

Chapter 1

FHWA Guidance & Policies Traffic Analysis Microsimulation as a Design Tool

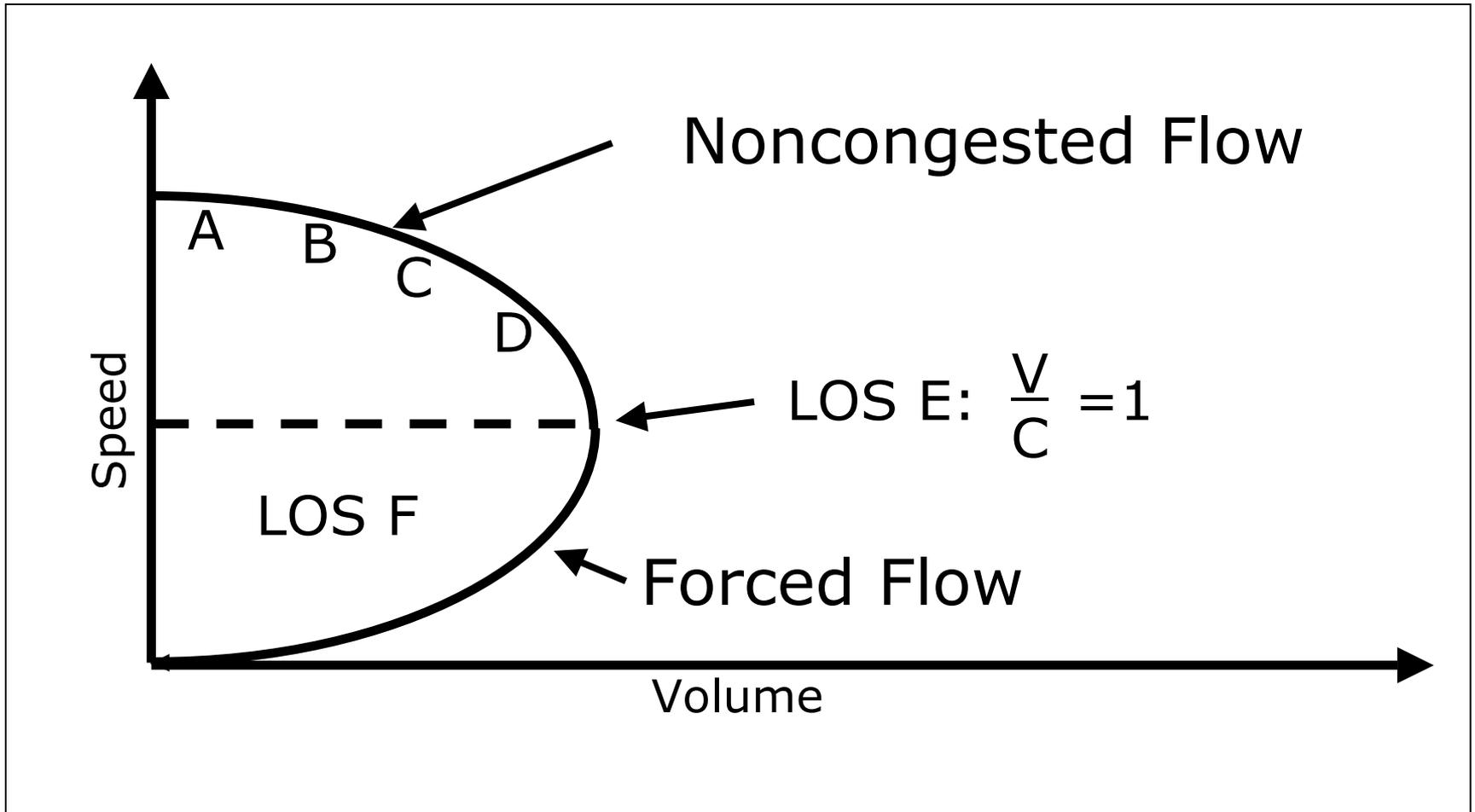


James P. McCarthy
Federal Highway Administration
James.mccarthy@fhwa.dot.gov
651-291-6112

Traffic Analysis in Design?

