



## SAFETY FOCUS INTERSECTIONS – WHITE PAPER

---

**Date:** March 2, 2011 Project #: 10633.07  
**To:** Jim Olson  
City of Ashland  
**cc:** Project Management Team  
**From:** Susan Wright, P.E. and Erin Ferguson  
**Project:** City of Ashland Transportation System Plan Update  
**Subject:** Safety Focus Intersections – White Paper

---

### **DIRECTION TO THE PLANNING COMMISSION AND TRANSPORTATION COMMISSION**

Five sets of white papers are being produced to present information on tools, opportunities, and potential strategies that could help Ashland become a nationwide leader as a green transportation community. Each white paper will present general information regarding a topic and then provide ideas on where and how that tool, strategy, and/or policy could be used within Ashland. You will have the opportunity to review the content of each white paper and share your thoughts, concerns, questions, and ideas in a joint Planning Commission/Transportation Commission meeting. Based on discussions at the meeting, the material in the white paper will be: (1) revised and incorporated into the alternatives analysis for the draft TSP; or (2) eliminated from consideration and excluded from the alternatives analysis. The overall intent of the white paper series is to explore opportunities for Ashland and increase the opportunities to discuss the many possibilities for Ashland.

### **SAFETY FOCUS INTERSECTIONS**

Crash data analysis was conducted and documented for the TSP study intersections as part of Technical Memorandum #4 Existing Conditions analysis. The crash data analysis identified six intersections within Ashland for additional study based on their historical crash rates and characteristics. These six safety focus intersections are:

- North Main Street (OR 99)/Hersey Street-Wimer Street;
- East Main Street (OR 99 Southbound)/Oak Street
- Siskiyou Boulevard (OR 99)/Tolman Creek Road;
- Siskiyou Boulevard (OR 99)/Lithia Way (OR 99 Northbound)/East Main Street;
- Ashland Street (OR 66)/Tolman Creek Road; and
- Ashland Street (OR 66)/East Main Street-Oak Knoll Drive.

Potential contributing factors and countermeasures were identified for these six safety focus intersections within Technical Memorandum #4. Table 1 summarizes the countermeasures previously identified.

**Table 1 Potential Countermeasures at Safety Focus Intersections**

Intersection	Potential Countermeasures
North Main Street (OR 99)/Hersey Street - Wimer Street*	Add left-turn pockets and/or right-turn lanes on North Main Street (OR 99). Consider installing a traffic signal or roundabout. Convert access to Hersey Street and Wimer Street to right-in/right-out/left-in access only.
East Main Street (OR 99 Southbound)/Oak Street	Consider removing third eastbound lane on East Main Street and realigning southern approach from the Downtown Plaza area to bring all exiting traffic to a stop.
Siskiyou Boulevard (OR 99)/Tolman Creek Road	Prohibit parking and/or enforce parking prohibition on Siskiyou Boulevard (OR 99) in the vicinity of the intersection. Conduct a speed study and investigate potential speed reduction treatments.
Siskiyou Boulevard (OR 99)/Lithia Way (OR 99 Northbound)/East Main Street	Conduct a roundabout feasibility study. Consider automated enforcement such as installing red-light running cameras.
Ashland Street (OR 66)/Tolman Creek Road	Consider automated enforcement such as installing red-light running cameras.
Ashland Street (OR 66)/East Main Street-Oak Knoll Drive	Conduct a sight-distance evaluation at the intersection. Add left-turn and right-turn pockets on Ashland Street (OR 66). Investigate prevailing vehicle speeds on Ashland Street (OR 66) and consider treatments to reduce vehicle speeds. Increase intersection sight distance by realigning intersection approaches.

Notes:

\*The countermeasures presented for this intersection are independent of the current proposed temporary road diet along North Main Street.

The purpose of this white paper is to present the safety focus intersections and corresponding potential countermeasures previously documented for discussion with project stakeholders (e.g., Planning Commission, Transportation Commission, Technical Advisory Committee). The project team would like to receive input regarding the following general topics:

- **Safety focus intersection priorities** - Of the six safety focus intersections, which do you think should be the City’s top priority? Second priority? Third priority?
- **Ideas and potential countermeasures to improve safety** - Which of the ideas and countermeasures to help reduce crashes are you most interested in having explored in Ashland?
- **Additional intersections or locations of concern** - Are there intersections or locations within Ashland not identified as safety focus intersections at which you do not feel safe as a pedestrian? as a bicyclist? while waiting for a bus? as a motorist?

