



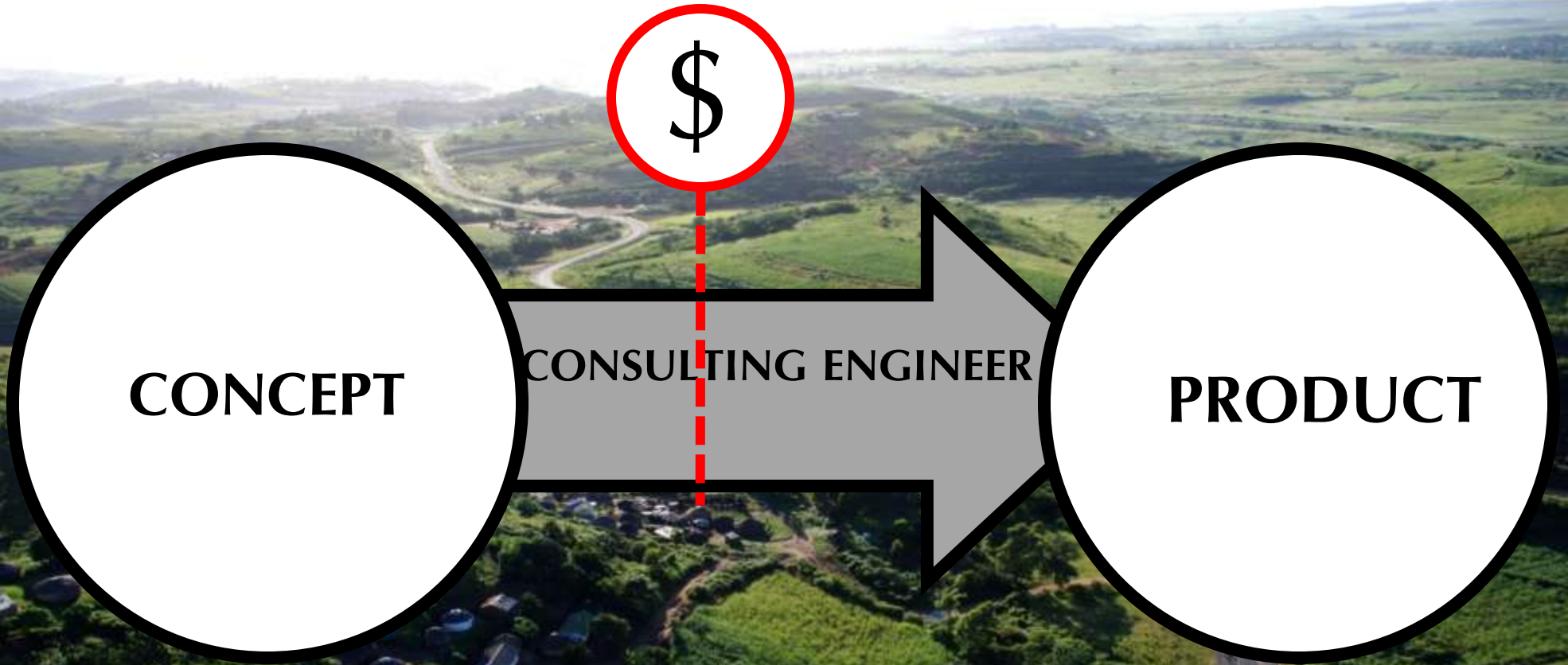
Greening Infrastructure from an Engineering Perspective

