# NKANGALA DISTRICT MUNICIPALITY

## PROJECT NO: 7302/14

## PROFESSIONAL SERVICES FOR RURAL ROADS ASSETS MANAGEMENT SYSTEM

# SCOPE OF WORK

**Part C3: Scope of Work**

C3 Scope of Work



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# C3 SCOPE OF WORK

### C 3.1.1 DESCRIPTIONS OF WORKS

The project will be implemented over the extended period of 3 years (36 months) with a phased approach that includes the following:

**a) Compilation of Rural Roads Assets Management Systems ("RRAMS") Business Plan**

The Service Provider shall on an annual basis be expected to compile a RRAMS Business Plan on a format prescribed from time to time by the Nkangala District Municipality ("NDM") and/or the National Department of Transport ("NDOT"). This include revising thereof where deemed necessary. The business plan will inter alia outline the development of an asset management system for road administrations, in a logical evolutionary step from managing individual assets and programs to managing from a broader perspective, making most effective use of the limited resources. This must clearly reflect that, asset management systems are generally integrated systems in which existing management systems for individual assets can be combined to produce new and often more conceptual information. In this regard, many road administrations already have a solid backbone on which to build an asset management system.

NDM will consider and examine whether or not the RRAMS Business Plan submitted is complaint and/or compatible with DORA framework requirements prescribed by the NDOT. Once satisfied, the NDM will forward the business plan to NDOT. It must be noted that District Municipalities are required to submit a Business Plan before the end of April of each year, indicating the proposed activities and expenditure for the following financial year, commencing each July. Release of grant funding to the District Municipality will be subject to the approval of the Business Plan.

Monthly progress reports, detailed progress and expenditure, are to be submitted in the format prescribed by the DOT



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**Data Collection**

The Service Provider shall in terms of DORA requirements, undertake data collection or revise/verify date already collected by predecessor in the format prescribed from time to time. The condition data will then be submitted to NDM for verification and submission to the DOT by the prescribed deadline.

During data collection process, the following must be adhered to:

- Data must be collected and presented in the format prescribed by RISFSA.
- Data collection should use labour intensive methods that comply with the Expanded Public Works Programme (EPWP) guidelines.
- All data collected must be made available to the National Department of Transport (NDOT), and/or any other Sector Department or State Owned Entity prescribed from time to time by NDM and/or NDOT. These may inter alia include South African National Roads Agency Limited (SANRAL) and the relevant provincial authorities and Local Municipalities.
- Systems developed to record data must be compatible with the Department of Transport specifications.

Following the fieldwork stage, the condition data must be validated and consolidated and the necessary refinement and corrections to the road centreline set will be done.

Unless prescribed otherwise, Data collection requirements shall be as follows:

- Roads (RISFSA Class 1,2 and 3)
  - Visual condition data (in accordance with TMH9 and TMH12) not older than two (2) years
- Roads (RISFSA Class 4 and 5)
  - Visual condition data (in accordance with TMH9 and TMH12) not older than three (3) years
- Bridges
  - Condition assessment data not older than five (5) years.
- Traffic
  - RISFSA Class 1,2 and 3 roads - traffic link volumes not older than three (3) years
  - RISFSA Class 4 and 5 roads - traffic link volumes not older than five (5) years
- TMH18 standards
  - Due to the change in the requirements of the TMH18 the data collected and submitted needs to be revisited due to the gaps in the data. The revision of this process will be updated annually to ensure the correctness of the information and data available.

**b) Data Collection Cycle**

A high-level programme indicating the key activities for the duration of the project will be submitted from which the following should be noted:

- A RISFSA road centreline set has been issued by the Provincial at the onset of the project, this data set will be updated through work carried out in the field.



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- Visual condition assessments must be undertaken on **surfaced roads** every year in order to build up a deterioration pattern.
- Visual condition assessments must be undertaken on all **gravel roads** (municipal and access roads) **every year**.
- A **bridge inventory** must be prepared **once**, during course of the project. Should extensive and obvious defects be noted, these must be reported to the relevant authorities. Updates on the condition of the bridge inspections must occur every 1,5 years
- A **road log** of selected road side features must be prepared annually.
- **Priorities and budgets estimates** must be prepared **annually** after each round of visual assessments.

With regards to traffic volumes, it should be noted that the District does not have complete dataset of traffic volumes on all classes of roads. Most of the municipal roads carry low volumes of traffic. It is therefore anticipated that **traffic counts** on a select few municipal roads will be carried out. In comparison, Municipalities such as Steve Tshwete and Emalahleni will have significant number of high trafficked internal roads.

**c) Update Road Asset Data**

The Service Provider shall be expected to inter alia:

- Utilize Ortho-photos and available road network data to identify and record the alignment of all roads within the District.
- Use Graduated Civil Engineering Technician(s) to do further cleaning and updating of the network, especially in respect of roads constructed subsequent to the dates of the ortho-photos.
- Utilize the available GIS data and planning data to classify each road according to the RISFSA functional classification system.
- Ensure configuring of data in order to be compliant to the requirements of the electronic visual assessment capturing system.
- Ensure that attributes tables of the road network are updated with data available from relevant municipal and provincial GIS systems.
- Ensure that bridge structure attributes and condition assessment results to be captured into GIS.

