Traffic Engineering 101 - The Basics

Understanding the basic principles and how these drive the decisions regarding traffic management in Louisiana

Traffic Engineering 101

March 22, 2010

- Purpose:
  - To provide an overview of engineering principles; guidelines & laws which govern traffic management in Louisiana
  - Discuss how DOTD's decisions impact local communities
  - Facilitate feedback & questions from local agencies on state and local traffic engineering issues

Make the Most of These Webinars

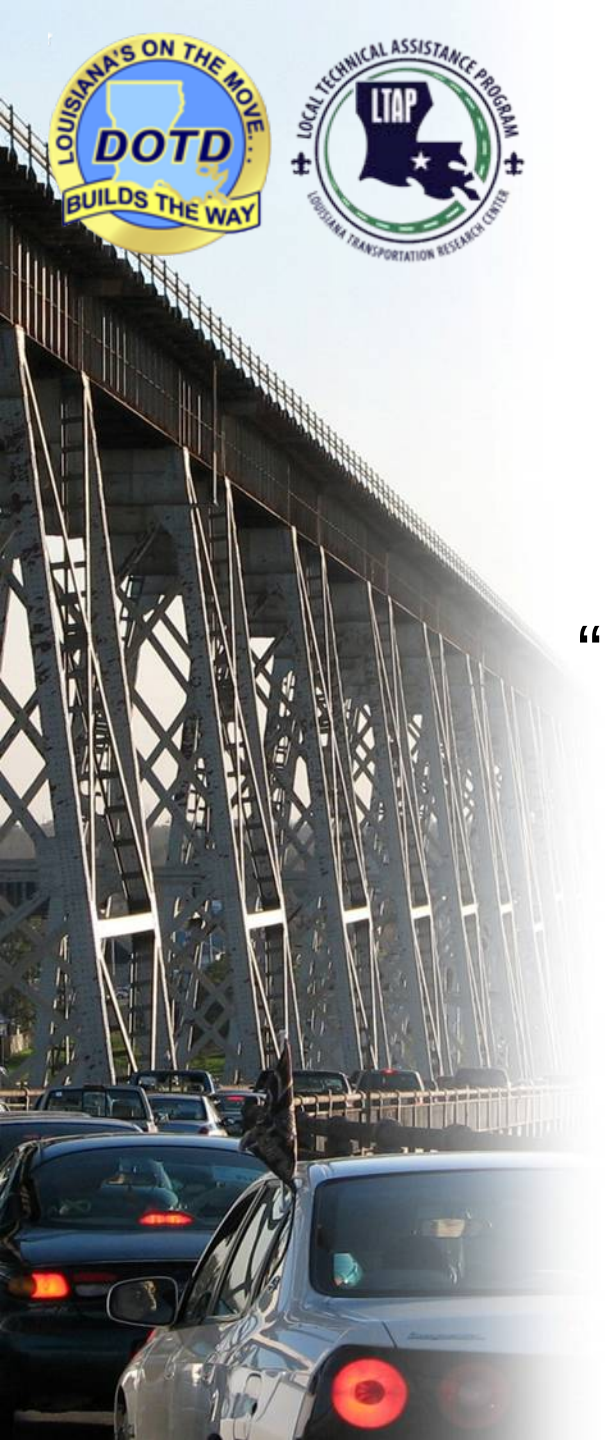
- Pick topics of interest & notify others
- Invite community to participate
  - Elected officials
  - Planners & engineers
  - Law enforcement
  - Road managers
  - Economic development
- Provide feedback & ask questions

Manual on Uniform Traffic Control Devices

- Federal policy
- All states must adopt
- Set minimums for traffic control devices such as
  - Signs
  - Pavement marking
  - And signals

Engineering Design Standard Manual

- DOTD policy
- Signed by Chief Engineer
- Provides additional requirements



Basic Principle of Traffic Engineering

"*Everything is designed to meet Driver Expectancy*"

TR Engineering 101

- Module:
  1. **Introduction & Overview (3/22/10)**
  2. Speed Management Overview (4/26/10)
  3. School Zones (4/26/10)
  4. Intersection Traffic Control (5/24/10)
  5. Traffic Signal (5/24/10)
  6. Roundabouts (5/24/10)
  7. Sign Selection & Installation (6/28/10)
  8. Work Zones (6/28/10)
  9. Access Management (7/26/10)

Introduction to Traffic Management in LA

- Overview of LA's transportation system
- Funding programs
- DOTD policies
- National guidelines
- MUTCD
- Louisiana laws
- DOTD's Traffic Engineering organization

Road Safety Management

- LA SHSP
- HSIP
- LRSP
- Rail grade crossing safety

Determination of Speed Limits

- Purpose of speed limits
- Safety issues w/ speed limits
- DOTD's policy on speed limits
- How to do a speed study
- Enforcement of speeds

School Zones

- When to set a school speed zone
- DOTD's policy
- How to sign
- Flashing school sign

Intersection Traffic Control & Management

- Different intersection types
- Control options
  - Stop control
  - Traffic signals
  - Roundabouts
  - Innovative designs
- Evaluation & selection of control device/method

Intersection Questions & Considerations

- How many people?
  - Turning left
  - Turning right
  - Going thru
- What are the busy times?
- Are there turn lanes?
- How will this affect the entire street?

Traffic Signals

- When are they warranted
- How are warrants determined?
- DOTD’s process to install or upgrade
- Cost for installation/upgrade
- Cost & methods to maintain
- DOTD’s Signal design manual
- DOTD signal EDSM’s
- MUTCD guidance

Roundabouts

- What are they?
- Where should they be installed?
- DOTD's policy
- Cost of installation & maintenance
- How do they improve traffic?

Effective Sign Selection & Installation

- DOTD's policy on signs
  - Interstate & non-Interstate
- MUTCD on signs
  - Standard vs. special
- Permitted signs
  - Gateway
  - Regulatory (engine brake, Do Not Litter)
  - Warning (school signs, plant entrance)

Work Zones

- Policies
- Traffic control details
- MUTCD

Access Management In Louisiana

- What is it & why do we need it?
- What is in place now?
- What is planned?
- EDSMs
- New access rule, handbook
- How can we work together to achieve this?

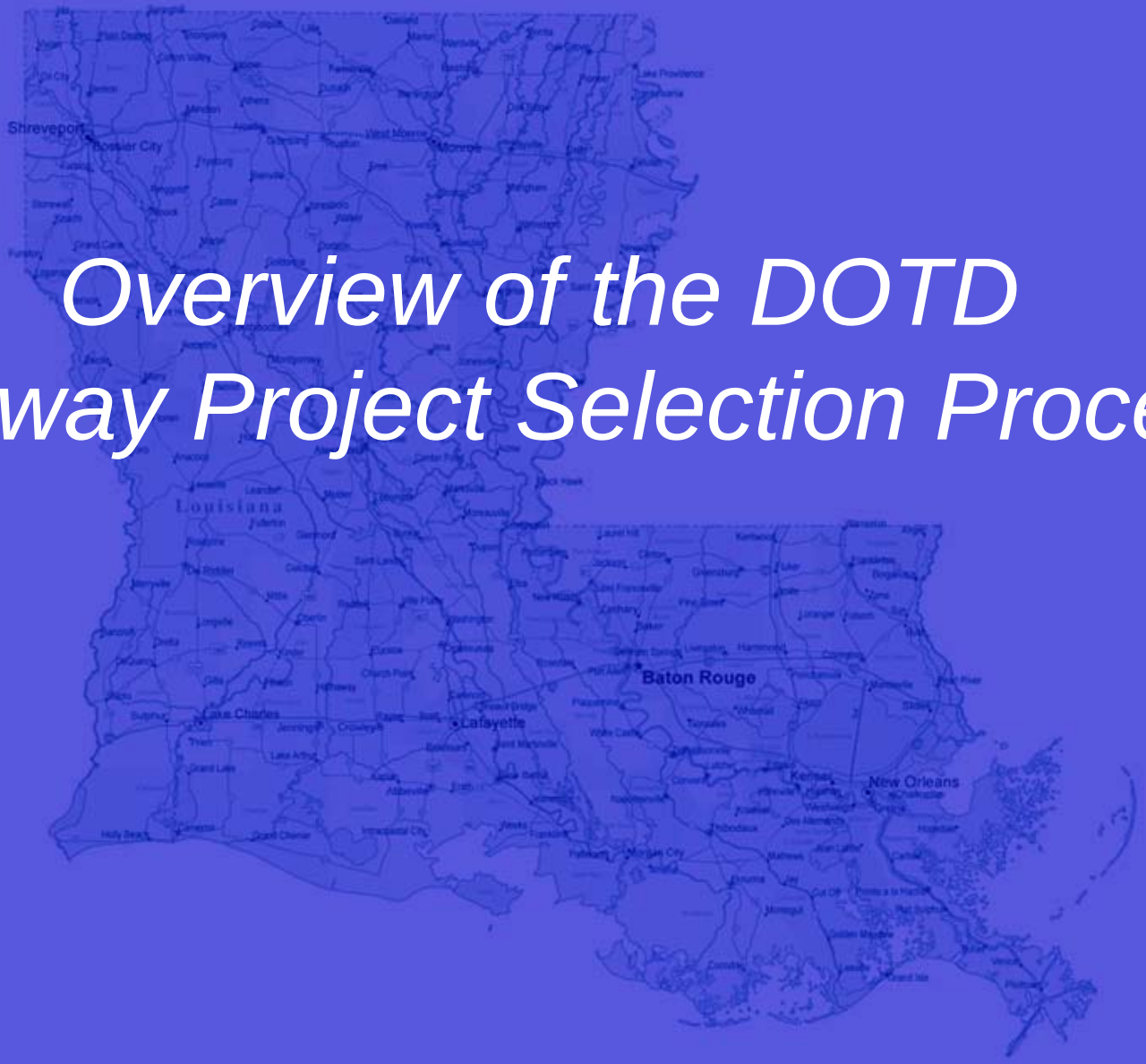
Suggestions & Feedback

- Specific questions you have regarding the major topics:
  - DOTD's traffic engineering staff & general program
  - Speed management decisions
  - Intersections
  - Traffic signals
  - Roundabouts
  - Signs
  - Access management

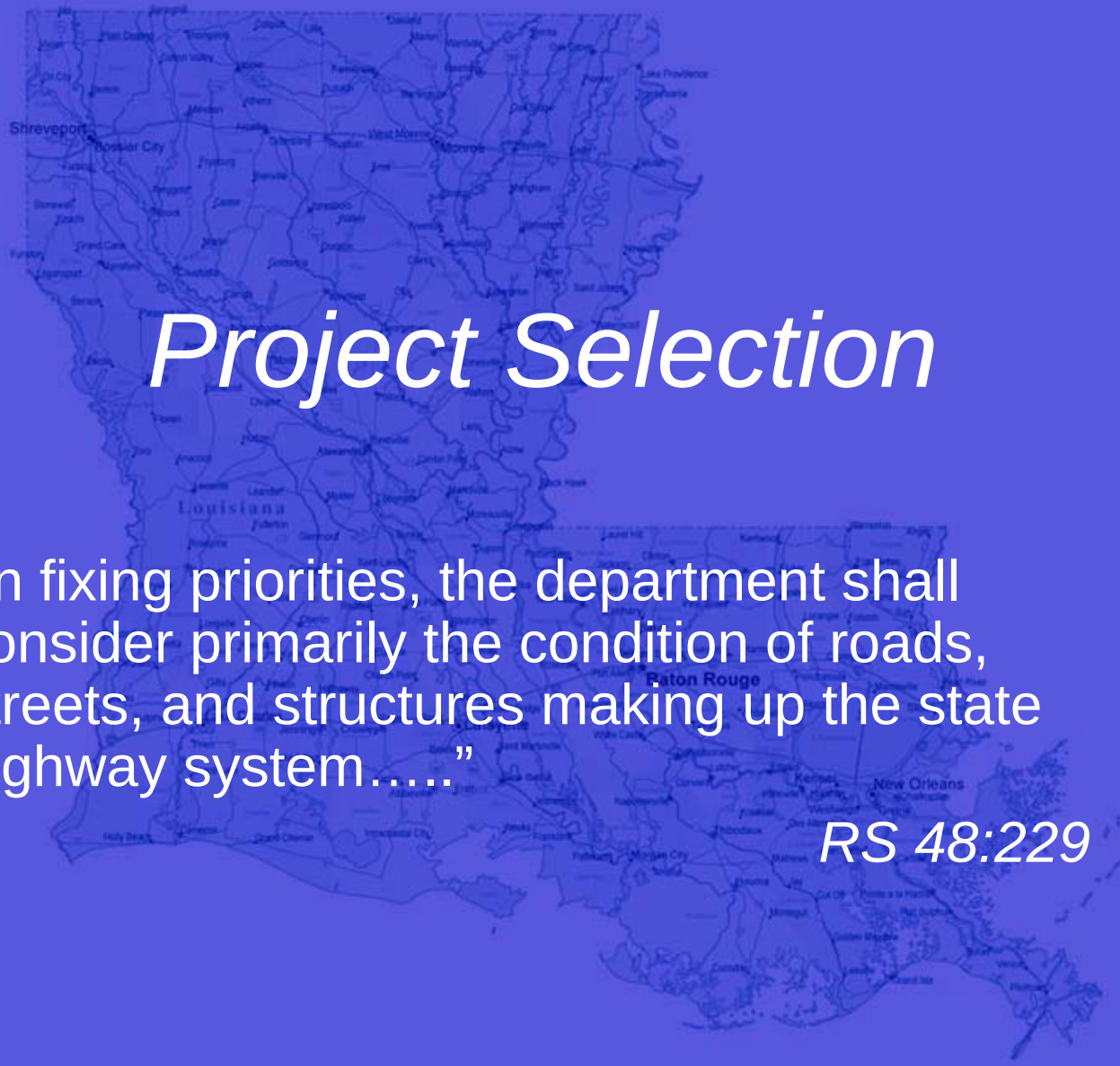
More Suggestions?

