

LARA

LAND REFORM IN AFGHANISTAN PROJECT

SYSTEM DESIGN DOCUMENT

MANATRON, INC. – A THOMSON REUTERS BUSINESS

ALRMIS

Arazi Afghanistan Land Authority

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Executive Summary

The Land Reform in Afghanistan (LARA) project is working with the appropriate Afghan authorities to implement an IT solution for improving of government land, lease, and monitoring system. The main objective of the system is to provide a tool for land and property rights in one integrated and comprehensive database management system for the Islamic Republic of Afghanistan. To provide for this solution, this document has been drafted to explain to the client how the proposed solution will satisfy the list of requirements provided by Thomson Reuters System Analyst Miguel Angel Sanjines.

This document defines system requirements including supported workflows, users or user groups to be configured in the system. This document has been developed in collaboration with the other consultants based on a document prepared during a visit to Afghanistan by Thomson Reuters System Analyst, Miguel Angel Sanjines.

This document contains information required to start the configuration of the base software application for Arazi Office for the ALRMIS Project. The system will support operational work for the Arazi office including automation of procedures for the registration of rights and interest of registered lands and will provide the following core processes:

- Support the automatic or semi-automatic generation of outgoing paper reports that are required by law and regulations.
- Support the scanning of all submitted documents and outgoing documents generated by the system.
- Support the scanning and encoding of property related archive paper records.
- Provide workflow integration with the Cadastre Management System (GRM Cadastre) so as to maintain a property index map with unique property identifiers for government land.

This document represents the completion of a key iterative design process within the ALRMIS, and contains the necessary topics identified by the system analyst to commence configuration of Thomson Reuter's base software products: GRM Registry and GRM Cadastre.



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1 INTRODUCTION

1.1 Purpose

This document details the user and system requirements for the implementation of information technologies for the ALRMIS. Automation of the registration processes will involve the configuration of the GRM Cadastre and GRM Registry sub systems.

This document has been written in an explanatory fashion to describe in detail both technical and administrative processes at the Afghanistan Land Authority (Arazi).

1.2 Scope

This document describes the functional requirements for modernization of the Afghanistan Land Authority (Arazi), specifically as it relates to the extension of GRM software products for the automation of cadastral and registration transactions that support the registration of rights, interests, and encumbrances.

1.3 Definitions, Acronyms and Abbreviations

This section provides the definitions of all terms, acronyms and abbreviations used in the document.

AfLIS	Afghan Land Information System
AGCHO	Afghan Geodesy & Cartography Head Office
AICRS	Afghan Integrated Cadastre & Registry System
AIMS	Afghanistan Information Management Systems
ALCO	Afghan Land Consulting Organization
ARTS	Afghanistan Reliable Technology Services
BAA	Business Area Analysis
BPR	Business Process Reengineering
CDMS	Cadastral Data Management System
COP	Chief of Party
CORS	Continually Operating Reference Station
COTR	Contracting Officer's Technical Representative
GDMA	General Directorate of Municipality Affairs
GIROA	Government of the Islamic Republic of Afghanistan
GIS	Geographical Information System
GPS	Global Positioning System
HR	Human Resources
ICT	Information and Communication Technology
IDLG	Independent Directorate for Local Government
ISAF	International Security Assistance Force



IT	Information Technology
LADM	Land Administration Domain Model
LARA	Land Reform in Afghanistan
LIS	Land Information System
LIS/PIMS	Land Information System/Parcel Information Management System
MC	(ILS) MultiCadastre – GRM Cadastre
MOU	Memorandum of Understanding
MUDA	Ministry of Urban Development Affairs
NGA	National Geospatial Intelligence Agency
PIMSS	Provincial Infrastructure Management Support System
RAMP-UP	Regional Afghan Municipalities Program for Urban Populations
SRS	Systems Requirements Specification
SUIS	Settlement Upgrading Information System
USAID	United States Agency for International Development
UNDP	United Nations Development Programme
VPN	Virtual Private Network

1.4 References

Reference 1. *ALRMIS Business Area Analysis Report, November 2012.*

Reference 2. *Land Management Law.*



2 REQUIREMENTS SPECIFICATIONS

The following chapter contains general requirements for the ALRMIS project

2.1 Overall Context

The Afghanistan Land Authority Arazi administers all records that affect the government land, including leases, transfers, encumbrances, conditions, restrictions, and others.

The ALARMIS system, will utilize GRM Registry to automate and administer government land initial registration and lease processes. Specifically, GRM Registry will be utilized to store, manage, retrieve and analyse the temporal information that is related to the registration of rights, interests and encumbrances for government land in Afghanistan.

The solution will also use GRM Cadastre, a specialized cadastral management tool that will be installed alongside ESRI ArcGIS Server with SDE Geo-database to capture, store, manage, retrieve, analyse, and display the cadastral information (i.e. the spatial representation and location of properties) administered by Afghanistan Land Authority.

2.2 System Architecture Description

ALRMIS will be implemented as multi-layer integrated system whereby the Cadastral and Registry sub systems shall be integrated at workflow and process level. Following are the basic components of each sub system:

- The GRM Registry and GRM Cadastre application server will serve as a service endpoint to the client application and will define business rules and workflow logic;
- Microsoft SQL Server will serve as the Database Management System and Alfresco as the Content Management System;
- The client solution will be comprised of the MS Windows- and Web -based applications; and
- The MS Windows based client solution will also provide scanning and document indexing features.

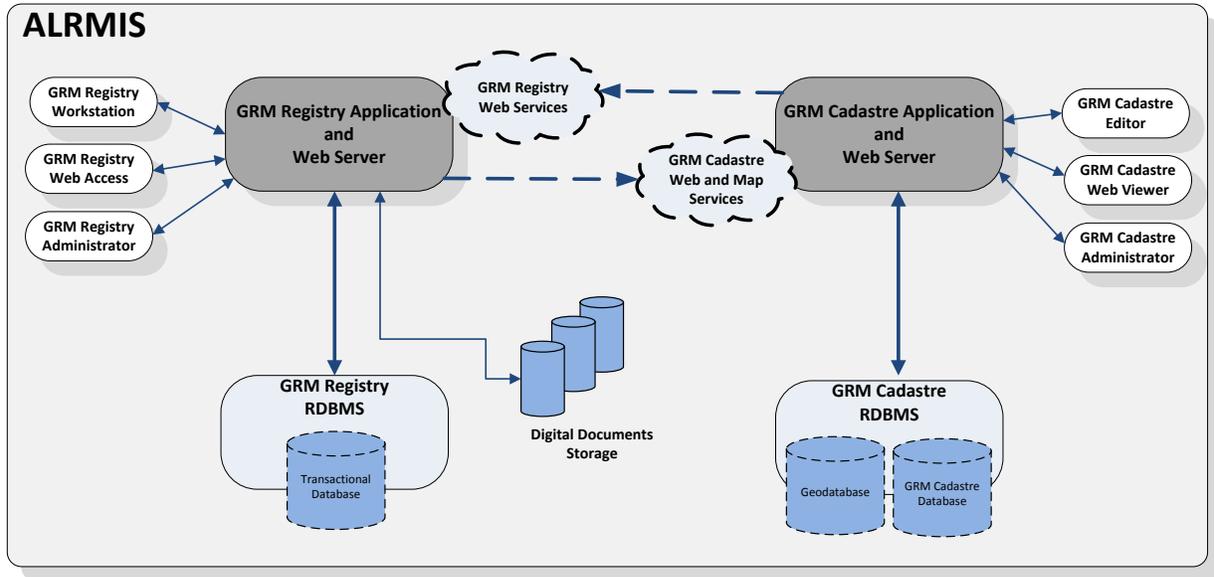


Figure 1. ALRMIS Architecture

2.2.1 Database and Content Management Systems (MS SQL Server and Alfresco)

The following databases will be used and configured on a Microsoft SQL Server to store information for the system:

- *GRM Registry Database* – information about registered deeds, supporting documents, parties, and rights on property;
- *GRM Registry Digital Documents* – stores scanned copies of documents;
- *GRM Cadastre Database* – stores GRM Cadastre user and groups and general configuration information; and
- *GRM Cadastre Spatial Database* – contains spatial property information loaded into an ESRI SDE database.

Note, that separating databases simplifies data management, backup, and database maintenance procedures.

