



Integrating Safety into Transportation Planning

*Research and Results
from NCHRP Report 811*

TRB Webinar

December 7, 2016

Presentation Overview

- » Integrating safety into Performance-Based Planning and Programming
- » Background on NCHRP 811 research
- » Seven principles for safety integration

Performance Based Planning and Programming



Source: Performance Based Planning and Programming Guidebook, FHWA.

Transportation Safety Integration

Planning Tasks

Public involvement
and outreach

Multidisciplinary
coordination and input

Development of a vision,
goals, and objective

Identification of performance
measures and targets

Data analysis

Project prioritization
and programming

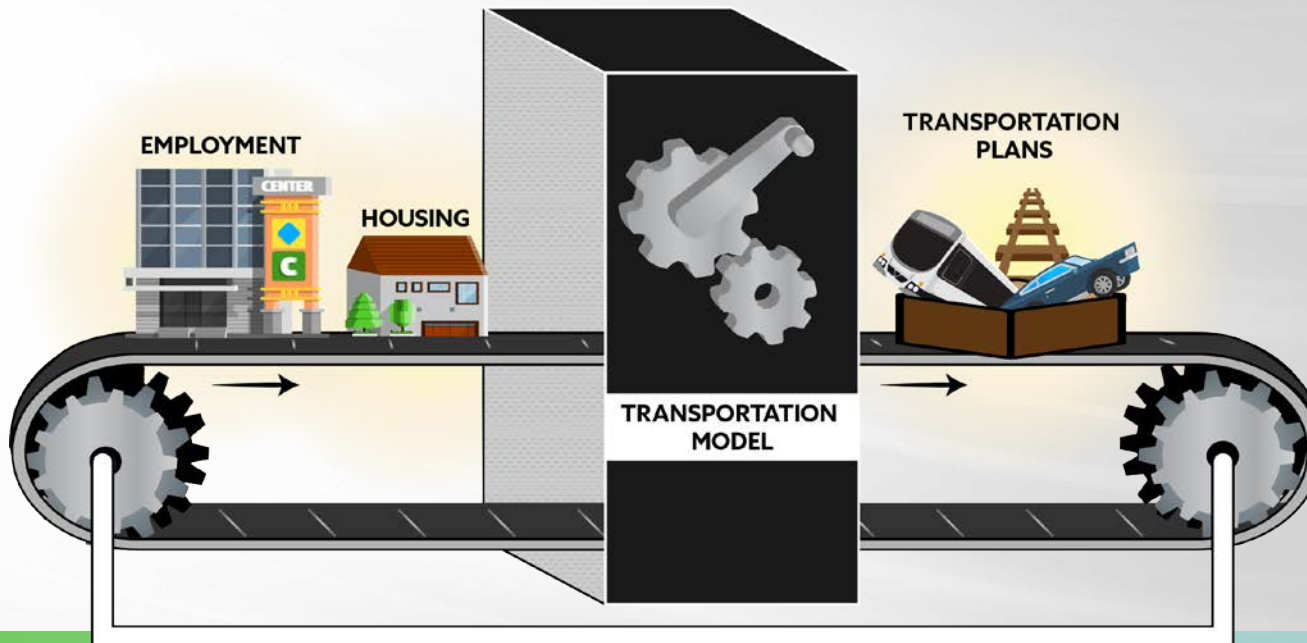
Monitoring
and evaluation

SAFETY



Importance of Addressing Safety in Transportation Planning

- » Connection to decision-makers
- » Support local jurisdictions
- » Analytic skills and tools
- » Holistic perspective of the transportation network
- » Identify regional and local transportation safety investments



Transportation Safety Research

Phase 1

NCHRP 08-76, *Framework for Institutionalizing Safety in the Transportation Planning Process: Final Report (2012)*

- » Literature review, practitioner outreach surveys, 48 interviews
- » Identified successful transportation safety planning practices, but no evidence of institutionalization
- » Outcome – Transportation Safety Planning (TSP) Framework, which defined institutionalization as seven principles



Seven Transportation Safety Principles

- 1** Include the results of safety analysis and discuss safety in public and stakeholder engagement activities
- 2** Discuss safety at committee meeting or identify opportunities to engage safety stakeholders in transportation plans
- 3** Collect and analyze crash and roadway data to inform transportation safety plans, policies, programs, and/or projects
- 4** Utilize public and stakeholder input, results of data analysis, and information in other plans to develop safety goals and objectives in planning documents
- 5** Develop safety performance measures and targets to track progress towards the safety goals and objectives
- 6** Establish safety as a decision factor for the selection of transportation projects
- 7** Routinely track and monitor safety performance and evaluate safety programs and policies

Transportation Safety Research

Phase 2

- » Research Question: Does the TSP Framework work in “real world” settings?
- » Conducted transportation safety planning workshops in Florida, Maine, Arkansas, Louisiana, Nevada, Oregon, and Vermont
 - Participants included FHWA Division staff, State DOT headquarters and division staff, MPOs, and RTPOs
 - Reviewed TSP Framework
 - Confirmed value of seven principles
 - Identified how the principles could be systematically implemented by a planning agency



Transportation Safety Research

Final Report

NCHRP Report 811: Institutionalizing Safety in Transportation Planning Processes: Techniques, Tactics, and Strategies

- » Describes opportunities to implement the seven principles during any transportation planning process (LRTP, corridor plan, modal plan)



Seven Principles and Strategies

1. Public Involvement

Planning Task  **Safety Integration**

Public Involvement and Outreach

*Solicit input to inform
planning decisions*

Utilize available
public involvement
tools/methods to
collect information on
transportation safety
issues and needs

Public Involvement *Strategies*

- » Surveys and comment cards
- » Open house materials
- » Safety summits
- » Outreach materials
 - Webpages
 - Newsletters
 - Social media
- » Mapping/input tool



2. Multidisciplinary Coordination

Planning Task  **Safety Integration**

Multidisciplinary Coordination

*Using committees to
inform planning
decisions*

Discuss safety with
committees or engage
safety stakeholders in
transportation plans

Multidisciplinary Coordination *Strategies*

- » Discuss safety with established committees
- » Create a safety committee for plan development or update
- » Institutionalize safety committee
- » Engage safety stakeholders in committee meetings