- Other traffic issues or questions?
- Contact Jody Colvin at **Jody.Colvin@la.gov**
- or Marie B. Walsh at **mbwalsh@ltrc.lsu.edu**

Overview of the DOTD Highway Project Selection Process



Project Selection



"In fixing priorities, the department shall consider primarily the condition of roads, streets, and structures making up the state highway system….."

RS 48:229

Overview of the DOTD Highway Project Selection Process

What are the goals for the State Highway System?

1. Preserve (i.e., maintain) the system
2. Operate the system
3. Improve the safety of the system
4. Expand the system

Overview of the DOTD Highway Project Selection Process

What are the categories of highway projects?

1. System Preservation
2. Operations/Motorist Services
3. Traffic Safety
4. Additional Capacity/New Infrastructure

Project Categories

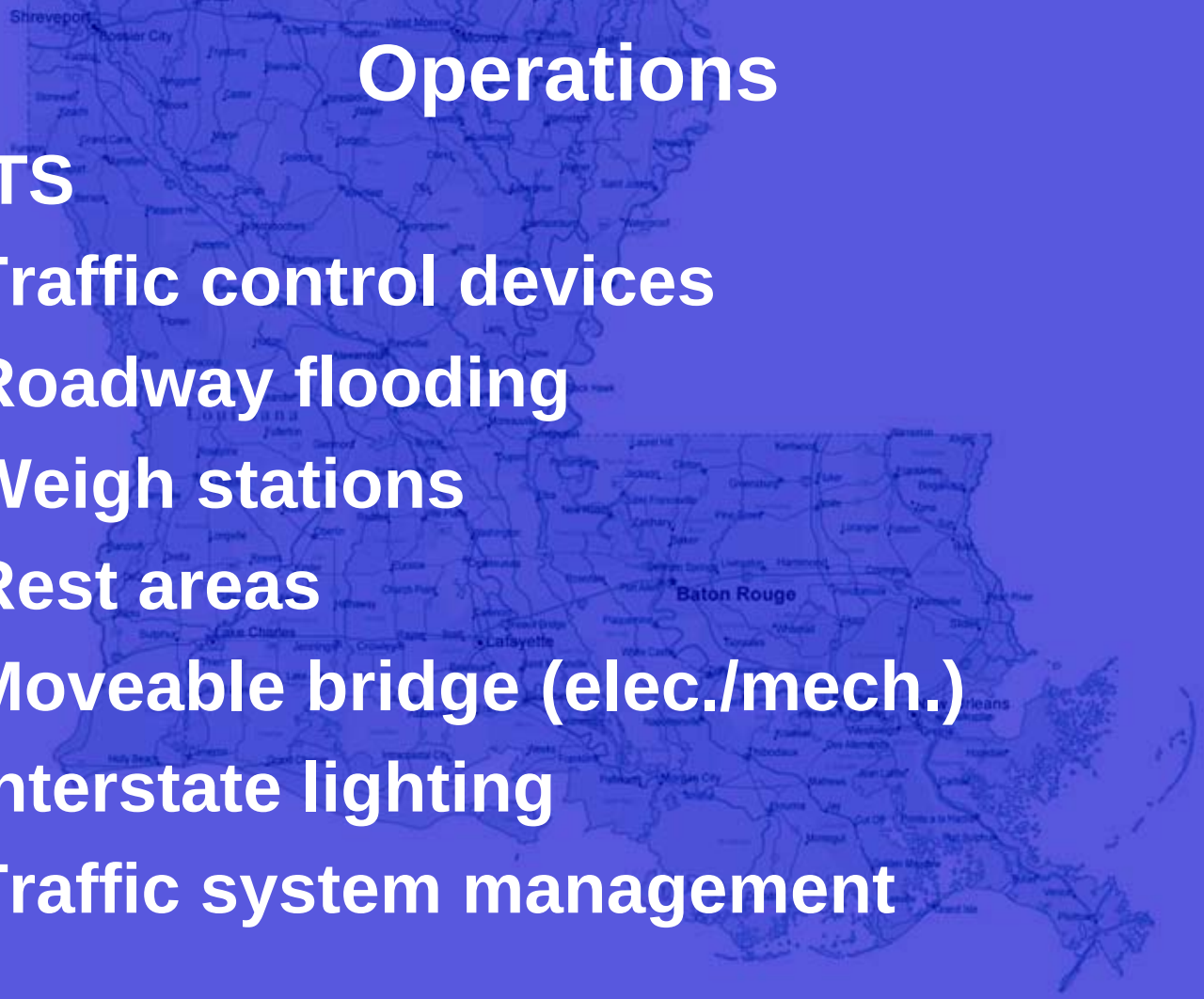
System Preservation

- **Non-interstate roadways**
- **Interstate roadways**
- **On-system bridges**
- **Off-system bridges**

Project Categories

Operations

- ITS
- Traffic control devices
- Roadway flooding
- Weigh stations
- Rest areas
- Moveable bridge (elec./mech.)
- Interstate lighting
- Traffic system management



Project Categories

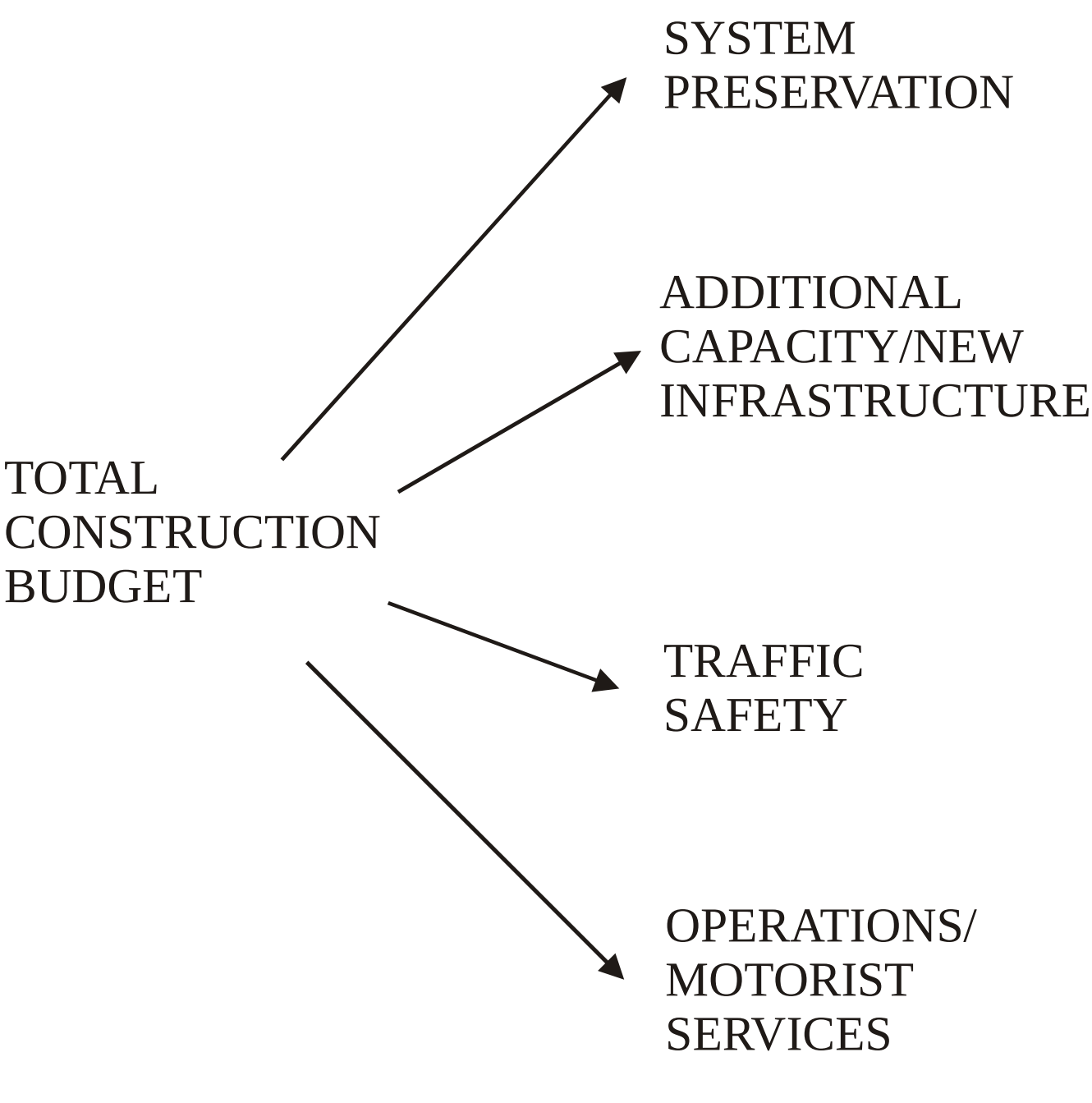
Safety

- **Regular Safety Program**
- **Railroad Crossing Upgrades**
- **Safe Routes to School**
- **Local Road Safety Program**

Project Categories

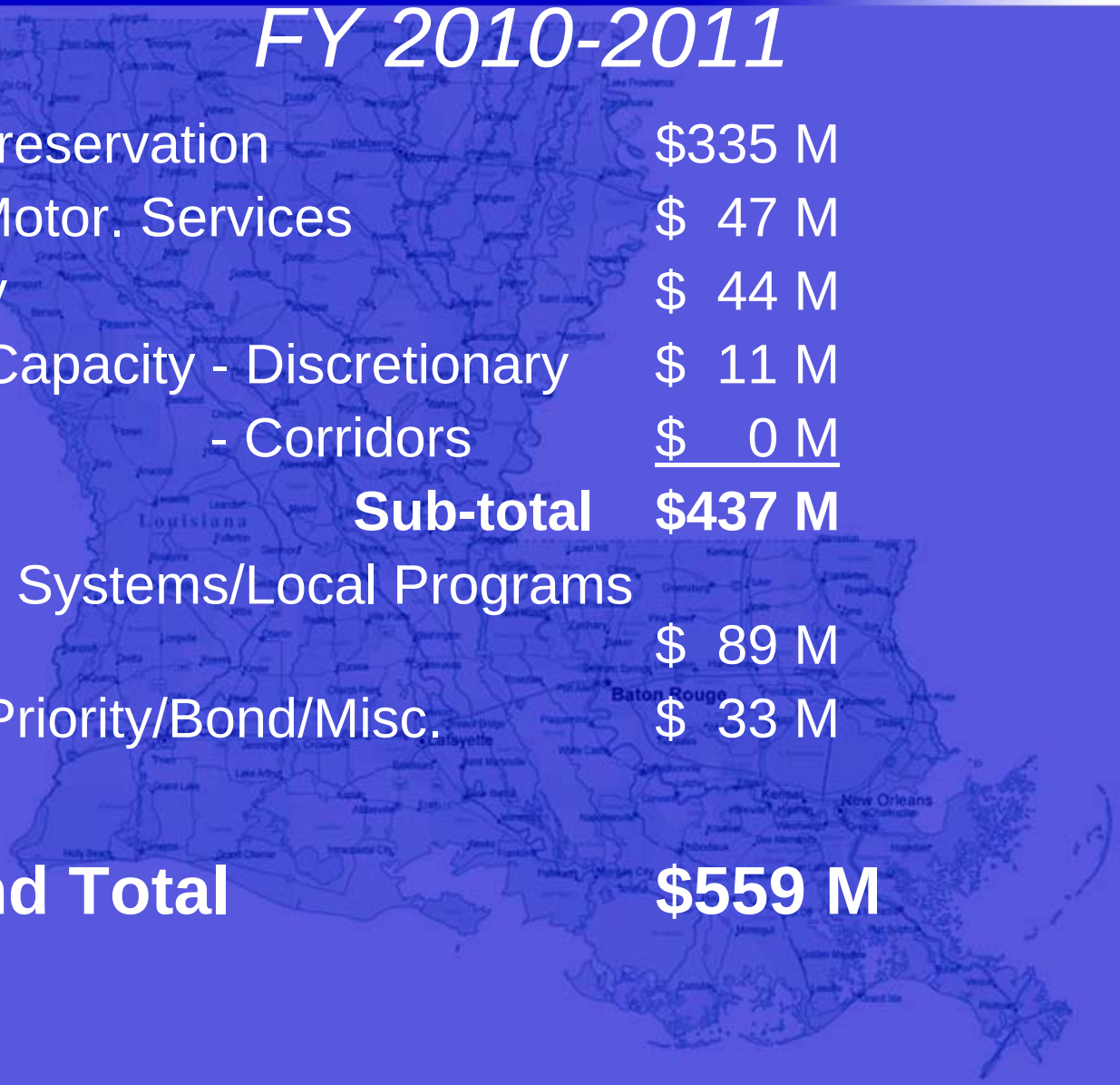
Other Programs

- **Urban System**
- **Congestion Management/Air Quality**
- **Enhancement**


TOTAL CONSTRUCTION BUDGET
SYSTEM PRESERVATION
ADDITIONAL CAPACITY/NEW INFRASTRUCTURE
TRAFFIC SAFETY
OPERATIONS/ MOTORIST SERVICES

Construction Budget
FY 2010-2011

• Sys Preservation	$335 M
• Ops/Motor. Services	$ 47 M
• Safety	$ 44 M
• Add. Capacity - Discretionary	$ 11 M
- Corridors	$ 0 M
Sub-total	**$437 M**
• Urban Systems/Local Programs	$ 89 M
• High Priority/Bond/Misc.	$ 33 M
Grand Total	**$559 M**



Overview of the DOTD Highway Project Selection Process

How are projects identified?