2.2.2 GRM Registry

2.2.2.1 GRM Registry Application Server

The application server will control access and set the security policy. The application server also includes workflow and business logic. The GRM Registry Application includes:

- Data Access – provides access to the DBMS;
- Workflow Engine – supports workflow functionality;
- Reporting Engine – supports report creation;
- Business Rules Engine – supports business rule definitions and constraints that apply to the business processes; and



- Web services – provides an interface for the integration with other GRM systems and potentially with other external systems.

2.2.2.2 *GRM Registry Workstation*

The GRM Registry Workstation client will enable the following functionalities:

- Initiating Transactions;
- Data Entry;
- Data Verification;
- Document scanning;
- Documents/files (Word, Excel, PDF, etc.) attachment to a transaction;
- Document Preparation and Reporting;
- Document Printing; and
- Scanning and encoding of the property related archive paper records.

2.2.2.3 *GRM Registry Administrator*

The GRM Registry Administrator provides a set of centralized configuration, administration and reporting tools for the GRM Registration. All configuration settings are server centric. Users with Administrative privileges are the only users allowed to access the administration module.

2.2.2.4 *GRM Registry Web Access*

The GRM Registry Web Access module provides an intranet web-based access to Registry content. The GRM Registry Web Access module provides the following functionalities:

- Search and browse registered transactions;
- Search and browse properties;
- Search and browse transactions in process; and
- Search, view, and print supporting documents (depending on permissions).

2.2.3 GRM Cadastre

2.2.3.1 *GRM Cadastre Application Server*

GRM Cadastre is a workflow driven enterprise parcel management system that comprises data creation and validation tools to facilitate the storage of parcel records and linkage to GRM Registry. GRM Cadastre supports versioning and allows tracking of changes to parcels. GRM Cadastre is based on Environmental Systems Research Institutes (ESRI's) ArcGIS products and provides standard and specialized data capture tools to generate deed plans, capture survey field records and ensures spatial data topological integrity. The following key parts of the application server are:

- Data Access – provides access to data through the DBMS;
- Workflow Engine – supports basic state workflow functionality;
- Reporting Engine – supports defined report generation; and
- Web services – provides an interface and contracts to the solution and possible integration with external systems.

2.2.3.2 *GRM Cadastre Editor*

Amongst other features, GRM Cadastre Editor provides the following basic features:



- Loads and displays raster imagery from external file geo databases;
- Allows the Geo referencing of raster images;
- Imports spatial data and text files to create and update the parcel fabric;
- Uses Coordinate Geometry (COGO) tools to load and verify survey data;
- Links parcels in the cadastral database to the properties in GRM Registry;
- Provides common features such a Zoom, Pan, Search, Full extent; and
- Provides support for different coordinates systems

2.2.3.3 GRM Cadastre Administrator

This module provides a set of centralized configuration and administration tools. Some configuration settings are server centric. Only users with administrative privileges can access the module.

2.2.3.4 GRM Cadastre Web Access

GRM Cadastre Web Access provides a web access to the spatial information:

- Searches and browses cadastral information stored in GRM Cadastre;
- Provides a set of tools to select, zoom, pan, and identify parcels; and
- Views linked GRM Registry property documents/transactions information related to parcels.

2.3 Functional Users and Groups

ALRMIS is envisaged to improve the business procedures in Arazi by automating processes.

Figure 2. GRM typical users, provides a graphic representation with a sample of the system users.

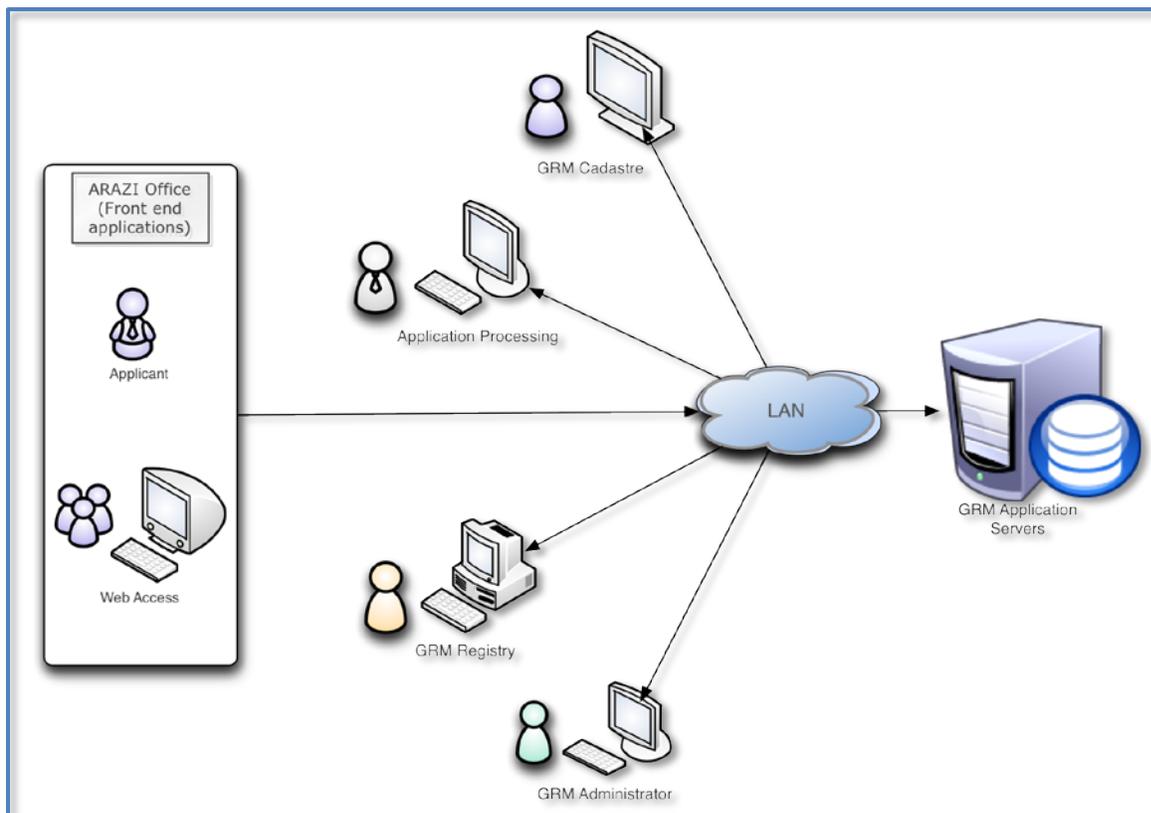


Figure 2. GRM typical users.



All the users that will work with the System can be seen on the *Figure 3* below, and in the following descriptive table.

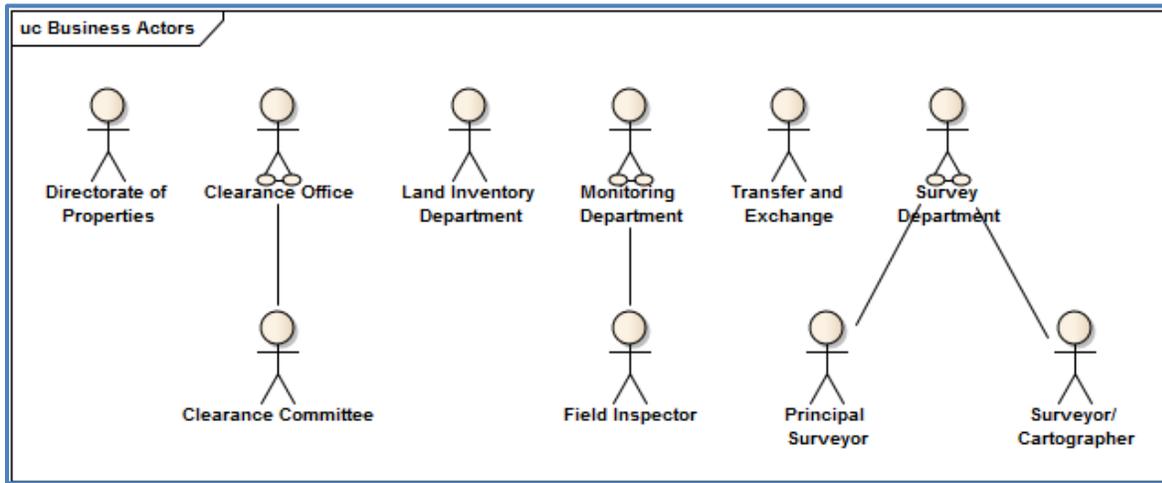


Figure 3. System Users

User Group (Figure)	User Group (Table)
Directorate of Properties	Directorate of properties
Land Inventory Department	Land Inventory Department
Transfer and Exchange	Transfer and Exchange
Clearance Office	Clearance Office
Monitoring Department	Monitoring department
Field Inspectors	Field Inspectors

ID	User Group	Description
[USR-01]	Data Entry Officer	Users of this group will capture the data from the forms and supporting documents in to the system,
[USR-02]	Scanning Officer	Users of this group are in charge of digitalizing incoming, internal and outgoing documents.



