FUTURE TRANSPORTATION ISSUES

- Kevin Mahoney, Director
  Highway Division
- John Adam, Director
  Statewide Operations Operations Bureau
- Sandra Larson, Director
  Research & Technology Bureau
- Mitchell Dillavou, Director
  Engineering Bureau
HIGHERWAY DIVISION ORGANIZATION

Director

Engineering Bureau
- Office of Road Design
- Office of Bridges & Structures
- Office of Location & Environment
- Office of Right of Way
- Office of Traffic & Safety
- Project Scheduling

Research & Technology Bureau

Statewide Operations Bureau
- Office of Construction
- Office of Contracts
- Office of Local Systems
- Office of Materials
- Specifications Section

Districts:
- District 1
- District 2
- District 3
- District 4
- District 5
- District 6

FTEs: 2,331
Budget: $188.8 m
Program: $400 m
<table>
<thead>
<tr>
<th>Design - 146 FTEs</th>
<th>Right of Way - 75 FTEs</th>
<th>Project Scheduling - 3 FTEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>- design policies and standards</td>
<td>- right of way design</td>
<td>- develop and maintain online reporting system</td>
</tr>
<tr>
<td>- erosion control projects</td>
<td>- property market value</td>
<td>- monitor and report project development status</td>
</tr>
<tr>
<td>- preliminary survey</td>
<td>- property acquisition</td>
<td>- coordinate development and programming activities</td>
</tr>
<tr>
<td>- aerial photography</td>
<td>- right of way management</td>
<td>- monitor project development and construction impacts on cash flow</td>
</tr>
<tr>
<td>- consultant design projects</td>
<td>- Bridges &amp; Structures - 84 FTEs</td>
<td>- Traffic &amp; Safety - 43 FTEs</td>
</tr>
<tr>
<td>- pavement/design/mgt./rehab</td>
<td>- hydraulics/preliminary design</td>
<td>- design and operation of signing, signals and lighting</td>
</tr>
<tr>
<td>- soil survey/design</td>
<td>- bridge &amp; structure final design</td>
<td>- manage safety programs, manage crash data and conduct safety studies</td>
</tr>
<tr>
<td>- project design</td>
<td>- consultant design projects</td>
<td>- advertising management</td>
</tr>
<tr>
<td>- vegetation management</td>
<td>- policies and standards</td>
<td>- fabricate, warehouse &amp; distribute signs</td>
</tr>
<tr>
<td>- rest area design</td>
<td>- bridge &amp; structure inspection</td>
<td>- access, utilities and work zones</td>
</tr>
<tr>
<td>- landscaping &amp; erosion control projects</td>
<td>- Superload truck permit analysis</td>
<td>- employee safety</td>
</tr>
<tr>
<td>- NEPA compliance</td>
<td>- Superload truck permit analysis</td>
<td>- spill recovery</td>
</tr>
<tr>
<td>- prehistoric/historic resource preservation</td>
<td>- regulated materials investigation/management</td>
<td>- employee safety</td>
</tr>
<tr>
<td>- Native American interests</td>
<td>- location and pre-location</td>
<td>- corridor preservation</td>
</tr>
<tr>
<td>- traffic noise studies &amp; abatement planning</td>
<td>- public involvement</td>
<td>- scenic byways</td>
</tr>
<tr>
<td>- 404 permit compliance</td>
<td>- scenic byways</td>
<td>- protected plants, animals, nature areas</td>
</tr>
<tr>
<td>- protected plants, animals, nature areas</td>
<td>- public involvement</td>
<td>- employee safety</td>
</tr>
<tr>
<td>- location and pre-location</td>
<td>- scenic byways</td>
<td>- spill recovery</td>
</tr>
<tr>
<td>- corridor preservation</td>
<td>- employee safety</td>
<td>- design and operation of signing, signals and lighting</td>
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<tr>
<td>- public involvement</td>
<td>- employee safety</td>
<td>- manage safety programs, manage crash data and conduct safety studies</td>
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<tr>
<td>- regulated materials investigation/management</td>
<td>- employee safety</td>
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<tr>
<td>- spill recovery</td>
<td>- employee safety</td>
<td>- fabricate, warehouse &amp; distribute signs</td>
</tr>
<tr>
<td>- employee safety</td>
<td>- employee safety</td>
<td>- access, utilities and work zones</td>
</tr>
</tbody>
</table>
## HIGHWAY DIVISION RESPONSIBILITIES

