Iowa Corridor Management Pilot Project Overview

Recommendations For A Corridor Management Program

August 2004

Presentation Overview

- Project goals
- Pilot project selection process
- Analysis results
  - Segment types 1, 2, and 3
  - Driveway and traffic signal inventory/density analysis
  - Safety
  - Land use
- Key findings
  - Segment types and their typical issues
- Recommended program (summary)
  - Retrofit studies on existing corridors with issues (mainly Segment 1 situations)
  - Corridor management agreements on corridors where future corridor management issues are likely to arise (Segment 2 situations)
  - Cooperative planning with local jurisdictions (Segment 3 situations)

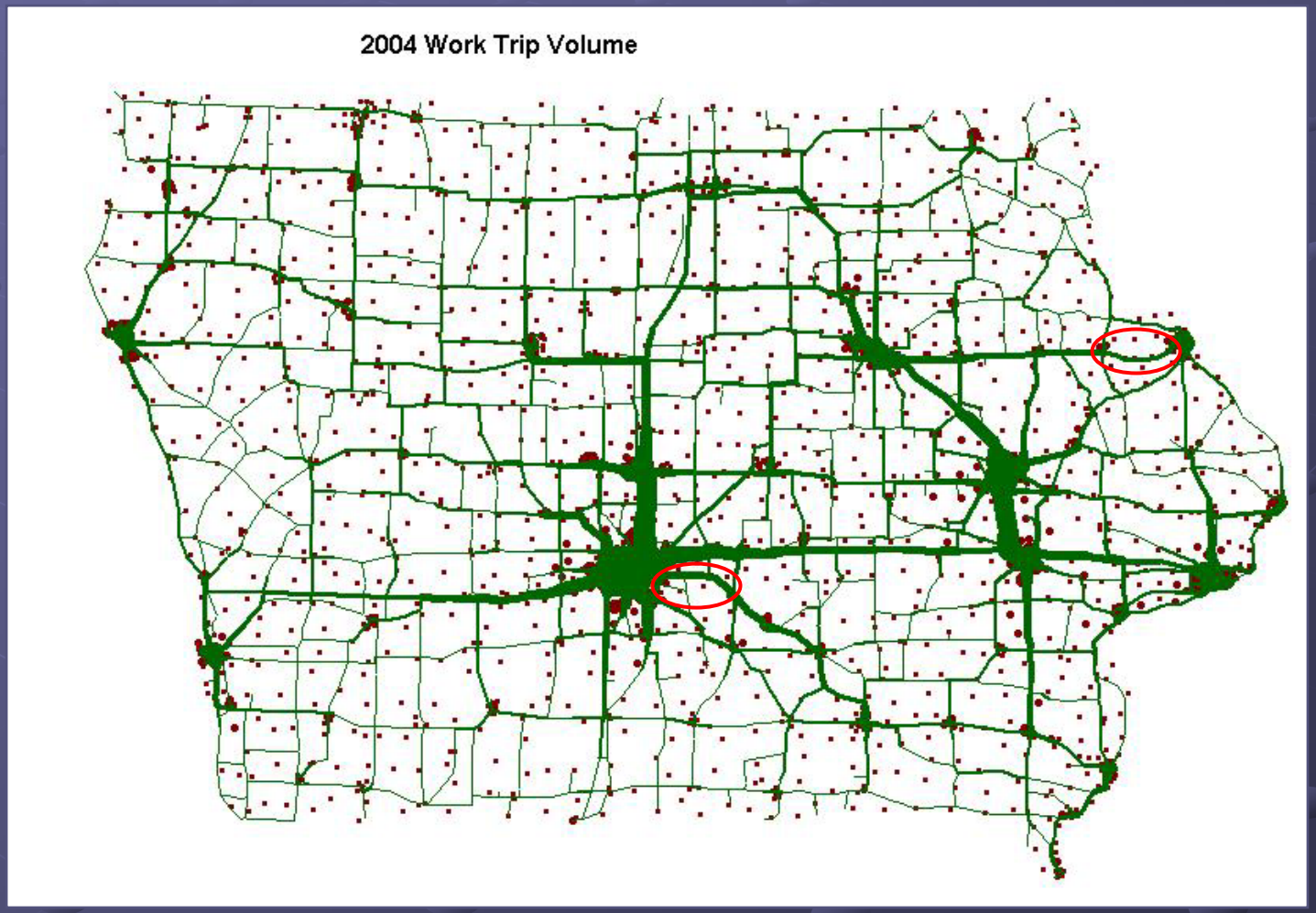
Project Goals

- Identify typical Iowa corridor management issues and problems
- Develop safety and land use analysis techniques to be used on other corridors
- Develop a framework for corridor management in Iowa
- Involve several Iowa DOT offices plus Districts and metropolitan/regional planning organizations

Corridor Planning Pilot Project Selection Process

- Two pilot projects were selected by Iowa DOT management
- Both of the pilot corridors selected for detailed analysis ranked in the top ten in a previous study that identified the top priority candidates for corridor management in Iowa based on:
  - Crash statistics
  - Importance for commuting
  - Likelihood of future access management issues

Key Commuting Routes In Iowa: 2004 Estimated Work Trips



Three Corridor Segment Types

1 Urban
2 Fringe
3 Rural

Urban Segments

- "Segment 1"
  - Urbanized
  - Largely built out
  - Predominately commercial land use
  - Relatively well-managed in terms of commercial driveway density and medians
  - Relatively high traffic signal density
  - Low incidence of left-turning crashes; higher rates of right turn and (especially) rear-end collisions at traffic signals
  - Some opportunity for retrofit access management improvements

US 20 Urban Segment (1)

Fringe Segments

- "Segment 2"
  - Urbanizing (suburban and urban fringe)
  - Largely undeveloped
  - Considerable land development potential
    - Likely use: mixture of commercial, industrial, and large lot residential
  - Relatively well-managed in terms of commercial driveway density and medians at present
  - A few traffic signals at major intersections or ramps
  - Low incidence of left-turning crashes; higher rates of right turn and rear-end collisions
  - Considerable potential for *future* access management problems

