Implementation of GISystems in the Land Acquisition Process and Road Maintenance

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The Road construction process / Project flow

Stage 1
Pre-planning and land acquisition
- Preliminary design
- Expropriation

Stage 2
Design and Build
- Design and Construction

Stage 3
Operations and maintenance
- Short term
- Long term
- Improvements/upgrades
The Land Acquisition process

- Acquisition/Titling
- Payment
- Legal clearances
- Verification and disclosure
- Preliminary design/ROW
- *ESIA Cadastral survey
- Land and property valuation

*Environmental and Social impact assessment
Right Of Way Management Information System -ROWMIS-
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- Topographic survey and setting out (CAD)
- Centre line
- Right Of Way
- Existing structures

Preliminary design/ROW

Migrate tool
ROWMIS Cont’d:.................

- Environment and Social impact assessment
- Opening boundaries
- Existing structures

*ESIA Cadastral survey

[Image of a map with a focus on surveyed areas and details of buildings and structures]
ROWMIS Cont’d: 

- Valuation assessment (MSExcel)
- Land and PAPs
ROWMIS Cont’d: 

- Valuation report format
- Linked by plot
- Unique identifier

Rules:
- One Card per land (1:1)
- PAP have only one card in the system (1:1)
- Land can have many PAPs (1:M)
- PAP can belong on more than 1 land (1:M)
ROWMIS Output

- Reports
- Maps

![ROWMIS Output Diagram](image-url)
ROWMIS Output

- Criteria/status requirement
- Exporting information
Operations and Road Maintenance

Stage 1: DATA COLLECTION
- Road inventory
- Bridges
- Traffic

Stage 2: DATA MANAGEMENT (dTIMS)
- Road management S
- Bridge management IS*
- Traffic IS

Stage 3: PROJECT MANAGEMENT
- Planning and programming
- Project control

*IS – Information System
GIS & GPS enabled Data collection tools

ROMDAS
- Road condition assessment
- Road geometry survey
- Location reference points
- etc....

MOBICAP Visual Assessment data capture software (Transition from field sheets)
- Lane & shoulder Width
- Pothole depth
- Edge conditions
- etc....

- Point data
- Traffic points
- Bridges
- Accident spots
- Adhoc data
- etc......
The ROMDAS System

Asset and pavement information
ROMDAS Cont’d….  

What it does:
- High-speed network level or project specific road surveying,
- Road roughness surveys,
- Transverse profile/rutting surveys,
- Macro-texture (MPD),
- Visual condition, environment or event rating,
- Automatic crack and surface defect inspections,
- Location referencing (spatial GPS/GNSS data or linear LRP data),
- GIS mapping of condition data and road alignment,
- Road geometry surveying
Mobicap Setup and interface

- Windows based tablet
- GPS’ and webcams can be connected
- Shapefile needs unique link ID
- Map window has similar controls to most GIS systems

- Mobicap is best used with a GPS connected to the tablet
- Background maps can be displayed
- Colours can be customised
Mobicap Data storage/sharing

- Backup of MDB file
- Add new Transdata Table
- Write a csv that can be Re-imported
- Write data to csv format
- Write only data needed to calculate vci to csv format
- Write list of photo’s to csv file
- Write list of network changes

Backup of MDB file
Write shapefile of logged roads
Write shapefile of nodes
Write shapefile of inventory items
Deighton Total Infrastructure Management System (dTIMS)

- Google maps
- Embedded map window
- Data.shp
- Perspective
- dTIMS Client
- Temporary Data files
- ArcGIS Client
- dTIMS Database server

Geodatabase:
- Roads
- Bridges
- Location Ref Points
- Other GIS data
Network condition in 5 years (2020) for Received budget
dTIMS as Decision Support and reporting tool

As a decision support tool
- An empty shell, but
  - Configured with HDM-4’s paved road RDWE models
  - Configured with HDM-4’s unpaved road models (roughness and gravel loss)
  - VOC vs roughness (IRI) relationships captured
  - Treatments, triggers captured
  - Unit costs of treatments captured
  - Budget scenarios captured
- Auto maintenance and repair ‘strategy generation’
- Life Cycle Cost Benefit analysis
- Heuristic optimisation for optimised network solution of benefit function
- Consequence / impact analysis
- Multi-year preventive maintenance, rehabilitation and upgrading programmes

Needs analysis
- Background
- Budget scenarios
- Immediate technical needs
- Received Funding
- Requested Funding
- Budget impacts
- Recommendations

Situation analysis
- Road network asset
- Road network analysed
- Traffic information
- Paved road network condition
- Unpaved road network condition
- Condition trends
- (Road user cost Asset value)
Thank you