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# Part-Time Shoulder Use Overview

## Decision Process for Dynamic Part-Time Shoulder Use

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# Active Traffic Management Strategies



- **Dynamic lane use/shoulder control:** The dynamic opening of a shoulder lane to traffic or dynamic closure of travel lanes on a temporary basis in response to increasing congestion or incidents.
- **Dynamic speed limits:** The dynamic change in speed limits based on road, traffic, and weather conditions.
- **Queue warning:** The dynamic display of warning signs to alert drivers that congestion and queues are ahead.
- **Adaptive ramp metering:** The dynamic adjustment of traffic signals at ramp entrances to proactively manage vehicle flow from local-access roads.
- **Dynamic rerouting:** The dynamic provision of alternate route information in response to increasing congestion at bottlenecks/incidents.
- **Dynamic junction control:** The provision of lane access based on highway traffic present and merging/diverging traffic to give priority to the facility higher volume to minimize the impact of the merging/diverging movement.
- **Adaptive traffic signal control:** The optimization of signal timing plans based on prevailing conditions to increase throughput along an arterial.

# What is Part-Time Shoulder Use?



- Various names:
  - Shoulder running.
  - Hard shoulder running.
  - Temporary shoulder use.
  - Part-time shoulder use.
- Same meaning: Use of the left or right shoulders of an existing roadway for travel during certain hours of the day.
  - TSMO strategy for addressing congestion and reliability issues
  - Preserves shoulder as shoulder during most hours of day

# When to Consider Part-Time Shoulder Use?



- If significant widening of the roadway is not practical due to various constraints (right-of-way, environmental, etc.).
- One strategy for increasing freeway capacity is to add a travel lane within the existing roadway footprint by reducing the widths of the existing lanes and/or allowing traffic on the shoulders.
- The additional lane may be utilized by:
  - All traffic at all times, or
  - Only specific types of vehicles during selected times of the day and/or when congestion warrants (e.g., temporary shoulder use).



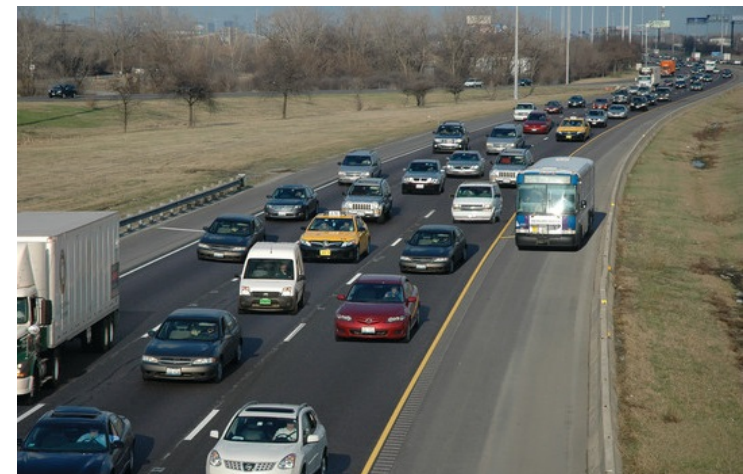
# Why Part-Time Shoulder Use?



- It adds capacity only when needed.
- It keeps the shoulder intact for most hours of the day.
- Do what is physically and financially possible.
  - Support decisions with analysis.
- A decision to use the shoulder part-time may defer major and costly widening.



