

Financial Consequence-Based Pavement Management System (FCPMS)

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The Message

- You can significantly improve pavement condition at your organization without spending more money!
- NDOT fully implemented the “Financial Consequence Based Pavement Management System” that resulted in NDOT having some of the smoothest roads in the country, with no funding increase since 1992.



The Message

NDOT has some of the smoothest roads in the country!

2005 IRI Data	Good < 95	Fair 95 to 170	Poor > 170
NHS	95%	5%	0%
NHS and STP Total System	72%	25%	3%



Outline

- What is FCPMS?
- Why should we use it?
- Who should use it?
- How to implement?
- What are the benefits?



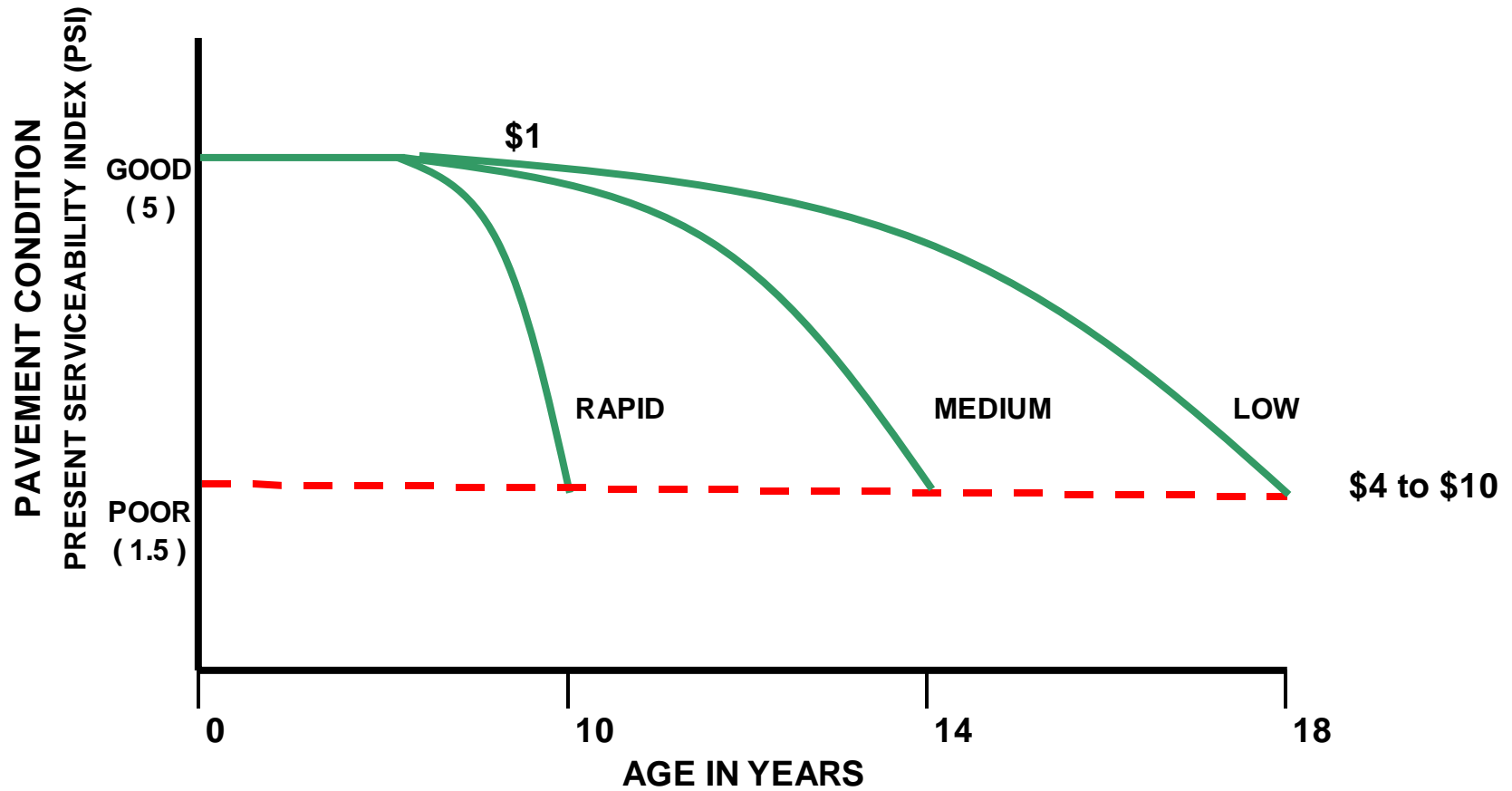
What is it?