Detailed questions consistent with the general ones listed are in the scorecard accompanying this white paper. Please keep these general questions in mind as you read the information below. The following sub-sections present the crash data assessment and potential countermeasures for each of the safety focus intersections.

### North Main Street (OR 99)/Hersey Street-Wimer Street

The North Main Street (OR 99)/Hersey Street-Wimer Street intersection is a two-way stop-controlled intersection located in the northwestern portion of the City of Ashland. This intersection is within the portion of North Main Street currently under consideration for a temporary road diet project that would reduce the four-lane undivided cross-section to a three-lane cross-section. As part of the temporary road diet project, this intersection is recommended to be converted to a right-in/right out access (on a temporary basis as part of the temporary road diet). Eliminating the left-turn and crossing conflicts at the intersection as part of the temporary road diet would help reduce crashes and improve operations along North Main Street.

This section discusses potential countermeasures for the intersection independent of the temporary road diet as a means of presenting alternatives to help reduce crashes if the temporary road diet is not implemented and/or does not become permanent.

The basic physical characteristics of the intersection are noted below.

- At the intersection, North Main Street has a four-lane cross-section with two through lanes in each direction.
- Hersey Street and Wimer Street are offset such that Hersey Street is slightly further south than Wimer Street.
- The offset alignment of Hersey Street and Wimer Street is a negative offset, which means the left-turn movements from North Main Street onto the minor streets occur behind (rather than in front) of each other. A negative offset creates additional conflicts and is a harder task for a driver as a result it is associated with higher occurrence of crashes.

Exhibit 1 is an aerial view of the intersection from Google Earth illustrating the physical characteristics noted above.

## Exhibit 1 North Main Street (OR 99)/ Hersey Street-Wimer Street



In reviewing the ODOT crash data in more detail, the following trends were identified:

- The majority of the reported crashes were rear-end crashes or turning crashes;
- The majority of the turning crashes (i.e., 18 out of 21 reported turning crashes) occurred when motorists waiting to turn left off of North Main Street (OR 99) onto a minor street turned in front of on-coming traffic;
- Slightly more than half of the reported rear-end crashes (i.e., 7 out of 13 reported rear end crashes) occurred when motorists waiting to turn left off of North Main Street (OR 99) were hit from behind by a motorist traveling straight on North Main Street (OR 99);
- Four crashes at the intersection were related to bicyclists or pedestrians attempting to cross North Main Street (OR 99); and
- Three crashes at the intersection were related to motorists misjudging gaps in traffic or failing to see approaching traffic while attempting to cross North Main Street (OR 99) from Hersey Street to Wimer Street or the reverse.

The following countermeasures could be considered to help reduce crashes at this intersection:

- **Add left-turn pockets and/or right-turn lanes on North Main Street (OR 99)** – The left-turn pockets would provide refuge for motorists waiting to turn left off of North Main Street (OR 99) and may help reduce the rear-end crashes on North Main Street (OR 99). Similarly, the right-turn lanes on North Main Street (OR 99) at the intersection would provide refuge for vehicles slowing to turn right.
- **Consider a traffic signal or roundabout at the intersection** – A traffic signal and/or roundabout would help facilitate the left-turn movements onto and off of North Main Street (OR 99) at this intersection. An engineering study is needed to determine whether a traffic signal or roundabout would be appropriate or effective for this location and if so, which type of traffic control would be most appropriate.

- **Convert access to Hersey Street and Wimer Street to right-in/right-out access only** – Restricting access to these minor streets to right-in/right-out only would eliminate collisions related to motorists turning left onto or off of North Main Street (OR 99) as well as crashes related to motorists crossing North Main Street (OR 99) from Hersey Street to Wimer Street or the reverse. Left-turn access to and from North Main Street (OR 99) could be served to the north through the signalized Maple Street/ North Main Street (OR 99) intersection or to the south through the signalized North Main Street (OR 99)/Laurel Street and/or the North Main Street (OR 99)/Helman Street intersections. This countermeasure is noted because 28 of the 42 reported crashes at the intersection were related to left-turning or crossing maneuvers. ***As part of the temporary road diet project, this intersection is recommended to be converted to a right-in/right out/left-in (for the movement from North Main Street to Hersey) access. This modification to access would be on a temporary basis as part of the temporary road diet; the combination of the off-set intersections with a center left-turn lane increases conflicts and potential for crashes. .***

