RoadSoft-GIS, a Transportation Asset Management Solution for Counties and Cities in Michigan and its application to agencies in Africa.

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AGENDA

- Where is Michigan?!?!?
- Transportation Asset Management.
- PASER System.
- Making it Work:
  - Alcona County Road commission.
  - Michigan DOT.
- *RoadSoft-GIS*.
- Mozambique Project.


Michigan Technological University
Lake Superior
MINNESOTA
UNITED STATES
CANADA
WISCONSIN
MICHIGAN
IOWA
ILLINOIS
ONTARIO
Lake Michigan
Lake Huron
Georgian Bay
Lake Erie
Hoyt Lakes
Grand Marais
Eagle River
Two Harbors
Duluth
Ontonagon
Houghton
L'Anse
Ashland
Marquette
Negaunee
Crystal Falls
Munising
Newberry
Iron River
Florence
Gladstone
Manistique
Escanaba
Kingsford
Park Falls
Hayward
Shell Lake
Phillips
Rice Lake
Barron
Eagle River
Rhinelander
Crandon
Merrill
Antigo
Medford
Wausau
Chippewa Falls
Eau Claire
Keshena
Oconto
Menominee
Leland
Sturgeon Bay
Marshfield
Stevens Point
Green Bay
Wisconsin Rapids
Waupaca
Appleton
Kewaunee
Winona
Wautoma
Neenah
Manitowoc
Onalaska
Oshkosh
Montello
La Crosse
Sheboygan
Caledonia
Portage
Fond du Lac
Waukon
Richland Center
West Bend
Watertown
Prairie du Chien
Madison
Milwaukee
Elkader
Lancaster
Janesville
Whitewater
Racine
Dubuque
Beloit
Kenosha
Rockford
Crystal Lake
Waukegan
Mount Carroll
Marion
Clinton
Dixon
Elgin
Iowa City
Naperville
Chicago
St. Joseph
Petoskey
Charlevoix
Boyne City
Bellaire
Leland
Beulah
Traverse City
Cheboygan
Rogers City
Alpena
Atlanta
Harrisville
Mio
Lake City
Manistee
Cadillac
West Branch
Tawas City
Ludington
Reed City
Standish
Bad Axe
Baldwin
White Cloud
Midland
Mount Pleasant
Caro
Sandusky
Ithaca
Saginaw
Stanton
Norton Shores
Grand Rapids
Flint
Holland
Waterford
Lansing
Sterling Heights
Battle Creek
Ann Arbor
Detroit
Kalamazoo
Portage
Jackson
Coldwater
Adrian
Sturgis
Sault Ste. Marie
St. Ignace
Blind River
Little Current
Manitowaning
Elliot Lake
Espanola
Sudbury
Chapleau
Nemegos
Gogama
Gowganda
Sultan
Ramsey
Biscotasing
Metagama
Westree
Ruel
Valley East
Noelville
Key Harbour
Byng Inlet
Pointe au Baril Station
Tobermory
Clarke's Corner
Lion's Head
Wiarton
Owen Sound
Port Elgin
Kincardine
Walkerton
Kitchener
Stratford
London
Sarnia
Chatham
Ashtabula
Mentor
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Roadway Management: A Trend Starts

- Early PMS Leaders in 1960's to 1970's.
- ASSHTO PMS Guidelines Published 1986:
  - Introduced and Defined PMS.
- Intermodal Surface Transportation Efficiency Act (ISTEA), 1991:
  - Required all states to have a PMS or forfeit federal highway aid.
  - Rescinded since 1995.

Transportation Asset Management in Michigan

- Michigan Act. 499:
  - Created the 12 Member Council in 2002.
- Rate the Federal-Aid Road System:
  - 2003, 2004, 2005, 2006 and 2007.
- Roadway Surface Rating:
  - PASER System.
- Defining Transportation Asset Management in Michigan.