Optimizing to the lowest life-cycle
cost

rather than

~~Pavement Condition~~

Pavement Rate of Deterioration





Why should we use it?

- Same level of \$\$\$ funding
- Better roads!!!
- Easy to get management support



Who should use it?

All public agencies who are faced with
doing more with less \$\$\$



How to implement? (7-Step Process)

①

Get support of administration, districts, and engineers.

②

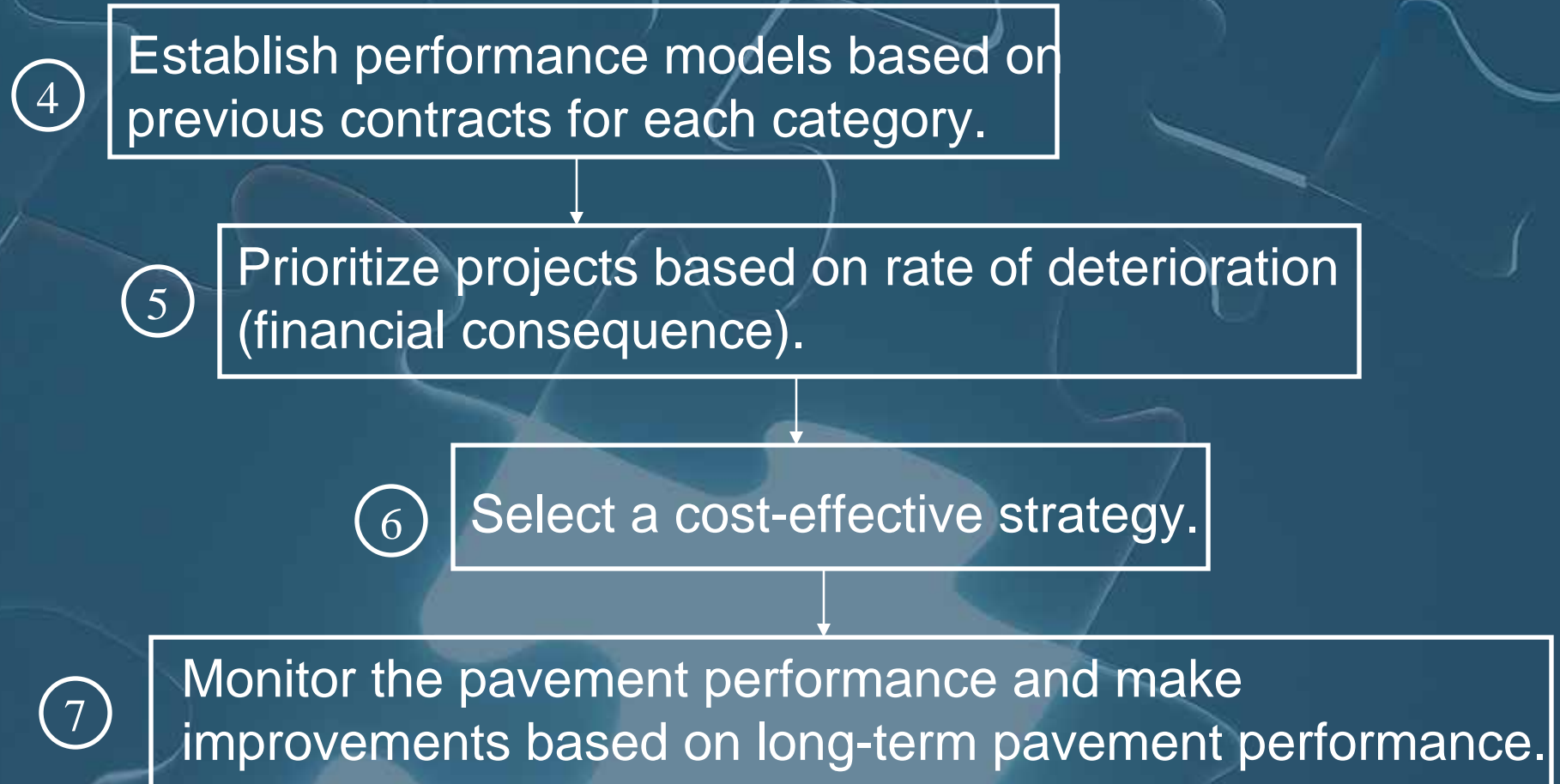
Develop an inventory of the entire system (route, traffic, date of last contract, and type of strategy).