### Statewide Operations

<table>
<thead>
<tr>
<th>Contracts - 21 FTEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>- contract lettings</td>
</tr>
<tr>
<td>- bid estimates</td>
</tr>
<tr>
<td>- external civil rights program</td>
</tr>
<tr>
<td>- letting/cost data</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construction - 12 FTEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>- technical/administrative support for highway projects statewide</td>
</tr>
<tr>
<td>- coordination of quality improvement initiatives</td>
</tr>
<tr>
<td>- implement new technologies</td>
</tr>
<tr>
<td>- education, training, and technology transfer</td>
</tr>
<tr>
<td>- develop policies and provide guidance for construction practices</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials - 61 FTEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>- maintain AMRL accreditation</td>
</tr>
<tr>
<td>- QA of Materials per FHWA</td>
</tr>
<tr>
<td>- Final Materials audit authority</td>
</tr>
<tr>
<td>- research support and testing</td>
</tr>
<tr>
<td>- new technology &amp; materials evaluation</td>
</tr>
<tr>
<td>- Pavement Management data base</td>
</tr>
<tr>
<td>- pavement/structural testing &amp; evaluation</td>
</tr>
<tr>
<td>- geological investigations and research</td>
</tr>
<tr>
<td>- statewide quarry certification</td>
</tr>
<tr>
<td>- materials technician certification/ training program</td>
</tr>
<tr>
<td>- I.M. Administration &amp; policy implementation</td>
</tr>
<tr>
<td>- AASHTO Materials/Testing Reviews</td>
</tr>
<tr>
<td>- field &amp; central lab equipment mgmt</td>
</tr>
<tr>
<td>- Certification of District Materials labs</td>
</tr>
<tr>
<td>- statewide materials engineering &amp; Admin support</td>
</tr>
<tr>
<td>- calibration, testing, certification of: air meters for state, local, &amp; contractors; Motor Vehicle Enforcement Scales</td>
</tr>
<tr>
<td>- Manage Laser Lux/reflectivity testing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maintenance - 53 FTEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>- statewide winter/snow programs</td>
</tr>
<tr>
<td>- Adopt-A-Highway</td>
</tr>
<tr>
<td>- statewide performance measurement</td>
</tr>
<tr>
<td>- statewide work program</td>
</tr>
<tr>
<td>- Resource Management System</td>
</tr>
<tr>
<td>- Maintenance Management System</td>
</tr>
<tr>
<td>- equipment Repair Shop</td>
</tr>
<tr>
<td>- statewide rest area administration</td>
</tr>
<tr>
<td>- statewide line marking program</td>
</tr>
<tr>
<td>- statewide fleet administration</td>
</tr>
<tr>
<td>- division budget and personnel issues</td>
</tr>
<tr>
<td>- emergency operations</td>
</tr>
<tr>
<td>- maintenance policies &amp; standards</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Local Systems - 13 FTEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>- liaison w/ counties, cities, utilities</td>
</tr>
<tr>
<td>- administer federal/state-aid programs</td>
</tr>
<tr>
<td>- guidance for local agency projects</td>
</tr>
<tr>
<td>- funds &amp; reports for local agencies</td>
</tr>
<tr>
<td>- city/county agreements</td>
</tr>
<tr>
<td>- primary project &amp; TJ agreements</td>
</tr>
<tr>
<td>- utility agreements</td>
</tr>
<tr>
<td>- training for local agencies &amp; utilities</td>
</tr>
<tr>
<td>- Street Finance Report</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specifications - 3 FTEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>- coordinate development, implementation, and publication of specifications</td>
</tr>
<tr>
<td>- manage Specification Committee activities</td>
</tr>
<tr>
<td>- develop and produce Electronic Reference Library</td>
</tr>
<tr>
<td>- coordinate with SUDAS group for efficiency and compatibility of specifications</td>
</tr>
</tbody>
</table>
## HIGHWAY DIVISION RESPONSIBILITIES

