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CTAC
Brownbag Discussion
September 6th, 2019
Bend Council Chambers
11:30 AM – 1:00 PM

BEND AREA TRANSPORTATION SAFETY ACTION PLAN (TSAP)

KITTELSON & ASSOCIATES

MEETING AGENDA

- Introductions
- Review of Draft TSAP
  - Policies and Goals
  - TSAP Emphasis Areas
  - Performance Measures and Metrics
  - Projects and Action Items
  - Plan provides direction for policy development in the TSP and MTP through a data driven planning process

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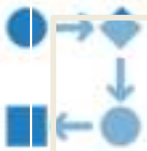
REVIEW OF DRAFT TSAP

WHAT'S IN THE TSAP?

Section 1

- Introduction
  - Policies and Goals



- Systemic Solutions

- Location Specific Applications

Section 2

- Crash Data Summary
- Emphasis Areas

- Speed management Toolbox

- Non-Infrastructure Measures

- Performance Measures
- Metrics

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TSAP EMPHASIS AREAS – *CRASH TYPES*

Section 2 of the Draft TSAP

Most frequent crash types associated with fatal/incapacitating:

- Turning movements,
- rear-end,
- angle,
- pedestrian,
- fixed object, and
- bicyclist crashes

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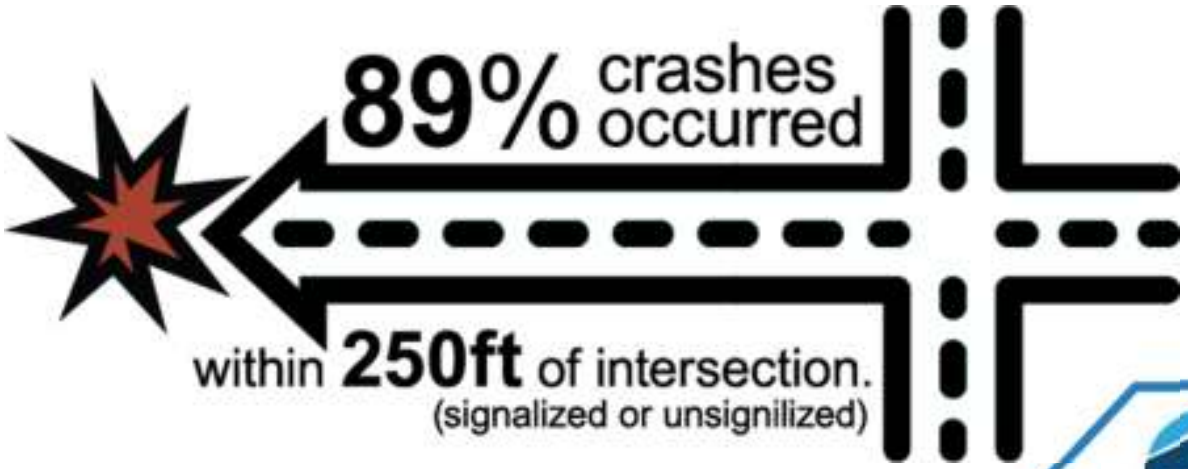
TSAP EMPHASIS AREAS- INTERSECTIONS

Section 2 of the Draft TSAP

Among fatal/incapacitating crashes at intersections, 49% occurred at stop-controlled intersections, and 28% occurred at traffic signals.

INTERSECTIONS



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TSAP EMPHASIS AREAS - ARTERIALS

21% of fatal/incapacitating segment crashes were fixed object, sideswipe, head-on, or overturn crashes.

58% of fatal/incapacitating crashes occurred on **arterial** roadways or at intersections with arterial roadways.

White lines on map show arterial type roadways in Bend.

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TSAP EMPHASIS AREAS - BICYCLIST

BICYCLE INVOLVED CRASHES

Bicyclists

- Bicycle crashes accounted for two percent of reported crashes and 9% of fatal/incapacitating crashes.
- 93% of bicyclist collisions occurred within 25- feet of an intersection.

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TSAP EMPHASIS AREAS - SPEEDING

13% of fatal/incapacitating crashes involved **excessive speeds**; 10% of excessive speed crashes resulted in fatality or incapacitating injury.

Alcohol/drug involvement was reported in 6% of crashes but in 20% of the fatal/incapacitating subset of collisions.

