SIMULATION OF ACCESS MANAGEMENT TREATMENTS NEAR INTERSTATE INTERCHANGES

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Project Purpose

- Interchanges are a crucial component of the interstate system.
- They provide access to and become focal points of urban, suburban, and rural areas.
- Development in the vicinity of interchanges often relatively dense.
- Operations on crossroads may impact freeway.

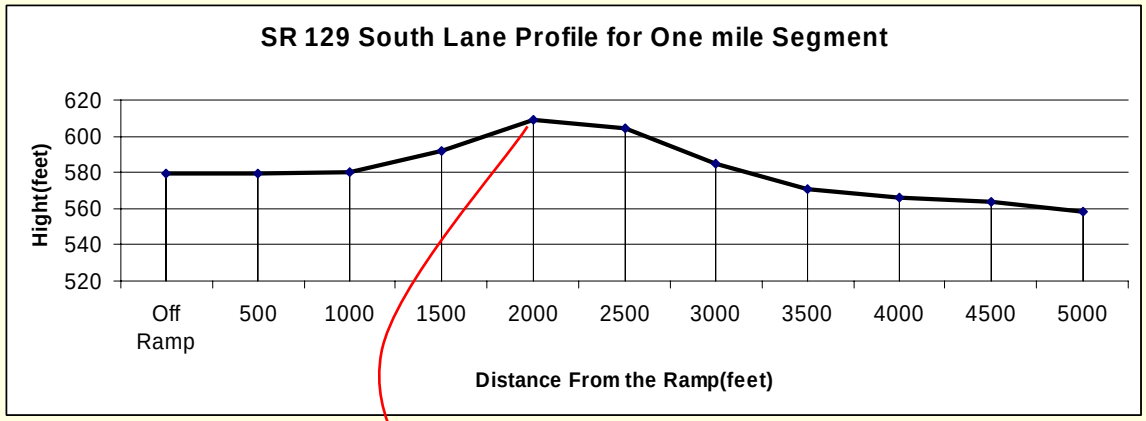
Project Overview

- Part of a larger effort to promote access management near interchanges.
- Provide analysis of concepts addressed in NCHRP 332.
- Illustrate microsimulation as a tool to evaluate access management.
- Two case studies
  - A “new” corridor in a rural area
  - A “retrofit” of access management along a congested suburban corridor.

“New” Case Study

- Use undeveloped interchange to illustrate benefits of incorporating access management into future development
- Rural interstate (Future I-22) and crossroad State Route 129 (SR 129)
- Very limited existing development
- More anticipated.
- Options limited by geometry.

“New” Case Study



“New” Case Study

- Existing volumes
- Project volumes to 2025
- Solicit input on likely land uses and perform Trip Generation
- Distribute trips to estimate intersection turn movements for scenarios with and without access management.