IDENTIFYING OPPORTUNITIES IN DESIGN & CONSTRUCTION

– Jonah Ptak & Manfred Uken

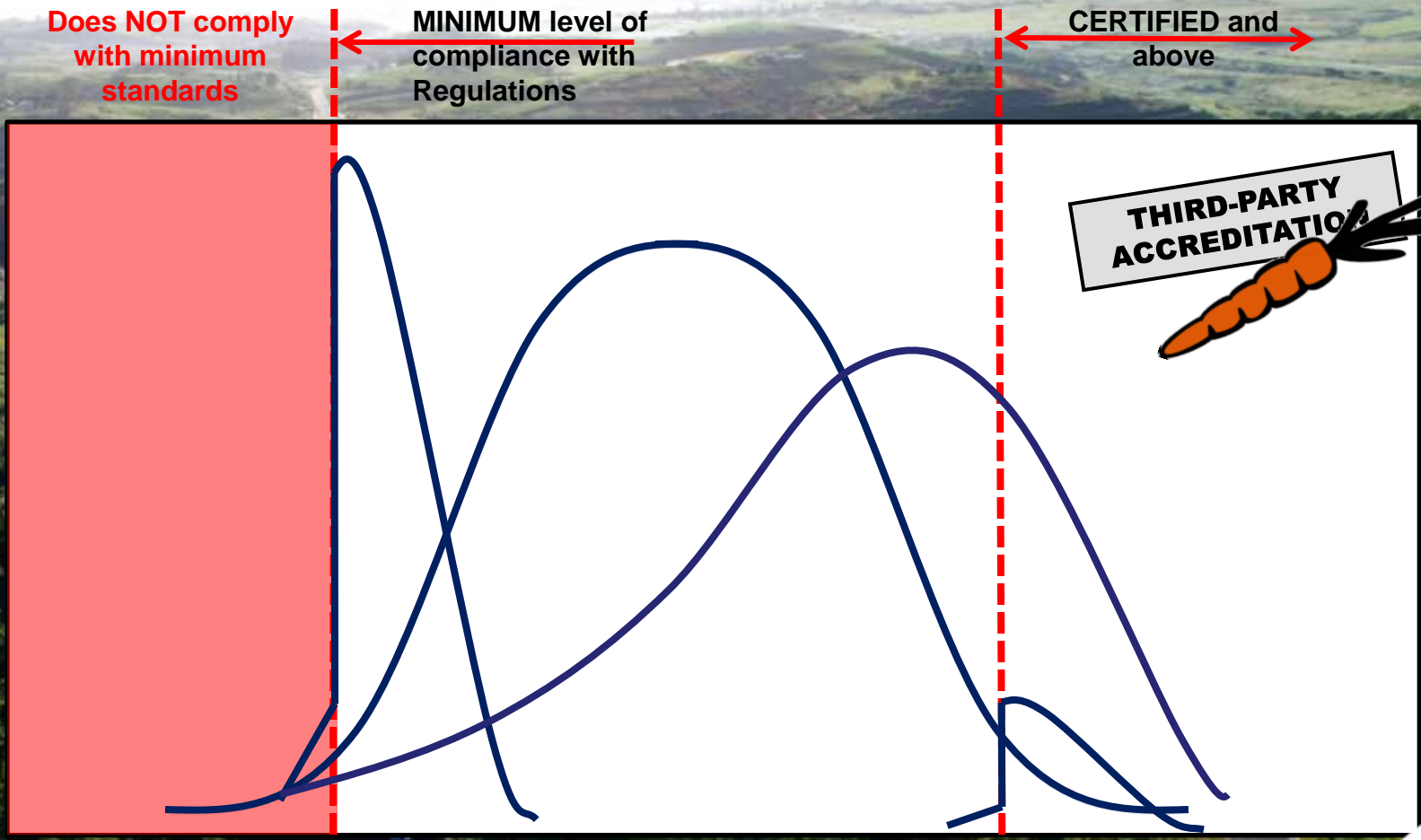


Roles & Challenges



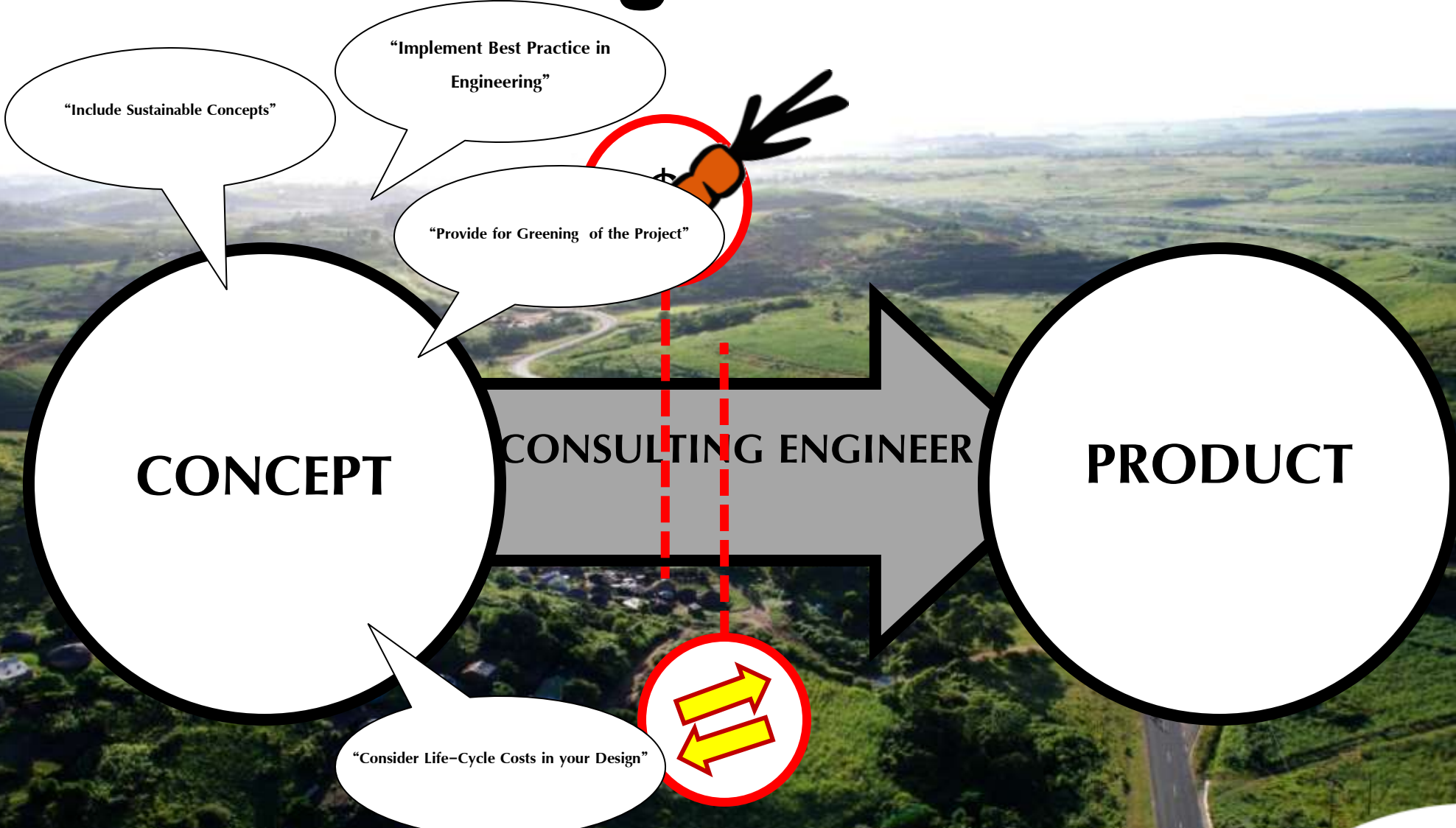
Roles & Challenges

PROJECTS

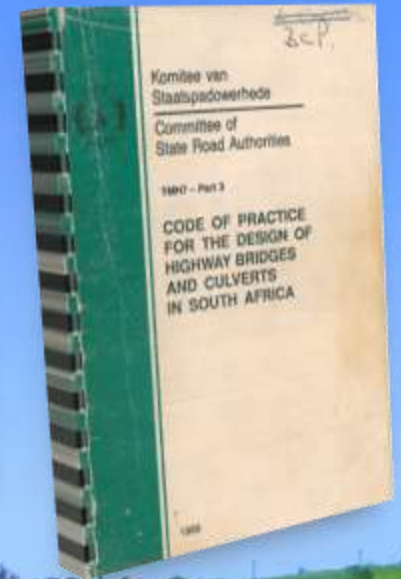
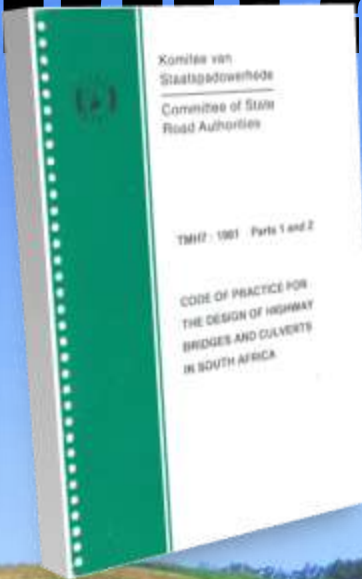
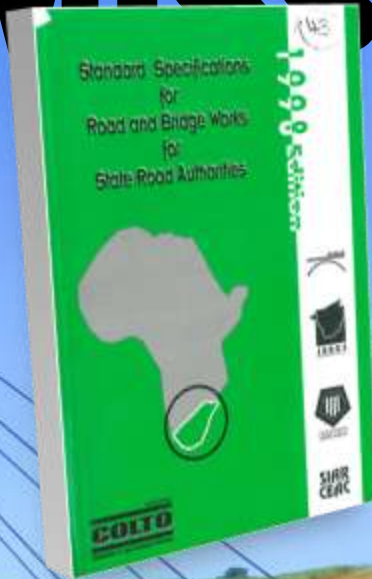


PROJECT REQUIREMENTS

Roles & Challenges

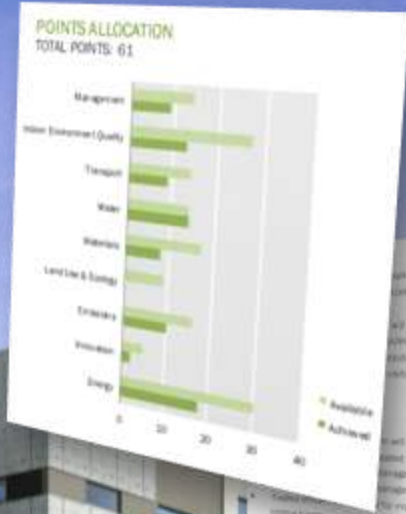


What's Missing?



- Define Standards
- Track
- Calculate
- Report

What's Missing?



...making plans as per site activity...
...will be provided for future visitors...
...provide showers and changing facilities...
...will be improved for foot-traffic...
...management system to support...
...to improve and for the air conditioning...