Mix of Fixes…

The Right Fix

…

At the Right Time

…

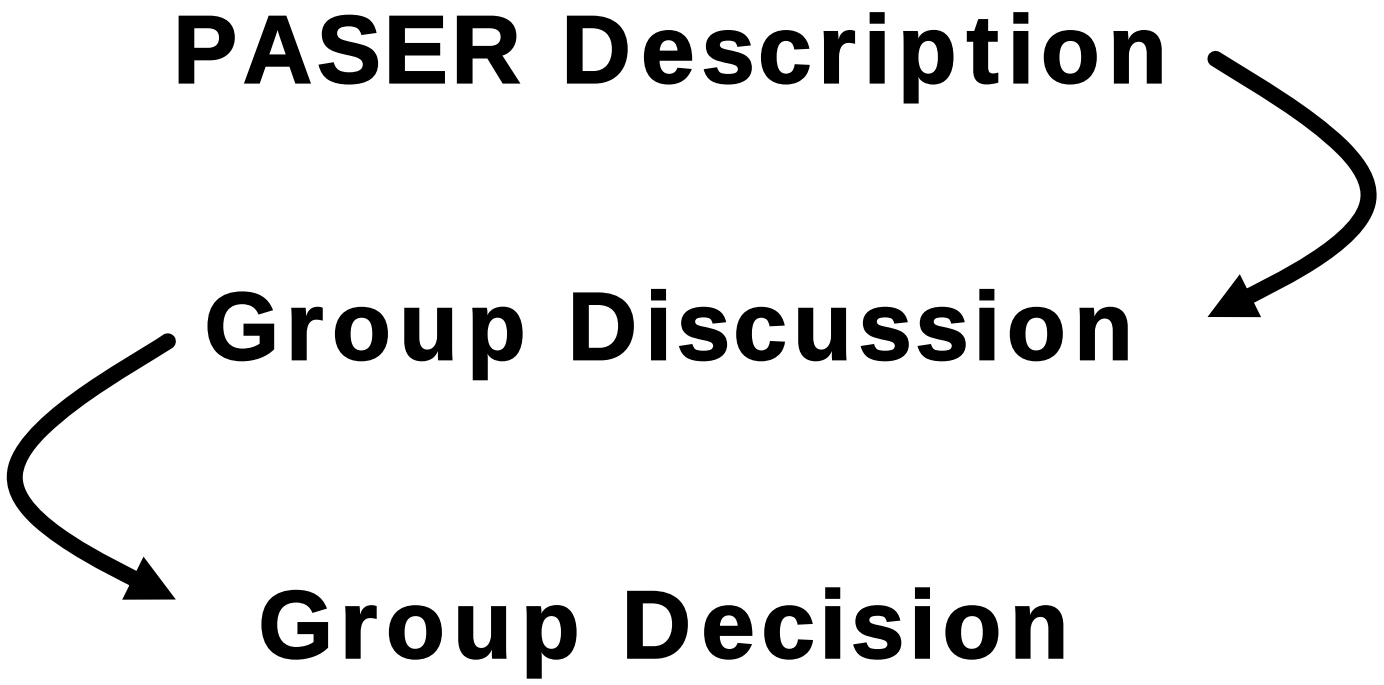
In the Right Place

PASER System

PASER System

- Pavement Surface Evaluation and Rating:
  - Windshield (Visual) Inspection.
- Scale from 1 (Failed) to 10 (Excellent).
- Surface Types:
  - Asphalt, Sealcoat, Concrete, Gravel, and Unimproved Earth.
- Laptop Data Collector (LDC).
- Transportation Information Center:
  - http://tic.engr.wisc.edu/publications.html

PASER as Group Dynamic



Alcona County

- Population: 11,570
- Area: 1,745 km^2
- County Road Network: 1,165 km
- Database:
  - Roadway Rating History.
  - Maintenance Program per Surface Type.
  - Integrated Modules:
    - Culvert
    - Signs
    - Guardrail
    - Pavement Marking
    - Crash

State of Michigan

- Population: 10 Million
- Roadway Network: 192,000 km
  - Keweenaw County: 280 km (2.200 People)
  - Wayne County: 3,300 km (2 Million People)
- Municipalities: 500+
- Counties: 83 (141,000 km, 5.700 Bridges)
- 4th Largest Roadway Network in the U.S.

