Asphalt Recycling and Pavement Preservation in Hillsborough County, Florida

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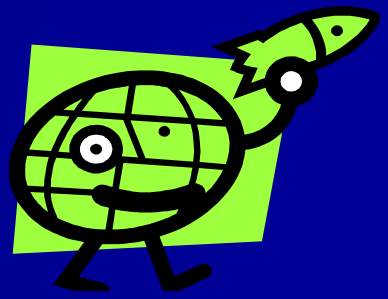
Systems Planning

Discussion Points

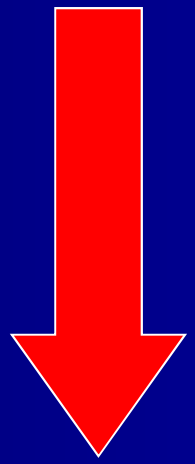
- Hillsborough's Inventory/Budget
- Pavement Process – "Tools of the Trade"
- Treatments – Focus on Recycling
  - Performance
  - Lifecycle – *Cost to Own*
- Project Examples
- Obstacles to Hot in Place Repaving - *IMHO*



Hillsborough Inventory/Budget

- 6,993 lane miles
  - Rural to major arterials
  - 4 lane miles of rigid pavement
  - Essentially zero dirt roads
- This Year - FY 2011 - $7.1 M

  Gas Tax: $3.6M
  CIT: $3.5M - FY12=$0
  Ad Velorem: $0



Budget FY2009: $13.9M
Budget FY2010 and 11: $7.5M
Budget FY2012: $3.6M

More lane miles that 5 State DOT's !!!

The Pavement Management Process

Accomplished by

1-Inspecting all road segments

2-Planning for projects based on budget and need

3-Implementation of appropriate treatments and evaluate performance

Tools of the Trade-
Step 1 – Inspections

Inspections Have Requirements

- Inspect ALL of the roads every three years (GASB34 compliant)
- Annual report on Overall PCI: 0-100 scale
- Overall PCI is to be above 55 (Hillsborough Adopted)
  TARGET =62.5 *i.e.*. FAIR CONDITION
- Hillsborough Co. adopted MicroPaver as PMS

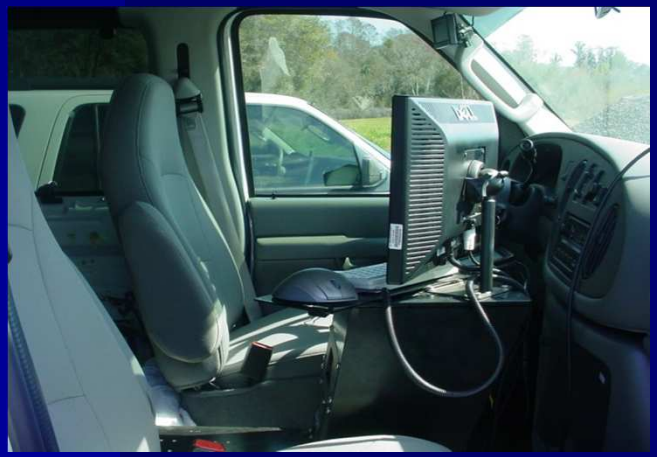
Tools of the Trade- Inspections

Hillsborough Pavement Inspection Vehicles

- Began development of Pavement Inspection vehicle in 2006.
- Vehicle collects visual distress as measured by an inspector
- Onboard GIS/GPS enabled equipment
- Rut Bar measures cross slope in real time
- All data is uploaded to MicroPAVER database for calculation of PCI and modeling of pavement conditions.

