



# 9th International Conference on **MANAGING PAVEMENT ASSETS (ICMPA9)**

## **USE OF VDOT'S PAVEMENT MANAGEMENT SYSTEM TO PROACTIVELY PLAN AND MONITOR PAVEMENT MAINTENANCE AND REHABILITATION ACTIVITIES TO MEET THE AGENCY'S PERFORMANCE TARGET**

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# Outline

- **Introduction**
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- **Methodology**
  - **Performance Targets/Paving Targets**
  - **Project Tracking**
  - **2013 Performance Monitoring Process**
- **Results**
- **Conclusions**
- **Sample Reports**

# INTRODUCTION

# Introduction

- **Maintenance of a pavement network requires well planned maintenance and rehabilitation (M&R) activities**
- **Pavement management systems recommend M&R activities, but detailed project-level analysis is needed to supplement these recommendations**
- **A performance monitoring process is needed to track the selections made in the field against the recommendations**

# BACKGROUND

# Background

- **VDOT consists of nine maintenance districts and a central office.**
- **The central office is responsible for storing the pavement condition data and provides analysis and reports.**
- **Each maintenance district is responsible for developing and planning the M&R activities within that district as long as recording paving.**
- **VDOT maintains approximately 127,000 lane miles on the Interstate, Primary and Secondary Networks.**
- **100 % of Interstate and Primary, 20% of Secondary pavement condition data is collected each year.**

# Background

- **VDOT tracks the Critical Condition Index (CCI) on its pavements**
- **The CCI is based on the lower of two calculated ratings– LDR and NDR (asphalt):**
  - **LDR- Load-related Distress Rating**
  - **NDR- Non-load-related Distress Rating**
- **LDR and NDR both follow the PCI procedure developed by the Army Corps of Engineers; rated on a scale of 0 (worst condition) to 100 (best condition)**
- **A “sufficient” pavement has a CCI  $\geq$  60**