- Estimate or Predict Traffic Performance For a Design
- Assess Capacity and Level of Service of a Transportation Facility

What's the Problem?



What is FHWA Policy

- Does FHWA Require Microsimulation
- FHWA Does Require That the Project Development Process and Design is Built on Good Traffic Engineering
- If Microsimulation is Needed FHWA Will Not be Able to Approve Projects Such as Interstate Access Without It.

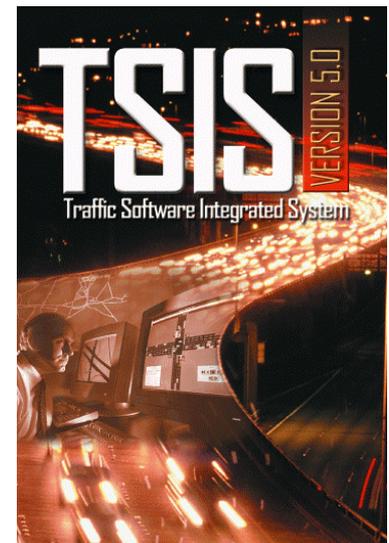
Consequences of Inappropriate Analysis Methods

- Unrealistic Results
- Incorrect Estimates of Traffic Performance
- Inappropriate Design of Control Strategies
- Wasted Resources
- Adverse Public Reaction to Changes



Microsimulation Features

- Analysis of a System
- Analysis of Over-Saturated Conditions
 - Spillback
 - Spillover
 - Bottlenecks
 - Weaves



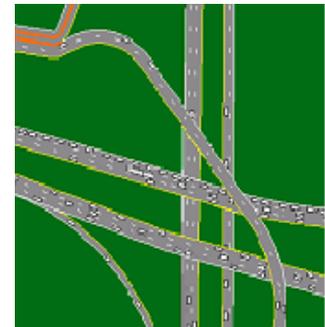
Spillover Effects



**Excessive Left-Turn Queue
Blocks Through Lane**

Advantages of Simulation

- Perform “System Analysis”
- Current and Alternative Conditions
 - Analyze Many “What-If” Scenarios
- Experiment Without Actual Traffic Disruption



Advantages of Simulation

- Eliminate Costly Mistakes and Inadequate Project Designs
- Implement Projects in Best Order
- Make Effective Use of Limited Gas Tax Revenue