US 20 Fringe Segment (2)

Rural Commuter Route Segments

- “Segment 3”
  - Rural, but within 30 minute commuter range
  - Largely undeveloped
  - Predominately agricultural land use
  - Relatively well-managed in terms of commercial driveway density and medians
  - No traffic signals
  - Low incidence of left-turning crashes; low rates of right turn and rear-end collisions
  - Opportunities for “spot” access management problems at a few locations

US 20 Rural Segment (3)

Example Analysis Results: US 20 Corridor Near Dubuque

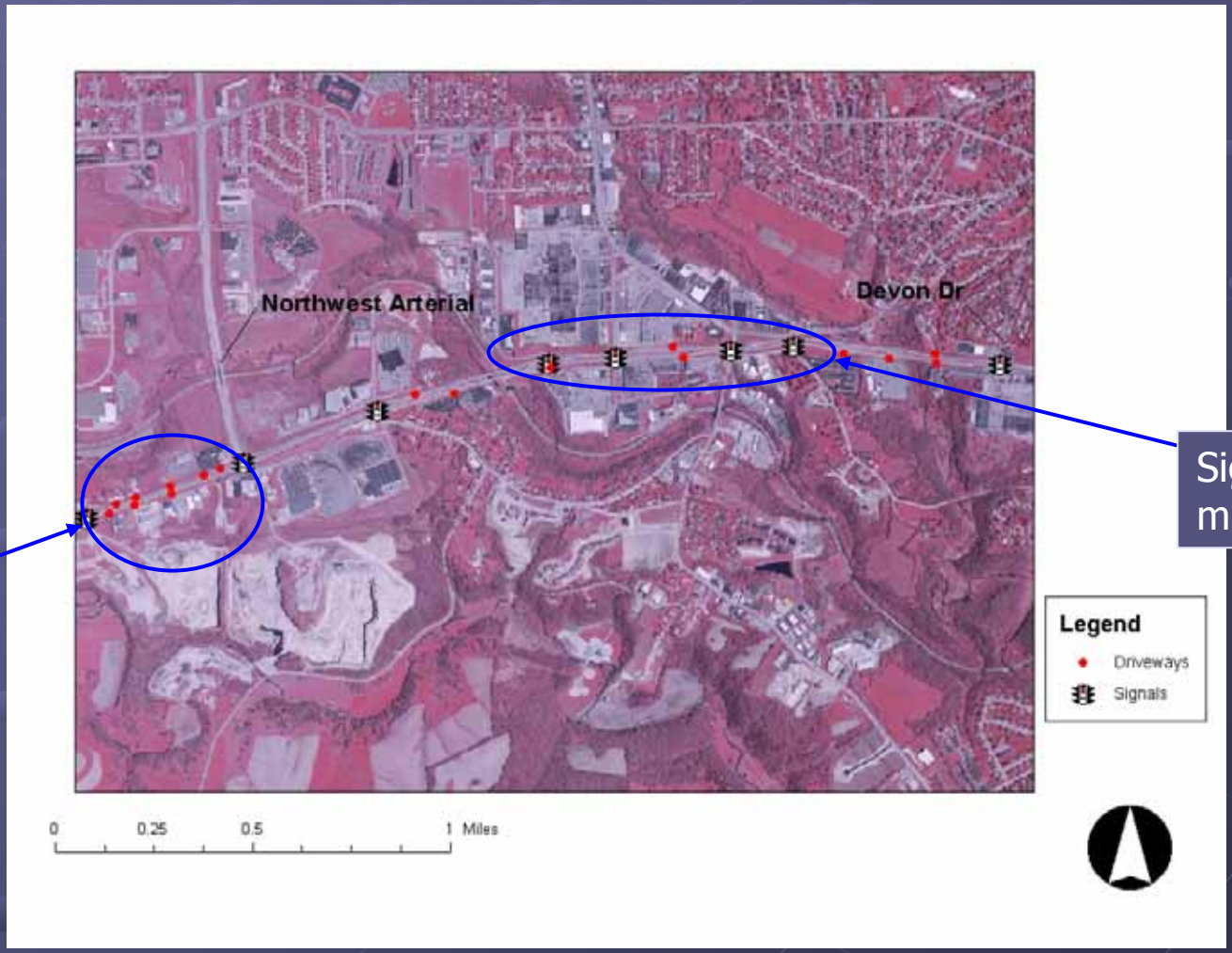
- Driveway locations and density
- Traffic signal location and density
- Safety: crashes frequency, type, and rate
- Land use: present and planned future

Driveway Density Analysis: US 20

	Segment Length	Driveway Count	Driveways/ Mile
Segment 1	2.0 miles	9	4.5 (low)
Segment 2	8.0	30	3.8 (low)
Segment 3	15.8	5	0.3 (very low)

Segment 2 has several instances of moderate density.

Traffic Signals And Driveways: Segment 1 And Portion Of Segment 2 US 20 In Dubuque



High driveway density

Signals <0.5 mile spacing

Segment 2 Driveways

Areas of concern

Segment 3 Driveways

Very well managed segment

Safety Analysis

- Crash frequency
  - Focus on access-related crashes
  - Left-turn, right-turn, and rear-end collisions
- Access-related crash rates
- Access-related crash severity

Current Safety Analysis US 20: Access-Related Crashes

	Segment 1	Segment 2	Segment 3	Corridor
Rear End	67 (35%)	27 (25%)	0 (0%)	94 (26%)
Right Turn	18 (9%)	8 (7%)	1 (2%)	27 (7%)
Left Turn	1 (1%)	3 (3%)	3 (5%)	7 (2%)
All Access-Related	86 (44%)	38 (35%)	4 (6%)	128 (35%)
Total Crashes	194 (100%)	108 (100%)	64 (100%)	366 (100%)