3. Data Collection and Analysis

Planning Task  **Safety Integration**

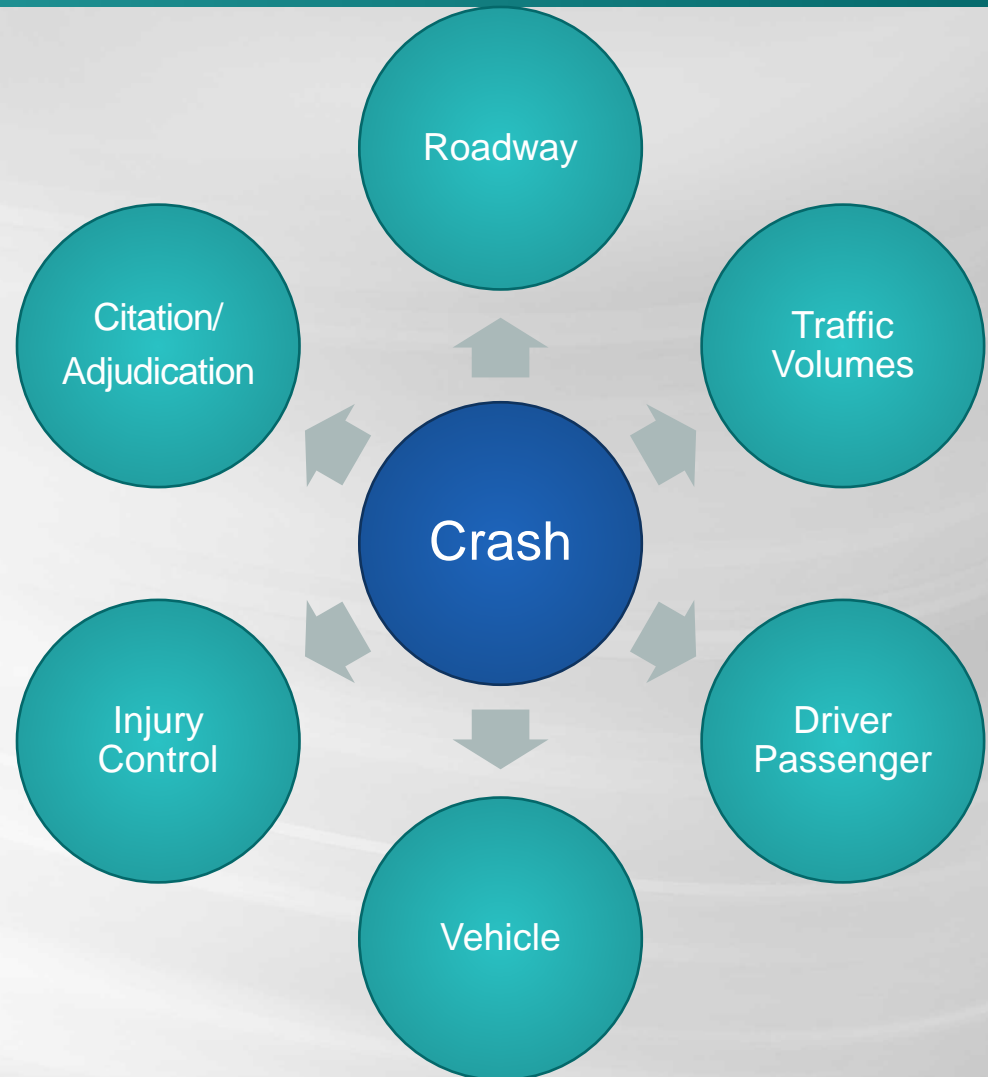
Data Collection and Analysis

*Identify regional
trends and issues*

Collect and
analyze safety data
(crash, volume,
roadway) to identify
goals, objectives, and
project/program
priorities

Data Collection Strategies

- » Identify where data are available
 - State database, local law enforcement
 - Identify what data are available
 - Crash, roadway, volumes
- » Identify how to obtain data
 - Generated report, custom report, raw data, other




Data Analysis *Strategies*

Understand what data are available and identify the analysis questions your agency wants to answer

Analysis Category	Analysis Question
Benchmarking	How many fatalities and injuries are occurring in my State?
Identify Trends/ Contributing Factors	Who is involved in crashes? When are the crashes occurring?
Identify/Evaluate Focus Crash Types	What are most common factors? What are most common crash types?
Network Screening	What locations (intersections/segments show most potential for safety improvements?

4. Goals and Objectives

Planning Task  **Safety Integration**

Goals and Objectives

Desired transportation outcomes and methods for achievement

Utilize public and stakeholder input, results of data analysis, and information in other plans to develop safety goals and objectives in planning documents

Goals and Objectives

Strategies

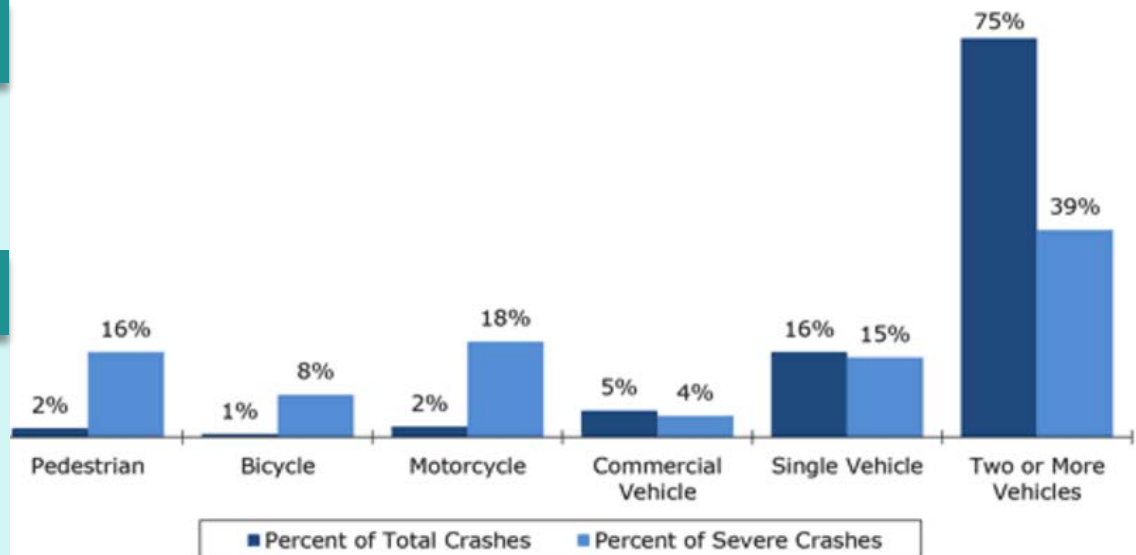
- » Include safety as a Federally required planning factor
- » Use feedback from stakeholders and the public
- » Draw upon goals and objectives from other plans
- » Use available data

GOAL

- Reduce severe crashes on the transportation system

OBJECTIVE

- Identify solutions to address the overrepresentation of pedestrian and motorcycle crashes



5. Performance Measures and Targets

Planning Task  Safety Integration

Performance Measures and Targets

Tool to track and evaluate progress towards transportation goals

Identify safety performance measures and targets for tracking progress toward safety goals and objectives

Performance Measures and Targets *Strategies*

- » Obtain baseline data for performance tracking and target setting
- » Coordinate with state, regional, and local transportation planners
- » Identify and test approaches to set targets

Performance Measures	Targets
Fatalities	Number of fatalities by X year
Serious Injuries	Number of serious injuries by X year
Fatality Rate	Fatality rate by X year
Serious Injury Rate	Serious injury rate by X year
Bicycle and Pedestrian Fatalities and Serious Injuries	Number of bicycle and pedestrian fatalities and serious injuries by X year

6. Project Prioritization and Programming

Planning Task  **Safety Integration**

**Project Prioritization
and Programming**


*Processes used to
select and prioritize
transportation projects*

Incorporate safety into
transportation project
prioritization and
programming
processes

Incorporating Safety into All Transportation Projects

- » Incorporate safety into project prioritization process for all transportation projects
 - Policy Considerations – Does the project meet the goals outlined in the plan?
 - Technical Considerations – Does the project address a data-driven safety need? What is the anticipated safety impact of the project?
- » Consider how to improve safety in programmed transportation projects
 - Maintenance projects
 - ITS solutions

7. Monitoring and Evaluation

Planning Task  **Safety Integration**

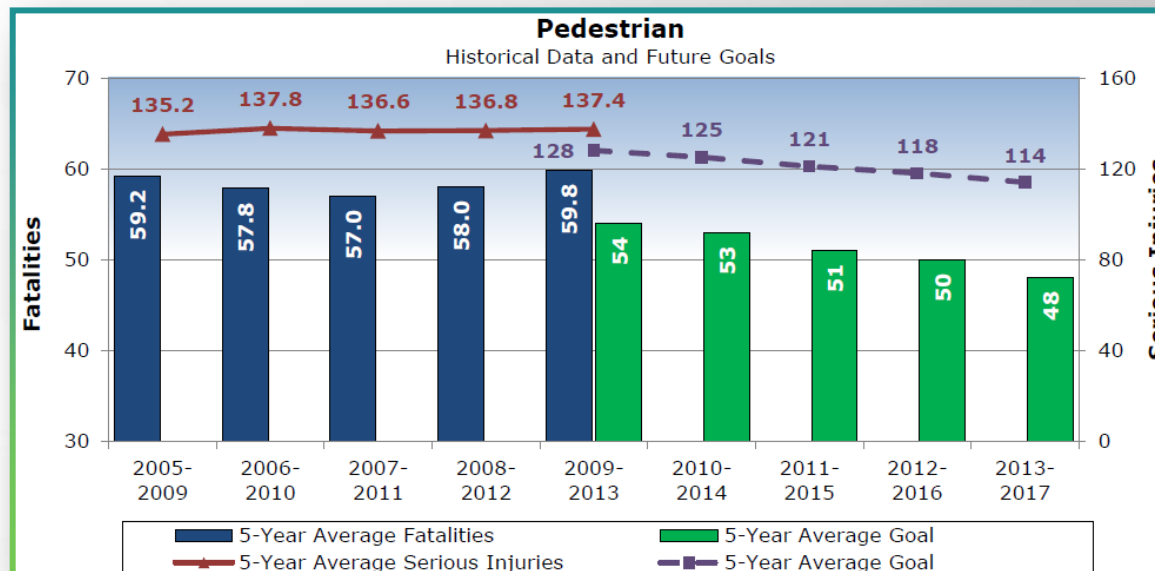
Monitoring and Evaluation

Process to determine effectiveness of transportation programs/projects

Routinely monitor and track safety performance to evaluate progress on performance measures and targets

