City of Battle Ground - Intersection Improvements

SW EATON BOULEVARD & SR 503

CRASH SUMMARY
(2018 - 2022)

48	1
Total Crashes	Fatal or Serious Injury Crashes
1	**0**
Bicycle & Pedestrian Crashes	Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

Near Schools
(to the west and east of the corridor)

RELEVANT GRANT OPPORTUNITIES

HSIP | SS4A

Location Summary

Contributing Factors
- Impaired driving
- Driving under the influence
- Distracted driving
- Speeding

Crash Types
- Angle crashes
- Rear-end crashes
- Hit object crashes
- Run-off-road crashes

Roadway & Contextual Factors
- Four lane road
- Posted speed: 55 mph

Goals

1. Add pedestrian and bicycle facilities to improve connectivity and safety for non-motorized users.
2. Enhance traffic flow and reduce turning movement conflicts.
3. Enhance signal and nighttime visibility along the corridor.
4. Reduce speeds and run-off-road crashes along the corridor.

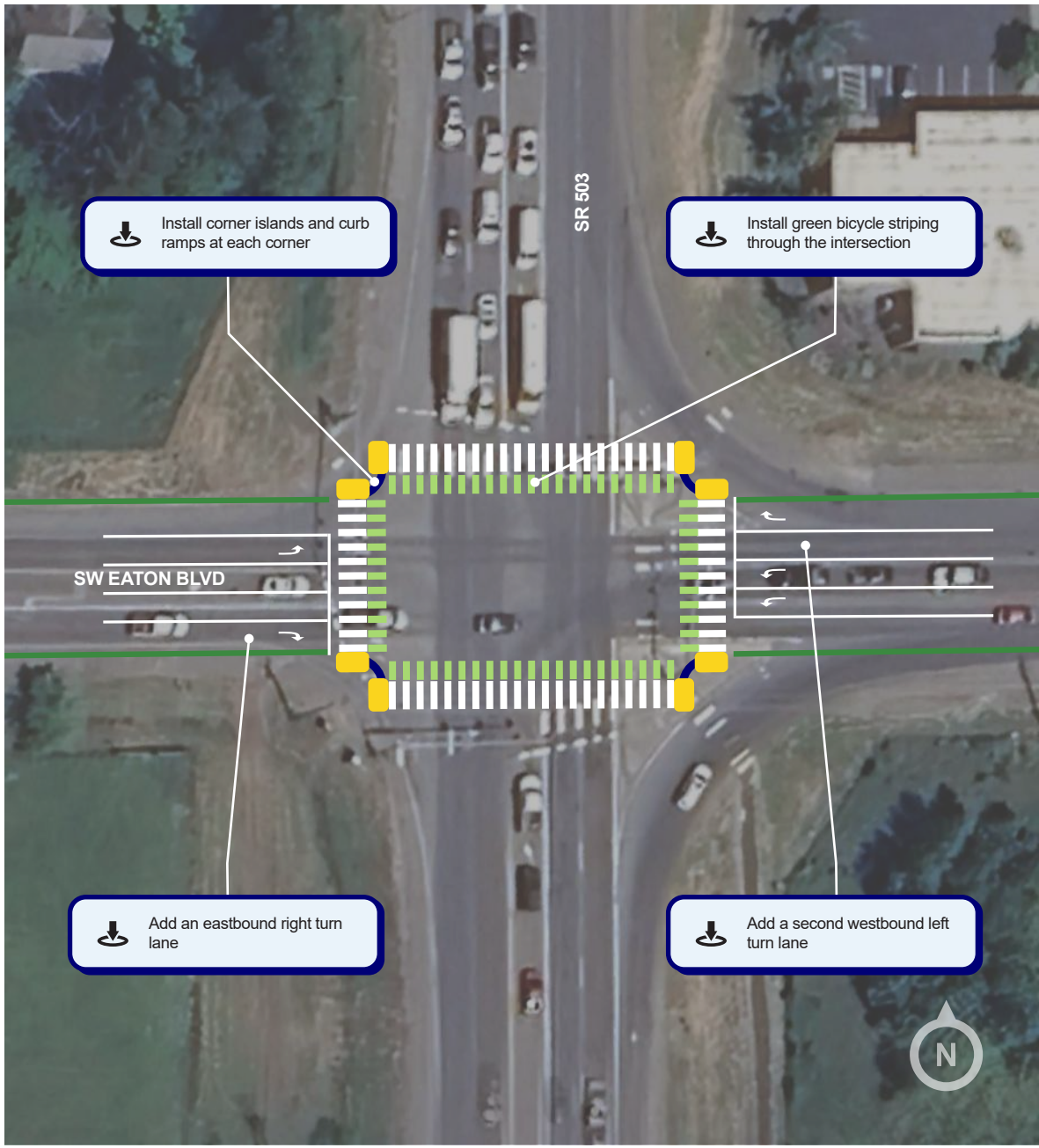
COUNTERMEASURE	CONCERN	TIME FRAME	CRASH REDUCTION FACTOR
Install corner islands and curb ramps at each corner	To address: Pedestrian safety, accessibility, and right of way	Near term	37%
Add an eastbound right turn lane and a second westbound left turn lane	To address: Traffic flow, congestion, and turning movement conflicts	Near term	N/A
Install green bicycle striping through the intersection	To address: Bicycle visibility and right of way at high-conflict areas	Near term	39%

City of Battle Ground - Intersection Improvements

SW EATON BOULEVARD & SR 503

Intersection Improvements

- Install signal heads at this intersection
- Install reflective backplates on signal heads
- Implement leading pedestrian and bicycle interval (LPI / LBI)



City of Battle Ground - Intersection Improvements

SW EATON BOULEVARD & SW 20TH AVE

CRASH SUMMARY
(2018 - 2022)

20	1
Total Crashes	Fatal or Serious Injury Crashes
1	**0**
Bicycle & Pedestrian Crashes	Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

Near Schools
(to the west and east of the corridor)

RELEVANT GRANT OPPORTUNITIES

HSIP | SS4A

Location Summary

Contributing Factors
- Impaired driving
- Driving under the influence
- Distracted driving
- Drowsy driving
- Dark - no street lights

Crash Types
- Rear-end crashes
- Angle crashes
- Pedestrian crashes

Roadway & Contextual Factors
- Two lane road
- Posted speed: 35 mph

Goals

1. Improve connectivity and safety for pedestrians and bicycle.
2. Enhance signal and nighttime visibility along the corridor.

COUNTERMEASURE	CONCERN	TIME FRAME	CRASH REDUCTION FACTOR
Add high visibility crossings	Pedestrian visibility and right of way	Near term	15%
Install corner islands and curb ramps at each corner	Pedestrian safety and accessibility	Near term	37%
Install signal heads at this intersection	Traffic control and signal visibility	Near term	77%
Install reflective backplates on signal heads	Signal visibility and driver awareness	Near term	15%
Install green bicycle striping at the east side of intersection	Bicycle visibility and right of way	Near term	39%
Install intersection lighting	Nighttime visibility and safety	Near term	38%

City of Battle Ground - Intersection Improvements

SW EATON BOULEVARD & SW 20TH AVE

Intersection Improvements

- Install signal heads at this intersection
- Implement leading pedestrian and bicycle interval (LPI / LBI)

City of Battle Ground - SW Eaton Boulevard Safety Improvements

SW EATON BOULEVARD (BETWEEN SW 20TH AVENUE AND SR 503)

CRASH SUMMARY
(2018 - 2022)

8	0
Total Crashes	Fatal or Serious Injury Crashes
0	**0**
Bicycle & Pedestrian Crashes	Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

Near Schools
(to the west and east of the corridor)

RELEVANT GRANT OPPORTUNITIES

HSIP | SS4A

Location Summary

Contributing Factors
- Impaired driving
- Driving under the influence
- Distracted driving
- Dark - no street lights

Crash Types
- Rear-end crashes
- Hit object crashes
- Run-off-road crashes

Roadway & Contextual Factors
- Two lane road
- 40 mph

Comprehensive Plan
- An employment/economic center on the south side of the corridor
- Residential areas on the north side
- High density residential near the intersections

Transportation System Plan (TSP)
- Truck route
- Update route to minor arterial standards

Goals

1. Add pedestrian and bicycle facilities to improve connectivity and safety for non-motorized users.
2. Improve nighttime visibility along the corridor.
3. Reduce speeds and run-off-road crashes along the corridor.

