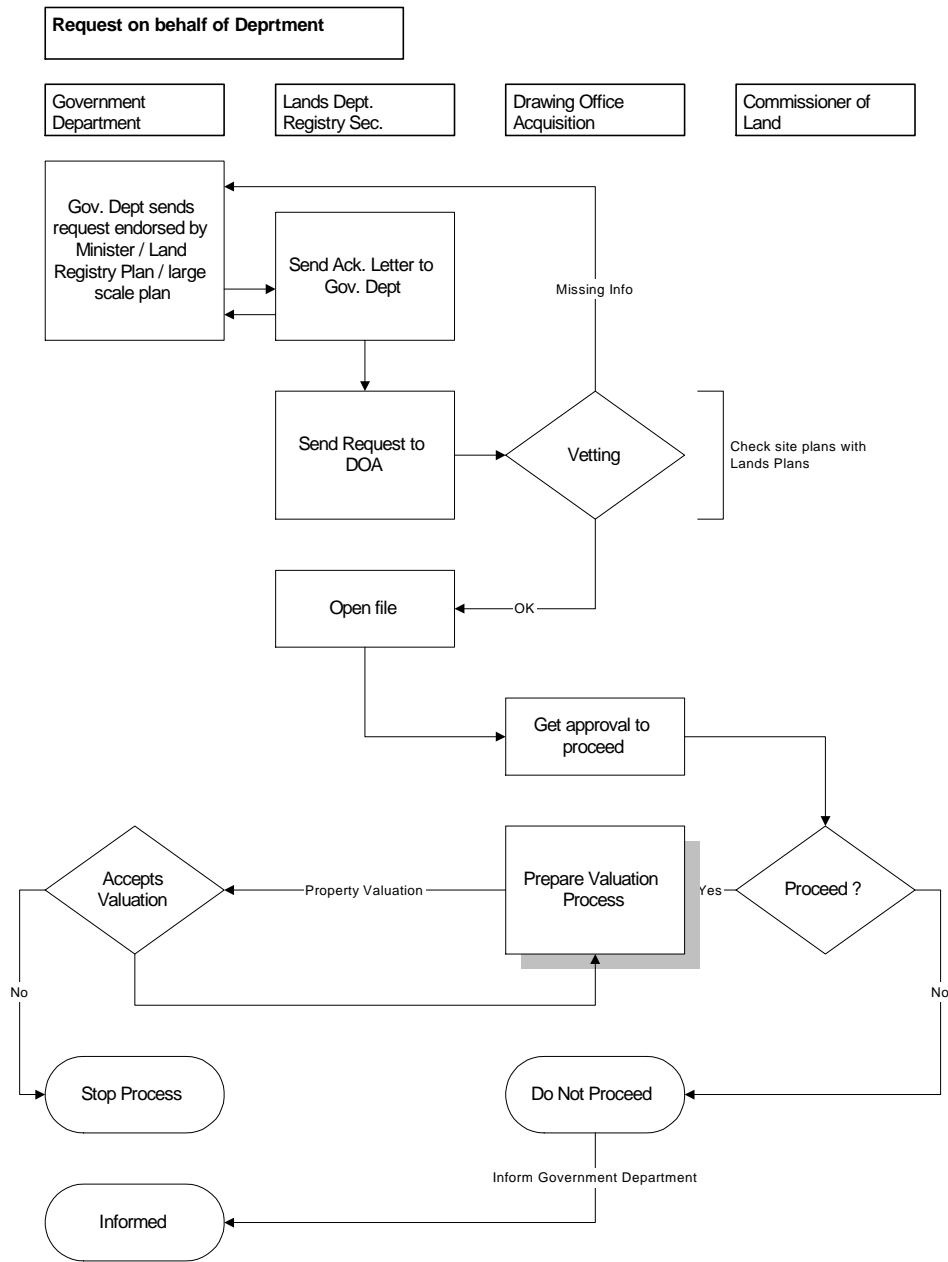


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Request at the expense of 3rd parties (continued)

- Any request from a 3rd party regarding lands acquisition is sent to the Public Works Department.
- Public Works department sends request endorsed by Minister, Land Registry plan, large scale plan and owner details to Land Department.
- Registry sends acknowledgement to Public Works department.
- These documents are vetted for any dubious, or left out, information.
- Registry opens manual file.
- Drawing Office Acquisition sends letter to 3rd party asking to seek amicable agreement with owner.
- If amicable agreement is not reached, file is passed to the Commissioner of Lands for the determination of procedure.
- If an amicable agreement is reached, the process comes to an end. It would be ideal that the third party informs the Drawing Office Acquisition Section for it to be able to update and close the file.
- If the request is not allowed to proceed, send letter to inform 3rd party.
- If the request is allowed to proceed start valuation process.