ID	User Group	Description
[USR-03]	Supervisor	Users of this group are in charge of the quality assurance of the data indexed and scanned.
[USR-04]	Directorate of properties	Users of this group are in charge of request first registration and record details about the properties and supporting documents.
[USR-05]	Land Inventory Department	Users of this group are in charge to register the new properties in government land inventory.
[USR-06]	Transfer and Exchange	Users of this group are in charge to track and record applications for transfer and exchange, also in charge of request authorizations for transfer procedures.
[USR-07]	Clearance Office	Users of this group are in charge to start land clearance procedures, request inspections and authorizations for land clearance.
[USR-08]	Monitoring department	Users of this group are in charge to monitor the leases, request inspections and compile results of those inspections regarding to the lease, and accomplishment of the terms listed on the lease.
[USR-09]	Field Inspectors	Users of this group are in charge of preparing reports on the physical inspections according to requested.



3 SUPPORTED TRANSACTIONS

3.1 GRM Registry Transactions

ID	Transaction	Workflow	Comments
[TR-01]	Public Land Inventory (Backfile)	Indexing and Scanning	Arazi has the mandate to identify and keep an inventory of public land in Afghanistan. This activity will include indexing and digitalization of previous land related deeds and link with the parcels in the government land inventory (Cadastre). The workflow is used to index and scan all existing public land related deeds and their supporting documents. It utilizes the GRM Registry to record (index) information, scan instruments (deeds) and pages.
[TR-02]	Registration of Government Land	First Registration	The workflow is used to create the initial registration of government land in to the system.
[TR-03]	Transfer of Government Land	Subsequent Registration	Transfer of government land can be done between two different government agencies, between the government and a municipality, or between the government and a private entity.
[TR-04]	Government Land Lease	Subsequent Registration	The government leases land to private individuals or organizations for a certain period of time and for a specific purpose (agricultural, industry, etc.).
[TR-05]	Lease Tracking	Lease Tracking	This workflow will record lease payments (made outside the system), produce lease payment letters for leases with outstanding payments, and field inspections (to evaluate if the land is been used for the intended lease purpose).
[TR-06]	Land Clearance (Tasfia)	Land Clearance	This workflow will record the steps, documents, and decisions during the Land Clearance (Tasfia) process.

3.2 GRM Cadastre Transactions

This section describes the supported transactions for GRM Cadastre. Below is a list of basic configured transactions to be supported by GRM Cadastre.

ID	Transaction	Workflow	Comments
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ID	Transaction	Workflow	Comments
[CTR-01]	Parcel Creation and Mutation	Parcel Creation and Mutation	
[CTR-02]	Deed Plan Creation	Deed Plan Creation	After generating the deed plan, the user will be able to export the plan to an image. The same workflow will be used for batch deed plan generation.



4 FUNCTIONAL REQUIREMENTS & PRINCIPLES

The functional requirements section describes the proposed functionality that will be delivered in the ALRMIS project. In an effort to provide a complete list of features, both project specific requirements and standard package features have been included.

4.1 Assumptions

In order to satisfy the requirements for GRM Cadastre and Registry, the following assumptions are made:

- Arazi must provide all hardware and network infrastructure including configured operating systems, installed on the end user workstations, and the servers that will be used for the installation and configuration of GRM Cadastre and GRM Registry.
- Arazi must provide a tested and functional network environment between GRM Cadastre and GRM Registry to be deployed on the separate servers.
- All lease payments will be made outside the system and receipts recorded in the correspondent transaction.

4.2 Registration Principles

4.2.1 General

ID	Description	Details/Comments
[GEN-01]	The system shall allow the Administrator and any other persons designated by the Administrator to access defined registry modules and/or applications.	
[GEN-02]	The system shall support the entry of the predefined information in an application form.	<p>The application form is under the development by Arazi. Once approved, It will have to be reviewed to validate the feasibility of the support by the system.</p> <p>It is anticipated, that the application form will contain the basic and necessary information about the applicant, party, property and transaction</p>
[GEN-03]	The system shall support data entry and the verification of information on the screen.	



ID	Description	Details/Comments
[GEN-04]	The system shall allow the postponement of transactions.	This is related to cases in which the transaction needs to be on hold (waiting for a payment, delivery of a document, etc.)
[GEN-05]	The system shall allow the suspension of transactions.	This is related to temporary hold of the transactions by saving the data and closing the wizard of the transaction workflow.
[GEN-06]	The system shall allow modification of data related to transactions prior to committing it into the database as “registered”.	Modifications will be allowed based on business rules and privileges of the user
[GEN-07]	The system shall allow the withdrawal of a transaction prior to committing it into the database as registered.	Transactions that need to be withdrawn from the system will require a justification (in the form of capturing a reason for the withdrawal). Information about the withdrawal will be kept in the database for the audit purposes
[GEN-08]	The system shall allow the scanning and linking of scanned documents to related transaction	
[GEN-09]	The system shall allow the attaching of already scanned images to a related transaction	
[GEN-10]	The system shall allow the attaching of files other than images to a related transaction	
[GEN-11]	The system shall allow the viewing of the transaction details via the web viewer.	Based on the privileges of the user
[GEN-12]	The system shall support GUI elements, data entry, and reports to be produced from the system in Dari.	

4.2.2 Property

ID	Description	Details/Comments
[PROP-01]	The system shall support the recording of basic information associated with a property	As per information captured from the property books.
[PROP-02]	The system shall support the recording of occupancy right for registered land.	Properties to be registered in the system are public lands (managed by the government)



ID	Description	Details/Comments
[PROP-03]	The system shall support the recording of property transfers between government offices.	
[PROP-04]	The system shall support the recording of information on land parcels only.	Arazi manages government land The recording of flats and condominiums will not be supported.
[PROP-05]	The system shall support the recording of past land related deeds.	As part of the Indexing and Scanning (property related archive paper records conversion) procedures
[PROP-06]	The system shall enforce parcels as the primary registration unit.	The system will ensure that no property can be registered in the system if the correspondent parcel does not exist in the spatial database of the GRM Cadastre.

4.2.3 Parties

ID	Description	Details/Comments
[PRT-01]	The system shall support the data entry of basic person/entity information.	The person/entity basic information is as per information captured currently in the property books.
[PRT-02]	The system shall support the search of persons already registered in the database	
[PRT-03]	The system shall support multiple parties as part of a single registration transaction.	Joint occupancy. The shares are not specified.

4.2.4 Rights

ID	Description	Details/Comments
[RGHT-01]	The system shall support the indexing of registered land related rights.	Rights are defined in GRM Registry through the recording of a specific transaction.
[RGHT-02]	The system shall support the recording of new rights as part of primary registration	The recording of rights will include indexing of certificate of title and supporting documents.

4.2.5 Identifiers



ID	Description	Details/Comments
[ID-01]	The system shall support the capturing of a serial unique identifier for all land related deeds.	The deeds are Certificate of Title, Lease contract, etc. The serial unique identifier is a sequential number issued by the Supreme Court.
[ID-02]	The system shall support the mandatory capturing of a unique identifier for each person/entity.	Taskera Number will be recorded for individuals and registration number for organizations
[ID-03]	The system shall support the use and generation of a unique identifier for all system generated transactions.	
[ID-04]	The system shall support the capturing of a document number for indexed documents.	