Speeding

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TSAP EMPHASIS AREAS - PEDESTRIAN

94% of pedestrian collisions resulted in injury or death. 24% resulted in death or incapacitating injury.

Fatal and incapacitating **pedestrian** collisions predominantly occurred in the **evening/nighttime hours**

PEDESTRIAN INVOLVED CRASHES

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TSAP EMPHASIS AREAS - LIGHTING

22% of fatal/incapacitating crashes occurred in **dark, unlit conditions**.

4% of crashes in dark, unlit conditions resulted in fatality or incapacitating injury.

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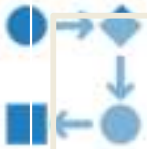

Section 3

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Section 7

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TSAP SAFETY GOAL

- **Goal:** The City of Bend aspires to a transportation system that is accessible, welcoming, and comfortable for all users, including the most vulnerable, and which will result in zero serious injuries or fatal crashes. The City recognizes that we must design and manage our transportation system with this end in mind.

Section 1.3 of the Draft TSAP

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TSP SAFETY POLICIES

- The draft safety policies reflect the work of the Transportation Safety Action Plan.

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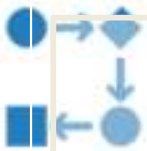

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PERFORMANCE MEASURES

Section 7 of the Draft TSAP

Effectiveness

- Performance Measures track the **results** of a program or activity. For example, they track how many fatalities or injuries occurred, or number of non-motorist fatalities

Efficiency

- Performance Measures track **effort and output**. For example, they track how many activities were conducted, or miles of treatment were installed

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PERFORMANCE MEASURES - EFFECTIVENESS

Base Period	Fatalities (People)	Fatality Rate (People per 100 Million VMT)	Serious Injuries (People)	Serious Injury Rate (People per 100 Million VMT)	Non motorized Fatalities and Serious Injuries
Bend UGB Area					
2012-2016	12	0.45	88	3.31	19
Bend MPO Area					
2012-2016	13	0.49	102	3.84	20
Oregon Performance Targets					
2013-2017		0.94		4.42	

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PERFORMANCE MEASURES - EFFICIENCY

- Measure efforts that are expected to lead to positive safety outcomes.

TSAP Section	TSAP Implementation Activity	Implementation Objective
1.5 Plan Development Process	1. Establish a TSAP governance structure, which could include an executive committee, “E”-level committees, etc.	A TSAP governance document detailing structure and actions of safety-focused teams and individual roles.
2.3 Emphasis Areas	1. Develop an approach to each Emphasis Area (e.g., identify a champion, establish an emphasis area team, etc.)	Number of Emphasis Areas with a documented implementation approach

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LOCATION SPECIFIC RECOMMENDATIONS: SITE-SPECIFIC CONCEPTS

Section 5.2 of the Draft TSAP

Implemented two network screening approaches to identify priority locations for recommendations.

Equivalent Property Damage Only (EPDO) Screening → *Site-Specific Concepts*

- The performance measures identify locations with high collision frequency and severity.

EPDO performance measure assigns weighting factors to collisions by severity to account for the societal costs of fatal/incapacitating crashes compared to less severe injury crashes. Fatal/incapacitating crashes were given 100 points; moderate and minor injury crashes were given 10 points; and property damage only crashes were given 1 point.