COUNTERMEASURE	ISSUE AREA	TIME FRAME	CRASH REDUCTION FACTOR
Install bike lanes and sidewalks	Ped/bike visibility, connection, and right of way	Near term	20% - 45%
High visibility crosswalks	Pedestrian visibility and right of way	Near term	15%
Install streetlights	Nighttime visibility	Near term	38%

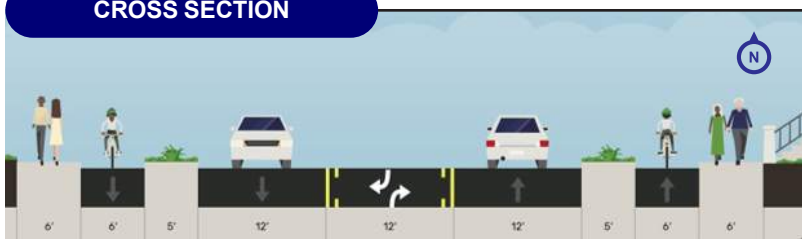
City of Battle Ground - SW Eaton Boulevard Safety Improvements

SW EATON BOULEVARD (BETWEEN SW 20TH AVENUE AND SR 503)

Corridor Improvements

- Provide separated bike lanes and sidewalks on both sides of the road
- Widen to include a third turn lane, based on upgrades identified in the Transportation System Plan
- Install streetlights

CROSS SECTION



City of Camas - Division Street Safety Improvements

DIVISION STREET (6TH AVENUE TO 22ND AVENUE)

CRASH SUMMARY
(2018 - 2022)

14 Total Crashes	**0** Fatal or Serious Injury Crashes
5 Bicycle & Pedestrian Crashes	**0** Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

- Near School
- Near Park

RELEVANT GRANT OPPORTUNITIES

- HSIP
- ATP
- SS4A
- SRTS

Location Summary

Contributing Factors

- Right of way violations

Crash Types

- Angle crashes
- Hit object crashes
- Pedestrian/bicycle crashes

Roadway & Contextual Factors

- Residential corridor
- Two lane road with parking on both sides from 11th St to 22nd Avenue
- 25 mph

Goals

1. Increase pedestrian and bicycle visibility with enhanced crossings and bike lanes.
2. Reduce speeds and angle crashes along the corridor with traffic calming treatments.

COUNTERMEASURE	CONCERN	TIME FRAME	CRASH REDUCTION FACTOR
Install bike lane	Bicycle right of way	Near term	45%
High visibility crosswalks	Pedestrian visibility and right of way	Near term	15%
Lane reconfiguration	Unsafe speeds, bicycle right of way	Near term	29%
Install curb bulbouts	Pedestrian visibility and right of way, unsafe speeds	Near term	37%
Install pedestrian scale lighting	Pedestrian visibility	Near term	42%

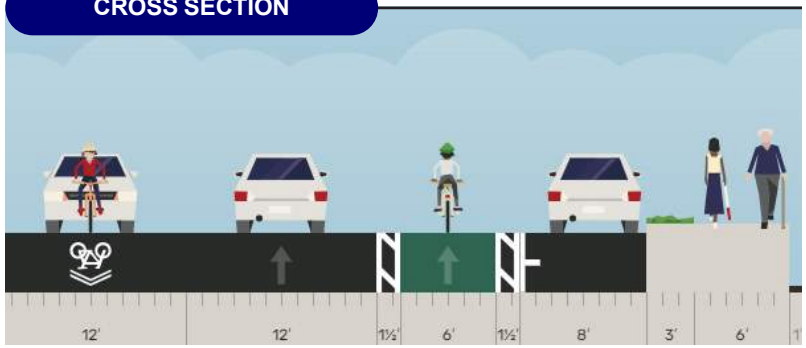
City of Camas - Division Street Safety Improvements

DIVISION STREET (6TH AVENUE TO 22ND AVENUE)

Whole-Corridor Improvements

- Road reconfiguration – Consolidate parking; only allow on east side of Division Street
- Install bicycle lane on the right side of Division St (uphill/ northbound direction)
- Install pedestrian crossings and curb bulbouts along the corridor

CROSS SECTION



Clark County - Systemic Access to Transit Corridor Improvements

CRASH SUMMARY
(2018 - 2022)

1,099 Total Crashes

51 Fatal or Serious Injury Crashes

82 Bicycle & Pedestrian Crashes

15 Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

- Near School
- Near Park
- Near Transit

RELEVANT GRANT OPPORTUNITIES

- HSIP
- SS4A
- SRTS
- Other

Location Summary

Contributing Factors

- Right of way violations
- Disregarded traffic signs and/ or signals
- Distracted driving
- Speeding
- Driving under the influence

Crash Types

- Walking and biking crashes*
- Angle crashes
- Hit object crashes
- Head-on crashes

Roadway & Contextual Factors

- Countywide issue
- Rural and urban roadways
- Transit corridors

**Crash type of focus for access to transit systemic improvement package*

Goals

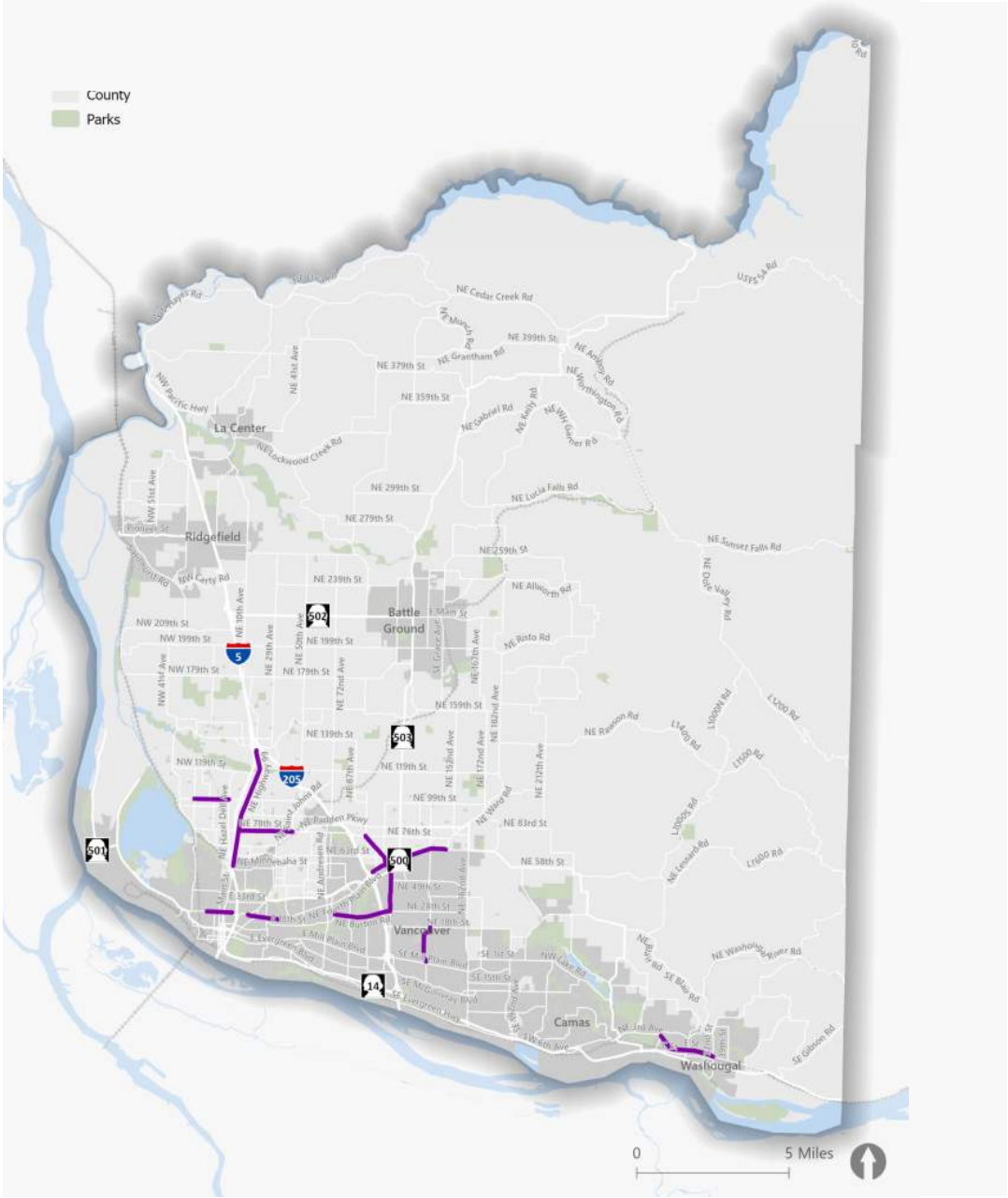
1. Reduce speeding along corridors.
2. Create safer facilities for people walking and biking to transit.

