



Use of HCS Streets and CORSIM/VISSIM

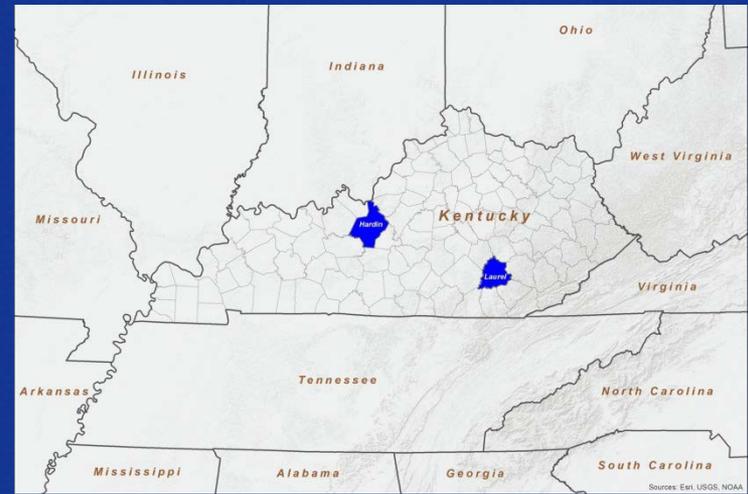
US 25 in London, KY

US 31W in Elizabethtown, KY

Presented by: Ashley McLain, PE, PTOE

Gary W. Sharpe, PE, PLS





Using HCS Streets, CORSIM, and VISSIM

US 25, Laurel County

US 31W, Hardin County

Two Projects

- ▲ High Density Commercial Areas
- ▲ High Crash Frequency
- ▲ High Levels of Congestion



