

HERS_IN

***HIGHWAY
ECONOMIC
REQUIREMENTS
SYSTEM
(for)
INDIANA***

**AASHTO Transportation
Estimator Association Conference
October 16, 2001**

OVERVIEW

- **HERS Background**
- **System Planning Tool Development**
- **HERS_IN Structure**
- **Results of Statewide Analysis**
- **Current Applications**
- **Future Development**
- **Question and Answer Period**

HERS BACKGROUND

- **Highway Economic Requirements System (HERS) developed in 1991 by Jack Faucett Associates**
 - **Uses the HPMS national sample data**
 - **USDOT “Status of the Nation’s Surface Transportation System: Condition and Performance-Report to Congress**
 - **HERS provides**
 - Summary of the highway system LOS and Speeds
 - Identify highway investment needs
 - Generates B/C analysis of investment levels
 - **HERS provides system level information based upon expansion of sample data**
 - **INDOT need for project specific B/C analysis**

SYSTEM PLANNING TOOLS DEVELOPMENT

■ Intermodal Management System

- Purchase of TransCAD GIS**
- Statewide GIS Highway Network and Routing System for Dynamic Segmentation**
- Display of State Jurisdiction Road Inventory Data**

■ Major Corridor Study

- Indiana Statewide Travel Model**
- Highway Economic Requirements System/Indiana**
- Develop State Jurisdiction Roadway Data for HERS_IN to create 100 percent database**

HERS_IN NEEDS ANALYSIS MODEL

- **FHWA Model Modified by Cambridge Systematics (Ver 3.097)**
- **Integration with Statewide Travel Demand Model**
- **Focus on Identification of Capacity Expansion Improvements**
- **Use of B/C analysis to Determine Improvements by Phase**
- **Estimation of Capacity Expansion Project Costs**
- **Expansion of Model Analysis (Basic and Override)**
- **Integration of Link Specific Output with GIS**