COUNTERMEASURE	CONCERN	TIME FRAME	CRASH REDUCTION FACTOR
High visibility crosswalks	Pedestrian visibility and right of way	Near term	15%
Install curb bulbouts	Pedestrian visibility and right of way, unsafe speeds	Near to medium term	37%
Install pedestrian-scale lighting	Pedestrian visibility and nighttime crashes	Near term	42%
Install rectangular rapid flashing beacon (RRFB)	Pedestrian visibility and right of way	Near to medium term	10% - 56%
Install pedestrian hybrid beacon crossing	Pedestrian visibility and right of way	Near to medium term	55%

Clark County - Systemic Access to Transit Corridor Improvements

Whole-Corridor Improvements

- Reduce speeding along corridors.
- Create safer facilities for people walking and biking to transit.



Clark County - Systemic Access to Transit Corridor Improvements

This provides an example of access to transit improvements; exact recommendations vary for each corridor. Key treatments include addition of biking/walking crossings (including enhancements and refuge islands as needed), sidewalk gap fill, addition or consolidation of transit stops, relocation of transit stops near existing crossings, and/or upgrades to crossings at signalized intersections.

E Street (from 20th Street to 32nd Street), Washougal

Clark County - Systemic Curve Improvements

CRASH SUMMARY
(2018 - 2022)

203 Total Crashes	**36** Fatal or Serious Injury Crashes
3 Bicycle & Pedestrian Crashes	**1** Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

- Near School
- Near Park

RELEVANT GRANT OPPORTUNITIES

- HSIP
- SS4A

Location Summary

Contributing Factors

- Distracted driving
- Speeding
- Driving under the influence
- Crashes at night (no street lights present)

Crash Types

- Hit object crashes
- Run-off-road crashes
- Sideswipe crashes
- Head-on crashes
- Rear-end crashes
- Overturned vehicles

Roadway & Contextual Factors

- Countywide issue
- Typically rural, two lane roadways with speeds between 25 to 40 mph

Goals

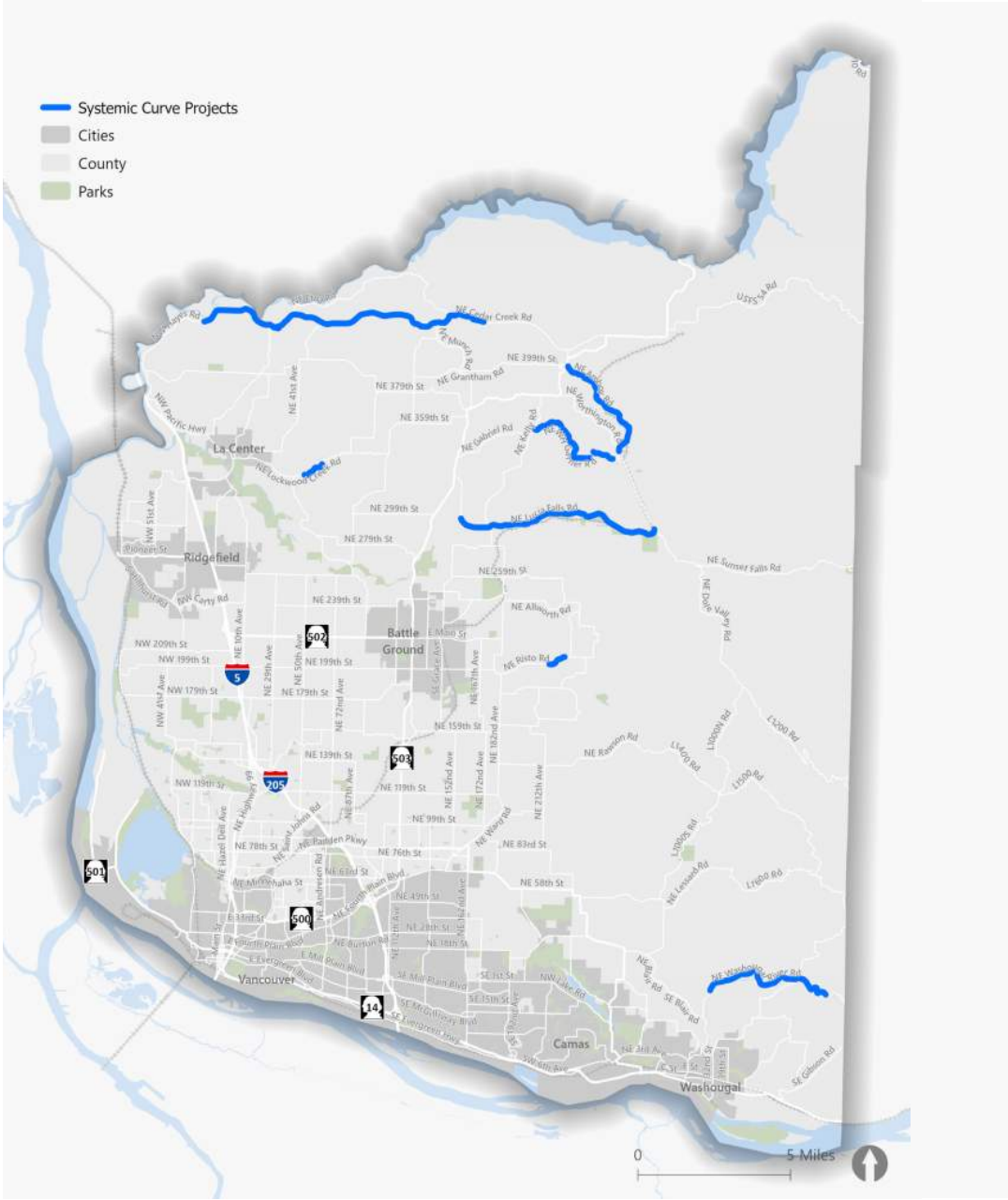
1. Reduce speeds and run-off-road crashes along the corridor.
2. Increase visibility of curves on roadway.
3. Improve nighttime visibility along the corridor.

COUNTERMEASURE	CONCERN	TIME FRAME	CRASH REDUCTION FACTOR
Install New Guardrail (Not Median Barrier Application)	Run off the Road crashes	Near term	47%
Increase Pavement Friction By Installing High Friction Surface Treatment - Curves Application	Run off the Road crashes	Near term	72%
Install RECOMMENDED Chevron Signs On Rural Horizontal Curves	Run off the Road crashes	Near Term	16%
Install REQUIRED Chevron Signs On Rural Horizontal Curves (Ballbanking And Revised Speed Riders Included)	Run off the Road crashes	Near term	16%
Install Oversized, Doubled Up And/Or Fluorescent Yellow Sheeting For Advance Curve Warning Signs	Run off the Road crashes	Near Term	20%
Install Advance Curve Warning Flashers (Curve Warning Signs Exist)	Curve crashes	Near Term	10%
Install Post-Mounted Delineators (Curve Application)	Curve crashes, Night crashes	Near Term	30%
Install Edgeline Striping (Tangent And/Or Curve Application)	Run off the Road	Near Term	11%
Install Centerline Rumble Strips	Head On, Sideswipe	Near Term	45%
Install Shoulder Rumble Strips	Run off Road	Near Term	22%

Clark County - Systemic Curve Improvements

Whole-Corridor Improvements

- Reduce speeds and run-off-road crashes along the corridor.
- Increase visibility of curves on roadway.
- Improve nighttime visibility along the corridor.



Clark County - Systemic Curve Improvements

NW Carty Road, Ridgefield

Clark County - Systemic Speeding Improvements

CRASH SUMMARY
(2018 - 2022)

990 Total Crashes	**72** Fatal or Serious Injury Crashes
21 Bicycle & Pedestrian Crashes	**5** Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

- Near School
- Near Park
- Near Transit

RELEVANT GRANT OPPORTUNITIES

- HSIP
- SS4A
- SRTS
- Other

Location Summary

Contributing Factors

- Distracted driving
- Speeding
- Driving under the influence
- Crashes at night (no street lights present)

Crash Types

- Hit object crashes
- Run-off-road crashes
- Ped/Bike crashes
- Sideswipe crashes
- Head-on crashes
- Rear-end crashes
- Angle crashes