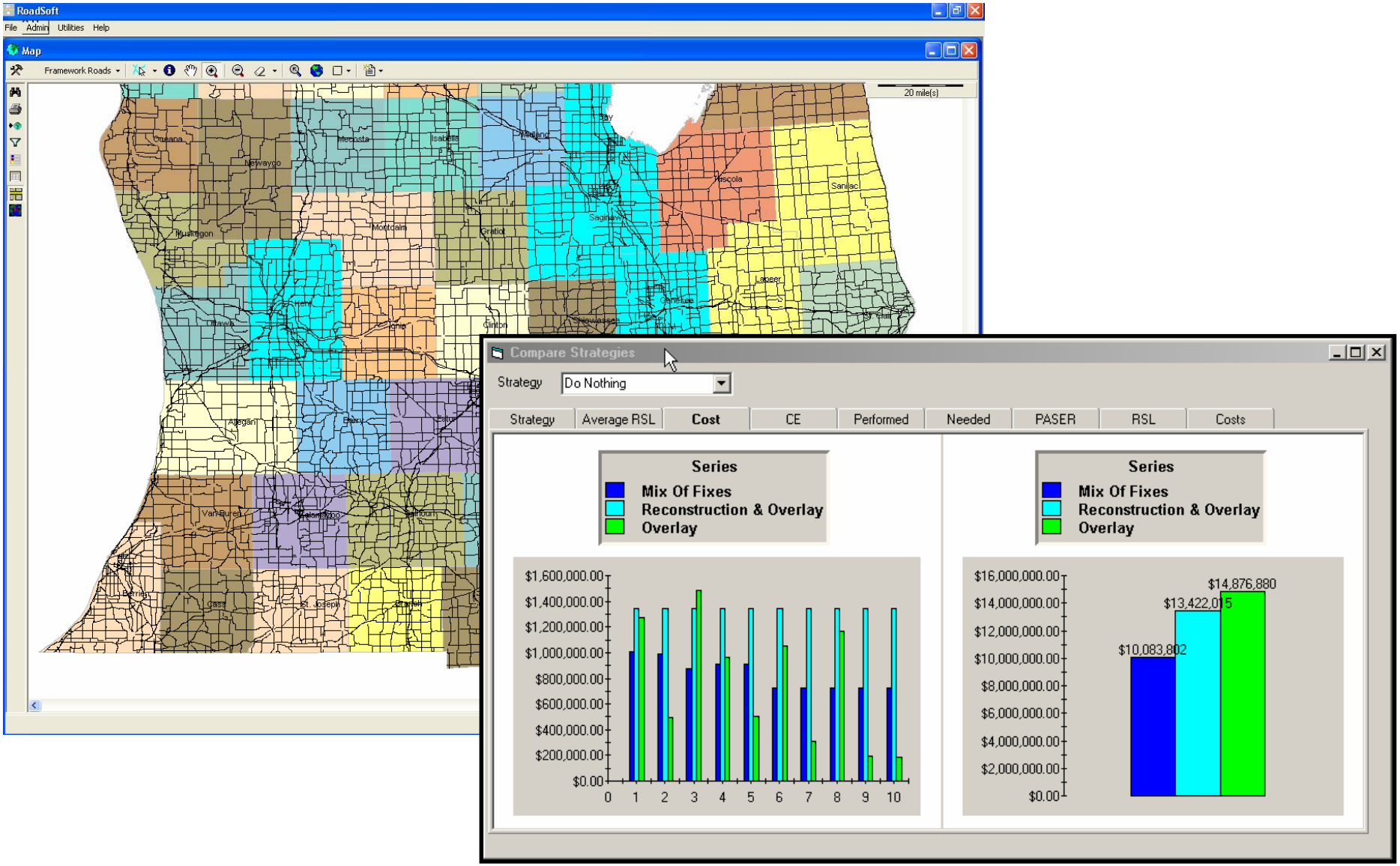
Making it Work…

- Working Together:
  - Alcona County Road Commission.
  - Northeast Michigan Council of Governments.
  - Michigan Department of Transportation.
- Measuring Something Different:
  - Preventive Maintenance (8, 9, 10).
  - Rehabilitation (5, 6, 7).
  - Reconstruction (1, 2, 3, 4).

Data Collection Numbers

- Cooperative Effort (All Local Agencies):
  - 200+ Participants.
- Over 68,800 km of Federal-Aid Rated.
- Nearly 87,200 km Driven.
- Over 2,060 Crew Hours.
- Cost (2003):
  - Budget = US$700,000.00
  - Cost = US$508,500.00
  - Cost/km = US$5.84