③

Divide the system into five categories based on ADT and ESALs.



How to implement?





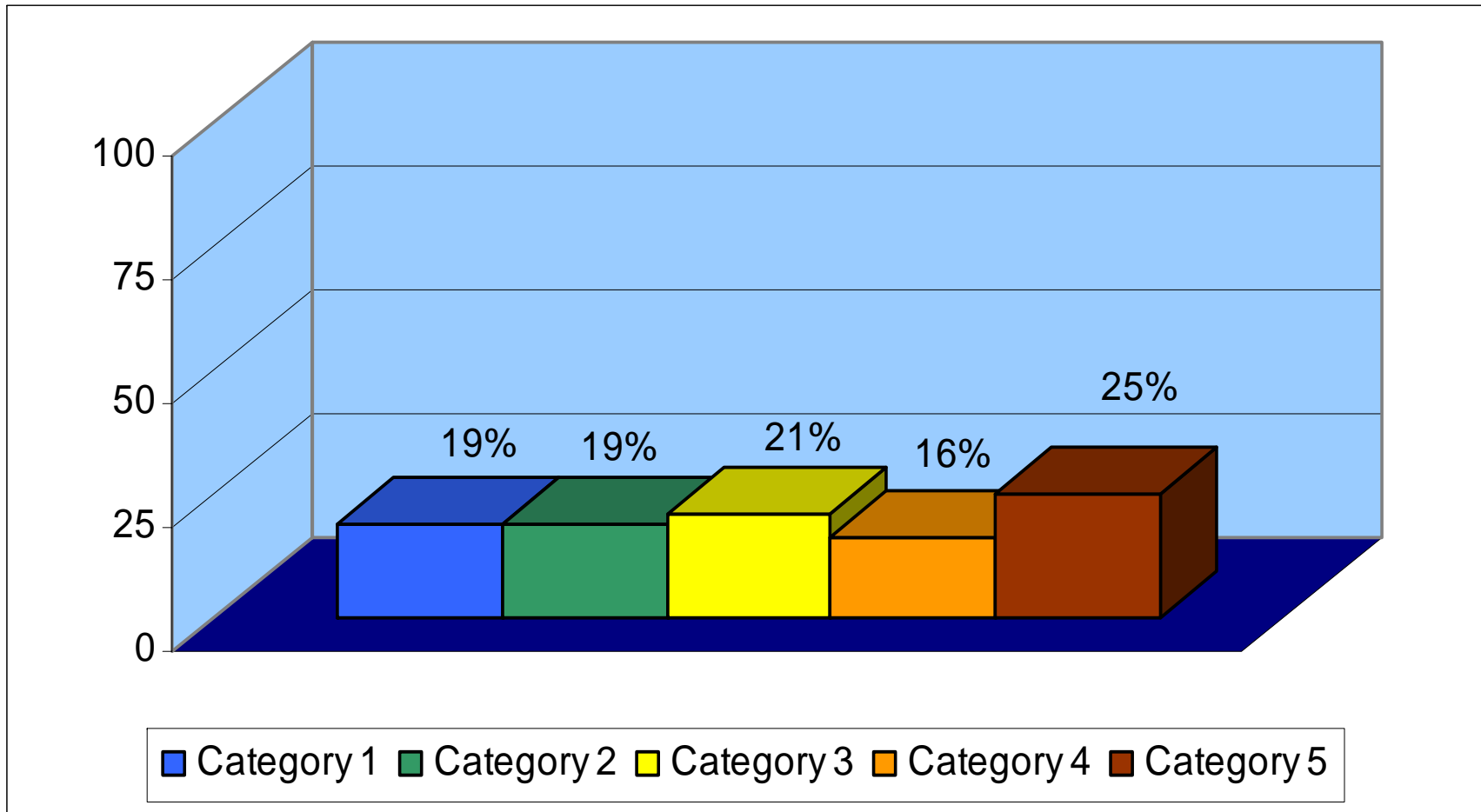
① Get Administrative Support

- It's easy since more \$\$\$\$ is not needed.
- Can improve the entire system over 5 years
 - Year 1) 20% funding on proactive projects
 - Year 2) 40% funding on proactive projects
 - Year 3) 60% funding on proactive projects
 - Year 4) 80% funding on proactive projects
 - Year 5) 100% funding on proactive projects