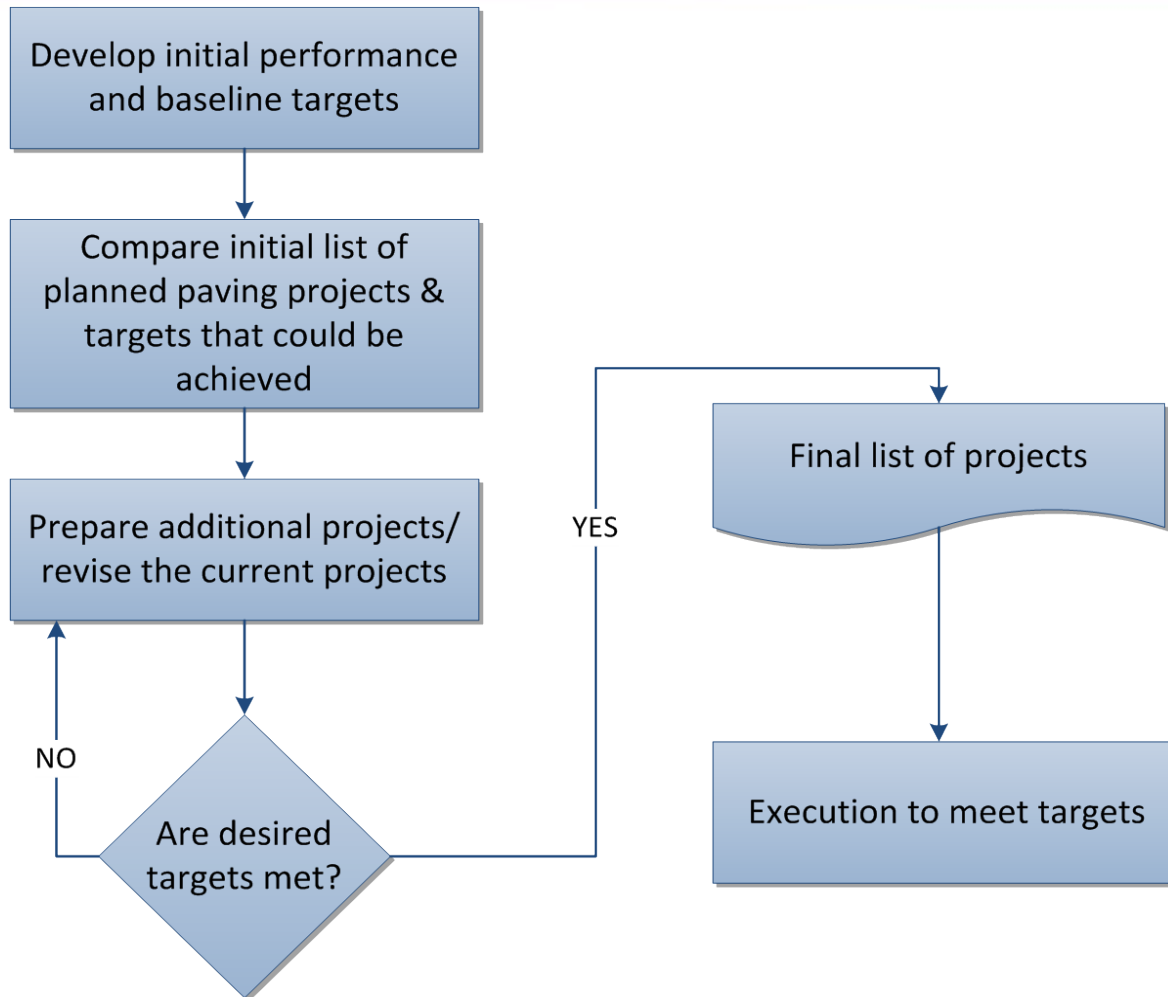
# Background

- **VDOT has a pavement program strategy identified for interstate, primary, and secondary systems**
  - **Interstate pavements are to maintain a sufficiency  $\geq 82\%$  with no management section rated with CCI  $\leq 30$**
  - **Primary pavements are to maintain a sufficiency  $\geq 82\%$**
  - **Secondary pavements are to maintain a sufficiency  $\geq 65\%$**



# METHODOLOGY

# Methodology



# Examples of Maintenance Activities

## Preventive Maintenance (PM)

- **Minor Patching**
  - <5% pavement area
  - Depth  $\leq 2''$
- **Surface Treatment**
  - Chip seal, slurry seal, latex, THMACO
  - Thin overlays up to 1''

## Corrective Maintenance (CM)

- **Moderate Patching**
  - <10% pavement area
  - Depth up to 6''
- **Partial depth patching and thin ( $\leq 2''$ ) overlay**
- **$\leq 2''$  milling and  $\leq 2''$  overlay**

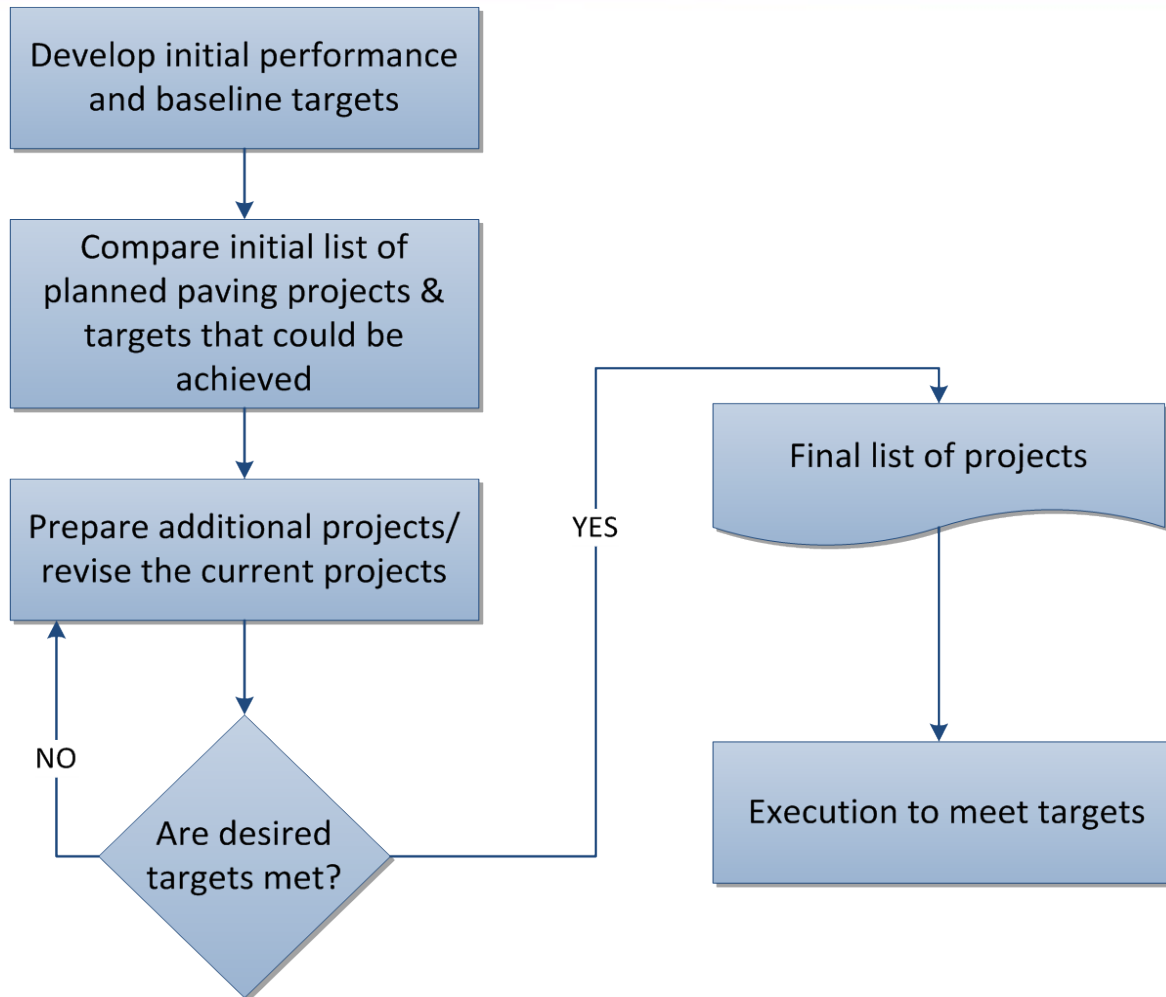
## Restorative Maintenance (RM)