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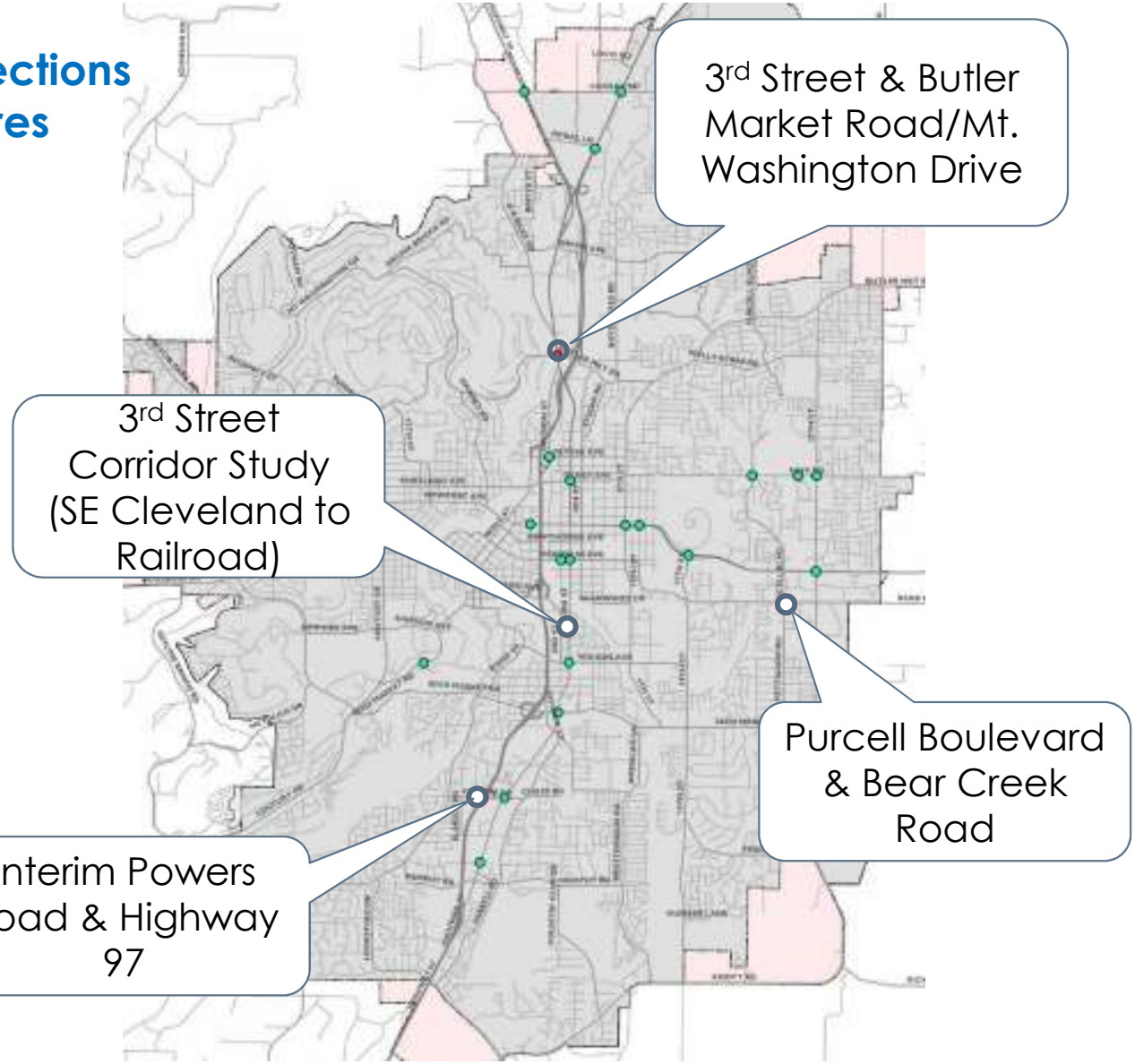
Figure 7 in TSAP: Intersections with Highest EPDO Scores

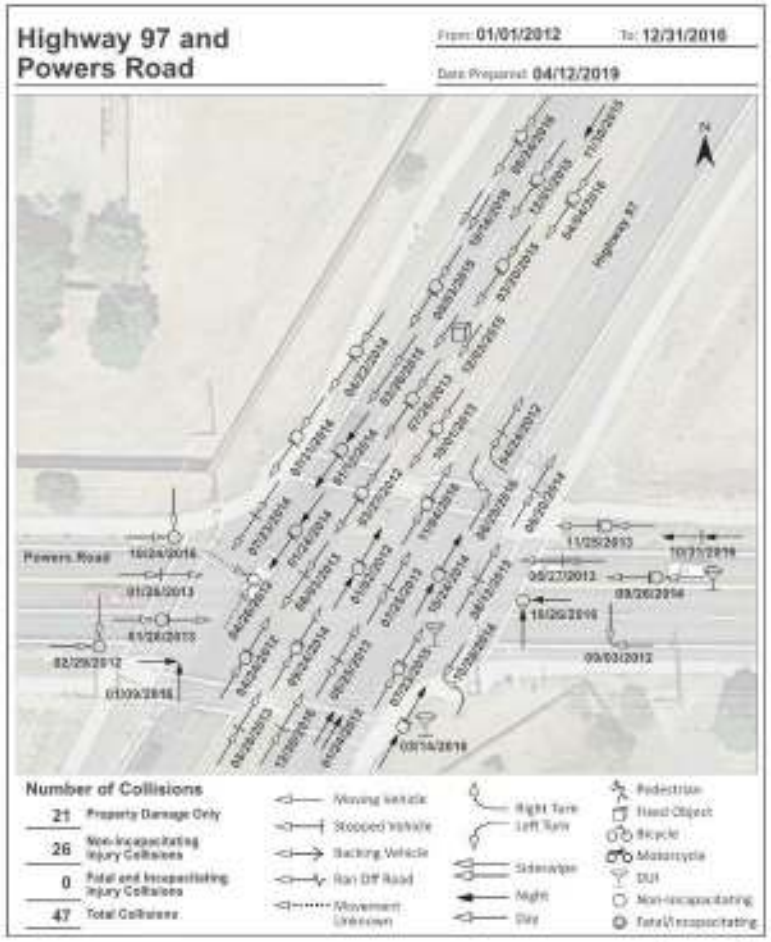
- *Four locations with site-specific concepts*
- *Most green locations are part of the City CIP or ODOT STIP*