Hillsborough Pavement Inspection Vehicles

Hillsborough Pavement Inspection Vehicles



Hillsborough Pavement Inspection Vehicles

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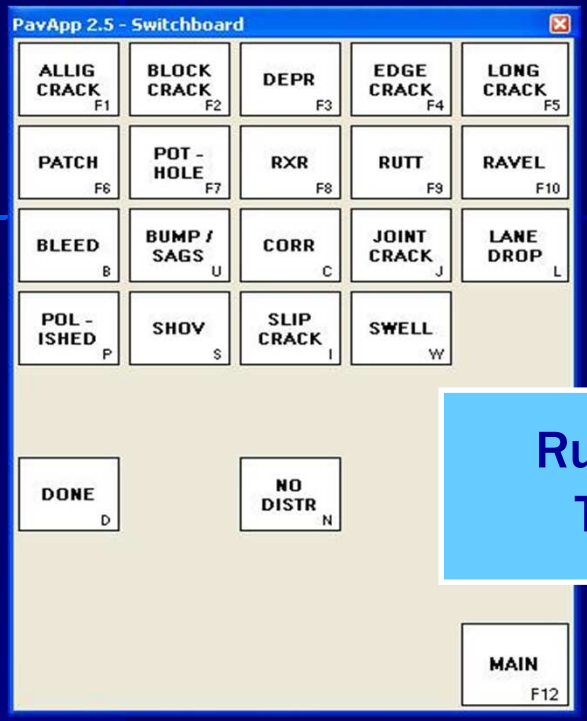
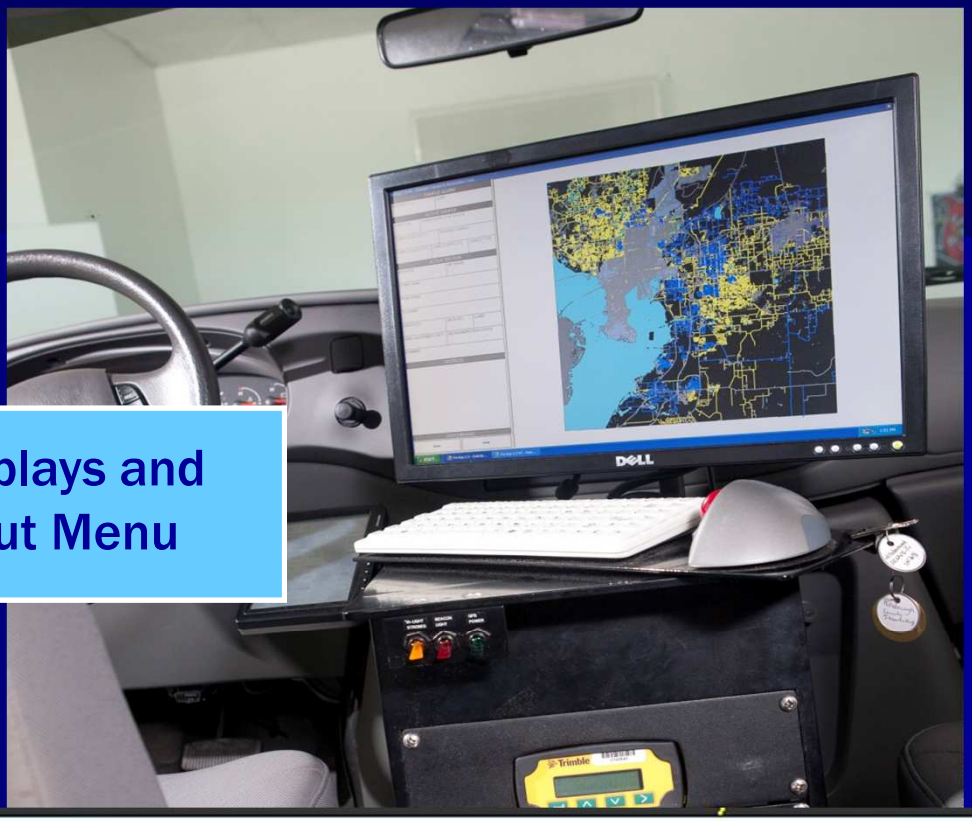
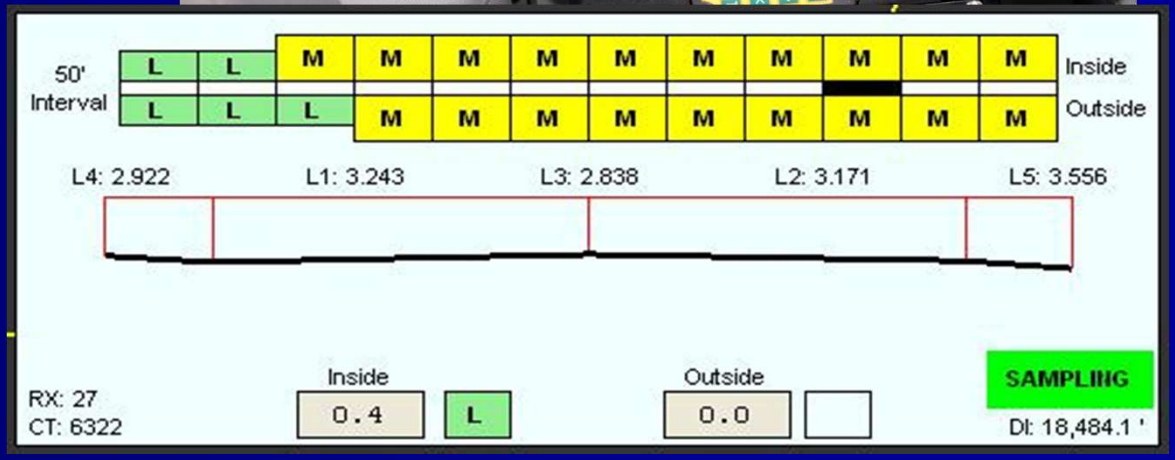
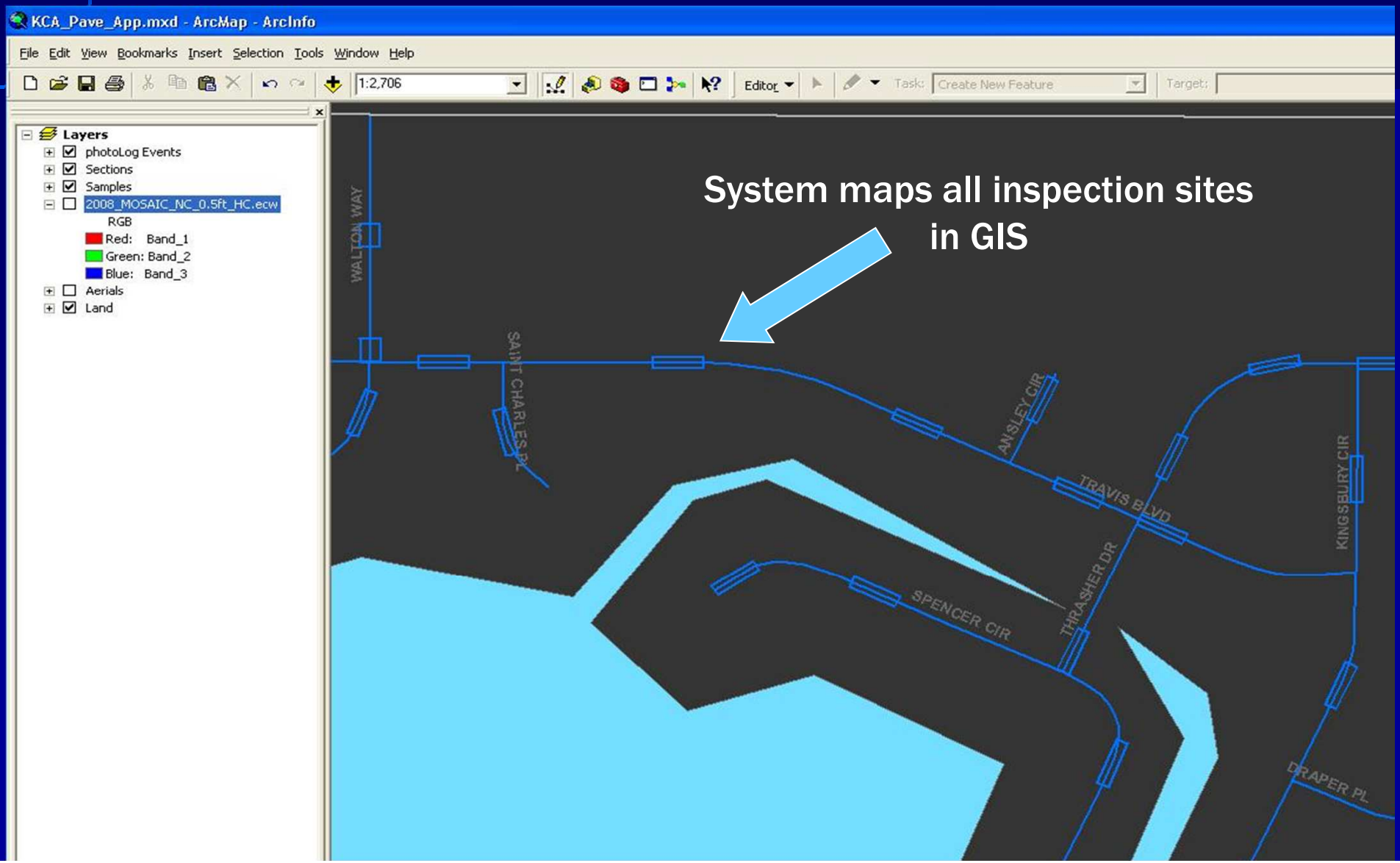