- **Heavy Patching**
  - <20% of pavement area
  - Depth up to 9''
- **Full depth patching and up to 4'' overlay**
- **Milling and up to 4'' overlay**

## Reconstruction (RC)

- **Mill, break and seat and thick overlay**
- **Reconstruction**
- **Full Depth Reclamation**

# Methodology



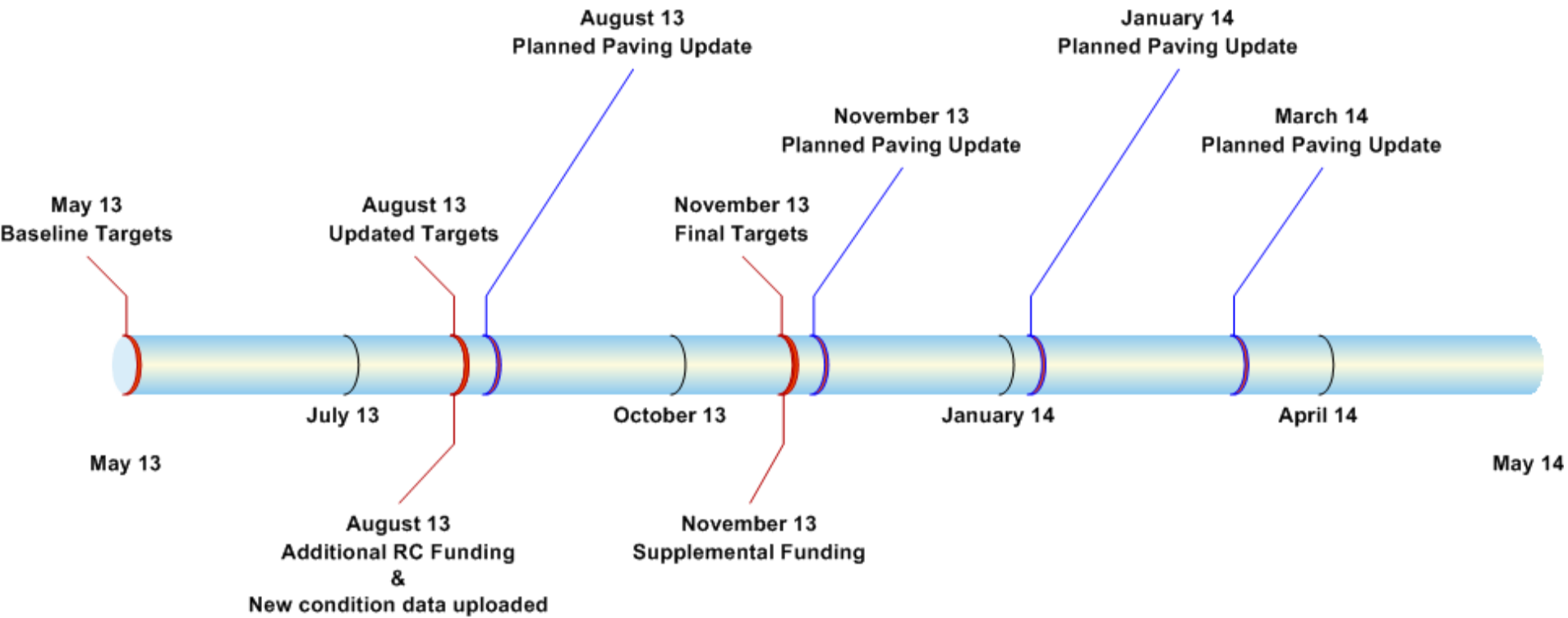
# 2013 Performance Monitoring

- **May 2013:**
  - **Initial baseline targets were published. This allowed the districts to start planning for the next year's paving.**
- **Aug 2013:**
  - **Targets were re-run with new condition data.**
  - **Influx in funding for RC projects on the interstate.**
  - **Drastic increase in RC lane miles for the August target.**
  - **Districts planned work in August 2013 based on the initial targets published in May, plus extra work based on the reconstruction funding that was made available.**