Monitoring and Evaluation Strategies

- » Develop a monitoring and evaluation plan
- » Develop performance measures and targets
- » Develop a tracking tool
- » Interpret the data
- » Share the results



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Pennsylvania Transportation Safety Planning

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December 7, 2016

▶ Pennsylvania Transportation Safety Planning

Agenda

- Planning in Pennsylvania
- Safety Planning
- Safety Data Sharing

▶ Pennsylvania Transportation Safety Planning

Planning in Pennsylvania

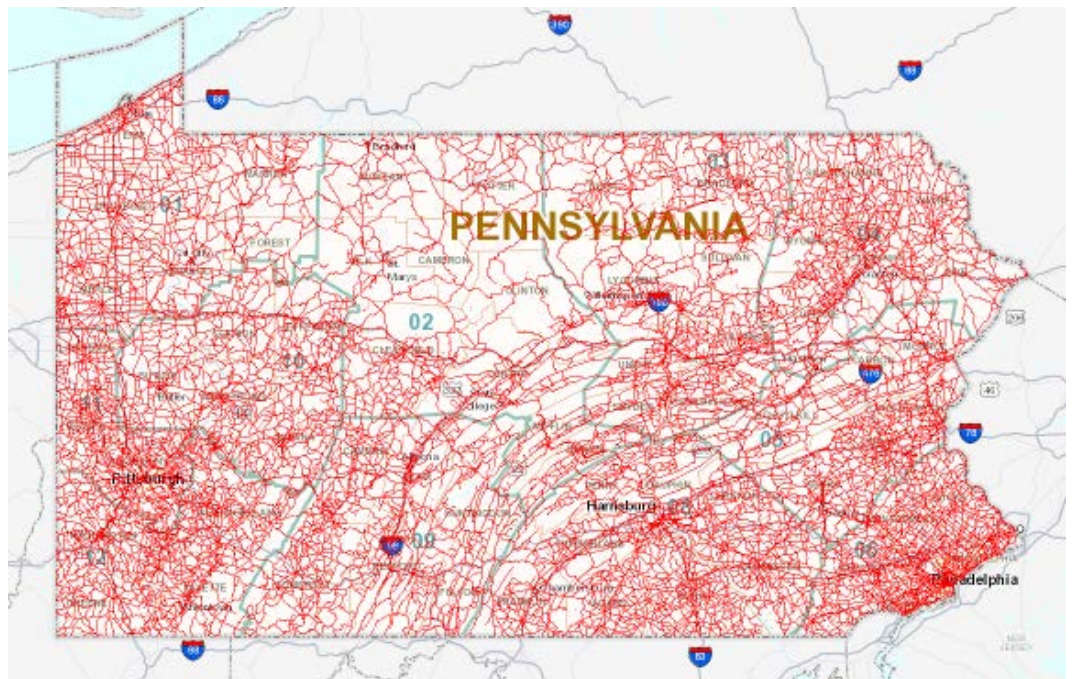
- 2,562 Municipalities
- 67 Counties
- 11 Engineering Districts



▶ Pennsylvania Transportation Safety Planning

Planning in Pennsylvania

- 39,756 miles of roadway PennDOT owned

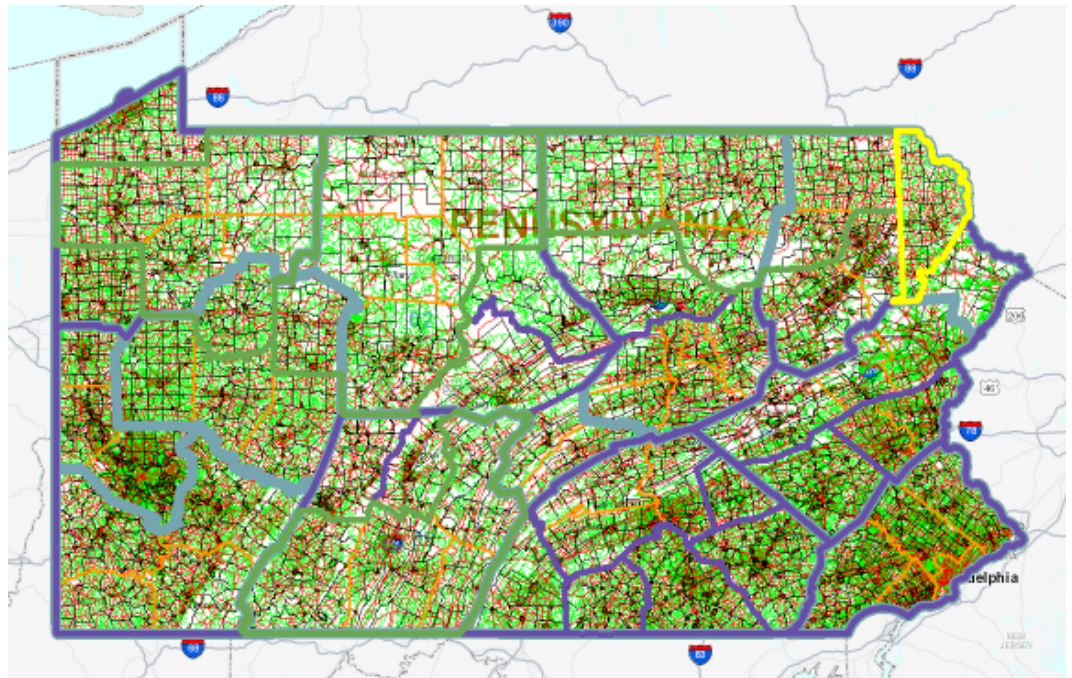


▶ Pennsylvania Transportation Safety Planning

Planning in Pennsylvania

- 2,562 Municipalities
- 67 Counties
- 11 Engineering Districts
- 24 Planning Partners
 - 19 MPOs
 - 4 RPOs
 - 1 Independent County
- 39,756 miles of roadway PennDOT owned
- 78,186 miles of roadway locally owned

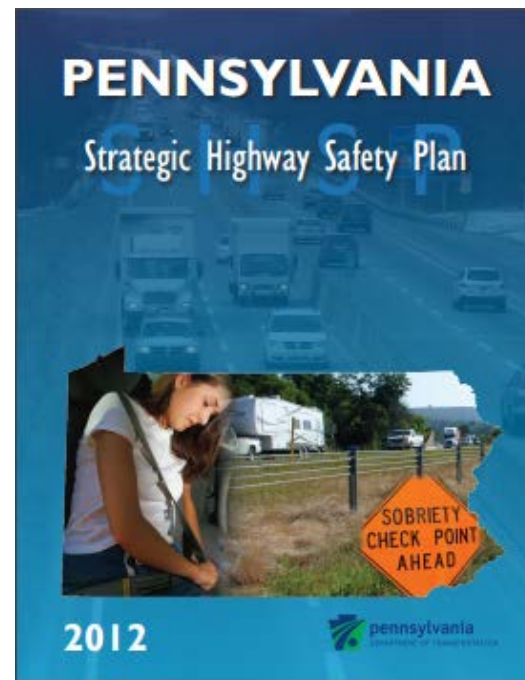
Pennsylvania's Challenge!



▶ Pennsylvania Transportation Safety Planning

Safety Planning

- Strategic Highway Safety Plan



▶ Pennsylvania Transportation Safety Planning

Safety Planning

- 2014 Transportation Safety Planning workshops



▶ Pennsylvania Transportation Safety Planning

Safety Planning

- Safety Planning Work Group

WORK GROUP

- Strategic Highway Safety Plan update
- Performance Measures and Target Setting
- Safety Project Approval
- Safety Set Aside
- Safety Data Sharing

Pennsylvania Transportation Safety Planning

Safety Data Sharing

- Reportable Crash

PA Title 75 §3746.

Immediate notice of accident to police department.

An accident involving:

- injury to or death of any person; or
- vehicular damage to the extent that it requires towing.

▶ Pennsylvania Transportation Safety Planning

Safety Data Sharing

- Accident Investigation

PA Title 75 §3754.

Accident prevention investigations.

- General rule – The Department may conduct investigations to determine accident causes, and the improvements which may help prevent them.
- Confidentiality of reports – investigations, records and reports shall not be discoverable in any legal action or other proceeding.