4.2.6 Registry Reports

ID	Description	Details/Comments
[REP-01]	The system will provide functionality to generate demand of lease payment notices.	For lease management payment, the system needs to generate a demand of lease notice for leases already due. The template format will be vetted with the respective directorate.
[REP-02]	The system shall provide the functionality to generate a delivery letter.	The system will generate the standard delivery letter (used in general in the GRM Registry)



ID	Description	Details/Comments
[REP-03]	The system shall provide the functionality to print GRM Registry standard reports.	<p>Reporting general statistics, contents, and summary reports. Reports will include:</p> <p>Content</p> <ul style="list-style-type: none"> • Content Summary; • Content Detailed; • Applicant list; and • List of Property Transfers. <p>Tracking</p> <ul style="list-style-type: none"> • Instrument Ageing; • Instrument Ageing Completed; • Pending Transactions; and • Registered Transaction. <p>Staff</p> <ul style="list-style-type: none"> • Staff List • Staff Productivity Detailed; and • Staff Productivity Summary.
[REP-04]	The system shall be able to export reports in standard exchange formats.	Standard exchange formats are PDF and XLS

4.3 Cadastre Principles

4.3.1 General

ID	Description	Details/Comments
[CGEN-01]	The system shall have control over users' access for editing the digital cadastre.	GRM Cadastre will provide authorized users with access to edit spatial data stored in the parcel fabric. Each user will have to enter a username and password before they are authorized to perform such tasks
[CGEN-02]	The system shall allow multiple users access to the data for editing.	GRM Cadastre will allow multiple users to access and edit spatial data simultaneously. Each user will define a job area and work on a different version



ID	Description	Details/Comments
		of the spatial data. Topology rules will be applied to the data before it is persisted to the parcel fabric
[CGEN-03]	The system shall provide tools to export data to external geodatabases.	GRM Cadastre will provide export ArcGIS tools so the user can select a layer to export the spatial data to file geodatabases
[CGEN-04]	The system should be able to deal with text information in the national official language.	ALRMIS will display and store information in Dari. Note that GRM Cadastre Editor is based on ArcGIS 10.0. Consequently, GRM Cadastre will display information in Dari only where feasible.

4.3.2 Importing Data

ID	Description	Details/Comments
[CID-01]	GRM Cadastre shall be able to load and view existing spatial information from standard data sources, such as shapefiles, rasters, orthophotos, and file geodatabase.	GRM Cadastre will provide tools to load and view spatial data from vector and raster data sources. All these layers can be geo referenced and used as background layers or base maps.
[CID-02]	GRM Cadastre shall be able to display survey data in standard CAD file formats (i.e. DXF)	GRM Cadastre will allow the user to load and view survey data stored in standard CAD files. The CAD layers can later be used as base maps for viewing and digitizing purposes
[CID-03]	GRM Cadastre shall be able to create survey data based on the inputting of Coordinate Geometry (COGO) information contained in survey plans and/or from survey field notes.	GRM Cadastre will provide a set of tools where by using a COGO spreadsheet, the user can digitize parcels using survey data such as points, lines, bearing, and distance.
[CID-04]	GRM Cadastre shall allow the georeferencing of raster images	GRM Cadastre will provide a set of tools where the user can load and georeference raster files.

4.3.3 Data Entry

ID	Description	Details/Comments
[CDE-01]	Spatial representation of the property (or parcels) will be committed to the geodatabase	GRM Cadastre manages and stores parcels based on a GRM Cadastre region. Users can create as many



ID	Description	Details/Comments
	after the parcel spatial reference information is entered in GRM Cadastre	regions as they wish, and each region upon creation is assigned a projected or geographic spatial reference.
[CDE-02]	GRM Cadastre shall allow the user to enter and/or select key information based on dictionaries instead of typing of such information (using attribute domains) where applicable.	Where applicable, GRM Cadastre will provide selectable lists where the user can select dictionary items from a pull down list.

4.3.4 Spatial Representation and Identifiers

ID	Description	Details/Comments
[SPI-01]	Parcels shall be represented spatially as polygons.	GRM Cadastre stores parcels in a parcel fabric and each parcel is stored as a polygon.
[SPI-02]	GRM Cadastre shall retain and archive lineage changes made to the parcel fabric.	Each time a mutation of a parcel is changed and committed to the parcel fabric, the previous version of the parcel and its attributes is stored and linked to the new version. The user will have an option to view each parcel mutation in history.
[SPI-03]	Parcels shall be labeled based on attributes in the geodatabase.	In GRM Cadastre, each parcel will be displayed and labeled by attribute(s) from the geodatabase. By default, the parcels' unique identifier will be displayed.
[SPI-04]	Parcels shall be identified with a Unique Parcel Identification number (UPIN).	GRM Cadastre will generate and store a unique identifier for each parcel. Using the system, the user will be able to define the format of the UPIN
[SPI-05]	GRM Cadastre shall automatically generate and assign the UPIN number to a real property object once a user creates it.	GRM Cadastre will provide a tool to link the parcel's unique identifier to a real property in GRM Registry.
[SPI-06]	The UPIN will be used as identifier to facilitate linkage process with registry data.	GRM Cadastre will provide a linkage tool to link the parcel's unique identifier to a real property in GRM Registry.
[SPI-07]	GRM Cadastre shall administer the Cadastral UPIN.	Once a UPIN format is defined, GRM Cadastre will generate and assign this number to the parcels in the fabric and will also manage the generation of this number.



4.3.5 Parcel Editing and Digitizing

ID	Description	Details/Comments
[PED-01]	GRM Cadastre shall allow the enforcement of the necessary topological rules in geodatabase to ensure parcel geometry integrity within cluster tolerance and GRM Cadastre regions.	GRM Cadastre will perform topology check within a region before committing the spatial data to the parcel fabric. Any violation of these rules will not allow the parcel to be committed to the fabric
[PED-02]	The Parcel shall be constructed automatically based on a set of lines and/or polygons.	GRM Cadastre will provide tools to construct parcels from polygons and lines. The closure coordinate will automatically close the polygon if the distance between the first and last coordinate is within the defined cluster tolerance
[PED-03]	GRM Cadastre shall provide standard digitizing tools for the creation of points, lines, and polygons.	GRM Cadastre will provide a set of tools to create points, lines, and polygons.
[PED-04]	GRM Cadastre shall provide an interface to populate parcel polygon with their attributes.	By default, GRM Cadastre will define and store a set of static attributes for each parcel. GRM Cadastre will provide a feature so that the user can extend these attributes with user defined fields for each parcel
[PED-05]	GRM Cadastre shall provide an option to create points based on (x, y) coordinates.	GRM Cadastre will provide tools to create points based on defined coordinate reference system.
[PED-06]	GRM Cadastre shall provide an option for parcel mutation	GRM Cadastre will provide tools for spatial adjustments, splitting, and merging of parcels

4.4 General Software Requirements

ID	Description	Details/Comments
[GS-01]	The Application Server of the system must be compatible with Windows Server 2008 x64 R2 Standard Edition.	
[GS-02]	The system must be implemented on MS SQL Server 2008 x64 Standard Edition.	
[GS-03]	The client applications of the system must be compatible with Windows 7 x32 and x64.	



4.5 General Hardware Requirements

ID	Description	Details/Comments
[GH-01]	The system should be able to run on Intel compatible platform	
[GH-02]	The Application Server components of the system must be able to run on x64 bit platform.	
[GH-03]	The client components of the system must be able to run on x32 and x64 bit platform.	



5 WORKFLOWS AND DESCRIPTIONS

This section describes the business processes that have been identified for configuration of the System.

5.1 Workflow Graphical Language Description

- This section describes the business process models that are depicted using process diagrams and tables. The process diagrams are composed using the following standard modeling notation elements used in the diagrams. The tables provide a description of the process workflow.

Element	Graphical Representation	Description
Actor		An Actor is a user of the system; user can mean a human user or a system function (subsystem) in the model. In the workflow diagrams, actors are shown within vertical swim-lanes that contain activities performed by the actor.
Start and End Points		An event is something that “happens” during the course of a business process. These events affect the flow of the process and usually have a cause (trigger) or an impact (result). Events are circles with open centers to allow internal markers to differentiate different triggers or results. There are two types of events: Start and End.
Activity		An activity is a generic term for work that the office performs. Activities may be tasks, processes or sub-processes.
Sequence Flow		A Sequence Flow is used to show the order that activities will be performed in a Process.



