



New Hampshire
Technology Transfer Center

Dr. Charles Goodspeed
Professor / Executive Director

NH's Needs For Preservation

**57% increase in
Highway Fatalities
From Last Year**

Facets of Road Preservation

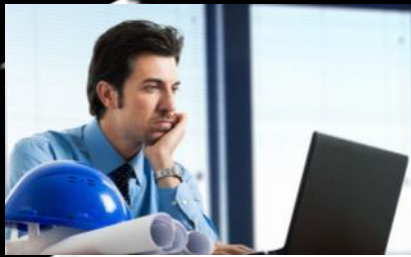
Budget
Committees



Public
Vote



The Perfect Road



Network Manager
&
Field Survey Crews



Maintenance
Crews

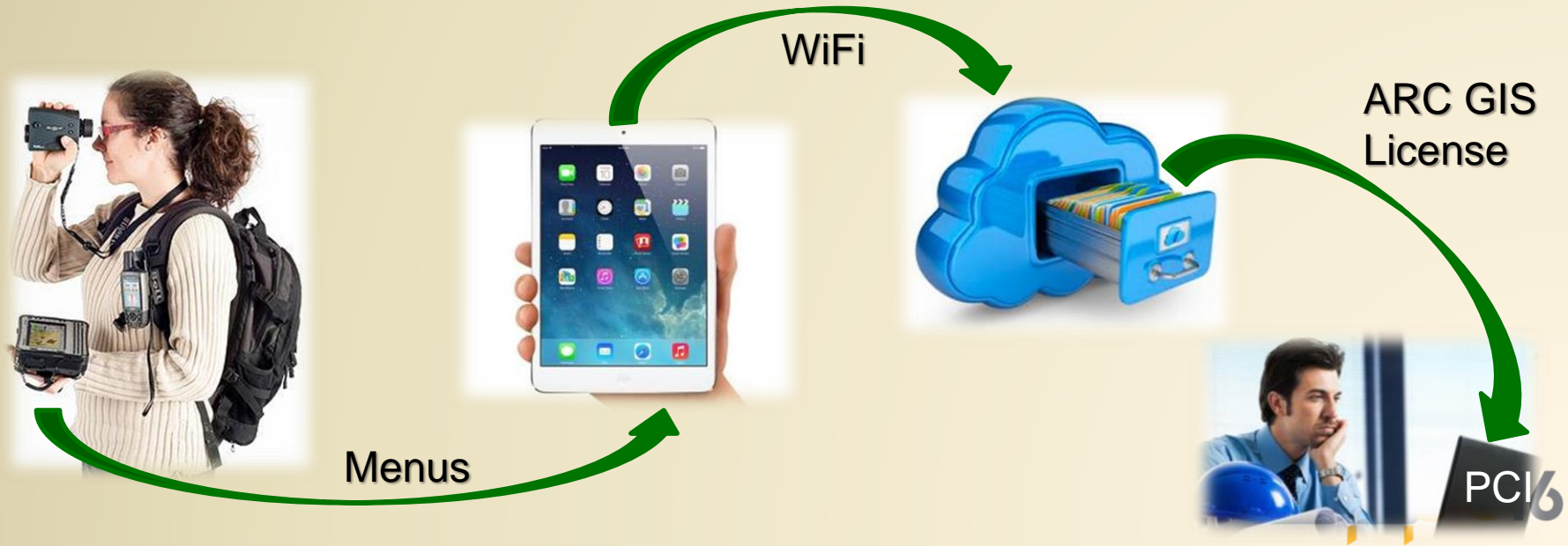


Network Manager's Tasks

- Condition Survey –
- Report Preservation Alternatives –
- Priority Factors -
- Budget Preparation & Defense
- Preservation Oversight – Crews, Social Media
- Public Awareness

Condition Survey Crews

➤ Condition Survey – Trained / Certified Inspectors



Condition Parameters $\frac{1}{4}$ mi

Condition	Severity	Extent
Longitudinal/Transverse Cracking	3	3
Edge Cracking	3	3
Alligator Cracking	3	3
Roughness	3	
Drainage	3	
Frost Heave	3	
Patching/Potholes	3	3
Rutting	3	3

