Using PMS to Develop a Transportation Asset Management Plan

Judith Corley-Lay
NCDOT (retired!)

Outline of Presentation

1. TAMP requirements from Notice of Proposed Rulemaking
2. Our assets and their condition
3. Gap Analysis
4. Life Cycle Cost Analysis
5. Conclusions

Definition: A Transportation Asset Management Plan (TAMP) provides a broad view of the assets for which an agency is responsible, the cost of those assets, and an approach to funding infrastructure condition over a 10 year period.

Components of TAMP

1. Listing of pavement and bridge assets and their condition.
2. Gap analysis including both traditional and non-traditional gaps.
3. System level life cycle cost analysis.
4. Risk analysis

Components of TAMP (continued)

5. 10-year Financial Plan
6. Funding Approach
7. Future TAMP activities.

Listing of Assets and Their Condition

- Used PMS to get current inventory
- NHS is required, but included non-NHS roads as well.
- In addition to PMS, also used data from Inventory and Mapping Unit.

Category	NHS Lane Miles
Normal Interstate	5,983.2
Business Interstate	272.1
US Route	10,936.6
NC Route	3,476.8
Secondary Route	932.1
Ramp	10.1
Non-System	165.4
Other State Agency	0.0
Federal	17.9
Total =	**21,794.2**

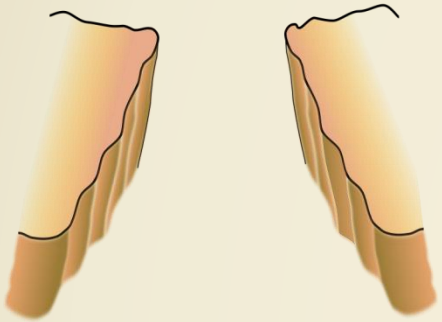
Interstate Assets and Conditions

System	Total Lane Miles	Lane Miles Good	Lane Miles Fair	Lane Miles Poor	% Good	% Fair	% Poor
Asphalt Interstates	4,368.943	2,954.394	1,410.935	3.614	67.62	32.29	0.08
JCP Interstates	1,394.270	686.004	686.721	21.545	49.20	49.25	1.55
CRC Interstates	82.416	41.402	41.014	0.000	50.24	49.76	0.00
Missing Interstates	137.596	0.000	0.000	137.596	0.00	0.00	100.00
Total Interstate Rating	5,983.225	3,681.800	2,138.670	162.755	61.54	35.74	2.72