5.2 Indexing and Scanning

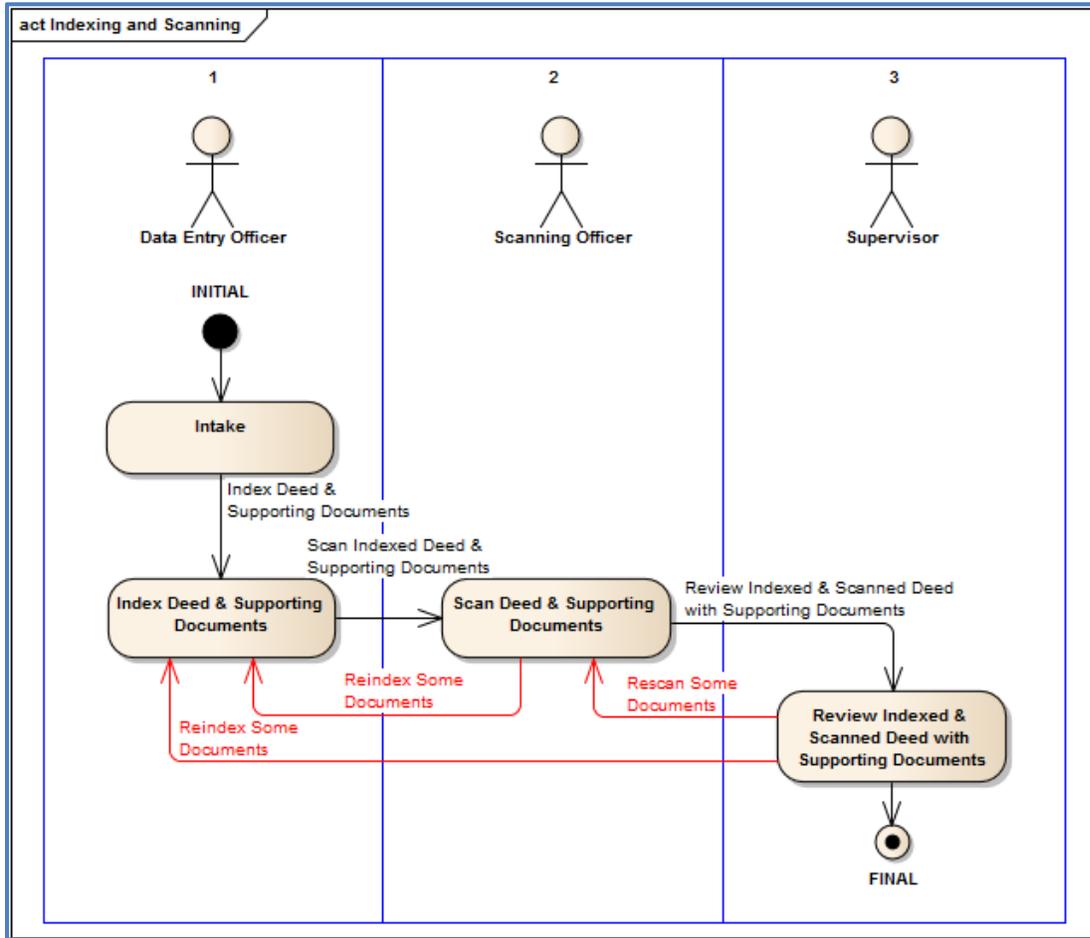


Figure 4. Indexing and Scanning Workflow.



5.3 First Registration

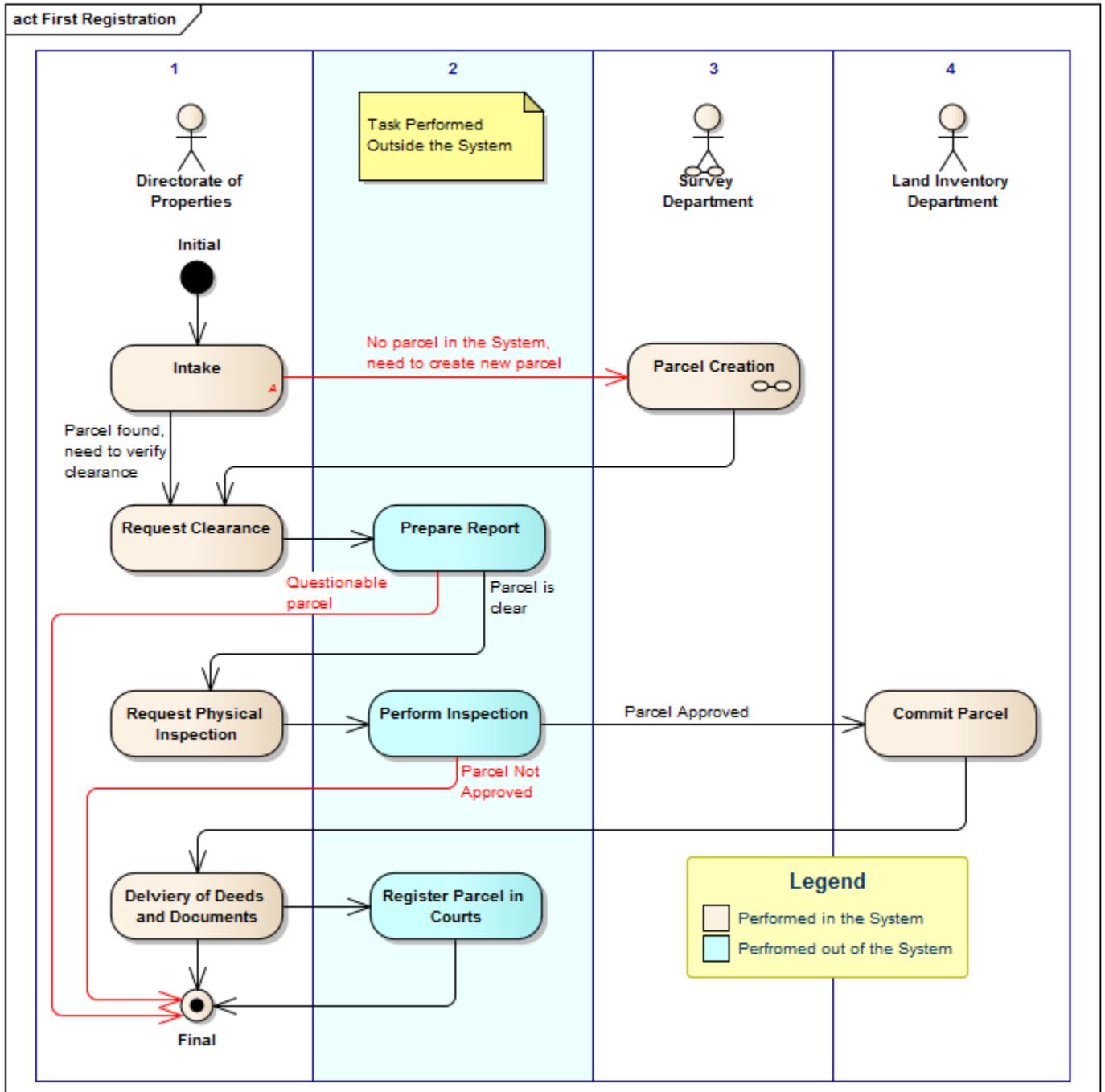


Figure 5. First Registration Workflow.