### Research & Technology Bureau

<table>
<thead>
<tr>
<th>Research &amp; Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 FTEs</td>
</tr>
<tr>
<td>- division recruiting</td>
</tr>
<tr>
<td>- student co-op program</td>
</tr>
<tr>
<td>- quality initiatives</td>
</tr>
<tr>
<td>- leadership skills</td>
</tr>
<tr>
<td>- division IP plan</td>
</tr>
<tr>
<td>- strategic automation</td>
</tr>
<tr>
<td>- statistical analysis/design</td>
</tr>
<tr>
<td>- highway operations research</td>
</tr>
<tr>
<td>- advanced transportation technologies</td>
</tr>
<tr>
<td>- ITS</td>
</tr>
<tr>
<td>- Iowa Highway Research Board</td>
</tr>
</tbody>
</table>
# Highway Division Responsibilities

## Districts

- **Districts - 1,752 FTEs**
  - **District Engineer - 193 FTEs**
    - design minor projects for letting
    - represent DOT at public hearings
    - ROW for project construction
  - **Construction - 244 FTEs**
    - support of construction projects
    - project progress and vouchers
    - construction project administration
    - construction inspection
    - process all project voucher payments
    - maintain all field records for auditing
  - **Maintenance - 1,252 FTEs**
    - support of all maintenance activities
    - operational guidance for primary roads
    - operational strategies for winter activities
    - fleet maintenance strategies
    - winter snow/ice removal operations
    - emergency response to disasters/crashes
    - preventive maintenance
    - roadside maintenance
  - **Materials - 64 FTEs**
    - material supply sources
    - material inspection
    - contractor compliance
    - staff certifications
FUTURE TRANSPORTATION ISSUES

- Planning
- Road Funding Alternatives
- Safety
- Environmental
- Access Management
- Context Sensitive Design
STATE HIGHWAY PLANNING
Iowa Public Road System Mileage
(As of January 1, 2004)

Total Mileage: 113,861
Iowa Road and Street System Comparison

Length | VMT | Large Truck VMT

City | County | State
## State Highway System Stratification

<table>
<thead>
<tr>
<th>Category</th>
<th>Mileage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>782</td>
</tr>
<tr>
<td>Commercial and Industrial Network (CIN)</td>
<td>2,339</td>
</tr>
<tr>
<td>Other State</td>
<td>6,161</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9,342</strong></td>
</tr>
</tbody>
</table>
Traffic Growth by System

- Interstate
- CIN
- Other State

Millions of VMT

Level Of Service (LOS)

- System of measure that describes operational conditions within a traffic stream
- Letter ratings A thru F designate each level with A being the best operating conditions and F the worst
- Generally applies to ‘peak-hour’ conditions
LOS A

- Free flow speeds
- Ability to maneuver in traffic stream is completely unimpeded
- Avg. spacing between vehicles is about 530 ft. (26 car lengths)
LOS B

- Reasonably free flow
- Lowest avg. spacing between vehicles is about 330 feet (17 Car lengths)
- Ability to maneuver within traffic stream is slightly restricted
- General physical and psychological comfort is still high
- Minor incidents and point breakdowns are absorbed
LOS C

