Quality Assurance Strategies

for the

Encoding of Records

into the

Land Administration and Management System

of the

One Stop Shop

Report F3

April 2007

Prepared by

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Land Equity International Pty Ltd

Contents

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE ii

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE iii

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LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE iv

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LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE v

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LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE vi

1.　　Introduction

This document is the proposed Quality Assurance Strategies (QAS) to be adopted to support the mass conversion of records into the Land Administration and Management System (LAMS) of the One Stop Shop (OSS). The OSS is being developed under Land Administration and Management Project Phase 2 (LAMP2).

The purpose of the document is to set out the principles and practices to be adopted by Registry of Deeds (RoD) and its Service Providers (SP) in order to ensure that an acceptable level of quality is assured in procedures, processes and deliverables and that the dependencies and outputs associated with quality are clearly defined. Hence it is intended to cover both in-house and out-source activities. It has been written to provide a specific plan for the guidance of quality throughout the data conversion project. It is intended to be used as a "Road Map" to identify and locate all procedures relating to quality and not intended as a specific instruction manual.

This report should be read in conjunction with the following associated reports:

- Report F2 – Data Capture Strategy for conversion of records into the Land Administration and Management System of the One Stop Shop; and

- Report F4 - Implementation Plan for the mass/intensive encoding of records into the Land Administration and Management System of the One Stop Shop.

Reference should also be made to Report F5 - OSS IT Systems Functional Requirements Specification

1.1　　Terms of Reference

Terms of Reference (TOR) pertaining to data quality was to:

- Develop a reporting strategy to record completeness, currency and correctness of land based records as encoded into the LAMS database.

Comment

1. Clarification was sought as to whether the TOR was for aspatial (attribute) records of RoD (Titles) only, or if it also included spatial data as contained in the wider OSS. The project Team Leader confirmed that it was intended to cover aspatial data associated with the land registration process only. Spatial capture of survey plans for the creation of Cadastral Index Maps (CIM) would be undertaken by another TA (Survey/Mapping or GIS).

   However, on investigation, the writer considered encoding of titles data could not be done in isolation from the wider picture as both titles data and spatial data are interrelated and need to be integrated to meet LAMP 2 Component 3 objectives. Thus **preliminary and cursory** inspection of CIM of OSS and processes for the compilation thereof was undertaken. Survey records, cadastral maps (CM) and administrative systems contained within DENR was also inspected, considered and commented on within this report.

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc　　　　PAGE 1

2. The writer considers that "completeness, currency and correctness" is more than just a reporting strategy. The report has therefore been extended to include other widely recognised Quality Assurance aspects and issues.

1.2   Assumptions and Limitations

At this stage, the full production process is not fully defined or built and is still subject to detailed implementation. Hence the final design and implemented processes will have an impact on quality assurance processes.

1.3   Terminology

Throughout this report, the term **encoding** is applied to the conversion of aspatial or attribute data, such as in the conversion of titles data. The term **capture** applies to the conversion of spatial or graphical data, such as in the conversion of cadastral mapping data. The term **conversion** or **data conversion** is applied to both processes.

Quality Control (QC)

In the context of this Quality Plan, quality control is principally an internal workflow function to be carried out by RoD's and/or its SP.

Quality Assurance (QA)

In the context of this Quality Plan, quality assurance is an external workflow function to be carried out by RoD personnel solely. For example, the QA of encoded data provided by an external SP.

Quality Audit

Unless otherwise defined, audit means quality audit in terms of the LAMP project. These may include quality audits of SP's or internal quality audits by Internal Auditors to ensure the provisions of the Quality Assurance Strategy have been implemented and are being complied with.

1.4   Disclaimers and Waivers

The views represented within this report are those of the writer. They do not necessarily represent detailed IT System Design Requirements. For those requirements see Report F5 - OSS IT Systems Functional Requirements Specification.

The views represented within this report are those of the writer and do not necessarily represent the views of Land Equity International Pty Ltd (LEI) or Policy Development and Planning Australia Pty Ltd (PDP)

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 2

2. Quality Methodology

2.1 Quality Approach

Every care will be taken to ensure a high level of Quality Assurance. The approach to quality in the Data Conversion processes is on of Total Quality Management (TQM) with an account-wide effort through full involvement of all Team Members and with a focus on continuous improvement to deliver optimal levels of data quality.

Quality will be built into processes wherever possible. Example so this approach include:

- Standardising and Simplifying processes as much as possible
- Use drop down menus, system code list and look-up tables to standardise and provide consistency of data conversion;
- Automatic "mapping" of entities that are able to be mapped, such as Barangay to Municipality to Province.

Quality Control will be more than simply preventing defects; it will be used to re-focus on the elimination of the problem that caused the defect.

Quality inspections will be used as a means of gathering information that can be used to improve quality, not just simply to remedy defective work.

2.2 Principles of Quality Management

The processes throughout the data conversion project will be structured so that;

- There is a focus on skills, training, motivation and incentives for exceeding quality targets;
- Processes are simplified as much as possible to reduce the opportunity for errors and rework;
- The focus is on quality improvement on end-to-end process;
- Ensure that the mindset of quality is one of prevention and continuous improvement;
- Recognise that everyone manages a process at their own level and is simultaneously a supplier and a customer;
- Emphasise that end results needs to drive process quality improvement;
- Ensure that corrective actions focus on removing the root cause of the problem, rather than treating the symptoms.

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 3

3.   Data Conversion Overview

The major processes involved in the data conversion project are shown by the following flowchart.