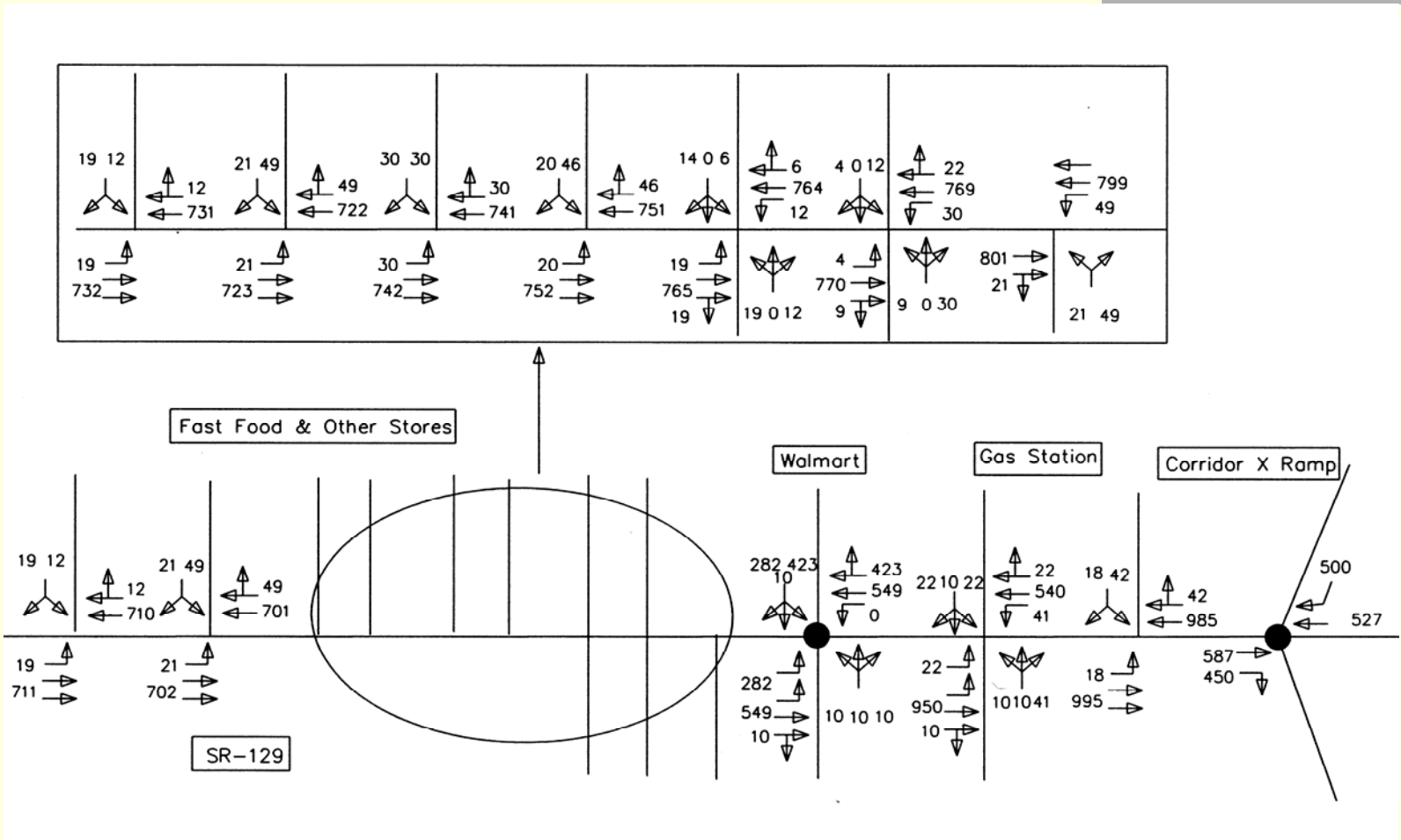
“New” Case Study

Development Type	Trips Base On	Trips In + Out/ daily
Bank	6,000 sq feet	252
Motel	200 rooms	94
Fast Food -2	4,000 sq feet	140 (each)
Gas Station -2	12 pumps	160 (each)
Truck Stop	13 acres	102
Light Industries	200 acres	100
Wal-Mart	135,000 sq feet	1,410

Source: (*ITE Trip Generation Manual 7th Ed.*)

