Key Management Issues for Low Volume Rural Roads in Developing Countries

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Based on paper of same name by Petts R., Cook, Dr. J., Salter, D.

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Presentation

- **Research in South East Asia - gTKP & SEACAP**
- **Tertiary and Access Roads:**
  - **Low Volume Rural Roads (LVRRs): <400vpd**
  - **Very Low Volume Rural Roads (VLVRRs): <50vpd**

Key Issues

- Policy
- Rural Road Classification
- Road Standards
- Road Environment
- Environmentally Optimised Design
- Surface & Paving Options
- Whole Life Costing
- Materials
- Specifications and Supervision
- Maintenance
- Further Investigations

Policy

Framework for objectives and approaches, addressing:

- **Classification**
- **Ownership**
- **Responsibilities for managing**
- **Financing and resourcing**
- **Setting and monitoring standards & specifications**
- **Socio-economic, employment, technology, safety, health and sustainability issues**
- **Monitoring performance**

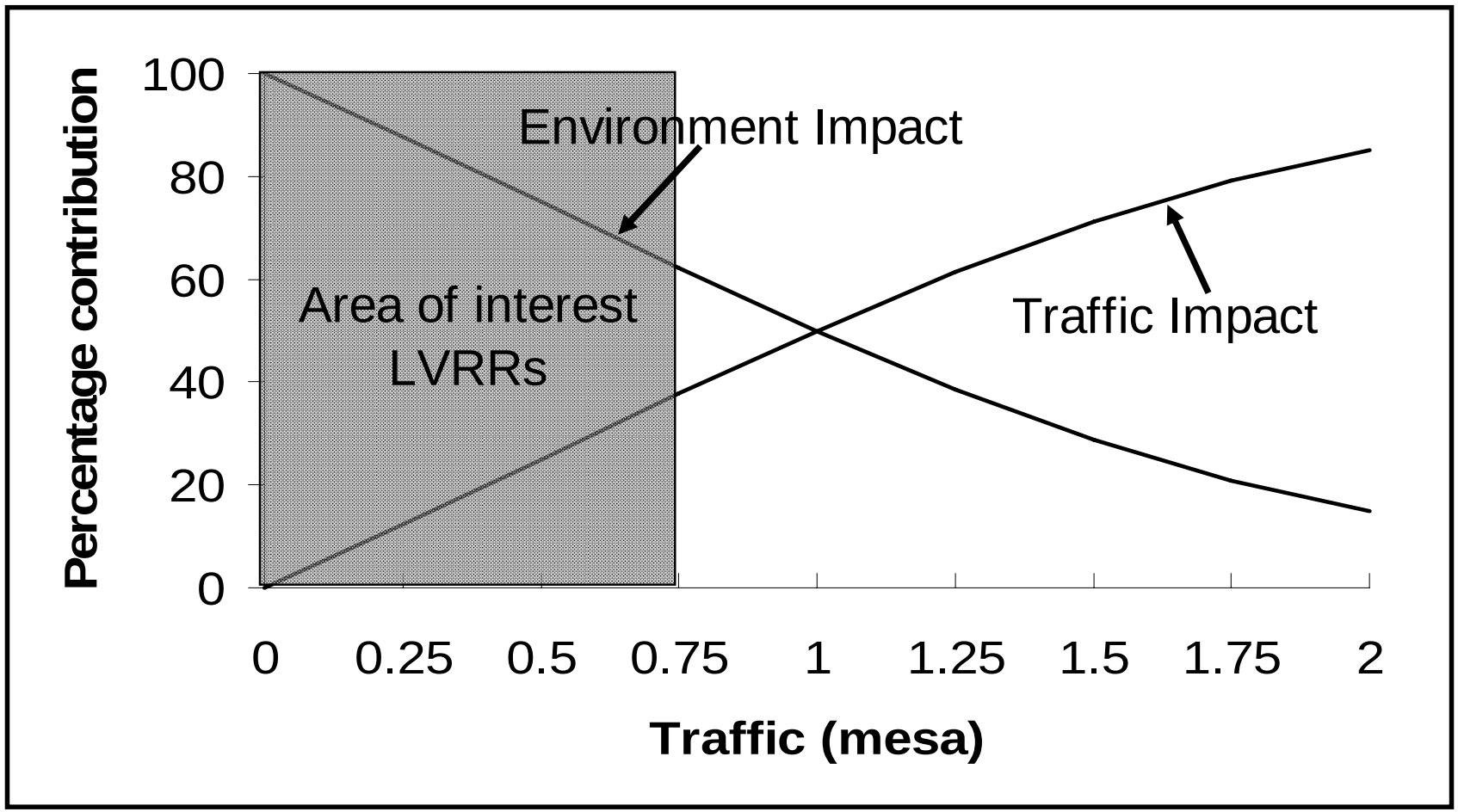
Rural Road Classification

- **Appropriate - based on local conditions and priorities.**
- **Relating to transport policy, responsibilities, traffic characteristics, economic and social factors**
- **Available financing**
- **LVRRs (<400vpd) usually local authority responsibility**
- **VLVRRs (<50vpd) likely require a stakeholder partnership**