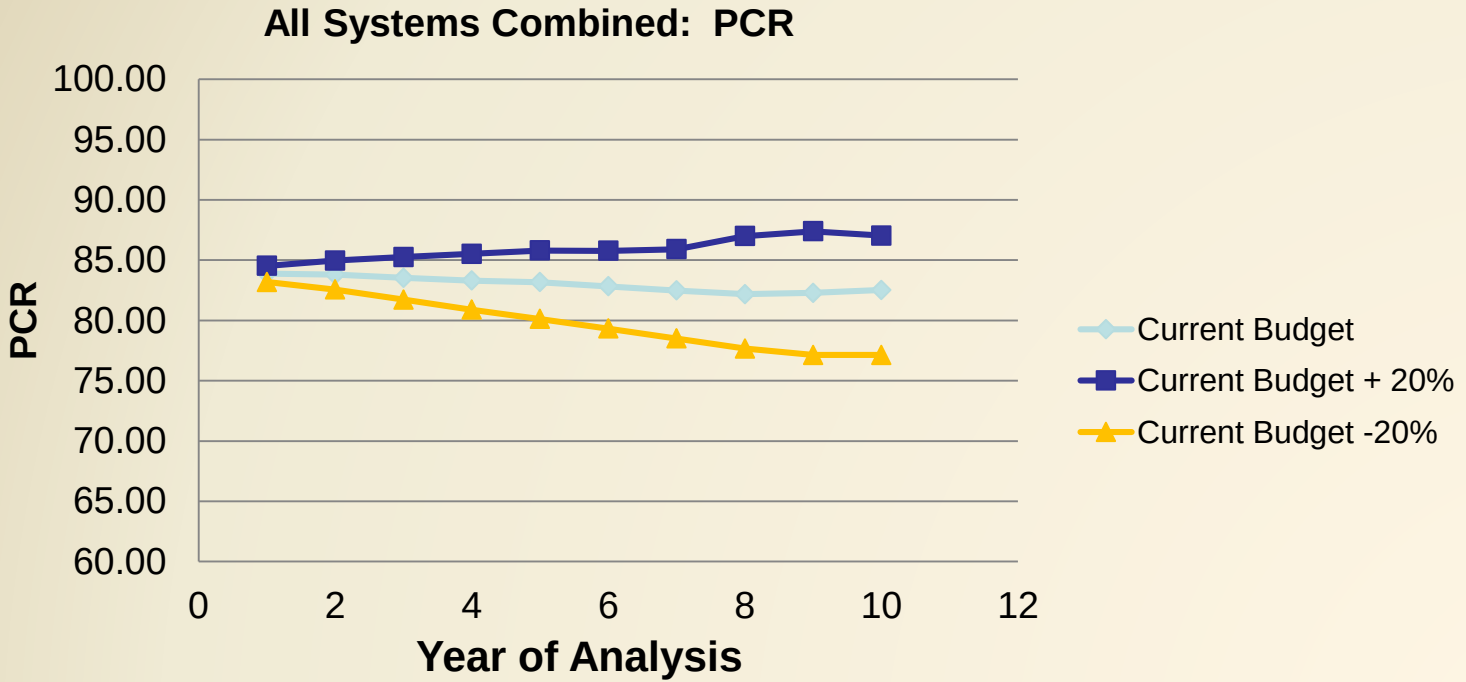
Non-NHS Pavements and Conditions

System	Surface	Total Lane-miles	Good lane-miles	Fair lane-miles	Poor lane-miles	% Good	% Fair	% Poor	Lane-mile weighted average rating (2014)
Interstate 1	Asphalt	34.680	34.680	0.000	0.000	100.00	0.00	0.00	97.13
Primary	Asphalt	20,756.27	13,796.40	5,713.75	1,246.12	66.47	27.53	6.00	85.03
Secondary	Asphalt	121,543.62	79,861.28	27,231.10	14,451.24	65.71	22.40	11.89	82.34
Interstate 2	JCP	0.154	0.154	0	0	100	0	0	93.60
Primary	JCP	94.60	55.829	30.32	8.451	59.02	32.05	8.93	81.58

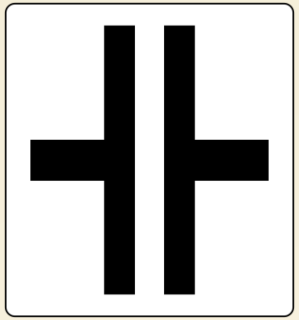
Gap Analysis was conducted by repeatedly querying the PMS and running various funding scenarios.