- Gather and analyze data
  - condition, operations, safety, and congestion
- Seek customer input (Legislative Hearings & year round)
  - Public
  - State and local elected officials
  - Metropolitan Planning Organizations
  - Rural Consultation Process
  - Regional/local planning officials
  - Other state agencies
  - Federal agencies

Overview of the DOTD Highway Project Selection Process

How are projects prioritized and selected?

- DOTD District and MPO officials rank projects based on:
  - Technical analyses
  - Customer input
- Project Selection Teams make the final selections based on:
  - District recommendations
  - Technical analyses
  - Customer input
  - Available funding

Overview of the DOTD Highway Project Selection Process

Then What Happens?

Overview of the DOTD Highway Project Selection Process

Recommended (selected) projects assembled into proposed Highway Program

Proposed Highway Program submitted to House & Senate Transportation Committees

Joint Transportation Committee holds public hearings throughout state for the Program & STIP

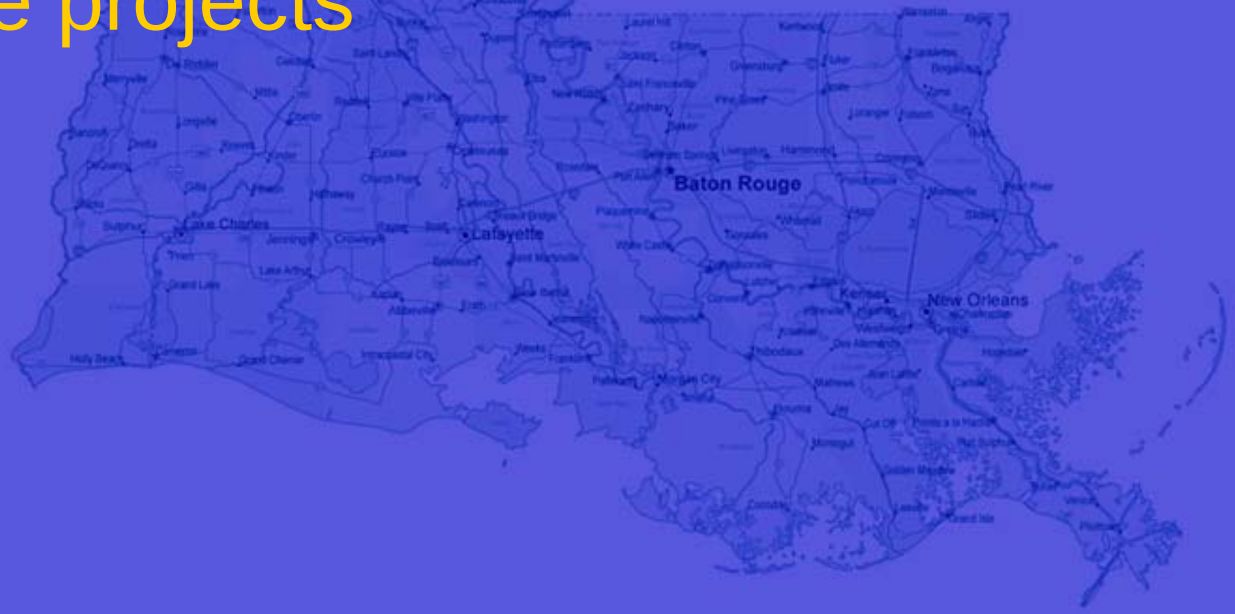
Final decision on Highway Program rests with House & Senate Trans. Committees and ultimately full Legislature

Local Programs

What is an MPO?

MPO Projects

- For projects funded with the MPO's Federal Urban Systems Funds (STP <200K, STP>200K), the MPO selects the projects



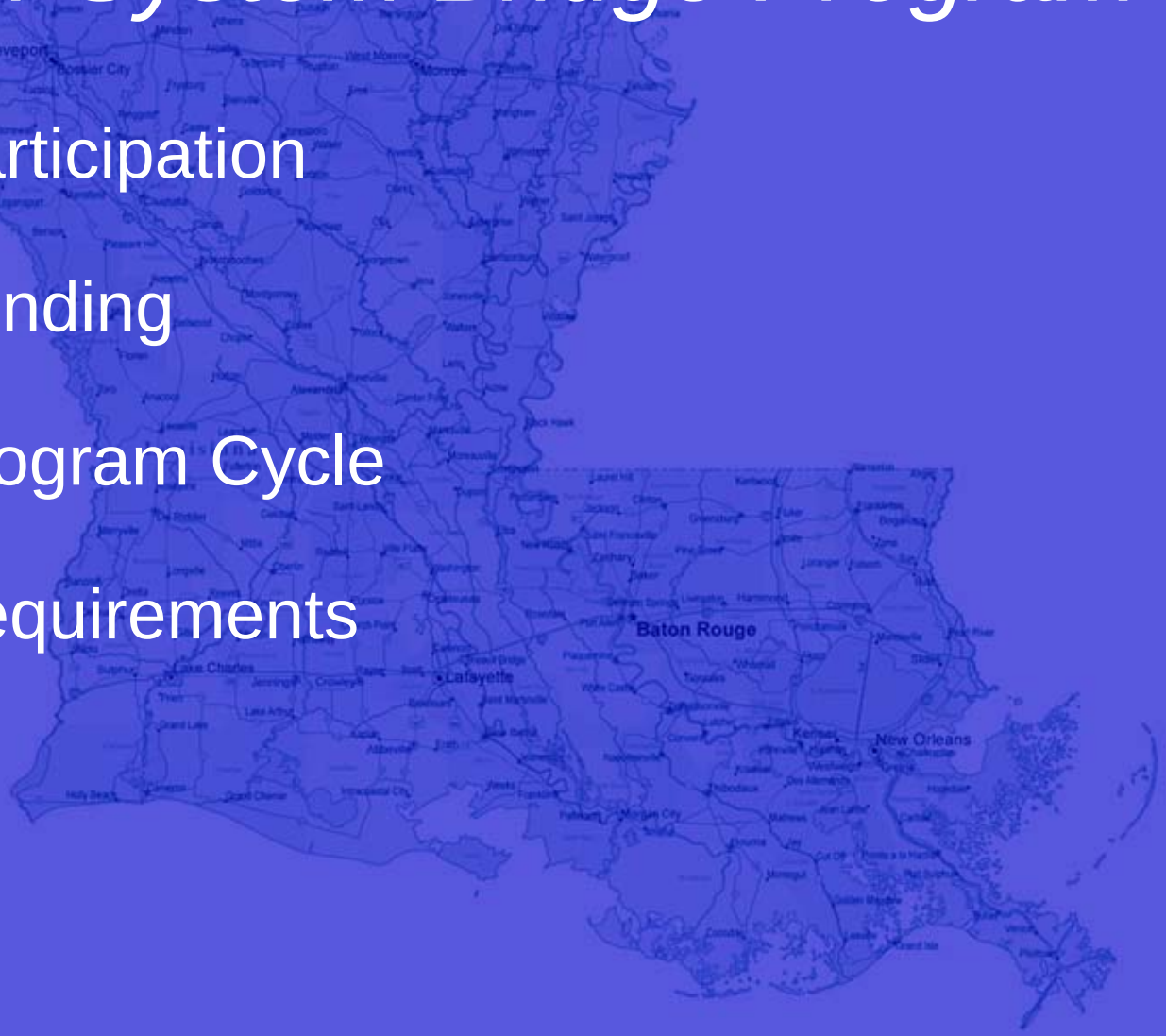
Other Local Programs

Local Programs

- Local Road Safety
- Safe Routes to School
- Off-System Bridge Program
- Enhancements
- Congestion Management/Air Quality

Off-System Bridge Program

- Participation
- Funding
- Program Cycle
- Requirements

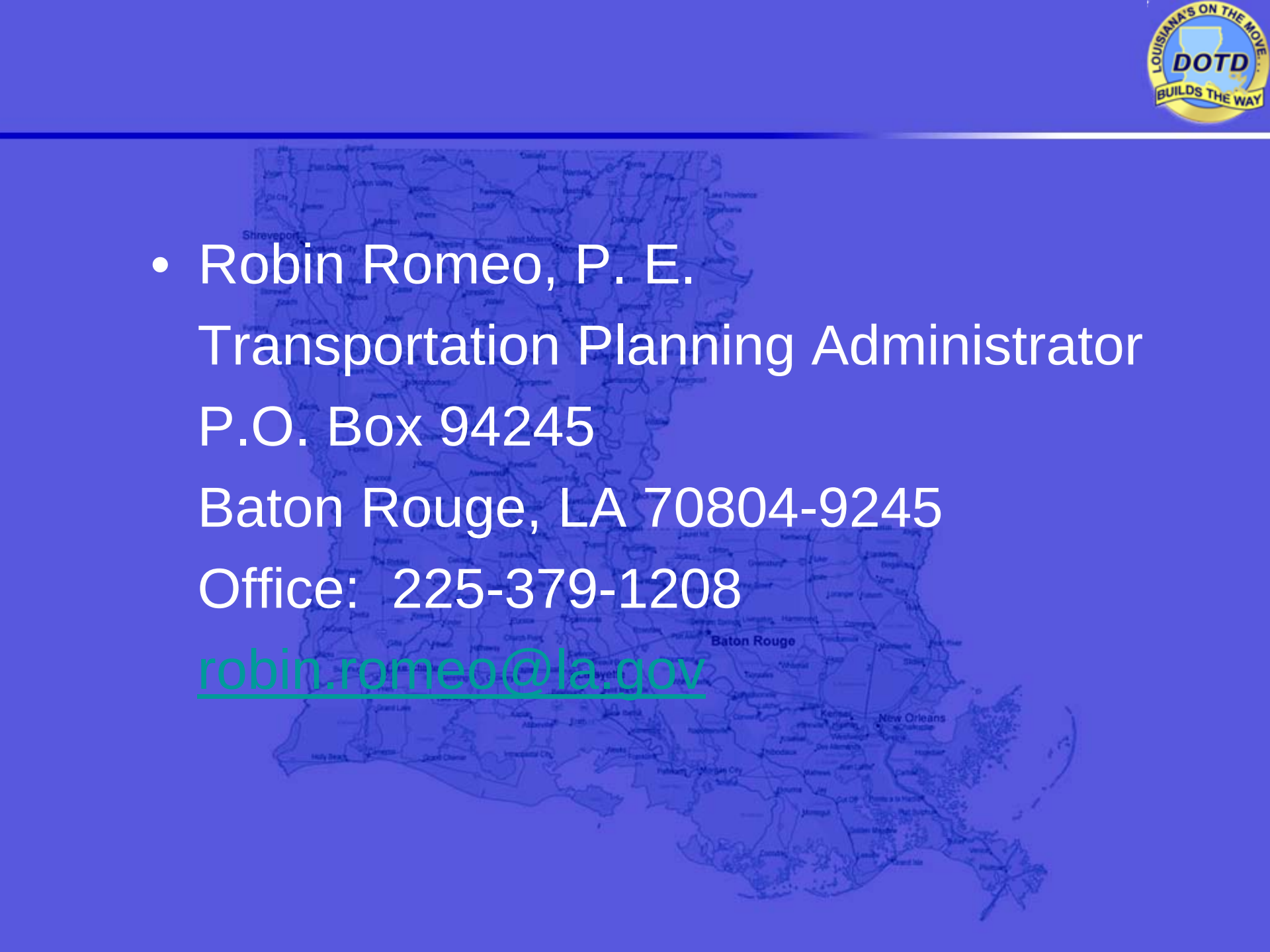


Enhancement Program

- Facilities for pedestrians and bicycles
- Pedestrian and bicycle safety & educational activities
- Acquisition of scenic easements and scenic or historic sites