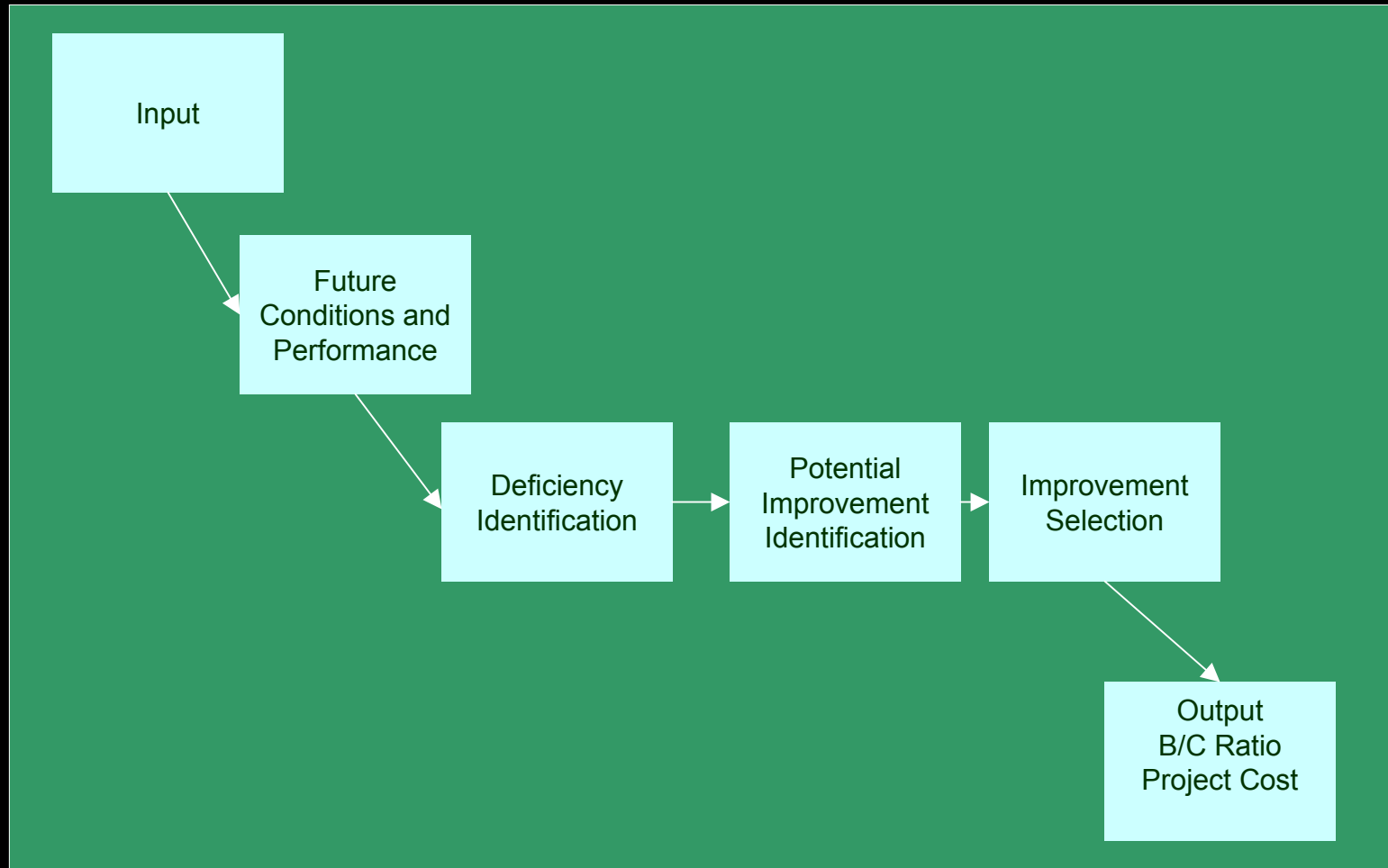
HERS_IN INPUT DATA FILE

- **MODIFIED HPMS DATA FILE**
 - **Linear Referencing Data (Route ID, Log Miles)**

- **ROAD INVENTORY FILE - - 12,000 Segments**
 - **Physical Features (FC, Lanes, Widths, Access Control)**
 - **Operating Characteristics (AADT, Posted Speeds)**

- **HPMS BASED DEFAULT DATA**
 - **Percent Sight Passing Distance**
 - **Percentage of Commercial Vehicles**
 - **Percent Green Time**
 - **Numbers of Intersections (Estimation Procedure)**

HERS_IN ANALYSIS - GENERAL PROCESS



HERS_IN IMPROVEMENT TYPES

- **Added Travel Lanes (Major Widening at Normal Cost)**
- **Improve Alignment (dropped for initial applications)**
 - **Horizontal and Vertical Curvature**
- **Pavement Improvement Treatments (Removed from Model)**
 - **Resurface**
 - **Reconstruction**
- **Ability to code in Pavement Replacement/Reconstruction locations in future work with HERS_IN “Override Mode”**

HERS_IN IMPROVEMENT COSTS

- **Costs based on 1997 INDOT Cost Estimates Developed by Engineering Assessment Section of Pre-Engineering and Environment Division**

- **Cost per Mile Varies by Improvement Type, Functional Classification Groupings (FC) , and Terrain**
 - **Major Widening at Normal Cost**
 - **Rural FC (Interstate, OPA, Min. Arterial, Major Collector)**
 - **Urban FC (Freeway/Expressway, Other Div, Un-Div)**

- **Experience has shown need to incorporate Major Widening at High Cost using widening feasibility codes**

BENEFIT CATEGORIES

- **Travel Time by Vehicle Type (2- Auto, 5-Truck)**
- **Operating Costs (Fuel, Oil, Tires, Maint. & Repair, Deprec.)**
- **Safety**
 - **Crashes**
 - **Injuries**
 - **Fatalities**
- **Residual Value of Improvement**

