



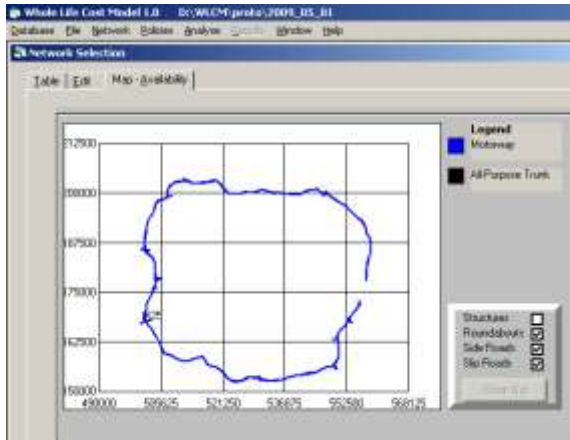
Sustainability and Whole Life Costs

Presented by: Trevor Bradbury
12 June 2012



Whole Life Value

From Network Analysis to Product Evaluation



- Network Whole Life Cost Modelling
- Informs clients of the impacts of changes in maintenance budgets or network condition



- Scheme Level Whole Life Costing
 - Pavements
 - Structures
 - Geotechnics
 - Drainage
 - Lighting etc.



- Product Life Cycle Evaluation
- Demonstrates the economic and environmental benefits that can be achieved from using new and innovative materials, technologies and methods of working

Whole Life Cost Analysis of Maintenance Schemes



- Whole Life Cost of each option:
 - Systematic consideration of all costs
 - Initial Cost
 - Analysis Period - Operations and maintenance
 - End of life – Renew / decommission
 - To include all costs (now and in the future):
 - Direct costs
 - Indirect costs (Users, Society, Environment...)
 - Residual value

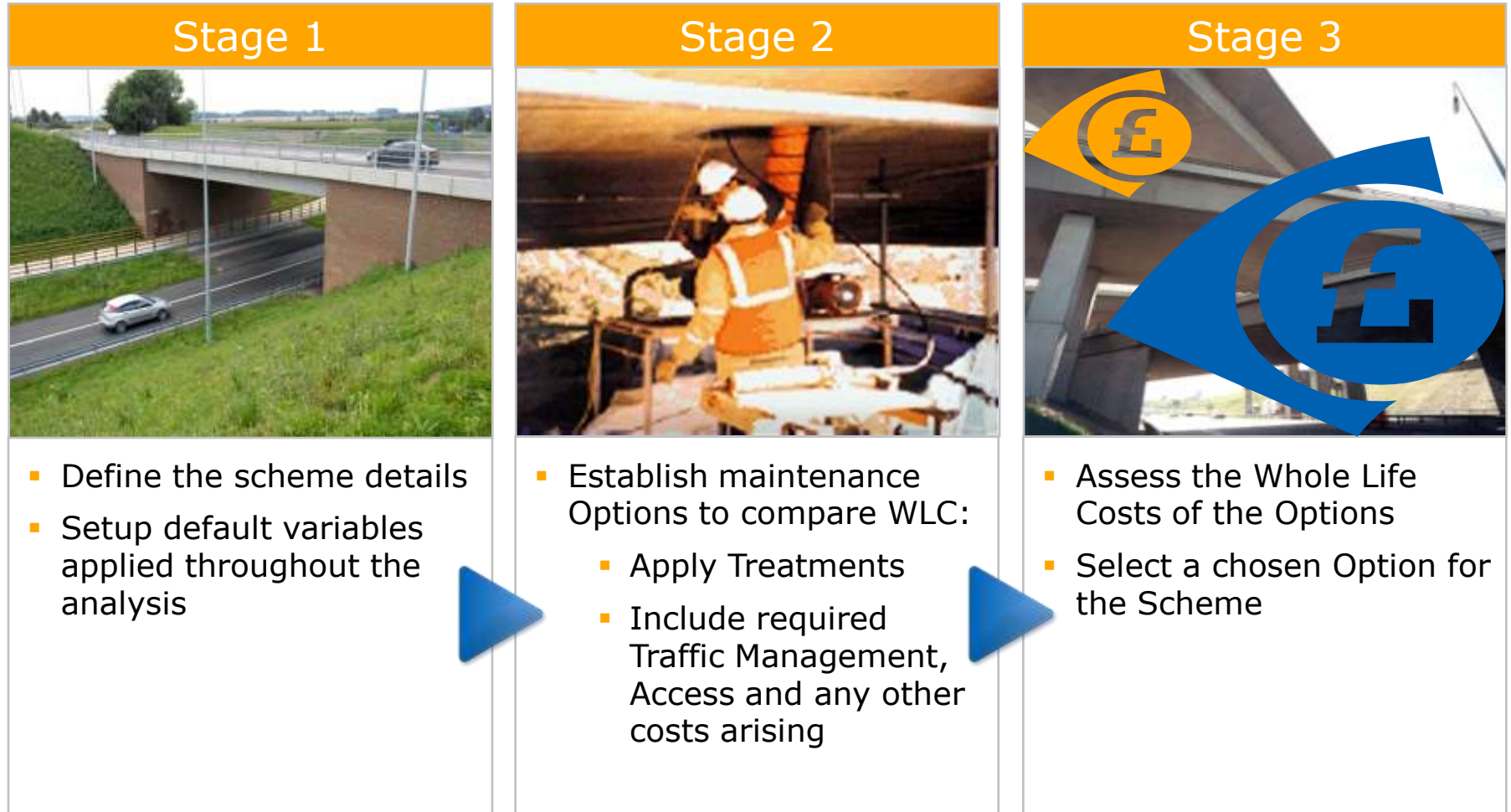
Whole Life Cost Analysis of Maintenance Schemes