Congestion Management /Air Quality

- Participation
- Funding
- Program cycle
- Requirements



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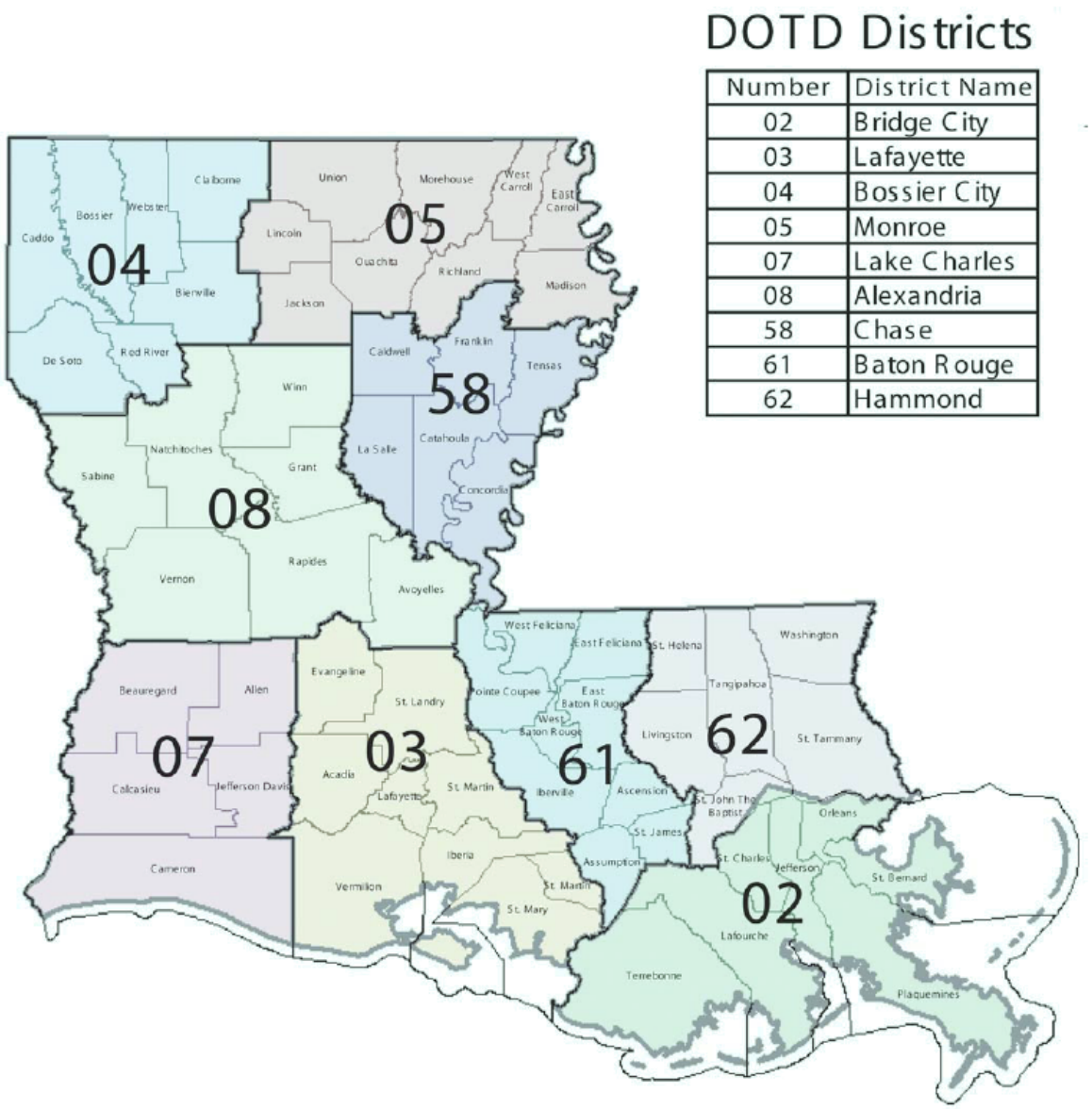
DOTD'S TRAFFIC ENGINEERING ORGANIZATION

DOTD's Districts



DTOE Contact Info

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FAX: (318) 549-8470

Keith Tindell (318) 549-8305
Jason Robinson (318) 549-8329
Shreveport Signals (318) 673-6181
Bossier City Signals (318) 741-8434

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FAX: (318) 342-0260

John Eason (318) 342-0105
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Monroe Signals (318) 329-2434

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Chase, LA 71324
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Malcolm Sayes (225) 389-2189
Dawn Picard (225) 389-214
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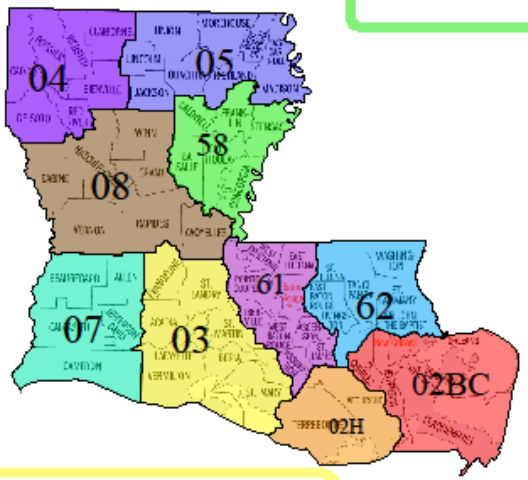

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Tyson Thevis (337) 437-9235

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Nick Fruge' (337) 262-6124
City of Lafayette Signals (337) 291-8548

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District 02BC
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Steve Strength (504) 484-0205
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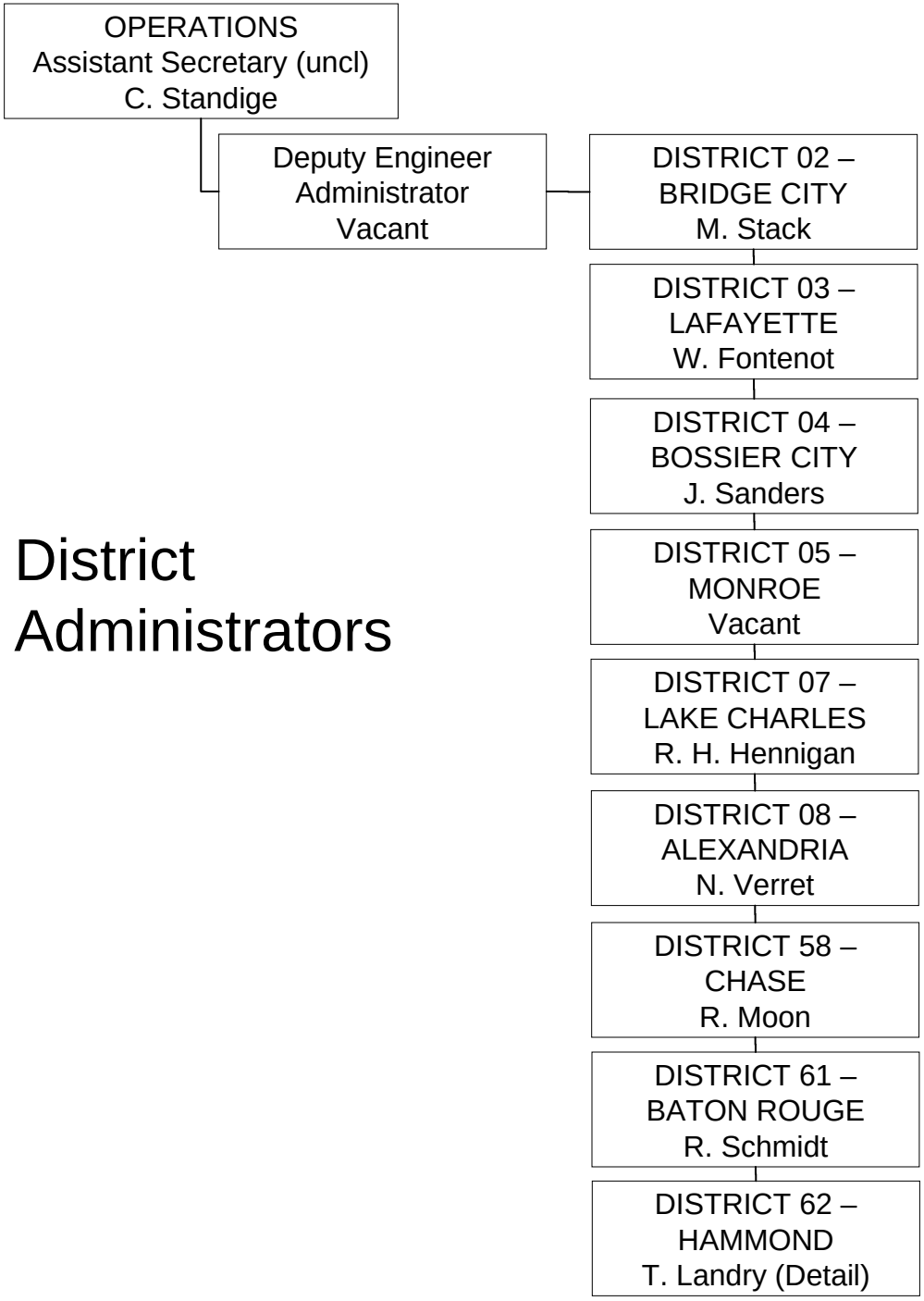
Bao Le (504) 484-0208
Corbett Hollier (504) 484-0207
New Orleans Signals (504) 658-8040
Jefferson Parish Signals (504) 736-6530

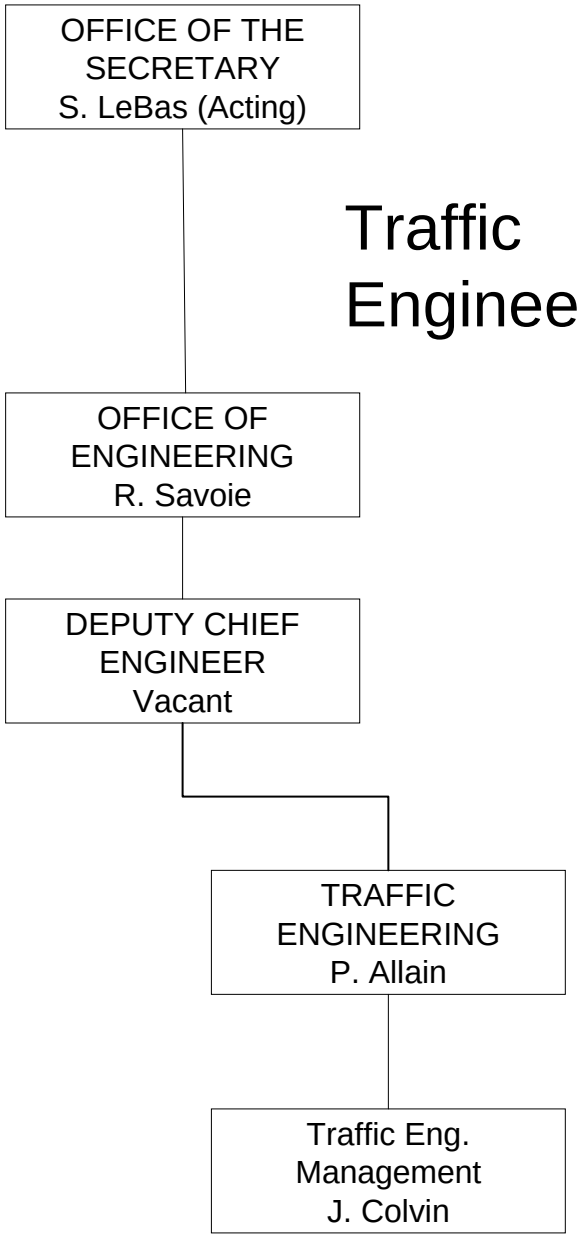
LADOTD Organization Chart

- Traffic Engineering Management is under the Office of Engineering
- District Traffic Engineers are under Office of Operations

District Administrators



Traffic Engineering



TEM Responsibilities

- Statewide
- Set policies for traffic engineering
- Review & design traffic plans

More TEM Responsibilities

- Design & update standard details & standard plans
- Update construction specifications

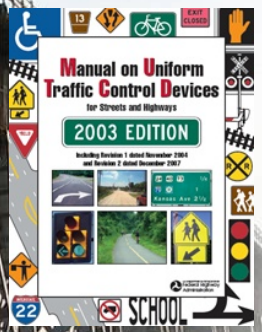
What Do the DTOE's Do?

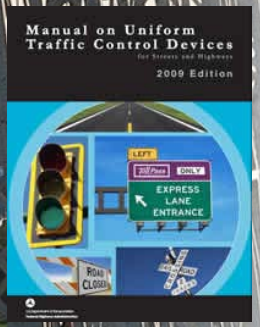
- "Operate" the roadway
- Determine improvements & upgrades to improve the safety & capacity of the roadway

DTOE's Responsibilities

- Responsible for State Road System:
  - Signals
  - Striping
  - Signing
  - Work zone
  - Driveways

Policy – What Governs?





- Manual of Uniform Traffic Control Devices
  - Federal law
  - Current edition 2003, adopted in December 2005
  - Sets minimums for signs, pavement markings, & signals
  - In the process of reviewing the 2009 MUTCD for adoption

MUTCD Applies to:

- Public streets
- Highways
- Bikeways
- Private roads

** Parking lots are not included*

MUTCD Levels of Requirements

- Standard - *shall*
- Guidance – *should*
- Option – *may*
- Support

MUTCD on the web…

mutcd.fhwa.dot.gov

Engineer Design Standard Manual (EDSM)

- Applicable to all state roads
- Applicable to any road financed (even partially) with federal funds

Examples of Traffic EDSMs:

- Warrant for establishment of Speed Zones
- Roundabout Safety and Approval
- Supplemental Guide Signs on Interstate Highways
- Horizontal Alignment Advisory Speed Signs
- Flashing Beacons and LED Flashing Signs
- Marking No Passing Zone for Special Situations

Policy – What Governs?