A brief explanation of the envisaged processes is as follows:
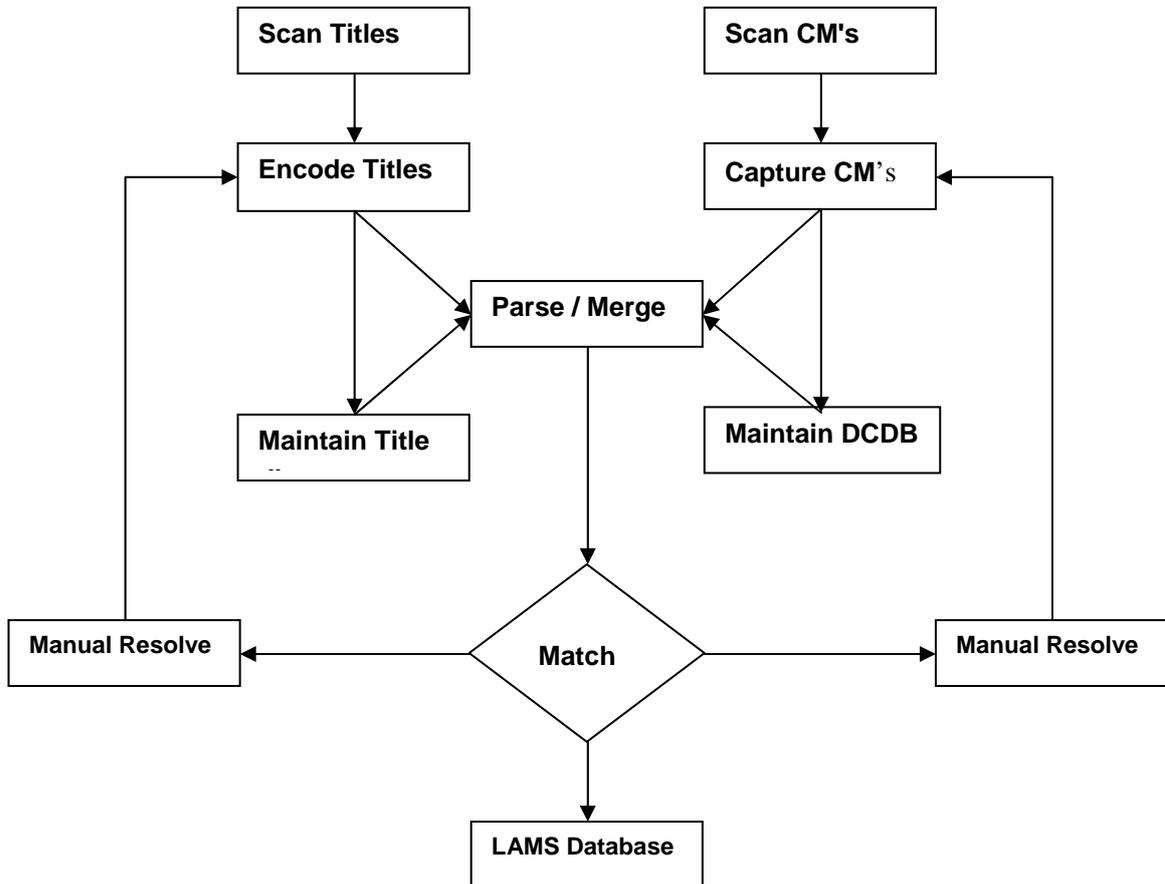
3.1   Scanning

This process involves the imaging of existing RoD titles documents and DENR cadastral record maps (CM)'s. It is envisaged that these processes be undertaken in-house and in parallel to title encoding and spatial data capture.

3.2   Encoding of Titles

This process involves encoding data from the scanned title imagery. It is envisaged that this be undertaken by entry of data into fields in a Title Encoding Form, with the form and image being displayed simultaneously on the computer screen. It is envisaged that this process be undertaken by out-sourcing of data encoding. However, the same provisions need to be replicated within RoD for encoding of new records and so that the converted database can be maintained.

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 4

3.3 Capture of Spatial Data

This process involves the digitising of parcel and associated attributes from scanned CM imagery. It is envisaged that this be undertaken by geo-referencing of the scanned image and screen digitising of the parcel fabric. It is envisaged that this process also be undertaken by out-sourcing of data capture. However, the same provisions need to be replicated within RoD for capture of new records and so that the converted database can be maintained, possibly by coordinate geometry (COGO) entry of survey data.

3.4 Merging and Resolution of Converted Data

This process involves the merging, linking or joining of the encoded titles database and captured parcel databases or Digital Cadastral Database (DCDB). It is envisaged that this be undertaken by a batch parsing process on completion of conversion. The results will be inspected and miss-matches resolved by manual inspection of title and CM records.

While many of the mismatches will be simple encoding errors, some may indicate the issue of duplicate parcels or even worse - duplicate titles. Procedures and protocols will need to be developed for the escalation and resolution of these more difficult occurrences.

3.5 Data maintenance

Throughout the processes, encoded titles data and captured spatial data will be maintained on a daily basis to ensure databases reflect the up-to-date position.

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 5

4. Quality Roles and Responsibilities

4.1 OSS Manager

The OSS Manger will be responsible to the Project Manager for:

- Ensuring the Quality Assurance strategies are being followed;

- Ensuring Data Conversion productivity is proceeding to the agreed timeline;

- Ensuring RoD procedures are being followed;

- All staff engaged in data conversion activity are provided with the necessary tools, environment and support to enable them to undertake assigned tasks to the utmost of their ability.

4.2 Quality Manager

The Quality Manager will be responsible to the Project Manager for:

- Establishing and maintaining a continuous improvement process to effectively deal with corrective and preventative measures;

- Monitoring the effectiveness of systems and processes to achieve quality objectives;

- Conducting Internal and External Quality Audits;

- Ensuring that documentation is adequately reviewed, current and that documents and records are controlled as appropriate;

- Facilitating the preparation of Procedure Manuals in the standard style of RoD's requirements as appropriate;

- Providing guidance for process QC inspections.

4.3 Data Conversion Manager

Responsible to the OSS Manager and Quality Manager for:

- Leading and managing the data conversion and maintenance processes;

- Determine and monitor project quality assurance aspects including correctness, completeness, currency and productivity of converted data;

- Preparation of Monthly Progress Reports (progress against performance targets);

- Preparation of Quality Reports specific to data quality aspects;

- Assisting with the staff recruitment process;

- Assisting with staff development and training;

- Assisting with the development and maintenance of Procedure Manuals;

- Management of Contracts raised to control SP activity;

- Coordinating Warranty (Warranty Coordinator) aspects of the Contract and return of data.

4.4 Team Leaders Title Encoding and CM Capture

Responsible to the Data Conversion Manager and Quality Manager for:

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 6

- Providing additional training and mentoring of Team Members as necessary in all required processes and quality measures;

- Providing timely advise and guidance on specific interpretations as required (problem solving and resolution);

- Analyse conversion performances and take remedial actions to improve performance where necessary;

- Assisting with the development and maintenance of Procedure Manuals;

- The implementation of quality measures specified for the tasks.