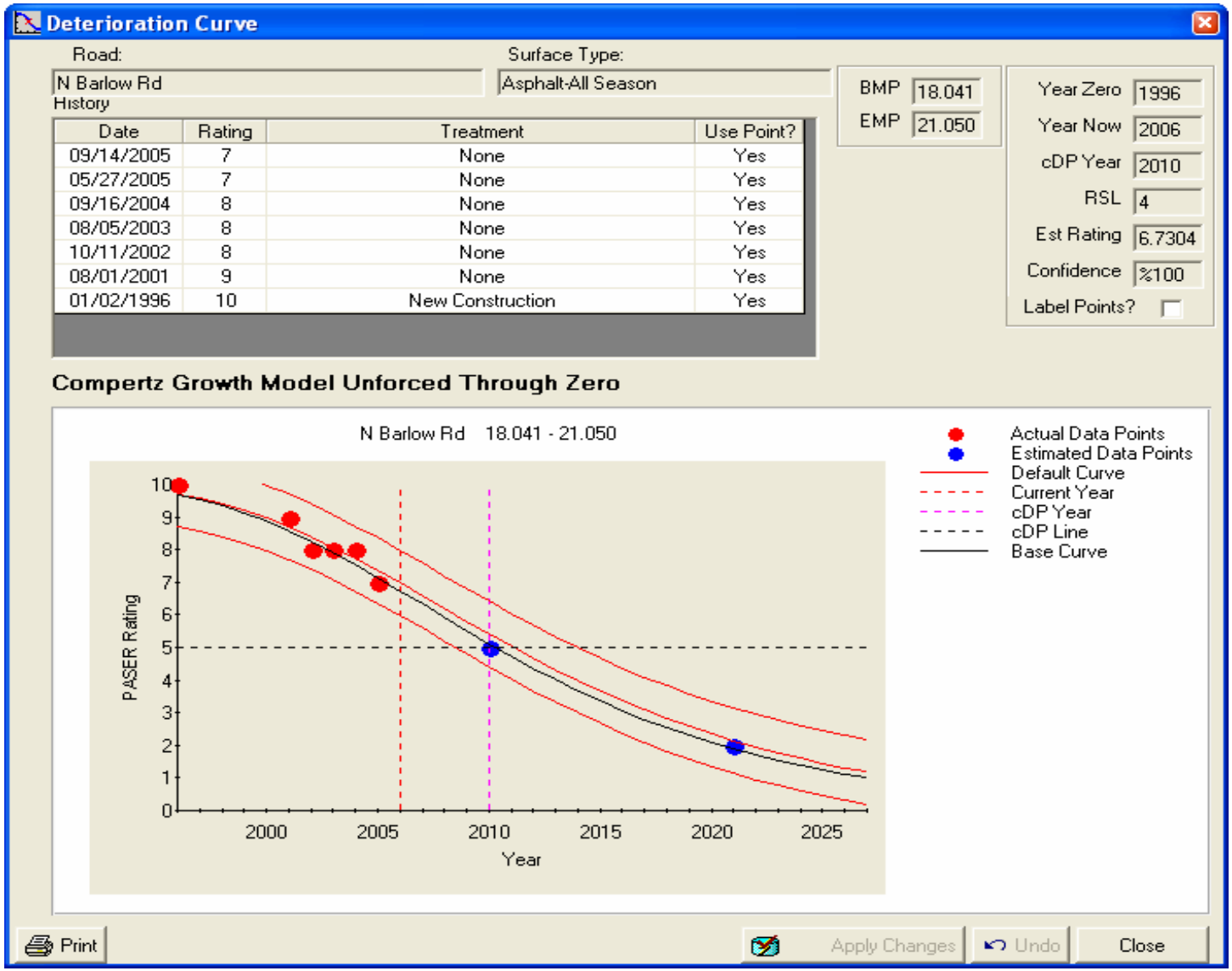
RoadSoft-GIS



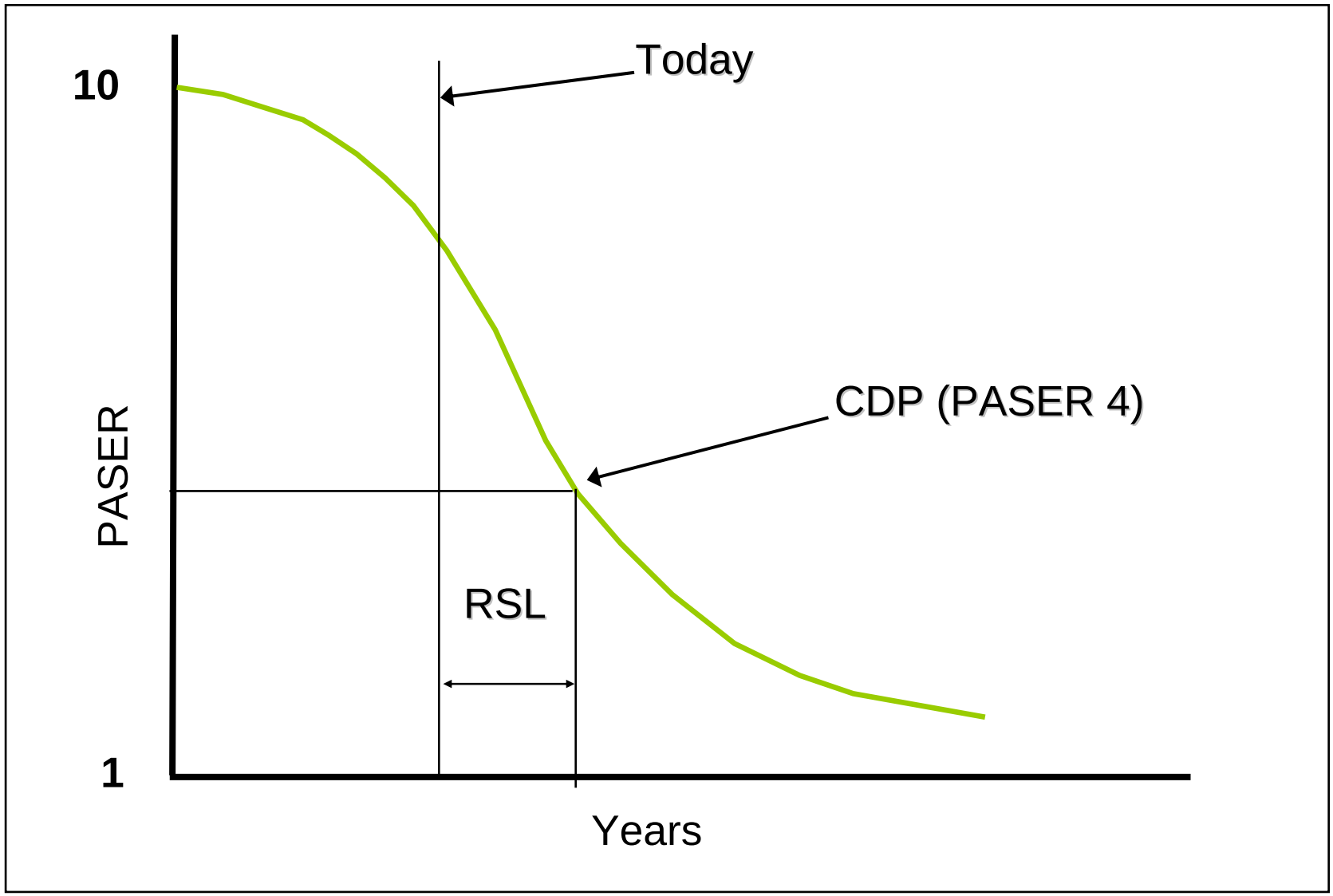
RoadSoft-GIS **Modules**

- Roadway Inventory & Management:
  - Pavement Deterioration Curves.
  - Strategy Evaluation.
  - Strategy Optimization.
- Culvert Inventory & Management