- EDSM's
  - Policy signed by Chief Engineer
  - Defines Louisiana Standards
  - Must obtain a waiver or design exception from the Chief Engineer to go against an EDSM

Policy – What Governs?

- Policy Manuals
  - *Traffic Engineering Manual:* signed by Chief Engineer that defines TE policy
  - *Traffic Signal Design Manual:* defines design & study process for traffic signals

Policy – What Governs?

- Standard plans & details
  - Details
    - TS details
    - TTC details
    - Sign details
  - Standard Plans
    - HS-01 sign installation
    - PM-01 pavement marking

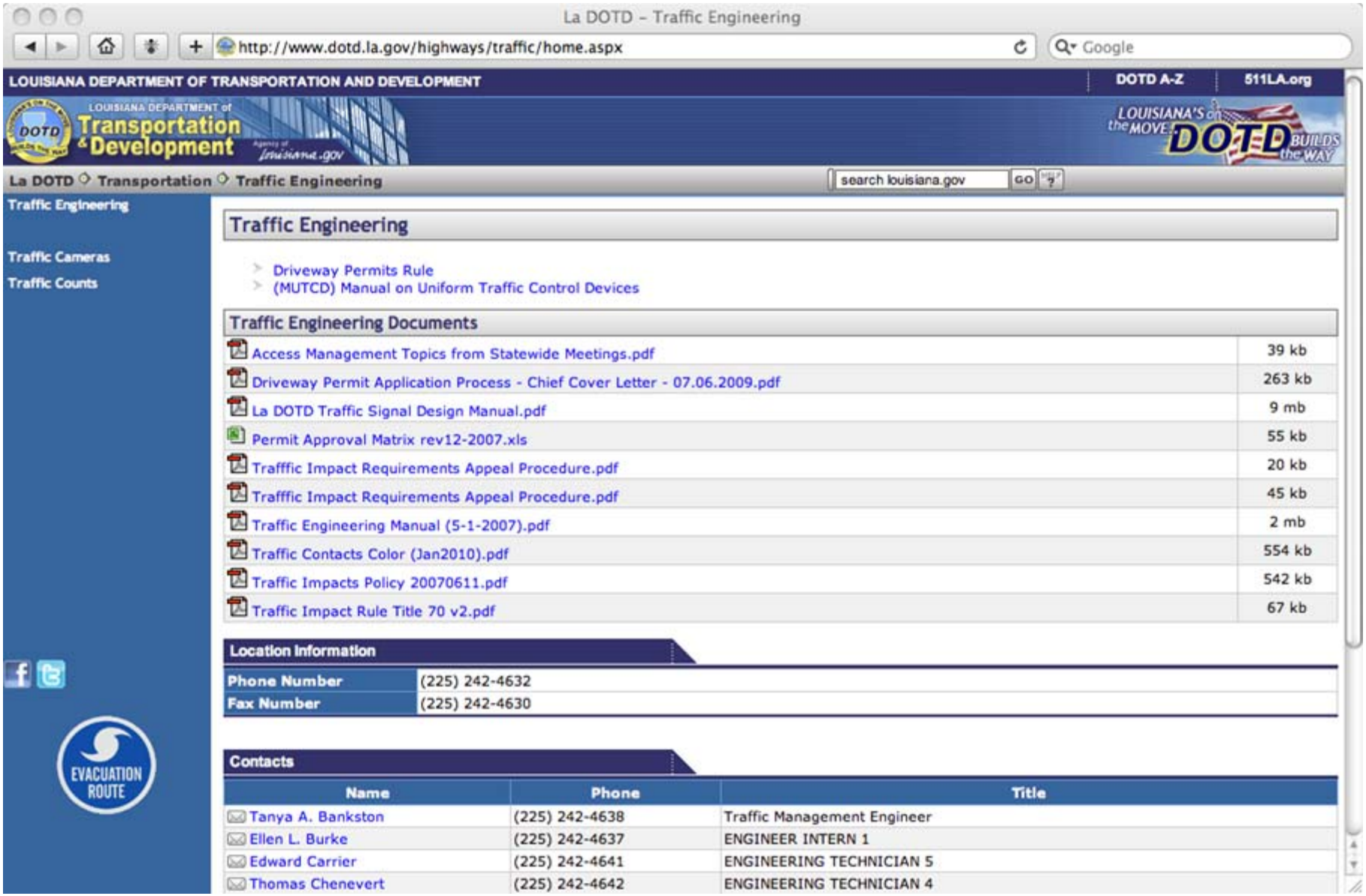
Policy – What Governs?

- Specifications
  - Describes type of materials to be used in construction & how contractor is to be paid
  - LADOTD *Standard Specifications for Roads & Bridges (2006)*
  - Special provisions

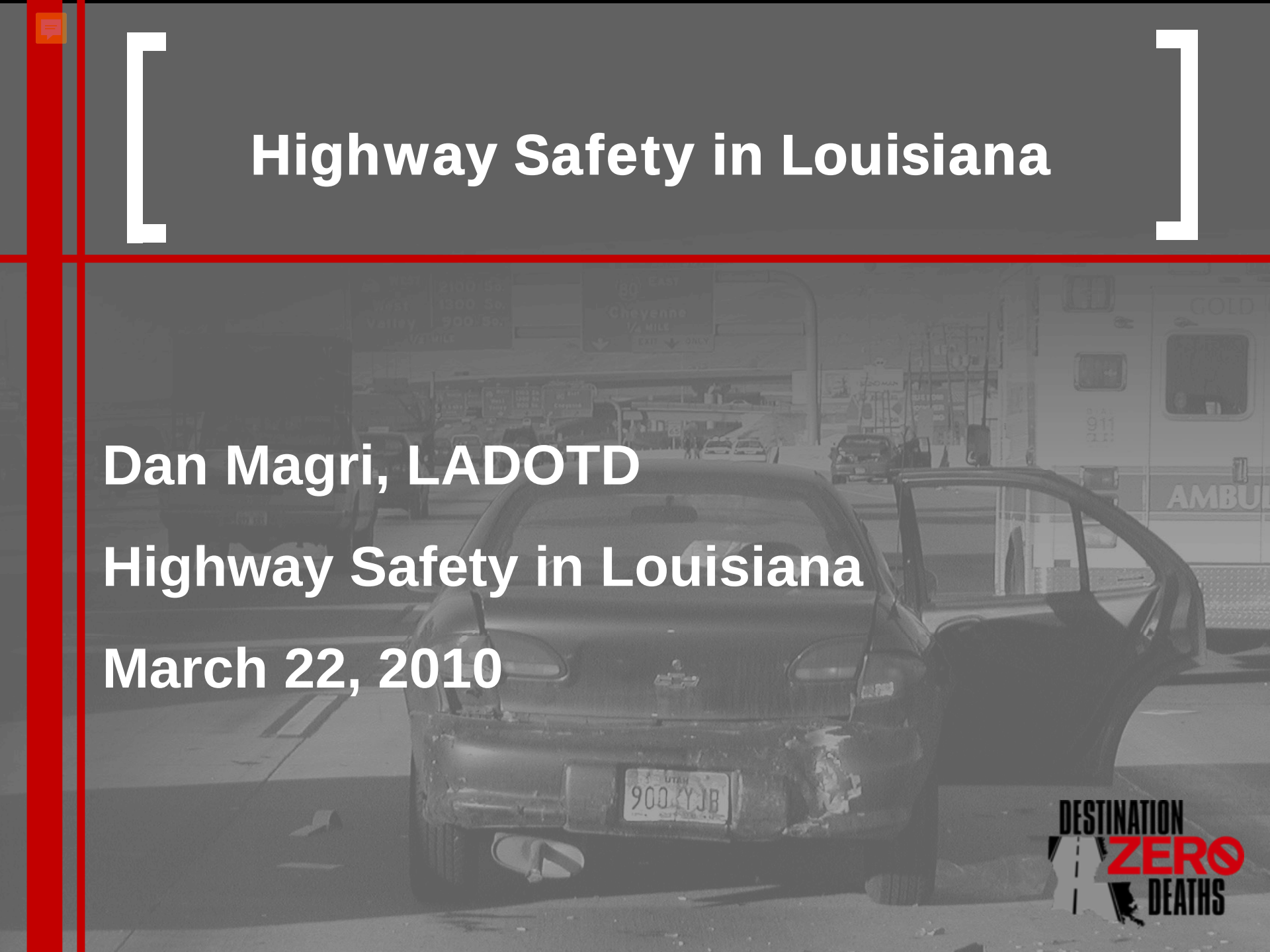
What Does This Mean?

- State routes are governed by
  - Federal policies (MUTCD)
  - State policies
- Local Roads (non-state) are governed by
  - MUTCD

www.dotd.la.gov/highways/traffic/home.aspx



Highway Safety in Louisiana



Dan Magri, LADOTD

Highway Safety in Louisiana

March 22, 2010

Louisiana Strategic Highway Safety Plan (SHSP)

- **Required by National SAFETEA-LU Legislation**
- **Requires Multi Disciplinary Approach**
- **Local Involvement Necessary**
- **LADOTD is lead agency**

DESTINATION ZERO DEATHS

Four E's of Safety

- Engineering
- Enforcement
- Education
- Emergency Services

Different Levels:

- Local
- State
- Federal

DESTINATION ZERO DEATHS

SHSP Stakeholders

- Highway Safety Commission
- Louisiana State Police Troop Commands
- Louisiana DOTD
- Local Technical Assistance Program
- Governor's DUI Task Force
- EMS
- LSU Highway Safety Research Group
- Louisiana Municipal Association
- Supreme Court
- Office of Motor Vehicles

DESTINATION ZERO DEATHS

SHSP Stakeholders

- Association of Chiefs of Police
- District Attorneys Association
- Sheriff's Association
- Operation Lifesaver
- Safe Routes to School
- Parish Engineers Association
- Motor Transport Association
- Federal representative
  - FHWA
  - FMCSA
  - NHTSA
  - Federal Railroad Administration

DESTINATION ZERO DEATHS

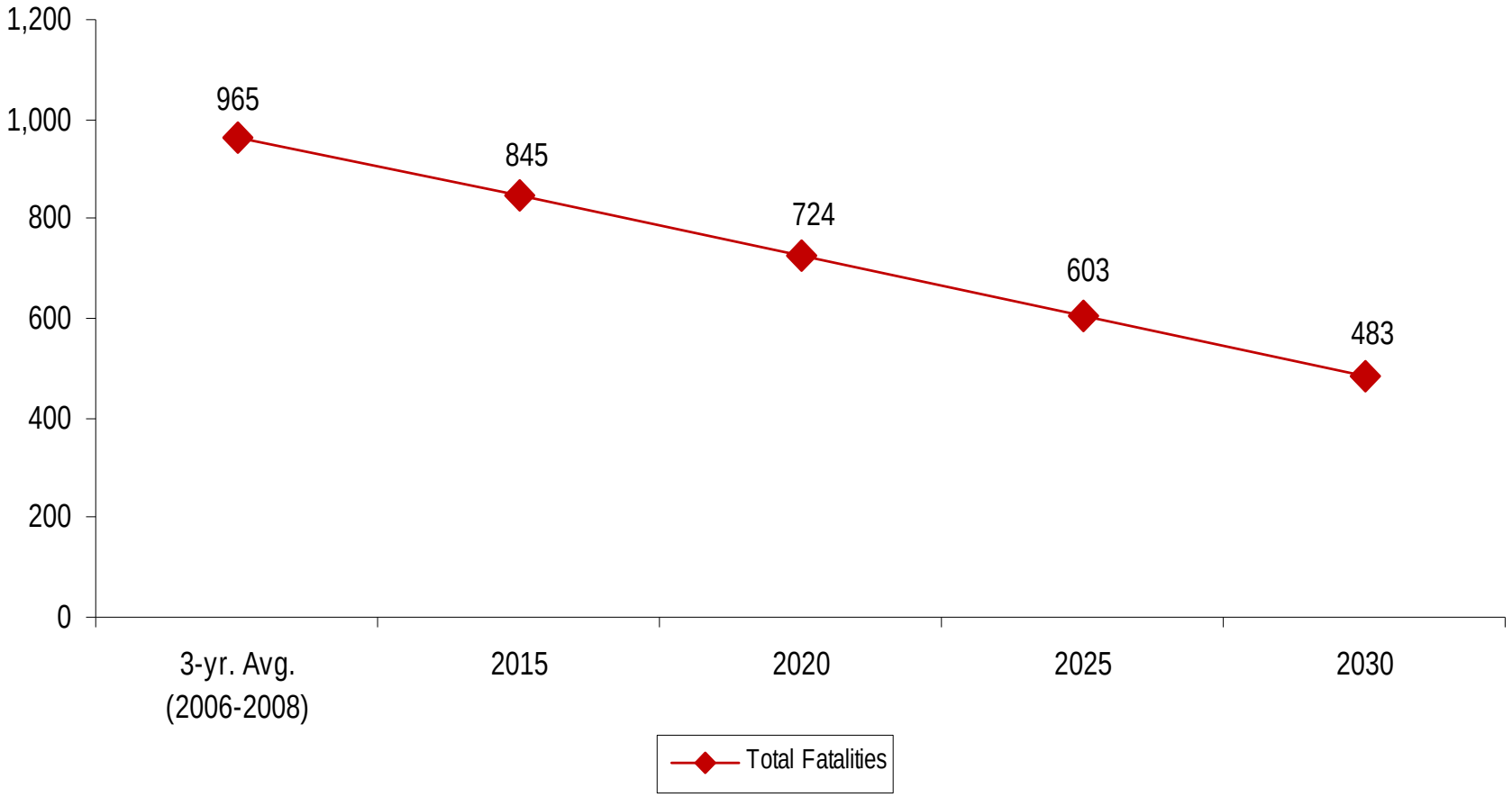
Vision and Mission

The vision of the Louisiana Strategic Highway Safety Plan (SHSP) is to reach *Destination Zero Deaths* on Louisiana roadways.