Traditional Gap Analysis

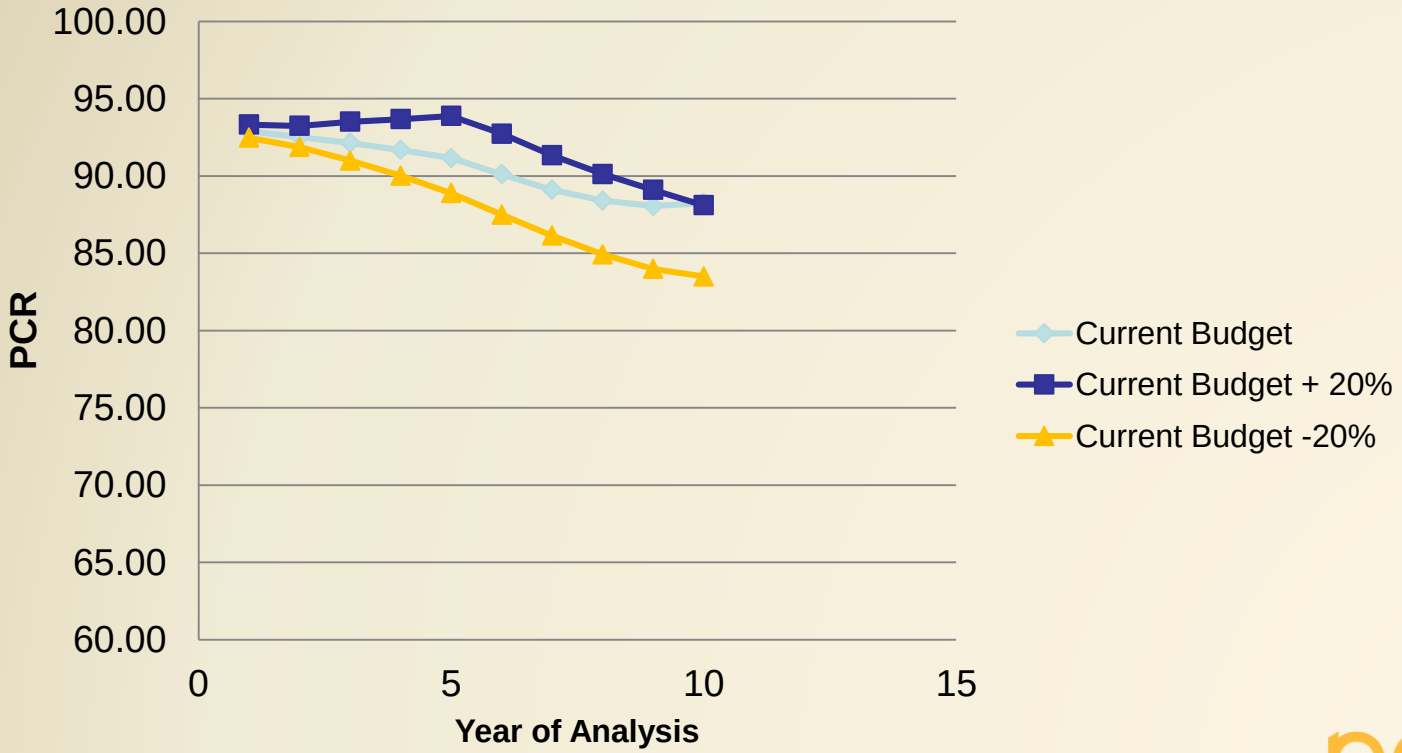


Can break this traditional Gap Analysis down by system.

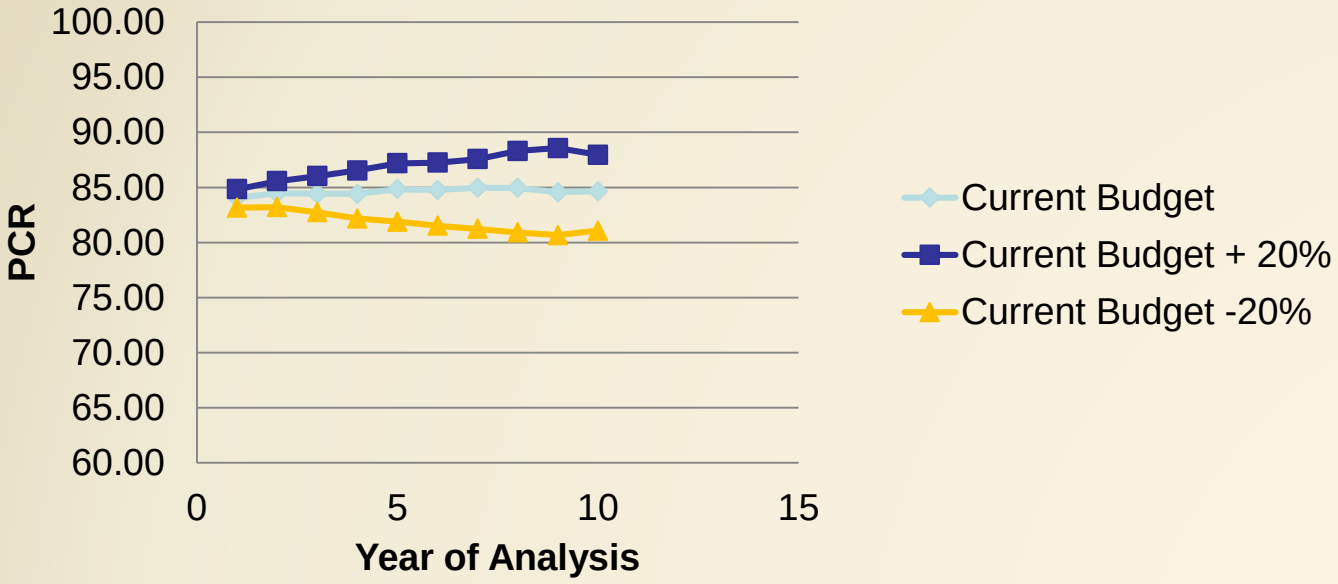


This showed that PCR goes down for Interstate but holds steady for secondary roads, where lower cost treatments are used.