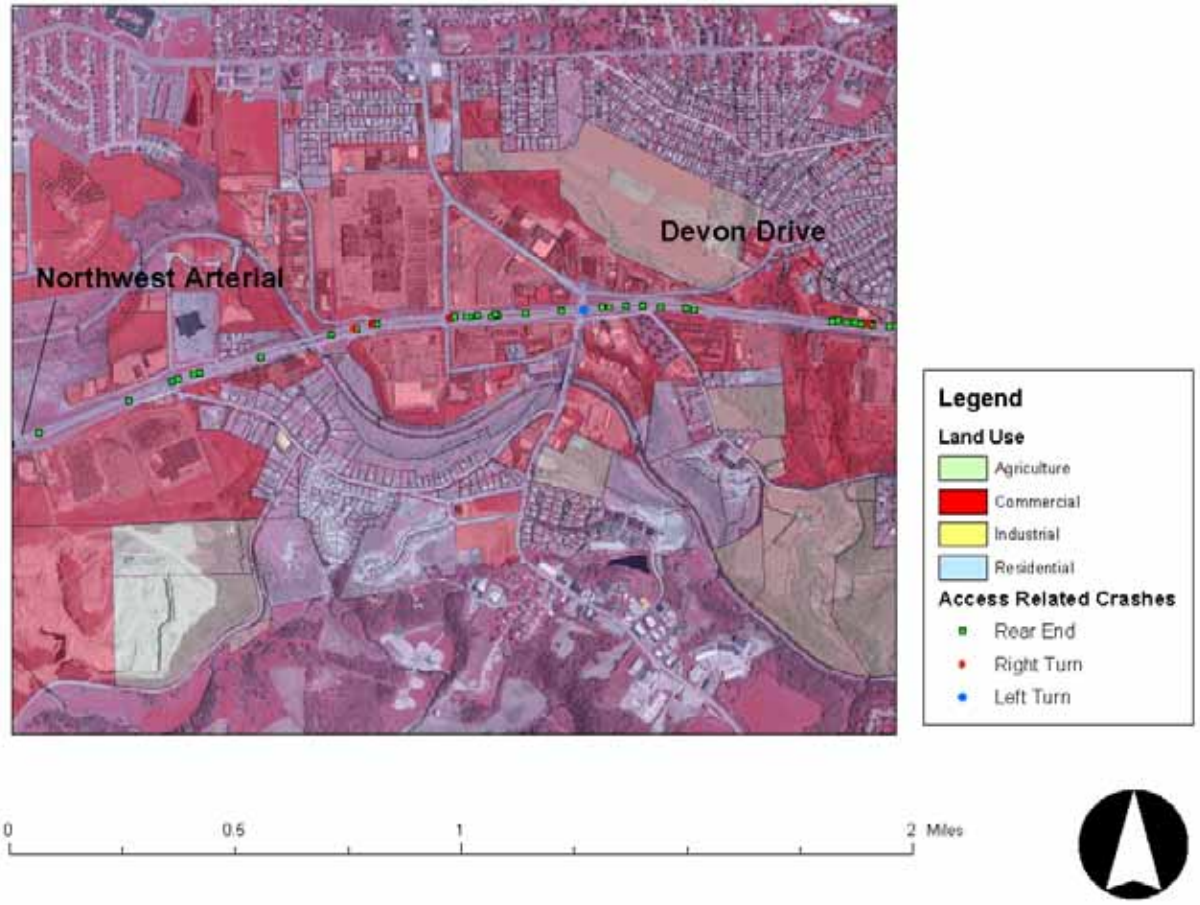
Note: Columns do not total to bottom number. Difference is non-access crashes.

Access-Related Crash Rates US 20

	Segment 1	Segment 2	Segment 3
Access-Related	4.2 (Moderate)	1.5 (Low)	Near Zero

Probable access-related crash rates per million vehicle-miles traveled. Includes right-turn, left-turn, and rear-end collisions.