▶ Pennsylvania Transportation Safety Planning

Safety Data Sharing

- Locations
 - Statewide High Crash Locations
 - MPO/RPO High Crash Locations
 - Intersection Safety Implementation Plan
 - Roadway Departure Safety Implementation Plan
 - Cable Median Barrier
 - High Friction Surfacing
 - Wrong Way Driver
 - Potential Roundabout

Pennsylvania Transportation Safety Planning

Safety Data Sharing

- Open Data



▶ Pennsylvania Transportation Safety Planning

Safety Data Sharing

- Open Data



Download Data

▶ Additional Information

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Links

PennDOT Safety

<http://www.penndot.gov/TravelInPA/Safety/Pages/default.aspx>

PennDOT Planning – State Transportation Commission

<http://www.talkpatransportation.com/>

Open Data

<http://data.pennshare.opendata.arcgis.com/>

Highway Statistics

http://www.dot.state.pa.us/public/pubsforms/Publications/PUB_600.pdf



Louisiana: An Explicit Consideration of Safety within Transportation Planning

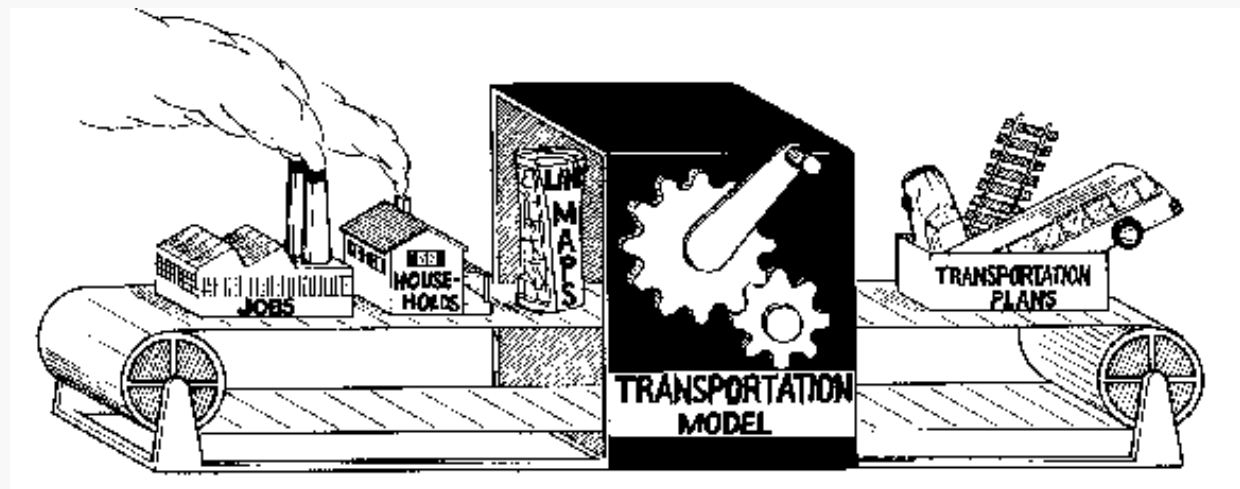
A Regional Approach

Evolution of Transportation Safety Planning



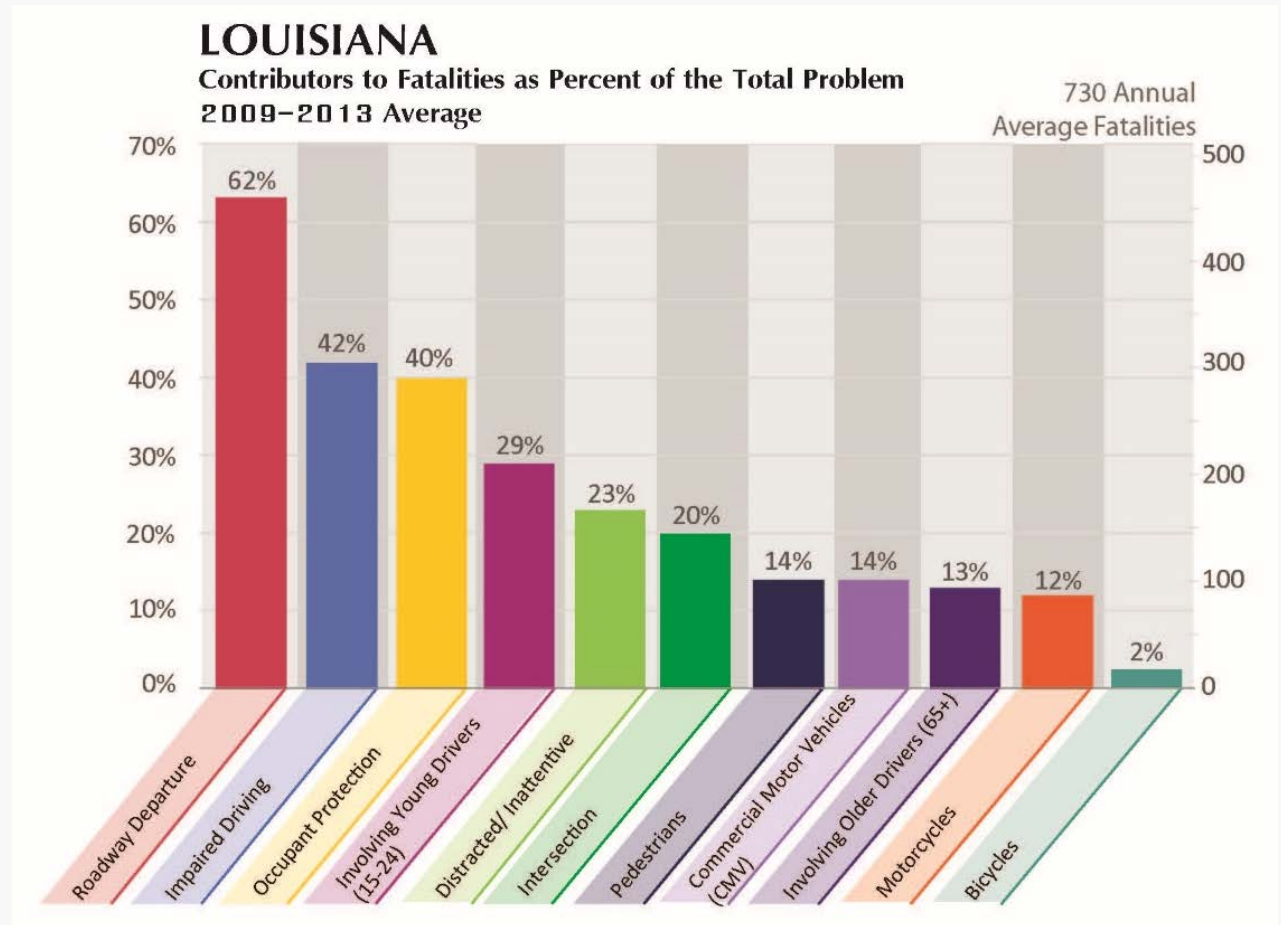
Planner's Role

- Connection to decision-makers
- Analytic skills and tools
- Commitment to the public good
- Holistic perspective of the transportation network
- Ability to prioritize and program regional transportation investments