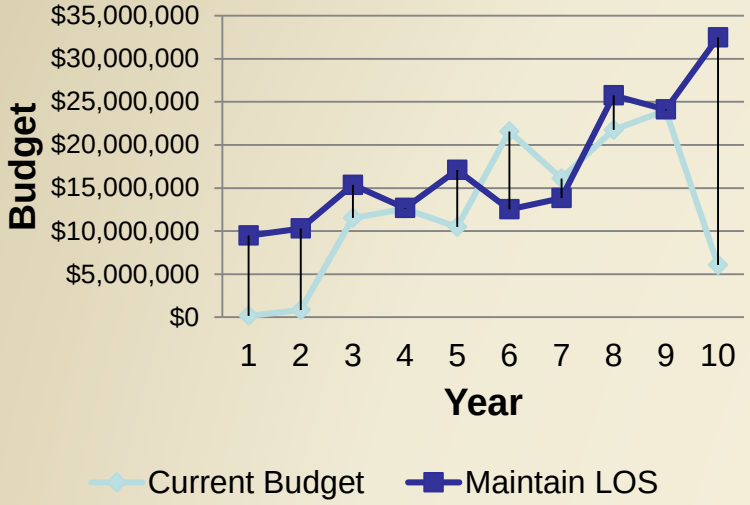
Interstate PCR for 10-Yr Analysis



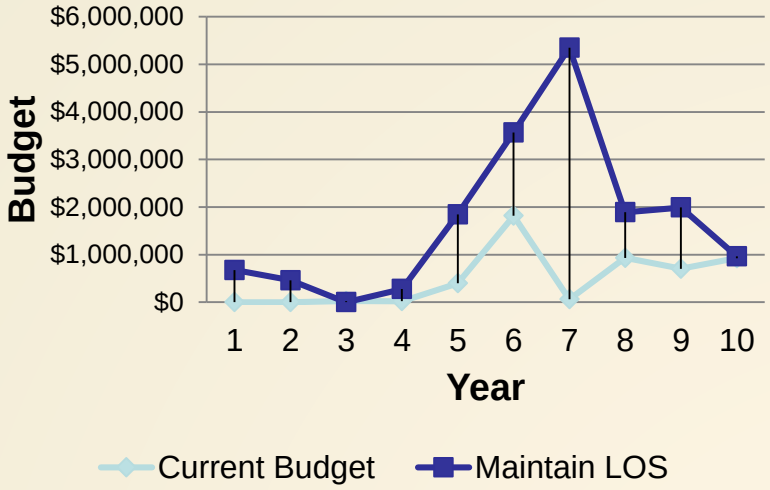
Secondary Roads PCR for 10-Yr Analysis



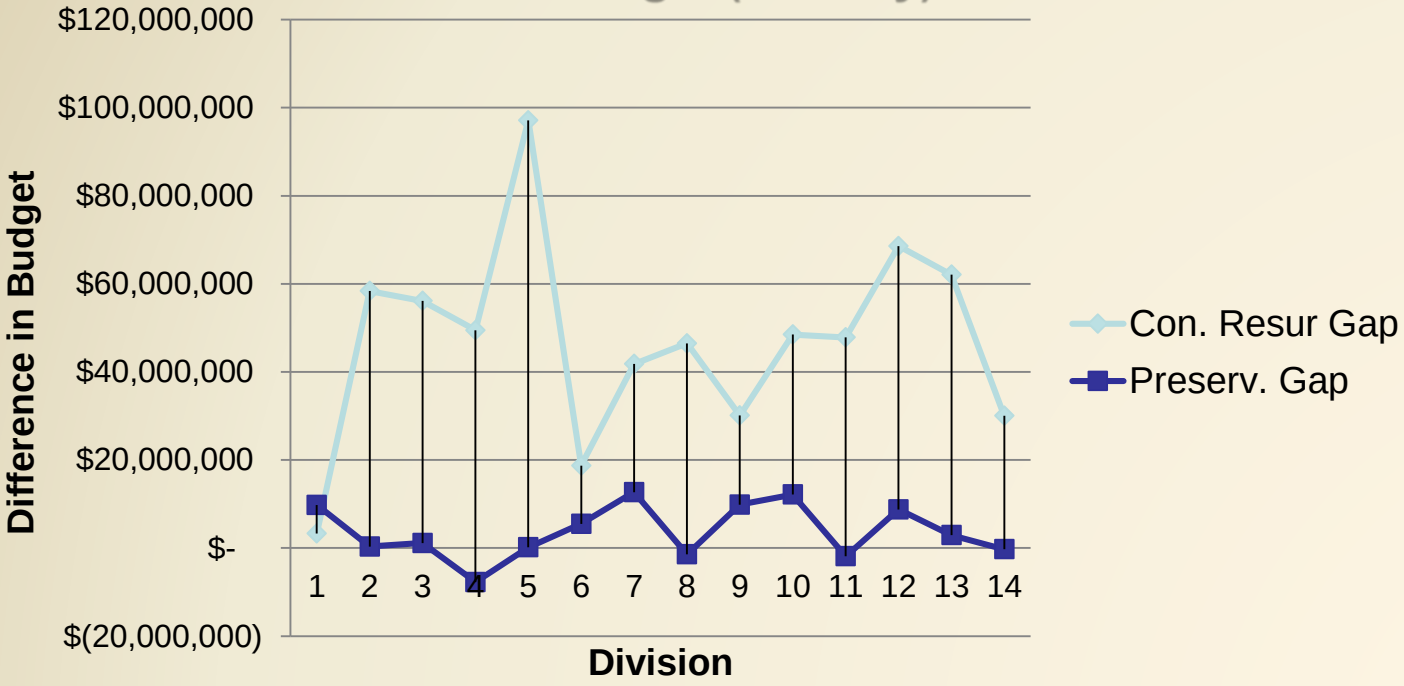
Division 10 Primary Contract Resurfacing