Land Use of SR-129/Future I-22 Interchange for 2025 Scenario

“New” Case Study

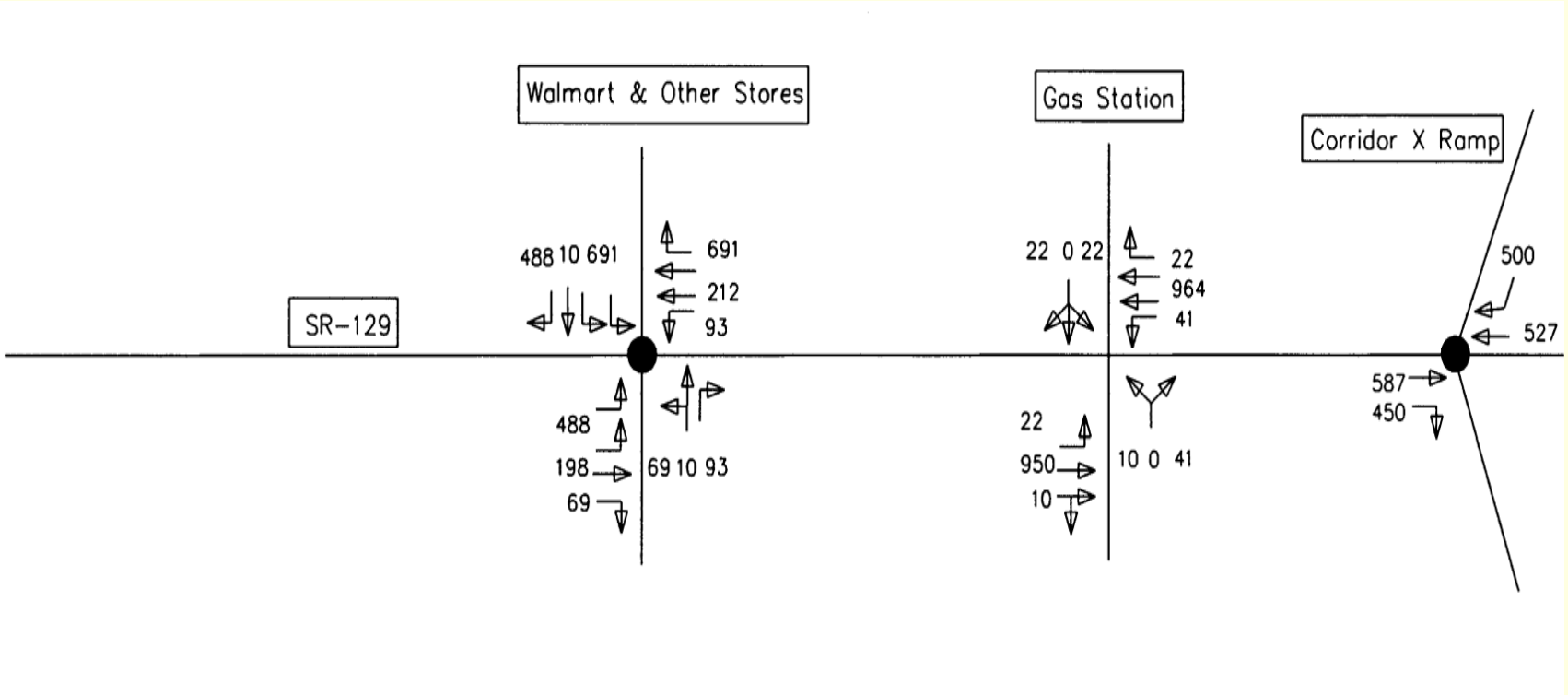


SR 129/Future I-22 – projected turning movements without access management

Proposed (i.e., modeled) Access Management for SR 129

- **Consolidation** of unnecessary access points
- Implementation of the **frontage road**;
- Maintaining minimum required **distance to signalized intersection** considering the site distance limitations
- **Right turn bay** is provided at the main intersection. each other and there is possibility of increasing the distance between them.