- Speeds are still at or near free flow speeds
- Freedom to maneuver is noticeably restricted.
- Lane changes require more care.
- Minimum avg. spacing is about 220 ft. (11 car lengths)
- Queues may be expected to form behind minor incidents or point breakdowns
LOS D

- Speeds begin to decline with increasing flows
- Freedom to maneuver is more noticeably limited
- Driver tends to experience reduced physical and psychological comfort
- Minor incidents can create queuing
- Minimum avg. vehicle spacing is about 165 ft. (8 car lengths)
LOS E

- Describes operation at capacity
- Vehicles are spaced at approximately 6 car lengths
- Minor disruptions can cause serious breakdown and extensive queuing
- Driver’s physical and psychological comfort level is poor.
LOS F

Beyond the capacity of the roadway
Total Iowa Freight Movements 2001-2011

2001
653 Million Tons

Through Tons: 41%
Intra-State Tons: 13%
Originating Tons: 27%
Terminating Tons: 19%

2011
742 Million Tons

Through Tons: 45%
Intra-State Tons: 9%
Originating Tons: 27%
Terminating Tons: 19%
Freight Value by Mode - 2001
Total $637 Billion
Iowa Truck Flows (To, From, Within)
VMT Growth vs. New Lane Miles

Index

Year

Total VMT
Truck VMT
Lane Miles

Average Daily Large Truck Increase
Iowa Rural Interstates 1980-2002
Truck as the Alternative to Rail
Increasing Truck Traffic
Wyoming Coal to Iowa Utilities
Iowa Corn to Foreign Countries
Iowa Tractors to China
Bicycle and Pedestrian Plan

Proposed Trails of Statewide Significance

- American Discovery Trail
- Mississippi River Trail
- Central Iowa Loop
- Iowa Great Lakes Connection
- Lewis and Clark Trail
Plan Guiding Principles

Moving people and goods through investments that strengthen our economic vitality.

Transportation investments should:
- Enhance our ability to compete economically
- Enhance Iowa’s natural resources
- Provide mobility and accessibility opportunities for everyone
## Plan Goals

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Efficiency</strong></td>
<td>To make the best use of resources</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td>To make Iowa a safer place to travel</td>
</tr>
<tr>
<td><strong>Quality of Life</strong></td>
<td>To make Iowa a better place to live, work and travel.</td>
</tr>
</tbody>
</table>
Iowa in Motion Directions

- Interstate system will have highest priority and be assured of adequate funding
- Increase Interstate system investment
- Maintain safe travel and to connect Iowa to regional, national, and international markets
- Maintain current pavement conditions
- Capacity improvements as needed generally in and around urban areas
Implementation of Iowa in Motion
Program Objectives

- Detailed analysis of Interstate, pavement preservation and bridge needs.
- Program Objectives: 2003-2007 Highway Program
  - Complete six priority corridors
  - Complete I-235
  - Interstate: Establish $190 million funding level for 2007 and beyond
  - Pavement Preservation: Maintain $100 million funding level
  - Bridges: Establish $35 million funding level for 2006 and beyond
- Safety: Discussions in early 2004 of $3 million to $5 million funding level
Priority Corridors

- Sioux City to Minnesota State Line
- Avenue of the Saints
- Des Moines to Marshalltown
- IA 5: I-35 to Knoxville
- US 151: Cedar Rapids to Dubuque
- Des Moines to Burlington
- Avenue of the Saints

Completion Dates
Current Schedule
- CY 2005
- CY 2006
- CY 2007
- CY 2008
- OPEN TO TRAFFIC
Commercial and Industrial Network

Legend:
- Interstate
- Designated Routes
- Future locations

Note: The Interstate and Commercial and Industrial Network comprise make up the national highway system.
Interstate Analysis

Annual Summary of Needs (x $1,000,000)

- Pavement: $103.0
- Capacity/Operational: $73.9
- Miscellaneous*: $14.1
- Total: $191.0