Rut Bar Visual Displays and Touch Tablet Input Menu



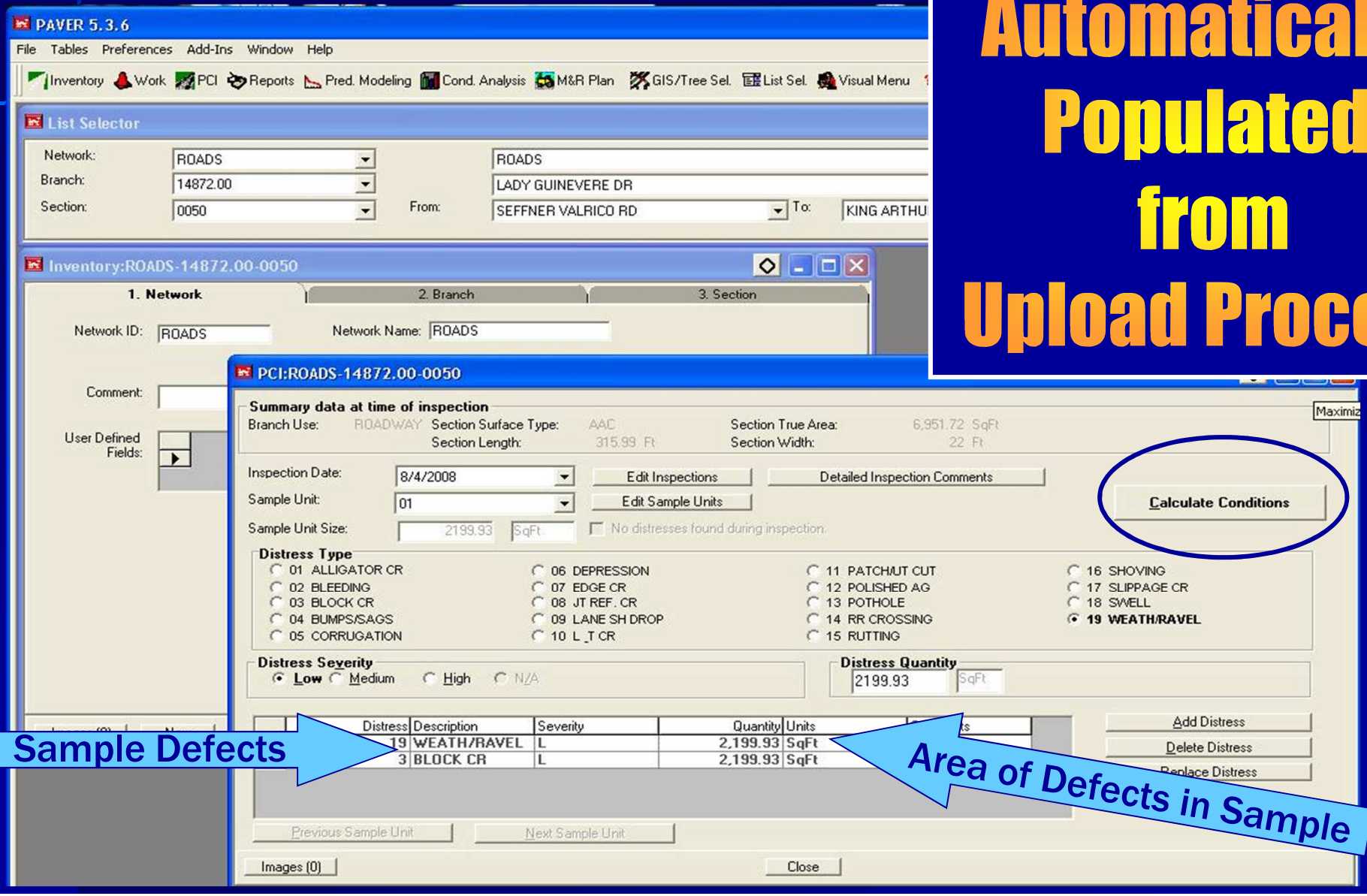


Hillsborough Pavement Inspection Vehicles - Inspection Samples



MicroPAVER - PMS

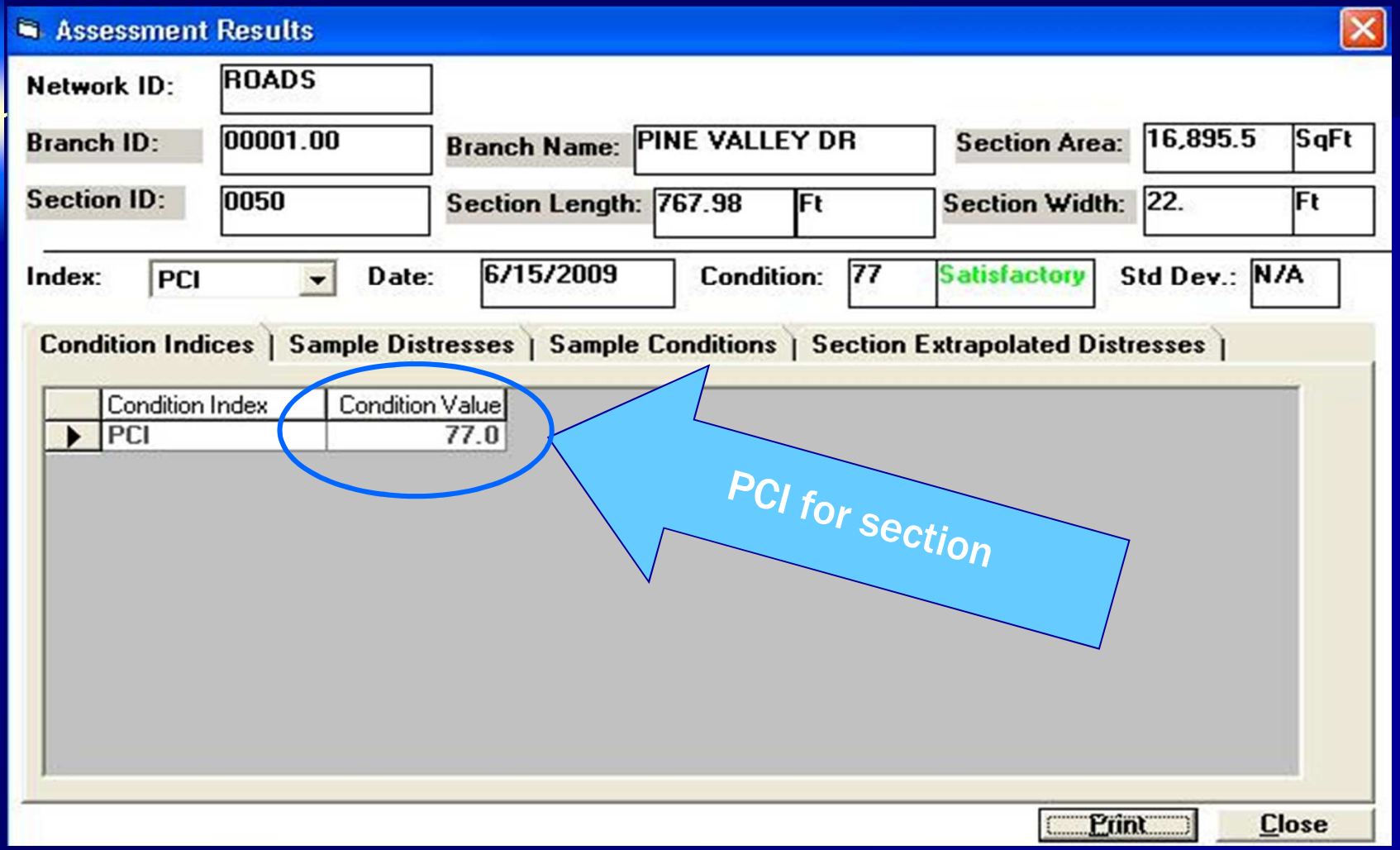
Hillsborough Pavement Inspections



Automatically Populated from Upload Process

MicroPAVER

Hillsborough Pavement Inspections



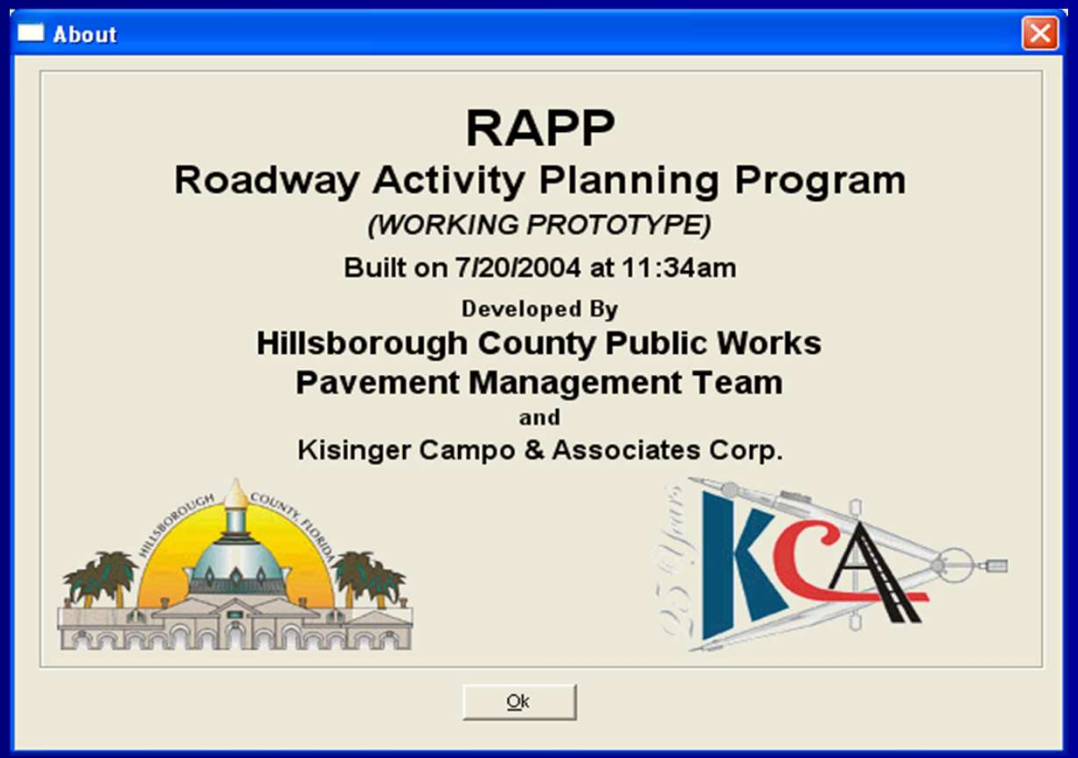
Tools of the Trade – Step 2 - Planning

- Groups of Projects Based on Treatment and Fiscal Year
- A group is a "list" of roads that will be treated in any given fiscal by a given treatment based on:
  - Condition
  - Budget
  - Strategy (i.e. pavement philosophy)
    - Worst First (bring lots of cash!! – Which one is actually worst?)
    - Last Year's Budget
    - Standard Program – (time re-occurrence, i.e. Treat Every 7 years)
    - "Fighting Fires" – (citizen driven)
    - Political Pressure – (Political considerations to establish priorities)
    - Gut Feel