- Sign Inventory & Management
- Guardrail Inventory
- Pavement Marking Inventory
- Safety Management (Crash Data)

Pavement Deterioration Curves



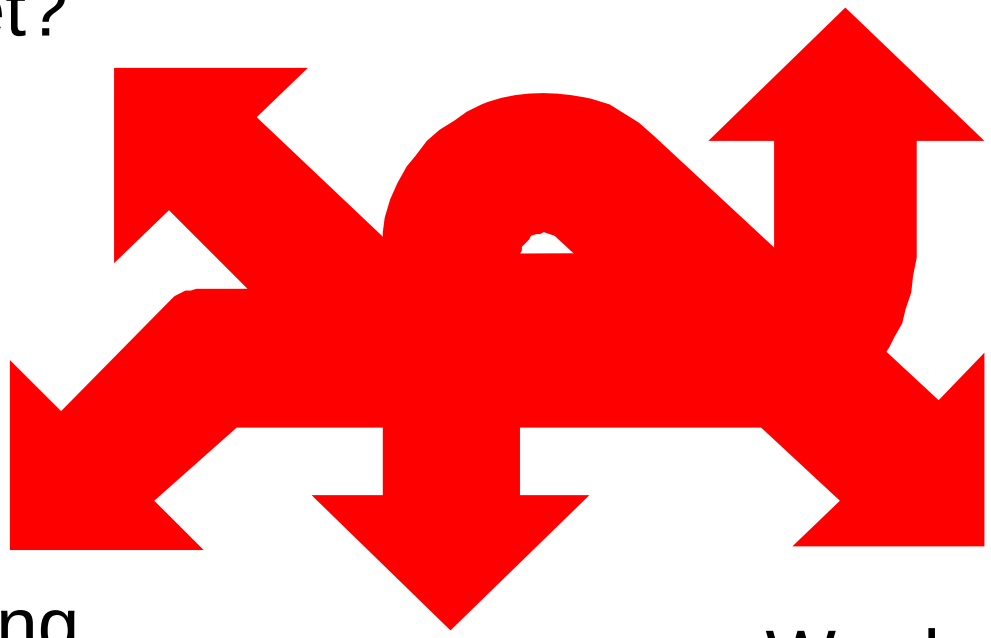
Remaining Service Life



“What-If” Scenarios…

We double the budget?

We work on 10 miles each year?