Roadway & Contextual Factors

- Countywide issue
- Rural and urban roadways
- Two to six travel lanes

Goals

1. Reduce speeding along corridors.
2. Create safer facilities for motorists, pedestrians and bicyclists.

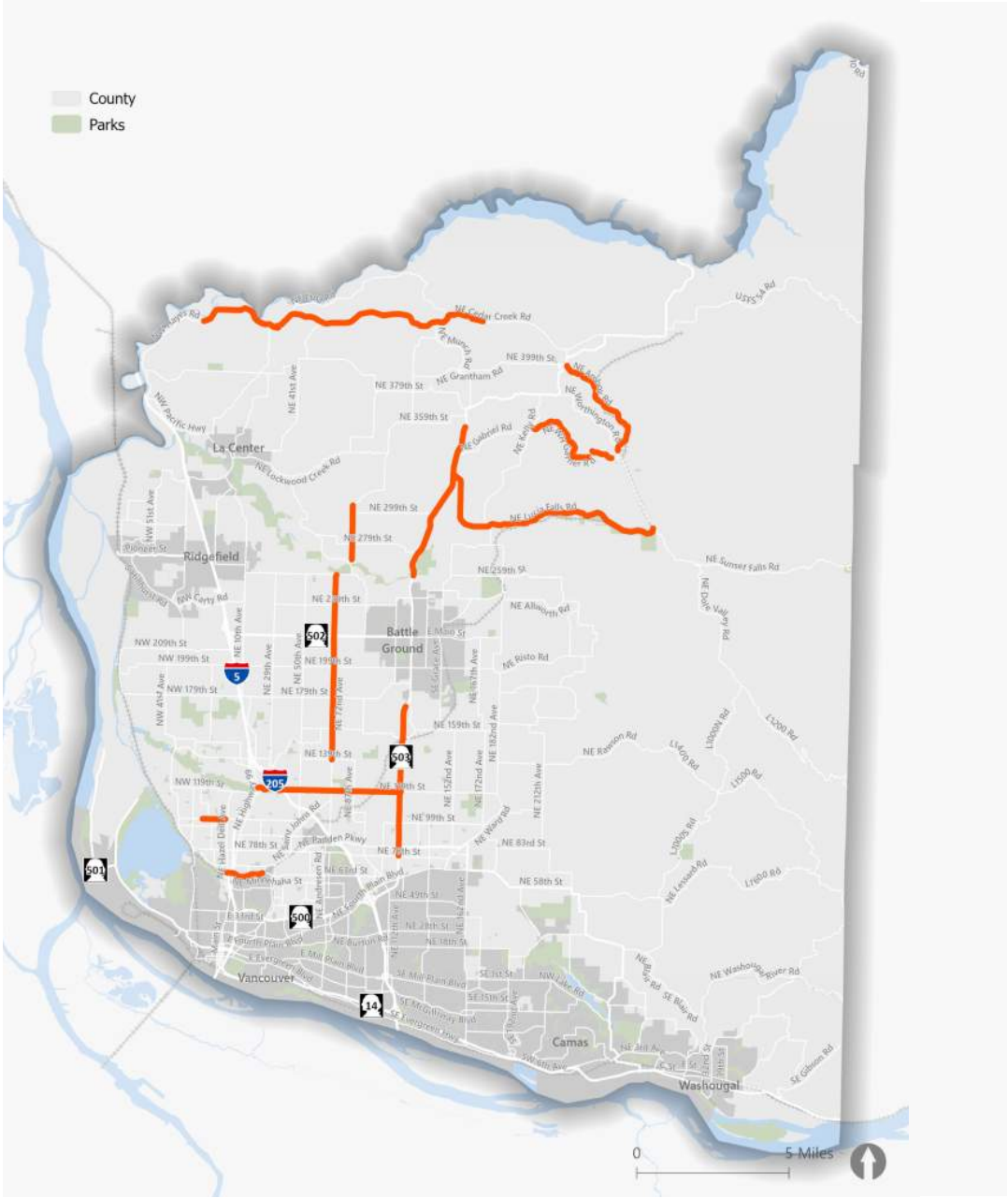
Clark County - Systemic Speeding Improvements

COUNTERMEASURE	CONCERN	TIME FRAME	CRASH REDUCTION FACTOR
Implement Appropriate Speed Limits for All Road Users	Run Off Road, Pedestrian Crash, Motorcycle Crash, Angle, Bicyclist Crash, Head-On, Opposite Direction Left Turn Across Path, Sideswipe, Opposite Direction Other, Rear End	Medium to Long term	Variable, depending on speed reduction.
Gateway Entrance Treatments	Pedestrian Crash, Angle, Bicyclist Crash, Opposite Direction Left Turn Across Path	Near term	N/A
Roundabout	Pedestrian Crash, Motorcycle Crash, Angle, Bicyclist Crash, Head-On, Opposite Direction Left Turn Across Path, Sideswipe, Opposite Direction Other, Rear End	Long term	78-82%
Install Transverse Rumble Strips	Run Off Road, Angle, Rear End	Near term	6-78%
Install Automated Speed Safety Cameras	Run Off Road, Pedestrian Crash, Motorcycle Crash, Angle	Medium to Long term	23-90%
Install Bicycle Boulevards/Shared Streets	Bicyclist Crash	Medium term	63%
Install Buffered Bicycle Lanes	Bicyclist Crash	Medium term	30-49%
Install Separated Bicycle Facilities	Bicyclist Crash	Near term	40-66%
Install Raised Medians	Head-On	Medium to Long term	46%
Road/Lane Diets	Motorcycle Crash, Angle, Sideswipe, Rear End, Bicyclist Crash	Medium to Long term	19% - 47%
Install RECOMMENDED Chevron Signs On Rural Horizontal Curves	Run off the Road	Near term	16%
Install REQUIRED Chevron Signs On Rural Horizontal Curves (Ballbanking And Revised	Run off the Road	Near term	16%
Install Edgeline Striping (Tangent and/or Curve Application)	Run off the Road	Near term	11%

Clark County - Systemic Speeding Improvements

Systemic Improvements

- Reduce speeding along corridors.
- Create safer facilities for motorists, pedestrians and bicyclists.



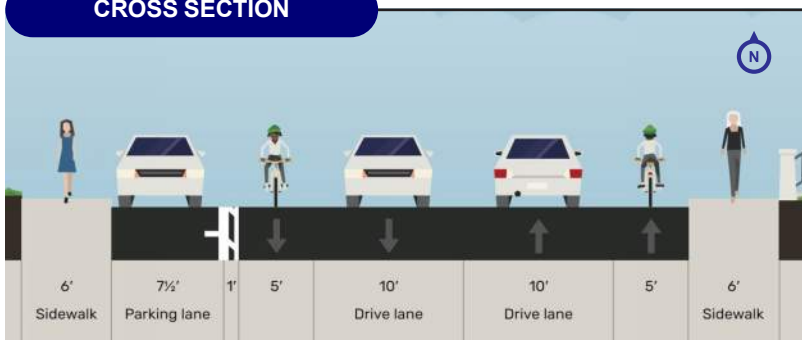
Clark County - Systemic Speeding Improvements

This provides an example of systemic speeding countermeasures applied to a corridor; exact recommendations vary for each corridor.