5.4 Subsequent Registration

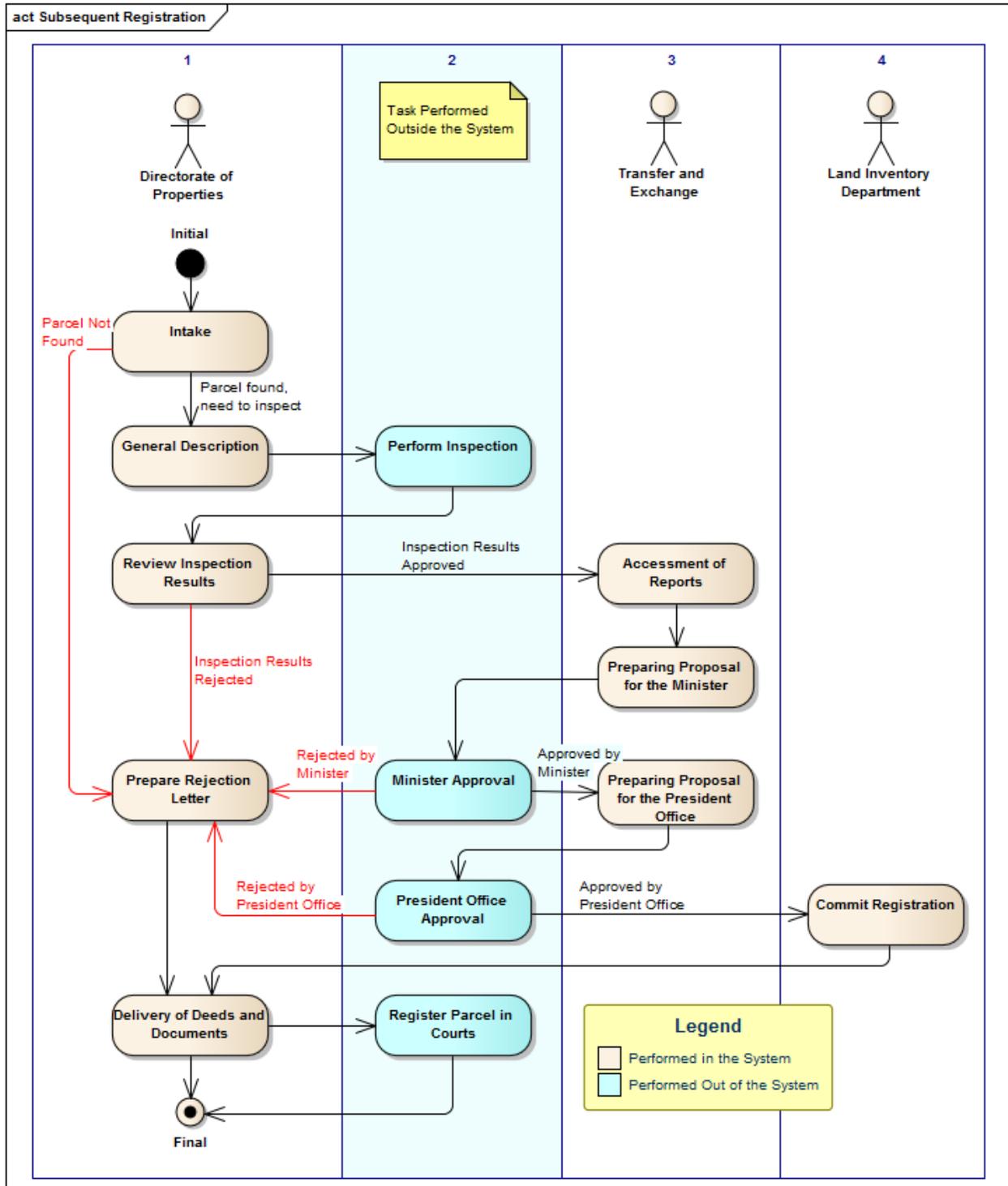


Figure 6. Subsequent Registration Workflow.



5.5 Land Clearance (Tasfia)

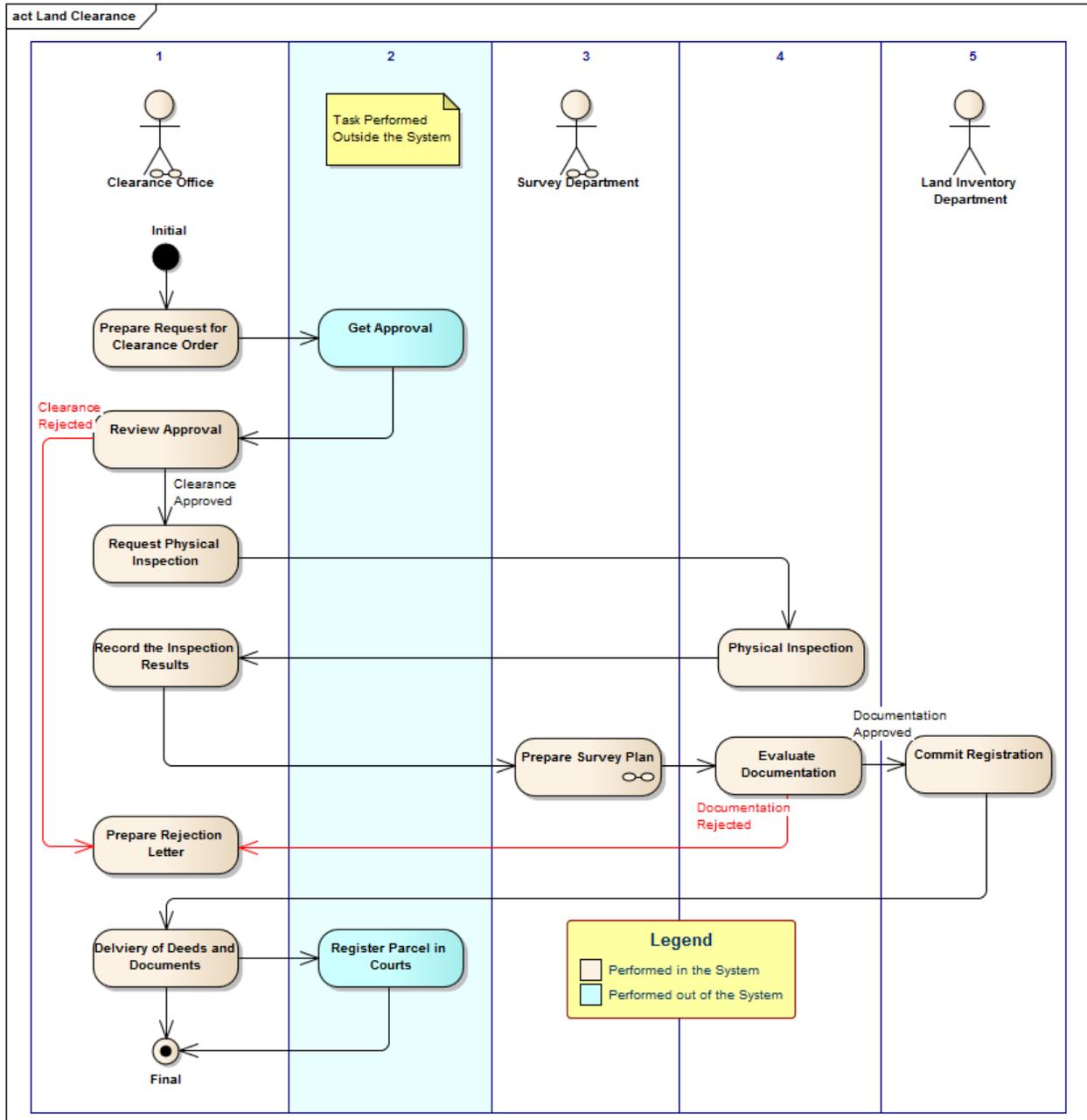


Figure 7. Land Clearance Workflow.



5.6 Lease Tracking

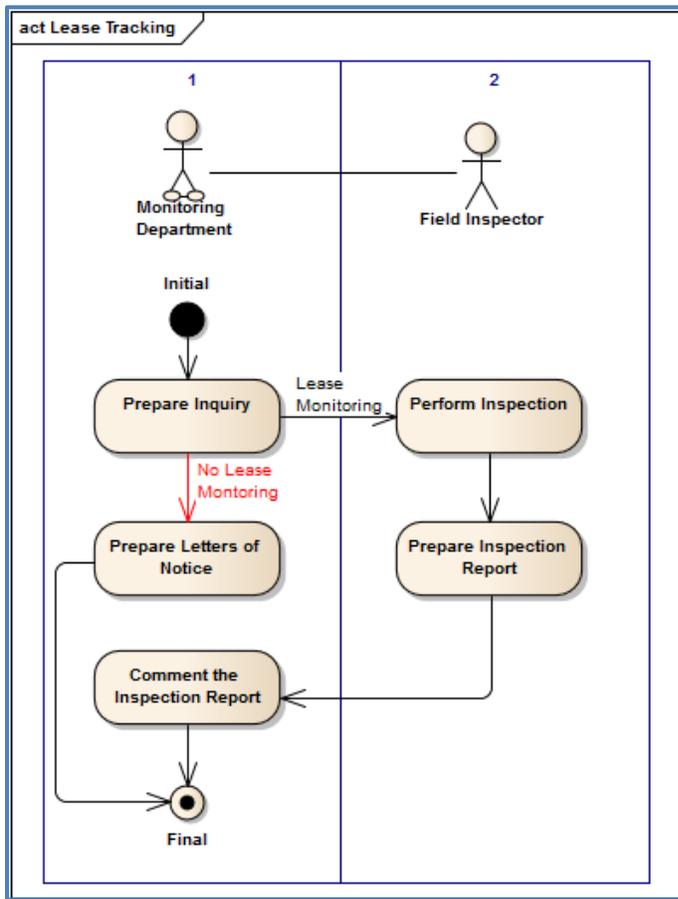


Figure 8. Lease Tracking.