7.2.2 Request on behalf of Government Department

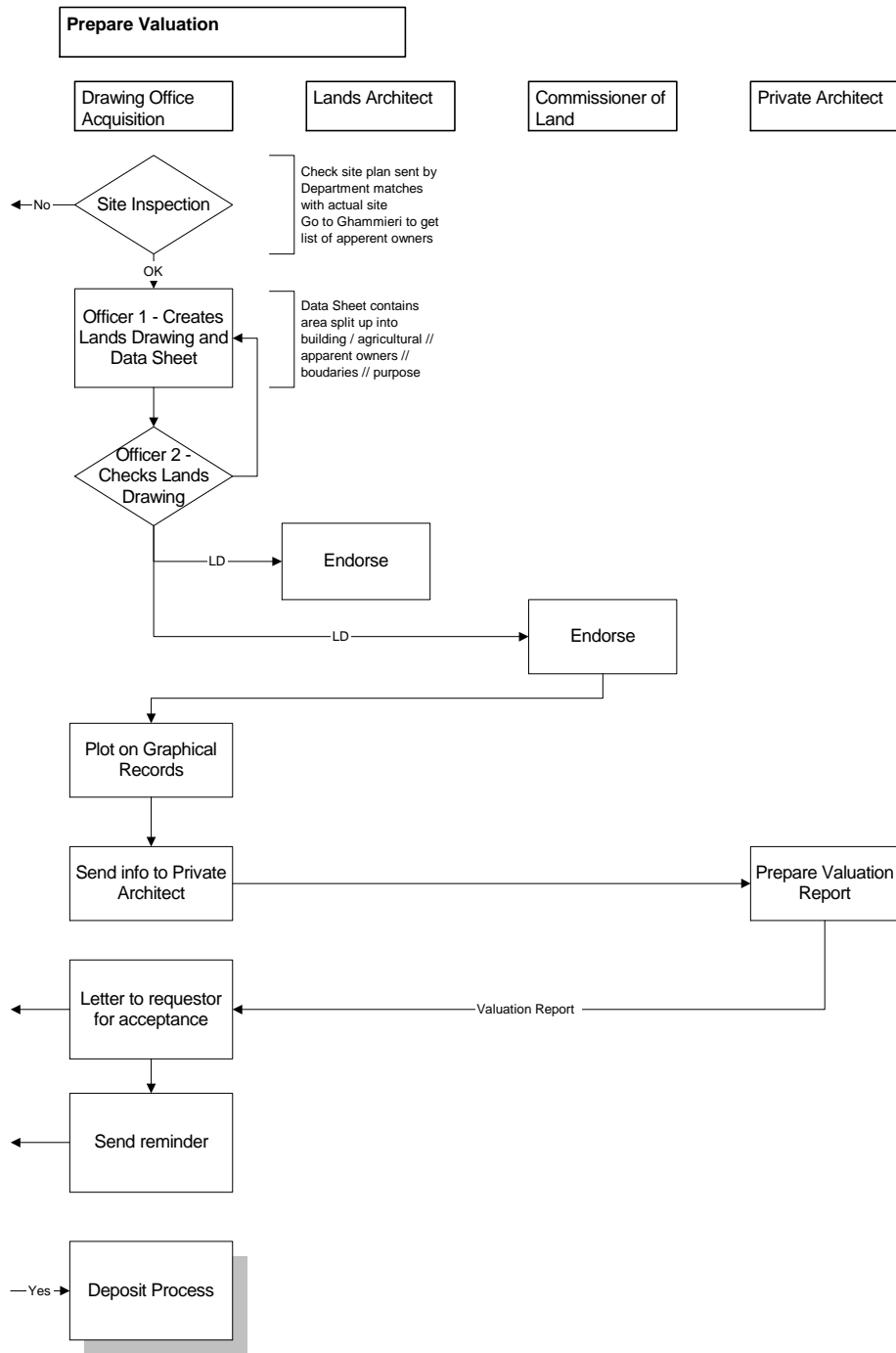


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Request on behalf of Government Department (continued)

- Government department sends request endorsed by Minister, Land Registry plan, large-scale plan to Land Department.
- Registry sends acknowledgement to Government department.
- These documents are vetted for any dubious, or left out, information.
- Registry opens manual file.
- File is passed to the Commissioner of Lands for the determination of procedure.
- If the request is not allowed to proceed, send letter to inform Government department.
- If the request is allowed to proceed start valuation process.