#### East Main Street (OR 99 Southbound)/Oak Street

The East Main Street (OR 99 Southbound)/Oak Street intersection is a two-way stop-controlled intersection located at the northern end of downtown. The basic physical characteristics of the intersection are:

- East Main Street (OR 99) is one-way southeast-bound with a two-lane cross-section.
- There are marked crosswalks on three approaches to the intersection.
- Opposite Oak Street is a driveway from a downtown off street parking lot and pedestrian area (i.e., the downtown plaza area), which intersects East Main Street (OR 99) at a skewed angle.
- The skewed approach from the Downtown Plaza area has a left-turn lane that allows motorists to turn onto Oak Street to travel north and a through-lane that is uncontrolled and becomes the third southeast-bound lane on East Main Street (OR 99).
- On-street parking is permitted along the north side of East Main Street (OR 99) on approach to the intersection.
- On-street parking is permitted along both sides of East Main Street (OR 99) east of the intersection.
- In general, the intersection is surrounded by urban activity including on-street parking, pedestrians, bicyclists, transit and autos.

Exhibit 2 is an aerial view of the intersection from Google Earth illustrating the physical characteristics noted above particularly the driveway opposite of Oak Street which intersects East Main Street at a skewed angle.

## Exhibit 2 East Main Street (OR 99)/Oak Street



In reviewing the ODOT crash data in more detail, the following trends were identified:

- Over half of the crashes reported at the intersection were turning related crashes and of those the majority involved improper turns in which motorists were distracted and/or failed to yield the right-of-way appropriately; and
- The majority of crashes at the intersection were property damage only crashes, which generally indicates the crashes that do occur are occurring at slower speeds as motorists navigate a busy urban area.

One potential countermeasure to reduce conflicts and countermeasures at this location is to eliminate the third lane on East Main Street, which is added to accommodate free flow traffic from the Downtown Plaza onto East Main Street. Providing an exclusive lane for the vehicles exiting the Downtown Plaza discourages drivers from confirming eastbound drivers on East Main Street are not changing lanes into the third lane. It also does not give motorists exiting from the Downtown Plaza a reason to stop or slow down as they enter East Main Street, which can result in higher than desired speeds or inattention from motorists. Removing the third lane and bringing all vehicles exiting the Downtown Plaza Area to a stop at a location across from Oak Street will eliminate the uncontrolled conflict and require motorists to look for a gap in traffic before entering East Main Street. Removing the third lane on East Main Street also would shorten the crossing distance for pedestrians. ***This treatment is consistent with the Downtown Plan.***

## Siskiyou Boulevard (OR 99)/Tolman Creek Road

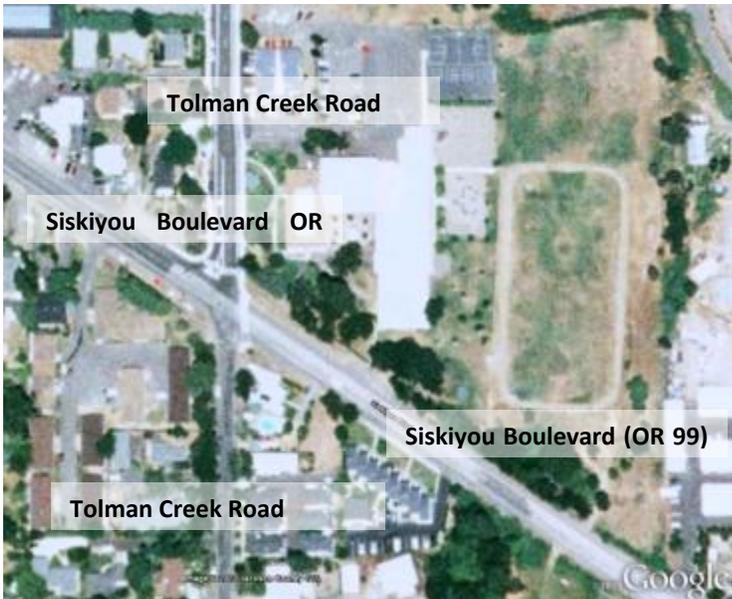
The Siskiyou Boulevard (OR 99)/Tolman Creek Road intersection is a two-way stop-controlled intersection located in the southwestern portion of the City of Ashland. The basic physical characteristics of the intersection are:

- The intersection is skewed with Tolman Creek Road oriented north-south and Siskiyou Boulevard (OR 99) oriented northwest-southeast.
- There is a flashing amber light at the intersection and marked crosswalks along the northern, southern, and southeastern legs of the intersection.