Highway 97 & Powers Road Area

Crash Data Overview

- The highest concentration of crashes were reported at or near the northbound on-ramp to Highway 97.
- 78 % of reported intersection crashes are rear-end crashes.
- 51% of the reported crashes in the Highway 97 & Powers Road Area resulted in some level of injury.



City of Bend, Deschutes County, Oregon
DUI represents a collision where alcohol and/or drugs were reported
*Not to scale

Figure 20
Crash Diagram

COORDINATION WITH THE TSP

- Site-Specific Concepts:
  - Incorporated as Projects in the TSP
    - Bear Creek/Purcell improvements (Near Term Project List)
    - 3rd Street Study (Study recommended)
    - US97 Powers (referred to Parkway Planning effort)
    - US20 Butler Market (referred to Parkway Plan effort)

Pettigrew Road/Purcell Boulevard/Bear Creek Road

TSAP Concepts

- Control crossing and turning movements with a single lane roundabout as well as reduce conflict points between road users.
- Complete streetscape treatments and include storm water management.

LOCATION SPECIFIC RECOMMENDATIONS

Section 5.3 of the Draft TSAP

Implemented two network screening approaches to identify priority locations for recommendations.

Excess Proportion Screening → *Systemic Treatments*

- The performance measures identified locations with a high concentration of particular crash types

Excess proportion performance measure quantifies, for a given location, the difference between the observed proportion of a specific collision type and the proportion among the relevant reference population (i.e., all intersections). The excess proportion is the difference between a site's proportion and the chose threshold. For example, if 40% of reported intersection collisions are angle collisions, a site with 70 percent angle collisions would represent a 30 percent excess proportion.

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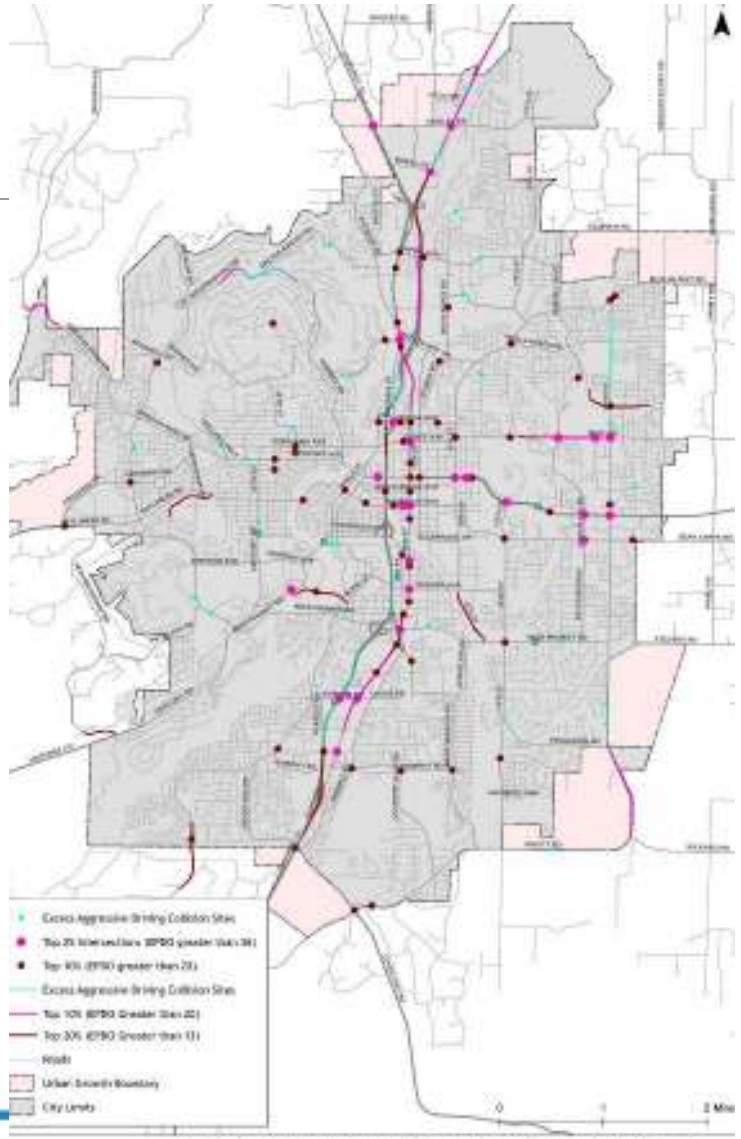
SYSTEMIC RECOMMENDATIONS