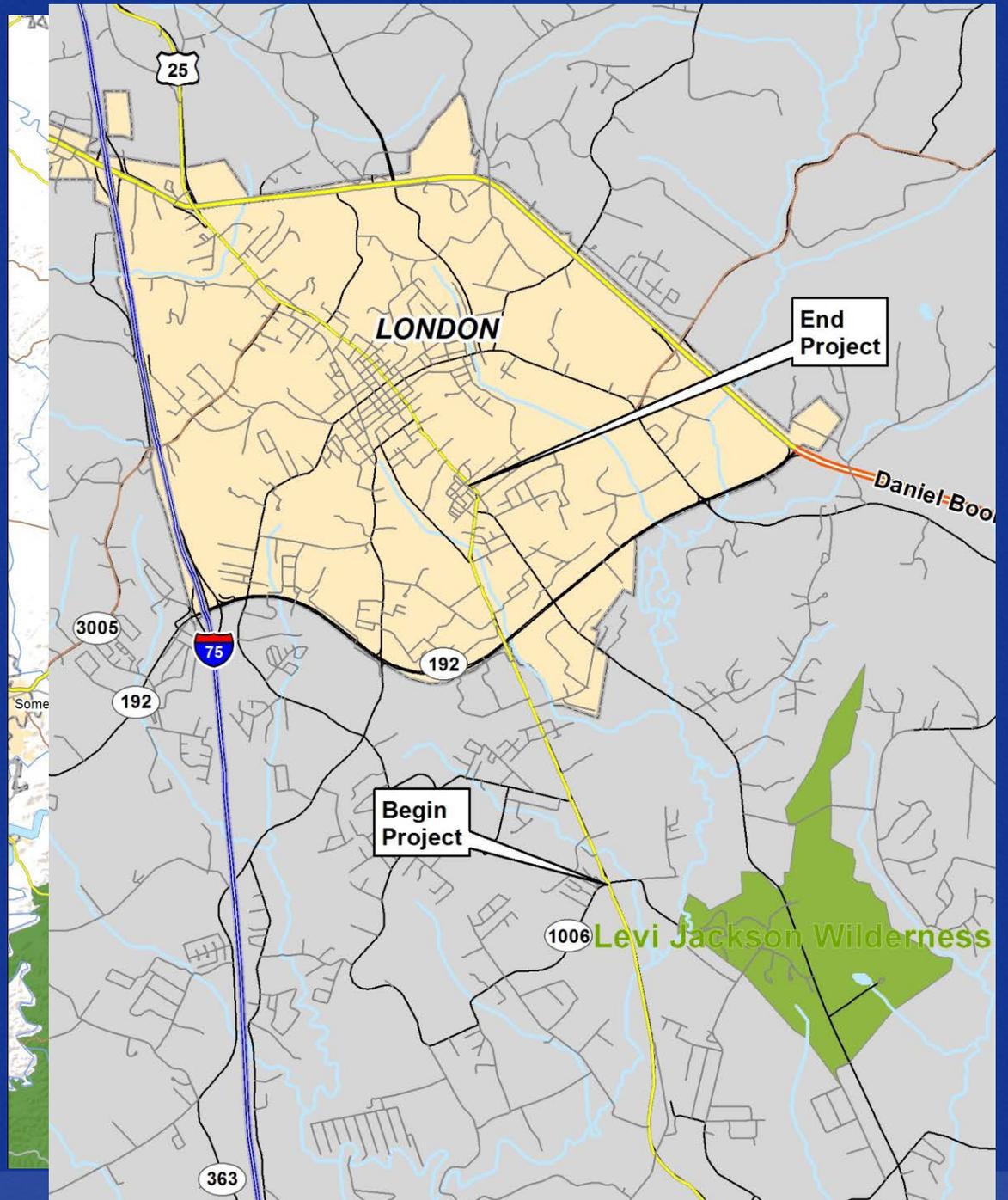
KENTUCKY
TRANSPORTATION
CABINET

Similar Project Goals

▲ Project Goals

- ❑ Improve Safety
- ❑ Improve Mobility
- ❑ Improve Capacity

US 25 Laurel County



KENTUCKY
TRANSPORTATION
CABINET

Existing Conditions – Laurel County

▲ US 25 – KY 1006 to KY 192

- ❑ 2 Lanes
- ❑ TWLTL



▲ KY 229

- ❑ 2 Lanes
- ❑ Narrow Shoulders

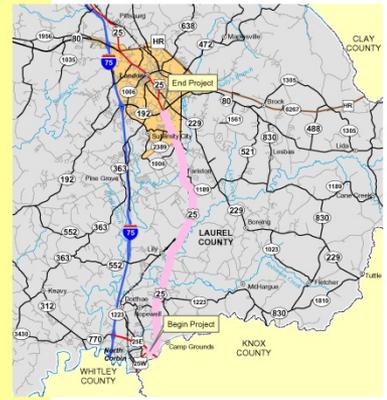


KENTUCKY
TRANSPORTATION
CABINET

Previous Studies – Laurel County

- ▲ Planning Study
- ▲ DNA Study

US 25; ITEM 11-8201
LAUREL COUNTY
FROM CORBIN TO LONDON



FINAL REPORT
July 2006

Prepared by
Kentucky Transportation Cabinet
Division of Planning



2011

US-25 DNA Pre-Design Scoping Study



01/01/2007



Laurel County: US-25 Updated Area Review
Project Area A: KY-229 from MP 11.522 to MP 12.211 to include: US-25 from MP 11.280 to MP 11.400 and
Project Area B: Co
Prepared by:
Kentucky Transportation Cabinet
District 11 and Division of Planning
2/15/2011

Proposed Improvements – Laurel County

▲ Relocated US 25

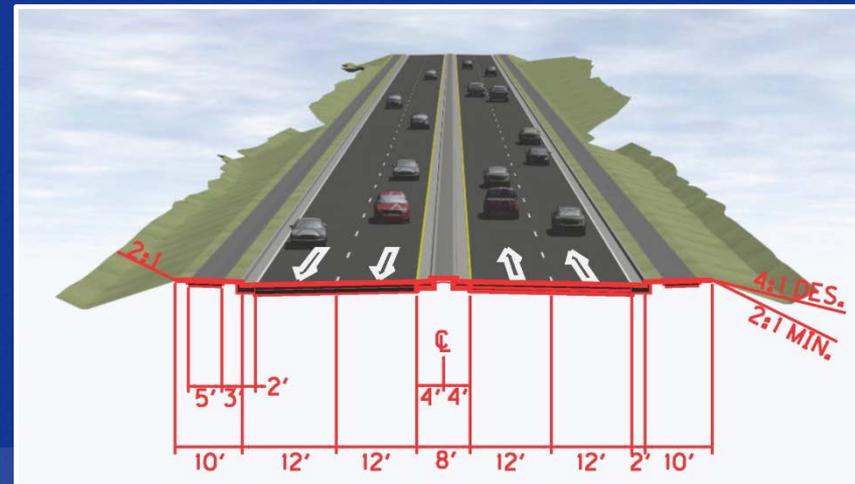
- ❑ 4-Lane Connection Between US 25 and KY 229
- ❑ Raised Median with Turn Lanes
- ❑ Defined Access Points and Median Openings
- ❑ U-Turns Permitted



Proposed Improvements – Laurel County

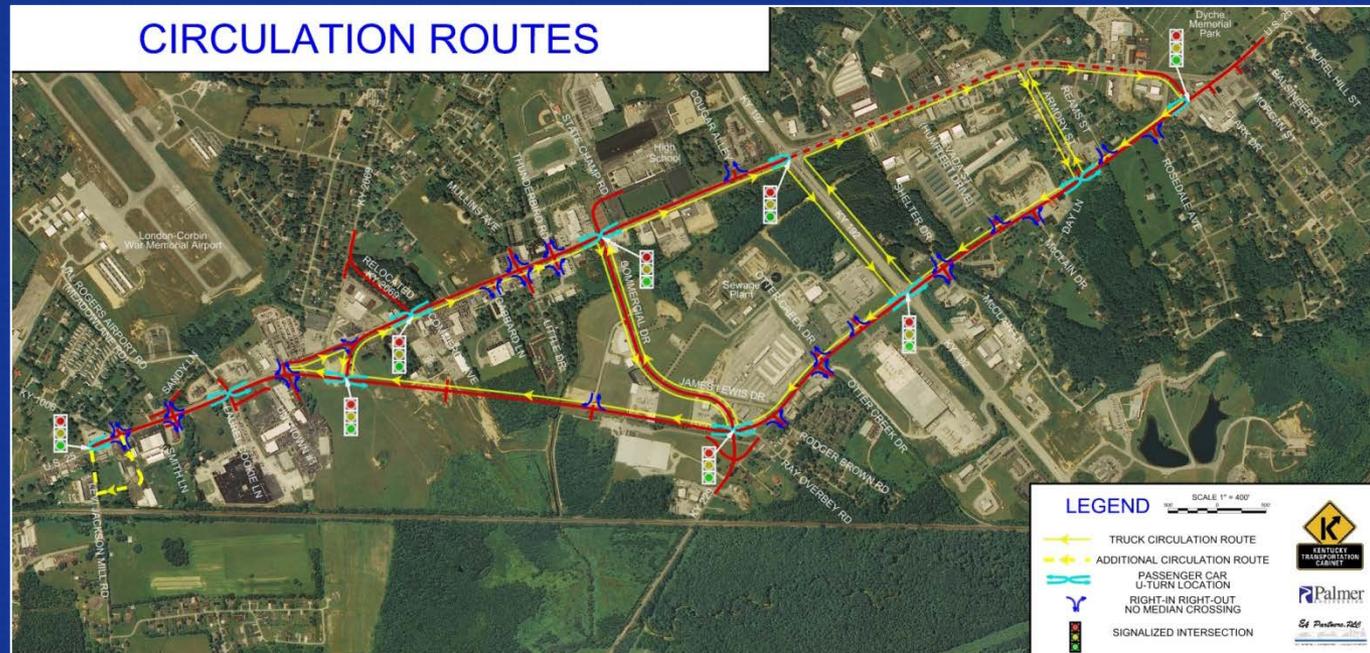
▲ Existing US 25

- ❑ Widen to 4-Lanes
- ❑ Raised Median with Turn Lanes
- ❑ Defined Median Openings and Access Points
- ❑ U-Turns Permitted