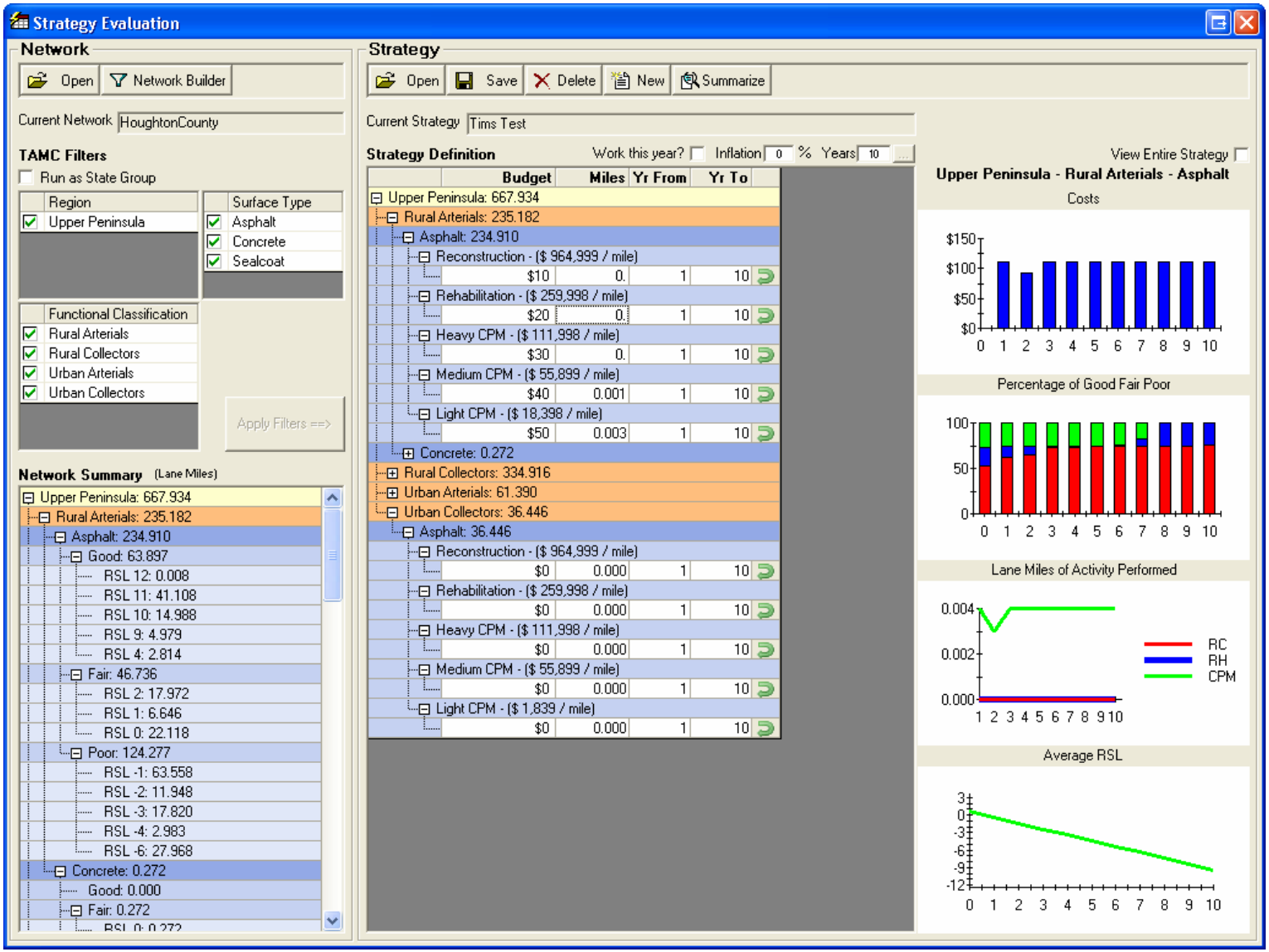


We do nothing for 3 years?

We delay the increase?

We do a 1” overlay on all the rough roads?