- Aggressive driving
- Dark conditions without street lights
- Angle and turning movement collisions
- Rear-end collisions
- Head-on collisions
- Roadway departure collisions
- Alcohol/drug involved collisions



Equivalent Property Damage Only Scoring and Excess Proportion
Top EPDO Scores and Excess Aggressive Driving Collision Sites
Bend Area, 2012-2016

Figure 32

SYSTEMIC RECOMMENDATIONS

- Systemic Solutions Toolbox
  - Often applied on a wide-scale (same treatment at many different locations) for relatively low-cost
  - Often incorporated into capital projects as well as ongoing maintenance activities to maximize cost-effectiveness
  - Crash Reduction Factors (CRFs) documented, when possible

SYSTEMIC RECOMMENDATIONS

- Systemic Solutions in 5 groups:
  - Spot treatment vehicle countermeasures
  - Systemic intersection countermeasures
  - Roadway departure countermeasures
  - Bicycle or Pedestrian Countermeasures
  - Enhanced Pedestrian Crossing Treatments

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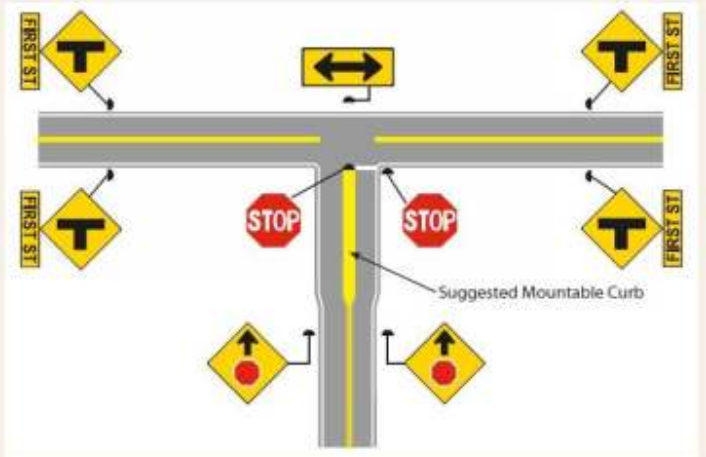
SYSTEMIC RECOMMENDATIONS

- Example treatment from Systemic Toolbox:

Install Raised Divider on Stop Approach (Splitter Island)

Installing a raised divider (with mountable curb) on a stop-controlled approach to an intersection can increase intersection visibility by adding a left-side stop sign and better delineate vehicle paths at the intersection. Where possible, a minimum width of 6-feet should be used for the splitter island.