*Signing, Patching, Landscaping, Rest Areas
Pavement Condition Index (PCI)

- Measure of pavement condition only
- 0-100 rating representing the condition of state highway pavements (0 worst – 100 best)
- Tool to identify pavement improvement needs
Percentage of Interstate Which Meets or Exceeds Targeted Pavement Condition
Percentage of Primary System Which Meets or Exceeds Targeted Pavement Condition
Iowa DOT Bridges
(Exclusive of the Interstate)

Number of Bridges, Narrow Bridges & Deck by Age

Number of Bridges

Deck Area

SQ FT (1000s)

Year Constructed

Number of Bridges

Narrow Bridges**

Deck Area

* Bridges on and over Interstate Routes not included

** Narrow Bridges- Bridge narrower than approach roadway. These are included in "Number of Bridges"
Iowa DOT Bridges

Number of Bridges, Narrow Bridges, & Deck Area by Age

Year Constructed

- Number of Bridges
- Narrow Bridges
- Deck Area

* Bridges on or over Interstate Routes
** Narrow Bridges: Bridge narrower than approach roadway. These are included in "Number of Bridges"
Iowa Bridges on the Primary System

![Bar Chart]

- Functionally Obsolete
- Structurally Deficient
Safety Investment Strategy

Candidate Safety Projects

- Paved shoulders
- Milled in shoulder rumble strips
- 2-lane shoulder widening
- High severity crash intersections
- High severity crash 2-lane roads
- High crash curves
- Expressway intersections
- Centerline rumble strips
- Cross-median head-on crashes
ROAD FUNDING ALTERNATIVES
Existing Road Funding

- State RUTF (FY 05 - $1.1 billion)
  - Fuel Tax (FY 05 – 39 percent)
  - Registration Fees (FY 05 – 36 percent)
  - Use Tax (FY 05 – 21 percent)
- Federal Funding (~$375 million)
Impact of Hybrid/Alternative Fueled Vehicles

- **Hybrid Vehicles**
  - 2004 – 0.2 percent of vehicles on road
  - 2010 – 3 percent share of market
  - 2020-2025 – 15 percent share of market
  - Consume 10 to 50 percent less fuel than fleet average

- **Alternative Fueled Vehicles**
  - 0.02 percent of market share in 2020
Alternative Funding Mechanism: Pooled Fund Study

Preferred Methodology

- Per-mile based fee
- On-board computer and GPS
  - State boundaries are kept on computer
  - Mileage tracked within each state (backed up by odometer readings)
  - Each state’s per-mile fee stored on computer
- On-board computer calculates total fees by state and stores on smart card
- Periodically smart card is removed by user and entered into a reader. (e.g. gas stations)
- Encryption used to preserve privacy
Conclusions/Future Actions

- Biggest impact on revenue is inflation
- Hybrid vehicles will have an impact as will alternative fueled vehicles but well into the future
- Need to start planning now
  - Pooled fund studies
  - Reauthorization
- Need to address privacy concerns
Iowa’s Future Highway Safety Challenges

- Growth in travel
  - Increase in truck travel
- Changes in vehicle size and design (SUV)
- Population demographic shifts (older drivers)
- Changing driver behavior (aggressive driving)
- Increasing driver distraction (more vehicle-based devices)
- High-speed congestion
- Ability for local governments to incorporate low-cost safety improvements in resurfacing projects.
Iowa Seat Belt Use and Fatalities

- 14% of Iowa’s drivers remain unbelted
- ≈50% of Iowa’s crash fatalities were not wearing a seatbelt*

* A large number of victims are reported as passenger restraint “unknown”
“Back to the Basics”
Safety Investment Emphasis

- 52% of Iowa’s fatalities are related to “lane departure crashes.”