Crash Hot Spots: Segment 1 Rear-End Collisions Predominate



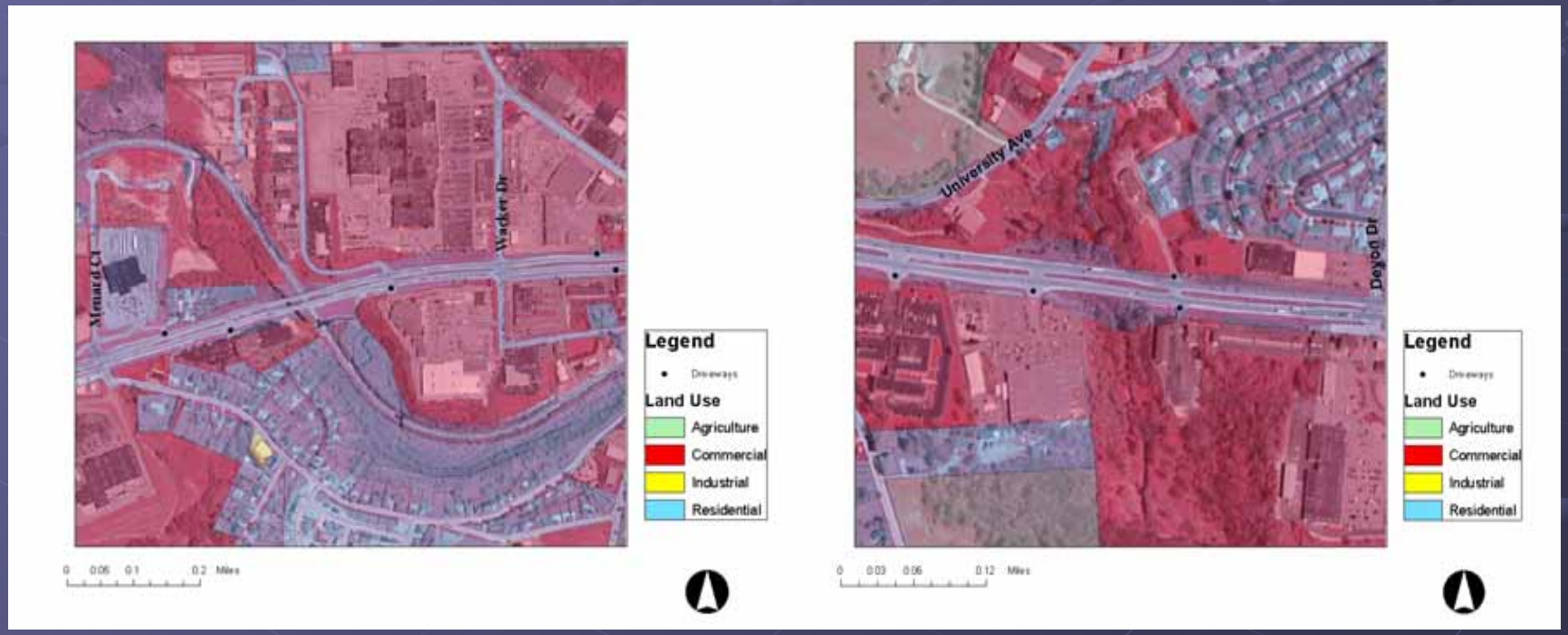
Safety Analysis For US 20: Conclusions

- **Overall**
  - Roughly 35% of all crashes in the corridor are access-related, but these are concentrated in the urban and suburban portions (Segments 1 and 2)
  - Access-related crashes tend to be severe
  - Driveway densities are generally not high on the route, but there are several concentrations of commercial driveways that could be consolidated
- **Segment 1**
  - Has significant numbers of rear-end collisions and right turn crashes
  - This is consistent with a multilane divided corridor with a high public road intersection density and high traffic signal density
- **Segment 2**
  - Has a less significant access-related safety problem than Segment 1
  - There are three problem sub-segments
  - Some safety problems are associated with public road intersections rather than with driveways
- **Segment 3**
  - Safety problems are generally not access-related (crashes are run off the road, weather-related, animal crashes, etc.)

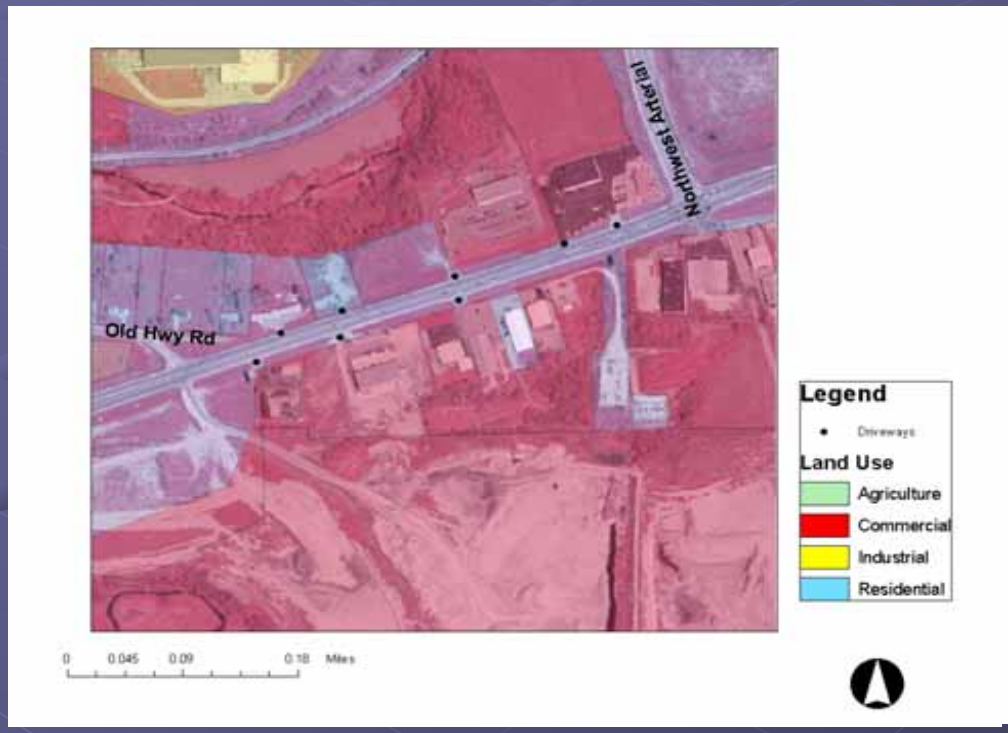
Land Use Analysis

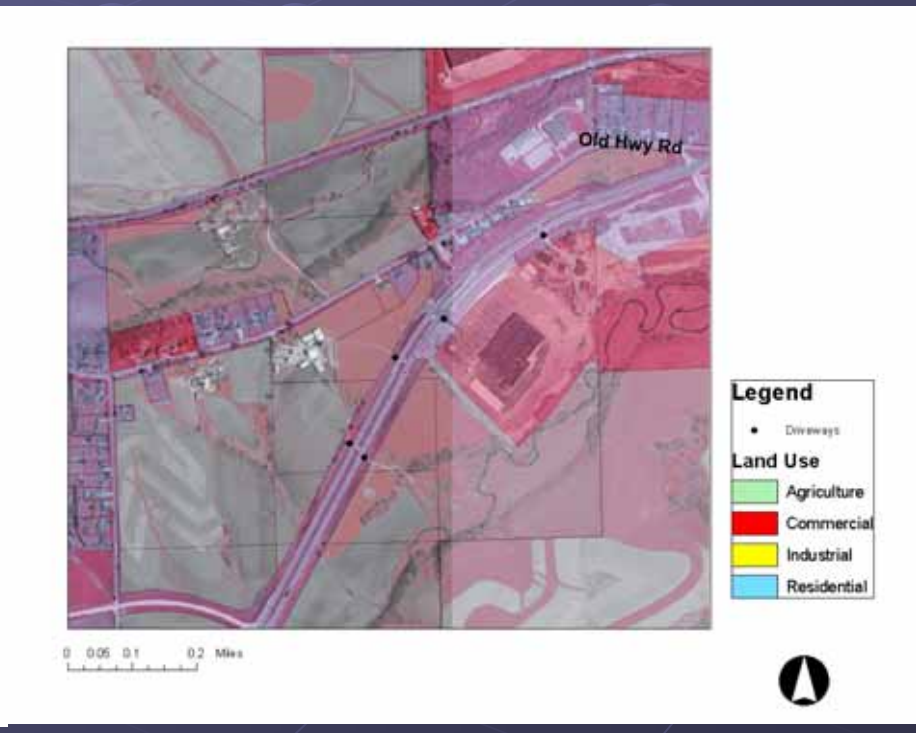
- Analysis process employed current and projected future land development in GIS format
- Segment 1
  - Largely commercial
  - Essentially built-out; little potential for further development except if re-developed
- Segment 2
  - Mixture of commercial, industrial, and agriculture
  - Considerable potential for new commercial and industrial development with associated demand for driveways
- Segment 3
  - Largely agricultural except in and around cities
  - Limited development at the edges of small cities