The mission of the SHSP is to *reduce the human and economic toll on Louisiana's surface transportation system due to traffic crashes through widespread collaboration and an integrated 4E approach.*

DESTINATION ZERO DEATHS

Goal: Reduce Fatalities 50% by 2030

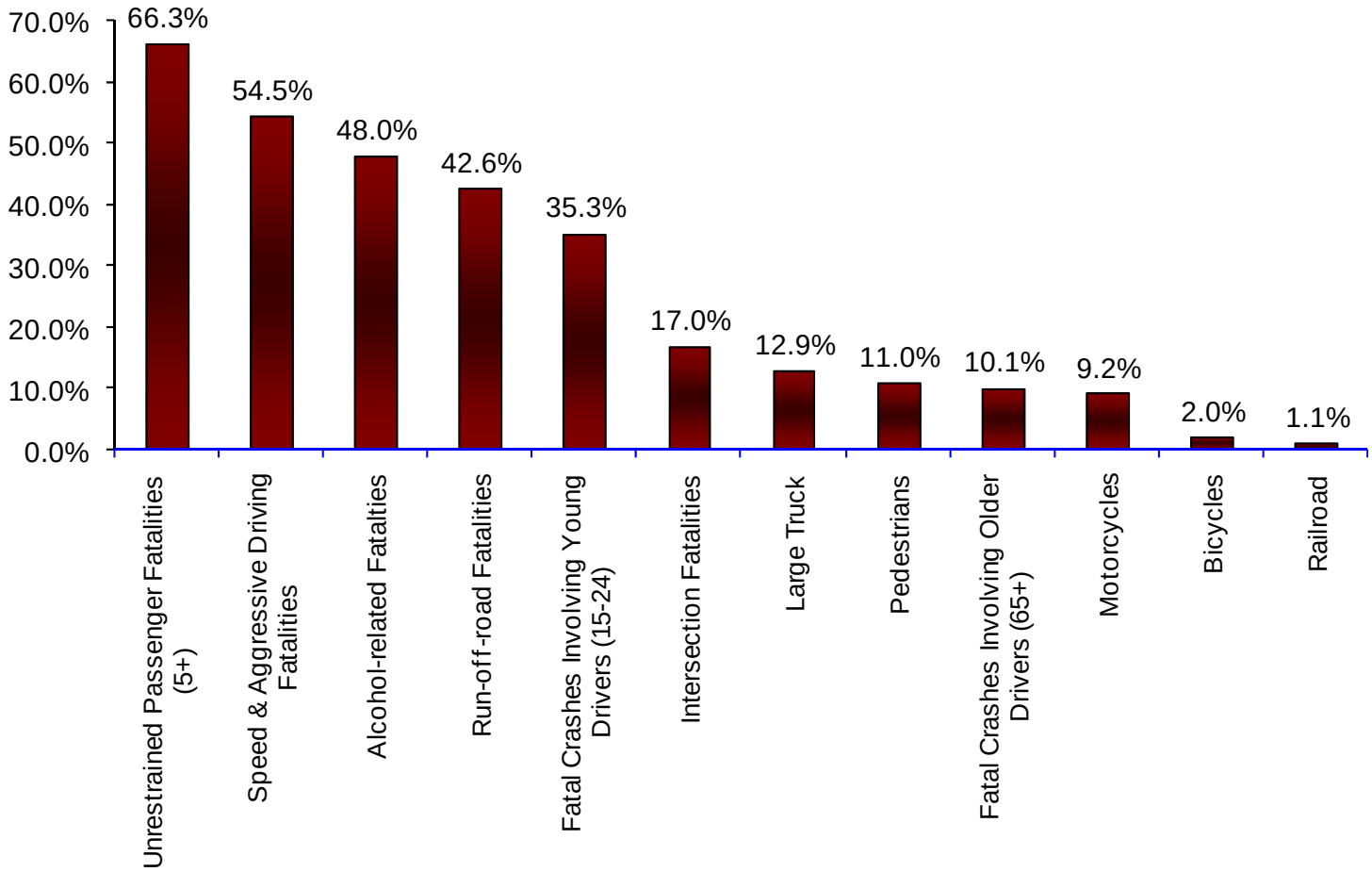


2010 SHSP Emphasis Areas

- Alcohol Impaired Driving
- Occupant Protection
- Infrastructure and Operations
- Crashes Involving Young Drivers