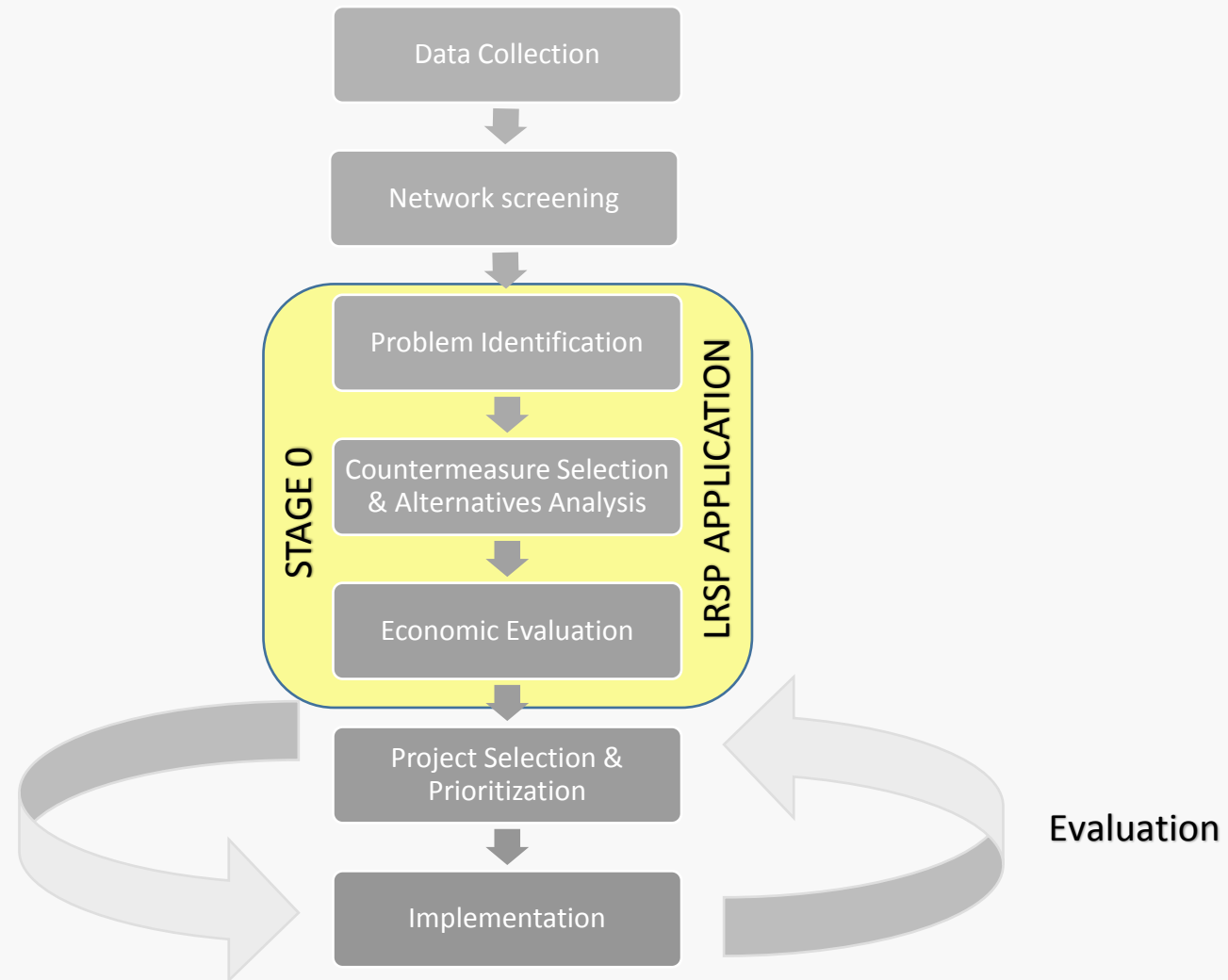


Engineer's Role

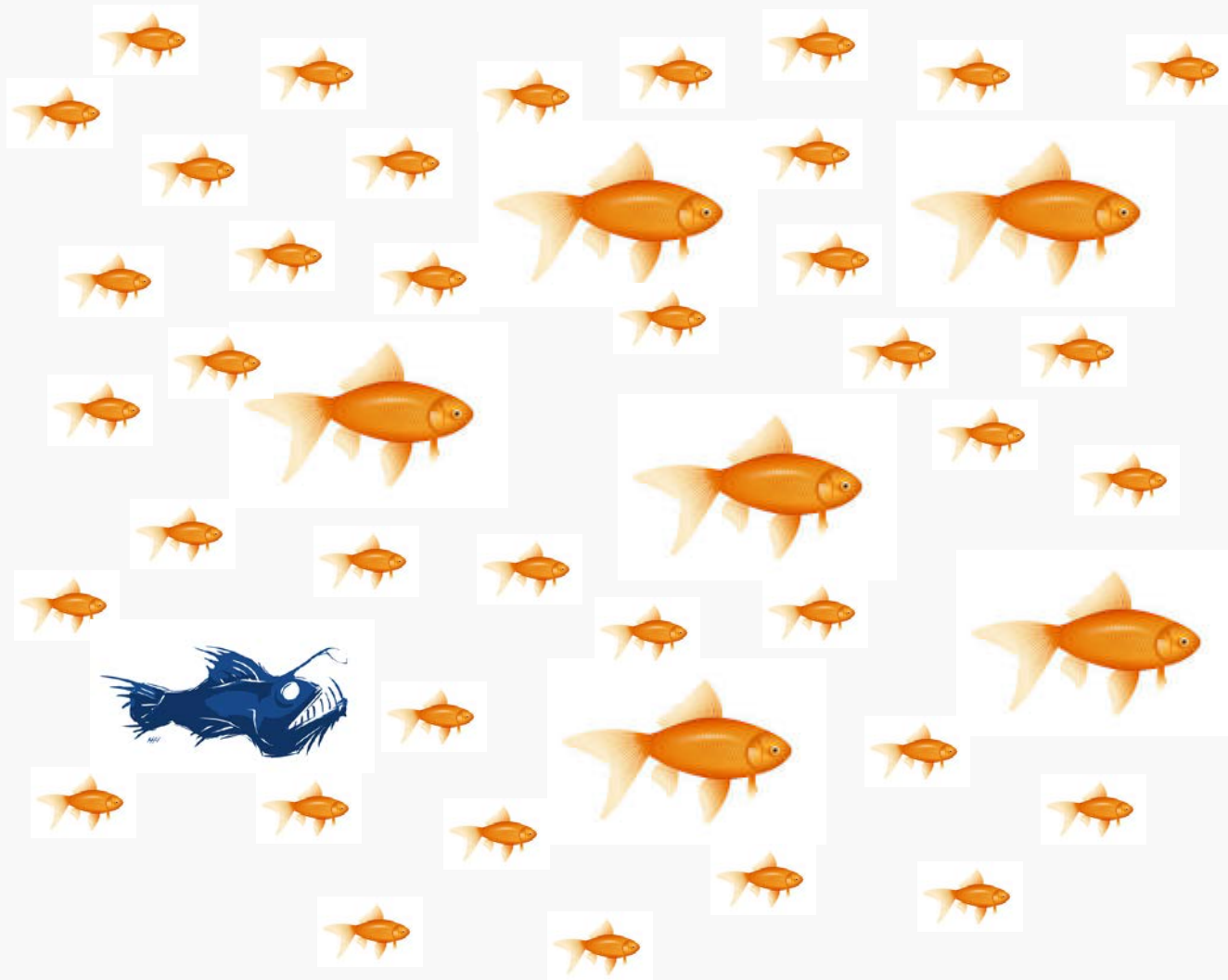
- HSIP
- ID of Sites with Promise
- Data Collection
- Analytical Resources
- Linking to the SHSP



Safety Management Process



Network Screening



Network Screening Options

- Crash Frequency
- Crash Rate
- EPDO
- Relative Severity Index
- Critical Rate
- Calibrated HSM Models (SafetyAnalyst)
- Regression Modeling (SPF/LOSS)
- Excess Proportion of Specific Crash Types
- Systemic Approach