MATERIALS
• Dedicated storage area will be provided for heavy to collect and...
• Building will be designed as an integrated fit-out, thus minimizing...
• Site of the materials used for the project will have been assessed...
EMISSIONS
• Subcontractors will have an on-site monitoring potential of zero...
• The overall site's energy will be supplied with an automatic...
• The energy required for this project...
• The site will not increase peak storm water flows from the overall...
• On-site air conditioning system will be installed for 100% through the...
• The government's installed 'clean' energy will be 100%...
INNOVATION
• A 'Green' award has been achieved, requiring 100% the standard and...
• The project awarded the building as an innovation for its sustainability...
• The building's award of green building, innovation...

- Define Standards
- Track
- Calculate
- Report



What's Missing?



Greenroads™ Summary	
Review Stage: Construction	
Federal Lands Highway	
Total Score*	21
Project Requirements	6/11
Environment & Water	6/21
Access & Equity	7/30
Construction Activities	1/14
Materials & Resources	7/23
Pavement Technologies	0/20
Custom Credits	0/10

*Score does not include Project Requirements



Greenroads™ Summary	
Review Stage: Construction	
Majority Road	
Federal Lands Highway	
Total Score*	18
Project Requirements	4/11
Environment & Water	3/21
Access & Equity	9/30
Construction Activities	1/14
Materials & Resources	0/23
Pavement Technologies	0/20
Custom Credits	0/10