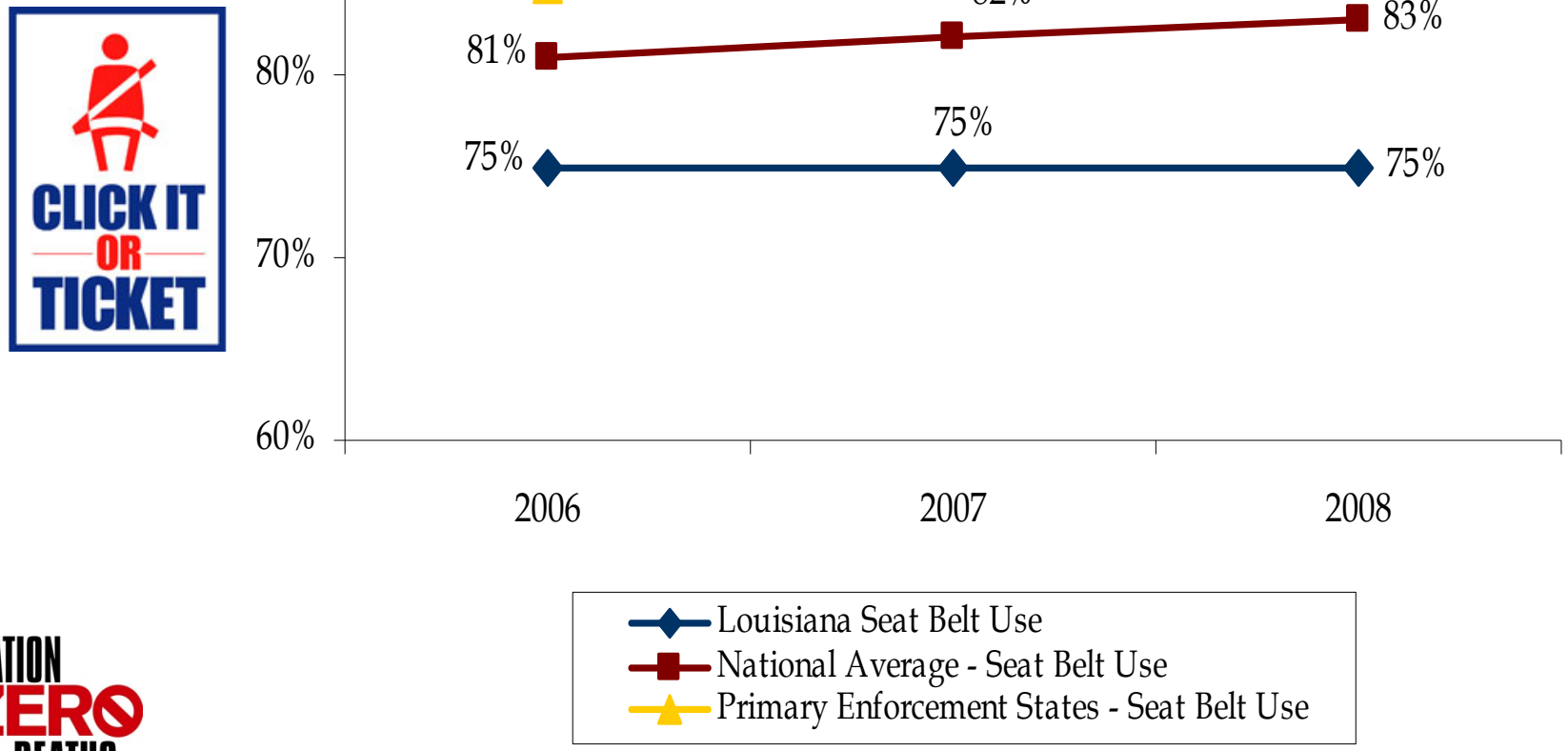
DESTINATION ZERO DEATHS

Contributing Factors

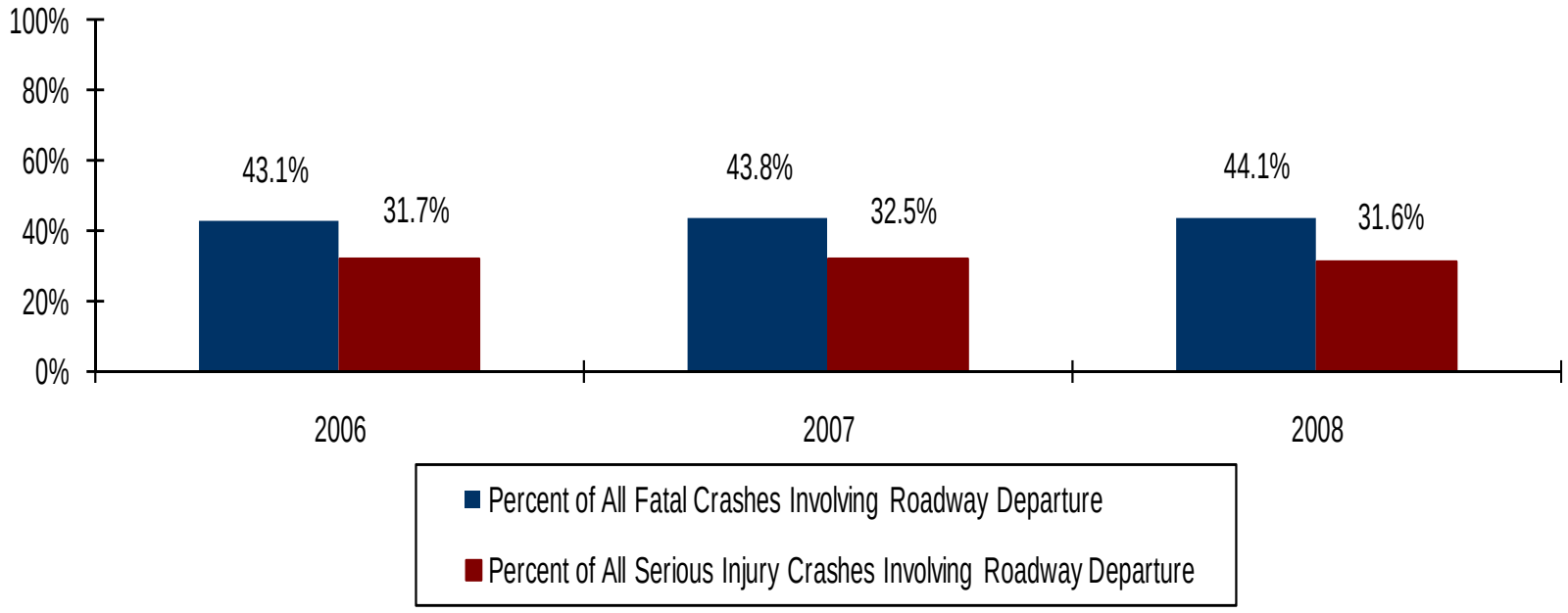


DESTINATION ZERO DEATHS

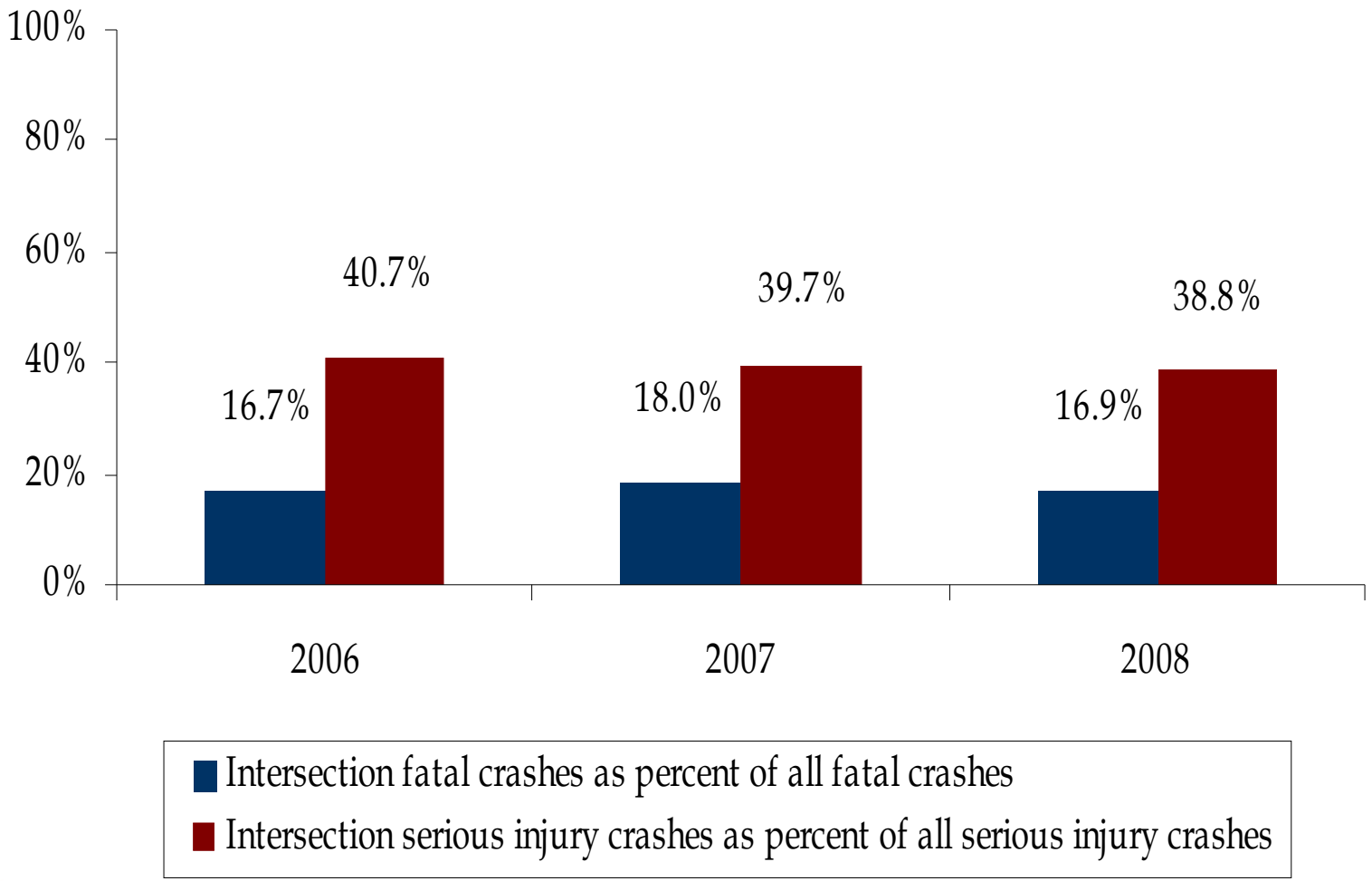
Occupant Protection



Roadway Departure



Intersections



DESTINATION ZERO DEATHS

Focus Area Action Plans

- **DOTD Roadway Departure**
- **DOTD Intersection**
- **LTAP Local Road Safety Action Plan**
- **Working with LHSC on:**
  - **Occupant Protection**
  - **Young Drivers**

DESTINATION ZERO DEATHS

Task Forces

- **Subjects**
  - **Speeding and Aggressive Driving**
  - **Distracted and Inattentive Driving**
- **Responsibilities**
  - **Determine analysis methods**
  - **Collaborate with the law enforcement community**
  - **Identify effective countermeasures**

DESTINATION ZERO DEATHS

Safety Accomplishments

- 8% decrease in crash-related fatalities from 2007 to 2008
- Safety training
- Median cable barrier
- Rural road safety improvement
- Low cost safety improvements in Pavement preservation projects

DESTINATION ZERO DEATHS

Safety Accomplishments

- **The Louisiana Local Road Safety Program (LRSP)**

- **Legislative accomplishments**
  - ***Safety belt extended to all occupants***
  - ***Slow vehicles in the left lane***
  - ***Safety zone around bicyclists***
  - ***Penalties for driving under suspension***
  - ***License suspension administrative hearings***
  - ***Mandatory motorcycle helmet***

DESTINATION ZERO DEATHS

Next Steps

- **Select strategies**
- **Develop action plans**
  - **Emphasis area teams**
  - **Task forces**
  - **Regional safety action teams**

DESTINATION ZERO DEATHS

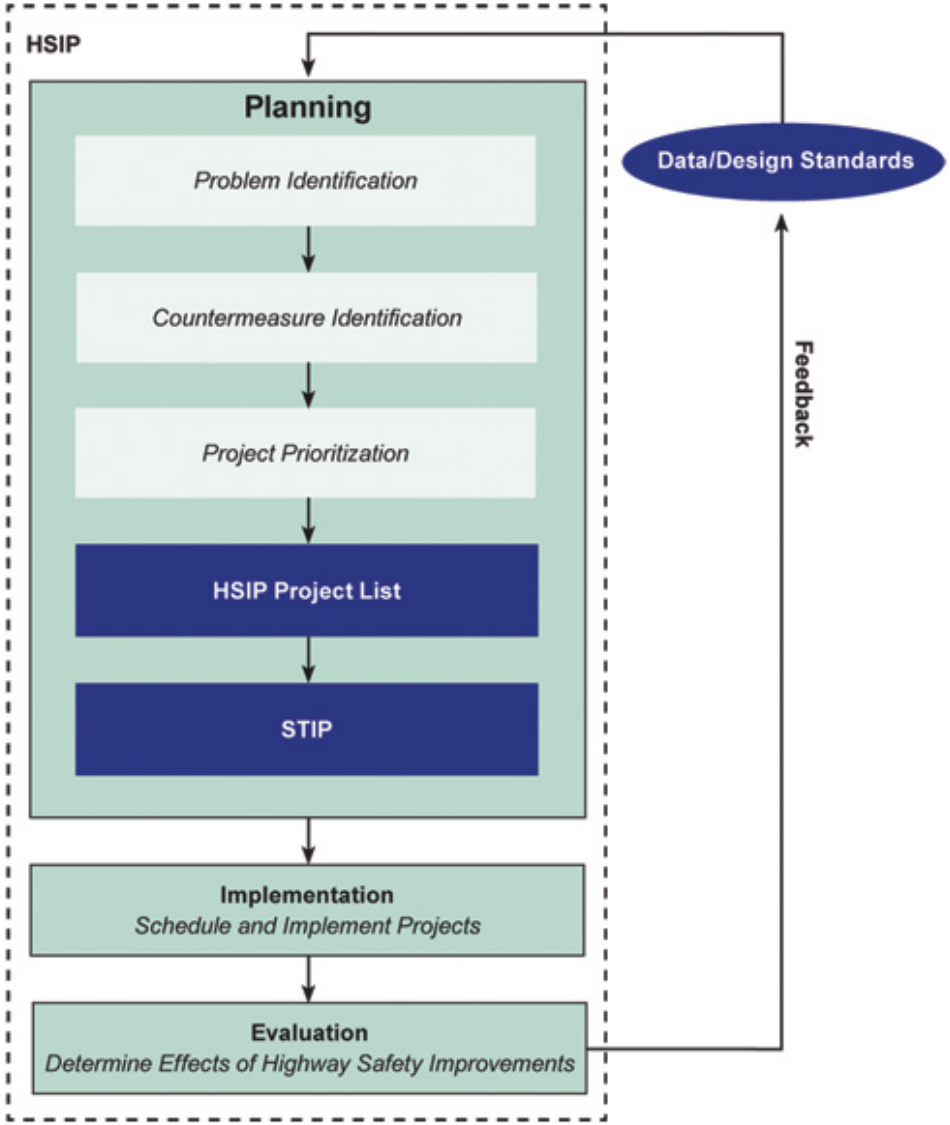
Regional Safety Action Teams

- **Local Leadership Needed**
- **Local participation & involvement necessary**
- **Proven in other states**
- **Contact DOTD Office of Highway Safety or Marie B. Walsh to get involved**

DESTINATION ZERO DEATHS

Highway Safety Improvement Program (HSIP)

HSIP Components



DESTINATION ZERO DEATHS

Typical Projects

- Intersection Improvements
- Striping
- Guard rail upgrade
- Cable barrier rail system
- Pavement markings
- Geometric improvements

DESTINATION ZERO DEATHS

Typical Improvements

- Minor widening
- Slope adjustments
- Signal upgrades
- Friction Treatments

DESTINATION ZERO DEATHS

Other Safety Programs

- Safe Routes to School (SRTS)
- High Risk Rural Road (HRRR)
- Bicycle/Pedestrian Safety
- Highway/Rail Grade Crossing Safety

DESTINATION ZERO DEATHS

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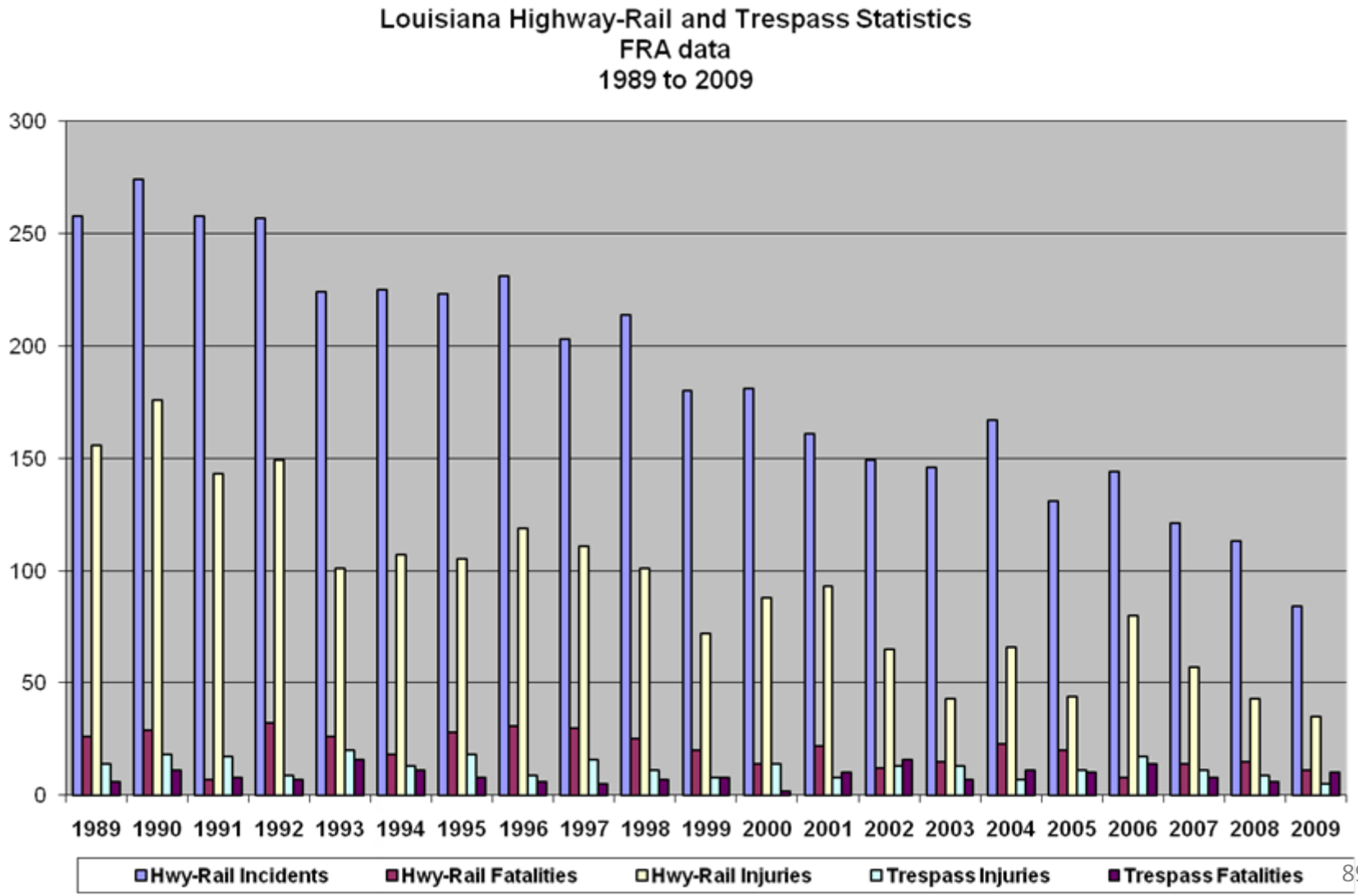
DESTINATION ZERO DEATHS