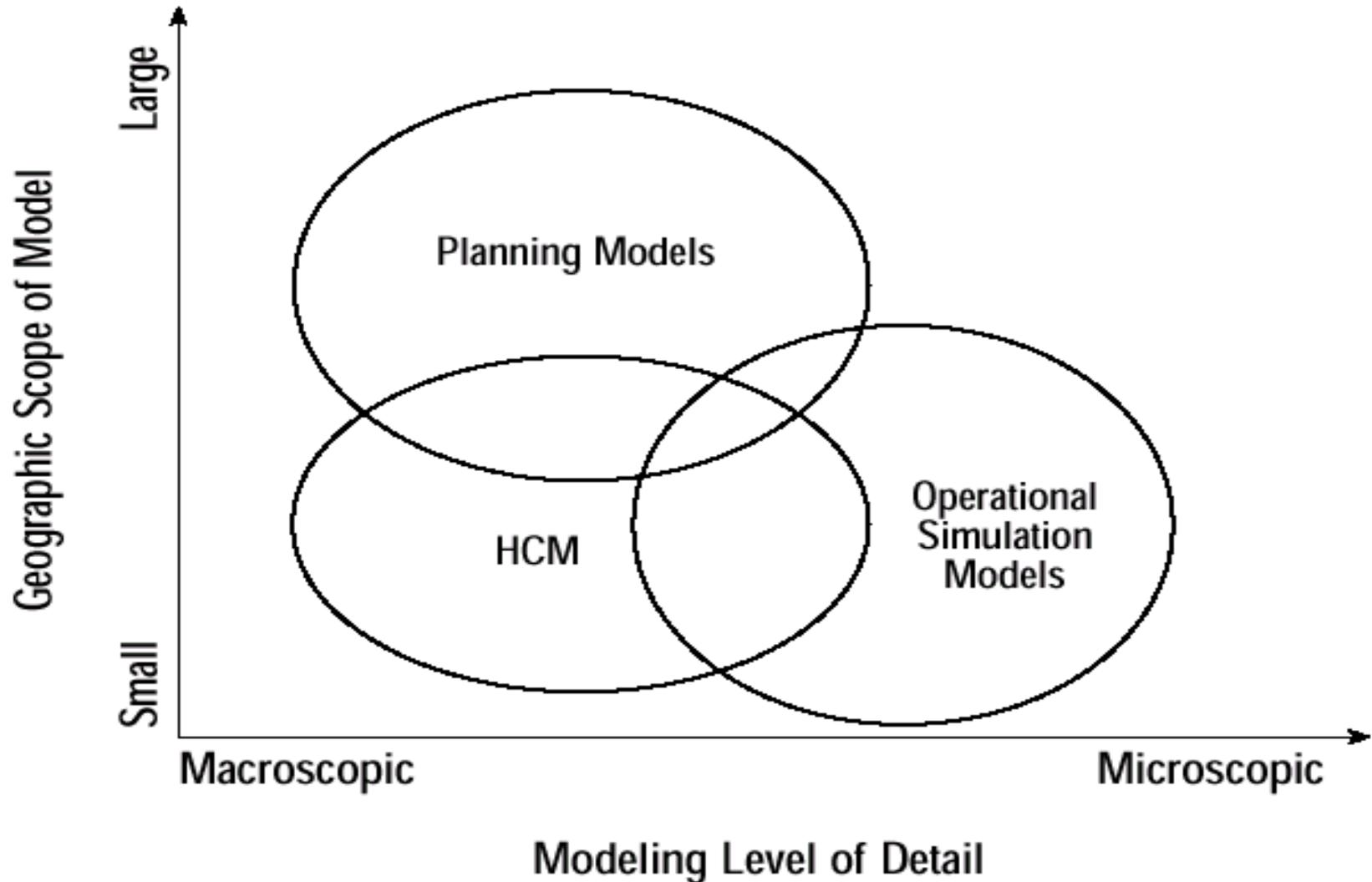
Successful Applications

- Portray Network
- Verifiable, Reproducible and Traceable
- Supports Efficient Design/Analysis
- Validate Control Strategy/Design
- Encompass Future Needs