7.2.3 Prepare Valuation

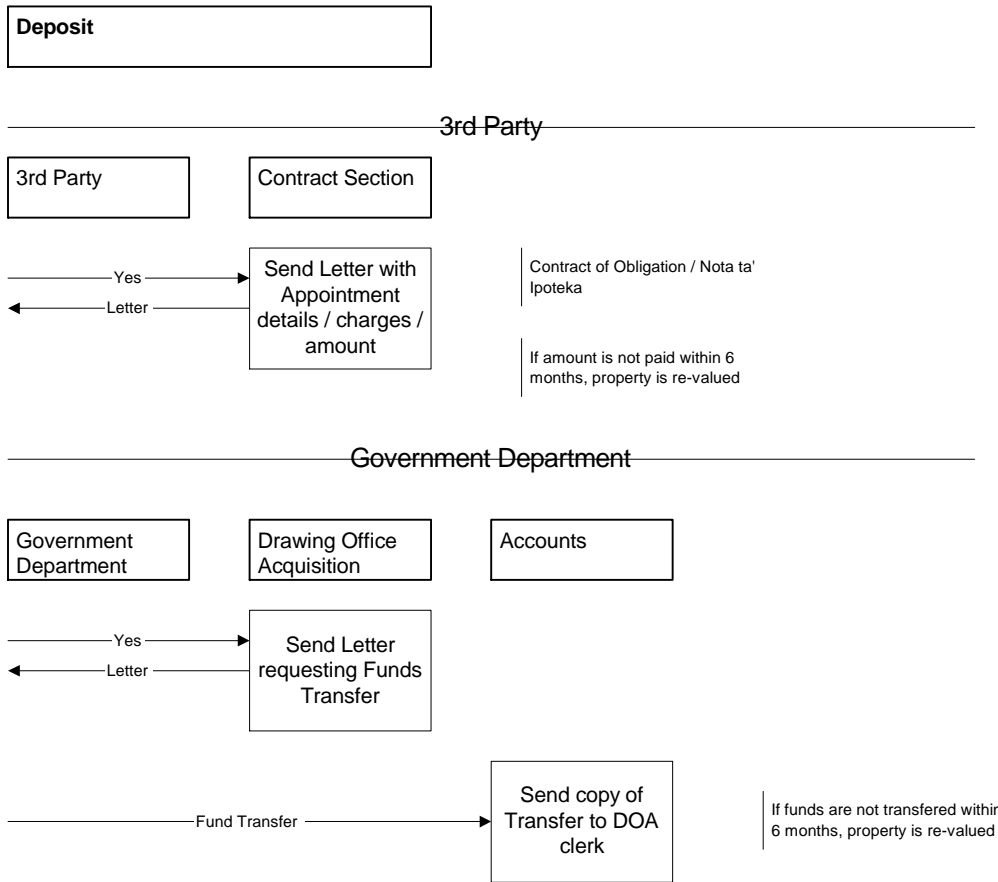


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Prepare Valuation (continued)

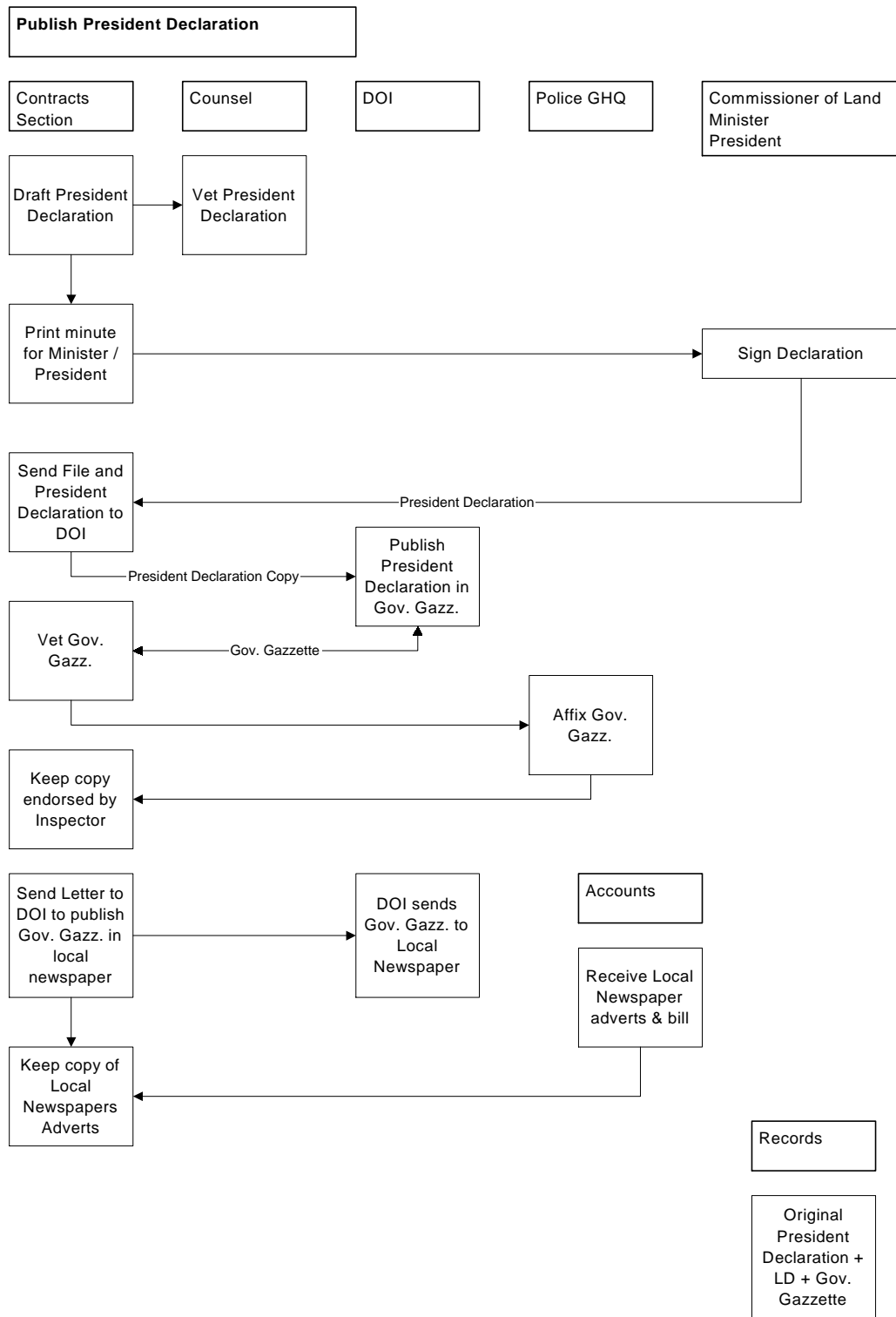
- Drawing Office Acquisition (DOA) Officer carries out site inspection – matching information provided against actual site.
- DOA Officer gets list of apparent owners from Government Farm.
- DOA Officer creates Lands Drawing (LD) and Data Sheet.
- DOA Officer 2 vets Lands Drawing (LD) and Data Sheet.
- Data sheet is endorsed by Lands Architect and Commissioner of Land.
- DOA Officers plots site on map and information is send to Private architect.
- Evaluation Report is initiated. If this information is late, a reminder is sent.