Strategy & Optimization



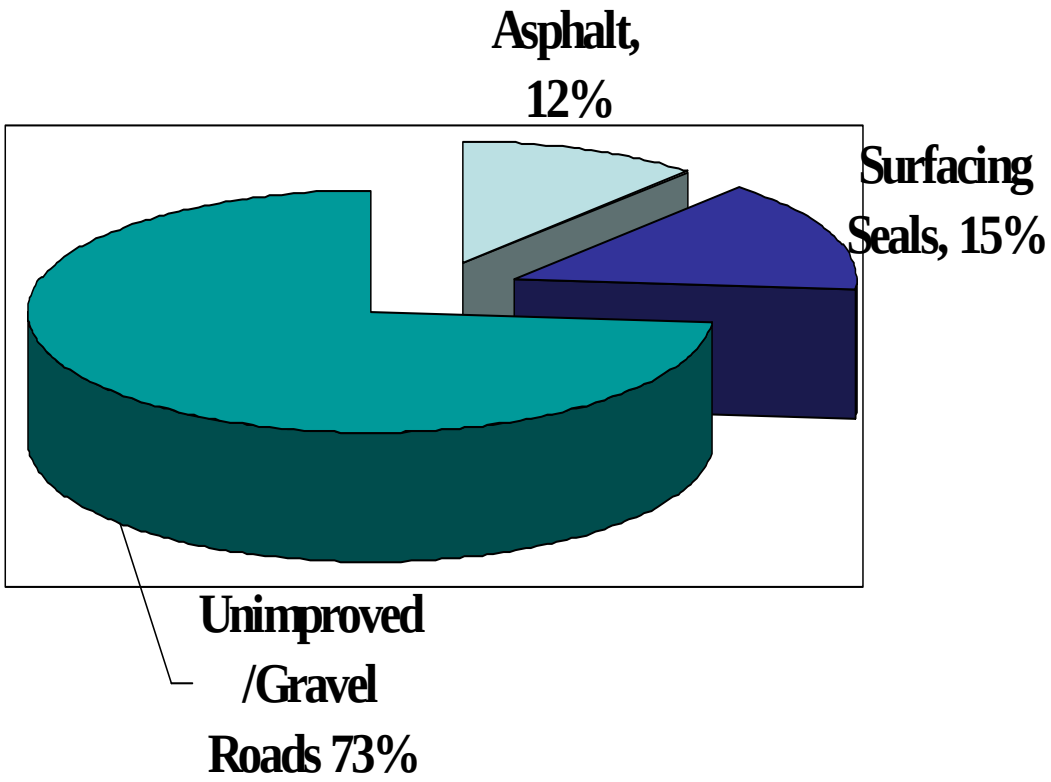
MOZAMBIQUE PROJECT

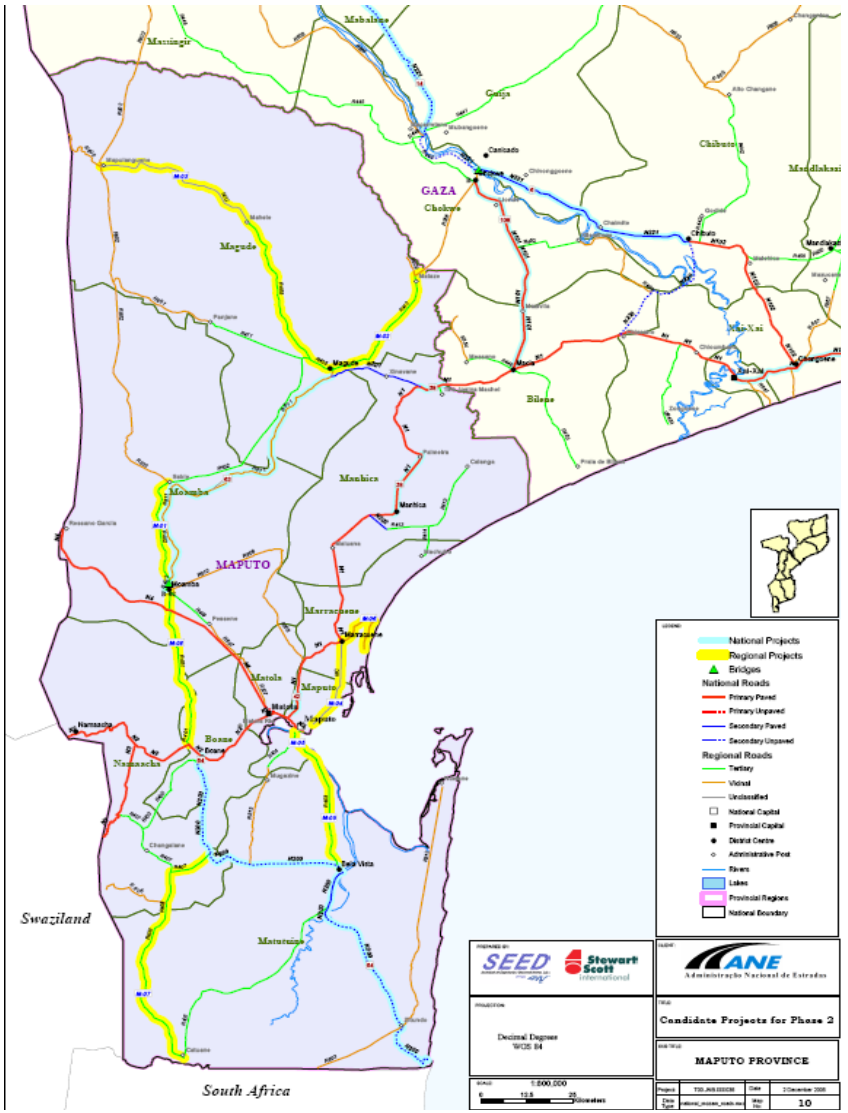
UNIVERSIDADE FEDERAL DE SANTA CATARINA
DEPARTAMENTO DE ENGENHARIA CIVIL

National Management Plan

- Rehabilitation Backlog*:*
  - Network condition information indicates 60% of network in “poor "condition.
  - Should be 5% –10 %;
  - Represents backlog of 30% -35% of network that needs rehabilitation above the normal.
  - Example: double rehabilitation requirement each year (i.e. 5% of network extra per year).
  - Catch up back log in 5 –7 years.