- Whole Life Cost:
 - Total costs over the lifetime (or Analysis Period) of the asset
 - Discount the costs from each year of the Analysis Period back to the base year
 - Net Present Value of all costs arising in the Analysis Period

Whole Life Cost Analysis of Maintenance Schemes

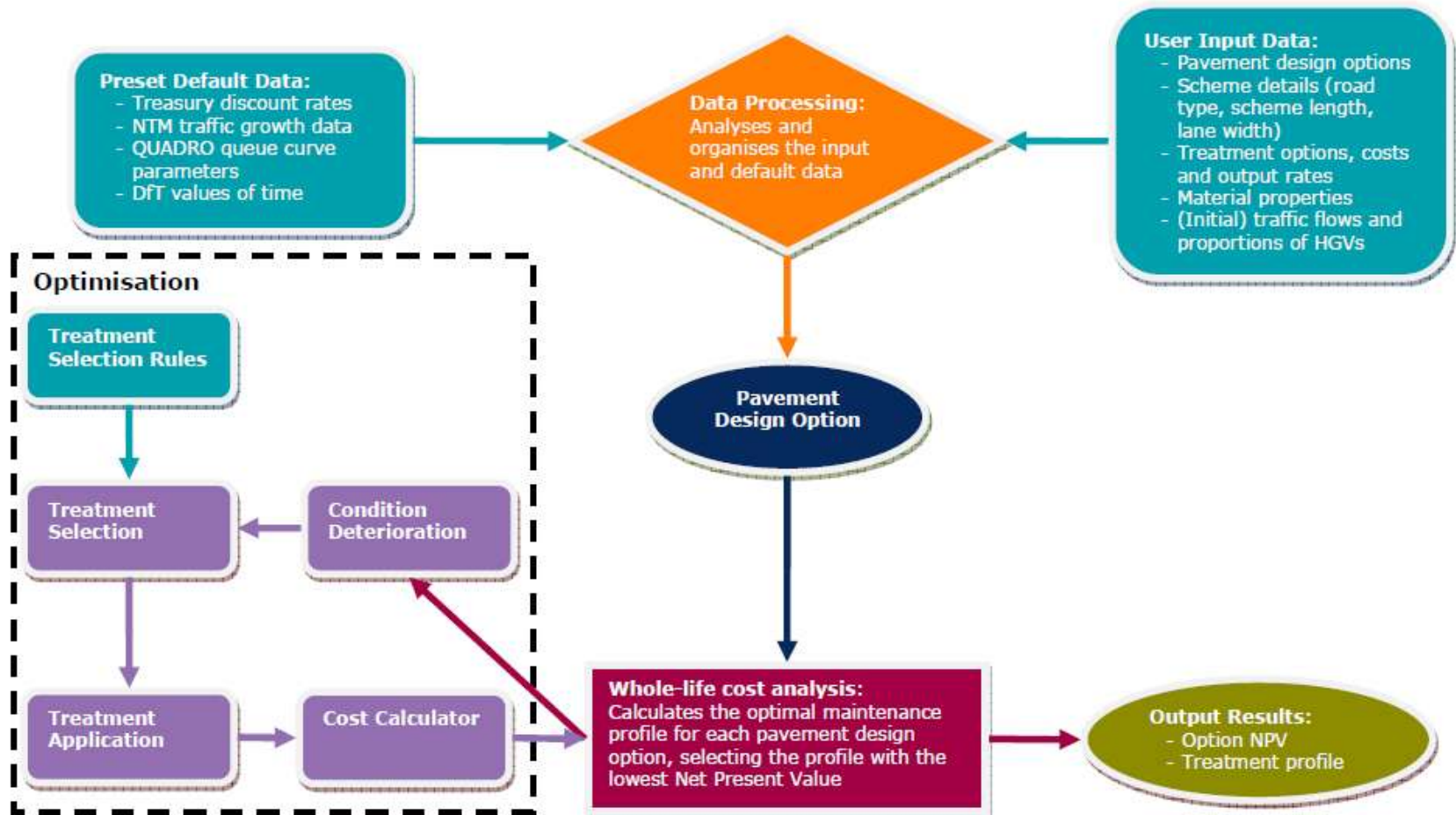
3 stage process: WLC of Renewals Maintenance