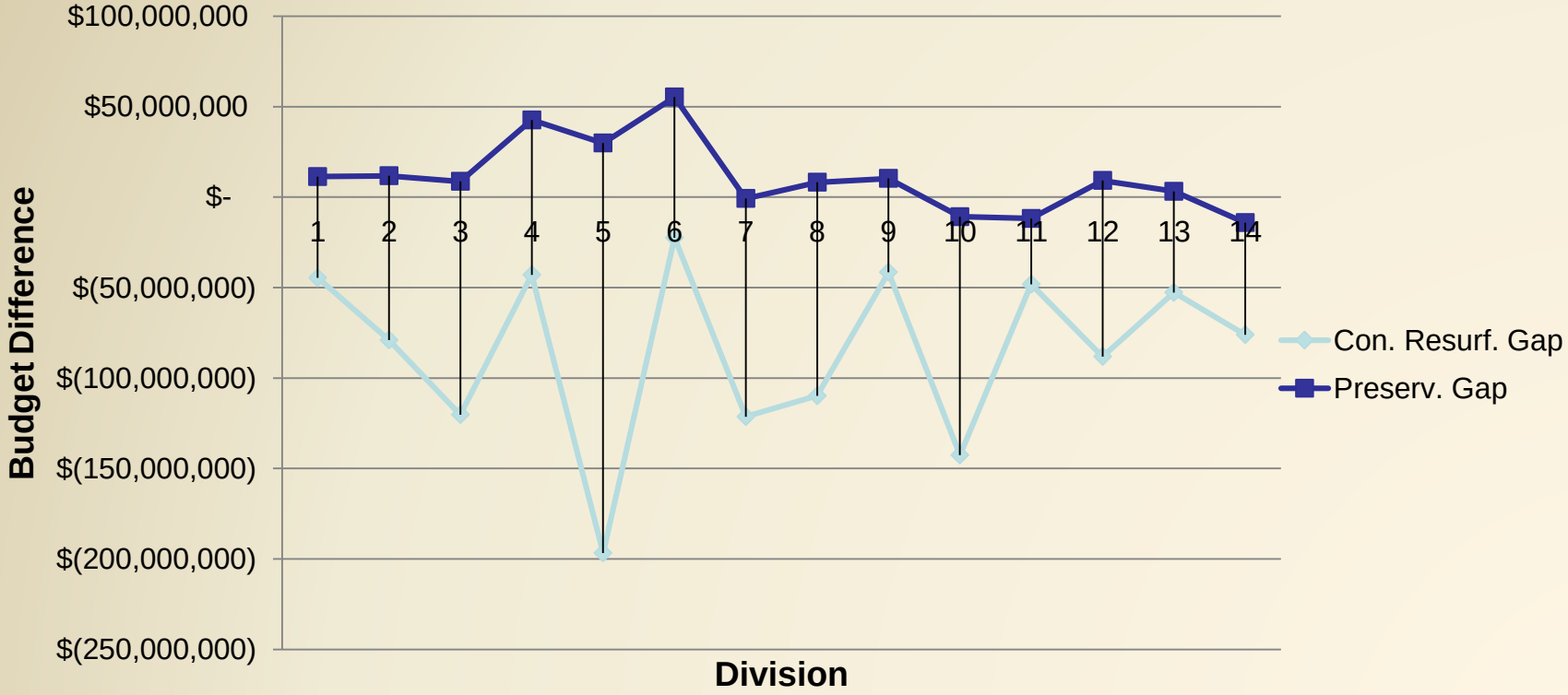
Division 10 Primary Preservation



Gap between Maintain LOS Budget and Current Budget (Primary)



Gap between Maintain LOS budget and Current Budget- Secondaries



We showed that the Divisions could close the gap by allocating funds differently… which they already have authority to do.

System level Life Cycle Cost Analysis is a challenge!

Subdivided our pavement system:

- Interstate 4 lanes Flexible
- Interstate 4 lanes Rigid
- Interstate 6 lanes Flexible
- Interstate 6 lanes Rigid
- Interstate 8 lanes Flexible
- Interstate 8 lanes Rigid

- Other NHS-US Routes high, medium and low traffic

Subdivisions (continued)

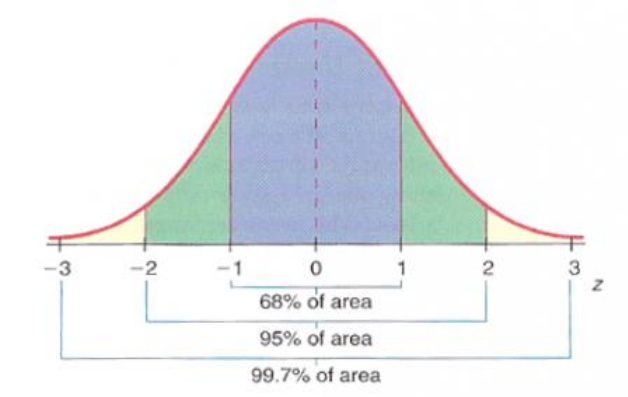
- NC Routes high, medium and low traffic
- Secondary high, medium and low traffic

The “breakpoints” for traffic coincide with the PMS decision trees.

For each subdivision, set up a series of treatments based on surveys of division personnel.

Medium Traffic Range Flexible Primary	
Year(estimate)	**Activity**
0	Initial construction
8.5	Crack seal
12.5	Overlay 1.5”
22	Mill and replace 1.5”
30	Crack seal
38	Mill and replace with intermediate course and overlay
44	Crack seal
49	Overlay 2”

Used surveys to determine distribution functions for treatment time of placement, time for which the treatment is effective, and treatment costs.



Used RealCost software from FHWA to analyze each subdivision for a one mile length of roadway.

Then multiplied by # of miles to get LCCA for that road category and traffic level.

Calculated for three treatment alternatives:

1. Do nothing from construction to reconstruction.
2. Intermittent treatments with preservation on regular basis.
3. Delayed treatments with increased cost due to patching.

Network Wide Results- both NHS and non NHS

LCCA Alternate	Total EAC (1000s $)
Do Nothing	3,597,020
Intermittent Treatments	2,373,850
Delayed Treatments	2,388,750

<u>One finding:</u> our field personnel had a very good understanding of treatment types and costs for flexible pavements, but had difficulty for rigid pavements.

Conclusions

1. PMS plays a vital role in developing the TAMP.
2. Has historically provided asset inventory and condition.
3. Can provide Gap Analysis to aid in identifying funding adjustments for the 10-year financial plan.
4. Provided breakdown of system and associated mileages for LCCA.
5. BMS also plays a parallel role for bridge assets.

Thank you for your attention!

Are there any questions?