“New” Case Study



SR 129/Future I-22 – projected turning movements with access management

New results

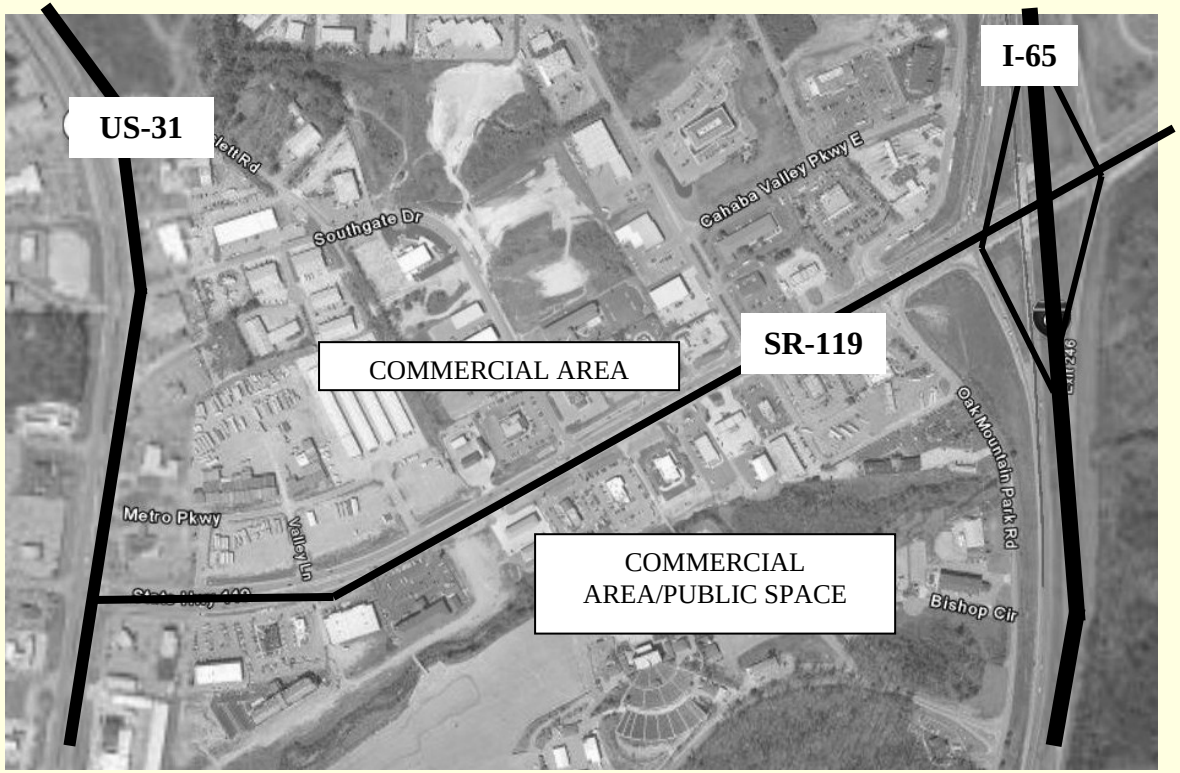
Comparison of access management scenarios for SR 129

Scenarios MOEs	Without access management	With access management
Systemwide VMT	9,493	9,398
Systemwide VHT	283	268
Avg. Spd (mph)	33	35
Total Delay (hrs)	75	56

“Retrofit” Case Study

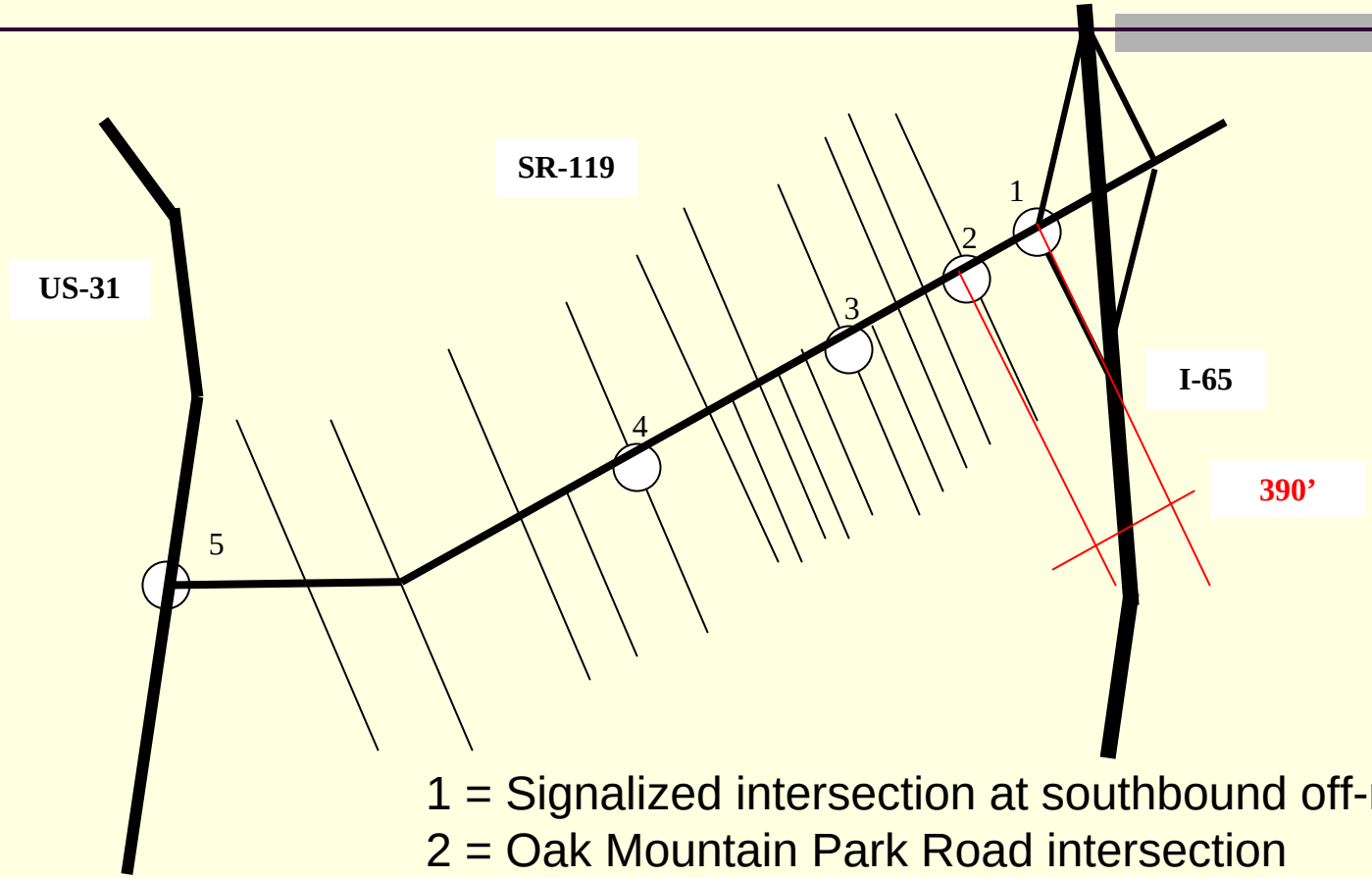
- Analyze existing congested crossroad to determine potential improvements gained by retrofitting access management treatments
- Existing turning movements
- Model existing geometry
- Propose access management strategies and model with redistributed turning movements