4.5   Team Members

Each Team Member will be responsible to the Team Leader for their own quality aspects, that is specifically;

- Ensuring process procedures are correctly followed;

- The implementation of personal and other quality measures specified for each task;

- The reporting of results of quality measures implemented for each task.

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 7

5.   Quality Processes and Standards

The following checks and processes will be introduced to ensure the correctness, completeness and currency of data encoded or captured.

5.1   Encoding Titles Data

5.1.1   Scanning of Titles Data

Scanning will be conducted outside of normal office hours so as not to disrupt normal daily business. However, if permanent staff are able to be assigned to this task and the required productivity rates can be achieved, then scanning could be undertaken within normal office hours. It will be undertaken within or within close proximity to the title safe. Scanning operations will be supervised by security personnel to ensure records are not removed from the approved location and that unauthorised personnel are not able to enter.

- Scanned images will be indexed in terms of title volume and page. A check will be made on the index at the completion of each daily run to ensure each page has been scanned;

- Scanner settings will be optimised to enhance readability and reduce "noise", that is to reduce speckles;

- Scanned images will be inspected to ensure all pages have been scanned and that all data required to be encoded is readable. Missing or unreadable images will be replaced.

5.1.2   Title Encoding Process

Title encoding personnel, whom have minimal knowledge of title interpretation, will be supervised by Team Leaders who will have experience and understanding of the title system. These officers will provide additional interpretation assistance or issue resolution on an as required basis. In addition to training, mentoring and reference to a comprehensive Procedures Manual, the following quality measures will be introduced:

- Encoding software will be developed with pull-down menus, look-up tables or data entities "mapped" so as to standardise and automate the encoding process wherever possible;

- The Title Encoding Form will be designed so as to replicate location to data to be encoded, that is fields located so that one does not need to unnecessarily pan around the scanned image;

- Titles will be encoded from scanned imagery from the latest title to the earliest;

- An automatic Workflow will be introduced whereby the system will automatically present the operator with the next available image to be encoded;

- The Title Encoding Form will not be able to be closed (saved) until all mandatory fields have been populated;

- Personal Quality Checks (PQC) will be made on entered data prior to saving, wherever possible, to ensure fields are populated with valid entries;

- Where the operator is unsure on values to be entered, they will seek advise from the Team Leader.

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 8

It is envisaged that good performances with respect to productivity and quality will be recognised and the Team Members receive appropriate rewards.

On completion of encoding and population of the titles database, internal checks will be conducted to ensure uniqueness of encoded data, that is that there is no duplication of title numbers, volume/folio numbers etc. and that attributes fall within valid ranges.

5.2   Capture Spatial Data

Spatial capture will be undertaken by screen digitising from scanned images of the Cadastral Map (CM). In addition to training, mentoring and reference to a comprehensive Procedures Manual, the following quality measures will be introduced:

- Scanning of imagery will be undertaken on a suitable flatbed scanner to ensure no distortions are introduced to the image as part of the scanning process;

- The Philippine Reference System coordinates of the neat edge corners shall be entered and RMS (root mean square) residuals of the geo-referencing process will be inspected to ascertain if within an acceptable tolerance. If outside of tolerance, the geo-referencing process will be repeated until acceptable RMS residuals are obtained, or an explanation is available as to why residuals outside of the acceptable range are being obtained;

- An affine or polynomial transformation be used to geo-reference or register the image;

- A standard "schema" will be used within MapInfo to ensure consistency of data layers, colours and attributes. Similarly, a standard schema will be used within AutoCAD for the maintenance of the spatial database;

- Procedures will be adopted during the screen digitising of the parcel fabric to ensure 100% linear and polygon topology will ensue. That is that the linear network contains no gaps or overlaps to associated nodes and polygons may be formed;

- Polygons will be formed and attributes assigned to polygon centroids;

- The resulting captured data will be inspected by plot and overlay and verified for completeness and correctness by the Team Leader or independent Team Member. Errors will be corrected;

- Data will be edge-matched to existing captured CM's to ensure a continuous database is established.

As with the titles database, internal checks will be conducted to ensure uniqueness of captured data, that is that there is no duplication of parcel attributes and that attributes fall within valid ranges etc.

5.3   Merging of Datasets

Merging of titles database and spatial DCDB will be undertaken in batch mode on completion of the conversion process. The Systems Administrator will initial the batch. Software will be developed to run this process and to report variations (miss-matches). This report will be inspected as part of a manual verification process to ascertain why variations exist and to correct variations.

While many of the mismatches will be simple encoding errors, some may indicate the issue of duplicate parcels or even worse - duplicate titles. Procedures and protocols will need to be developed for the escalation and resolution of these more difficult occurrences.

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 9

5.4 Outsourcing of Data Conversion

It is envisaged that encoding of titles data and capture of spatial CM data will be undertaken by out-sourcing. Out-sourcing will be controlled by competitive tender and Contract.

The Contract will have similar quality provisions to this QAS, that is the SP will be required to:

- Submit for consideration and approval a QAS that outlines similar principles and provisions as is outlined within this QAS;

- Comply with all performance and quality assurance standards as agreed within that QAS, specifically:

  i.   Meet all encoding and capture performance targets;

  ii. Meet all quality assurance standards;

  iii. Conduct their own QC and continuous process improvement measures;

  iv. Comply with the agreed Project Communication plan (PCP);

  v.   Comply with all physical and system security provisions;

  vi. Make operations and processes available for conducting of Quality Audits.

The Data Conversion Manager will manage the respective Contracts. He or she will be required to:

- Assign and receive batches of work;

- Ensure the assigned batches are of a quality standard for the conversion task;

- Ensure the batches received are of the required quality standard;

- Ensure that performance measures are met by undertaking Quality Assurance checks on the uploaded data;

- Undertake Quality Audits of the SP with assistance of the Quality Manager.

Breaches of the above will be regarded as a breach of Contract and therefore subject to penalty provisions as outlined within the Contract.