5.7 Parcel Creation

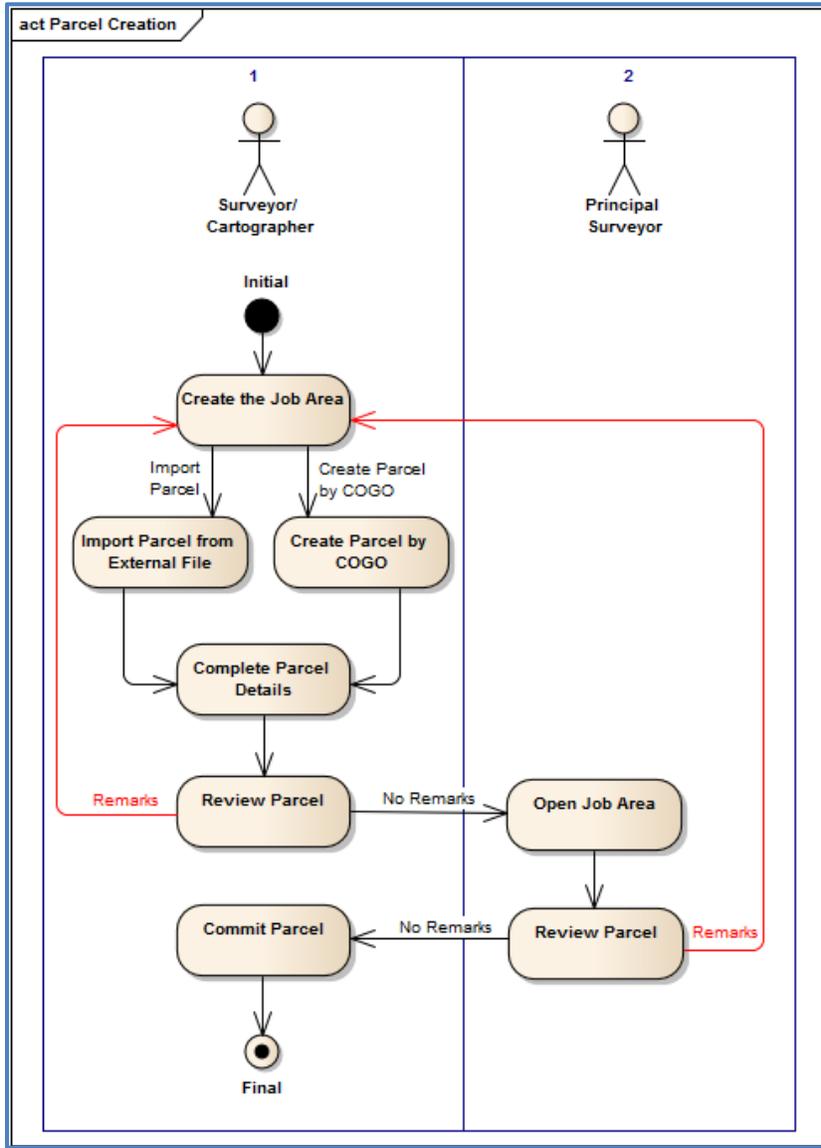


Figure 9. Parcel Creation Workflow.



5.8 Deed Plan Creation

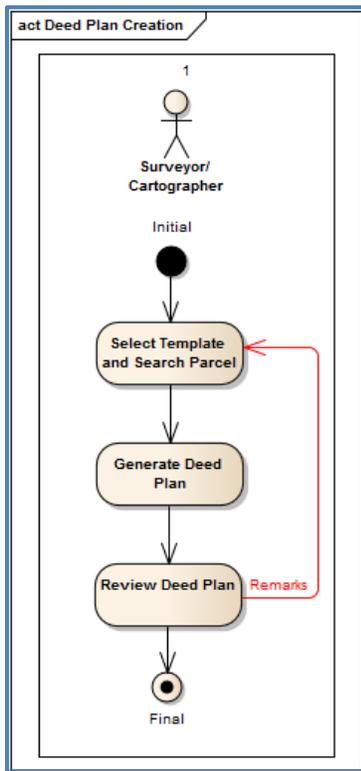


Figure 10. Deed Plan Creation Workflow.

5.9 Workflow Stages Description

The following information is captured in a table following each process diagram:

- **Activity/Stage:** The name of an activity or stage in the process; activities which have been determined to be similar in nature between processes may have the same name, but may be slightly different and include different inputs and outputs.
- **Description/Business Context:** Identifies the ‘Actor’ or the role of the user who is performing this activity; and the description of what the ‘Actor’ is doing in the activity.
- **System Functions:** Describes the functions that should be performed by the system; the information used and captured by the system (‘inputs’); the system artefacts (‘outputs’ in the form of reports, letters, etc.) that are generated during this activity; and the ‘next activity’ in the process.

5.9.1 Indexing and Scanning

Arazi has property books that will be recorded by the system, and the indexed details of the property (and parties) will be linked to the parcels that are being uploaded in to the parcel fabric.

ID	Stage	Description	System Functions
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ID	Stage	Description	System Functions
[IS-01]	Intake	Data entry officer will enter details of the book to be indexed	GRM Registry will save the data and display wizard to move next stage
[IS-02]	Index Deed and Supporting Documents	Data Entry will index the details of each property in the book with details of the parties (to the extent that exists).	Properties will be created inside the system and link the registration book as supporting document.
[IS-03]	Scan deed and supporting documents	The scanner officer will scan all the pages of the book and survey plan associated with the book as supporting documents	GRM Registry will link the scanned documents to the transaction
[IS-04]	Review Indexed and scanned deed	<p>The supervisor will review the accuracy of the indexed and scanned data and decide if is ready to link or if the data needs amendments.</p> <p>If the indexed data and the digitalized documents are correct, a linkage will be formed (the properties in the book have the same property identifier as the parcels in the survey plan, then a complete match is expected)</p>	GRM Registry will interact with GRM Cadastre to mass link all the properties in the book

5.9.2 First Registration

Properties that are identified as public land and not registered yet in the government property book will go through primary registration and linked with the correspondent parcel in the parcel fabric.

ID	Stage	Description	System Functions
[FR-01]	Intake	<p>Data entry officer will enter details of the property and confirm if the parcel has already been created in the parcel fabric.</p> <p>If the parcel has not been created the task of parcel creation will be assigned to the survey department.</p>	GRM Registry will save the data and display a wizard to move to the next stage



ID	Stage	Description	System Functions
[FR-02]	Request Clearance	<p>If the parcel exists in the parcel fabric, a clearance report is requested from the Land Clearance Directorate.</p> <p>If the parcel has conflicts, the application will be cancelled and sent to the Conflict Resolution Directorate.</p>	<p>Link with GRM Cadastre and retrieve parcel data, if not present, initiate parcel creation sub workflow</p>
[FR-03]	Request Physical Inspection	<p>A physical inspection of the parcel is requested, and results are recorded in order to confirm details about the property, location, land use, land type, and compliance with any plan</p>	<p>Record inspection results and scan of physical documents.</p>
[FR-04]	Commit property in the system	<p>If no objections are found and the inspection results in a positive approval recommendation, the property will be committed in to the land inventory, and any remaining physical documentation will be digitalized.</p>	<p>Property details are committed. System generates forms to request registration of the property in the Supreme Court</p>
[FR-05]	Delivery of documents	<p>Request for registration is scanned into the system and sent to the courts for formal registration.</p>	<p>System generates delivery receipt</p>

5.9.3 Subsequent Registration

This workflow covers the activities of transfer of public land and land lease for properties already registered in the government land inventory

ID	Stage	Description	System Functions
[SR-01]	Intake	<p>Data entry officer will enter details of the transaction to be indexed and confirm if the parcel is already created in the parcel fabric and if the property is part of the public land inventory.</p> <p>If the parcel is not created, the task of parcel creation will be assigned to the survey department.</p>	<p>The system will perform a search in the DB to confirm that the property exists and is linked to a parcel.</p>
[SR-02]	Request Physical Inspection	<p>A physical inspection of the parcel is requested.</p>	<p>System will produce a request for an inspection report</p>