Road Standards

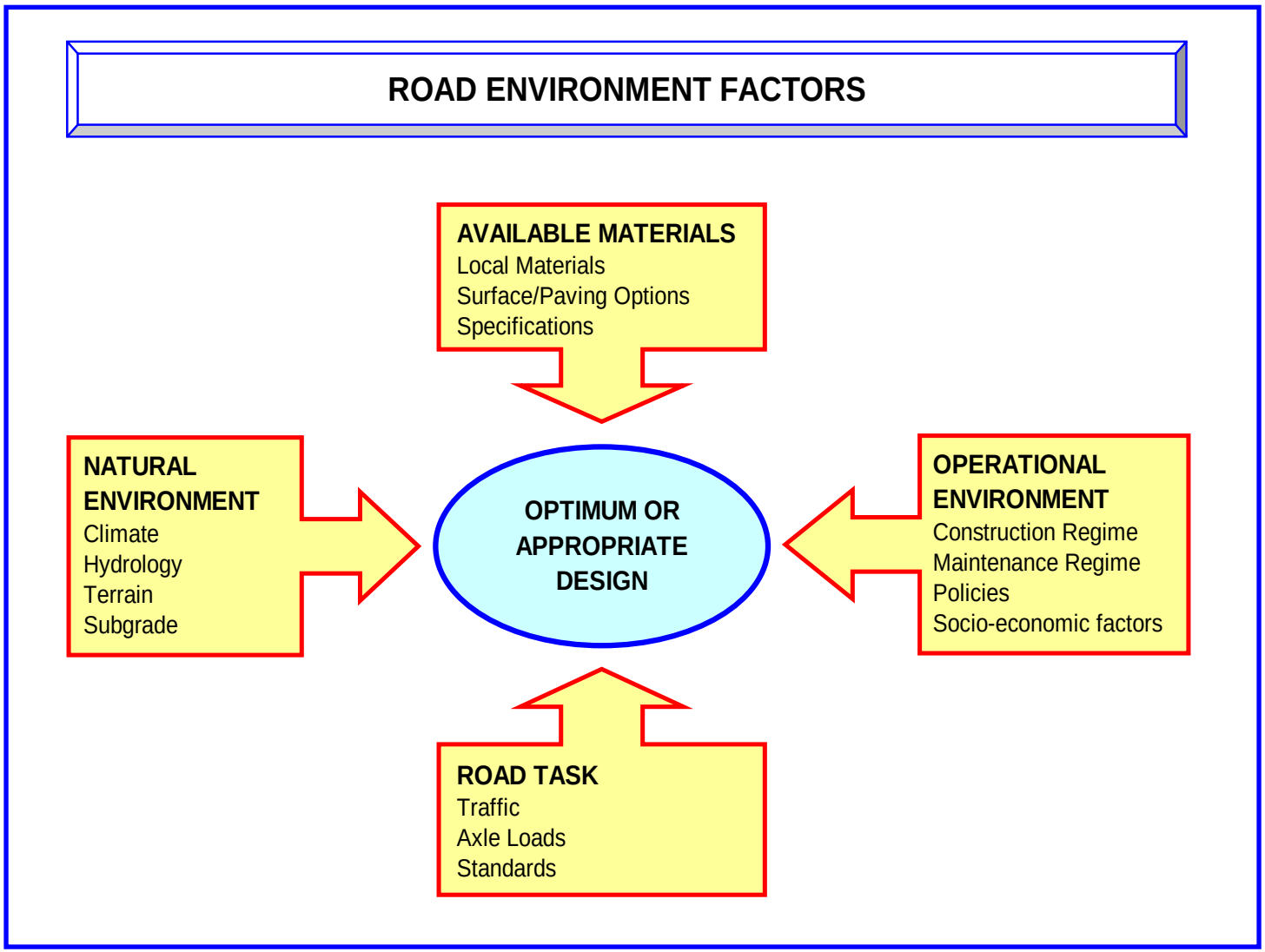
- **Compatible with**
  - **task,**
  - **road category,**
  - **environment, and**
  - **affordability**