# 2013 Performance Monitoring

- **Nov 2013:**
  - **Further funding was available and the targets were rerun.**
  - **Districts responded to the changes in targets and funding by adjusting their planned lane miles accordingly.**
- **Jan/Feb 2014:**
  - **Both the targets and the work planned by the districts remained stable.**
  - **Districts finalized their planned paving for the 2014 construction season.**

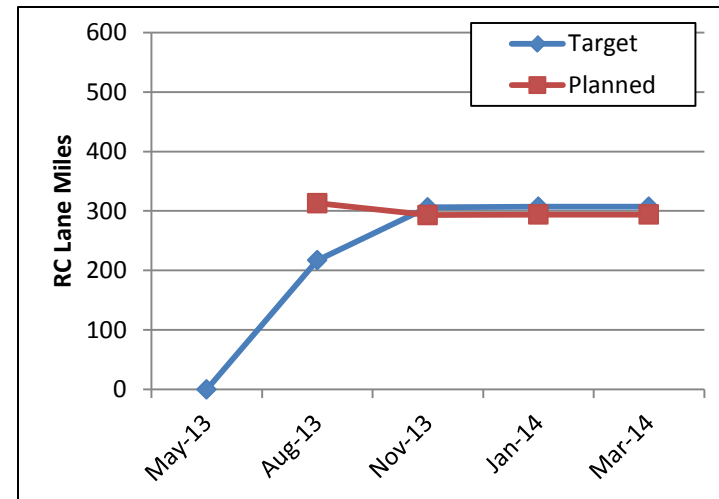
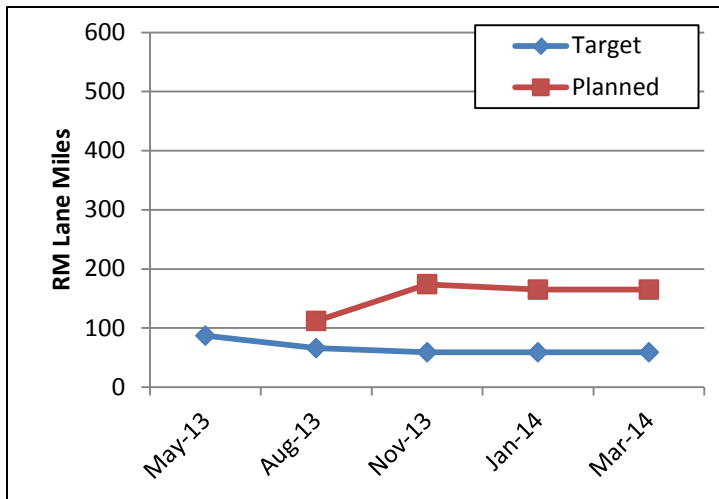
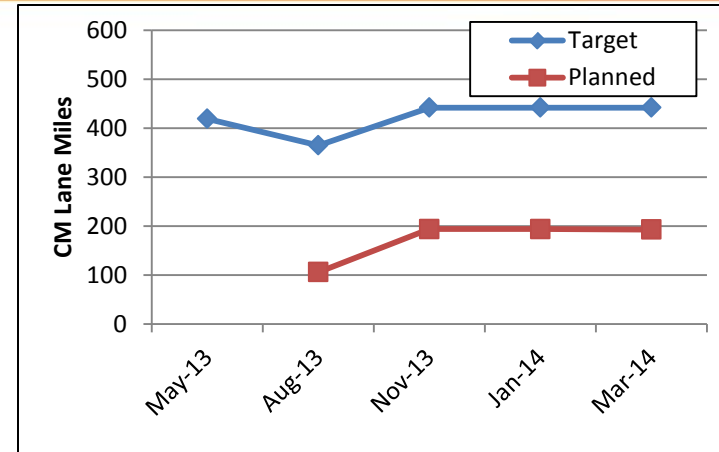
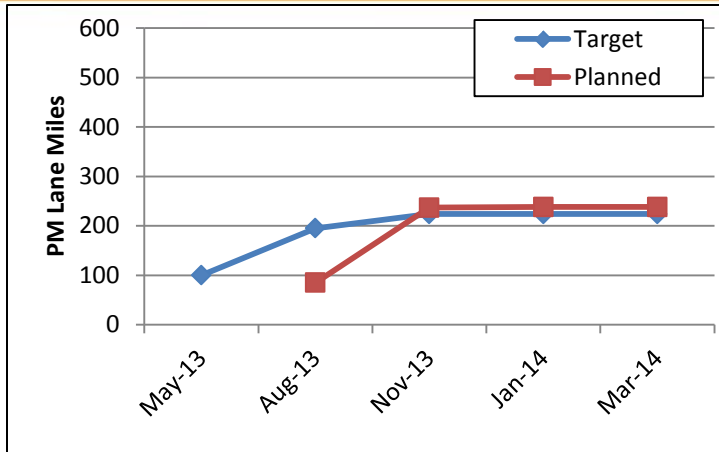
# Timeline