Level of Service of Safety

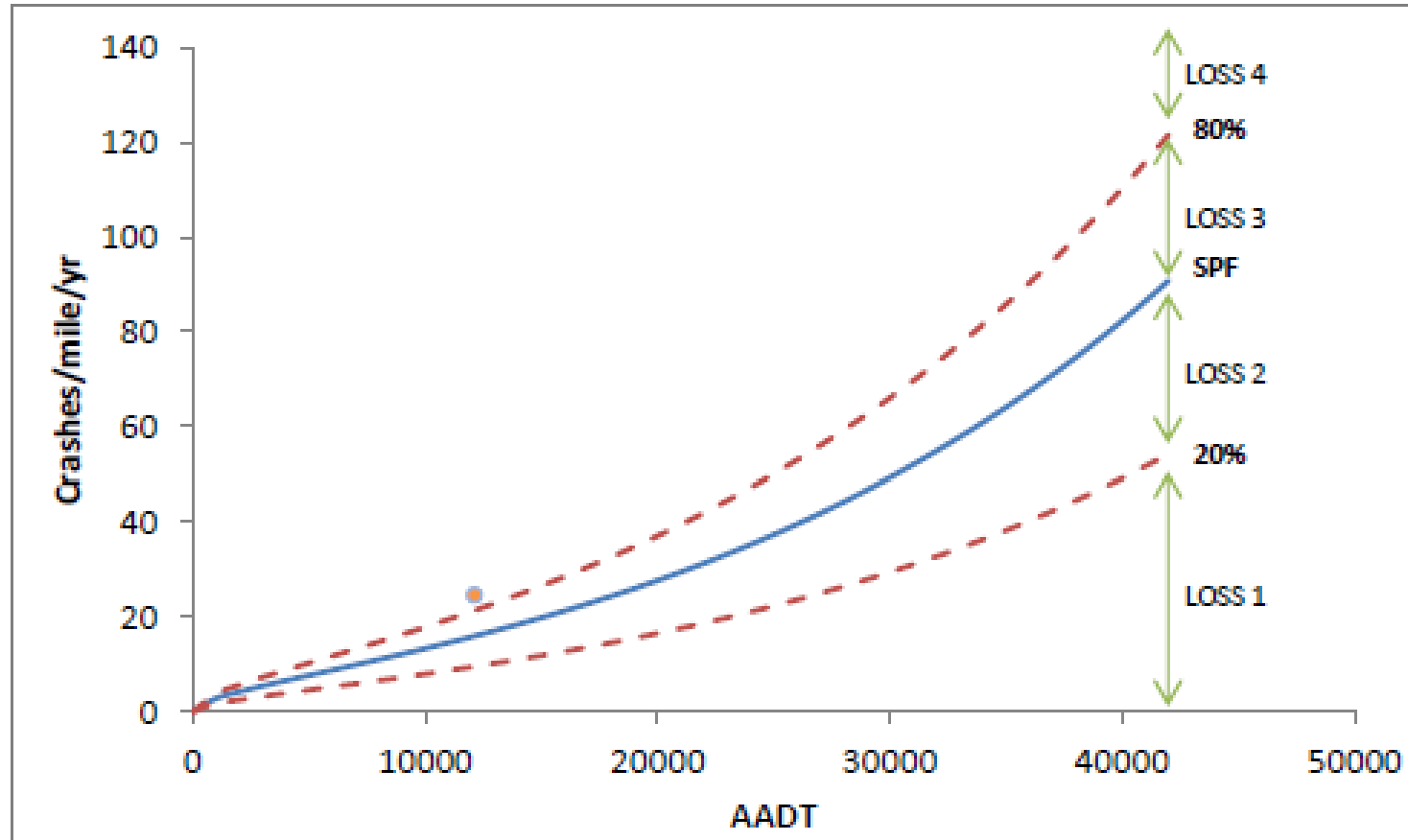
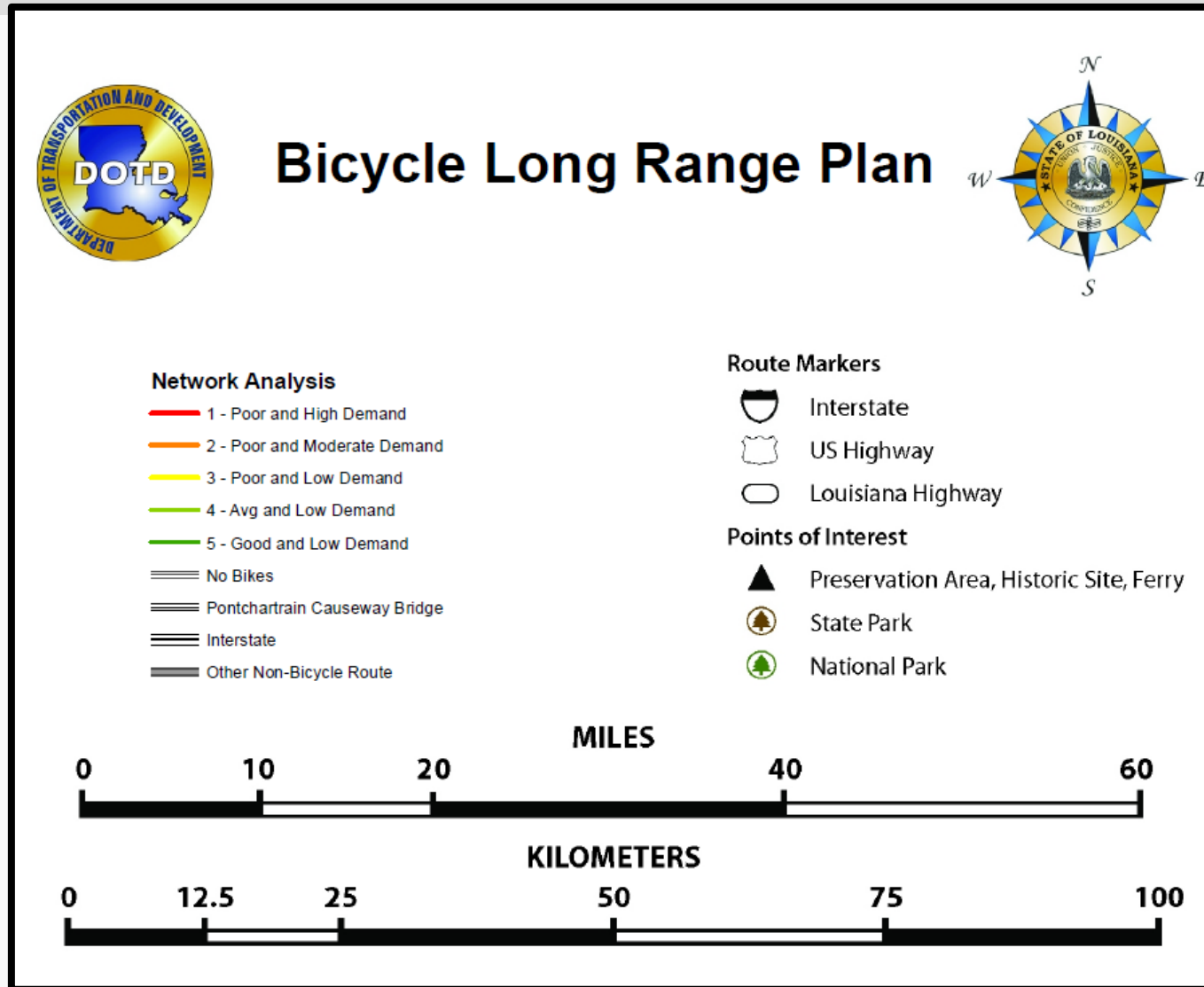