5.4.1 Warranty of Converted Data

The SP will be required to offer a Warranty on all converted data. This shall be for three (3) calendar months from the time the data was supplied back to RoD for upload. The Warranty shall cover:

- Defective data is that which does not faithfully reflect data from the title or CM from which the data has been encoded or captured, or

- Violates quality assurance rules that are clearly documented in the QAS provided by the SP or as agreed by RoD.

The Warranty will not apply to data that has subsequently been modified by RoD as part of its maintenance process, or changes to application specifications or requirements that has caused the data to be defective, which was not defective prior to the change.

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 10
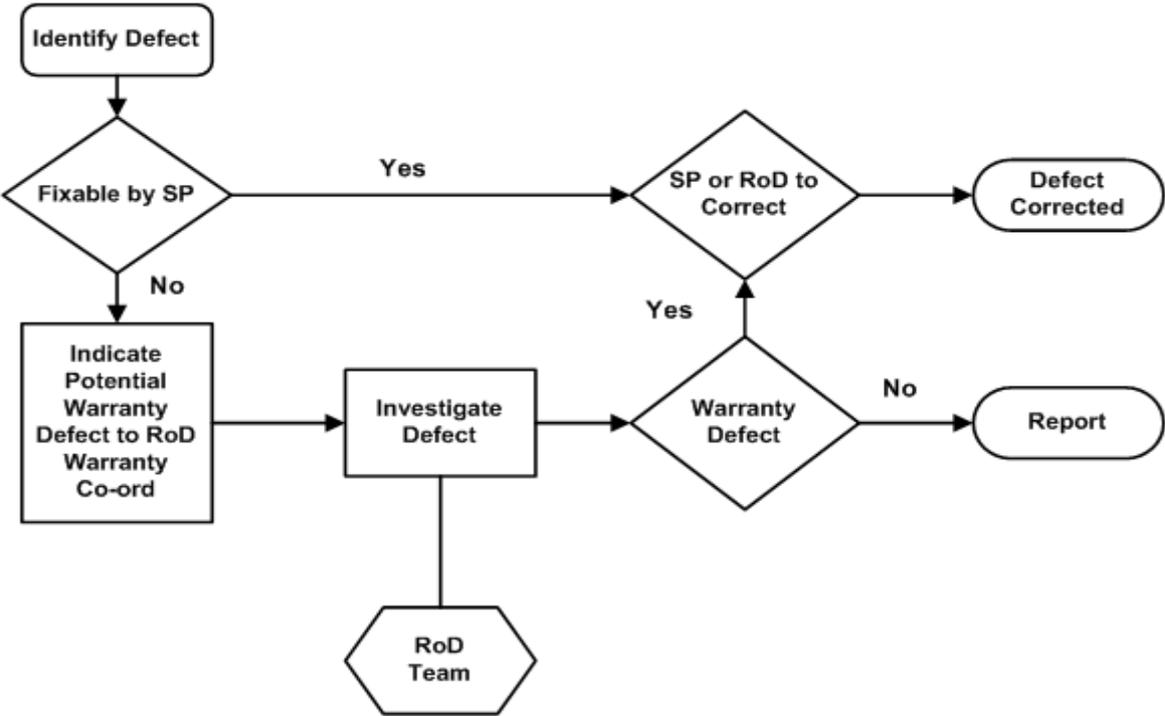
5.4.1.1 Warranty Process

On detection of a warranty issue, the defect or defects will be logged by a RoD representative using a Warranty Notification Form.

Where RoD require the Service Provider to remedy the warranty defect, then:

- RoD will attach any information to the Warranty Notification Form that shows the changes made and the amount of time spent to remedy the defect. This information must clearly show the defective data before the remedy is actioned to assist the Service Provider to address the problem that caused the defect;

- All warranty defects actioned by RoD will be collated by the Warranty Coordinator;

- The Warranty Notification Forms for all defects remedied by RoD must be provided to the SP within 10 working days of receipt of the batch with a summary of time spent by RoD remedying the defects;

- If during the batch, the time spent by RoD in exceeds the agreed amount, then the Warranty Coordinator will notify the SP. The two parties must agree on a plan for remedy of warranty issues for that batch;

- If the volume of warranty defects exceeds the agreed threshold, then RoD will raise an invoice to the SP for the time spent rectifying warranty errors, at RoD standard rates, no sooner than 10 days after the report has been provided to the SP;

- The SP will have 10 working days to query the batch report and invoice from RoD.;

- The agreed amount will be reviewed on a batch-by-batch basis.

If RoD wish for the SP to remedy the defect, then:

- The Warranty Notification Form will be sent electronically to the SP;

- RoD will provide an assessment of the actions required to remedy the defect, otherwise the two parties will agree on the action to be taken;

- The SP will maintain a record of time spent investigating suspected warranty defects that are subsequently discovered to be due to other problems outside of the SP's control;

- The Warranty Notification Forms for all defects remedied by the SP must be provided to RoD within 10 working days of notification, together with a batch report;

- RoD will have 10 working days to query the SP batch report;

- RoD will raise an invoice to the SP for any time above 20 hours per month for the time spent investigating suspected warranty defects that subsequently are found not to be. The invoice shall be raised no sooner than 10 days after the report has been provided to the SP.

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 11

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 12

6.   Quality Assurance Measures

RoD approach to quality as part of the data conversion project in one of Total Quality Management (TQM) with a project wide effort through full involvement with a focus on continuous improvement to deliver optimal levels of data quality.

Quality will be built into processes wherever possible by the use of standards, drop down menus and look-up tables to standardise and provide consistency of data conversion. Quality inspections will be used as a means of gathering information that can be used to improve quality, not just simply to remedy defective work.

Every care will be taken to ensure a level of project assurance appropriate to the encoding of titles data and capture of spatial data. Specific general project assurance issues impacting on quality are as follows:

6.1   Communication and Reporting

A Project Communication Plan (PCP) will be developed which will identify the need for regular meetings and reports which will ensure appropriate levels of communication both within the RoD project team and between its SP's. Key topics to be included in the PCP are the identification of issues impacting on the project, risk management, progress reporting and quality reports.

Internal reports will be generated monthly. They will include progress and quality items such as:

- Monitoring actual progress against estimated progress;
- Accuracy obtained;
- Completeness;
- Staff performance issues (good and bad);
- Non-conformance issues and resolution thereof.