- Siskiyou Boulevard (OR 99) has a two-lane cross-section with relatively wide shoulders.
- The posted speed limit on Siskiyou Boulevard (OR 99) changes from 45 mph to 35 mph when approaching the intersection from the southeast.

Exhibit 3 is an aerial view of the intersection from Google Earth illustrating the physical characteristics noted above.

Exhibit 3 Siskiyou Boulevard (OR 99)/Tolman Creek Road



In reviewing the ODOT crash data in more detail, the following trends were identified:

- The majority of the reported crashes were angle crashes; and
- The majority of the angle crashes occurred when vehicles were attempting to cross Siskiyou Boulevard (OR 99) or turn onto Siskiyou Boulevard (OR 99); motorists appear to misjudge approaching vehicle speeds or fail to see approaching vehicles.

Based on the physical conditions at the intersection and the reported crashes, drivers appear to have difficulty judging approaching speeds or seeing approaching vehicles. Potential countermeasures include:

- **Prohibit parking on Siskiyou Boulevard (OR 99) in the vicinity of the intersection** - Based on photos on Google Earth, parking on the shoulder of Siskiyou Boulevard (OR 99) appears to be permitted or if it is prohibited, violations are occurring. The presence of parked vehicles may be inhibiting motorists' sight distance at the intersection. Prohibiting parking and/or enforcing the parking prohibition in the vicinity of the intersection would help improve sight distance and potentially help reduce crashes.
- **Conduct a speed study and investigate potential speed reduction treatments** - A pertinent next step could be to conduct a speed study to determine prevailing vehicle speeds on Siskiyou Boulevard (OR 99) and if they are higher than appropriate for the desired conditions. This could be the case given the change in the posted speed limit from 45 mph to 35 mph on approach to the intersection. This is also the area in which Siskiyou Boulevard

(OR 99) begins to change in function from a non-urban highway-type function to a facility passing through an increasingly urban area that provides access as well as mobility to travelers. If prevailing speeds are higher than desired on approach to the intersection, speed reduction treatments may be appropriate and may serve as an opportunity to change the physical cross-section of Siskiyou Boulevard (OR 99) to visually inform drivers the change in roadway function.

#### Siskiyou Boulevard (OR99)/Lithia Way (OR 99 Northbound)/East Main Street

The Siskiyou Boulevard (OR99)/Lithia Way (OR 99 NB)/East Main Street intersection is a signalized intersection located at the southern end of the downtown couplet terminus. The basic physical characteristics of the intersection are:

- Lithia Way (OR 99 NB) is a one-way street in the northbound direction.
- Siskiyou Boulevard (OR 99) on the northbound approach to the intersection has a two-lane cross-section without exclusive turn lanes.
- There are marked crosswalks across all four legs of the intersection.
- East Main Street has a two-lane cross section without exclusive turn lanes.

Exhibit 4 is an aerial view of the intersection from Google Earth illustrating the physical characteristics noted above.

Exhibit 4 Siskiyou Boulevard (OR 99)/Lithia Way (OR 99 Northbound)/East Main Street



In reviewing the ODOT crash data in more detail, the following trends were identified:

- The majority of reported crashes are rear end crashes that occurred when motorists were following too close or were distracted;
- The angle/turning crashes at the intersection occurred when motorists disregarded the traffic signal and/or failed to yield to pedestrians in the crosswalk.

In general, the types of crashes noted above are consistent with what is expected to occur at signalized intersections. Potential countermeasures include:

- **Conduct a roundabout feasibility study** – Research regarding roundabouts in the United States has found converting traffic signals to roundabout controlled intersections can reduce total crashes up to 48% depending on the number of lanes in the roundabout<sup>1</sup>. As noted in the Roundabout White Paper, they are also useful for efficiently serving U-turning traffic, which is necessary at couplet terminuses and they serve as an aesthetically pleasing gateway treatment into downtown areas. This particular location may be challenging given the angles at which the roadways intersect and the right-of-way constraints. A roundabout feasibility study would be able to determine the potential safety and operations benefits as well as how or if a roundabout could fit within the right-of-way constraints. ***It should be noted that the Downtown Plan identifies a signal or roundabout to improve this intersection and includes a preliminary double lane roundabout design.***
- **Consider installing red-light running cameras** - A potential countermeasure that may help reduce crashes particularly those related to disregarding the traffic signal could be automated enforcement such as red-light running cameras. It is important to note while red-light running cameras tend to help reduce crashes related to disregarding the traffic signal, in some instances they have been found to increase the occurrence of rear-end crashes.

