The Role of a PPP Project in Road Maintenance

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N3 Toll Concession (RF) (Pty) Ltd.
INTRODUCTION

• The Concession Contract (PPP Project)
• Typical Management System Approach
• Categorising Road Maintenance
• Contracting Models and Funding Sources
• Road Maintenance – a PPP Project
• Role of Road Maintenance in Sustainability & Enterprise Development
• Customer Value Add Benefits
• Conclusion (Comparison PPP vs Public)
THE CONCESSION CONTRACT

• 30-Year Concession Contract with Government (SANRAL) 1999 to 2029

• Public Private Partnership (PPP) requires N3TC to:
  • Design; • Construct; • Finance; • Operate; and • Maintain.

• N3TC committed to spending R25-billion on the development of the N3 Toll Route.

• Current routine maintenance expenditure approximately R40 million per annum.

• Current rehabilitation expenditure approximately R600 million per annum.
N3TC NETWORK- KEY CHARACTERISTICS

- 415 km length = 1660 lane km: 15 Highway Sections
- 141 Bridges + 181 major culverts
- 4 Mainline Toll Plazas + 4 Ramp Plazas
- Total of 90 toll lanes all with e-Tag payment option
- Traffic volumes: 6000 to 19000 vehicles/direction/day
- Heavy vehicles: 1800 to 3800 per direction per day
- E80/heavy varies 2.6 to 2.8
- Current total traffic growth
  - 2017/18/19: +2.8%
- Route Services Patrols 24/7. Approx. 1.5 million km /annum
- Route Control Centre 24/7 & Social Media
N3TC NETWORK - DESCRIPTION

218 km - 2 x 2 Lane Divided Highway

197 km - 4 Lane Undivided Highway

62 km - Concrete Highway now has Bituminous Surface
Network Analysis and Reporting

1. Analysis of compliance to concession requirements
2. Summary of current network condition
3. Analysis of network performance trends
4. Prediction of future deterioration and performance
### Requirements for Rutting

<table>
<thead>
<tr>
<th>Limiting Rut (mm)</th>
<th>Maximum length of each 1 km segment with Rut &gt; Limiting Value</th>
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<tbody>
<tr>
<td>15</td>
<td>10% (90th percentile should be below limiting value)</td>
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<tr>
<td>20</td>
<td>5% (95th percentile should be below limiting value)</td>
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<tr>
<td>25</td>
<td>0% (Maximum should be below limiting value)</td>
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## Requirements for Roughness (IRI)

<table>
<thead>
<tr>
<th>Limiting IRI</th>
<th>Maximum length of each 1 km segment with IRI &gt; Limiting Value</th>
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<tbody>
<tr>
<td>3.2</td>
<td>20% (80th percentile should be below limiting value)</td>
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<tr>
<td>3.5</td>
<td>5% (95th percentile should be below limiting value)</td>
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<tr>
<td>4.5</td>
<td>0% (Maximum should be below limiting value)</td>
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Section Performance Trends: (Riding Quality)
DETERIOTATION TREND ANALYSIS

Section Performance Trends: (Rutting)

N3TC: N3-8-North (7) from 30000 to 48800, Lane:Slow

Rut Depth in LWP

90th %-tile
Mean
10th %-tile
N3TC ANNUAL PAVEMENT MANAGEMENT PROCESS

- Condition Data
- Traffic Data
- Condition & Compliance Reporting
- Contract Requirements
- Deterioration Modelling
- Pavement Engineering Strategy
- Financial Model
- Data Management & Condition Analysis System
- Maintenance and Rehabilitation Projects

Flowchart:
- Data Management & Condition Analysis System
  - Condition Data
  - Traffic Data
  - Condition & Compliance Reporting
  - Contract Requirements
  - Deterioration Modelling
  - Pavement Engineering Strategy
  - Financial Model
- Engineering Input
- Funding
- Revenue
# Categorising Road Maintenance and Funding