Segment 1: Largely Commercial And Mainly Built-Out



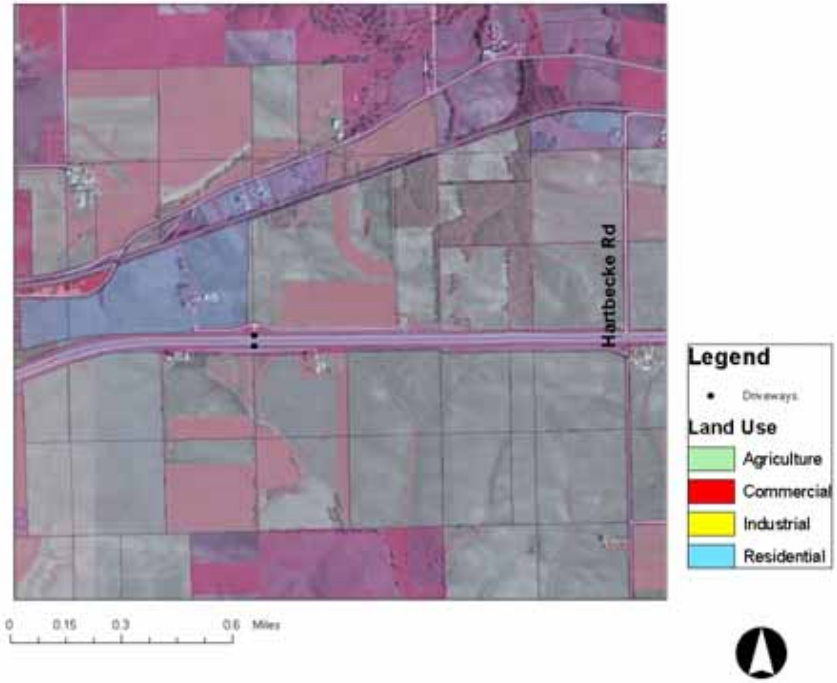
Segment 2: Mixed Land Use With Much Room For More Development