Intersection or Segment	*Intersection (Unsignalized)*
Applicable Collision Types	*All collisions*
Potential Collision Reduction	*15%*
Planning-Level Cost	*$7.55 per sq ft*



Source: FHWA

* FHWA, "Low-Cost Safety Enhancements for Stop-Controlled and Signalized Intersections," (2014)

SPEED MANAGEMENT TOOLBOX

- Treatments organized into three categories:
  - Pavement markings
  - Physical roadway improvements
  - Signage

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SPEED MANAGEMENT TOOLBOX

- Example from Speed Management Toolbox:

Transverse Lane Marking

Description: Transverse lane markings are horizontal markings placed on the roadway. There are many types of transverse lane markings including optical bars and chevron marking. They may extend partially into a lane or be placed fully across the lane.

Application Guidance: Transverse markings are especially useful for transition zones and can be used in locations where there is an approaching change in roadway character such as an intersection or curve. Markings may be spaced increasingly closer on the approach to an intersection to give the appearance so a driver is more aware of their speed. Transverse lane markings support decreased speeds on intersection approaches or other roadway transition. Optical speed bars are an additional type of transverse marking. MUTCD Section 3B.22 provides guidance on placement of optical speed bars.

Source: FHWA

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7 Es OF SAFETY

- Engineering
- **Emergency Medical Services (EMS)**
- **Enforcement**
- **Education**
- **Encouragement**
- **Equity**
- **Evaluation**

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EXAMPLE ACTION ITEM

- Create a regional transportation safety committee

Action Item	Description	Emphasis Area(s)	Lead Agency	Supporting Agencies	Funding Need
A1	Create and implement a Regional Transportation Safety Committee to coordinate on transportation safety and implement the Action Items identified in the TSAP. Other representatives from various outreach or advocacy groups will also be helpful to help with outreach. City staff participation from various departments such as police, streets, capital projects, engineering, and community development will help promote coordination across departments and the share of resources and data to coordinate transportation safety efforts. Regular meetings should occur at which the committee share data/resources, implements the Deschutes County and Bend Area TSAP Action Items, and identifies new actions needed based on more recent crash history.	Safety Culture	ODOT or City of Bend	Deschutes County, City of Bend, Bend MPO, Redmond, Sisters, La Pine, Police, Sheriff, District Attorney's office, Emergency Services, OLCC, Department of Public Health	$$$

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NON-INFRASTRUCTURE ACTION ITEMS

Identified emphasis areas:

- Safety culture
- Education
- Enforcement
- Emergency response
- Aggressive driving
- Distracted driving
- Impaired driving
- Motorcyclists
- Pedestrians & bicyclists
- Senior drivers
- Young drivers
- Technology
- Monitoring

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NEXT STEPS

- *Incorporate findings into Bend's Transportation System Plan Updates for City and MPO*
- *Plan will be updated with new crash data outcomes about every 3 years*
- *Performance Measures tracked for reducing fatal or serious injury crashes*
- *Programs, Projects and Actions items implemented and tracked for effectiveness*

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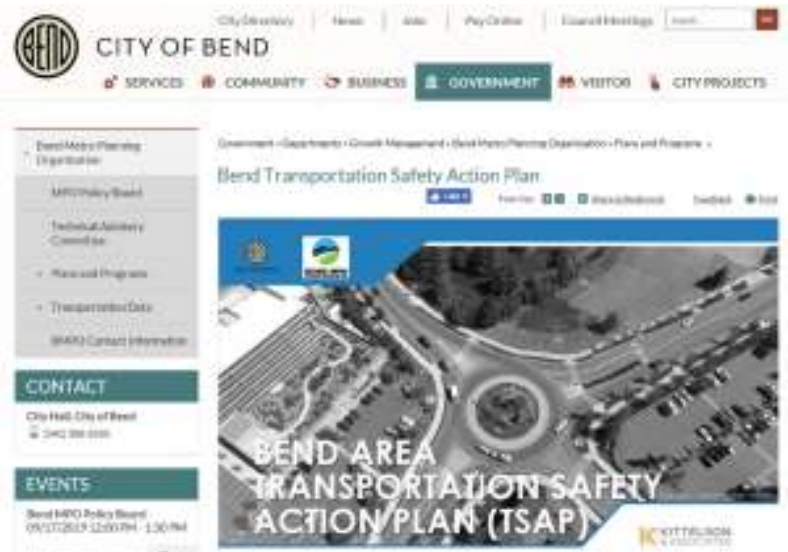
QUESTIONS?

www.bendoregon.gov/transportationsafety



Bend Area Transportation Safety Action Plan

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