Figure 1 Urban 4-lane Undivided SPF - All Crashes

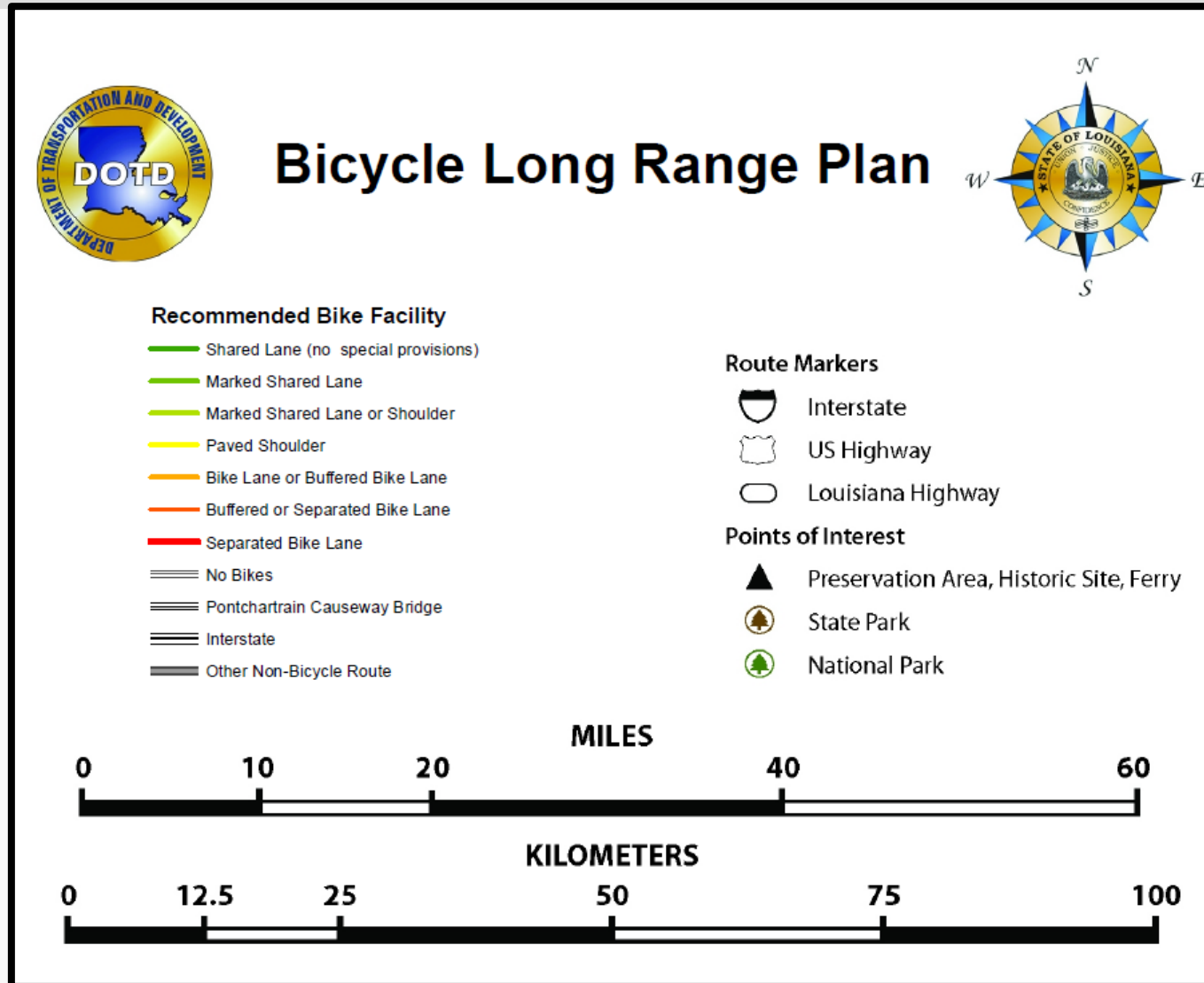
Tableau Tool



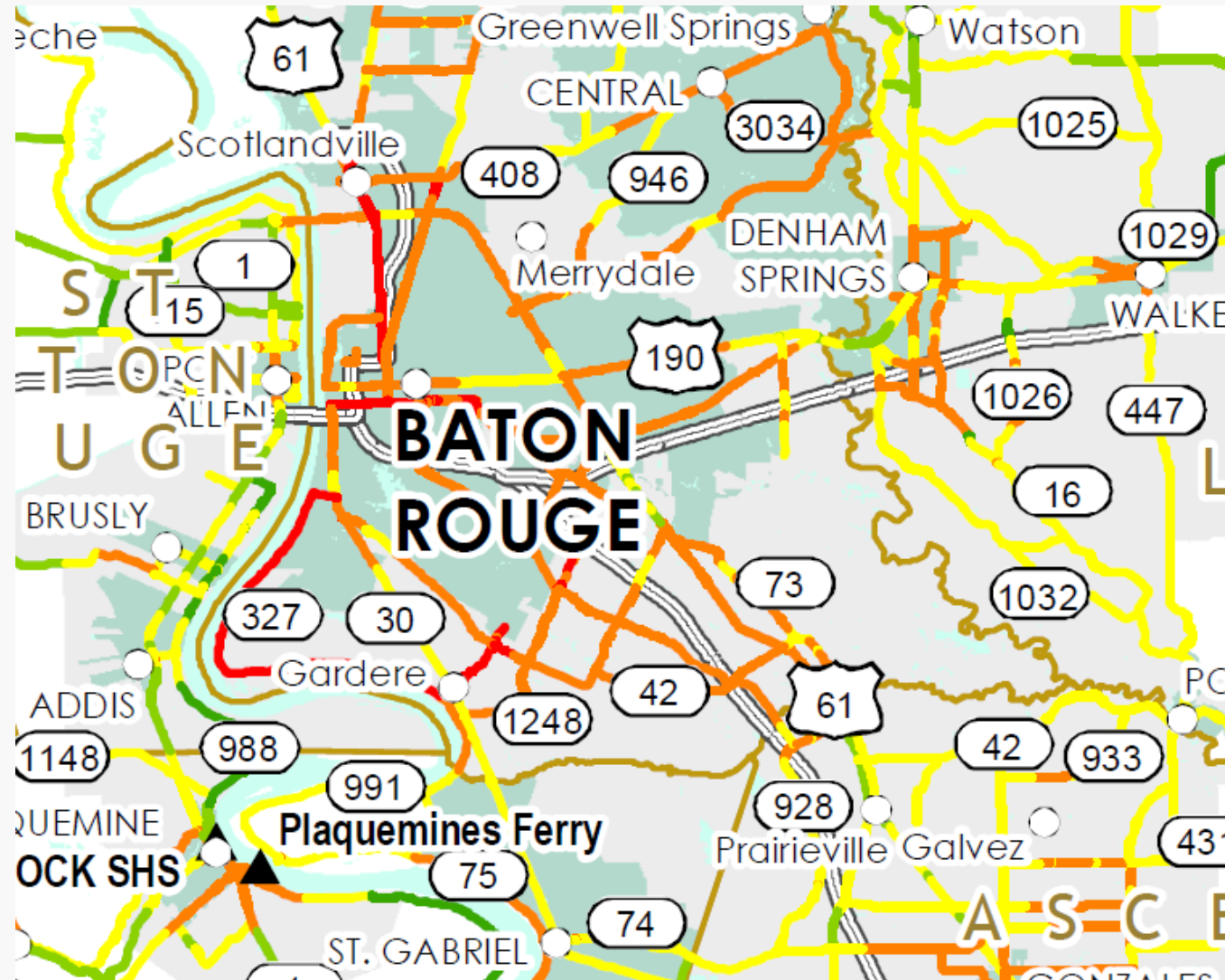
Long Range Bike Map



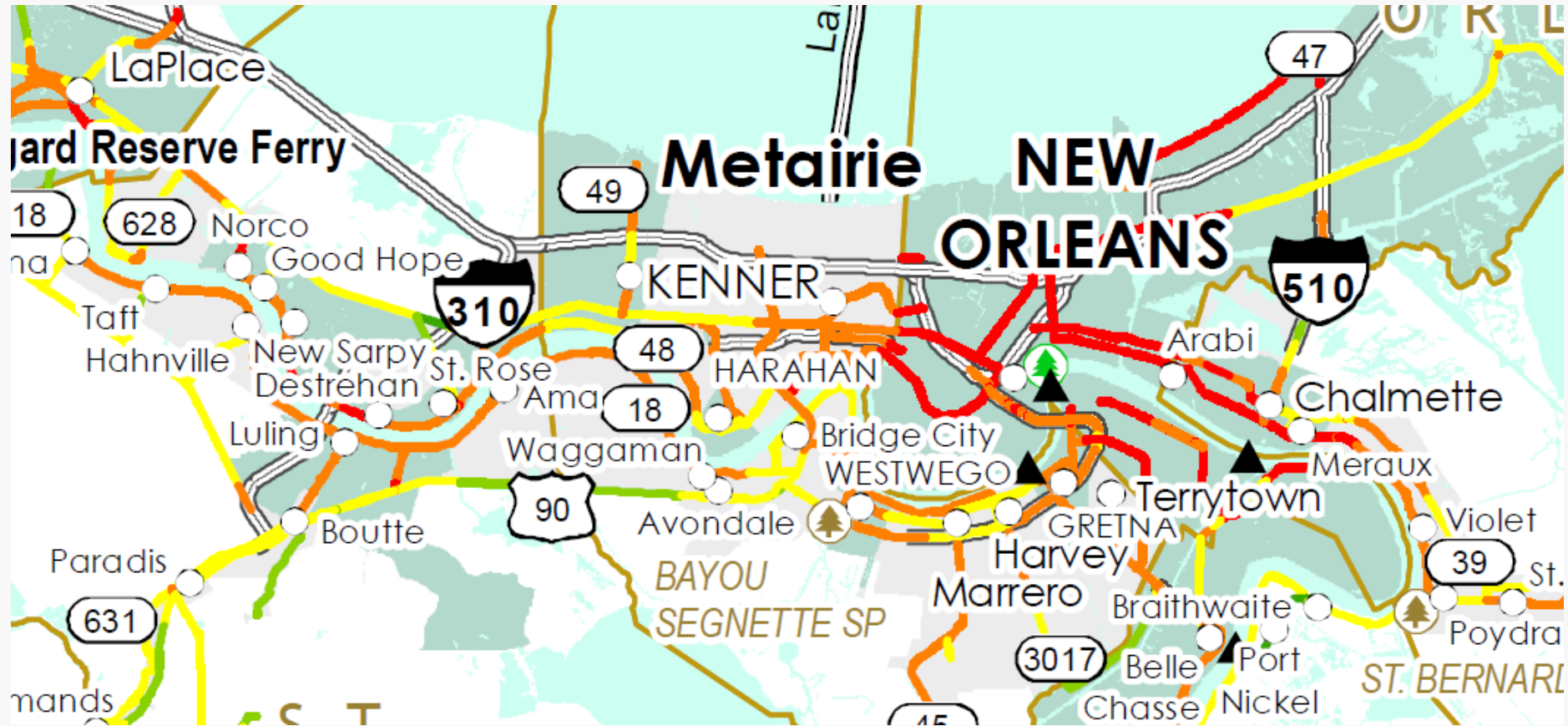
Long Range Bike Map



2016 Target Cities: Baton Rouge



2016 Target Cities: New Orleans



Local Road Safety Program – Parish Safety Plans

High severity is typically associated with higher speeds and speeding.