- ***HILLSBOROUGH STRATEGY – KEEP THE GOOD ROADS GOOD!!***

Tools of the Trade - Planning

Hillsborough's Planning tool is called RAPP



This was actually developed FIRST!!

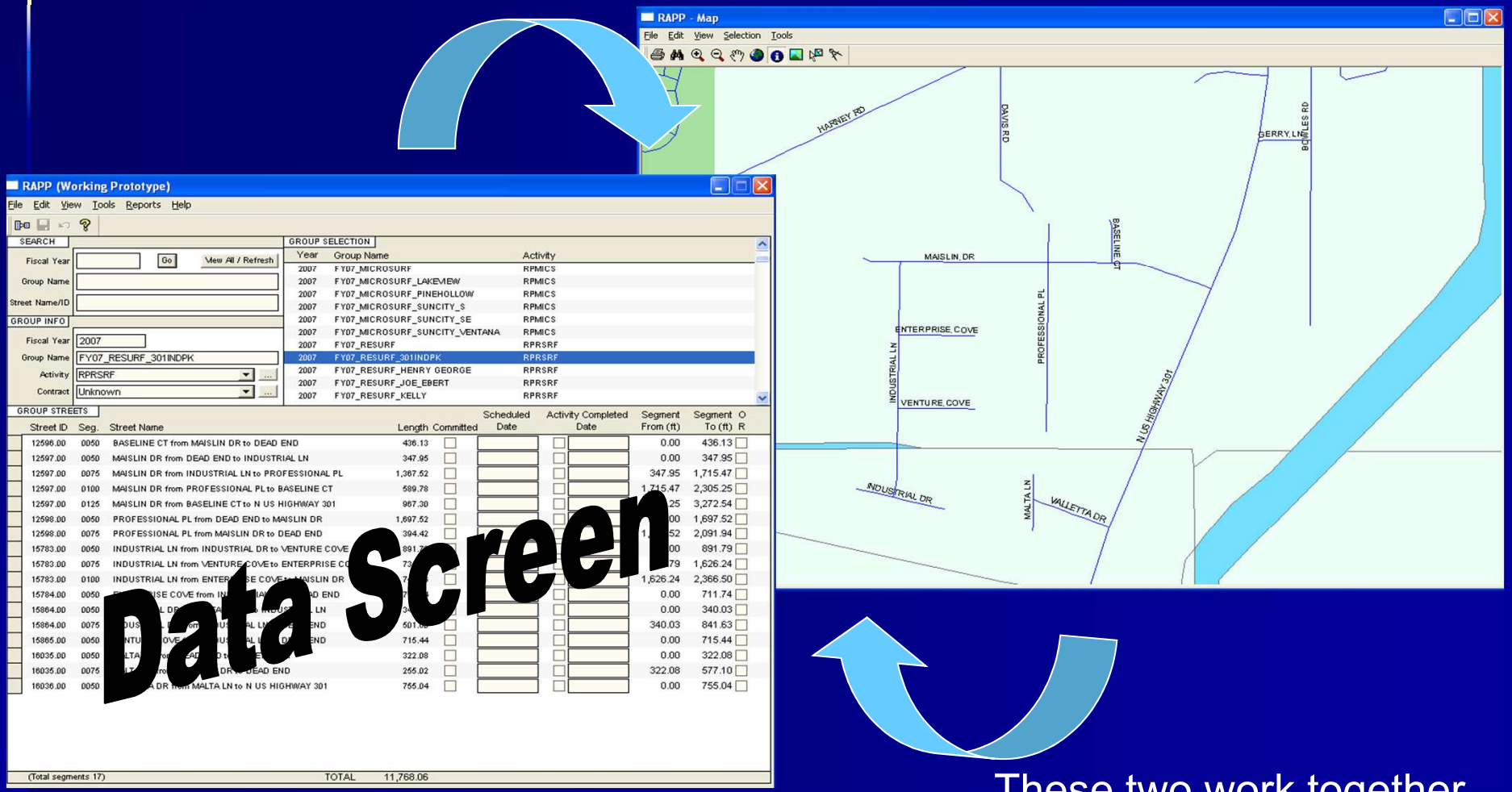
RAPP- Yeah.... What is That???

Data window that creates and displays pavement management project groups based on selections made from a spatial environment

RAPP Keeps Track of
WHEN
WHAT
WHERE

Roadway Activity Planning Program

RAPP Data Window consists of a map, and a data screen



These two work together

Tools of the Trade –
Step 3 – Implementation / Evaluations

Right Treatment
Right Road
Right Time

…AND
what was the benefit?

Tools of the Trade – Step 3 – **Implementation**

Hillsborough Treatments (Current)

- Crack seal – With Micro-Overlay
- Micro surface (Single-Dbl)
- Micro pave (sp4.75 w/76-22)
- Hot in Place Recycle Repaving (single pass – virgin lift)
- Overlay (SuperPave)
- Mill and Overlay (Wedge Mill)
- Full Depth Reclamation
- Conventional Reconstruction

10 HIR projects since 2002

Project Comparison - COST

Hot In Place Recycle Repaving- Example

- Cost comparison based on 2009 pricing
- Compare 2 " mill and fill vs. Hot in Place Repaving
- Virgin HMA 1" lift Superpave SP9.5 w/64-22 binder
- Assume that the road selection is correct.