Highway/Rail Safety

March 22, 2010



Highway/Rail Safety

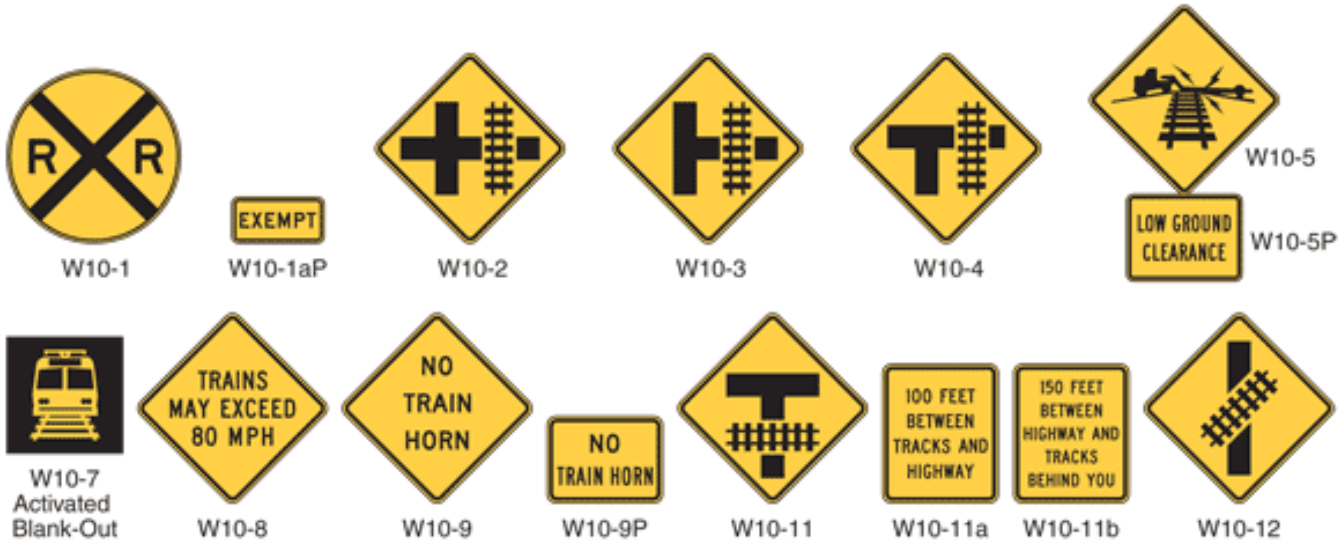
- LADOTD's Diagnostic Review Process
  - We need your input to:
    - Help determine TRUE existing conditions
    - Help determine appropriate plan of action
  - You know your community best

Highway/Rail Safety

Signs

http://mutcd.fhwa.dot.gov/htm/2009/part8/part8_toc.htm

Figure 8B-4. Warning Signs and Plaques for Grade Crossings

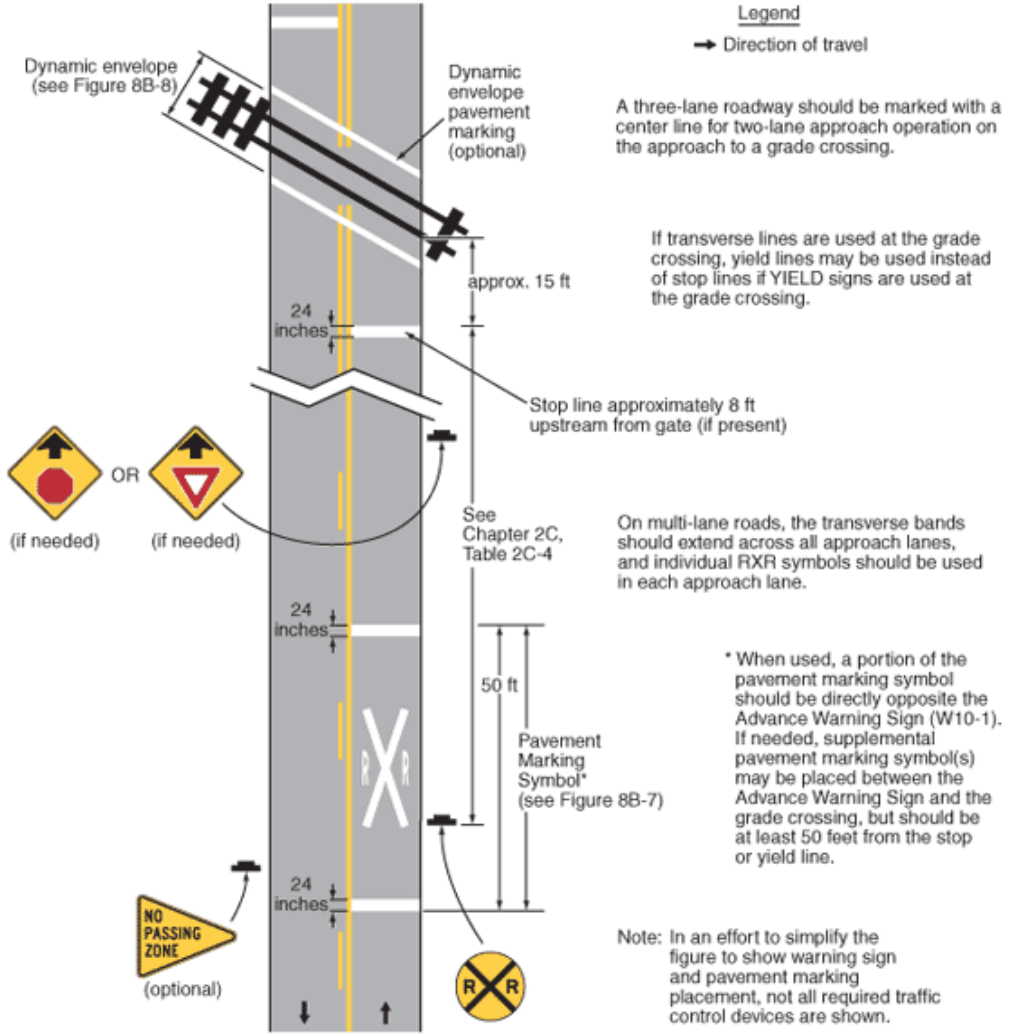


Note: The W10-11 sign is a W10-3 sign modified for geometrics. Other signs can be oriented or revised as needed to better portray the geometrics of the roadways and the tracks.

Highway/Rail Safety

- Signs

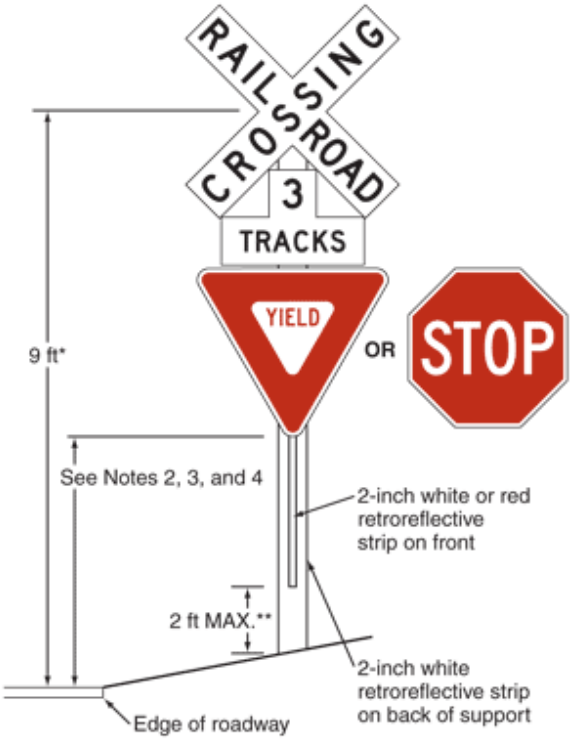
Figure 8B-6. Example of Placement of Warning Signs and Pavement Markings at Grade Crossings



Highway/Rail Safety

Signs

Figure 8B-2. Crossbuck Assembly with a YIELD or STOP Sign on the Crossbuck Sign Support



*Height may be varied as required by local conditions and may be increased to accommodate signs mounted below the Crossbuck sign

**Measured to the ground level at the base of the support

Notes:

1. YIELD or STOP signs are used only at passive crossings. A STOP sign is used only if an engineering study determines that it is appropriate for that particular approach.
2. Mounting height shall be at least 4 feet for installations of YIELD or STOP signs on existing Crossbuck sign supports.
3. Mounting height shall be at least 7 feet for new installations in areas with pedestrian movements or parking.

Highway/Rail Safety

- Contact Information:
  - Trey Jesclard, P.E.
    - 225-379-1445
    - Trey.Jesclard@la.gov
  - Bill Shrewsberry, P.E.
    - 225-379-1543
    - William.Shrewsberry@la.gov
  - THANKS AGAIN!

Louisiana Local Technical Assistance Program (LTAP)

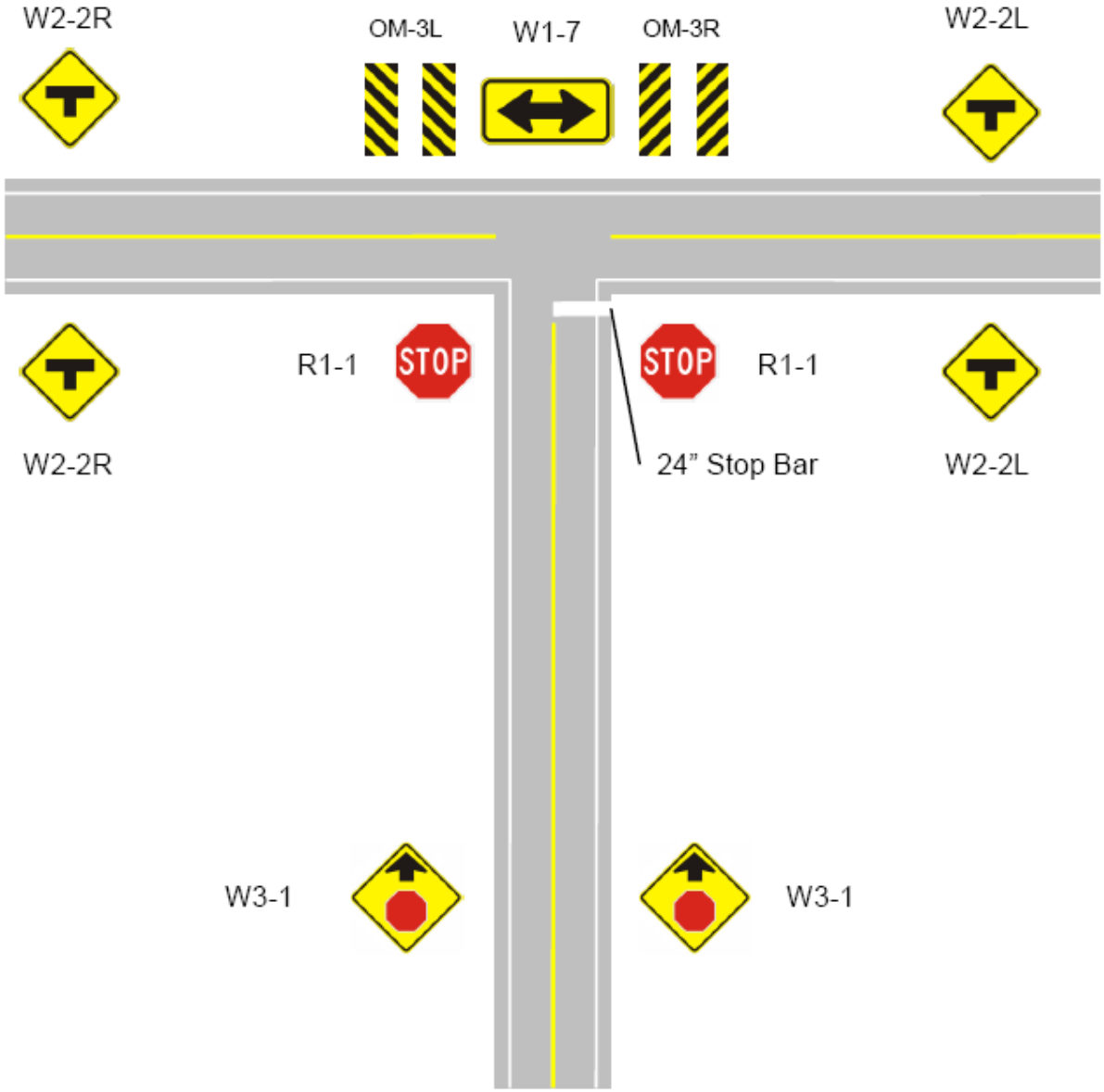
Marie Walsh, Director

Local Road Safety Program

- Outreach
- Training & education
- Technical assistance
  - Data analysis
  - Consultation
- Low cost safety improvement projects

LRSP Intersection Action Plan

- Analyzed local data (CRASH 3)
- Excluded highest crash parishes from initial analysis
- Set crash thresholds for selection
- Identified sites with potential
- Beginning process to implement



LRSP’s typical treatment for T-intersections

Roadway Departure Action Plan

- Analyzed available data (limited to spots & sections due to geographical info)
- Defined crash thresholds
- Identified 24 sections & 16 spot locations
- Made recommendations

Low Cost Recommendations

- Curve warning signs
- Advisory speed plates
- Chevron signs
- Flashing yellow beacons
- Center and edgeline striping

How Can You Help?

- Notify us of any specific sites that you know of that should be visited by our engineers
- Suggest sites for & participate in a Road Safety Audit (RSA)
- Participate in existing safety coalitions
- Multidisciplinary approach

Buckle Up Louisiana
No Excuses

- Coalition effort
- More local involvement
- Develop process for efficient outreach
- Collaboration between more stakeholders
- LMA & PJA Resolutions
- Need local leadership & participation
- May 24 – June 6, 2010

Contact Information

LTAP/LRSP

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Traffic Engineering 101

- Thank You!

- See you on April 26th at 2:00 PM for Speed Management & School Areas