Monthly reports will also be provided by SP's. Content and format will be similar to the above and to a standard appropriate for the project and as agreed by RoD. All items of risk will be addressed, together with measures taken to mitigate against risk.

See also Section 7 below – Monitoring Evaluation

6.2   Process Documentation

A Procedure Manual will be issued to every person engaged on the Data Conversion Project. All data conversion tasks will be fully documented to provide instruction in all procedures and to assist with interpretation. Procedure manuals will include examples wherever possible. They will also include all standards and definitions used to support QC.

Procedure Manuals will be created to a standard, style and level of documentation as required by the NTA - IT Standards & Quality. Contents will be constantly reviewed and amended as part of

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 13

RoD's quality improvement process. The manual will clearly indicate the version number and date of issue. It will be the responsibility of the Team Leader to ensure that the most current manual is issued and used.

Procedures manuals will include the following subject matter:

6.2.1   Scanning Procedures Guide

This manual will detail the scanning of titles process. Contents will include:

- Handling and security of title documents;
- Use of scanner;
- Indexing of documents;
- Image quality inspection;
- A Revision History.

6.2.2   Title Encoding Procedures Guide

This manual will detail processes, inputs, outputs and tools used for the encoding of title data from scanned imagery. The contents will include:

- Description and requirements of Data Encoding Form;
- Use of imagery;
- Specific encoding requirements and examples;
- Maintenance of the Titles database;
- A Revision History.

6.2.3   Spatial Capture Procedures Guide

This manual will detail processes, inputs, outputs and tools used for the capture of parcel data from scanned imagery of CM's. The contents will include:

- Geo-referencing of CM images;
- Digitising of linework;
- Polygon formation;
- Capturing of polygon attributes;
- Maintenance of the DCDB database;
- A Revision History.

6.2.4   Merge Resolution Procedures Guide

This manual will detail the merge and resolution process between encoded titles data and captured parcels data. The contents will include:

- Running of batch merge software and generation of report;
- Inspection and interpretation of report;

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 14

- Manual resolution of variations;

- Correction of variations;

- A Revision History.

6.2.5   Quality Assurance Manual

RoD's Quality Assurance Analysist will be provided with a Procedure Manual that will guide their work. The manual will include:

- An explanation of the QA purpose and roles;

- An overview of the QA processes;

- A guide to the Error Management system and the thresholds;

- A guide to the Quality Improvement process and resolution of non-conformance;

- A guide to the QA reporting and related procedures;

- A Revision History

6.3   Quality Improvement

RoD will implement a Quality Improvement initiative. Quality improvement may result from the need to improve processes to include additional functionality, or to improve performance, or to effect a change in methodology resulting from non-conformance detected by testing or internal or external reviews.

Any area of non-conformance discovered internally during the course of the data conversion project or on delivery by a SP will be documented, investigated and corrective and preventative measures taken to ensure the non-conformance is not repeated. This may include and range from:

   i.   a process improvement investigation being initiated;

  ii.   additional checks being implemented;

 iii.   retraining of staff in areas of consistent poor performance;

  iv.   improved documentation.

The focus will be on corrective action to remove the root cause of the problem, rather than treating the symptoms.

6.4   Security

6.4.1   Physical Security

Security of title records is of utmost importance. Imaging (scanning) of titles will be undertaken in an approved area within or within close proximity of the title safe. Scanning will be undertaken within or outside of normal office hours. However, disruption to normal office routines must be

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 15

avoided. A Security Officer will be engaged to ensure titles are not removed from the approved scanning area and that unauthorised personnel are not able to enter the approved area.

All source data supplied by RoD to SP's during the course of data conversion will be held in a safe and secure location to avoid intentional or accidental loss or damage. Source data includes CD-ROM's of title imagery. Source data will be returned to RoD on completion of encoding, that is on acceptance of the encoded batch. Supply and return of source data will be by via a reputable Courier agency.

The SP will operate in a secured office environment to protect all physical and Intellectual Property of RoD. Standard international Copyright laws will apply. No data will be provided to any third party in any form without the express permission of RoD. On Contract completion, the SP will be required to certify that no data has been supplied to any third party in any form. The SP will delete all records, including computer records and certify that all copy has been deleted.

6.4.2   System Security

The standard LAMS back-up procedures will be adopted to cover encoded and captured database data, data files and software scripts used in the course of data conversion. A recovery test will be conducted in the early stages of data conversion to ensure the effectiveness of these procedures and to make sure all data and software scripts can be retrieved in the event of a major system failure.

Similarly, Service Providers engaged as part of data conversion will be required to have similar back-up procedures. A report on the outcome of recovery tests will be supplied to RoD on request.

6.5   Quality Assurance

The main quality assurance processes to be implemented are:

- Project requirements will be reviewed prior to implementation of processes to ensure all aspects with respect to process steps, completeness and standards are identified and fully tested and documented;

- Persons engaged on the project will be fully trained on all relevant processes and will be mentored to ensure a full understanding of requirements are known;

- Persons engaged on the project will be held responsible and accountable for their own PQC's. Checks will be undertaken throughout all processes as necessary to ensure the required quality is being achieved;

6.6   Quality Checks

In addition to the quality assurance measures and measures built into system software to ensure a high degree of quality is being obtained, quality checks will be implemented to ensure the final product meets the expected quality performance targets. These checks will include the following:

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 16

- Each encoding Team Member will undertake a PQC prior to saving to ensure data has been encoded correctly. Where the requirements to capture data within a field is not clear, the Team Leader will be consulted;

- Each spatial capture Team Member will be required to complete a PQC Form during MapInfo conversion to ensure all process steps have been completed;

- A peer review will be undertaken of each converted CM. This will involve inspection of a plot of the converted data against the original Cm to ensure all spatial and aspatial data has been correctly captured. Where deficiencies are found, corrective actions will be undertaken;

- Reports will be generated of encoded data and inspected for aspects of correctness and completeness. Where deficiencies are found, corrective actions will be undertaken.

6.7   Internal Quality Audits

All quality assurance measures and associated documentation implemented in the project set-up stages will be subject to an internal Quality Audit by the RoD Quality Manager. Quality Audits will also be undertaken to ensure documented quality assurance procedures are being followed.