Conventional Repaving

- Cost comparison based on 2009 pricing – HC Contract
- Compare 2 " mill and resurface
- Superpave SP12.5 w/64-22 binder

Hot in Place Re-paving

- Cost comparison based on 2008 pricing – HC Contract
- Single Pass Hot in Place Repaving
- 1" Scarification Heat and Rework
- HMA 1" lift Superpave SP9.5 w/64-22 binder

Project Cost Comparison - COST

- Cost comparison based on 2009 pricing
- Compare 2 " mill and fill vs. Hot in Place Repaving
- HMA 1" lift Superpave SP9.5 w/64-22 binder
- Assume that the road selection is correct.

Conventional Repaving

Tonnage SP12.5…….$85.00/ton (in place)

Mill 2"…… $2.30 per SY

Price per SY ……$10.80 per SY

Hot in Place Re-paving

Heat and Re-work……$2.20 SY

Recycle Agent…… $0.15 per SY

Tonnage SP9.5……$82.11/ton (in place)

Price per SY……$6.45 per SY

Project Cost Comparison

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Project Cost Comparison – Life Cycle

Cost to Own per Year = Cost per SY/Year

- Recycle project Life Cycle……10 years (assume)
- Conventional Resurfacing project……15 Years

Hot in Place Repaving

- Cost per SY….$6.45
- Cost to own = $6.45/10Years

Cost per SY/Year = $0.64

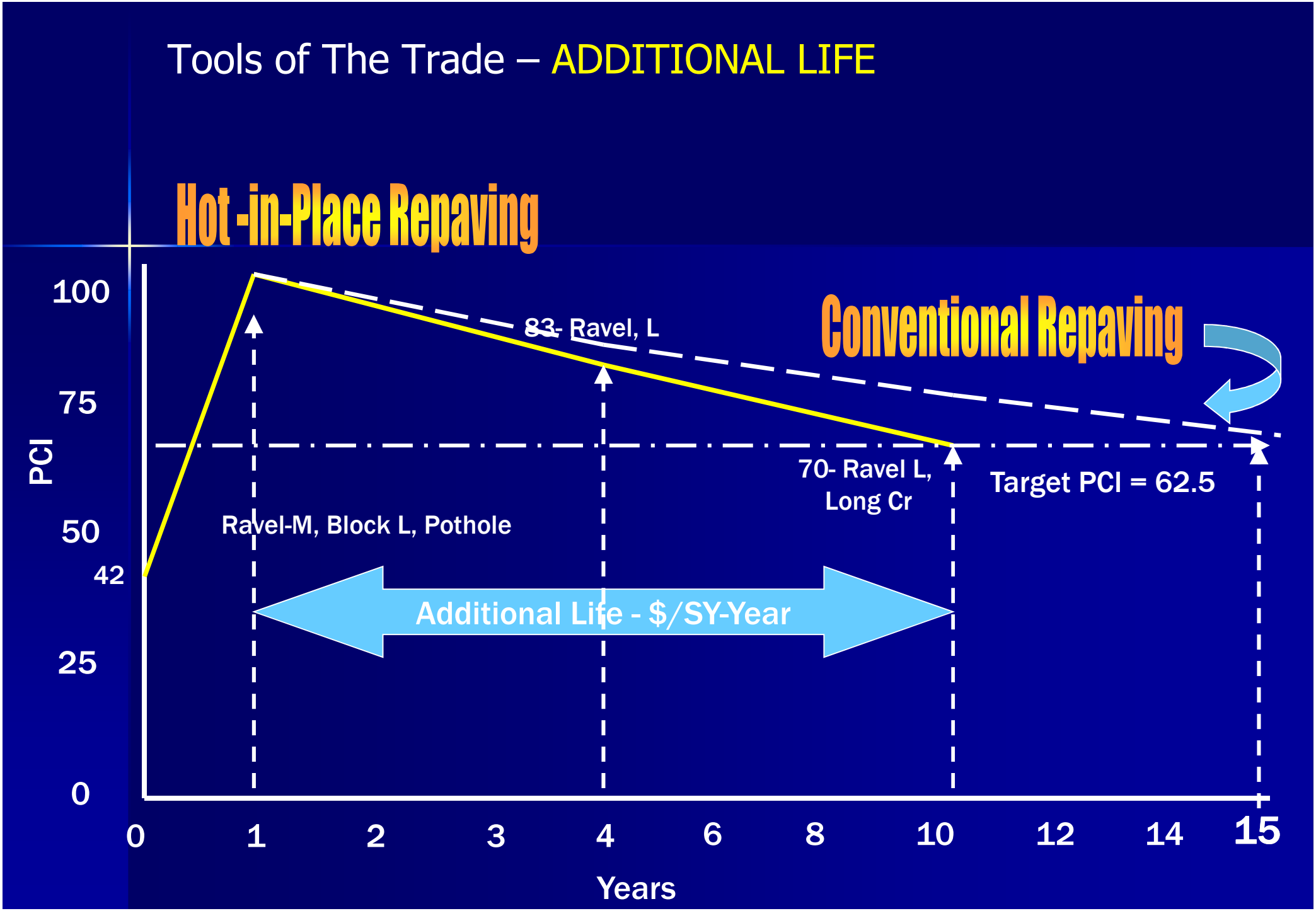
Conventional Resurfacing

- Cost per SY….$10.80
- Cost to own = $10.80/15Years

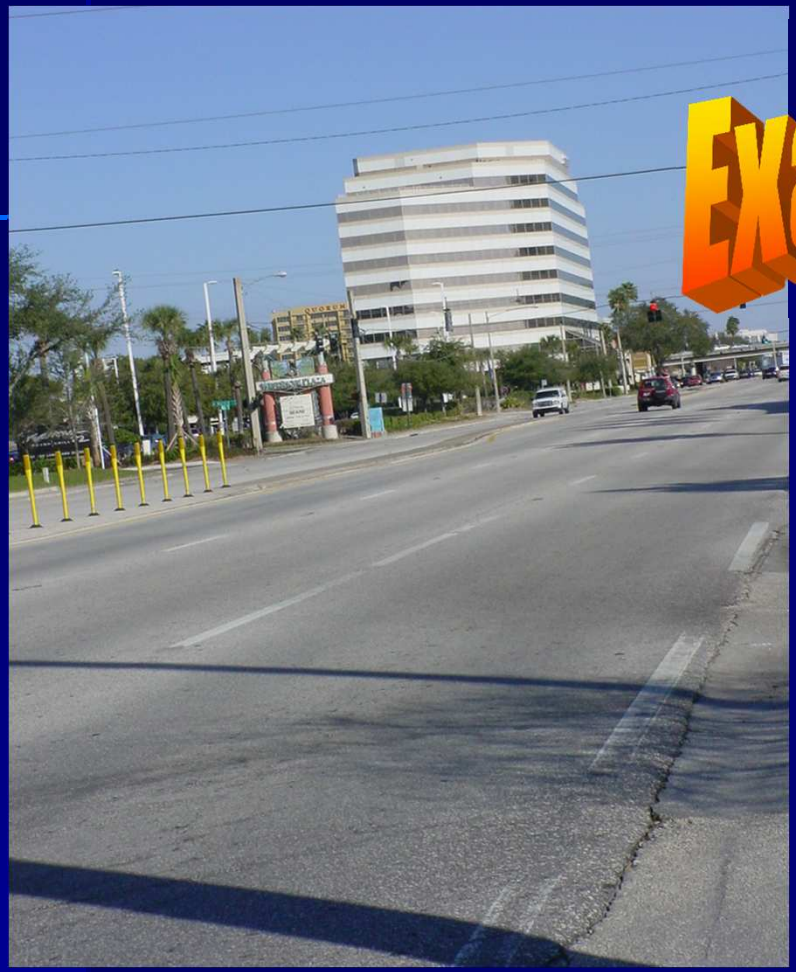
Cost per SY/Year = $0.72

- Cost per square yard year appears to be similar… so this looks viable!!!
- The deterioration (PCI) curves will be different, with HIR being potentially steeper.

Tools of The Trade – ADDITIONAL LIFE

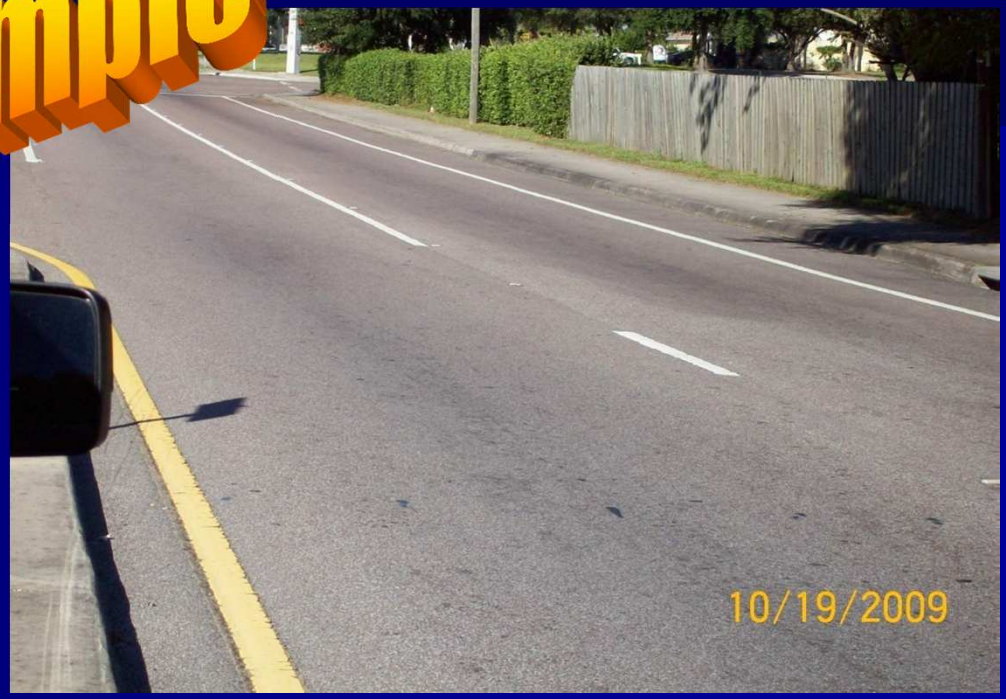


Project Examples



Hot in Place Repaving – 13 years old

Example



New Construction – 10 years old

Right Treatment

Right Road

Project Example - Westshore Blvd

Hot in Place Repaving – 13 years old

Project Example - Westshore Blvd

Hot in Place Repaving – 13 years old

Project Example - Westshore Blvd

Hot in Place Repaving – 13 years old

Tools of The Trade – Get it RIGHT!