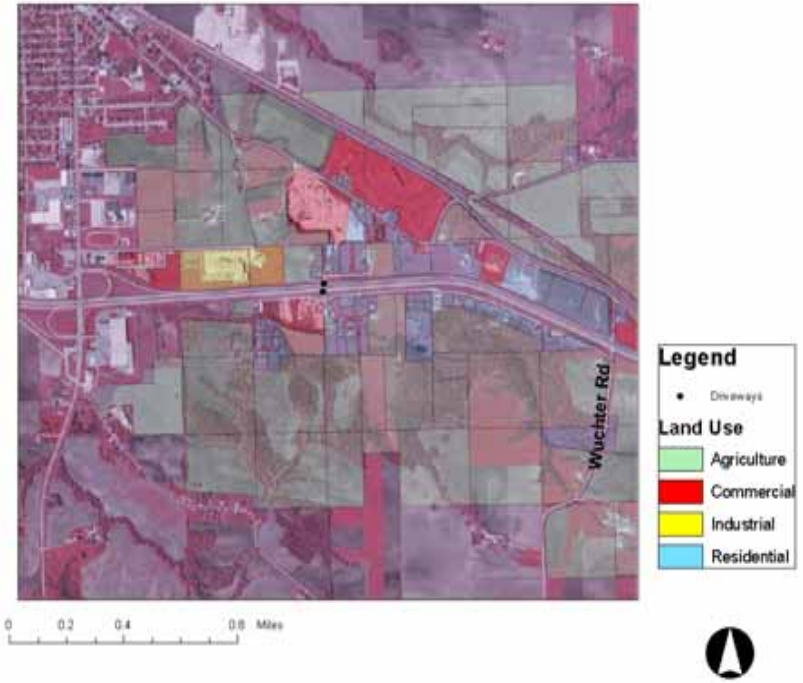




Classic "strip" development

Segment 3: Mainly Agricultural With Mixed Use Near Cities

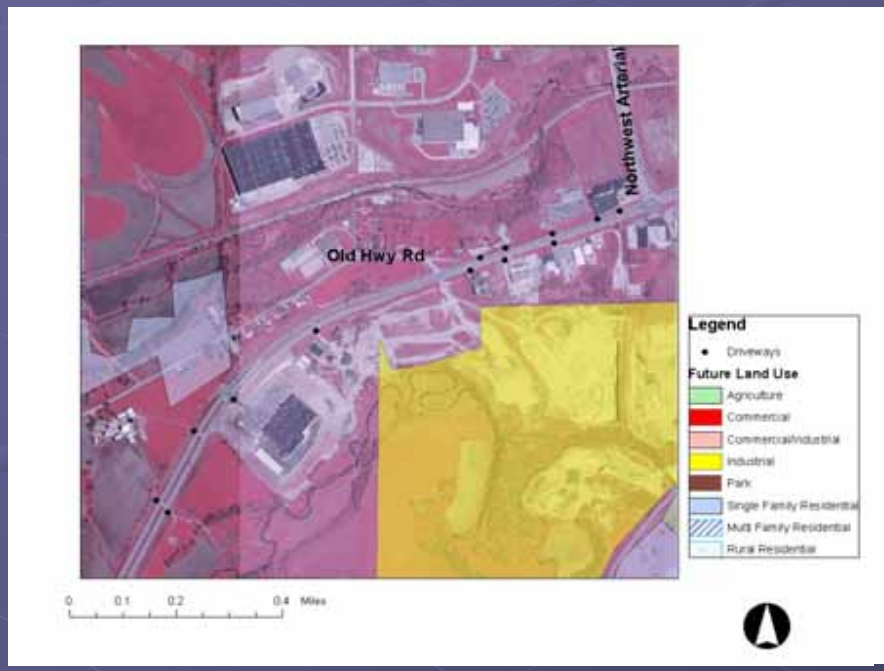


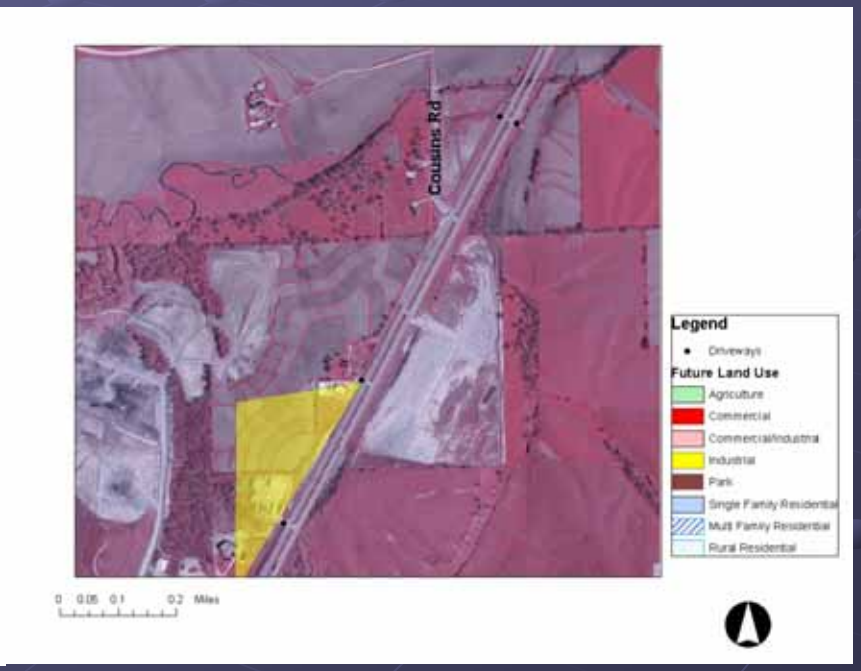


Future Land Use Analysis: US 20

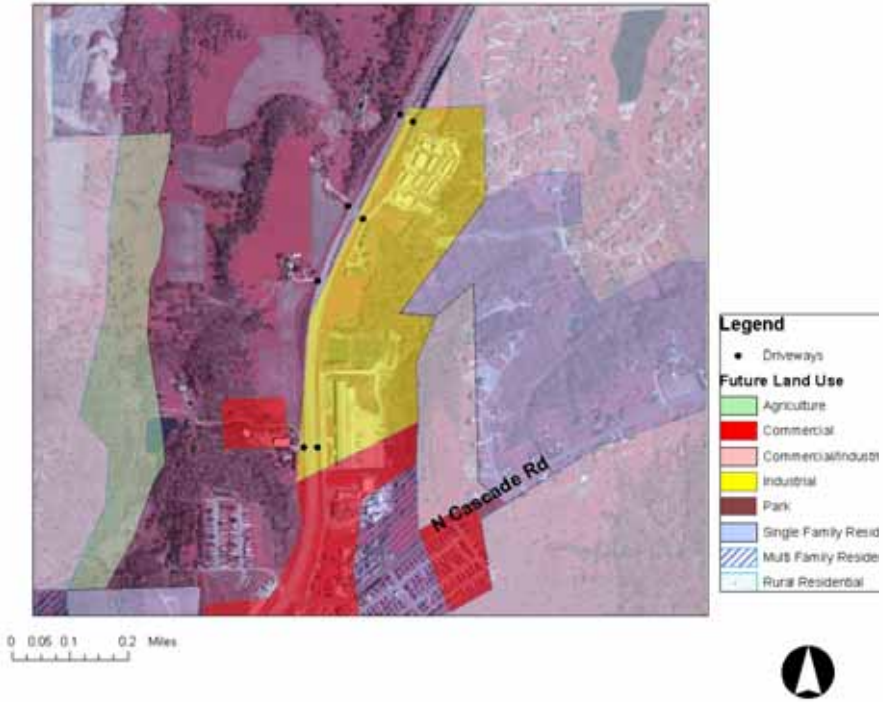
- Segment 1 will continue to exist as a commercial strip with some changes in individual parcels and businesses
- Segment 2 will likely continue to develop as a commercial/industrial strip (eastern half) and large lot residential (western half)
  - This segment has (by far) the most potential for future land development
- Segment 3 will likely remain largely agricultural except in and near Peosta, Epworth, Farley, and Dyersville (small cities along the corridor)