6.8   External Quality Audits

The RoD Quality Manager will undertake an audit of quality assurance measures and associated documentation implemented by the SP. Quality Audits will also be undertaken at their premise to ensure documented quality assurance procedures are being followed.

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 17

7. Monitoring and Evaluation

The following reporting are envisaged to monitor completeness, currency and correctness of data conversion.

7.1 Scanning

- Number of titles scanned per day;

- Number images rejected;

- Number of titles scanned verse the number of images;

- Identification of breaks in sequential volume/folio numbering (possible missed title images).

7.2 Title Encoding

Regrettably, as there is no existing titles database, there is no means of comparing actual titles with the number encoded. Also it is known that volumes of titles may not be complete as folios have been removed and hence there may not be sequential numbering. Consequently, no check can be made of encoding completeness. However, if the existing RoD manual titles registers were data based, a check could be made of completeness between titles indexed within the database and titles encoded.

- Report on comparison between Titles db and Title Register Index;

- Number of titles encoded per day;

- Number encoded per Data Encoder / performance;

- Number rejected or amended per Data Encoder as part of QC;

- Total number of title db records compared with number of images plus number of new title records created as part of maintenance.

On completion of encoding and population of the titles database, internal checks will be conducted to ensure uniqueness of encoded data, that is that there is no duplication of title numbers, volume/folio numbers etc. and that attributes fall within valid ranges.

7.3 Spatial Capture

Similarly to above, as there is no existing plan/parcel database, there is no means of comparing actual parcels with parcels captures. However, if the existing DENR plan and lot indices were data based, a check could be made of completeness between plan/parcel indexed within the database and parcels captured.

- Report on comparison between Parcels db and Parcel Plan Index (DENR);

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 18

- Number of CM captured per week per Data Capture Operator;

- Number of Parcels (centroids) captured per day;

- Number of Parcels captured per day per Data Capture Operator;

- Number rejected or amended per Data Capture Operator as part of QC.

As with the titles database, internal checks will be conducted to ensure uniqueness of captured data, that is that there is no duplication of parcel attributes and that attributes fall within valid ranges etc.

7.4   Merge and Resolve

- Number title records accessed;

- Number of parcel records accessed;

- Number merged and not merged;

- Detailed report of missed matched records for titles and parcels for investigation (manual resolve).

While many of the mismatches will be simple encoding errors, some may indicate the issue of duplicate parcels or even worse - duplicate titles. Procedures and protocols will need to be developed for the escalation and resolution of these more difficult occurrences.

7.5   Maintenance of Databases

7.5.1   Titles db

- Number of title database records actioned per week;

- Number outstanding per week;

- Maximum, Minimum and Average time to action maintenance request.

7.5.2   Parcel db

- Number of new DCDB parcel records actioned per week;

- Number outstanding per week;

- Maximum, Minimum and Average time to action maintenance request.

See also Sections 5 and 6 above for Quality Assurance measures to be initiated to processes and associated documents.

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 19

8. Definitions and Entities

Definitions and entities shown in black are **proposed** for the encoding and capture processes.

The definitions and entities shown in red are **possible** additional definitions and entities that may be needed for the wider representation of titles and DCDB data.

The definitions, entities and system codes listed here are indicative only. They are presented as a guide to the level of detail that is required within a **Data Dictionary** to support spatial and aspatial data.

For the full and authoritive listing, see Report F5 - OSS IT Systems Functional Requirements Specification or appendixes there to.

8.1 Title

A **title** is a record of all estates, encumbrances and easements that exist over a peace of land (parcel).

Title Id – A system generated static and unique identifier allocated for each title (UTI Primary Key)

Title Number - The Title Number allocated on Registration. The title number consists of a Type and Number and separated by spaces and dashes. For example: **P – 36118**

Patent Number - Assigned Patent #

Location – The Barangay, Municipality and Province in which the title is located

Owner – The Registered Owner of the Title

Spouse – The partner of the Registered Owner

Status – CURR for live title; CANC for cancelled title; PROV for provisional title (not yet registered

Former Title – Title #

Subsequent Title – Title #

CLOA Number – The title number issued as part of the CLOA process

EP Number – The title number issued as part of EP process

Date – Date Registered – DD MM YYYY

Time – Time Registered. HH MM (08 00 to 12 00 represents AM – 12 01 to 05 00 represents PM

Title Type – See System Code List below

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 20

System Code	Description	Status	Value(s)
P	Patient	CURR/CANC/PROV	Patient
C	Cadastral	CURR/CANC/PROV	Cadastral
TP	Transfer Patient	CURR/CANC/PROV	Transfer Patient
TC	Transfer Cadastral	CURR/CANC/PROV	Transfer Cadastral
	Cross Lease	CURR	Cross Lease
	Freehold	CURR	Freehold
	Leasehold	CURR	Leasehold
	Marine Licence	CURR	Marine Licence
	Timeshare	CURR	Timeshare
	Unit	CURR	Unit

8.2 Encumbrance

An **encumbrance** is a restriction on what the owner of a piece of land can do with that land (eg mortgage, lease, restrictive covenant)

Encumbrance Number - The number that uniquely identifies each encumbrance (Primary Key). The Encumbrance Number consists of a Type and Number and separated by spaces and dashes. For example:

Status - CURR for live encumbrances; CANC for cancelled encumbrances – **Note**: only current encumbrances are required to be encoded as part of the title conversion project.