Proposed Improvements – Laurel County

- ▶ Truck Circulation Routes
- ▶ Frontage and Backage Roads

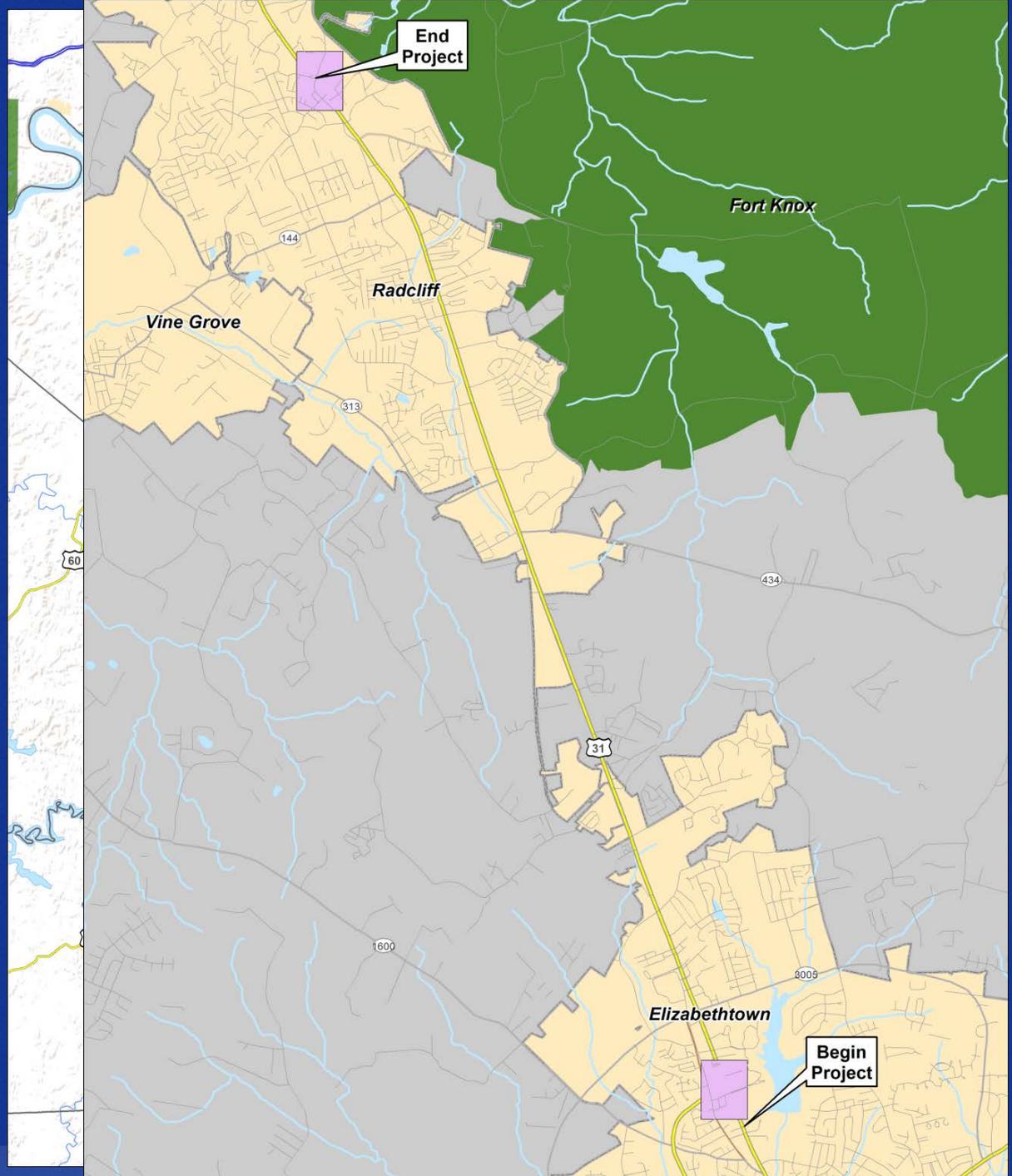


Proposed Improvements – Laurel County

- ▲ HCS Streets
- ▲ VISSIM
- ▲ Citizens Advisory Committee



US 31W Hardin County



KENTUCKY
TRANSPORTATION
CABINET

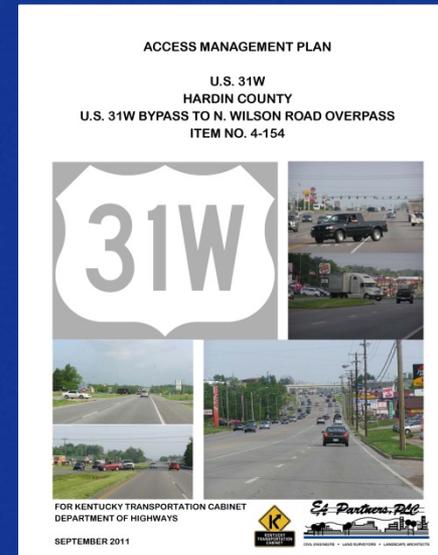
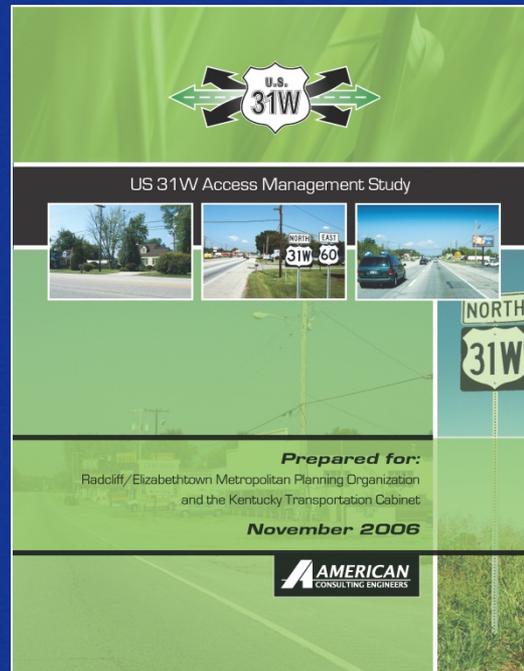
Existing Conditions – US 31W, Hardin County

- ▲ US 31W Bypass to Wilson Road Overpass
- ▲ Near Fort Knox Military Base
- ▲ Existing Multi-Lane Roadway with Turn Lanes