7.2.4 Deposit



- In the case of private entity, letter of acceptance is issued and contract of obligation is sent to be signed. If the department is not contacted within a specific time limit a reminder is send.
- In the case of Government entity, a letter requesting the transfer of funds is issued. These funds are later send to the Accounts department, which in turn send a copy of the transfer to the Drawing Office Acquisition.

7.2.5 Publish President's Declaration

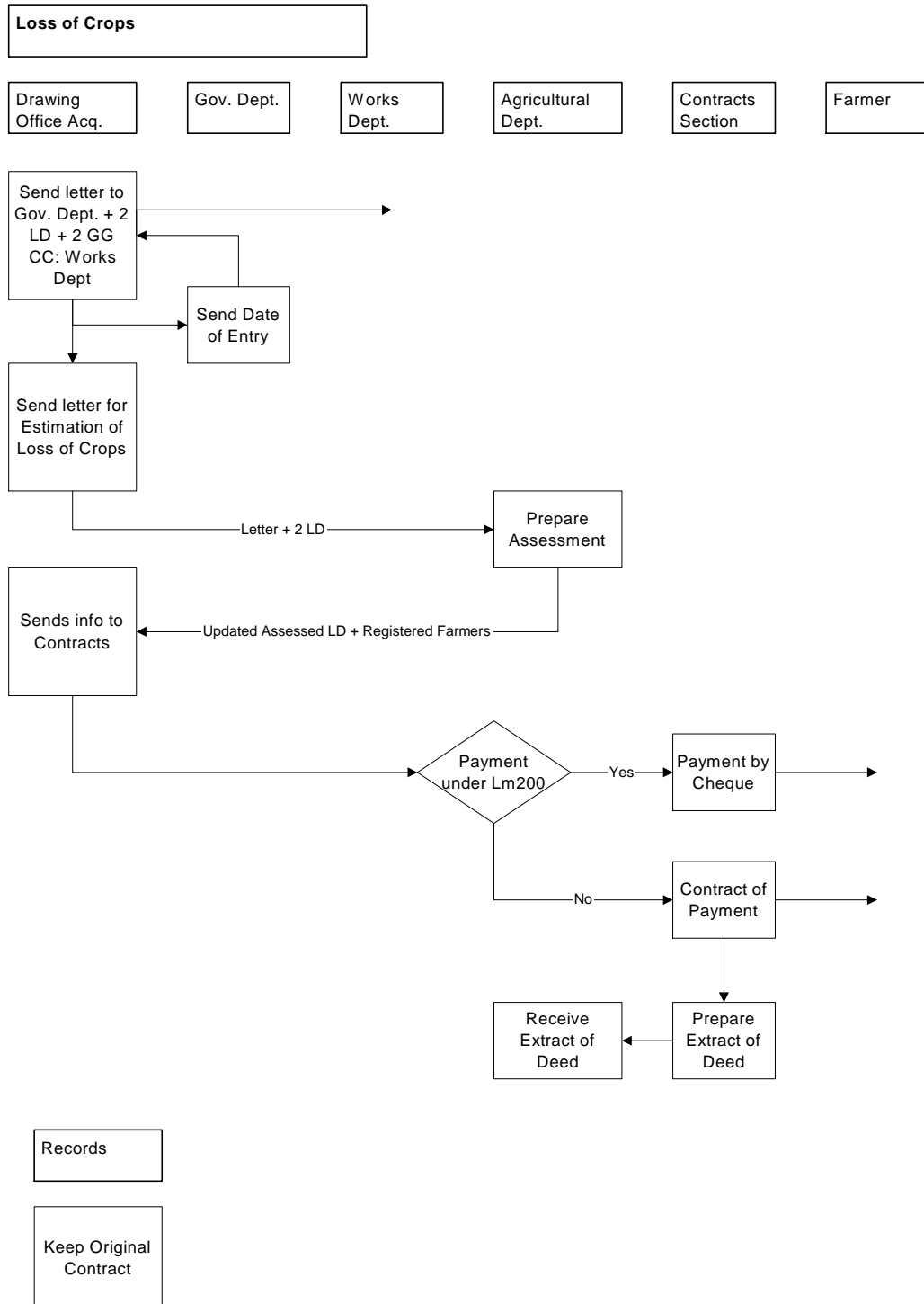


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Publish President's Declaration (continued)

- Contracts section drafts President's declaration and Legal Counsel vets it.
- Minute for minister/ president is printed and is then endorsed via covering letter from the Commissioner of Land.
- After that the President signs declaration, a copy is sent to DOI to publish it in the Government Gazette.
- Contracts section vets Government Gazette. Corrections are sent back to DOI.
- Declaration is affixed in the relevant police station. Concurrently, a letter is send to DOI to publish the declaration in local newspapers.
- Local newspapers' bills are received by the Accounts section, which settle the debt and sends a copy to the contracts section.
- The original President declaration, Land drawings and Government gazette are stored by the Records section.