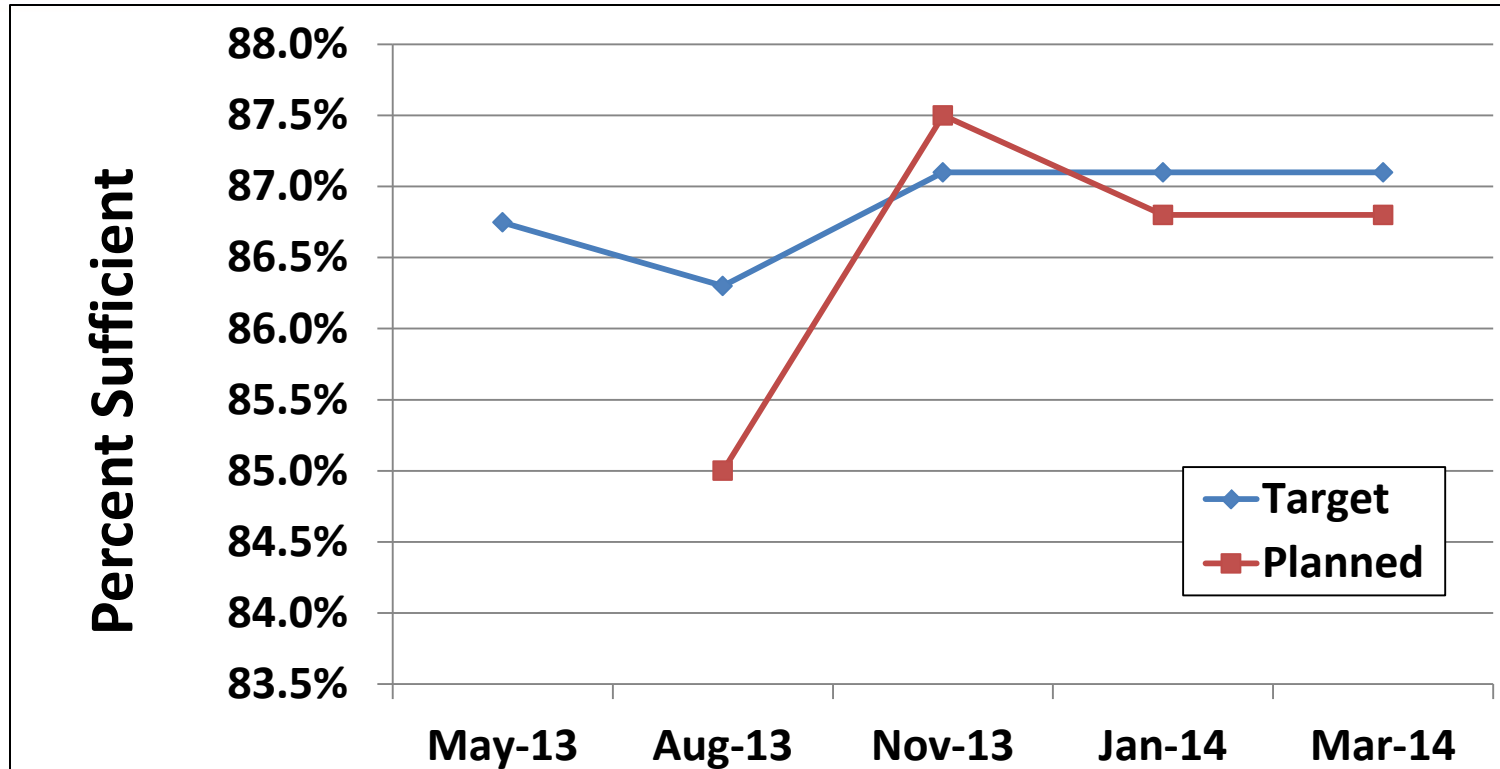
# RESULTS



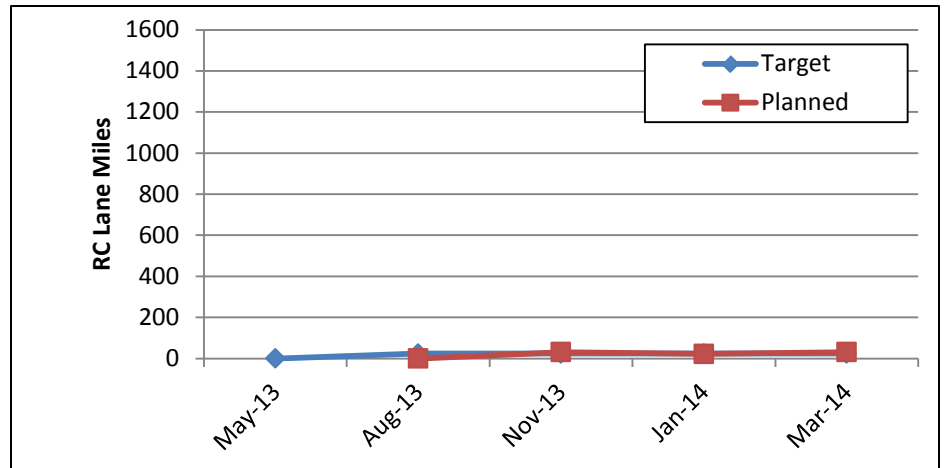
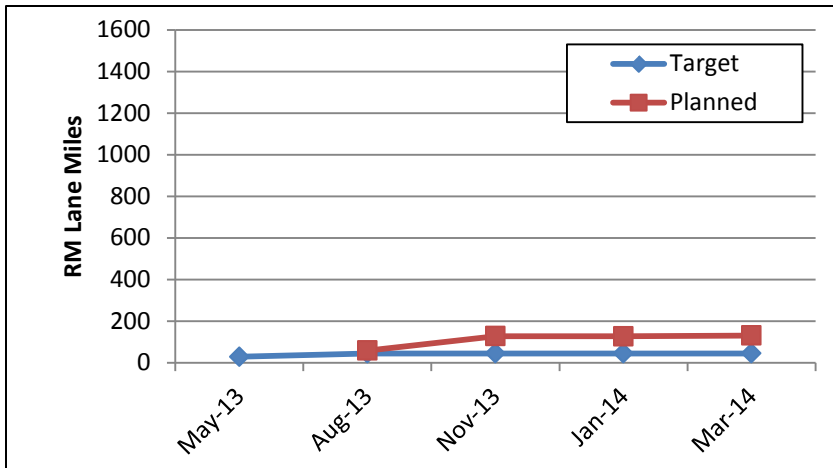