Date – Date Registered. DD MM YYYY

Time – Time Registered. HH MM (08 00 to 12 00 represents AM – 12 01 to 05 00 represents PM)

Encumbrance Type – See System Code List below

System Code	Description	Status	Value(s)
	Absolute Sale	CANC	Totally Cancelled
	Adverse Claim	CURR/CANC	Adverse Claim
	Affidavit of Confirmation and Waiver	CANC	Affidavit
	Amendment of Mortgage	CURR/CANC	Amendment of Mortgage
	Assignment of Mortgage	CURR/CANC	Assignment of Mortgage
	Attachment	CURR/CANC	Attachment or Execution
	Bail Bond	CURR/CANC	Bail Bond
	Board Resolutions	CURR/CANC	Board Resolution
	Cancellation of Liabilities	CURR/CANC	Cancellation of Liabilities

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 21

	Cancellation of Lien	CURR/CANC	Cancellation of Lien
	Cancellation of Mortgage	CURR/CANC	Cancellation of Mortgage
	Certificate of Sale in Foreclosure of Mortgage	CURR/CANC	Certificate of Sale
	Confirmation of Sale	CURR/CANC	Confirmation of Sale
	Consequent Deed of Absolute Sale	CURR/CANC	Deed of Sale
	Consolidation of Mortgage	CURR/CANC	Consolidation of Mortgage
	Consolidation of Ownership	CANC	Consolidation of Ownership
	Consolidation of Ownership in Pacto de retro Sale	CANC	Consolidation of Ownership
	Consolidation of Ownership in Extrajudical Foreclosure	CANC	Consolidation of Ownership
	Court Decision	CURR/CANC	Court Decision Intermediate Appellate
	Deed of Absolute Sale	CANC	
	Deed of Donation	CANC	Deed of Donation
	Deed of Quitclaim	CANC	Deed of Quitclaim
	Deed of Redemption	CURR/CANC	Deed of Redemption
	Deed of Sale of Unsegregated Portion	CURR/CANC	Deed of Sale
	Exchange or Barter	CANC	Deed of Exchange
	Extrajudicial Partition	CURR/CANC	Extrajudicial Partition
	Extrajudicial Settlement	CURR/CANC	Extrajudicial Settlement
	Extrajudicial Settlement of Estate	CANC	Extrajudicial Settlement of Estate
	Final Deed of Sale	CANC	Final Deed of Sale
	Foreclosure Sale	CURR/CANC	
	Heirs Bond	CURR/CANC	Heirs Bond
	Judicial Reconstitution of Lost Original	CURR/CANC	Order of the Court
	Judicial Foreclosure of Mortgage	CANC	Final Record
	Lease	CURR/CANC	Lease
	Letter of Guardianship	CURR/CANC	Letter of Guardianship
	Letters of Administration	CURR/CANC	Letters of Administration
	Liabilities	CURR/CANC	Liabilities
	Limitation	CURR/CANC	
	LIS Pendens	CURR/CANC	Notice of LIS Pendens
	Mortgage	CURR/CANC	Mortgage

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 22

	Mortgage Bond	CURR/CANC	Mortgage Bond
	Notice of Levy	CURR/CANC	Notice of Levy
	Notice of LIS Pendens	CURR/CANC	Notice of LIS Pendens
	Officers Deed	CURR/CANC	
	Order	CURR/CANC	Order by the Court
	Liabilities		Liabilities
	Order for Replacement of Lost / Destroyed Title	CURR/CANC	Order for Issuance of New Owners Duplicate
	Order of Registration of Improvement	CURR/CANC	Order of Court
	Power of Attorney	CURR/CANC	Power of Attorney
	Project of Partition	CANC	Project of Partition
	Real Estate Mortgage	CURR/CANC	Mortgage
	Repurchase by Pacto De Retro Sale	CURR/CANC	Repurchase
	Resolution	CURR/CANC	Resolution
	Sale by Instalment or Conditional Sale	CURR/CANC	Conditional Sale
	Sale by Pacto De Retro Sale	CURR/CANC	Pacto De Retro Sale
	Sale of Undivided Portion of Property	CANC	Deed of Sale
	Sale of Unsegregated Portion	CURR/CANC	Sale of Unsegregated Portion
	Sale with Assumption of Mortgage	CANC	Sale with Assumption of Mortgage
	Sheriff's Certificate of Sale	CURR/CANC	Certificate of Sale
	Special Power of Attorney	CURR/CANC	Special Power of Attorney
	Subdivision Plan	CANC	Subdivision Plan
	Summary of Settlement of Estate	CANC	Summary of Settlement

Note – The above encumbrance types are presently being investigated by the NTA – OSS Management and TA Land Registration with a view to simplification, rationalisation and standardisation.

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 23

8.3   Easement

An **easement** is right other than ownership than someone may have over land owned by someone else. An easement may be in favour of another block of land (a "normal" easement) or an easement may be in favour of an individual/company/government body (an easement in gross).

Easements will be recorded as a type of Encumbrance. See Encumbrance.

Easement Type -

System Code	Description	Status	Value(s)
	Building Overhang	CURR	Building Overhang
	Convey Gas	CURR	Convey Gas
	Convey Water	CURR	Convey Water
	Drain Sewage	CURR	Drain Sewage
	Drain Stormwater	CURR	Drain Stormwater
	Drain Water	CURR	Drain Water
	Party Wall	CURR	Party Wall
	Right of Way	CURR	Right of Way
	Transmit Electricity	CURR	Transmit Electricity
	Transmit Telecom.	CURR	Transmit Telecom.

8.4   Covenant

A **covenant** is restriction registered against the title that imposes conditions of use of the land contained within the title. It may be a protective land covenant, protecting rare features, or restrictive covenants restricting use, type of building or height of development etc.

Covenants will be recorded as a type of Encumbrance. See Encumbrance.

Covenant Type - protective or restrictive.

System Code	Description	Status	Value(s)
	Protective	CURR	
	Restrictive	CURR	

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 24

8.5   Parcel

A **Parcel** is a polygon (possible multi polygon, doughnuts etc) consisting of boundary lines (features which are boundary features) which may be, or may be capable of being defined by survey and includes the parcel area and appellation.

Multi polygons or polyhedrons are required in order to define stratum estates and easements etc.

Parcel Id – A system generated static and unique identifier allocated for a parcel (UPI Primary Key)

Parcel Number = Lot Number - The number allocated for the parcel on approval of the Survey plan

Parcel Status – A Parcel may be Proposed, Current or Historic (PROP/CURR/HIST)

Parcel Area – the area as provided by a surveyor on a new survey lodged to support a title or amend a title in hectares and decimals thereof (metres squared). For example 1.1012 or 0.1012 (1012 m2)

Parcel Intent – The reason/intention for creation of a parcel – See System Code List below.