<table>
<thead>
<tr>
<th>Maintenance Operating Expenditure Routine Road</th>
<th>Maintenance</th>
<th>Rehabilitation Capital Expenditure</th>
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<tbody>
<tr>
<td>Day to day Operations</td>
<td>Preventative Maintenance</td>
<td>Expansion or Renewal of Pavement</td>
</tr>
<tr>
<td>Emergency &amp; Reactive</td>
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<tr>
<td>• Repair of damaged assets e.g. Fences, Guard rails, Potholes</td>
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<tr>
<td>• Verge Maintenance – Grass Cutting, Fire breaks</td>
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<tr>
<td>• Litter Collection</td>
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<td></td>
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<tr>
<td>• Drainage Maintenance</td>
<td></td>
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<tr>
<td>• Route Patrols</td>
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<tr>
<td>• Emergency Services</td>
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- Crack Sealing
- Rejuvenation
- Micro Surfacing
- Reseal *
- Drainage Improvements
- Overlay
- Reseal
- Reconstruction
- Addition of Lanes
Preservation vs. Rehabilitation

Preservation Strategy:
- Years 5, 14, 30 & 39: Crack Sealing
- Years 10 & 35: Micro Surfacing (Double)
- Years 17 & 49: Chip Seal
- Year 25: Mill & Pave

Rehabilitation Strategy:
- Year 15: Unstabilized FDR plus 4" HMA Overlay
- Year 30: Unstabilized FDR plus 4" HMA Overlay
- Year 45: Unstabilized FDR plus 4" HMA Overlay
WHAT IS THE IMPACT OF PROACTIVE MAINTENANCE ON PAVEMENT PERFORMANCE

![Graph showing the impact of proactive maintenance on pavement performance. The x-axis represents the pavement number, while the y-axis represents the pavement capacity (expected values) in MESA. The graph includes data points for LTPP: Sound, LTPP: Warning, LTPP: Severe, N3TC, Category A, and Category B. The trend lines indicate an increase in pavement capacity as the pavement number increases.]
ROAD MAINTENANCE CONTRACTING MODELS

- In-house Agency Maintenance (typical Local and Provincial Government)
- Managed Outsourced Contracts (typical SANRAL Model).
- CTROM (Comprehensive Toll Road Operate and Maintain).
  - Initially designed to have a single point responsibility and to incentivise performance through risk sharing & improving revenue.
  - This is now typically restricted to Toll Operations and Route Services.
- PPP. Concession between Government and the Private Sector to manage the asset on behalf of the Agency with performance measures and end of term hand back obligations. Revenue and Cost Risks lie solely with the Concessionaire.
There is no such thing as a free road

<table>
<thead>
<tr>
<th>NON TOLL</th>
<th>AGENCY/ GOVERNMENT RISK</th>
<th>TOLL</th>
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<tbody>
<tr>
<td>HIGH</td>
<td>Shadow Tolling</td>
<td></td>
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<tr>
<td></td>
<td>Funding provided based on vehicle volumes</td>
<td>CTR OM Contracts</td>
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<td></td>
<td>Perceived lower quality service</td>
<td>Incentive to provide better service to attract traffic and increase compensation</td>
</tr>
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</table>

- Non-Toll
  - Funding from Fiscus through Tax Revenues
  - All Tax payers pay
  - Programed works with no incentives

- Toll
  - CTR OM Contracts
  - Portion of toll allocated to CTR OM
  - With incentives and penalties
  - Funding from Revenue Only USER pays
  - Penalties for non-compliance
DEFINING VALUE FOR MONEY – PPP PROJECT

- Net benefit to the Agency in terms of
  - Cost
  - Quality
  - Risk Transfer

- Delivery of Service – Right place at Right Time
- Ensuring Customer Service and Satisfaction

Customer Care:
You will always overachieve on your deliverables if you take the Road User’s Needs and Desires into account
Routine Road Maintenance (RRM)

- Contractual Maintenance Obligation is viewed by N3TC as the absolute minimum standard.
- In order to achieve maintenance goals, N3TC appoints Contractors from adjacent local communities on long term contracts.
N3 ROUTINE ACTIVITIES