“Retrofit” Case Study



Land Use and Aerial Map of SR-119/ I-65 Interchange

“Retrofit” Case Study



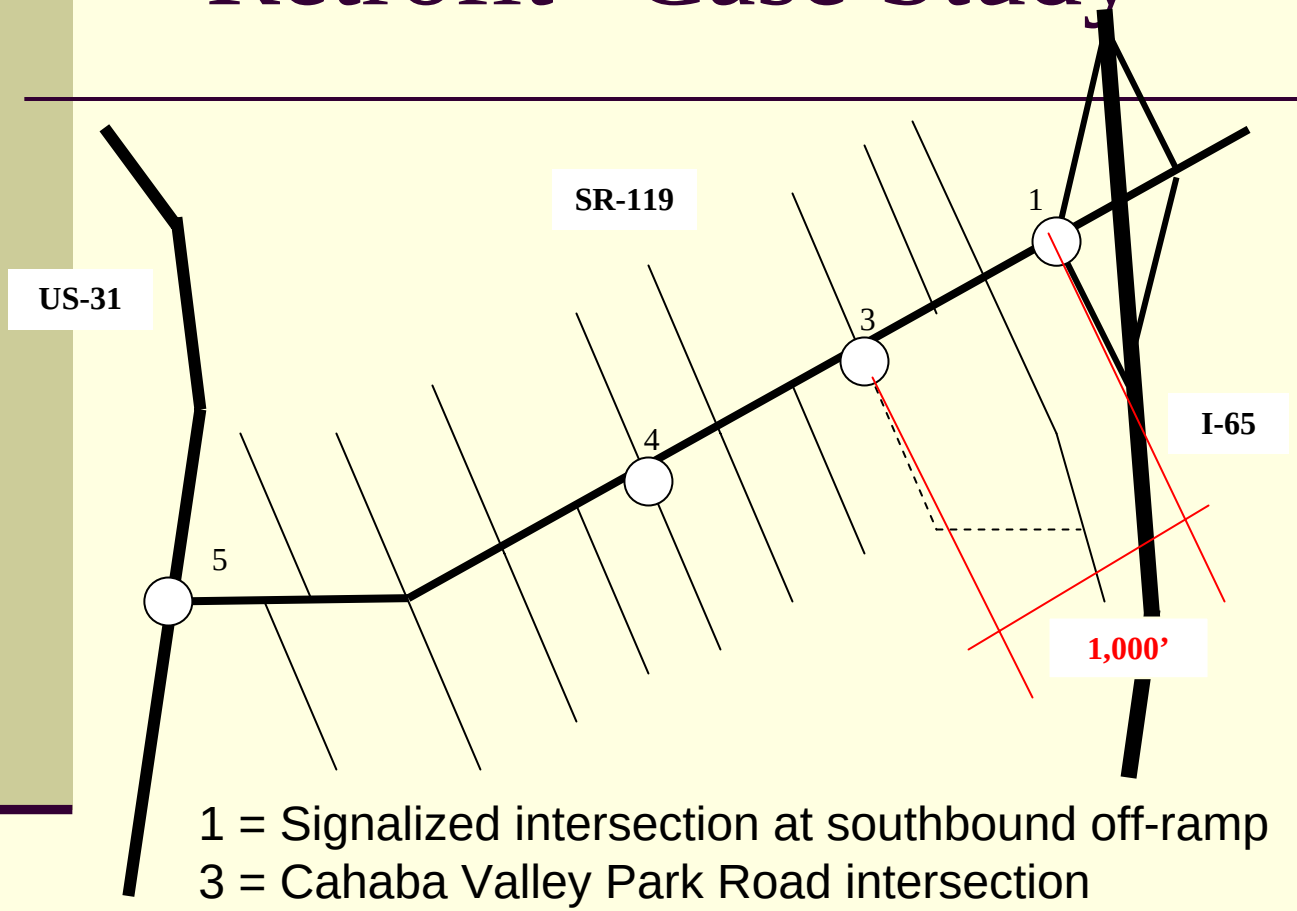
1 = Signalized intersection at southbound off-ramp
2 = Oak Mountain Park Road intersection
3 = Cahaba Valley Park Road intersection
4 = Fast food access drive
5 = US-31 intersection