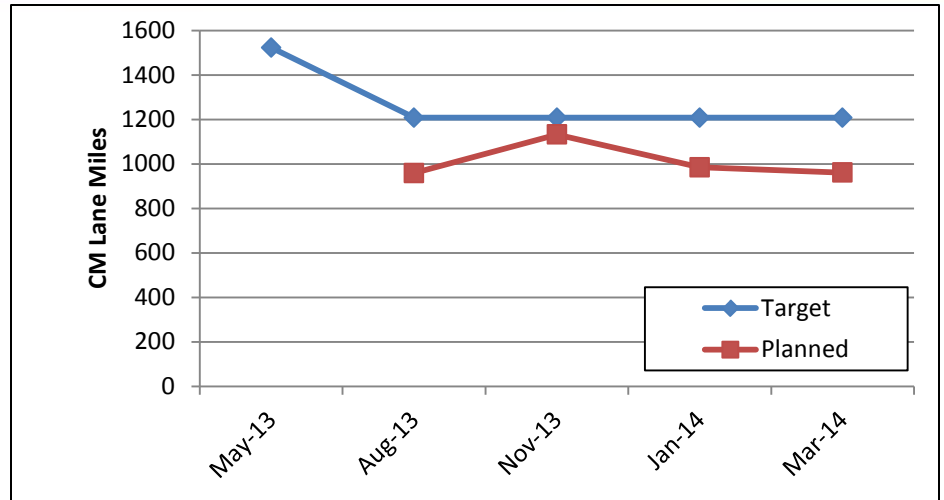
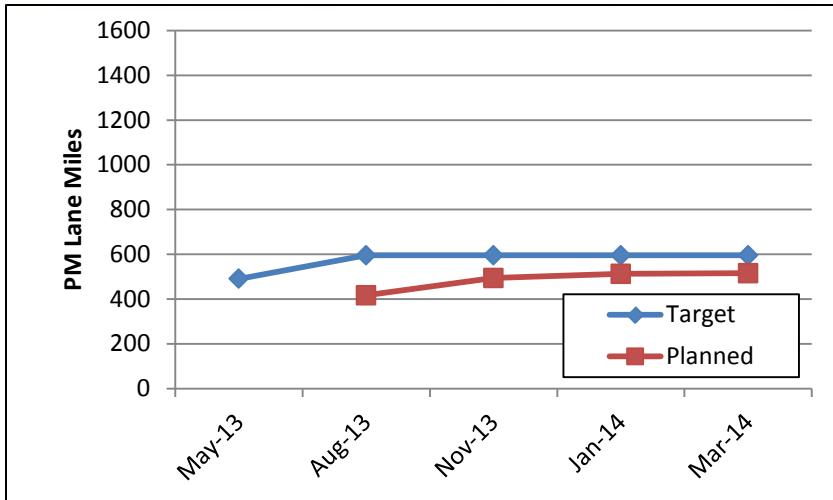
# Results- Interstate