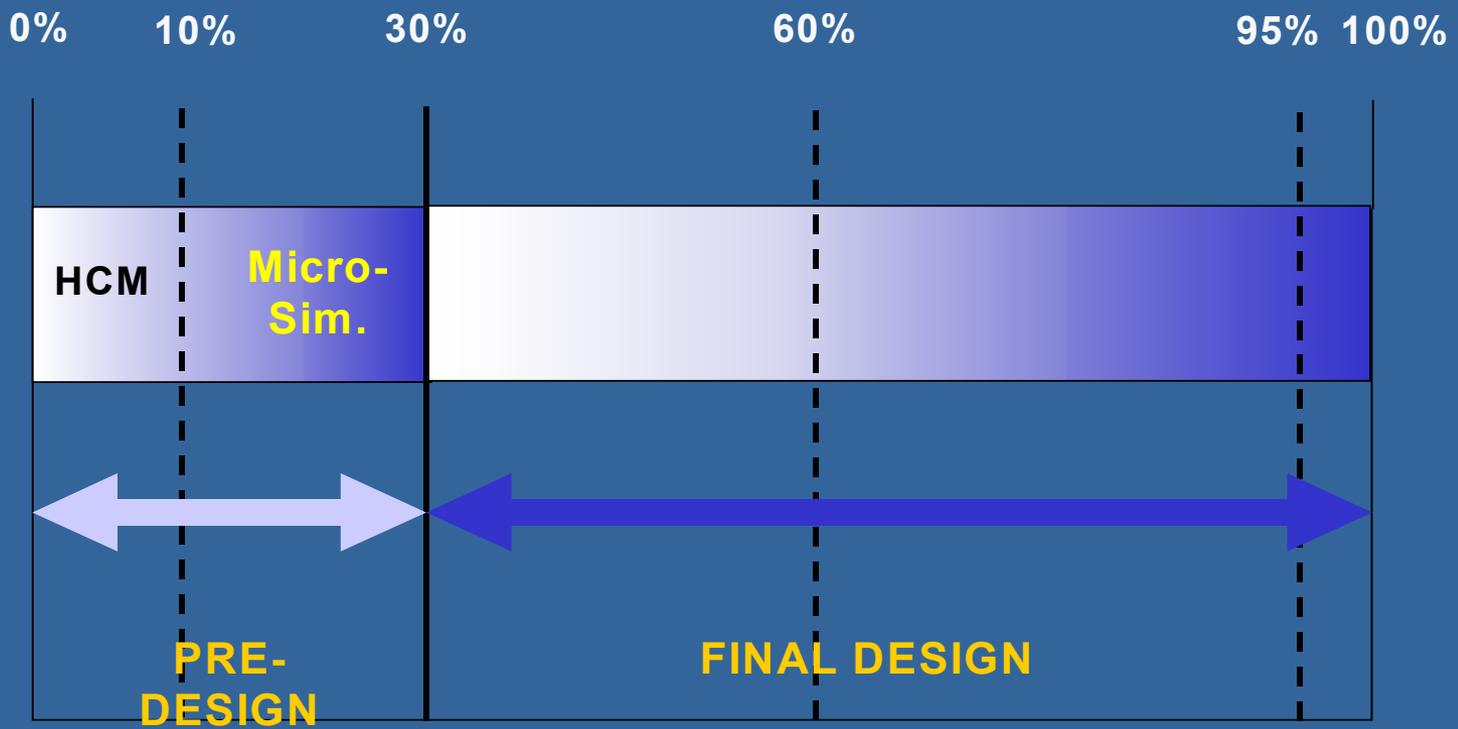
FHWA Regulation on Traffic Analysis

- FHWA Has No Specific Regulation on Traffic Analysis Methodology
- FHWA's 23 CFR States:
“The SHA (State Highway Administration) Must be Adequately Staffed and Equipped to Carry Out the Federal-Aid Highway Program...”

Typology of Models



TRAFFIC OPERATIONS AND DESIGN DELIVERY



When is Simulation Needed?

1. For Most or All IARs in Metro Area
2. To Support Design/Project Layout For Major Reconstruction Projects
3. Changes in Operation
 - HOT Lanes
 - New Ramp Metering System

Current FHWA Interstate Policy

- **Published in the Federal Register on February 11, 1998.**

The **FHWA will continue to use the current edition of the Highway Capacity Manual (HCM)**, published by the TRB, in its review of proposed access points.

Other traffic analysis methods including simulation programs may also be used in the access request report to aid in the decision-making process. However, if the access request report does not contain an HCM analysis, the data submitted with the report must be sufficiently detailed and compatible with the HCM procedures to

New FHWA Interstate Policy

January 2004

- “Use Appropriate Traffic Analysis Methodology and Software
- FHWA Prefers HCM or CORSIM For Interstate Access
- Other Simulation Programs?

FHWA Interstate Access Policy 1

A request for new or revised access must show that:

1) Existing interchanges and/or local roads and streets in the corridor can neither provide the necessary access nor be improved to satisfactorily accommodate the design-year traffic demands while at the same time providing the access intended by the proposal.