Hot in Place Repaving – 13 years old

Project Example - Westshore Blvd

Hot in Place Repaving – 13 years old

Project Example – Orient Road

Project Example – Orient Road

Project Example – Orient Road

Hot in Place Repaving – 7 Years old

Recycled Structural Course

Project Example – Orient Road

Hot in Place Repaving – 7 Years old

Recycled Structural Course

Project Example – Causeway Blvd

Project Example – Causeway Blvd

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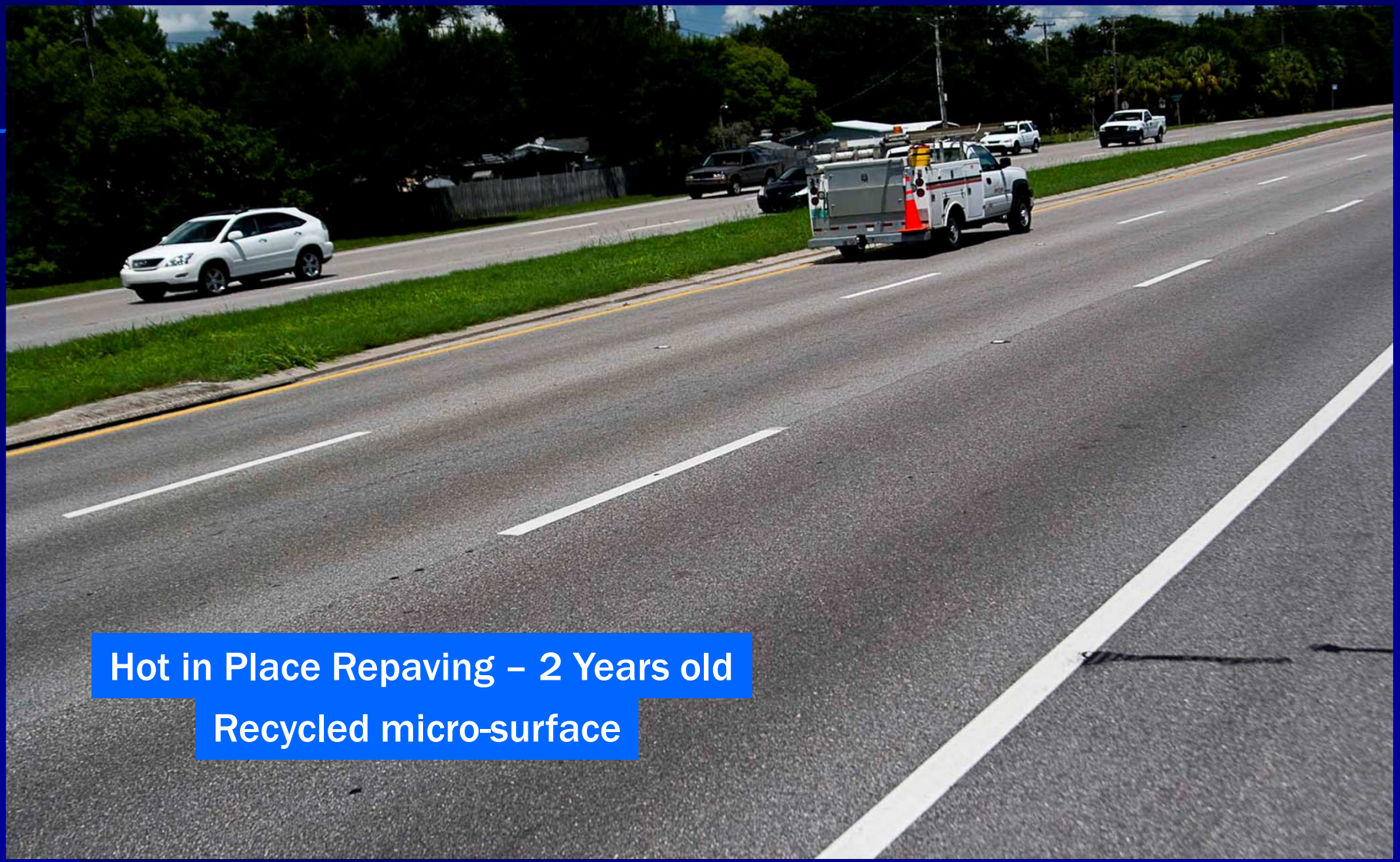


Project Example – Causeway Blvd

Project Example – Causeway Blvd

Hot in Place Repaving – 2 Years old

Recycled micro-surface

Project Example – Causeway Blvd

Hot in Place Repaving – 2 Years old

Recycled micro-surface

Project Example – Waters Avenue

Tools of The Trade – Pre Construction

Micro surface on arterial – 3 years old treatment on friction coarse

Tools of The Trade – Post Construction

Hot in Place Repaving
Recycled micro surface

Obstacles to Hot in Place Repaving

IMHO

Obstacles to Hot in Place Repaving - *IMHO*

Recycling could benefit from additional clarity of terms.

"Hot in Place Recycling" sub-catagories:

- Surface Recycle – Process used to soften the asphalt surface
  - could use multiple heating units
  - could use spring activated teeth, tines or a small diameter milling head.
  - could use recycling agent in scarified material (if required)
  - could be used to prepare for an HMA overlay (new surface)

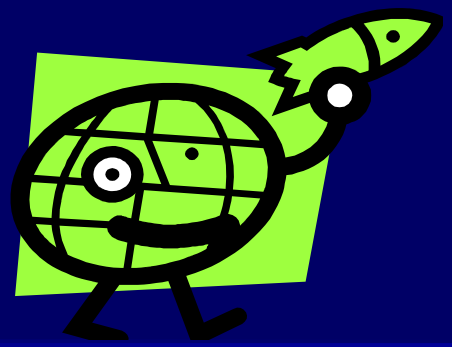
- Remixing – Same as Surface Recycle but new HMA is added and mixed throughly.
  - could be left as the wearing course
  - could be overlayed
  - could be single stage, scarify in single pass
  - could be multi-stage, scarify in multiple passes-(windrow)

- Repaving – Combines Surface Recycling OR Remixing with the simultaneous placement of overlay of new HMA
  - could mix the recycle in a pug mill or using augers
  - could be single pass (two screeds)
  - could be multi-pass (conventional paver used for final riding course)

Obstacles to Hot in Place Repaving – *IMHO*

- Specifications - Many DOT's do not have standard specifications for HIR/Recycling/Remixing/Repaving. Leaves some local agencies to develop own specs.
- Experience - Some agencies lack experience with these processes and become reluctant to attempt projects. *Nobody really likes trial and error.*
- Poor Road Selection – "Wrong Road" leads to failed projects.
- Procurement - Poor understanding of processes and application techniques leads to bids that are unclear.

Conclusions



- HIR processes can increase PCI at a cost savings when applied to the correct road.
- HIR processes are cost effective when compared to like conventional treatments.
- The HIR cost per SY year is comparable to conventional processes. However re-treatment may occur earlier.
- Standard DOT specifications would be beneficial to the proliferation of HIR processes.
- Clearer definitions and education could reduce confusion concerning HIR sub-catagories.
- Clearer understanding of the differences in the sub-categories of HIR would assist in the bidding process.

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