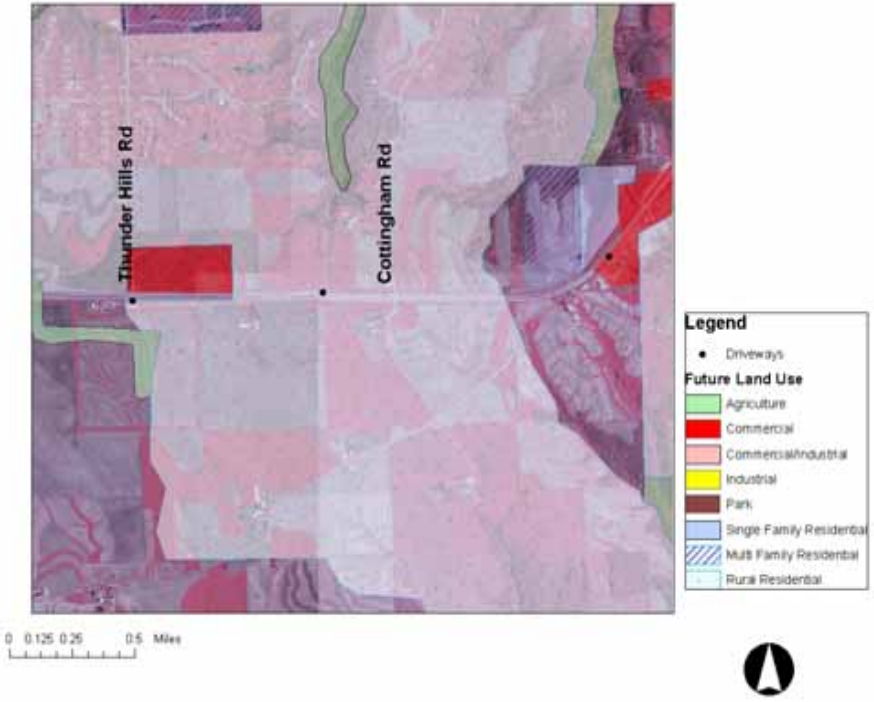
Segment 2: Planned Industrial Development (Yellow)



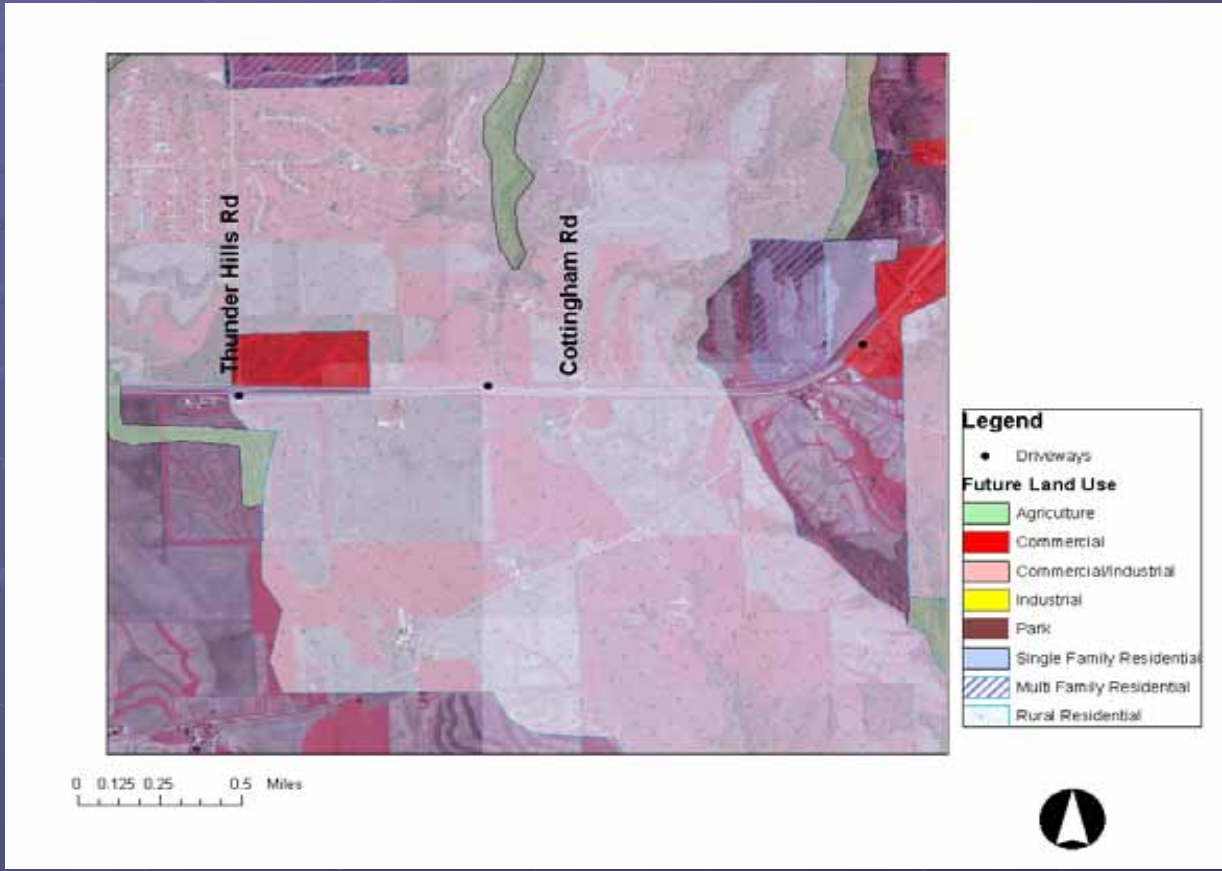


Segment 2: Planned Development At The Dubuque Fringe (Yellow and Red)