*Score does not include Project Requirements



Greenroads™ Summary	
Review Stage: Design	
Water Corridor Sub - Phase 1	
Seattle Department of Transportation	
Total Score*	48
Project Requirements	7/11
Environment & Water	5/21
Access & Equity	26/30
Construction Activities	1/14
Materials & Resources	9/23
Pavement Technologies	5/20
Custom Credits	2/10

*Score does not include Project Requirements



Greenroads™ Summary	
Review Stage: Construction	
Coastal Road and Various Routes	
Federal Lands Highway	
Total Score*	25
Project Requirements	3/11
Environment & Water	3/21
Access & Equity	10/30
Construction Activities	1/14
Materials & Resources	11/23
Pavement Technologies	0/20
Custom Credits	0/10

*Score does not include Project Requirements

- Define Standards
- Track
- Calculate
- Report



MANUAL
4.0

What's Missing?



Context & Specificity



GREENROADS RATING SYSTEM

LIST OF CREDITS (v1.5)

No.	Title	Pts.	Description
Project Requirements (PR) – Mandatory for all projects			
PR-1	Environmental Review Process	Req	Complete a comprehensive environmental review
PR-2	Lifecycle Cost Analysis (LCCA)	Req	Perform LCCA for pavement section
PR-3	Lifecycle Inventory (LCI)	Req	Perform LCI of pavement section
PR-4	Quality Control Plan	Req	Have a formal contractor quality control plan
PR-5	Noise Mitigation Plan	Req	Have a construction noise mitigation plan
PR-6	Waste Management Plan	Req	Have a plan to divert C&D waste from landfill
PR-7	Pollution Prevention Plan	Req	Complete a LD feasibility study
PR-8	Low Impact Development (LID)	Req	Have a pavement management system
PR-9	Pavement Management System	Req	Have a roadside maintenance plan
PR-10	Site Maintenance Plan	Req	Publicize sustainability information for project
PR-11	Educational Outreach	Req	Publicize sustainability information for project
Environment & Water (EW) – Up to 21 Points			
EW-1	Environmental Management System	2	ISO 14001 certification for general contractor
EW-2	Runoff Flow Control	1-3	Reduce runoff quantity
EW-3	Runoff Quality	1-3	Treat stormwater to a higher level of quality
EW-4	Stormwater Cost Analysis	1	Conduct an LCCA for stormwater elements
EW-5	Site Vegetation	1-3	Use native low/no water vegetation
EW-6	Habitat Restoration	3	Restore habitat beyond what is created
EW-7	Ecological Connectivity	1 or 3	Connect habitat across roadways
EW-8	Light Pollution	3	Discourage light pollution
Access & Equity (AE) – Up to 30 Points			
AE-1	Safety Audit	1-2	Perform roadway safety audit
	Intelligent Transportation Systems (ITS)	2-5	Implement ITS solutions
		5	Plan for context sensitive solutions
		5	Reduce emissions with quantitative methods
		2	Provide/improve pedestrian accessibility
		2	Provide/improve bicycle accessibility
		2	Provide/improve wheelchair accessibility



- Project Requirements
- Environment & Water
 - Access & Equity
- Construction Activities
- Materials & Resources
- Pavement Technologies
 - Custom Credits

- Socio-Economics
- Community Involvement

Context & Specificity



Greenroads South Africa™ Manual v0.5

LABOUR-INTENSIVE METHODS

GOAL

Maximise employment opportunities through the use of construction methods requiring semi- and unskilled labour.

REQUIREMENTS

There are multiple methods of earning points for labour-intensive methods:

- Including a component or subcomponents of the project that must be built using labour-intensive construction.
- Provisional Sums and/or Specifications in the tender document that outline project components or labour-intensive methodologies and how they are to be utilised.

Labour-intensive construction and unskilled labour that form part of a conventional project do not count towards this credit. Examples of non-contributing LIC include "excavation by hand for foundations", "backfill in a restricted area" and provision for "flagmen"

Details

It is estimated that South Africa has an unemployment rate of 24% or higher. Many of the country's unemployed have had little access to formal education and job skills development. Creating work opportunities and employment skills for semi- and unskilled labour is a means to creating not only income for South Africa's historically disadvantaged, but a labour force to maintain the country's growing infrastructure.