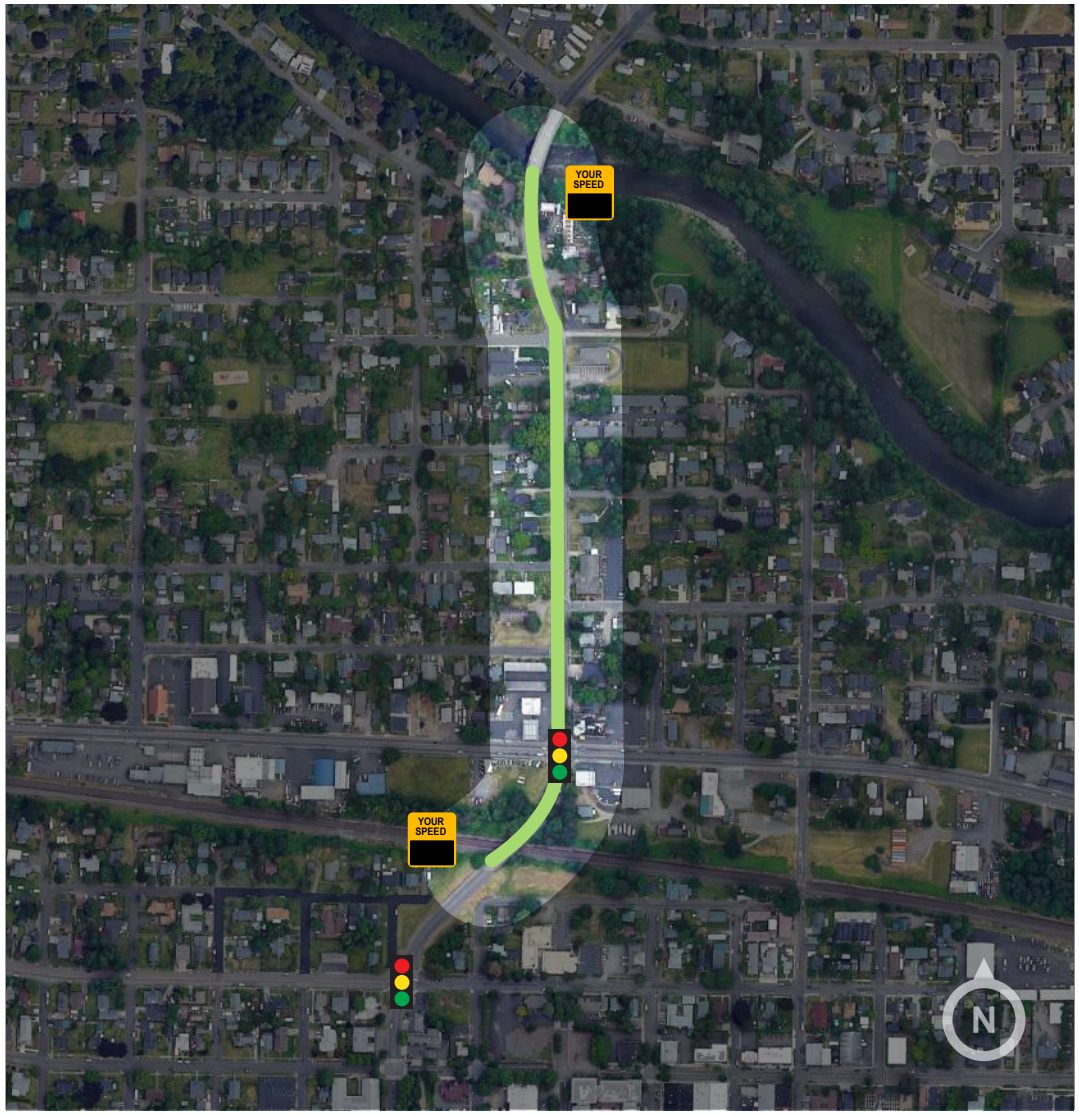
Systemic Improvements

- Restripe travel lanes to a width of 10-11 feet.
- Consider consolidating parking to one side (see cross section).
- Provide bike facilities to connect to downtown bike network.
- Install speed feedback signs (locations to be determined)
- Buffer the bike lane on the northern section of the corridor on or near the bridge.
- Consider automated speed enforcement at E St/Washougal River Rd.

CROSS SECTION



Washougal River Road, Washougal



Clark County - Systemic Walking and Biking Improvements

CRASH SUMMARY
(2018 - 2022)

689
Bicycle & Pedestrian Crashes

140
Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

- Near School
- Near Park
- Near Transit

RELEVANT GRANT OPPORTUNITIES

- HSIP
- SS4A
- SRTS
- Other

Location Summary

Contributing Factors

- Frequent right-of-way violations
- Frequent distracted, aggressive, or impaired driving
- Frequent speeding

Crash Types

- Ped/Bike crashes
- Angle crashes
- Rear-end crashes
- Turning movement crashes

Roadway & Contextual Factors

- Countywide issue

Goals

1. Reduce speeding along corridors.
2. Create safer facilities for pedestrians and bicyclists

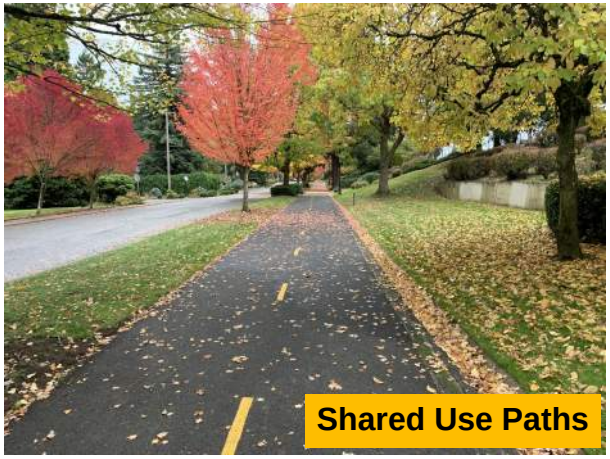
COUNTERMEASURE	CONCERN	TIME FRAME	CRASH REDUCTION FACTOR
High visibility pedestrian crossings, including enhanced/actuated crossings, curb extensions, striping, and signs	Pedestrian visibility and right of way	Near term to medium term	15% - 56%
Added or improved sidewalks	Pedestrian visibility and right of way	Near term to medium term	20%
Comfortable bicycle facilities, including bicycle boulevards, bicycle lanes, buffered bicycle lanes, or separated bike lanes in locations appropriate to the context	Bicycle visibility and right of way	Near term to medium term	45% - 63%
Adding shared use paths for walking and biking	Bicycle and pedestrian visibility and right of way	Medium term	N/A
Improvements at intersections like dedicated signal phases, shorter crossing distances, and high visibility crossing markings	Bicycle and pedestrian visibility and right of way	Near term to medium term	Varies

Clark County - Systemic Walking and Biking Improvements

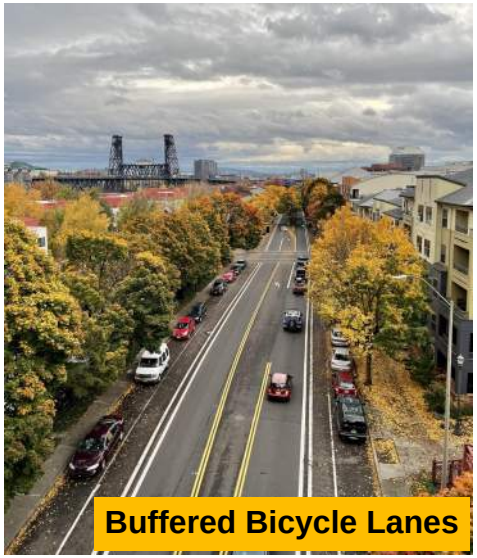
Crossings, sidewalks, bicycle facilities, and shared use paths can improve the safety and comfort of all users by giving users of each mode their own space to travel. The following countermeasures seek to separate people driving, walking, and biking, which simplifies road operations for everyone and makes all users safer. By implementing these countermeasures in spots where crashes involving people walking and biking are unusually common - that is, in spots on Clark County's Walking and Biking High Injury Network - we can better protect our most vulnerable residents while making sure everyone gets where they need to go. This is not a comprehensive list, and the actual design of what is needed is based on the context, but this shows a variety of treatments that can be considered for Clark County.


Crossings


Sidewalks


Shared Use Paths


High Visibility Striping at Intersections; Bicycle Turn Boxes


Buffered Bicycle Lanes


Separated Bicycle Lanes

City of La Center - Intersection Improvements

NW LA CENTER ROAD & NW TIMMEN ROAD

CRASH SUMMARY
(2018 - 2022)

6	0
Total Crashes	Fatal or Serious Injury Crashes
0	**0**
Bicycle & Pedestrian Crashes	Bicycle & Pedestrian Fatal or Serious Injury Crashes

**A fatal crash was reported at this intersection in July 2008.*

LOCATION ATTRIBUTES

None

RELEVANT GRANT OPPORTUNITIES

HSIP | SS4A

Location Summary

Contributing Factors
- Right of way violation

Crash Types
- Angle crashes
- Rear-end crashes

Roadway & Contextual Factors
- Two lane road
- 35 mph
- Planned development south on La Center Rd at intersection