7.2.6 Loss of Crops

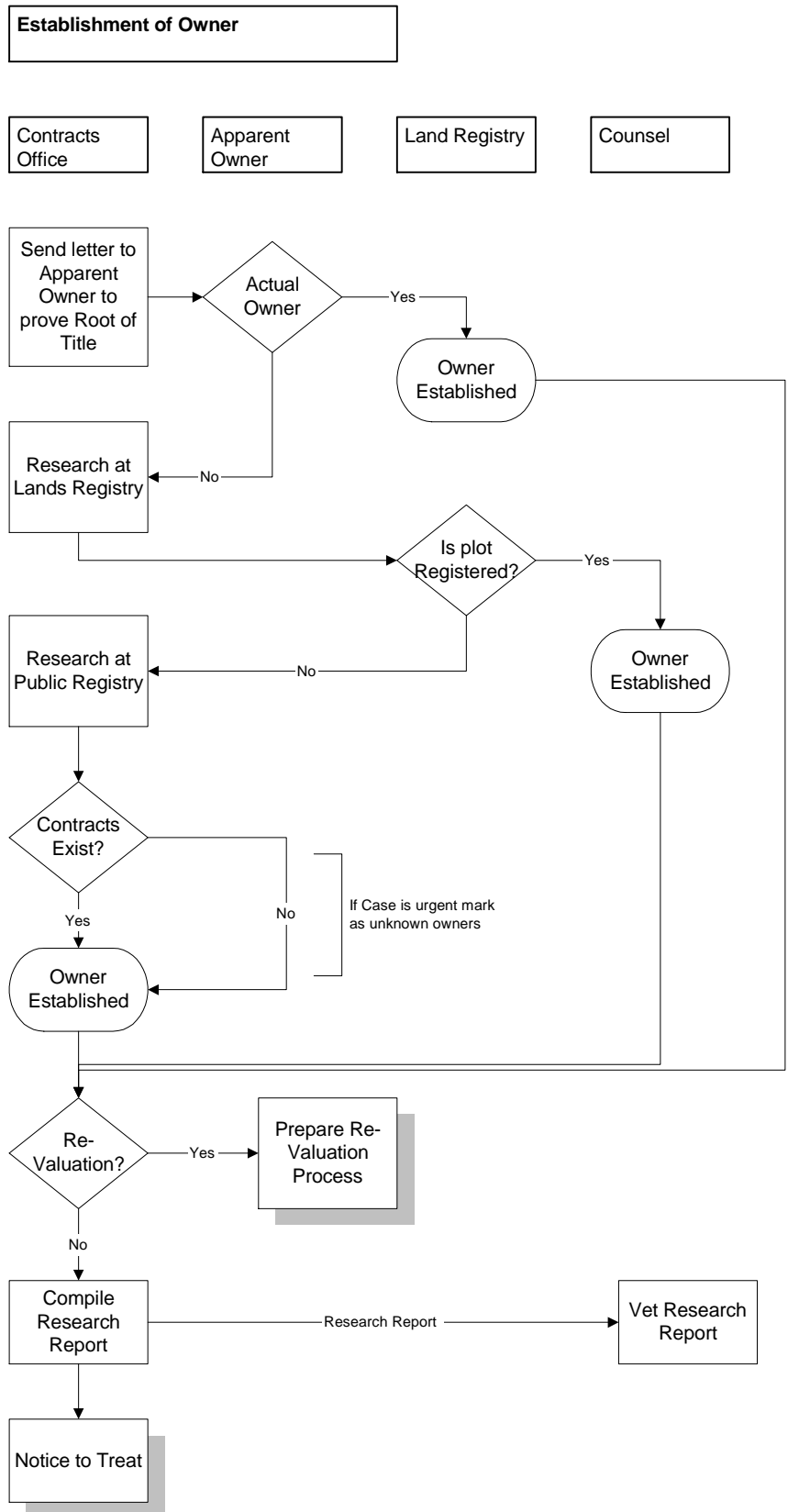


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Loss of Crops (continued)

- In the case of cultivated land additional compensation must be paid for any agricultural improvements made and also for loss of crops. This compensation is paid only to the tenant of such land and is therefore not paid where the cultivator is the owner.
- Drawing Office Acquisition sends two copies of the Government gazette and two copies of the Land drawing to the Works department.
- Concurrently, date of entry is send to the Government department and a letter for the estimation of Loss of Crops is send to the Agricultural department.
- The Agricultural department prepares the assessment and sends it to the Drawing Office Acquisition, which in turn sends it to the Contracts section.
- If payment is less than Lm200, a cheque is issued to farmer or land owner.
- If payment is more than Lm200, then a Contract of Payment is issued. Farmer receives Extract of Deed.
- Records keep original contract.