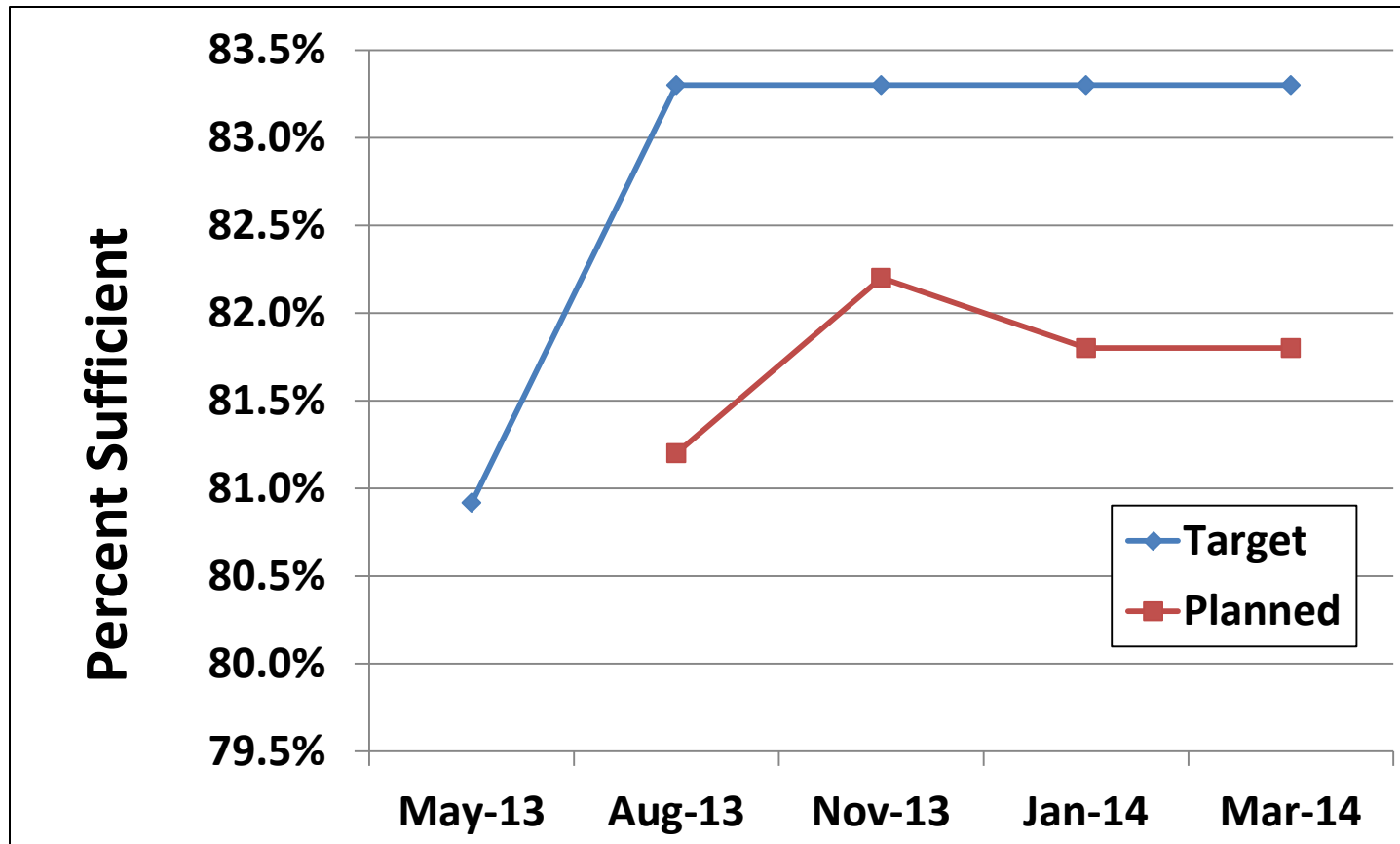
# Results- Interstate



# Results- Primary



# Results- Primary



# Results

- **The formal performance monitoring process introduced a level of accountability regarding expectations based on funding levels**
- **Districts had to incorporate a “mix of fixes” to meet the targets set through the performance monitoring process**
- **M&R plans progressively improved toward meeting the defined network goals.**

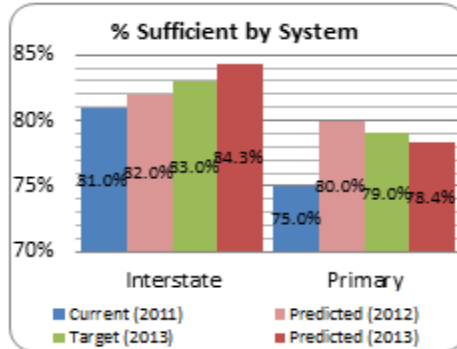
# CONCLUSIONS

# Conclusions

- **Performance monitoring reports provide guidance for the selection of treatments for the future paving season.**
- **The reporting intervals vary from as long as a quarter year in the initial stages, to once a month at the later stages of treatment plan development.**
- **Results presented here show that the M&R plans allow for course correction to progressively improve toward meeting the defined network goals.**
- **Establishment of a performance monitoring process has helped to ensure that the network level objectives are met with respect to the maintenance of the roadway network.**