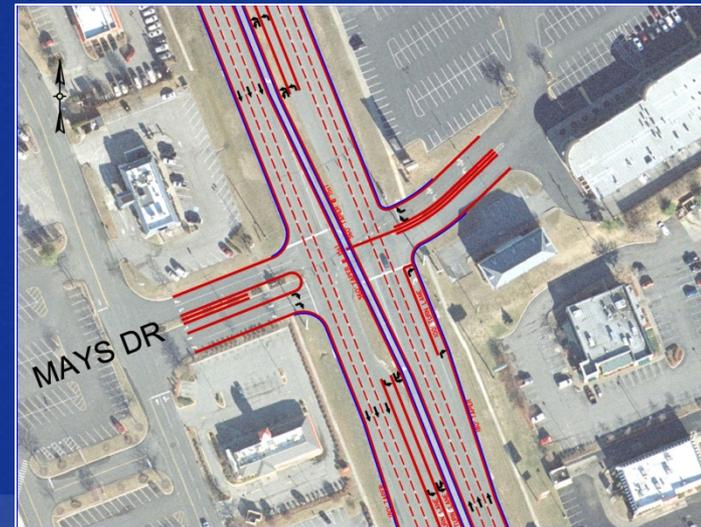
Previous Studies – US 31W, Hardin County

- ▲ US 31W Access Management Study (2006)
- ▲ US 31W Access Management Plan (2011)



Proposed Improvements – US 31W, Hardin County

- ▲ Modifying & Consolidating Median Openings
- ▲ Redistributing Existing Lanes
- ▲ Lengthening Existing Turn Lanes
- ▲ Adding Turn Lanes
- ▲ Modifying Signal Timing
- ▲ Providing U-Turns

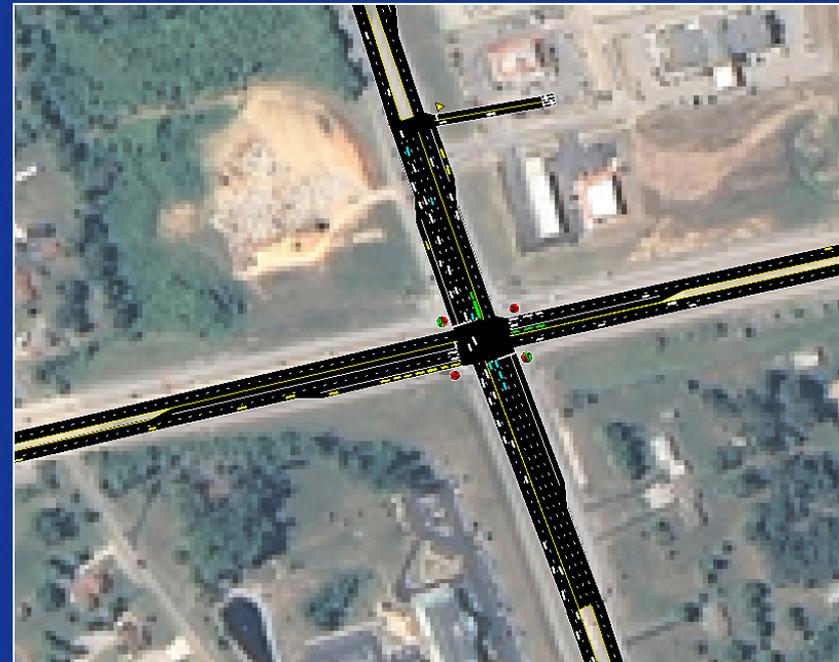


KENTUCKY
TRANSPORTATION
CABINET

Proposed Improvements – US 31W, Hardin County

▲ HCS Streets and CORSIM

- Evaluate Existing Conditions
- Evaluate Proposed Improvements



Access Management Plans

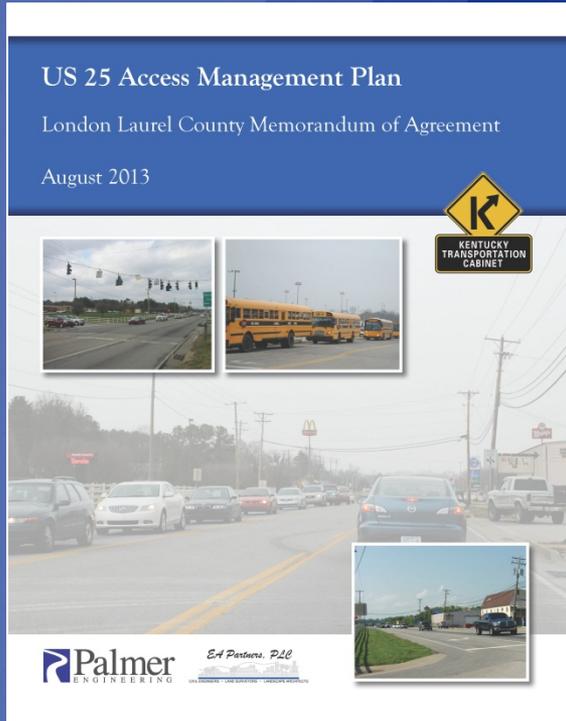
US 25, Laurel County – Developing in Phase I