- Candidate projects focus on lane departure and identified high crash locations or conditions.
Iowa’s Roadway-Related Fatal Crashes

- **52%** of Iowa’s fatalities are related to Lane Departure
- **39%** of Iowa’s fatal crashes are single-vehicle Run-Off-the-Road (ROR)
HES
Safety Investment Strategy

Candidate Safety Projects

- Paved shoulders
- Milled in shoulder rumble strips
- 2-lane shoulder widening
- High severity crash intersections
- High severity crash 2-lane roads
- High crash curves
- Expressway intersections
- Centerline rumble strips
- Cross-median head-on crashes

7 of 9 address ROR crashes
ENVIRONMENTAL PERMITTING
Introduction

- One of the most strictly regulated aspects of our project development process
- ~ 40 major Federal and 20 State statutes, regulations and orders governing our environmental compliance mission
- Integrated decision-making process
- Includes human & natural
- Involves dependency on agencies/entities outside zone of direct influence
Concurrence & Approvals
(Major program areas)

- National Environmental Policy Act (NEPA)
  - Documents:
    - “Purpose and Need” - the reason for the project
    - Potential environmental impacts as a result of work on this project
    - Selected alternative for best balancing “Purpose and Need” vs impacts to Environment
    - Public involvement
  - NEPA document signed/approved by FHWA
Concurrence & Approvals (Cont)

- Archaeological & Historic Properties:
- SHPO advises FHWA as to conformance with the National Historic Preservation Act
- Endangered Species (Federal & State listed)
- Air Quality
Concurrence & Approvals (Cont)

- Environmental Justice
- Tribal Notification and Consultation
- 4(f) Properties
- 6(f) Properties
Permits

- Wetlands Protection (Section 404)
- State Water Quality (401)
- Floodplain Management
- Stormwater Discharge (NPDES)
- Coast Guard Permits
Major Stakeholders:

- **Sovereign Nations** (Native American Tribes)
  - Twenty seven (27) different tribes are recognized as having affiliation and interest in Iowa

- **Federal Agencies**
  - FHWA
  - Corps of Engineers
  - Environmental Protection Agency - Region 7
  - Coast Guard
  - Fish & Wildlife Service
  - Advisory Council on Historic Preservation
  - Natural Resource Conservation Service (NRCS)
  - National Park Service
  - Housing and Urban Development (HUD)
  - Homeland Security
Major Stakeholders (cont.):

- **State Agencies**
  - Iowa DNR
  - State Historic Preservation Office (SHPO)
  - Office of the State Archaeologist (OSA)
  - Iowa Dept. of Economic Development

- **Local Governments and Agencies**
  - Cities and Counties
  - Metropolitan and Regional Planning Agencies (MPO/RPA)

- **Public**
  - Anyone having an interest in a particular project including special interest groups
Massasauga
Turtle
Critter Barrier

Amphibian - Reptile Wall & Culvert Crossing
Critter Crossing
Shiner
Stream Baffles
Mitigation Site Construction
October 2003
Emergent Wetland
Freeway Site Pan View
Sound Wall Fill 3
Building the Iowa River Bridge
ACCESS MANAGEMENT
What Is a Corridor Access Management Plan?

- It is an agreement that involves both state and local jurisdictions.
- It defines how accesses are to be managed on a highway. (It may be specific or it may be general.)
What Does a Corridor Access Management Plan Do?

- It provides all the jurisdictions a set of rules to use for development of the property along the route.
- It puts in writing how accesses can be utilized so developers can plan accordingly.
What Is the Goal?

- Preserve the capacity of the highway.
- Safety
  - Reduce crashes
- Optimize $$$
- Optimize property.
Examples of Corridor Access Management Plans

- US 6 in Polk/Dallas Counties
- State of Iowa
- Clive
- Urbandale
- Waukee
1990 Clive to Waukee
2002 Clive to Waukee
2004 Clive to Waukee

- Signal location
- Non-signalized access
CONTEXT SENSITIVE DESIGN
Okoboji Lakes Bridge and Causeway
I-235
The Bridge at Keosauqua