#### Ashland Street (OR 66)/Tolman Creek Road

The Ashland Street (OR 66)/Tolman Creek Road intersection is a signalized intersection. The physical characteristics of the intersection, trends from ODOT crash data, and potential countermeasures are discussed below.

The basic physical characteristics of the intersection are noted below.

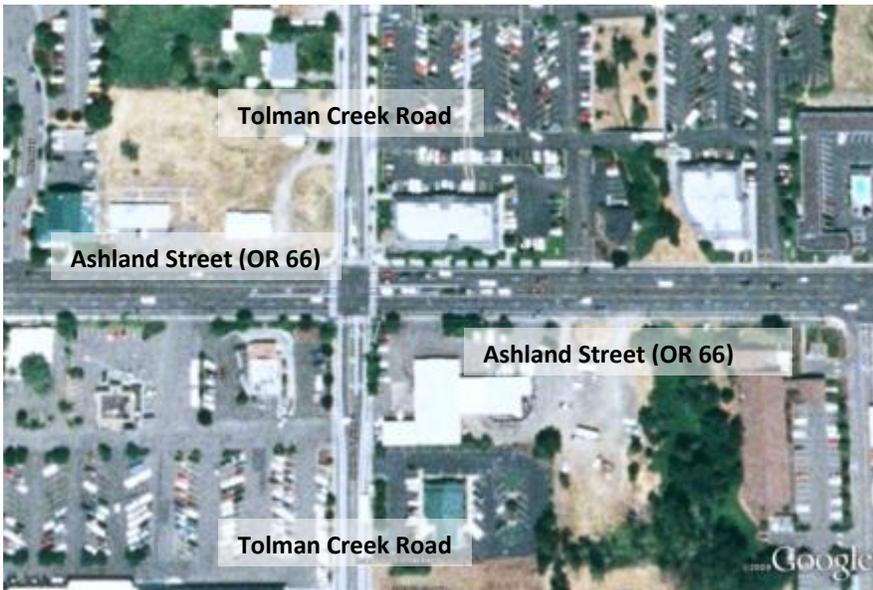
- Ashland Street (OR 66) has a five-lane basic cross-section on approach to the intersection.
- There are exclusive left-turns on all four approaches at the intersection.
- Right-turns are served by shared through/right turn lanes on all four approaches.
- Marked crosswalks are present across all four approaches.

Exhibit 5 is an aerial view of the intersection from Google Earth illustrating the physical characteristics noted above.

---

<sup>1</sup> American Association of State Highway Transportation Officials (AASHTO). *1<sup>st</sup> Edition of the Highway Safety Manual*. 2010.

#### Exhibit 5 Ashland Street (OR 66)/Tolman Creek Road



In reviewing the ODOT crash data in more detail, the following trends were identified:

- Crashes tend to be rear end, angle or turning crashes;
- The majority of the rear end crashes occurred when motorists failed to stop or were following too close to vehicles in front of them;
- The majority of turning crashes occurred when motorists turned from the wrong the lane; and
- The majority of angles crashes occurred when motorists disregarded the traffic signal control and/or were distracted or inattentive.

The current intersection form does not exhibit obvious features for improvement. The types of crashes reported for the intersection tend to be consistent with the types expected to occur at signalized intersections. One potential countermeasure would be to install red-light running enforcement cameras, which tend to reduce crashes related to disregarding traffic signals. However, red-light enforcement cameras have also been found to increase rear-end crashes. Therefore, additional information regarding why motorists are currently failing (and historically have failed) to stop to avoid other stopped vehicles would be helpful in determining whether or not red-light enforcement cameras would be appropriate for this intersection as well as what other countermeasures could be considered.

#### Ashland Street (OR 66)/East Main Street/Oak Knoll Drive Intersection

The Ashland Street (OR 66)/East Main Street/Oak Knoll Drive intersection is a two-way stop controlled intersection located in the southeastern portion of the City of Ashland. The physical characteristics of the intersection, trends from ODOT crash data, and potential countermeasures are discussed below.

The basic physical characteristics of the intersection are noted below.

- The intersection is skewed and occurs along a horizontal curve.