Priority Weighting Factors



Condition

Criticality

Risk



Functional

Traffic Volume



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New Hampshire's **NEED!**

Safety



Distraction

Rumble Strips
Guardrails



Speed

Road Preservation

Forecasting

Priority	PCI	Street	SRI	Order	Length (ft)	Width	Length	Surface Type	Shoulder Type	Selected Repairs													
82.25	43	Ash Swamp Rd	L3370051__	4	1320	22	2	Paved	None	Year 1: FDR w/ Asphalt Stabilization and HMA (3")													
Segment PCI and Repair Cost				Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10	
Average PCI Before Repairs				41.07		39.22		37.45		35.77		34.16		32.62		31.15		29.75		28.41		27.13	
Average PCI After Repairs				97.05		92.69		88.51		84.53		80.73		77.10		73.63		70.31		67.15		64.13	
Total Repair Cost (inflated)				60,804.33				0.00				0.00				0.00				0.00			

Pavement Preservation/Maintenance

Repair	Unit Cost (\$)	Units	Life Span (months)	Repair Cost (\$)	Cost (\$) / Life Improvement	PCI Improvement %	Repaired PCI	\$ /Delta PCI	Repair Year									
									1	2	3	4	5	6	7	8	9	10
Chip Seal	2.35	Square Yards	60	\$7,582.67	\$126.38	70	82.9	\$190.04	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Chip Seal	3.90	Square Yards	84	\$12,584.00	\$149.81	70	82.9	\$315.39	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fog Seal	1.10	Square Yards	36	\$3,549.33	\$98.59	65	80.05	\$95.80	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sand Seal	1.70	Square Yards	48	\$5,485.33	\$114.28	70	82.9	\$137.48	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Microsurfacing (Single)	2.50	Square Yards	60	\$8,066.67	\$134.44	70	82.9	\$202.17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HMA Shim (1/2") & Chip Seal	4.31	Square Yards	84	\$13,906.93	\$165.56	75	85.75	\$325.31	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asphalt Rubber SAM	4.65	Square Yards	108	\$15,004.00	\$138.93	80	88.6	\$329.04	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bonded Wearing Course	6.75	Square Yards	120	\$21,780.00	\$181.50	80	88.6	\$477.63	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HMA Shim (3/4" avg)	2.94	Square Yards	48	\$9,486.40	\$197.63	65	80.05	\$256.04	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Preservation Training

▶	12	T2 Courses	Preservation Alternatives	286
▶	9	T2 Field Visits	Survey Crews	27
▶		Site Visits	Tech Assistance	??

Preservation Alternatives

Pavement Preservation/Maintenance

Repair	Unit Cost (\$)	Units	Life Span (months)	Repair Cost (\$)	Cost (\$) / Life Improvement	PCI Improvement %	Repaired PCI	\$/Delta PCI
Chip Seal	2.35	Square Yards	60	\$7,582.67	\$126.38	70	82.9	\$190.04
Double Chip Seal	3.90	Square Yards	84	\$12,584.00	\$149.81	70	82.9	\$315.39
Fog Seal	1.10	Square Yards	36	\$3,549.33	\$98.59	65	80.05	\$95.80
Sand Seal	1.70	Square Yards	48	\$5,485.33	\$114.28	70	82.9	\$137.48
Microsurfacing (Single)								
HMA Shim (1/2") & Chip Seal								
Asphalt Rubber SAM								
Bonded Wearing Course								
HMA Shim (3/4" avg)								



Optimization Factors

Repair Alternative

- Life Span (mo)
- Cost (\$) / Life Improvement (mo)
- PCI Improvement (%)
- Repaired PCI {current + % (100%-current)}
- \$ / Δ PCI

Preservation Scheduling

Repair	Repair Year									
	1	2	3	4	5	6	7	8	9	10
Chip Seal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Chip Seal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fog Seal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sand Seal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Microsurfacing (Single)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HMA Shim (1/2") & Chip Seal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asphalt Rubber SAM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bonded Wearing Course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HMA Shim (3/4" avg)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Optimization & Schedule

Priority	PCI	Street	SRI
82.25	43	Ash Swamp Rd	L3370051__

Segment PCI and Repair Cost	Year 1	Year 2	Year 3	Year 4	Year 5
Average PCI Before Repairs	41.07	39.22	37.45	35.77	34.16
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Budget Financing



Preservation Funding



U-Ride

- **Station Advertised \$/gal**
- **Transponder**
- **Pump Code Reader:** **Reads MPG /GVW**
- **Pump Increments $-\$/\text{Gal}$:** **Reduction Function of MPG/GVW**
- **Pump Fuel:** **Station Pays U-Ride**



Enjoy Your Trip on Better Roads!