US 31W, Hardin County – Validating

Access Management Plan Laurel County

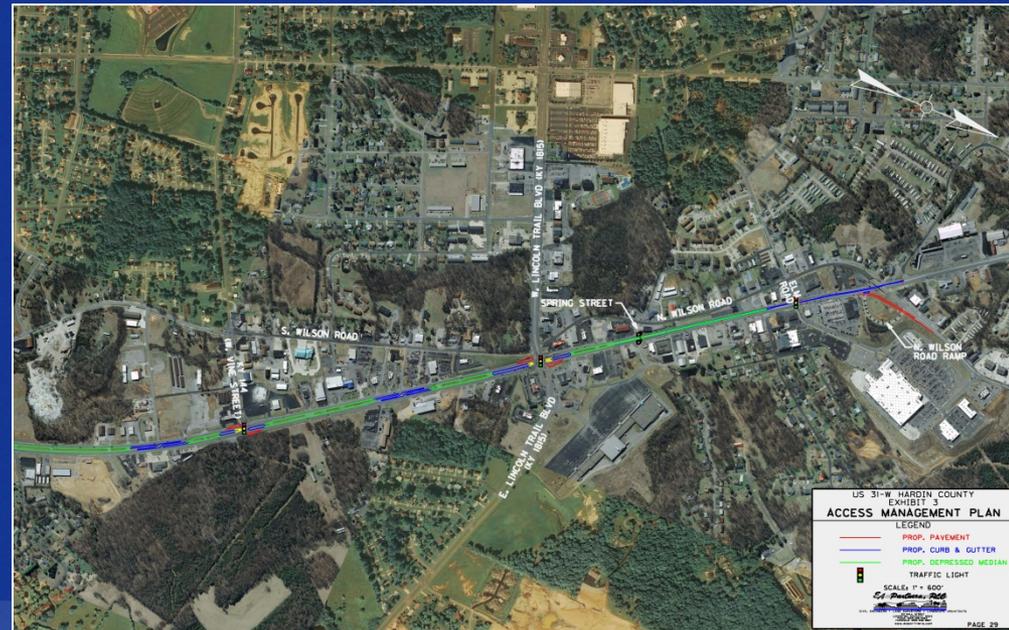
▲ Developed in Phase I Design

- ❑ Citizens Advisory Committee
- ❑ Project Team
- ❑ Public Meetings
- ❑ Eliminate Conflict Points
- ❑ Operational Analyses



Access Management Plan US 31W, Hardin County

- ▲ HCS Streets
- ▲ CORSIM
- ▲ Validate Proposed Access Management Plan



Operational Analyses

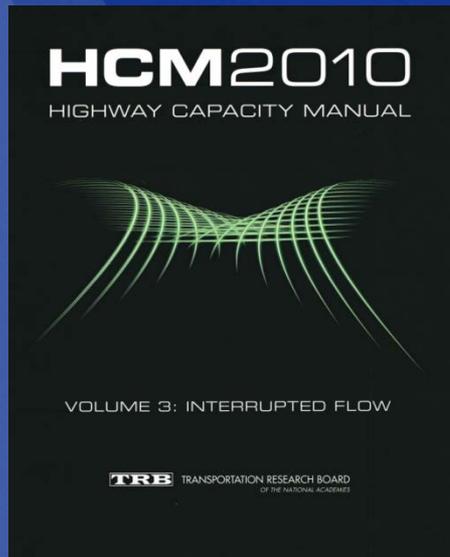
US 31 W Hardin County

US 25 / KY 229 Laurel County

Analysis Tools

▲ HCS Streets Accounts for:

- ❑ Multiple Signalized Intersections
- ❑ Effect of Access Points on Flow of Traffic



HCS Streets & US 31W



- ▲ HCS Streets Beta Test Project
- ▲ Used in Conjunction with CORSIM
- ▲ Worked Closely with McTrans
 - Develop & Refine US 31W Models
 - Software Enhancements

US 31W



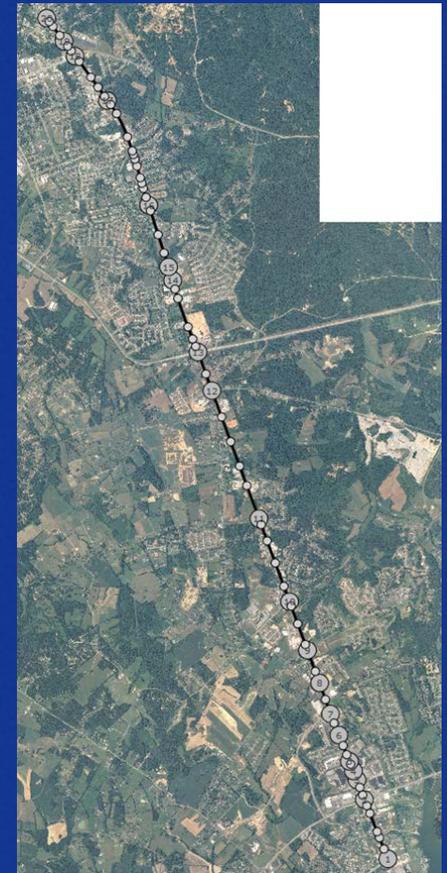
- ▲ 9.5 Mile Segment
- ▲ 19 Signalized Intersections
- ▲ Coordinated and Uncoordinated Systems
- ▲ 393 Unsignalized Access Points



Initial Data Collection

▲ Multiple-Period Analysis

- ❑ PM Peak (4:00 PM - 5:30 PM)
- ❑ Six-15 Minute Periods
- ❑ Accounts for Unmet Demand