Goals

1. Reduce speeds and angle crashes along the corridor with roundabout.

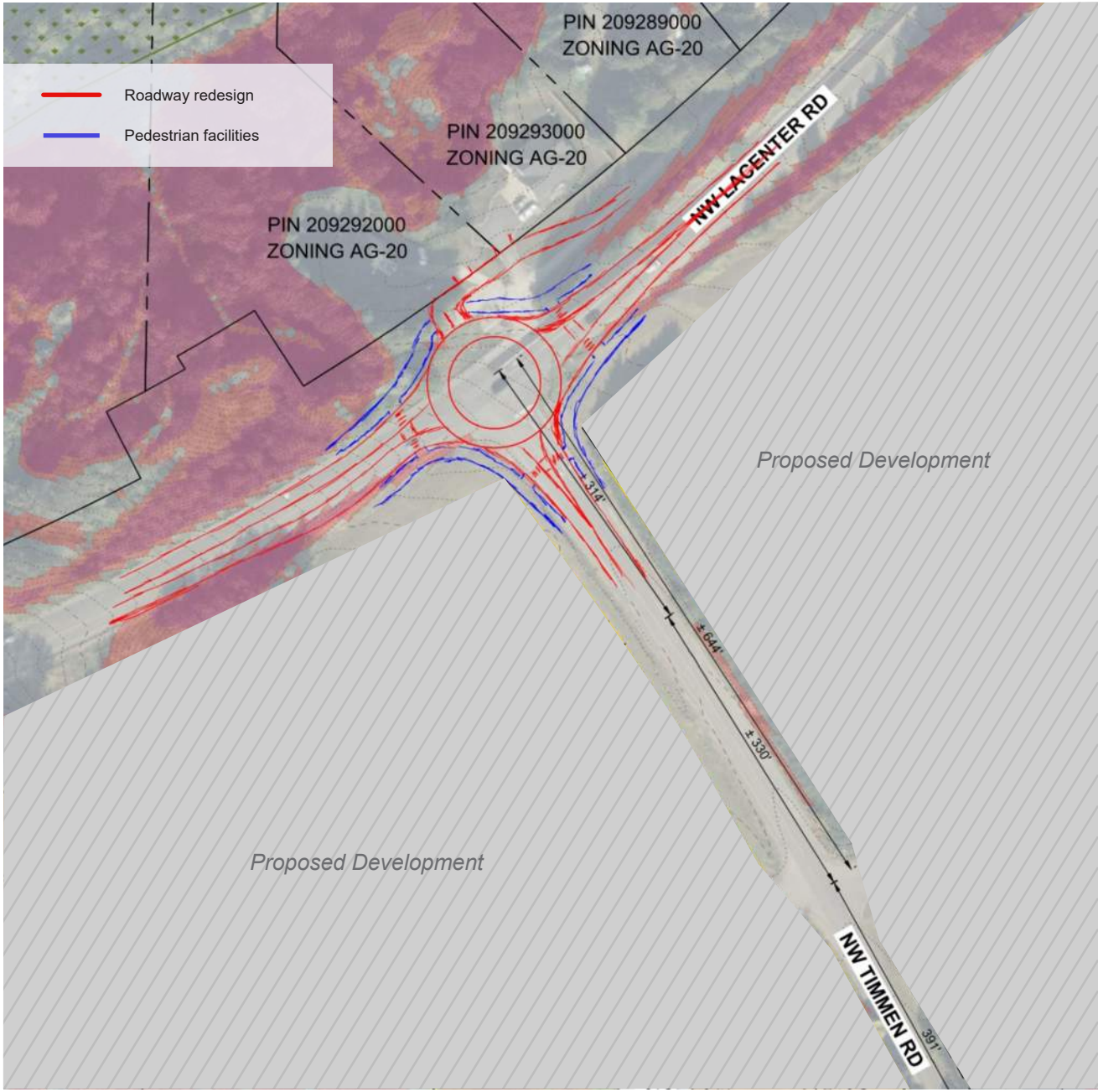
COUNTERMEASURE	CONCERN	TIME FRAME	CRASH REDUCTION FACTOR
Convert intersection to round-about	Speeding, angle crashes	Long term	82%
High visibility crosswalks	Pedestrian visibility and right of way	Long term	15%

City of La Center - Intersection Improvements

NW LA CENTER ROAD & NW TIMMEN ROAD

Intersection Improvements

- Convert minor-road stop-controlled intersection to roundabout.
- Install pedestrian crossings at roundabout for future pedestrian activity near the intersection.
- Regrade longitudinal grade (La Center Road) from 7% to 4%.



City of Ridgefield - Northwest Carty Roadway Improvements

NW CARTY ROAD

CRASH SUMMARY
(2018 - 2022)

4 Total Crashes	**0** Fatal or Serious Injury Crashes
0 Bicycle & Pedestrian Crashes	**0** Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

Near School

- *Fifty percent of the area is identified as critical areas.*
- *Planned 8-inch sewer line in Carty Road and a pump station near the intersection of Carty Road and NW 24th Avenue.*

RELEVANT GRANT OPPORTUNITIES

SS4A

Location Summary

Contributing Factors

- Right of way violations
- Speeding
- Distracted driving
- Dark - No Street Lights

Crash Types

- Hit object crashes
- Sideswipe crashes

Roadway & Contextual Factors

- Two-lane minor arterial road with ~700 Average Daily Traffic (ADT)
- Posted speed: 35 mph; 15 - 30 mph at curves
- Lacking bike and pedestrian facilities

Goals

1. Reduce speeds and run-off-road crashes along the corridor.
2. Add pedestrian and bicycle facilities to improve connectivity and safety for non-motorized users, while supporting community-oriented uses.

COUNTERMEASURE	CONCERN	TIME FRAME	CRASH REDUCTION FACTOR
Install/update signing and striping (e.g. lateral in-lane striping, chevrons and curve warning signs)	Speeding and run-off road crashes	Near term	10% - 16%
Use reflective materials, Advance Curve Warning flashers, and larger signs	Increase nighttime visibility	Near term	10% - 20%
Install separated multi-use path	Pedestrian and bicycle visibility, connection, and right of way	Long term	25%

City of Ridgefield - Northwest Carty Roadway Improvements

NW CARTY ROAD

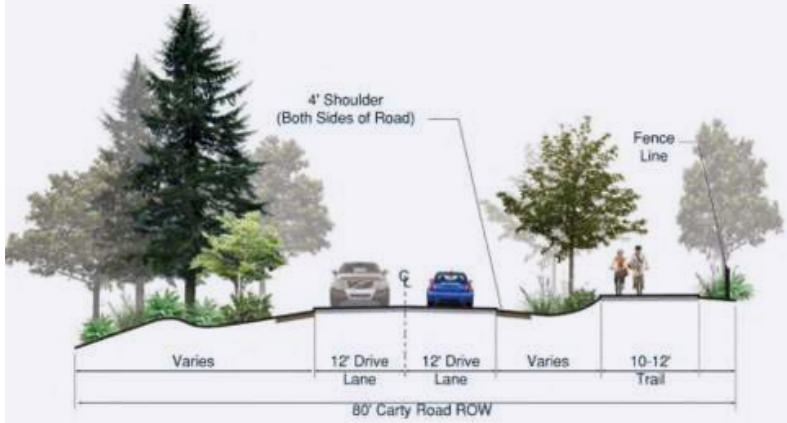
Near Term Whole-Corridor Improvements

- Use consecutive chevrons or a “One-Direction Large Arrow” if warranted by analysis
- Provide proper chevron signs in accordance with MUTCD guidelines
- Double up curve warning signs
- Ensure regular signage maintenance, including clearing weeds, to maintain proper sight distances
- Improve nighttime visibility with reflective materials, Advance Curve Warning flashers, and larger signs

Long Term Whole-Corridor Improvements

- Transportation improvements on Carty Road (80-foot right-of-way)
- Trail connectivity – separated multiuse path along Carty Road

CROSS SECTION



City of Vancouver - Intersection Improvements

NE BURTON ROAD & NE 86TH AVENUE

CRASH SUMMARY
(2018 - 2022)

30	2
Total Crashes	Fatal or Serious Injury Crashes
1	**0**
Bicycle & Pedestrian Crashes	Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

- Near School
- Near Transit
- Near Park

RELEVANT GRANT OPPORTUNITIES

- HSIP
- ATP
- SS4A
- SRTS

Location Summary

Contributing Factors

- Right of way violations
- Speeding
- Distracted driving
- Driving under the influence

Crash Types

- Angle crashes
- Rear end crashes
- Sideswipe crashes
- Ped/bike crashes

Roadway & Contextual Factors

- Three lane road (two travel lanes and center left-turn lane)
- Bike lanes along NE Burton
- Residential land uses
- Transit corridor

Goals

1. Reduce intersection crashes with signal timing and visibility modifications.
2. Increase pedestrian and bicycle visibility with enhanced crossings.

COUNTERMEASURE	ISSUE AREA	TIME FRAME	CRASH REDUCTION FACTOR
Install retroreflective backplates on signals	Signal visibility	Near term	15%
Upgrade signals from permissive to protected phasing	Angle and rear-end crashes	Near term	99%
Install pedestrian crosswalks	Pedestrian visibility in intersection	Near term	15%
Install bicycle striping through intersection	Bicyclist visibility in intersection	Near term	39%
Install Bicycle Boxes	Bicyclist visibility in intersection	Near term	35%
Install Leading Pedestrian/Bicyclist Interval	Pedestrian and bicyclist visibility in intersection	Near term	37%
Install SIGNAL AHEAD warning signs	Pedestrian visibility and right of way, unsafe speeds	Near term	35%

City of Vancouver - Intersection Improvements

NE BURTON ROAD & NE 86TH AVENUE

Signal Improvements

- Converting from permissive to protected phasing (remove doghouse signal head)
- Installing reflective backplates on signal heads
- Implementing leading pedestrian and bicycle interval (LPI / LBI)
- Increasing signal visibility with signal upgrades and signs
- Enhancing biking and walking crossings at the intersection

City of Vancouver - Intersection Improvements

SE MILL PLAIN BOULEVARD & SE 164TH AVENUE

CRASH SUMMARY
(2018 - 2022)

32 Total Crashes	**2** Fatal or Serious Injury Crashes
2 Bicycle & Pedestrian Crashes	**1** Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

- Near School
- Near Transit

RELEVANT GRANT OPPORTUNITIES

- HSIP
- ATP
- SS4A

Location Summary

Contributing Factors

- Right of way violations
- Disregarding traffic signs/signals
- Speeding
- Improper turning
- Distracted driving
- Driving under the influence

Crash Types

- Angle crashes
- Sideswipe crashes
- Ped/bike crashes

Roadway & Contextual Factors

- Four lane road with posted speed of 40 mph
- Bike lanes east of the intersection (between 164th Avenue and 172nd Avenue)
- Commercial land uses and access driveways at intersection
- Transit stops at each corner

Goals

1. Increase pedestrian and bicycle visibility with crossing improvements, signal improvements, and bike lanes.
2. Reduce speeds along the corridor with protected intersection elements and signal modifications.