STATEWIDE ANALYSIS 2000 TO 2025

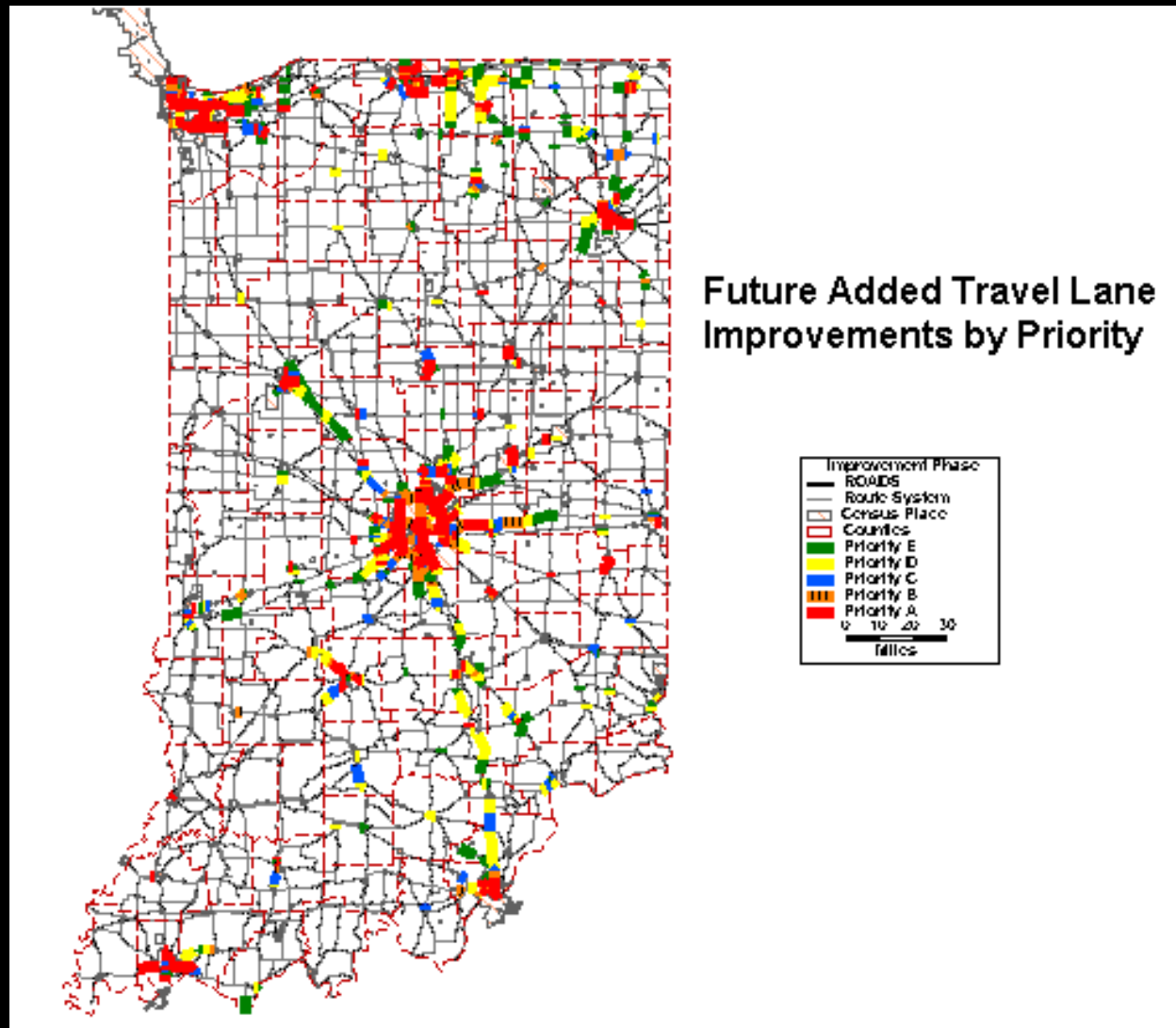
•NO BUILD

- Statewide Annual VMT increases 62 %**
- Percentage of VMT below MTC for Congestion increases from 4% to 25%**
- Overall System Speed decreases 10%**
- Urban Interstate Speeds decrease 25%**

•FULL SYSTEM IMPROVEMENTS

- Improvement Costs \$ 3.2 Billion with 1074 miles of roadway widened**
- Percentage of VMT below MTC for Congestion decreases from 4% to 2%**
- Overall System Speed decreases 1%**
- Urban Interstate Speeds remain constant**