- The minor streets (East Main Street and Oak Knoll Drive) are offset from one another. Similar to the Hersey-Wimer/North Main Street (OR 99) intersection, the offset is a negative offset meaning the left-turns onto the minor streets occur behind each other rather than in front of each other. As noted above, this creates additional conflicts points, is a more difficult task for drivers and is associated with a higher occurrence of crashes as a result.
- There is a downhill grade when traveling on Ashland Street (OR 66) approaching the intersection from the northwest.
- Ashland Street (OR 66) is a two-lane cross-section (one travel lane in each direction) at the intersection.

Exhibit 6 is an aerial view of the intersection from Google Earth; the horizontal curve, intersection skew, and offset minor street approaches noted above can be seen.

Exhibit 6 Ashland Street (OR 66)/East Main Street/Oak Knoll Drive Intersection



In reviewing the ODOT crash data in more detail, the following trends were identified:

- The majority of the crashes are rear end crashes or angle/turning crashes;
- The rear end crashes tend to occur when a vehicle is stopped on Ashland Street (OR 66) waiting to turn left onto East Main Street or Oak Knoll Drive; and
- The angle/turning crashes tend to occur when a vehicle is attempting to cross Ashland Street (OR 66) while traveling from East Main Street to Oak Knoll Drive or the reverse. Crashes also tend to occur when a vehicle turning off of or onto Ashland Street (OR 66) fails to yield or give the right-of-way to through traffic on Ashland Street (OR 66).

Based on the physical conditions in the field as well as the crash types and events documented in ODOT's crash data, it appears motorists may have minimum or inadequate sight distance at the intersection. A lack of sight distance could be contributing to the rear end crashes on Ashland Street (OR 66) because motorists traveling along Ashland Street (OR 66) do not have adequate time and distance to identify and react to vehicles stopped in the roadway waiting to turn. Similarly, motorists attempting to turn to, from, or crossing Ashland Street (OR 66) may not have adequate sight distance

to identify and react to acceptable gaps in traffic for turning and crossing maneuvers and/or may misjudge gaps.

Considerations and potential countermeasures to reduce crashes at this intersection include:

- **Conduct a sight-distance evaluation at the intersection** – It would be pertinent to conduct an engineering study to determine the amount of sight distance available at the intersection for the turning movements onto and off of Ashland Street (OR 66) as well as the sight distance available for motorists approaching the intersection on Ashland Street (OR 66). Findings from such a study would help guide decisions related to what types of countermeasures are considered for the location.
- **Add left-turn and right-turn pockets on Ashland Street (OR 66)** – These would provide a refuge for vehicles stopped waiting to turn left off of Ashland Street (OR 66) and for vehicles slowing to turn right off of Ashland Street (OR 66).
- **Investigate prevailing vehicle speeds on Ashland Street (OR 66) and consider treatments to reduce vehicle speeds** – The prevailing vehicle speeds on Ashland Street (OR 66) may be higher than is appropriate for the roadway geometry. A speed study could be used to determine if the 85<sup>th</sup> percentile speed is higher than the posted speed and/or the appropriate speed based on the sight distance at the intersection. If prevailing vehicle speeds on Ashland Street (OR 66) are higher than those warranted for the sight distance at the intersection, treatments to slow vehicle speeds on approach to the intersection could be explored. *NCHRP Report 613 Guidelines for Selection of Speed Reduction Treatments at High-Speed Intersections* contains information on potential treatments.
- **Increase intersection sight distance** – This could be accomplished by adjusting the horizontal and/or vertical alignments of the intersecting roadways. Whether or not realigning or adjusting the horizontal and/or vertical alignments for the intersection is feasible and the potential value it would provide should to be explored in an engineering study.

## NEXT STEPS

The six intersections above have been identified as safety focus intersections for the City of Ashland. Based on input from the Planning Commission, Transportation Commission, Technical Advisory Committee, and City staff, projects (i.e., projects, studies, strategies) to reduce crashes at these intersections will be included in the TSP update. To ensure safety concerns are being addressed, the project team would like input from the groups listed above regarding:

- **Safety focus intersection priorities** - Of the six safety focus intersections, which do you think should be the City's top priority? Second priority? Third priority?
- **Ideas and potential countermeasures to improve safety** - Which of the ideas and countermeasures to help reduce crashes are you most interested in having explored in Ashland?
- **Additional intersections or locations of concern** - Are there intersections or locations within Ashland not identified as safety focus intersections at which you do not feel safe as a pedestrian? as a bicyclist? while waiting for a bus? as a motorist?

Please use the scorecard questions accompanying this white paper to provide input and thoughts.