COUNTERMEASURE	CONCERN	TIME FRAME	CRASH REDUCTION FACTOR
Install retroreflective backplates on signals	Signal visibility	Near term	15%
Install signal gap detection software	Red light running, angle and rear-end crashes	Medium to Long term	N/A
Install pedestrian crosswalks and protected intersection corner islands	Pedestrian visibility in intersection, speed reduction during right turns	Near term	37%
Install bicycle striping at and through intersection	Bicyclist visibility in intersection	Near term	39%
Install Leading Pedestrian/Bicyclist Interval	Pedestrian and bicyclist visibility in intersection	Near term	37%

City of Vancouver - Intersection Improvements

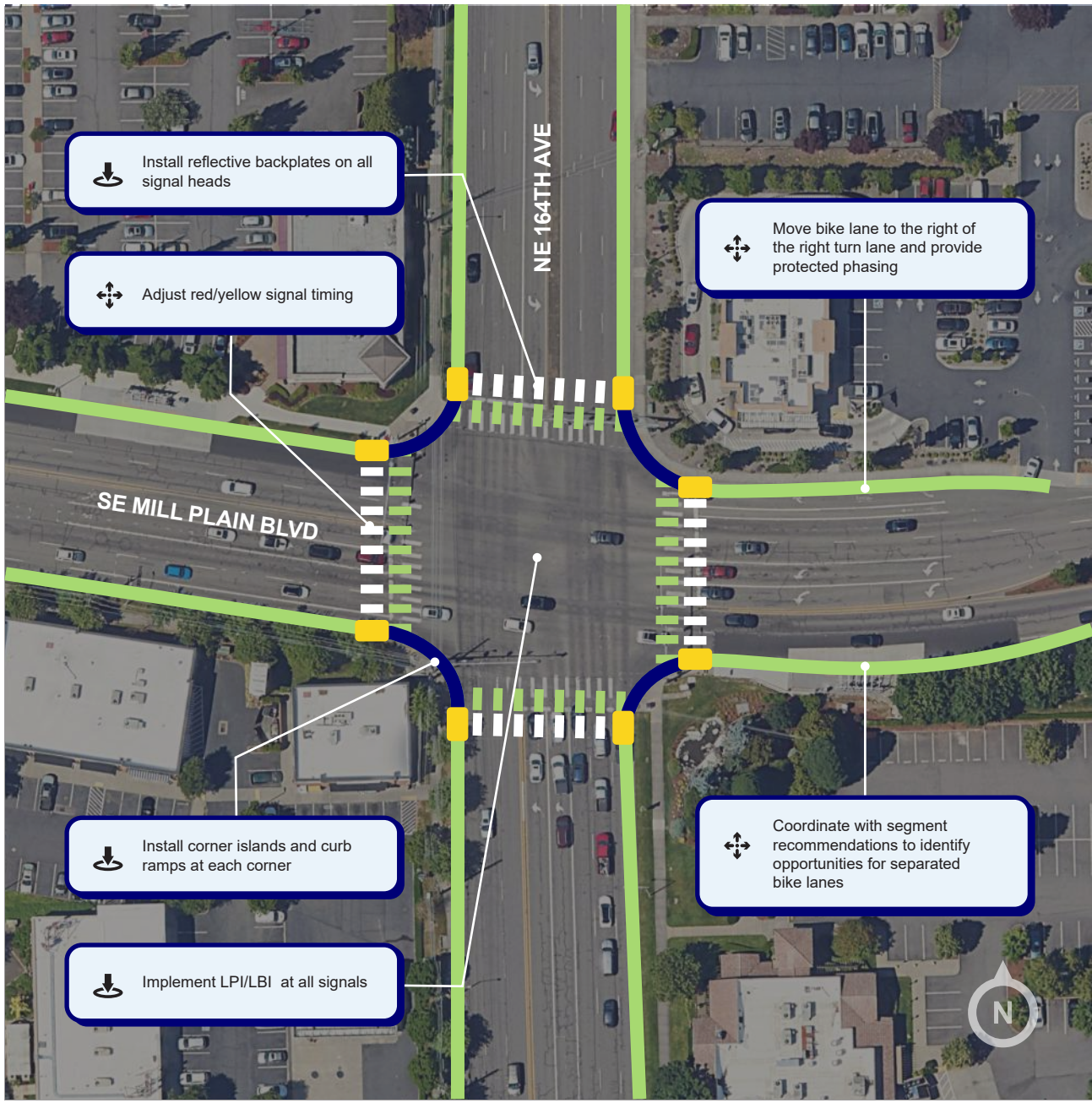
SE MILL PLAIN BOULEVARD & SE 164TH AVENUE

Signal Improvements

- Installing reflective backplates on signal heads
- Adjusting red/yellow signal timing
- Installing signal gap detection software
- Implementing Leading pedestrian and bicycle interval (LPI / LBI)

Safety Improvements

- Install protected intersection elements, including:
  - Separated bicycle facilities
  - Enhanced pedestrian crossings
  - Intersection crossing markings
  - Pedestrian and bicycle signals
  - Corner islands and curb ramps



City of Vancouver - SE Mill Plain Blvd Improvements

SE MILL PLAIN BOULEVARD (157TH AVENUE TO 172ND AVENUE)

CRASH SUMMARY
(2018 - 2022)

93	4
Total Crashes	Fatal or Serious Injury Crashes
4	**2**
Bicycle & Pedestrian Crashes	Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

- Near School
- Near Transit

RELEVANT GRANT OPPORTUNITIES

- HSIP
- ATP
- SS4A

Location Summary

Contributing Factors

- Right of way violations
- Disregarding traffic signs/signals
- Speeding
- Improper turning
- Distracted driving
- Driving under the influence

Crash Types

- Angle crashes
- Hit object crashes
- Sideswipe crashes
- Ped/bike crashes

Roadway & Contextual Factors

- Four to six lane road with posted speed of 40 mph
- Bike lanes between 164th Avenue and 172nd Avenue
- Commercial and residential land uses
- Transit corridor

Goals

1. Increase pedestrian and bicycle visibility with pedestrian signs and signals and bike lanes.
2. Reduce speeds along the corridor with speed reduction treatments and signal improvements.

COUNTERMEASURE	CONCERN	TIME FRAME	UNIT COST	CRASH REDUCTION FACTOR
Add protected bike lane	Bicycle right of way	Near term		47%
Install Pedestrian Hybrid Beacon pedestrian crossings	Pedestrian visibility and right of way	Medium to long term		55%
Install PEDESTRIAN AHEAD warning signs	Pedestrian visibility and right of way, unsafe speeds	Near term		25%
Install speed feedback signs	Unsafe speeds	Near term		10%

City of Vancouver - SE Mill Plain Blvd Improvements

SE MILL PLAIN BOULEVARD (157TH AVENUE TO 172ND AVENUE)

Whole-Corridor Improvements

- Identify opportunities to add separated bicycle facilities between SE 155th Avenue and 164th Avenue
- Install pedestrian crossings along the corridor
- Provide other safety improvements to reduce speeds, such as:
  - Speed feedback signs
  - Reduce speed limit along corridor
  - Adjust red/yellow signal timing

City of Camas - Intersection Improvements

SHEPHERD RD & NE 3RD AVE *

CRASH SUMMARY
(2018 - 2022)

7	1
Total Crashes	Fatal or Serious Injury Crashes
0	**0**
Bicycle & Pedestrian Crashes	Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

- Near Transit
- Near Park

RELEVANT GRANT OPPORTUNITIES

- HSIP
- SS4A
- SRTS

Location Summary

Contributing Factors

- Impaired driving
- Speeding
- Driving under the influence
- Distracted driving
- Wildlife

Crash Types

- Motorcycle and moped crashes
- Run-off-road crashes
- Hit object crashes
- Angle crashes
- Rear-end crashes