② Develop an Inventory of the Entire System

Contracts Ordered By Route, County Sequence, From Cum Mile, Last Contract, Award Date, Category, Funky Class									
Route	County	From Cum Mile	To Cum Mile	Project Description	Contract	Award OR EA Date	Repair	Category	Funky Class
SR028	DO	0.00	1.23	From US050 at Spooners to the DO/CC County Line	73237	1/2/2007	3" coldmill, 3" PBS with OG	3	6
SR028	CC	0.00	3.95	From the DO/CC County Line to the CC/WA County Line	73237	1/2/2007	3" coldmill, 3" PBS with OG	3	16
SR028	WA	0.00	4.98	From the CC/WA County Line to East Lakeshore Blvd, also a functional class break	73237	1/2/2007	3" coldmill, 3" PBS with OG	3	6
SR028	WA	4.98	7.96	From East Lakeshore Blvd, also a functional class break, to 2.98 miles North	73105	1/2/2006	3" coldmill, 3" PBS with OG	3	16
SR028	WA	7.96	11.00	From 2.98 miles North of East Lakeshore Blvd to the NV/CA State line	73271	1/2/2006	3" coldmill, 3" PBS with 1" OG	2	16
SR088	DO	0.00	2.31	From the CA/NV State line to 2.31 miles North, the South Urban Limits of Gardnerville	3221	6/30/2004	1" coldmill, 2.5" PBS with OG	3	6
SR088	DO	2.31	4.37	From 2.31 miles North of the CA/NV Stateline to Centerville Lane	3221	6/30/2004	1" coldmill, 2.5" PBS with OG	3	14
SR088	DO	4.37	7.30	From Centerville Lane to Mackland Drive	3221	6/30/2004	2" coldmill, 2.5" PBS with OG	3	14
SR088	DO	7.30	7.87	From Mackland Drive to US395	3027	6/5/2000	4" coldmill, 4" PBS with OG	2	14
SR115	CH	0.00	4.82	Harrigan Road, from Berney Road to Stillwater Road	2447	6/17/1991	2" PBS with chip seal	4	17
SR116	CH	0.00	5.90	Stillwater Road, from the junction with US050 to 0.30 miles East of Hicks Road	2170	10/23/1986	8" RBM, 3" PBS with chip seal	3	7
SR116	CH	5.90	8.97	Stillwater Road, from 0.30 miles East of Hicks Road to 3.37 miles East of Hicks Road	2170	10/23/1986	8" RBM, 3" PBS with chip seal	4	7
SR116	CH	8.97	10.49	From 3.37 miles East of Hicks Road to Stillwater	2170	10/23/1986	8" RBM, 3" PBS with chip seal	5B	7