Road Environment



Road Environment

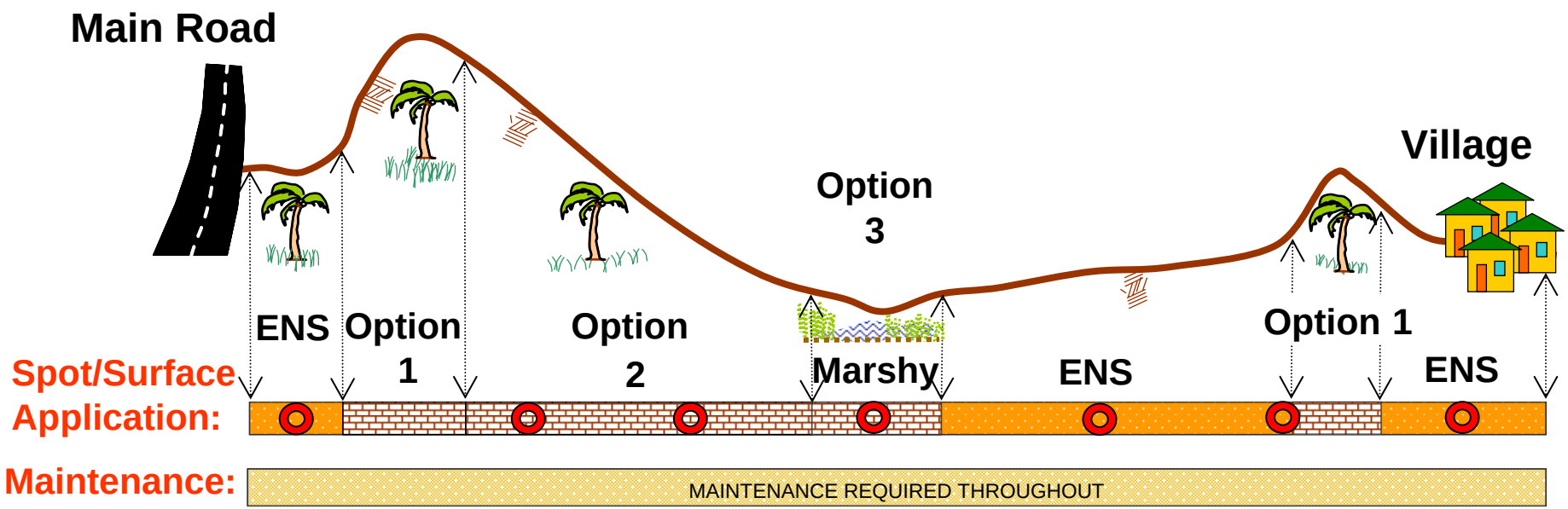
Holistic approach for LVRR design



Environmentally Optimised Design (EOD)

- **Standards and designs = f (road task + environment + available recourses).**
- **Solutions: range from spot to whole link upgrades.**
- **Technologies: Engineered Natural Surfaces - Paving**