Roadway & Contextual Factors

- Four-lane road with turn lanes at intersection
- Posted speed: 40 mph
- Signalized intersection
- No crosswalk marking on the east side of the intersection

Goals

1 Reduce collisions and severity of collisions with intersection reconfiguration and signal modifications.

COUNTERMEASURE	ISSUE AREA	TIME FRAME	CRASH REDUCTION FACTOR
Add supplemental signal heads at curved approaches	Signal visibility on curve	Near term	28%
Install reflective backplates on signal heads	Signal visibility	Near term	15%
Implement Leading Pedestrian and Bicycle Intervals (LPI / LBI)	Pedestrian and bicycle visibility	Near term	37%
Reduce turning radii and provide pedestrian crossings on each leg of the intersection	Speeds and crossing exposure	Long term	37%
Install curb ramps at each corner	ADA accessibility	Long term	N/A
Install green bicycle striping through the intersection	Bike/ped connection and right of way	Long term	39%
Replace span wires with mast arms for signal support	Signal reliability and visibility	Long term	-9%
Install enhanced pedestrian crosswalks on all legs	To address: pedestrian safety and visibility	Long term	15%

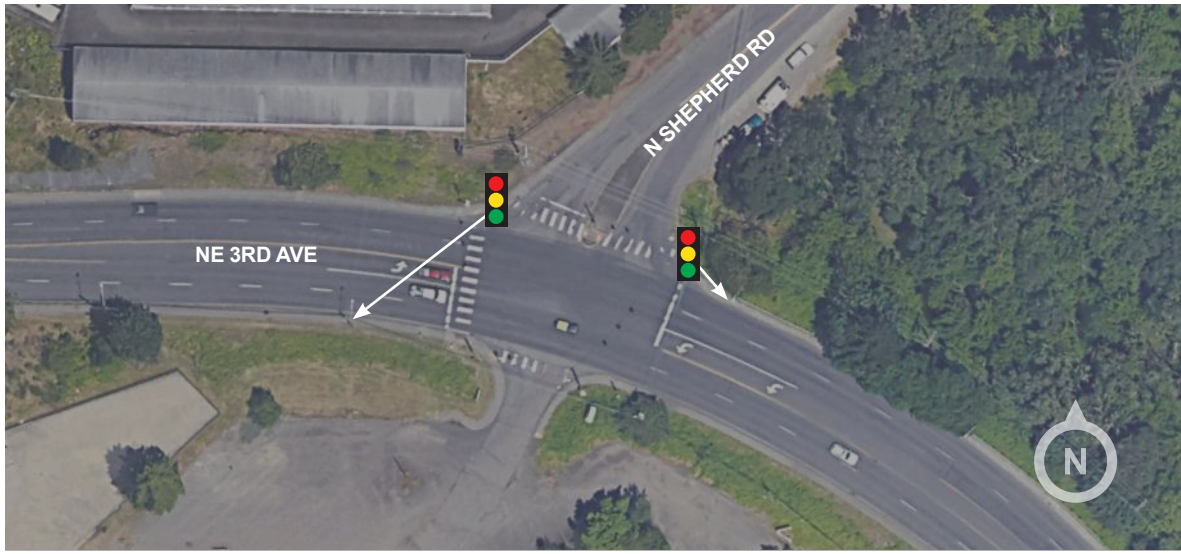
*This intersection falls within the Camas city limits and connects to the Shepherd Road in Washougal.

City of Camas - Intersection Improvements

SHEPHERD RD & NE 3RD ST *

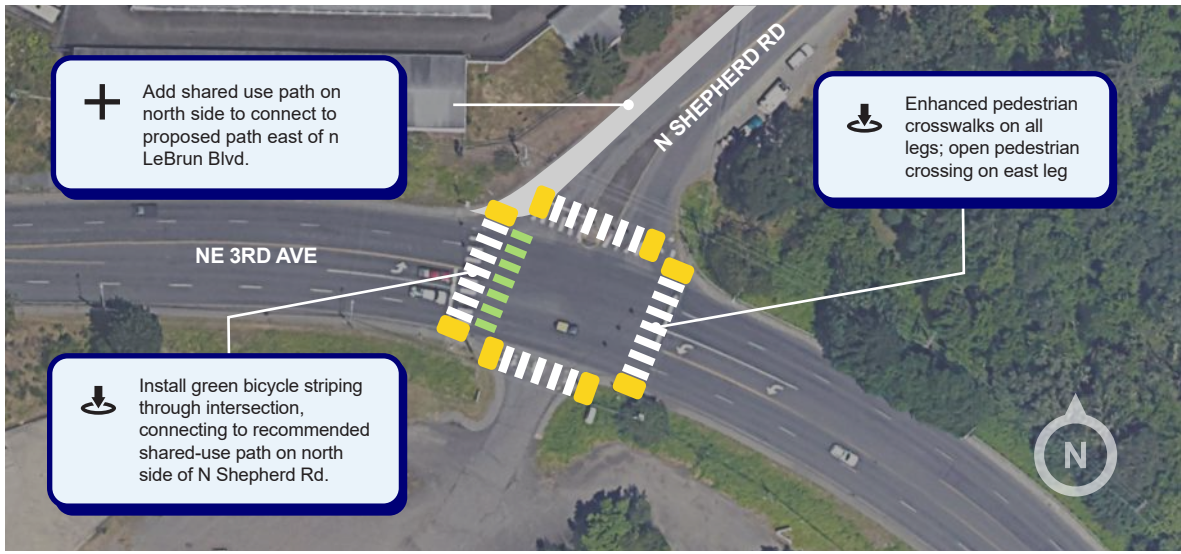
Near Term Signal Improvements

- Add supplemental signal heads at curved approaches with limited sight distance to improve signal visibility
- Install reflective backplates on signal heads
- Implement leading pedestrian and bicycle interval (LPI / LBI)



Long Term Intersection Improvements

- Tighten the intersection layout, particularly the northwest corner, to reduce turning radii and crossing distance
- Add curb ramps at each corner; consider adding protected corner islands to NW corner; open and provide high visibili-ty striping for crossings on each leg of the intersection
- Evaluate need to replace span wires with mast arms for signal support



*This intersection falls within the Camas city limits and connects to the Shepherd Road in Washougal.

City of Washougal - Shepherd Road Improvements

SHEPHERD ROAD (NE 3RD AVENUE TO N WASHOUGAL RIVER ROAD)

CRASH SUMMARY
(2018 - 2022)

3 Total Crashes	**1** Fatal or Serious Injury Crashes
0 Bicycle & Pedestrian Crashes	**1** Bicycle & Pedestrian Fatal or Serious Injury Crashes

LOCATION ATTRIBUTES

- **Near Schools** (north side)
- **Near Public Parks** (swimming hole; south side)
- **Near Transit** (N Shepherd Rd & NE 3rd St)

RELEVANT GRANT OPPORTUNITIES

- **SS4A**

Location Summary

Contributing Factors

- Impaired driving
- Speeding
- Driving under the influence
- Distracted driving
- Wildlife
- Dark - No Street Lights

Crash Types

- Pedestrian crash
- Run-off-road crashes
- Hit object crashes

Roadway & Contextual Factors

- Two-lane road
- Posted speed: 25 mph (20 mph in school zone)
- Major sidewalk gaps along approx. 85% of the corridor
- Neighborhood sidewalks present east of N 8th St on the north side of the corridor
- Near swimming hole: AADT 2,027; 85th percentile speed: 36 mph

Goals

1. Reduce speeds and run-off-road crashes with targeted road design and traffic calming measures.
2. Enhance pedestrian and bicycle connectivity, improve crossings, and secure dedicated right-of-way.

COUNTERMEASURE	CONCERN	TIME FRAME	CRASH REDUCTION FACTOR
Install/update signing and striping (e.g. lateral in-lane striping, speed feedback signs, and curve warning signs)	Speed and run-off-road crashes	Near term	9% - 16%
Install streetlights	Increase nighttime visibility	Near term	26% - 38%
Install enhanced crossing	Pedestrian safety and bike/ped connection	Near term	15%
Install shared-use path	Ped/bike visibility, connection, and right of way	Long term	25%

City of Washougal - Shepherd Road Improvements

SHEPHERD ROAD (NE 3RD AVENUE TO N WASHOUGAL RIVER ROAD)

Near Term Whole-Corridor Improvements

- Install speed feedback signs
- Install curve warning signs if warranted
- Install enhanced pedestrian crossing
- Install streetlights to increase nighttime visibility

Long Term Whole-Corridor Improvements

- Widen road to provide space for parking and shared use path on N Shepherd Rd between Washougal River Rd and Lebrun Blvd (Transportation CFP: High priority)
- Coordinate with the City of Camas to extend path to NE 3rd Ave