Collision Types describe collisions between vehicles that typically occur at intersections.

Non Coll - Identifies single vehicle crashes.

ROAD AND CRASH CATEGORIES	SEVERITY					EMPHASIS AREA					COLLISION TYPE										BASIC COUNTERMEASURE							
	A- Fatal	B- Severe	C- Moderate	D- Complaint	E- None	Non-Intersection	Intersection	ALCOHOL	DARK	WET	Head On	Left Turne	left Turn-f	Left Turn-g	Non Coll	Other	Rear End	Right Turn-h	Right Turn-i	RT Angle	s swipe (od)	s swipe (sd)	Pavement Marking	Curve Signing	Int Warning Signs	Stop Signs	Speed Limit Signing	Other Countermeasures
Curves - Run off Road						X																X						
Curves - Run off Road, Dark						X		X														X						
Curves - Run off Road, Wet						X			X	X												X						
Curves - High Severity, Run off Road	X	X	X	X		X				X												X						
Curves - Run off Road, Culverts						X																						
Curves - Run off Road, Mailbox						X																						
Curves - Run off Road, Trees						X																						
Straight - High Severity, Run off Road	X	X	X	X		X																X	X					
Straight - Urban	X	X	X	X		X																X	X					
Intersections - Wet									X			X	X	X			X	X	X	X	X	X	X					
Intersections (Unsignalized) Crashes						X					X	X	X				X	X	X	X	X							
Intersections (Unsignalized) Dark						X	X				X	X	X				X	X	X	X	X							
Intersections (Signalized)						X					X	X	X				X	X	X	X	X							
Intersections (Signalized) Rear End						X											X	X										
Intersections (Signalized) Pedestrians																	X	X										
Pedestrians																												
Wildlife																												
Train																												

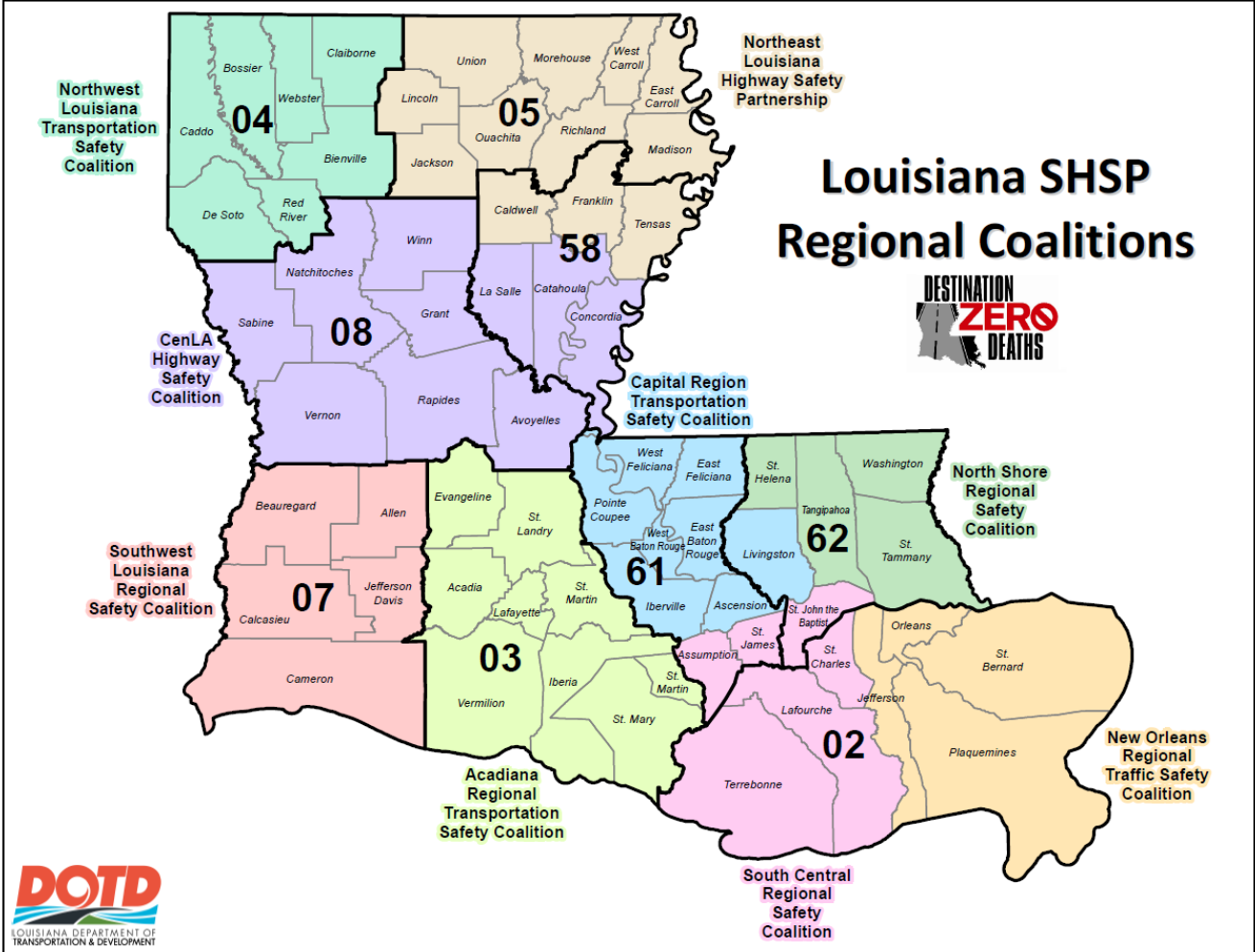
Categories represent common combinations of roadway conditions and crash patterns. Combinations of these occurrences are also likely.

Emphasis Areas identify patterns in possible contributing factors.

Countermeasures shown are basic low cost improvements that are proven to reduce crashes. More complex solutions may be considered after additional analysis.

INFORMATION	Road Name:	E Burton St	
Owner:	Parish Gov	Total Crash Count	180
Parish:	Calcasieu Parish	Fatal/Severe Injury Count	0/3
Road Rank in Parish (by Crash #):	13	Statewide Rank (by Rate):	1938
ROAD FEATURES			
	Value	Value	Value
Road Length, miles	2.1	ADT	4578
Road Type (Urban/Rural)	Rural	ADT, Year	2015
Land Use	Residential	ADT, Source	DOTD
Intersections, #/mi	13	Posted Speed, mph	45
Driveways, #/mi	48	Marking (CL, RPM, EL)	none
Pavement Width, ft	22	Marking Condition	
Pavement Type	Asphalt	Crosswalks	none
Pavement Condition	Good	Crosswalk Condition	
Shoulder Width, ft	4	Stop Bars	none
	Type	Stop Bars Condition	
Alignment	Straight	Sidewalks	none
	Slight Curves	Lighting	none
	Sharp Curves	Railroad Crossings	Yes
Clear Zone	Ditch	Mailboxes	X
	Culverts	Power Poles	X
	Trees	Bridges	
CRASH PROFILE			
Over Represented Crashes		Alcohol	
Intersection		non-Intersection	
Pedestrian	X	Lighting	
Severity	B-Sev + C-Mod	Wet	
Intersection Crash		Non-Intersection Crash	
Rear End		Run off Road	X
Left Turn	X	Head On	
Right Angle		Side Swipe (OD)	
POSSIBLE PROBLEM			
Guidance, Visibility, Speeding			
IMPROVEMENT TYPE			
Intersection		PENDING PROJECTS	
Curves		Pending projects at this location.	
Entire Roadway	X	Pavement overlaid May 2014	
RECOMMENDED IMPROVEMENTS			
1 Pavement Marking - Center line and Raised Pavement Markers			
2 Speed Limit Signs at 3/4 mile spacing			
3 Check intersection sight distances at cross roads			
4			
User:	P. Allain	Date:	7/8/2016

Regional Safety Coalitions



Long Term Goals

- Explicit consideration of safety
- Safety to be considered across all programs and projects, not only the HSIP
- More strategic investments of limited resources
- Transparent and data-driven decisions

Questions?

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Highway Safety

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