ID	Stage	Description	System Functions
[SR-03]	Review Inspection Results	Results are recorded in order to confirm details about the property, location, land use, land type, and compliance of the business plan with the master plan.	Results of the inspection and decision will be recorded in the system. If result of the inspection is unsatisfactory the system will produce a rejection within the next stage.
[SR-04]	Assessment of Reports	Directorate of transfer and exchange will assess the documentation and reports and provide a recommendation	System will record the recommendation and additional notes
[SR-05]	Preparing proposal for the minister	The directorate will prepare a proposal for transfer or approval for lease to the Minister's Office and attach the collected and produced documentation	System will produce the letter to the ministry and record all the dispatched documents.
[SR-06]	Preparing Proposal for the President Office	The directorate will prepare a proposal for transfers or approval of lease to the President's Office and attach the collected and produced documentation, including the comments and result from Ministry's Office	System will produce the letter to the President's Office and record all the dispatched documents.
[SR-07]	Commit Registration of property in the system	If President's Office approves the changes in property owner / lessee such will be record with details of the deed and terms and conditions	System will commit the property and deeds details to the system and prepare the forms for registration in the Courts
[SR-08]	Delivery of deeds and documents	Request of registration is scanned in the system and sent to the Courts for formal registration.	System generates delivery receipt

5.9.4 Land Clearance (Tasfia)

The procedure of land clearance involves inspections and approvals by different directorates and committees and managed by the Land Clearance Directorate.

ID	Stage	Description	System Functions
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ID	Stage	Description	System Functions
[LC-01]	Prepare request of Clearance order	Once the area and plots to be cleared have been identified, the directorate will prepare a request for clearance order.	System will produce the request for clearance report
[LC-02]	Review Approvals	The directorate will review the received documents and proceed according to the recommendations. If no authorization is granted then a rejection document will be produced for record purposes	System will record decisions and move to the next stage, or prepare a rejection letter
[LC-03]	Request Physical Inspection	A request for physical inspection will be produced and dispatched	System will generate a request for physical inspection with details of the properties to be inspected
[LC-04]	Record inspection results and request survey plan	Results are recorded in order to confirm details about the property, location, land use, land type, and compliance of the business plan to the master plan. A survey plan will be requested to the Survey Department	Results of the inspection and decision will be recorded in the system. System will request the survey plan sub-workflow to be executed in Survey Department
[LC-05]	Evaluate Documentation	Clearance Committee will evaluate all the documentation and plans and provide a decision.	System will record the decision and notes. If the decision is to not move forward, the system will generate a rejection letter for record purposes
[LC-06]	Commit Registration of property in the system	If the committee approves the clearance, the property will be recorded in the Public Land Inventory	System will commit the property and details to the system and prepare the forms for registration in the Courts



ID	Stage	Description	System Functions
[LC-07]	Delivery of deeds and documents	Request of registration is scanned in the system and sent to the courts for formal registration.	System generates delivery receipt

5.9.5 Lease Tracking

This workflow will track the existing leases, produce payment requests for rent due, or record physical inspections

ID	Stage	Description	System Functions
[LT-01]	Prepare Inquiry	A decision will be made to prepare an inspection or generate letters. If the option is to prepare an inspection, an inquiry on the parcel (s) will be displayed	GRM Registry will proceed according to the selected choice
[LT-02]	Perform Inspection	If the request is for made an inspection it will review the current use and compare with the proposed terms in the original lease	
[LT-03]	Prepare Inspection Report	After inspection, is conducted a report needs to be prepared and linked to the property.	Record of inspection results and scans of physical documents. Produce a recommendation report.
[LT-04]	Comment Inspection report	Report will be reviewed and commented on for record purposes	Details of the recommendation will be recorded
[LT-05]	Prepare Letters of Notice	If necessary letter of due payment will be prepared for each lease with the lessee details and outstanding payments	System will generate notices

5.9.6 Parcel Creation

As necessary, this workflow can be invoked from GRM Cadastre or from GRM Registry. Note that GRM Cadastre works using a job area concept. After the workflow has been created, a job area or boundary has to be defined before modifying the parcel fabric. Following is the default behaviour of this workflow.

ID	Stage	Description	System Functions
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ID	Stage	Description	System Functions
[PC-01]	Start	Depending on the assigned task, the surveyor starts and loads the job. Based on the user decision, the user decides if the parcel creation will be performed using the feature class import or the COGO spreadsheet.	GRM Cadastre Server initiates the job by creating a Job Instance
[PC-02]	Create parcel by COGO	<p>The surveyor would perform the following steps</p> <ul style="list-style-type: none">• Load the GRM Cadastre region;• Create job area;• Load raster deed plan or survey data source;• Enter survey data using COGO tools;• Fix errors if necessary; and• Save Job. <p>This tool will allow the surveyor to create the parcel from points, lines, distance and bearing.</p>	<p>GRM Cadastre displays the COGO Spreadsheet and tools</p> <p>Based on configuration, GRM Cadastre will assign a UPIN to the parcel.</p>
[PC-03]	Import Parcel From External Source	<p>If the surveyor decides to create the parcel by parcel import, the surveyor would perform the following steps</p> <ul style="list-style-type: none">• Load GRM Cadastre region;• Create job area;• Load raster deed plan or survey data source;• Load source data; and• Save Job <p>If there are topology errors, a field inspection can be requested.</p>	Based on configuration, GRM Cadastre will assign a UPIN to the parcel.



ID	Stage	Description	System Functions
[PC-04]	Complete Attributes for Parcel	<p>After completing the above task the surveyor can input the tabular data for the parcel. The step to follow are</p> <ul style="list-style-type: none">• Load default attributes;• Fill data; and• Validate and save data. <p>If there are topology errors, a field inspection can be requested.</p> <p>Capture property attributes from the source data for each property (e.g. land use, land cover) and save data upon completion</p>	<p>The default attributes entered or calculated are:</p> <p>ParcelName Lot, Block, ParcelArea AreaUnit, Owners PropertyType, UseType OwnershipType SurveyType SurveyStartDate SurveyEndDate, Surveyor Draftsman</p>
[PC-05]	Parcel Review (QA)	<p>The surveyor will then perform a review of the job done by :</p> <ul style="list-style-type: none">• Loading the job area; and• Reviewing all data. <p>If any correction is needed, the surveyor can perform this task by routing the task.</p>	<p>GRM Cadastre will display the parcel and its attributes</p>



ID	Stage	Description	System Functions
[PC-06]	Review Parcel(s)	<p>This review is performed by the Supervisor, The user will</p> <ul style="list-style-type: none"> • Load the job; • Load the job area;and • Review all data. <p>If any correction is needed, the supervisor can perform this task by routing the task to the surveyor.</p> <p>There may be topology errors between the newly created parcel and existing parcels.</p> <p>If this is the case, the user can request a field inspection to resolve the issues</p>	<p>GRM Cadastre will display a list of jobs.</p> <p>GRM Cadastre will display the parcel and its attributes</p> <p>Supervisor can also view that attached survey data</p>
[PC-07]	Commit Parcel (s)	<p>On approval, the task is routed to the surveyor and the user can commit the parcel(s) to the parcel fabric layer</p>	<p>GRM Cadastre will store and persist the data to the parcel fabric</p>

5.9.7 Deed Plan Creation

ID	Stage	Description	System Functions
[DPC-01]	Start	<p>The surveyor receives a request to prepare a deed plan and loads the assigned job to create the deed plan</p>	<p>GRM Cadastre Server initiates the job by creating a job instance</p>
[DPC-02]	Select Template, Search Parcel	<p>After starting the job, the surveyor</p> <ol style="list-style-type: none"> 1. Loads the GRM Cadastre region 2. Selects the deed plan template 	<p>GRM Cadastre displays a set of tools to perform the task</p>
[DPC-03]	Generate Deed Plan	<p>After choosing the correct template, the surveyor</p> <ol style="list-style-type: none"> 1. Selects the parcel; 2. Sets the appropriate scale; and 3. Generates the deed plan using tools. 	<p>GRM Cadastre displays a set of tools to perform the task.</p> <p>As output a standard survey plan can be printed or exported to an image format</p>



ID	Stage	Description	System Functions
[DPC-04]	Deed Plan Review	<p>The surveyor reviews the deed plan; if no observations are necessary the plan is accepted.</p> <p>If corrections are required, the task is sent back. The reviewer will make annotations to the record indicating that corrections are needed.</p> <p>This is an important QA stage to complete deed plans</p>	



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