System Code	Description	Status	Value(s)
	Accessory Unit		
	Accessway		
	Covenant Area		
	Common Property		
	Easement		
	Fee Simple Title		
	Government Reserve		
	Hydro		
	Lease < 20 years		
	Lease > 20 years		
	Licence/Permit		
	Municipal Reserve		
	Principal Unit		
	Road		
	Road Strata		
	Seabed		
	Service Lane		
	Statutory		
	Strata		

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 25

8.6   Line

A **Line** is a fundamental entity of structural topology (shapes/geometry of features/objects). It is the joining line between two nodes, that is each line must have at least two associated nodes – a start node and an end node. Within a LIS / GIS environment these should be captured and coded in a hierarchical order or relationship, duplicated in their entirety within separate layers, of associated using object orientation. Consideration needs to be given as to whether vectors need to be assigned to lines, that is their bearing and distance as shown on approved survey plans.

Line Id – A system generated static and unique identifier allocated for a line (Primary Key)

Line Vector Bearing

Line Vector Distance

Line Layer - or

Line Type – Feature Code for line type – See System Code List.

System Code	Description
prime_parcel_bdy	
easement_parcel_bdy	
Covenant_parcel-bdy	
road_bdy	
hydro_bdy	
road_centline	
road_intersectn_bdy	
traverse_line	

8.7   Node

A **Node** is a fundamental entity of structural topology (shapes/geometry of features/objects). It is a "point" representing the change in direction of a line (arc or vector) or intersection of lines.   There is usually a one to one relationship between nodes and survey marks. However, there may be no marks associated with nodes along natural/irregular boundaries and at road intersections. Each node will have assigned coordinates.

Node Id – A system generated static and unique identifier allocated for each node (Primary Key)

Coordinate East – Coordinate east of the PRS false origin.

Coordinate North - Coordinate north of the PRS false origin.

Source Code – Code indicating source of node and an indication of expected accuracy.

System Code	Description	Expected Accuracy - (Greater majority of nodes)

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 26

0	Numerically entered	+/- 0.1 meters
1	Orthophotography	+/- 0.25 meters
2	Digitised from 1:500 CM	+/- 0.5 meters
3	Digitised from 1:1,000 CM	+/- 1 meters
4	Digitised from 1:2,000 CM	+/- 2 meters
5	Digitised from 1:4,000 CM	+/- 4 meters

8.8   Mark

A **Mark** or survey mark is a physical monument placed for the purpose of being surveyed. A survey mark is a node occupied by a physical mark. There is usually a one to one relationship between survey marks and nodes. However, there may be no marks associated with nodes along natural/irregular boundaries and at road intersections.

Mark Id – A system generated static and unique identifier allocated for a mark (Primary Key);

Mark Number– The number allocated for the mark on an approval of the Survey plan

Mark Type – IS, IT, Conc Pillar, Beaconed etc

Mark State – New, Old, Adopted, etc

Mark Condition – Reliable, Destroyed, Not Found, Replaced, etc

Mark Class - I, II,III, IV etc – an indication of accuracy

Source Code – Code indicating sourc

System Code	Description	

8.9   Label Point

A **Label Point** is a graphic element that can be displayed on a view. It is usually associated with a feature. In the case of OSS, the feature is the Survey Plan Number. Colour may be used to indicate survey plan Status.

Label Point Id – A system generated static and unique identifier allocated for a label point (Primary Key);

Label Point Value = **Survey Plan Number** (See Survey Plan)

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 27

8.10 Survey Plan

The **Survey Plan** is the document created and lodged by a Geodetic Engineer (surveyor) that supports parcel definition. The plan may be provisional, that is lodged but not approved as to survey, or approved as to survey. The plan shows the dimensions of the parcel (bearings and distances), lot (parcel) number, area and mark type and number. The survey plan number will be represented by labels. See Label.

Survey Plan Number – Survey plan numbers consist of Type Code, Region #, Sequential plan number and Source each separated by spaces and dashes. For example: PSD - 08 - 022043 - D

Survey Plan Sources - **B** (Bureau (or government GE), **D** (Private GE)

Status – Status may be Provisional (not approved) Approved, or Historical (approved but Superseded for present parcel definition)

Survey Plan Type -. See System Code List below.

System Code	Description	Status	Value(s)
AP	Advance Plan	PROV/APPR/HIST	Advance Plan
AS	Actual Survey	PROV/APPR/HIST	Actual Survey
CSD	Consolidated Subdivision	PROV/APPR/HIST	Consolidated Subdivision
CV	Conversion Survey	PROV/APPR/HIST	Conversion Survey
PSD	Private Original Survey	PROV/APPR/HIST	Private Original Survey
PSU	Private Original Survey	PROV/APPR/HIST	Private Original Survey

8.11 Administration Polygon

An **Administration Polygon** is a polygon consisting of an amalgamation of other parcel or administration polygons to form an administrative area.

Admin Polygon Id – A system generated static and unique identifier allocated for an Admin Parcel (Primary Key)

Admin Polygon Status – A Parcel Current (CURR)

Admin Polygon Intent – The reason/intention for creation of a parcel – See System Code List below.

System Code	Description	Status	Value(s)
BNGY	Barangay	CURR	Barangay Name
MUNC	Municipality	CURR	Municipality Name
PROV	Province	CURR	Province Name
REGN	Region	CURR	Region Name

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 28

9. Abbreviations and Acronyms

CENRO	Community Environment and Natural Resource Office
CIM	Cadastral Index Map
CLOA	Certificate of Land Ownership Award
CM	Cadastral Map
COGO	Coordinate Geometry
DENR	Department of Environment and Natural Resources
EP	Emancipation Patent
ITA	International Technical Advisor
LRA	Land Registration Authority
NTA	National Technical Advisor
OSS	One Stop Shop
PCP	Project Communication Plan
PQC	Personal Quality Check
QA	Quality Assurance
QAS	Quality Assurance Strategy
QC	Quality Control
RoD	Registry of Deeds
RSM	Root Mean Square (geo-referencing transformation)
SP	Service Provider
TA	Technical Advisor
ToR	Terms of Reference

LAND EQUITY INTERNATIONAL

F:\Documents and Settings\Administrator\My Documents\bakup\2007\TA Major Reports\F03\Quality Assurance Strategy_v0.3.doc   PAGE 29