7.2.7 Establishment of Owner

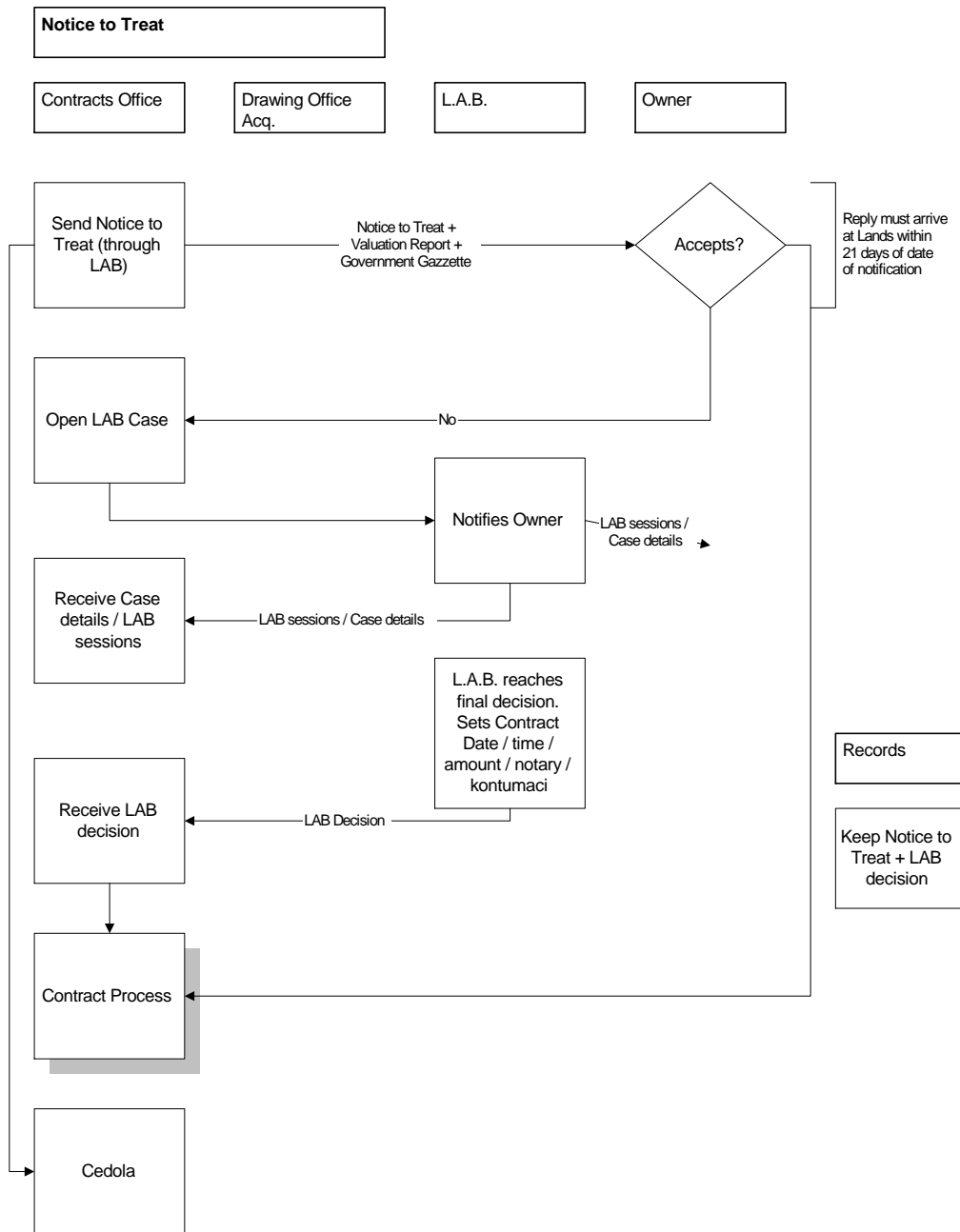


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Establishment of Owner (continued)

- Contracts office sends letter to apparent owner to prove Root of Title. If the person is the actual owner, there could be a revaluation of land carried out (6 months have passed from the previous revaluation), from which a report is compiled and the owner is again notified.
- If the person contracted is not the actual owner, Contracts office carries research at the Lands Registry. If plot is registered, then owner can be established, where the revaluation process can be carried out and a report is compiled and the owner is notified.
- If the plot is not registered, research is carried out at Public Registry. If a contract exists, then owner can be determined.
- There could be cases where land has no recognised ownership and in such cases, it is considered as “unknown owners” or “uncertain owners”.
- Contracts compile Research report which is then vetted by the Counsel.

7.2.8 Notice to Treat



Notice to Treat (continued)

- Contracts office sends Notice to Treat to the Apparent owner who either:
- Accepts and the contract processes is initiated, or
- Rejects and Land and Estate Management Department opens a case at the Land Arbitration Board.
- LAB reaches final decision. Contract conditions and characteristics are determined.
- The LAB decision passes information to the Contracts office, from which Contract formulation process commences.
- Notice to Treat and LAB decision are kept by the Records department.
- Sometimes Cedola is utilised, given that the land is required urgently.

7.2.9 Contract Process



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Contract Process (continued)

- Contracts Office checks with the Public Registry, whether owners have any outstanding debts or liabilities.
- Contracts Office checks with the Lands Registry, whether owners have any outstanding debts.
- Contracts Office checks with the Land and Estate Management Department Accounts Section, whether owners have any outstanding debts.
- The Contracts office, drafts the contract and sends it to the Commissioner of Land who vets it and sends it back. The department sends for all people who have to appear on the contract.
- Contract is signed. If property bought is within the Registration area, a copy of the Contract and of the Plan are sent to Lands Registry.
- If payment is done by instalments, Note of Privilege is signed. This is then registered at the Public Registry and sent to the Notary Public who updates it, makes a copy of the contract and sends the original to Notary to Government.
- Concurrently, after signing the contract, Notary Public registers Contract and Hypotech. These are also registered at the Public Registry.