FHWA Interstate Access Policy 2

A request for new or revised access must show that:

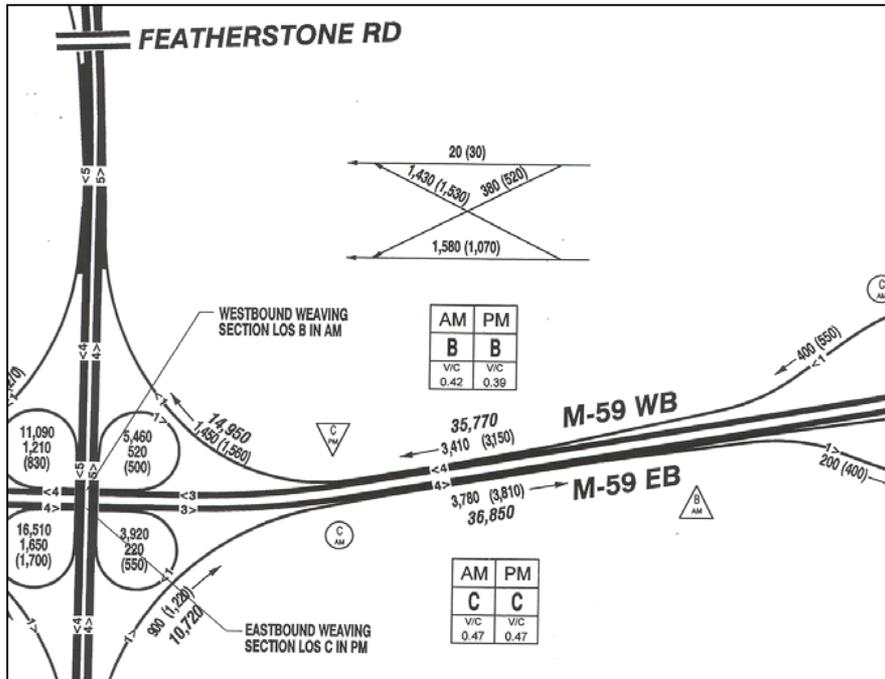
2) All reasonable alternatives for design options, location and transportation system management type improvements (such as ramp metering, mass transit, and HOV facilities) have been assessed and provided for if currently justified, or provisions are included for accommodating such facilities if a future need is identified.

FHWA Interstate Access Policy 3

A request for new or revised access must show that:

3) The proposed access point does not have a significant adverse impact on the safety and operation of the Interstate facility based on an analysis of current and future traffic. The analysis for existing conditions shall include sections of Interstate to and including the first adjacent existing or proposed interchange on either side. Crossroads and other roads shall be included in the analysis to the extent necessary.

What is the Intent of Policy 3?



- Demonstrate That Traffic Operations Will be Adequate *System-Wide* (Not Just Where the New Access Point is Proposed) For Design Year Conditions
- Show That the Proposed Plan of Access Will be Designed to Meet or Exceed Interstate Design Criteria For Safe Operations

FHWA Interstate Access Policy 6

A request for new or revised access must show that:

6) In areas where the potential exists for future multiple interchange additions, all requests for new or revised access are supported by a comprehensive Interstate network study with recommendations that address all proposed and desired access within the context of a long term plan.