Effect of Access Points

- ▲ **393 Unsignalized Access Points**

- ▲ **HCS Streets**

 - # Right-Hand Access Points

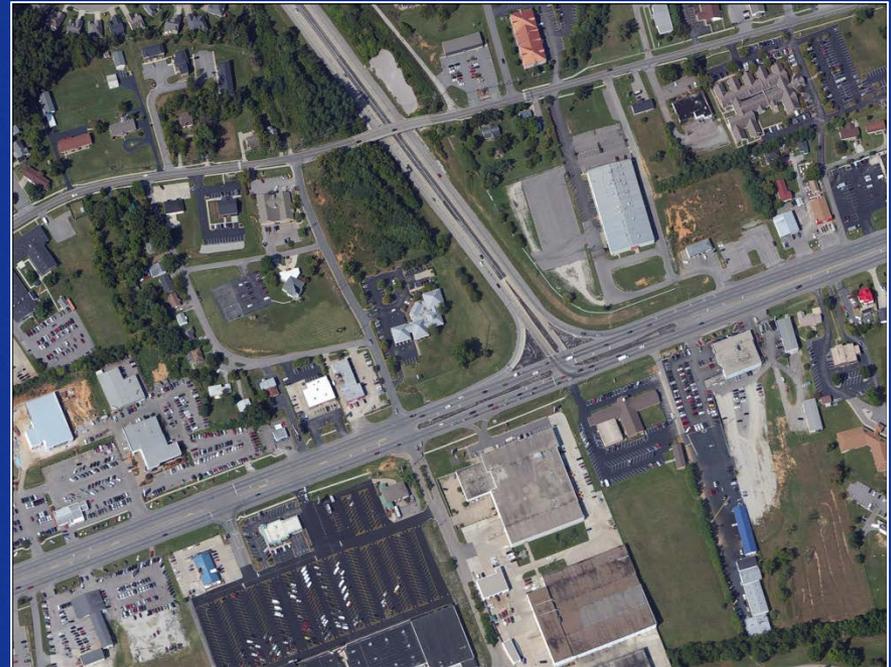
 - Mid-Segment Delay

- ▲ **Combined Into 53 Active Access Points**

- ▲ **Trip Generation Rates**

Field Visits

- ▲ Volume Surveys at Representative Access Points



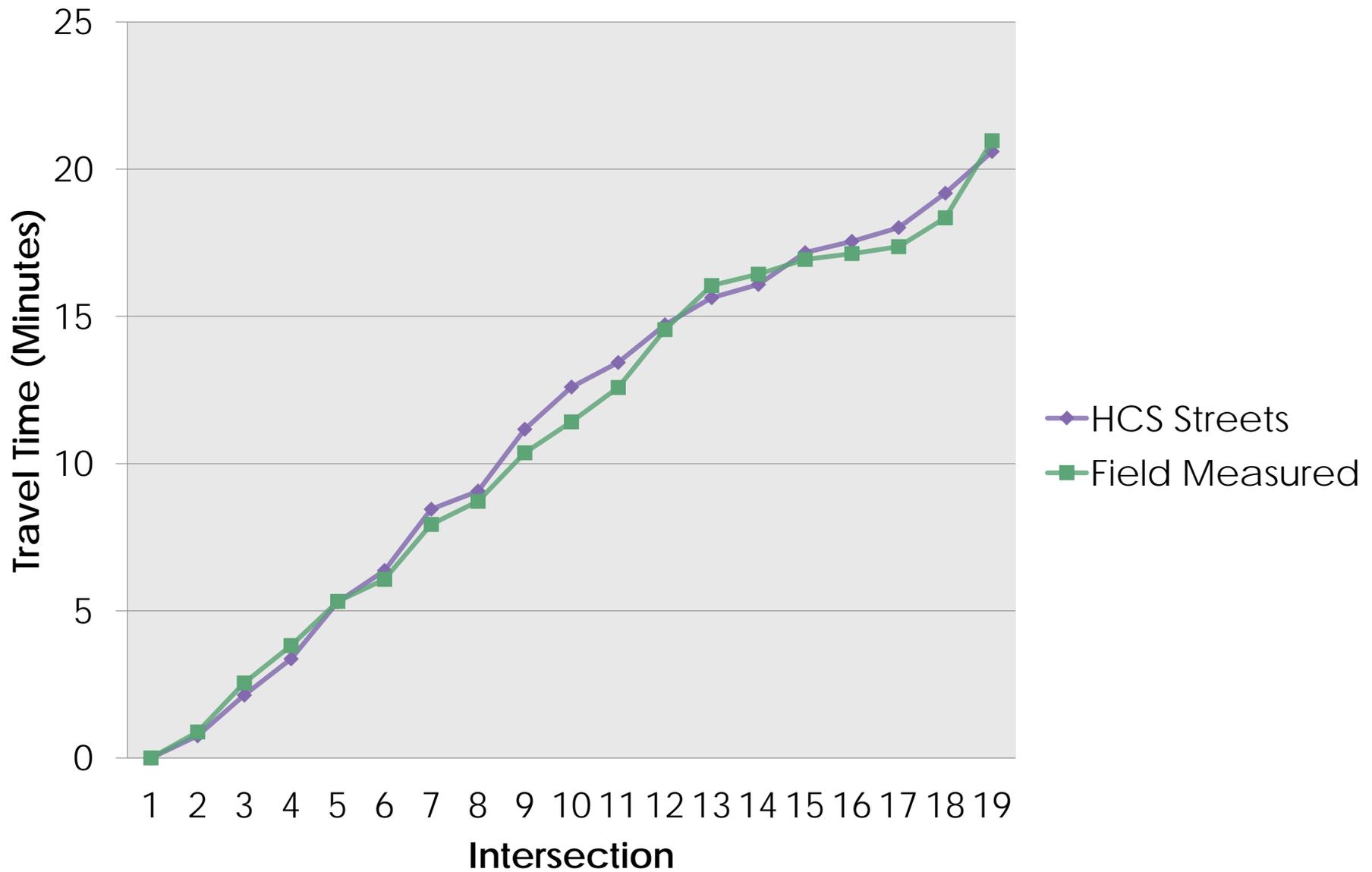
Field Visits

- ▲ Travel Times
- ▲ Queues
- ▲ Saturation
- Headway
- ▲ Speeds



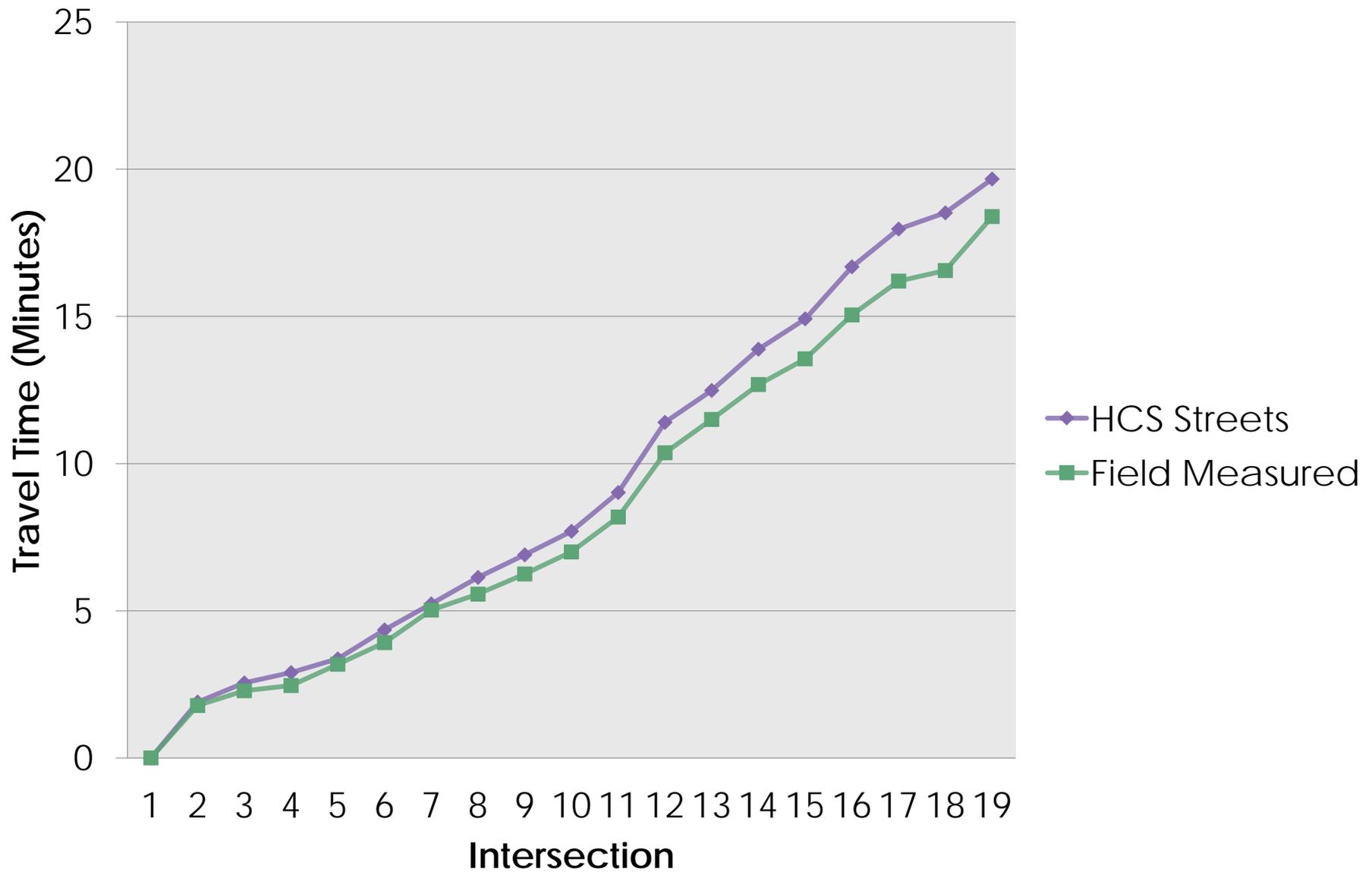
Travel Times

Southbound US 31W Corridor



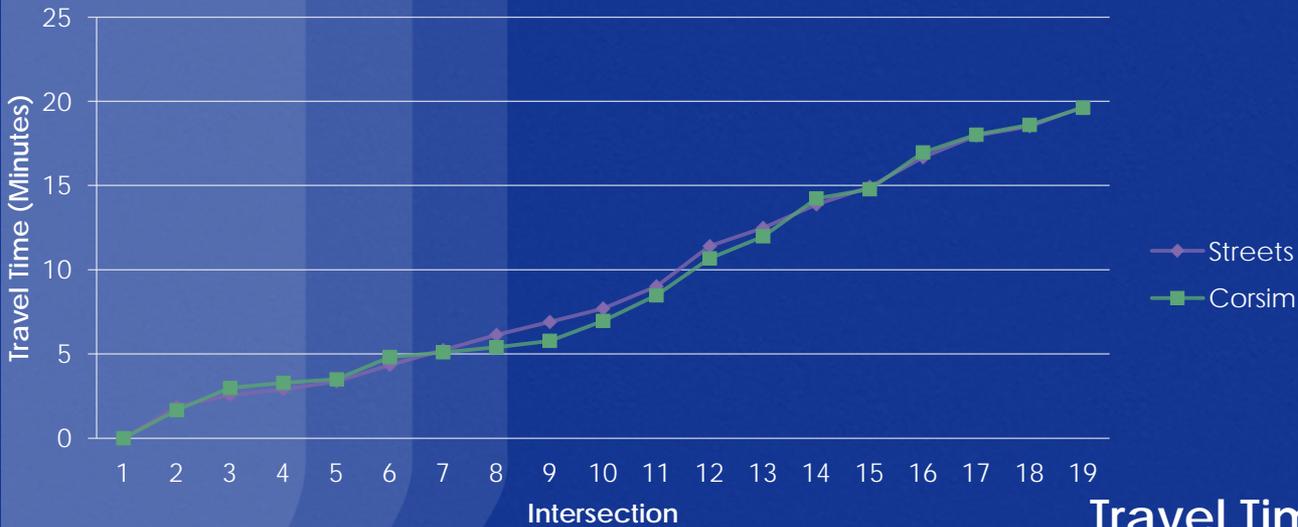
Travel Times

Northbound US 31W Corridor



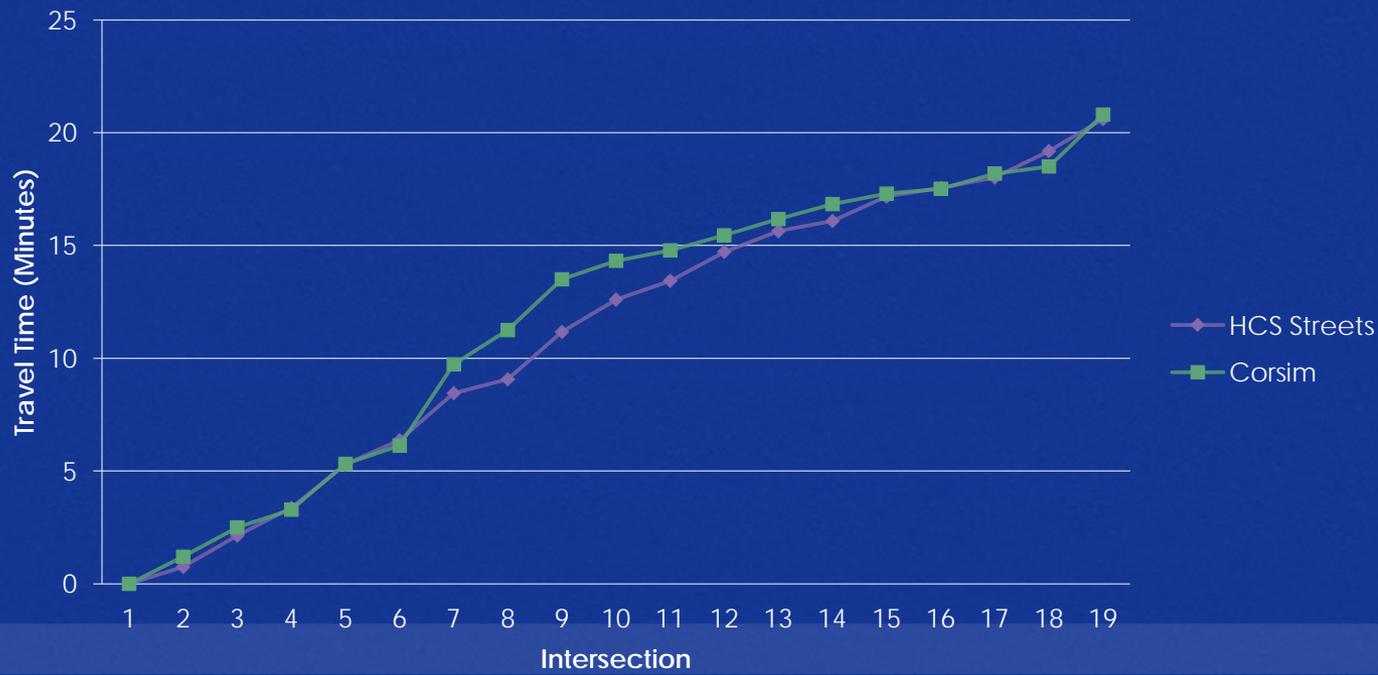
Travel Times

Northbound US 31W Corridor



Travel Times

Southbound US 31W Corridor



HCS vs. Field Measured Results

▲ Travel Time

- SB within 2%