# Sample Report

## Hampton Roads District – 2013 Predicted Performance



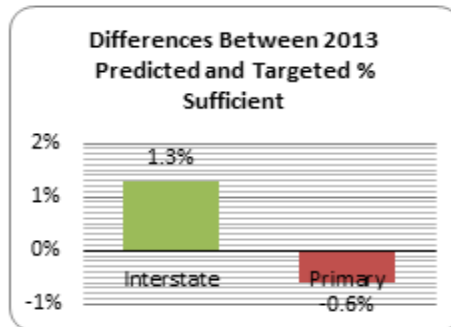
### Hampton Roads Condition Summary

#### *Interstate System*

Current (2011) % Sufficient:	81.0%
Predicted (2012) % Sufficient:	82.0%
Targeted (2013) % Sufficient:	83.0%
Predicted (2013) % Sufficient:	84.3%

#### *Primary System*

Current (2011) % Sufficient:	75.0%
Predicted (2012) % Sufficient:	80.0%
Targeted (2013) % Sufficient:	79.0%
Predicted (2013) % Sufficient:	78.4%



### Hampton Roads Predicted vs. Targeted % Sufficient in 2013

#### *Interstate System*

2013 Predicted % Sufficient:	84.3%
2013 Targeted % Sufficient:	83.0%
Difference:	+1.3%

#### *Primary System*

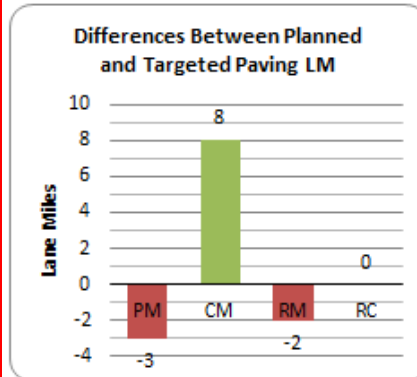
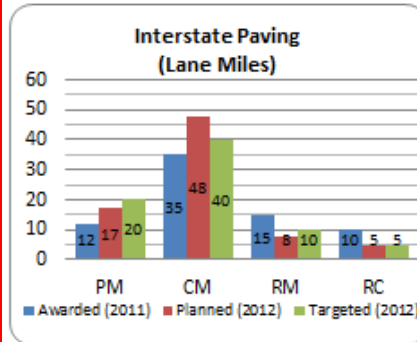
2013 Predicted % Sufficient:	78.4%
2013 Targeted % Sufficient:	79.0%
Difference:	-0.6%

Given initial pavement conditions, expected deterioration and planned paving, Hampton Roads District **is** predicted to achieve its 2013 performance target of 83.0% of Interstate network in Sufficient Condition and **is not** predicted to achieve its 2013 performance target of 79.0% of Primary network in Sufficient Condition.



# Sample Report

## Hampton Roads District – 2012 Interstate Planned Paving



### Hampton Roads Interstate Paving Summary

#### Preventative Maintenance (PM)

2011 Awarded (PMSS):	16 LM
2012 Planned (PMSS):	17 LM
2012 Targeted (PMS Optimized):	20 LM
Difference (Planned – Targeted):	-3 LM

#### Corrective Maintenance (CM)

2011 Awarded (PMSS):	35 LM
2012 Planned (PMSS):	48 LM
2012 Targeted (PMS Optimized):	40 LM
Difference (Planned – Targeted):	+8 LM

#### Restorative Maintenance (RM)

2011 Awarded (PMSS):	15 LM
2012 Planned (PMSS):	8 LM
2012 Targeted (PMS Optimized):	10 LM
Difference (Planned – Targeted):	-2 LM

#### Reconstruction / Major Rehab (RC)

2011 Awarded (PMSS):	10 LM
2012 Planned (PMSS):	7 LM
2012 Targeted (PMS Optimized):	7 LM
Difference (Planned – Targeted):	0 LM

Given planned 2012 Interstate paving, Hampton Roads District:

- **Is not** predicted to achieve its 20 lane mile paving target for Preventative Maintenance on the Interstate system.
- **Is** predicted to achieve its 40 lane mile paving target for Corrective Maintenance on the Interstate system.
- **Is not** predicted to achieve its 10 lane mile paving target for Restorative Maintenance on the Interstate system.
- **Is** predicted to achieve its 7 lane mile paving target for Reconstruction / Major Rehabilitation on the Interstate system.

# Questions?