Source: Minnesota DOT



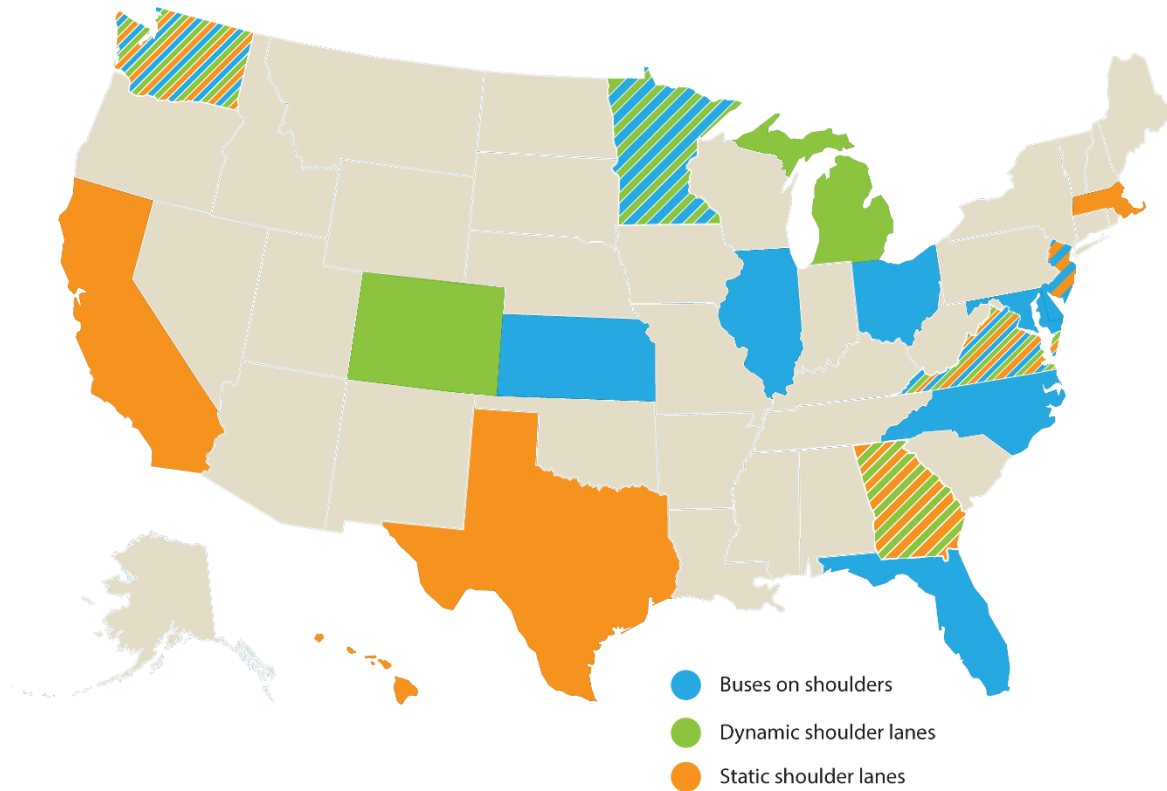
Source: Pace Bus

# Types of Part-Time Shoulder Use



- Static shoulder use – open to passenger vehicles during predetermined hours of operation.
- Dynamic shoulder use – open to passenger vehicles based on need and real-time conditions.
- Bus-on-Shoulder (BOS) – open only to buses, usually at driver's discretion.
- Shoulder use typically implemented on freeways, but can be applied to arterials.

# Where is Part-Time Shoulder Use?



Source: FHWA

There are many international applications as well.

# Some Early Screening Questions



## Preliminary Engineering

- Is shoulder width adequate, or can it be widened?
- Are vertical clearances adequate?
- Is the shoulder pavement structural capacity adequate in terms of drainage and rideability?
- Is it feasible to provide supplemental emergency turn-out or refuge areas beyond the shoulder at reasonable intervals?
- Is a sufficiently long segment available, or is an acute bottleneck being relieved?

## Operations Concepts

- Should the right or left shoulder be used?
- What vehicles will the shoulder be open to?
- If the shoulder is open to more than buses, should it be static (fixed hours of operation) use dynamic use
- Will there be speed restrictions?
- Use in conjunction with other operational strategies?



# Bus On Shoulder (BOS) in Minneapolis-St. Paul



Source: Metro Transit

# Left-Shoulder Bus on Shoulder (BOS) in Chicago



Source: Pace Bus

# Static Shoulder Use – US 2 in Washington State



Source: © 2015 Google ®



# Static Shoulder Use – I-66 in Virginia



Source: Virginia DOT

- Made Dynamic in 2015
- Dynamic signs over shoulder, but fixed hours of operation.

# Dynamic Shoulder Use – I-66 in Virginia



Source: Virginia DOT



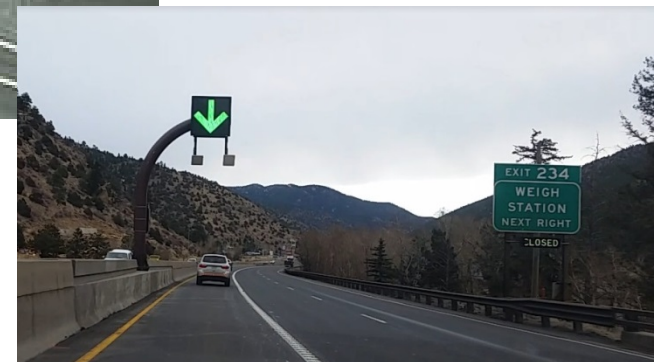
Source: Kittelson & Associates, Inc



# Shoulder Use on I-70 Mountain Express Lane, Colorado



Source: Colorado DOT



Source: Colorado DOT

# I-70 Project Background



- Environmentally sensitive location: canyon, creek, scenic vistas, limited options for widening.
- Congestion comes from recreational use, primarily winter and summer weekend days and holidays.
- Moderate to low volumes other times.

## Solution

- Part-time shoulder lane, dynamic operations, limited number of days per year.
- Tolled to manage demand and recover expenses.
- Significant travel time reductions for managed lane and GP lanes.
- Reliable travel times for the managed lane.