- NB within 6%

▲ Average Speed by Segment

- Within 5 mph

▲ Queues Consistent with Field Observation

Beta Testing Conclusions

▲ **Accurately Modeled Baseline Conditions**

▲ **Key Factors**

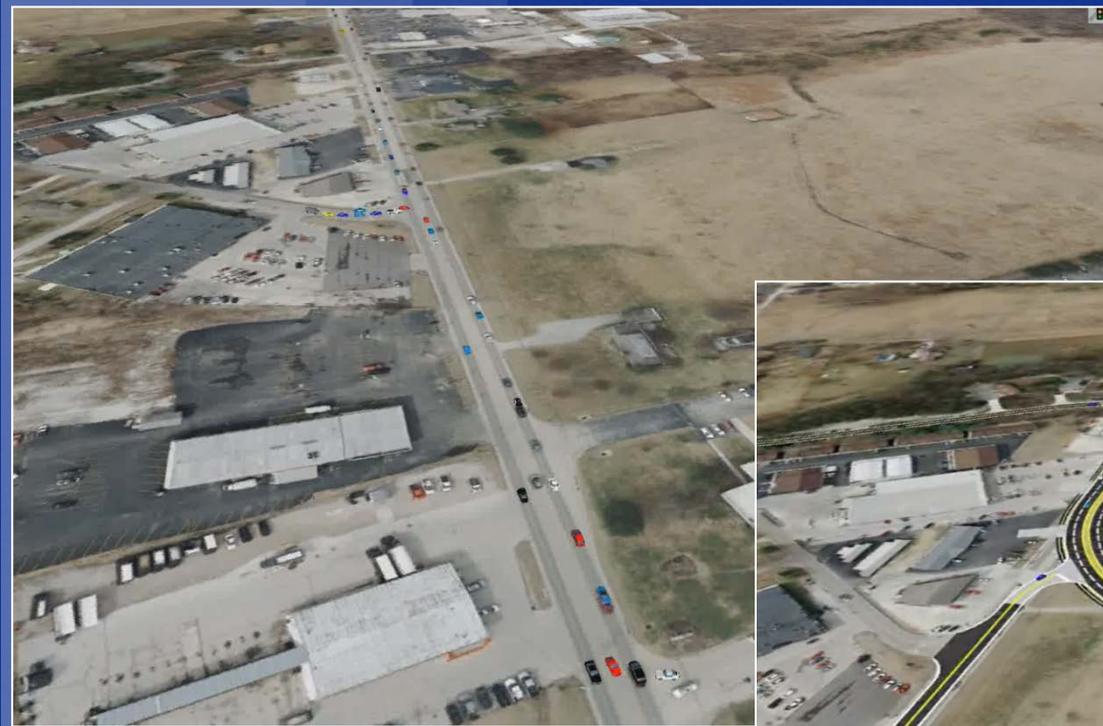
- ❑ Obtaining Existing Signal Timing
- ❑ Calculating Saturation Flow Rate
- ❑ Using Multiple-Period Analysis

US 25

- ▲ 2.2 Mile Segment
- ▲ 4 Signalized Intersections
- ▲ Uncoordinated Systems
- ▲ 150 Unsignalized Access Points



VISSIM – Laurel County Operational Analyses



KENTUCKY
TRANSPORTATION
CABINET

VISSIM – Laurel County Operational Analyses



KENTUCKY
TRANSPORTATION
CABINET

Laurel County Operational Analyses

- ▲ Travel From KY 1006, Across KY 192, To KY 229
 - Today : ~5 to 6 Minutes
 - 2040: 10+ Minutes
 - 2040 With Improvements: 5 to 6 Minutes



Applications

▲ HCS Streets

- Corridor Level Analyses
- Multiple Signalized Intersections
- No Public Involvement
- Provides Travel Time
- Provides Typical HCS Results
 - ▲ Level of Service

Additional Applications

▲ VISSIM

- ❑ Public Involvement / 3D Animation
- ❑ Complex Geometry
- ❑ Common MOE's Except LOS

Where Are We Today?

US 25, Laurel County

US 31W, Hardin County

Where Are We Today? Laurel County

- ▲ Completing Phase I Design
- ▲ Finalizing Access Management Plan
- ▲ Advancing to Phase II Design
- ▲ Anticipated Construction – Spring 2015



KENTUCKY
TRANSPORTATION
CABINET

Where Are We Today? US 31W Hardin County

- ▲ Project Continuation Pending:
 - Travel Demand
 - ▲ Elizabethtown to Radcliff Connector
 - ▲ Bullion Blvd Connector
 - Future Public Involvement

Thank You

Questions ?