Maputo Province





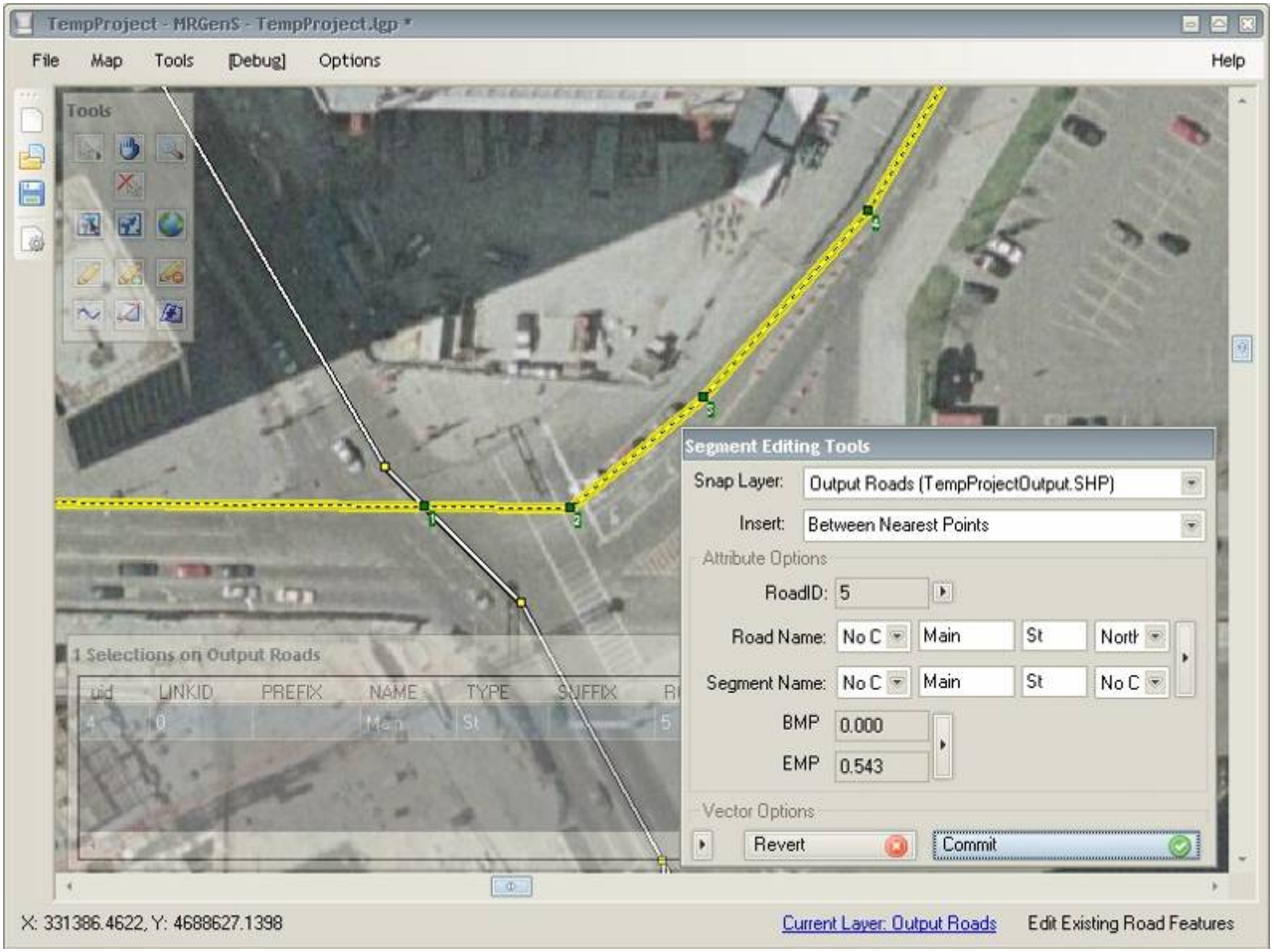
Goals and Objectives

- Develop a system based on Mozambique’s characteristics.
- Use PASER as an ongoing system to collect and rate the Road Network.
- Establish an ongoing process to collect and store data, diminishing the money spent in re-colleting and re-storing data.
- Provide realistic projects for Maintenance of Paved and Unpaved Roads.

First Steps…

- *RoadSoft-GIS*'s "Tropicalization":
  - Incorporate GIS Files with MrGenS.
  - Translation from English to Portuguese.
  - Conversion from English to Metric Units (SI).
  - Modules:
    - Pavement Deterioration.
    - Strategy Evaluation and Optimization.
    - Additional Assets
      - Culverts, Signs and Guardrails.

Referencing System



Unpaved and Unimproved Roads

- PASER System:
  - Gravel Road Manual.
  - Unimproved Road Manual.
  - Drainage (Rural/Urban) Manual.
- Deterioration (Performance) Curves:
  - Special Considerations.
- Strategy Evaluation and Optimization:
  - Customized by/for Mozambique’s Needs.

Questions?