Draft Credits



1-5 Points

RELATED CREDITS

X
X
X
X

SUSTAINABILITY COMPONENTS

X
X

BENEFITS

X
X



MANUAL
v1.5

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- **Job Creation**
- **Skills Development**
- **Road Safety Education**
- **Maintenance Plans**
- **Pedestrian-Friendly Roads**

Speedy R.O.I.



Context & Specificity

Infrastructure

Buildings

Transportation

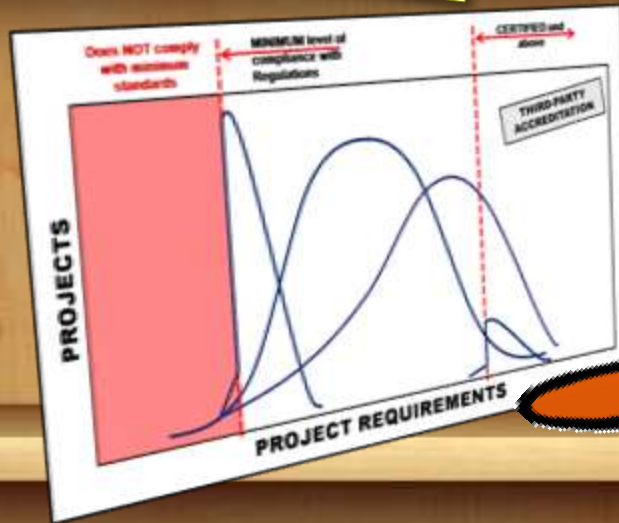
Spatial Planning

Energy

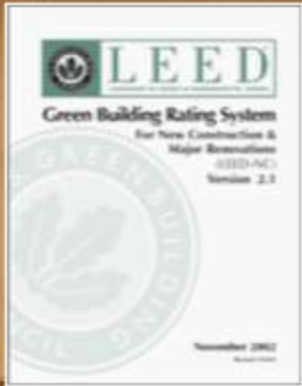
Water

Etc.

Council



Context & Specificity



Context & Specificity

Infrastructure

Buildings

Transportation

Spatial Planning

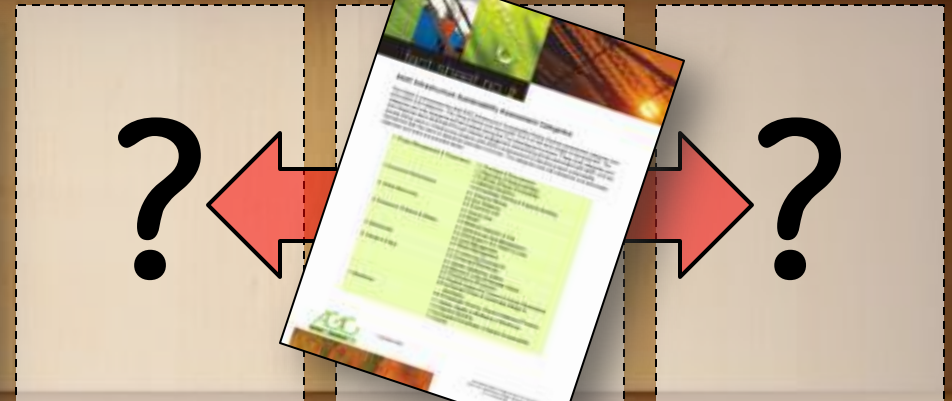
Energy

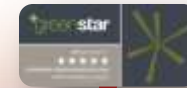
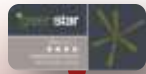
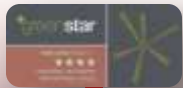
Water

Etc.

GBCSA

GrCSA





Greenroads Council of South Africa

Stakeholders

**Not 'Starting Soon'...
Already Started**

**Please Consider this
A FIRST CALL for
Interested groups**



Thank you