7.3 Possession and Use

Land may be acquired for any public purpose on possession and use terms (for a stated time or as long as the public interest requires it) in which case a yearly acquisition rent is paid to the owners.

Possession and Use is valid for 10 years then property could either:

- be released, or
- converted into a public tenure, or
- into an outright purchase

Requests for Possession and Use comes from a Government Department.

The process is similar to the outright purchase with the only differences in the Valuation process where the Architect formulates a Descriptive Report. The acquisition rent payable to the owners is determined by the LAB according to pre-specified criteria laid down in LAO. In practice however acquisition rent normally, unless challenged in front of LAB, established by the department as that appearing in the registers of the Land Valuation Office at the Public Registry.

7.4 Public Tenure

Land may be acquired for any public purpose, on public tenure (a kind of perpetual emphyteusis in favour of government) - a yearly recognition rent is paid to the owners in perpetuity.

Process is the same as for Possession and Use. The Architect formulates a Descriptive Report. The recognition rent payable to the owners is established by the Rent Regulation Board.

Public Tenure can also be a result of a conversion from Possession and Use.

7.4.1 Conversion from Possession and Use

If there is a contract for Possession and Use, Architect certifies that building is required permanently. Architect formulates a Conversion Certificate.

Contracts Office establishes Owner and contract is signed. Amount paid is equivalent to the rent amount increased by 40% (can be backdated upto 10 years)

If contract for Possession and Use does not exist. Architect still formulates a Conversion Certificate.

7.4.2 Redemption

Government may, on application of the owner, redeem the recognition rent payable thus acquiring full ownership. Redemption is presently made by capitalising the rent payable by 5%.

7.5 Release

At any point the Department might release the property which is under possession and use.

The Department has to file a request to release. The Valuation process is similar to the outright purchase with the only difference is that the Architect formulates a Descriptive Report.

Contracts conduct research to establish owner. Owner has to sign a waiver declaring that he will not sue the Government for damages.

President's Declaration is issued on the Government Gazette.

Drawing Office Records mark released plot on map.

7.6 Easement

Process is the same as for Outright Purchase with the addition that the Request must also include cross-section elevation plan.

7.7 Survey

There are cases when the owners refuse to co-operate and do not allow the Department officers in their property to take the measurements.

The Department has to submit a request to survey. Architect formulates a Descriptive Report.

President's Declaration is issued on the Government Gazette.

7.8 Freezing

There are cases when the Government needs to freeze a huge area of land so that no developments can be undertaken in that area.

The Department has to submit a request to freeze. Architect formulates a Descriptive Report.

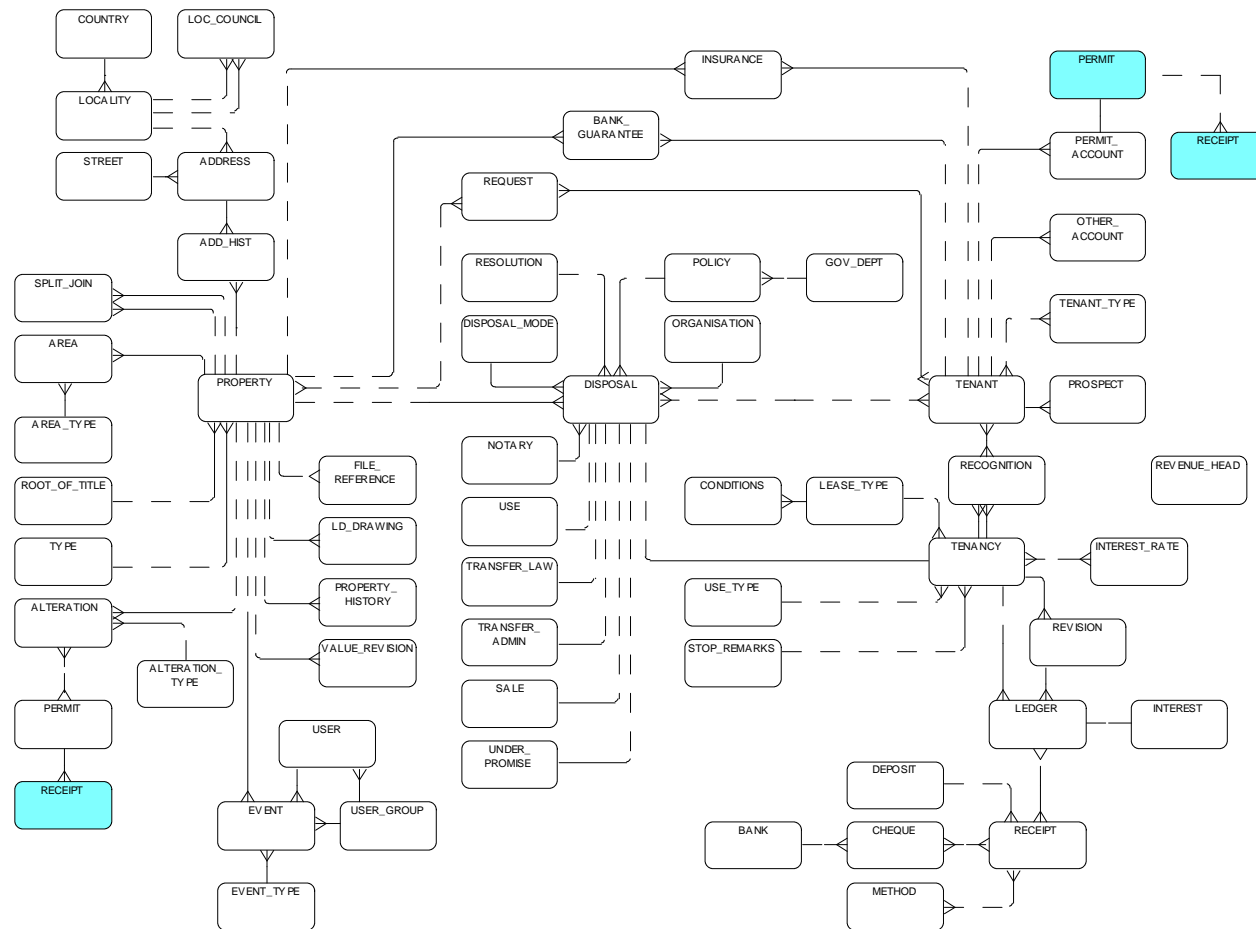
President's Declaration is issued on the Government Gazette.