# Dynamic Shoulder Use: I—35W in Minneapolis



Source: Minnesota DOT

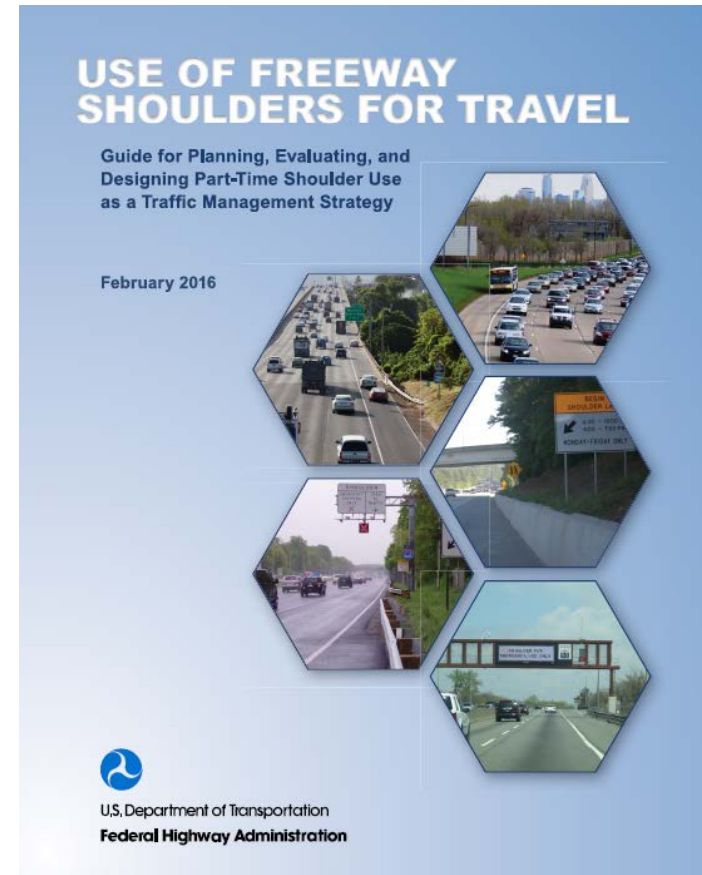
Part of Managed Lane (HOT) operation

# A New Resource



- There is a new resource to assist State DOT's considering part time shoulder use.
- It is a guide, not a standard, directive or policy.
- It is consistent with other FHWA initiatives.
  - PBPD
  - TSMO and Active Traffic Management

Source: FHWA



<http://www.ops.fhwa.dot.gov/publications/fhwahop15023/index.htm>

# Objectives of the Shoulder Guide



- The purpose of this guide is to provide guidance for planning, designing, implementing, and operating part-time shoulder use.
- It provides guidance on factors that need to be considered in:
  - Deciding through a comprehensive Performance-Based Practical Design(PBPD) process if the part-time use of the shoulder is a viable alternative for meeting the current and projected goals of the region.
  - Determining the impacts and feasibility of implementing part-time shoulder use.
  - Designing and operating part-time shoulder use to optimize safety and lane utilization.



# What the Guide Is Not



- This guidance does **NOT** address:
  - The “part-time” use of a shoulder in work zones during construction.
  - Permanent, fulltime “conversion” of a shoulder into a travel lane.
  - Pedestrian and bicycle considerations because it is focused on freeway applications.
- This guide presents only limited arterial-specific considerations.

# Target Audience of the Guide

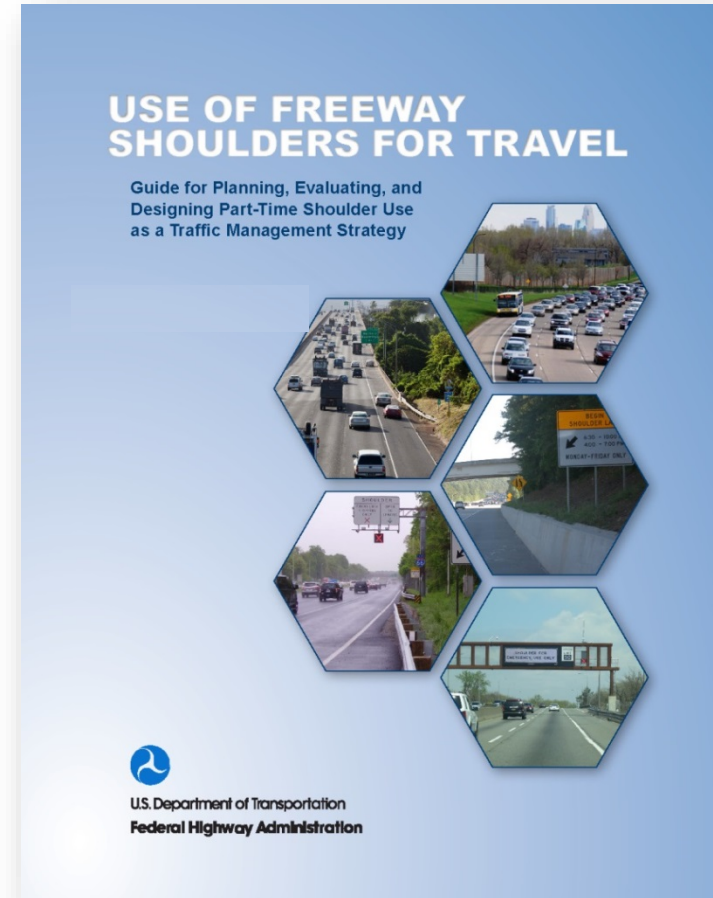


- The target audience for this guide consists of planners and designers at:
  - State Departments of Transportation (DOT)
  - Toll agencies
  - Metropolitan Planning Organizations (MPOs)

# Questions and Comments



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