SR-119/I-65 Interchange without access management (existing)

Proposed (i.e., modeled) Access Management Retrofits for SR 119

- **Eliminate the first signalized intersection** and redistributing traffic turning left to next intersection downstream from the interchange. Convert both approaches to the intersection nearest to the interchange (i.e., Oak Mountain Park) were converted to channelized right-in/right-out (RIRO).
- Provide **raised median** along crossroad **to disallow left turning traffic**.
- Provide **U turn phase** at ramp signal.
- Relocate some driveways were to allow **shared access** to adjacent properties.
- Provided **left and right turn bays** at all intersections and access points.
- **Consolidate access points** according to the following criteria:
  - If the development has approach from the side road or backage road.
  - If internal circulation was possible among adjacent sites
  - If two necessary driveways were close to each other and there is possibility of increasing the distance between them.

“Retrofit” Case Study



1 = Signalized intersection at southbound off-ramp
3 = Cahaba Valley Park Road intersection
4 = Fast food access drive
5 = US-31 intersection
-- = new connection for left-turn access to and from Oak Mountain Park Road

SR-119/I-65 Interchange with access management (proposed)

Retrofit results

Comparison of access management scenarios for SR 119

Scenarios MOEs	Without access management	With access management
Systemwide VMT	1,588	5,761
Systemwide VHT	3,025	504
Total Delay (hrs)	2,979	338

Retrofit results

Comparison of access management scenarios on I-65 southbound ramp

Scenarios MOEs	Without access management	With access management
Left-turn max. queue (ft)	1,145	556
Left-turn avg. queue (ft)	1,022	225
Right-turn max. queue (ft)	516	459
Right -turn avg. queue (ft)	494	160

Retrofit results

Comparison of access management scenarios along adjacent section of SB I-65

Scenarios	Without access management	With access management
Avg. Speed upstream of SR 119 ramp (mph)	1	36

Conclusions

- Simulation is a useful tool for evaluating potential operational benefits of access management
- Implementation of access management in the vicinity of an interchange improves traffic operations.
- Eliminating/prohibiting major access points within the first 1,000 feet from the interchange may provide substantially improved operations
- More potential benefits attributable to reduced conflict points.

Questions?

- Thank you