FULL NEEDS ANALYSIS

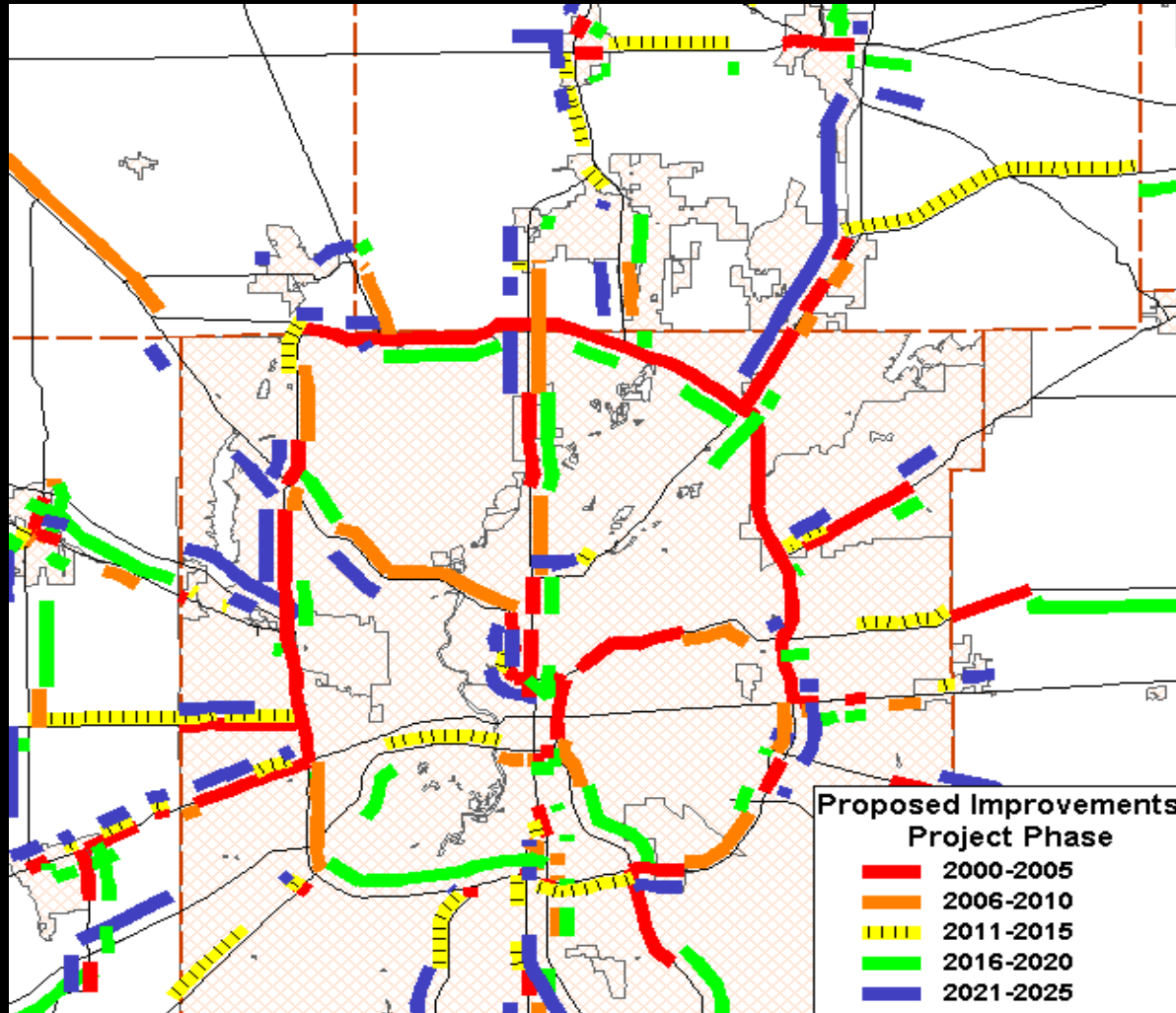


HERS - PROJECTS IDENTIFIED

FULL NEEDS ANALYSIS

- 66 % of Roadway Improvements in Urban Areas
- Interstate Improvements (\$1.473 Billion)
 - Rural 110 miles
 - Urban 190 miles
- Principal Arterial (\$1.388 Billion)
 - Rural 91 miles
 - Urban 475 miles
- Minor Arterial (\$201 Million)
 - Rural 89 miles
 - Urban 29 miles
- Collector --85 miles Rural, 0 miles Urban---(\$127 Million)

HERS - PROJECTS IDENTIFIED



HERS_IN APPLICATIONS

- **Needs Identification Tool for 2000 to 2025 Statewide Plan**
- **Statewide System Performance Report for Executive Staff**
- **District / MPO Needs Report and Project Map**
 - **Project Specific Discussion at MPO/District Project Development Process (PDP) Meetings for Selecting New Projects for Development**
 - **Review of MPO Long-Range Plan Proposals for State Jurisdictional Roadways**

FUTURE HERS_IN APPLICATIONS

- **Improve Integration between Road Inventory Data updates, the Statewide Travel Demand Model and HERS_IN**
- **Update Cost Estimation Information**
- **Update HERS_IN Model with HERS/ST Improvements**
- **Integrate Pavement Management System**

Highway Economic Requirements System for Indiana



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