• Vegetation Control
  • Grass cutting;
  • Alien removal;
  • Fire management

• Drainage Maintenance;

• Roadside Maintenance;
  • Fencing
  • Shoulder Repairs
  • Litter Collection – Recycling

• Road Sign and Road Furniture Maintenance
DEVELOPMENT OF CONTRACTORS

- Requires a long term approach. Minimum 5 years. There is no quick fix.
- Requires on-going training programmes.
- Requires high level of financial assistance initially;
- Requires high level of management assistance initially;
- Requires gradual removal of assistance so that Contractors can develop confidence of responsibility and build up a credit track record.
- Establishment of Special Maintenance Projects for EME Development
ON-GOING DEVELOPMENT

Projects previously let as Commercial Contracts because of need for costly specialist equipment.

• N3TC acquired the specialist equipment and hires it back to the Maintenance Contractors.

• Contractors attended in-depth training courses;

• N3TC assists with purchase of costly materials;

• Result —
  • Major increase in level of skills and capacity.
  • Enterprise Development
ROAD MARKING
VALUE ADDED BENEFITS - A GOOD REASON TO PAY

Route Patrol and Incident Response Services.

The Concessionaire provides for your CARE

- Mobile route services;
- Roadside assistance;
- Emergency response to incidents and accidents;
- Early notification to emergency services;
- 24 hr Customer Care Centre

HOW DO YOU VALUE THIS
WHEN YOU ARE IN INVOLVED IN AN INCIDENT.
Integrated Road Incident Management System.

• Dedicated 24/7 Customer Care Helpline:
  • Route Control Centre located in Harrismith.
  • Route Patrol Service – first responders to crashes, incidents, breakdowns and route monitoring:
    • 48 Patrolmen and Specialist Incident Managers.
    • 24 hr Patrols – 1,5 Million patrol km per annum

• PROACTIVE LAW ENFORCEMENT IS ESSENTIAL
• DEDICATED LAW ENFORCEMENT PERSONNEL IS IDEAL
  (Opportunity for PPP law enforcement project)
## COMPARISON BETWEEN PPP PROJECT AND PUBLIC PROJECT

<table>
<thead>
<tr>
<th>Driven by</th>
<th>PPP Toll Road Management</th>
<th>Public Network Management</th>
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<tbody>
<tr>
<td></td>
<td>Functional Requirements.</td>
<td>Political / Bureaucratic policy.</td>
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<td>Financial Constraints.</td>
<td>Funding Constraints.</td>
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<td></td>
<td>Customer Care</td>
<td>Compensation</td>
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<td>Proactive Maintenance</td>
<td>Reactive Maintenance</td>
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<th>Input</th>
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<tr>
<td></td>
<td>Good Traffic Data.</td>
<td>Averaged traffic data.</td>
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<td></td>
<td>Good growth forecasts.</td>
<td>Average growth forecasts.</td>
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<td></td>
<td>Up to date condition data.</td>
<td>Limited condition data.</td>
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<td>Good historical data.</td>
<td>Funding competition.</td>
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<td>Good Performance knowledge</td>
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<td>Flexibility</td>
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<td>Remaining Life Strategy.</td>
<td>Prioritised program.</td>
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<td>Flexibility in engineering judgement.</td>
<td>Network level based funding</td>
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<td>Preventative Maintenance cycles</td>
<td>Reactive Maintenance resulting in lower level of service.</td>
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<td>Financially controlled.</td>
<td>Bureaucratic delivery delays</td>
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<td>Fast delivery</td>
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<td>Customer Care and Satisfaction</td>
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<td>Micro Management.</td>
<td>Macro Management.</td>
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<td>Long term Forecasts.</td>
<td>Medium term forecasts.</td>
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<td>Performance Based Contracts</td>
<td>Managed Contracts</td>
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QUESTION: SHOULD WE CHANGE OUR MAINTENANCE APPROACH

THANK YOU