Product Evaluation

- TRL has undertaken product evaluation for a number of clients. This has included:
 - Evaluation of Life Cycle Carbon Emissions from new products (i.e. New asphalt mixes, using the TRL developed, industry led, asPECT tool).
 - Evaluation of the optimum whole life cost savings achievable from using a product, treatment or system of work.
 - Sensitivity analysis to investigate the whole life impact of variations in the unit cost (price) of new materials.
- The above has allowed our customers to demonstrate the whole life benefits that can (in theory) be delivered from using their products in preference to conventional solutions.

Product Evaluation – Modelling Approach



TRL's pavement test facility

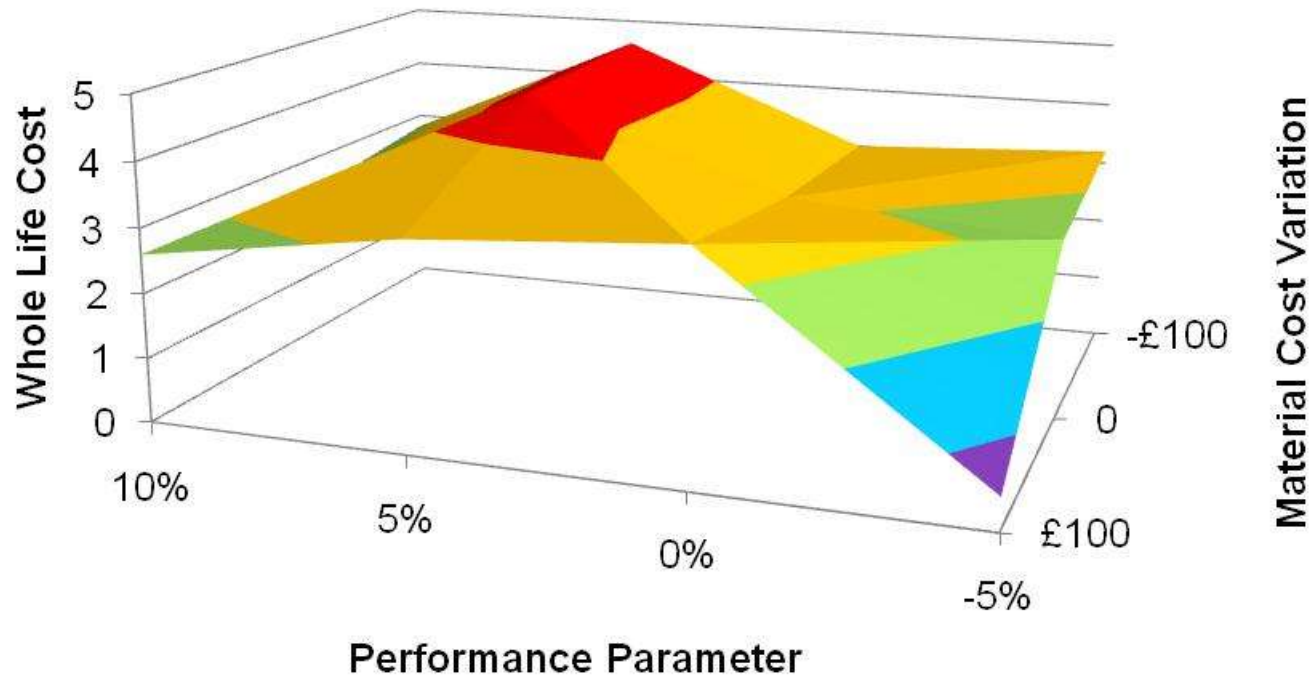


Product Evaluation - Reverse Whole Life Costing

- Where performance data (e.g. Expected life; durability) is not available an analysis based on assumed levels of performance can be carried out.
- Perturbing the performance parameters in the analysis and evaluating the resulting changes in whole life cost can be used to target the development of new products: to meet the performance criteria that deliver the greatest savings in whole life cost for a given application scenario.