Spot improvement strategy



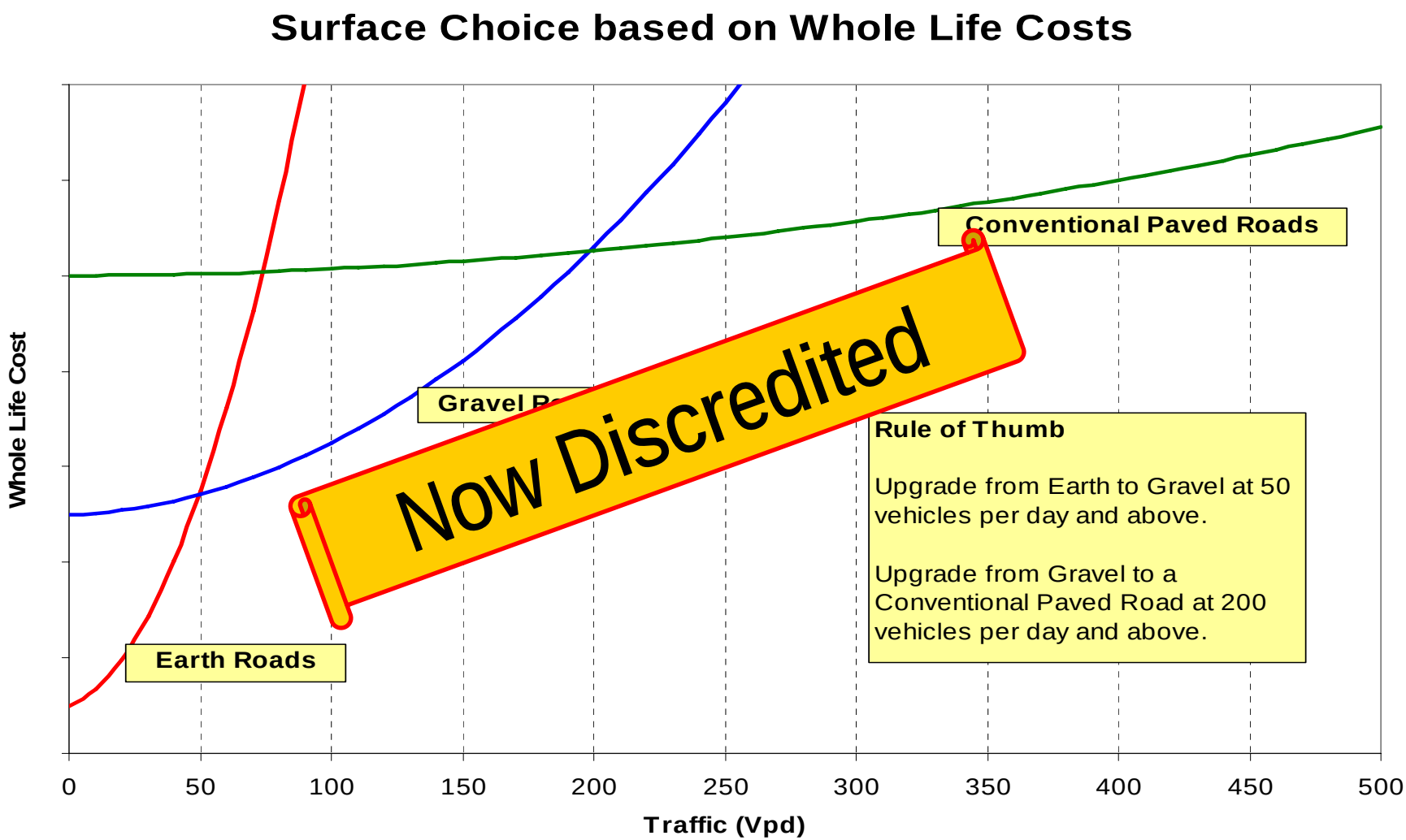
Low Cost Structure or culvert

Surface Options

Engineered Natural Surface (ENS)

Maintenance

Paving Options – Traditional 'Rule of Thumb'



Research - Gravel

NOT appropriate if:

- Gravel quality is poor
- Compaction & thickness cannot be assured
- Drainage is not provided
- Haul distances are long
- Rainfall is very high *(>2m),* or dry season dust problems
- Traffic levels are high
- Longitudinal Gradients *(> 4% if rainfall >1,000mm/year)*
- Adequate maintenance cannot be provided
- Sub-grade is weak or soaked (flood risk), or
- Gravel deposits are limited/environmentally sensitive

PROVEN Options:

- Stone
- Bitumen
- Concrete
- Brick

Whole Life Cost

+

Local Resource Use

Whole Life Costing (WLC)

WLC = Investment + Maintenance + Residual

Current constraints are:

- **Limitations of existing models**
- **Knowledge of maintenance costs**
- **Actual maintenance capacity**
- **Local VoC – road condition relationships**

More research is required

Materials

Issues:

- **Resources - non-renewable**
- **Gravel - ‘wasting’ surface**
- **Growing sustainability/energy issue**

Select materials:

- **Fitness for purpose;**
- **Adapting specs/design to suit available materials; and**
- **Adapting/modifying materials to suit realistic specifications.**

Specifications & Supervision

Keys issues:

- **Materials excavation, transportation, processing, placing, compaction;**
- **Source and on-site testing;**
- **Authority/motivation of the supervision staff;**
- **Must be achievable with materials, plant, contractors available; and**
- **Evidence of widespread non-compliance of gravel.**

Maintenance

Key issues are:

- **All roads require maintenance**
- **Vital if the investments are not to be wasted**
- **Widespread in-effective maintenance**
- **Some surfaces require less maintenance and are intrinsically lower risk**
- **Need to get ALL stakeholders engaged and committed.**

Conclusions

- **LVRR are a substantial challenge for road managers, engineers and the communities themselves**
- **Range of issues justifies more attention than hitherto provided**
- **Recent research has improved knowledge of low cost, more sustainable road and access solutions**

Further Investigations

Improved knowledge required for:

- **Maintenance arrangements and costs related to all technology options**
- **Vehicle Operating Cost – road condition relationships for range of Asian environments and vehicles**
- **Social costs and benefits**

Further Information

Two important dissemination forums supporting LVRR knowledge:

gTKP: www.gtkp.com

SEACAP:www.seacap-info.org