The Freezing is valid for 5 years and has to be renewed through President's Declaration published on the Government Gazette

8. Appendix B - High Level Data Model

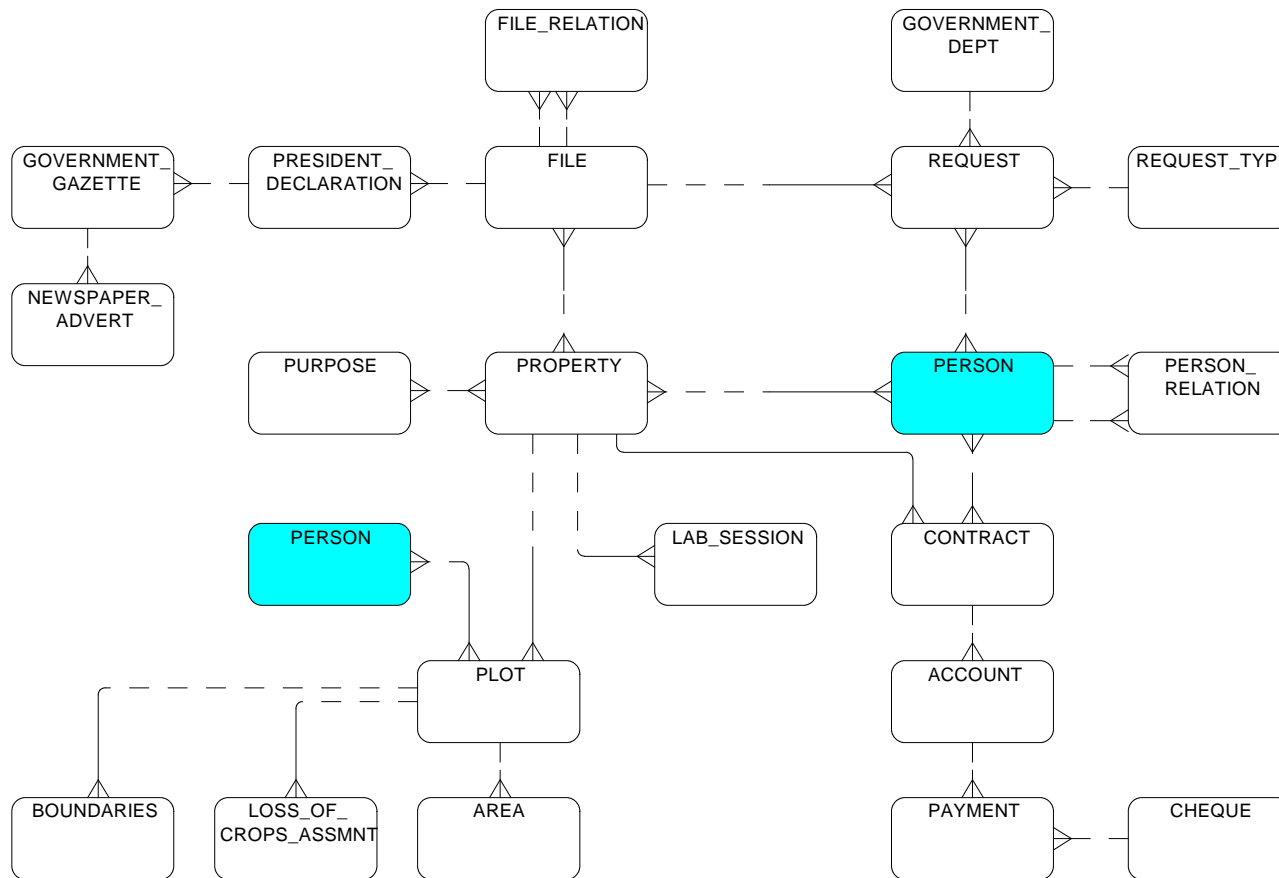
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8.1 Property Management & Revenue Management



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8.2 Acquisition Management



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