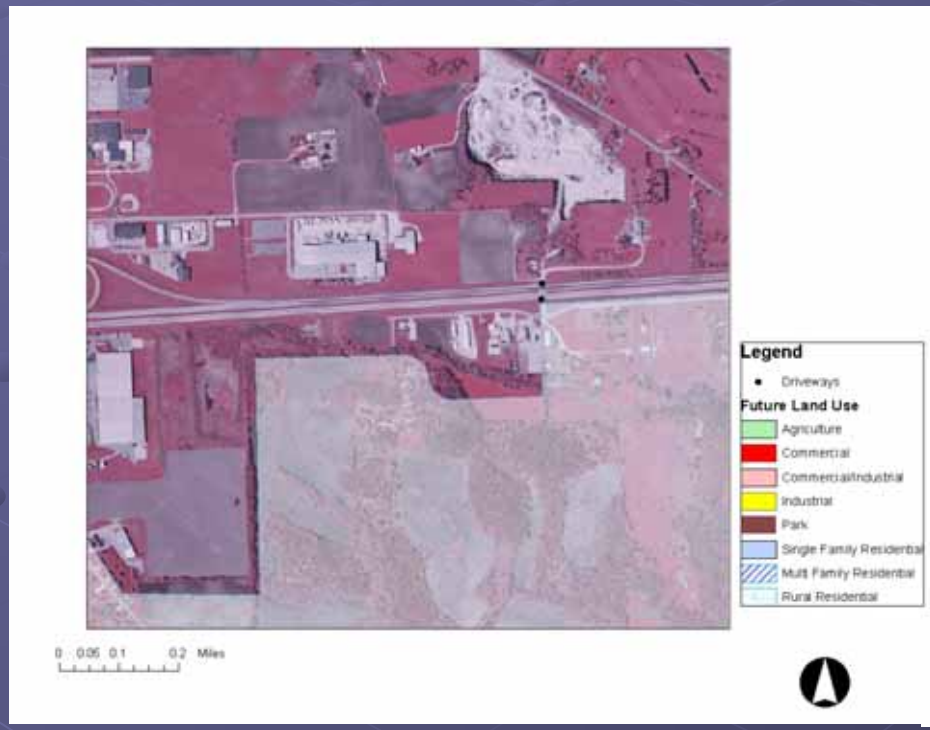


Large Portions Of Segment 2 Are Planned As Low Density Residential



Commercial uses (red) are clustered—positive feature

Segment 3:
Limited New Development Planned



Corridor Management Issues By Segment Type

- Segment 1
  - High density of public road intersections and median breaks
  - High density of traffic signals
    - Close spacing leads to a decline in mean travel speed, reduction in LOS, and an increase in rear end collision rates
  - Lack of dedicated turning lanes at major intersections
  - Discontinuous frontage road system
    - Frontage road system too close to the mainline
  - A handful of direct driveway accesses could be closed or consolidated

Corridor Management Issues By Segment Type

- Segment 2
  - Several areas with direct driveway accesses that could be closed or consolidated
  - Areas of high crash rates that are usually related to land development and access decisions
  - Discontinuous frontage road system
  - Large potential for future access management issues as land develops
    - Especially important in areas slated for commercial and industrial development

Corridor Management Issues By Segment Type

- Segment 3
  - “Spot” safety issues associated with individual developments
  - Examples:
    - Existing and potential commercial development near Farley and Epworth located around at-grade intersections
    - Large, new BMX (cycling) facility located in a rural area

Overall Corridor Management Goals

- Reduce at-grade public road intersection density (full intersections), full median break density, and traffic signal density along Segment 1
- Reduce direct driveway accesses where possible through driveway sharing and alternative access way development along Segment 2
- Develop a complete frontage and backage road system where appropriate with a substantial separation from the mainline
- Improve land use planning along Segments 2 and 3 so that new commercial developments are clustered around existing and planned interchanges
- Clear commercial driveways a reasonable distance away from interchanges and major intersections

“Ideal” Corridor Configuration

- Segment 1
  - Urban expressway with high level of access control (or a freeway)
  - 45-55 mph mean travel speed
  - Traffic signals spaced at least ½ mile apart
  - No direct driveway accesses
  - Full frontage road system with accesses to mainline at interchanges at least ½ miles apart (ideally 1 mile apart)
- Segments 2 and 3
  - Suburban/rural expressway with high level of access control
  - 55-65 mph mean travel speed
  - Full median break spacing >1 mile (no traffic signals)
  - Driveway spacing >0.25 miles (right-in right out only, where possible)
  - Backage road system with accesses to mainline separated at least 1 mile

Suggested Iowa Corridor Management Program Framework

- Segment 1
  - Develop retrofit access management plans
- Segment 2
  - Develop corridor management 28E agreements
  - New Iowa US 6 agreement as a model (District 4, Iowa DOT)
  - NCHRP Synthesis as a tool
- Segment 3
  - Cooperative planning with local land use planning jurisdictions
  - Spot corridor safety improvements
- Overall
  - Improved inventories of driveway permit locations, access priority classification levels, and access rights obtained
  - Automated access permitting system?

Suggested Items To Be Addressed In A Retrofit Access Management Study

- Segment 1 Situations
  - Inventory: driveways, medians,
  - Safety analysis: crash rates, locations, and types
  - Present and future land use
  - Traffic signal location and spacing
  - Improved traffic control systems
  - Dedicated turning lanes
  - Frontage or backage road system and internal circulation in adjacent developments
  - Consolidation and clearance of commercial driveways

Suggested Items Recommended To Be Included In A Corridor Management Intergovernmental Agreement

- Segment 2 Situations
  - Public road interchanges and intersections
  - Traffic signal locations
  - Medians and median break locations
  - Driveway locations and directions (e.g. right-in, right-out)
  - Dedicated turning lane locations
  - Alternative access ways (e.g. development of frontage and backage road systems)
  - Generalized land use planning

Items That Could Be Pursued In Rural Parts Of Corridors

- Segment 3 Situations
  - Some communities along key commuting corridors have no comprehensive land use plans or badly outdated plans
    - Encourage them to develop and update plans
  - Cooperatively review new development proposals for potential access and safety issues, especially those that involve commercial and industrial development
  - Conduct “spot” safety and access analyses at current and potential problem locations

Expected Benefits Of A Corridor Management Program

- Preservation of the Iowa DOT's multi-million dollar investments in major corridors
- Maintain mean travel speed and LOS, especially on Segment 1s
- Lower rear-end collision rates (mainly on Segment 1s)
- Lower right and left turning crash rates (mainly on Segment 2s)
- Preservation of Segment 3s, which are generally well-managed and safe now
- Maintenance of business environment on Segment 1s, which might otherwise begin to suffer due to higher travel times and greater congestion

Current Program Status

- Several Iowa DOT offices (Development, Location, Safety, Planning) are involved
- Each Iowa DOT District (1 through 6) is identifying a corridor for which an Intergovernmental Corridor Management Agreement will be developed between Iowa DOT and local governments
- Retrofit access management studies are being programmed as needed
- MPOs and Regional Planning Affiliations being included as partners

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