Product Evaluation - Reverse Whole Life Costing

- Example output from reverse whole life costing approach.



Example of Environmental Assessment

The asphalt Pavement Embodied Carbon Tool (asPECT)



4 components of asPECT

- Protocol – a defined set of “rules” for footprinting asphalt products and applications
- Guidance – explains the decision making process behind the Protocol and provides worked examples
- Software – facilitates the calculation for those that choose to use it (calculations can alternatively be embedded into other company systems)
- Software User Guide

asPECT Version 3.0.0.4

TRL

Cmpa
essential materials
sustainable solutions
asphalt

HIGHWAYS AGENCY

rba REFINED BITUMEN ASSOCIATION

About
This tool is an execution of the protocol for the calculation of life cycle greenhouse gas emissions generated by asphalt used in highways. It will calculate CO2 equivalent figures for each of the life cycle stages as per the criteria laid out in the above protocol and accompanying guidance document.

Online
Visit the Sustainability of Highways website for up to date information and the latest versions of the Protocol and Guidance documents and the asPECT software and users guide. <http://www.sustainabilityofhighways.org.uk>

License Agreement
This software is the Copyright of TRL. It is free to download and available to utilise for single copy licence use ONLY on condition that you register with the site. It is produced with the belief that it is accurate. However, TRL accepts no liability for errors in the calculations or results. You may not edit, reverse engineer or otherwise re-brand the software. Nor may you host it on any other website. Should you wish to disseminate the software to multiple users in your organisation, you must first seek permission from TRL. Use of the site and software is done at your own discretion and risk. TRL shall have no responsibility for any damage to your computer system or loss of data that results from the download of any content, materials, information or software.

Please accept the licence agreement above to proceed

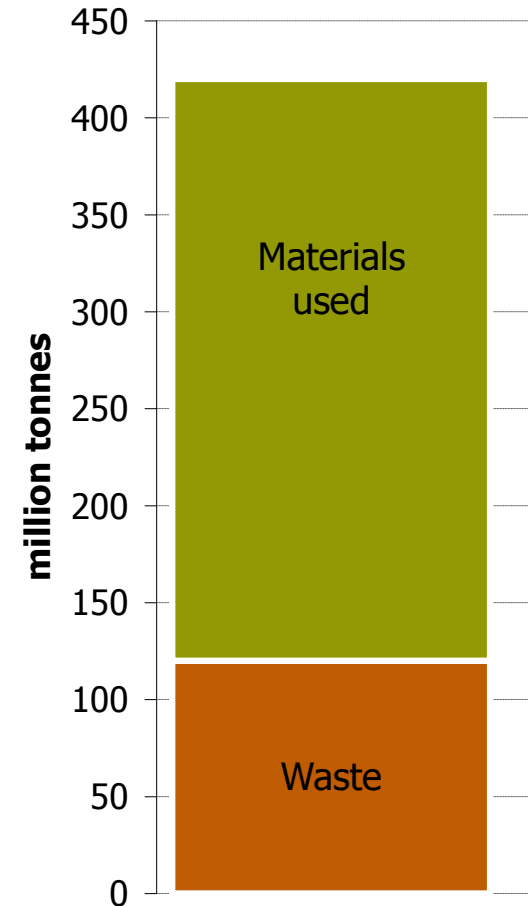
Copyright © 2010 by TRL. All rights reserved.

www.sustainabilityofhighways.gov.uk



Why resource management?

- Materials consumed
~**420** million tonnes pa
- Waste generated
~**120** million tonnes pa
- Waste sent to landfill
~**13** million tonnes pa
- Cost of wasted materials
~**£1.5** billion pa



Working with the Supply Chain



Clients



Set requirements in project procurement

Contractors



Set requirements in sub contractor procurement

Trade & Specialist Subcontractors



Avoid waste on site by proper handling, storage and use of materials

Designers & Consultants



Identify or create design solutions that use resources efficiently

Manufacturers & Suppliers



Use more recycled materials and reduce packaging

Waste Management Contractors



Increase waste recovery rates