Interstate Access Analysis Requirements

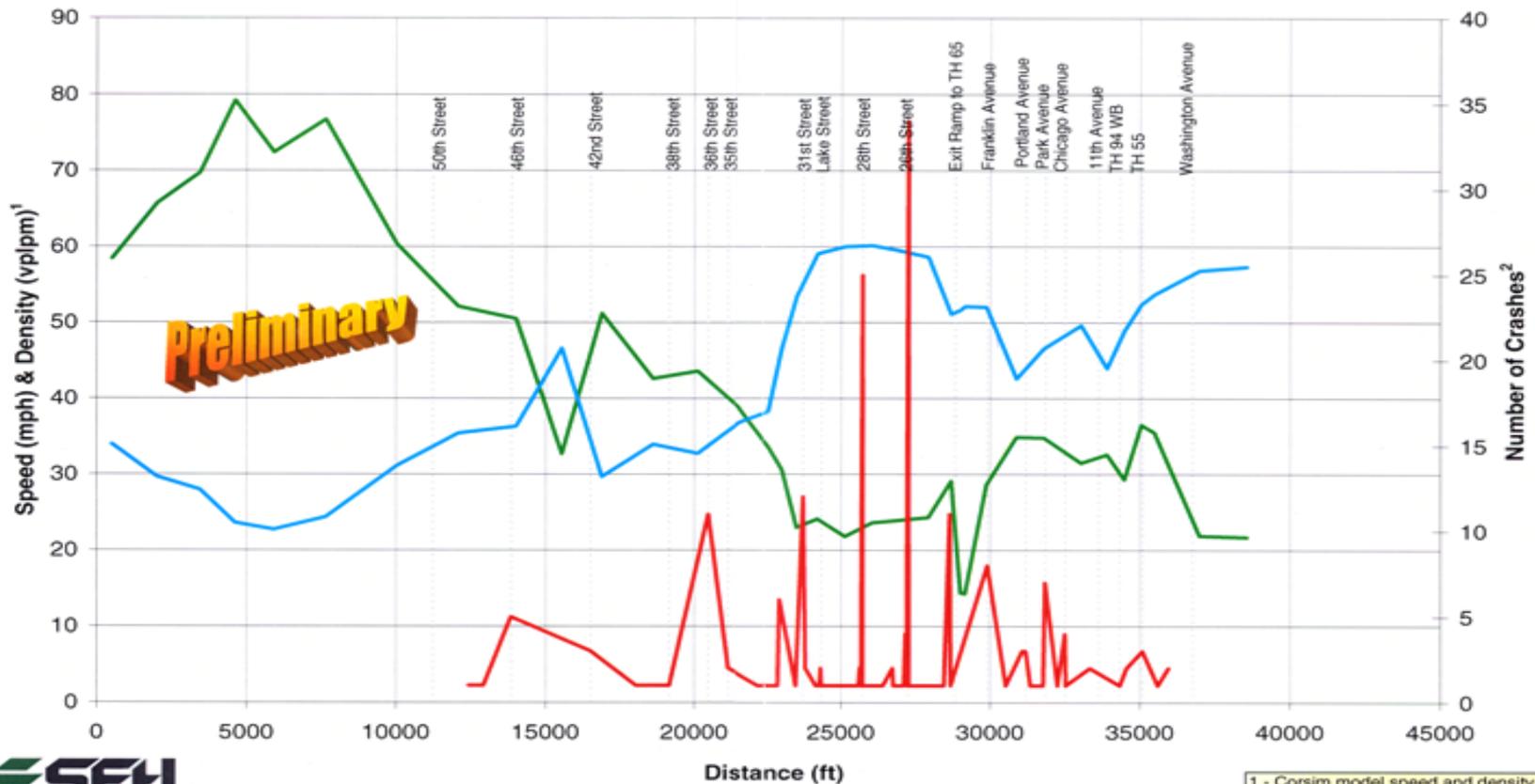
	Existing	No Build	Build
Today			
Opening Year			
Design Year			

I-35W & Lake St. Case Study

- Can a New Access be Added?
- What Are the Problems?
- Is There a Viable Solution?
- Is It Acceptable?
- Does It Fit With Future Expansion or Corridor Plan?
- Future Mainline Lanes, HOV, HOT?

Understanding Safety With CORSIM

Safety Analysis
Existing NB I-35W PM Peak



— Density (vplpm) — Speed (mph) — Accident Frequency

1 - Corsim model speed and density reports
2 - 3 year (1999 - 2001) crash history (includes all peak period crashes 3PM to 7PM)

FHWA and MnDOT's Advanced CORSIM Guidelines

- To Support New Microsimulation Users
- Provide a Reference For Developing a Scope of Work
- To Support Accurate and Reusable Models – ex. I-694 & Rice St. Reused

Approval Authority for IAR

FHWA - Washington DC	FHWA - Minnesota
<ul style="list-style-type: none">• New Access - Metro• New or Modified System Interchange	<ul style="list-style-type: none">• Modify Service Interchange• New Access – Outstate