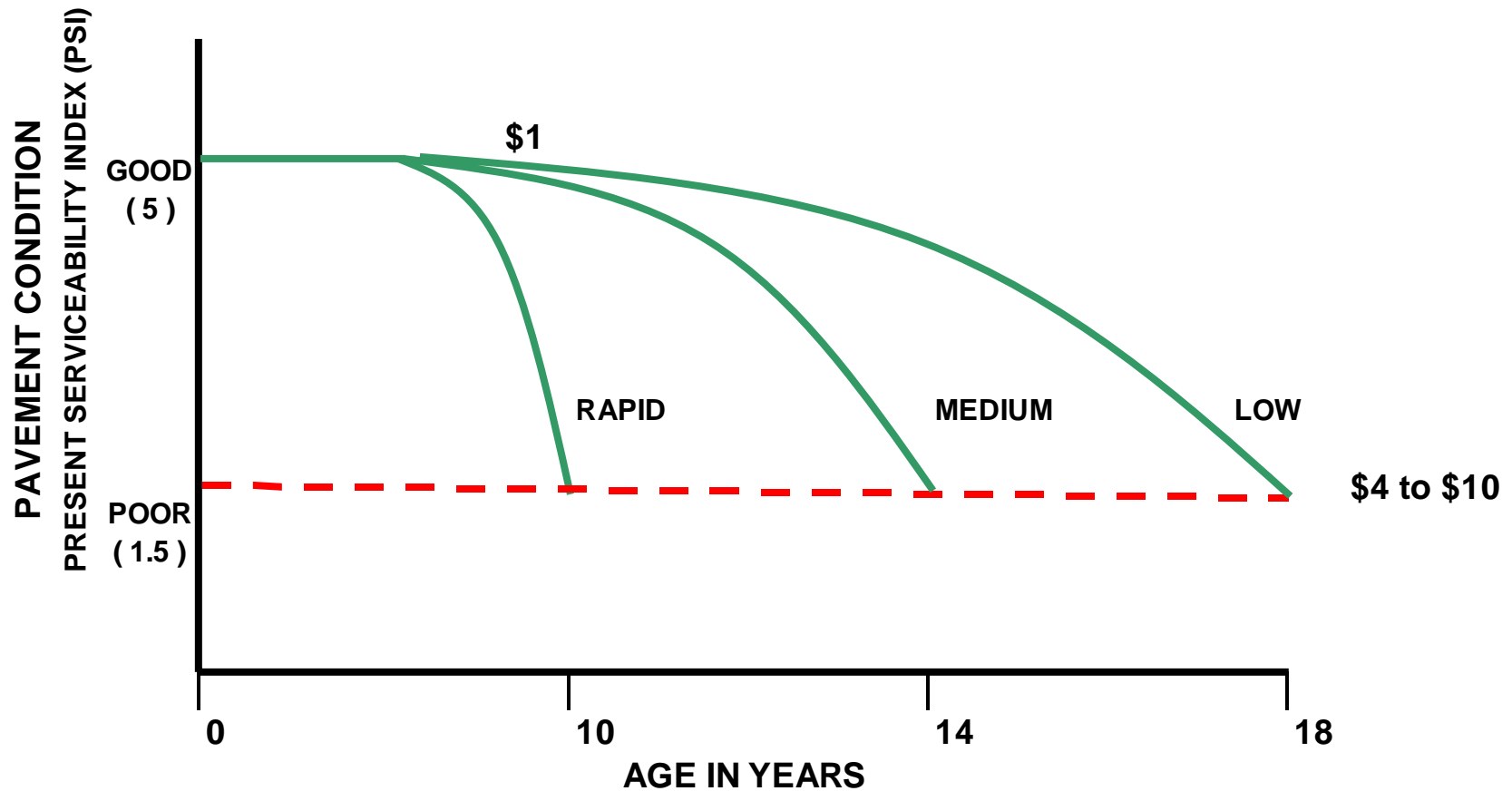
③ Divide the System into Five Categories



④ Establish Frequency of Pavement Rehabilitation

Prioritization Category	Two Directional Traffic	Frequency of Rehabilitation In Years	Percentage of the System	Reactive Cost Per Year	Proactive Cost Per Year	Difference in Cost
1	CONTROLLED ACCESS asphalt concrete	8 18	19	\$50M	\$30M	\$20M
2	ESAL > 540 OR ADT > 10,000	10	19	\$42M	\$37M	\$5M
3	540 >= ESAL >405 OR 1600 < ADT <= 10,000 + NHS	12	21	\$30M	\$17M	\$13M
4	405 >= ESAL > 270 OR 400 < ADT <= 1600	15	15	\$14M	\$10M	\$4M
5A	280 < ADT <=400	20	6	\$5M	\$5M	\$0M
5B	120 < ADT <= 280	20	10			
5C	ADT <= 120	20	9			
TOTAL				\$141M	\$99M	\$42M

⑤ Prioritize Projects Based on Rate of Deterioration





*Example

Route Name	Pavement Condition	Rate of Deterioration	Cost of Rehabilitation Today	Cost of Rehabilitation in 2-years	Priority Ranking
I-80	Fair	Rapid	\$10M	\$40M	#1
US-95	Poor	Moderate	\$10M	\$15M	#2
SR-552	Very Poor	Slow	\$10M	\$12M	#3

* When safety is not a major concern.



Select Strategies Based on Life-Cycle Cost!

6

- Life-Cycle cost does not mean complete reconstruction!! (different options including reconstruction should be evaluated)



Need Enough Tools in the Tool Box!

- Cold in Place Recycling
- Hot in Place Recycling
- Full Depth Reclamation
- Crack and Seat of Concrete Pavement
- Rubblization of concrete pavement
- Chip Seal
- Flush Seal
- Microsurfacing
- Slurry Seal

Cold In Place Recycle Train





Recycle Plantmix





Micro Surfacing





⑦ Monitor Performance

- Monitor the pavement performance and make improvements based on long-term pavement performance.



Conclusions

- Better roads with less \$\$\$ in a very short time
- Easy to get administration support and easy to understand
- Consequences of reactive decisions can easily be quantified
- Improve public perception, reduce user cost, and decrease construction time



Financial Consequence Based PMS





Questions?

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