**d) Acquire Resources**

The Service Provider shall be expected to ensure procurement and acquisition of the following equipment:

- Computer hardware (10’ Acer Iconia Tablets) for electronic capturing of Visual Assessments
- Computer Software for electronic capturing of Visual Assessments
- Desktop Computers with Microsoft Office and ARC GIS 10 Software
- Hire suitable vehicles – 1 LDV per team
- PPE (Personal Protective Equipment) such as reflective jackets
- Miscellaneous hand tools as required
- Additional and optional equipment to capture further detail for the asset register will be used.



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**e) Visual Condition Assessments Fieldwork**

Visual condition assessments must be undertaken in accordance with new TMH9, TMH12 and M3-1. All known surfaced and gravel roads on the RISFSA dataset must be assessed / re-assessed and updated.

During this fieldwork the unknown roads must be identified, logged first and thereafter unknown or new roads must then be assessed. Road names must be verified (where street name boards are present) including status thereof (i.e. track, access road, right-of-way, access controlled, etc.) with a view to refining the road centreline set and RISFSA/RCAM classification. Class 6 roads must also be identified, as these roads provide access to dwellings in rural areas, and large number of these roads have the following status:

- Numerous of these roads that have been constructed for vehicular accesses have become inaccessible due to lack of maintenance;
- Roads which could be traversed by vehicles have been cut off either by the loss of access over stream crossings or by severe local erosion.

Initially all network and scenario analyses must be undertaken using Microsoft Excel or Microsoft Access. Standard Visual Condition Indices (VCIs) and Visual Gravel Indices (VGIs) must be calculated using standard algorithms. The results of the analysis must be exported into shape file format so that it can be drawn into the local and district municipalities GIS systems for viewing and further processing.

As a further step, it is anticipated that the following data must be uploaded onto the GIS systems to assist the local and district municipalities with future planning:

- Clinics and hospitals,
- Police stations,
- Schools,
- Cultural and historic sites and places of interest,
- Agricultural and development nodes, and
- Public transport routes and facilities

This information is readily available from the various service departments and are considered essential in assisting local and district municipalities with road maintenance and planning.

**f) Road Inventory Data Fieldwork**

- A road log of selected furniture must be prepared by the Trainee Student Engineers/Technicians, to record certain selected road-related assets.

**g) Condition Data Checking and Capturing**

- Screen the captured and downloaded data for quality and once verified be upload for processing.

**h) Capturing of Traffic Data**

- Once the Visual Assessments have been completed the Trainee Student Engineers/Technicians will continue with the conducting of Traffic Counts at certain nodes in accordance with the prescribed criteria monitored and guided by a qualified traffic engineer.

**i) Bridge Visual Condition Survey**

The preparation of a detailed road and bridge inventory must be undertaken during the course of the project. The inventory will include logging the position and condition of all road signs, stormwater drainage (such as pipe culverts, headwalls, etc.), bridges and major culverts, guardrails.

All bridge structures must be listed on a database/register and the physical properties of each structure must be captured and logged into the specific GIS layer by the Trainee Student Engineers/Technicians after which a suitably qualified structural engineer will conduct the prescribed condition inspection/survey on each structure. These results must also be logged into the GIS attribute table by the Graduates.
Any bridge or culvert structure which poses a risk due to its structural condition will immediately be reported to the relevant authority for action.

**j) RAMS Acquisition, Installation and Training**

- The acquisition of membership on the provincial wide Road Asset Management System that will be hosted by the Provincial of Transport.
- Service Provider must identify and train the Trainee Student Engineers/Technicians and other RAMS champions in the Municipalities.
- Service Provider must load all data, including the Road Asset Register, into the various RAMS subsystems.

**k) RAMS Analysis, performance standards, program & budget**

- Once all the data has been captured and processed into the Road Asset Management System the following deliverables will be extracted from the system:
  - Performance standards for bridge structures according to the class of road it serves.
  - Performance standards for roads per class.
  - Repair and maintenance programs.
  - Capital investment plan (constructing of new assets).
  - Multi-year financial budget estimates.

**l) Project Management and Reporting**

The Service Provider will be expected to inter alia:

- Manager and coordinate the project on a daily basis.
- Liaise with Local Municipalities as well as the Provincial Department of Transport.
- Compile and timely submit monthly progress reports in the formats as prescribed by the District Municipality, DoT and DORA.
- Effectively manage finance of the project.

**m) Human Capacity & Sustainability**

The Service Provider must ensure that at least three (3) Civil Engineering students are enrolled on a programme and will work as a team under the guidance of the Service Provider.

Graduates must be mentored under Registered Professional Engineers, working under a Commitment of Undertaking to ECSA to ensure that their experience during the 36-month period counts towards their professional registration. Mentoring must be supported by attendance of accredited training courses to ensure that their Continued Professional Development (CPD) points are achieved.

The overall objective of the training programme must not only be focused on RRAMS data collection but must extend towards the development of well-rounded technical staff that are well-versed in GIS, can analyse and interpret RAMS data, can prioritise projects, can undertake effective maintenance planning and design, can draw up maintenance and construction tender documentation, prepare reports and monitor construction.

The (5) graduates must also be encouraged and/or be permitted to pursue their further studies such as B-Tech Studies, and arrangements must be made to allow them time off during their block periods required at the Universities or Universities of Technology.



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