City of Kent

Systemic Local Road Safety Plan

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1. Introduction

The City of Kent has prepared this plan in alignment with the principles of the Target Zero: Washington State Strategic Highway Safety Plan from the Washington Traffic Safety Commission and the Systemic Safety Project Selection Tool from the Federal Highway Administration (FHWA). This is also consistent with several City Comprehensive Plan goals and policies that address roadway safety, as well as Council-adopted policies on the prioritization of transportation capital projects that have increasingly emphasized safety improvements over capacity improvements. This plan includes analysis of crashes on managed access state highways in Kent which are SR 99, SR 181, SR 515 and sections of SR 516. It does not include areas of the limited access state highways I-5, SR 167, and sections of SR 516; which are completely under the authority of the Washington State Department of Transportation (WSDOT).

The crash data used in the preparation of this plan were provided by WSDOT and only includes crashes that were logged by police with a crash report. This likely covers all fatal and serious injury crashes, but it does not include all the minor injury and property damage only crashes that are not reported. As a result, fatal and serious injury crashes may be slightly over-represented as a percentage of all crashes. Only crash data in the five-year period between January 1, 2018, and December 31, 2022 were used in the preparation of this plan, which focuses on the fatal and serious injury crashes.

The City has traditionally used "hot spot" analyses where high-crash locations are identified, countermeasures are selected, then projects created and prioritized to construct those countermeasures. This process can be effective at addressing historical problems but does not address locations with similar risk factors until crashes begin to occur at those similar locations.

The process used herein attempts to identify similar types of crashes on a system-wide basis, identify locations with similar risk factors, prioritize the most cost-effective countermeasures for those risks, and apply them systemically. To be consistent with the principles of the Strategic Highway Safety Plan component of the FHWA Highway Safety Improvement Program (HSIP) Target Zero goals, prioritization is focused on fatal and serious injury crashes.

This plan will be updated periodically, which will allow an assessment of the effectiveness of this strategy as well as the effectiveness of the countermeasures chosen. As the City's safety program progresses, subsequent updates will also address less frequent crash types that are lower on the prioritization list.

2. Identification of Focus & Priorities

2.1 Identification of Primary Crash Types

Primary crash types for fatal and serious injury crashes in Kent consist of the following types in rank order. Underlined crash types are those where the percentage of occurrences is higher than the average of other western Washington cities. Up/down arrows and equal signs show the relative change in position since the 2022 Local Road Safety Plan (LRSP).

1. Hit Pedestrian (30.5%) =
2. Angle - Through (18.8%) (Right Angle) ↑
3. Hit Fixed Object (13.7%) ↓
4. Rear End (8.6%) ↑
5. Angle - Left-Turn (8.2%) ↓
6. Other (5.1%) ↑
7. Head On (4.3%) ↑
8. Hit Cyclist (3.5%) ↓
9. Sideswipe - opposite direction (3.1%) ↓
10. Overturn (2.0%) =
11. Hit parked vehicle (0.8%) =
12. Sideswipe – same direction (0.8%) ↓
13. Angle – Right-Turn (0.4%) ↑
14. Railway (0.4%) ↓

This analysis will focus on the top three crash types, which account for 63% of the City's fatal and serious injury crashes. As shown above, Right-Angle crashes are the second-most common fatal and serious injury crash type, but are also the second-most common overall crash type for all crash severities. Reducing the number of severe right-angle crashes could also have a significant impact on the total number of crashes in Kent.

Priority Crash Types for this Plan

1. **Hit Pedestrian**
2. **Angle – Through (Right Angle)**
3. **Hit Fixed Object**

2.2 Other Crash Types

There are other fatal and serious injury crash types that were identified in the analysis. This report is focusing on the top three types. In the future as the Kent's safety program continues and the crash types discussed in this report are reduced the other crash types will be addressed.

3. Identification and Evaluation of Risk Factors

Each of the fatal and serious injury crashes in the top three types were evaluated individually to identify potential risk factors. These risk factors varied by crash type, but there are some commonalities. Table 1 summarizes the most common risk factors for each crash type. Data points and risk factors with significant correlation are shown in **bold text**. Not all risk factors are included in this summary table, so the percentages may not add up to 100%. Percentage totals within some crash types or factor groups may also not add up to 100% due to rounding.

The vast majority of fatal and serious injury crashes occurred on roadways with posted speed limits of 35 mph or more and those functionally classified as arterial roadways. These numbers reflect the intent of arterial roadways to carry large volumes of traffic and thus have a greater potential for crashes compared to a lower volume roadway. The data also supports industry research that higher speeds are a contributing factor to the severity of crashes.

Eighty-nine percent of the fatal or serious injury crashes occurred on roadways with a posted speed limit of 35 mph or more, which account for 28% of the center-line miles (CLM) in the City. Roadways posted at 35 mph accounted for 42% of the fatal and serious injury crashes but are only 18% of CLM.

The following Risk Factors were most commonly present for all 3 crash types, but not necessarily present for all fatal or serious injury crashes:

- Posted speed limit greater or equal to 35 mph,
- Principal or Minor Arterial functional classification,
- Roadway width of five or more lanes
- A roadway tangent (straight, not in a curve) section.

3.1 Pedestrian Crashes

Of the 77 fatal and serious injury pedestrian crashes, 64% occurred at midblock locations, 36% at intersections and driveways. Only 29% were at marked crosswalks, 9% were at unmarked crosswalks, and the remaining 62% were locations with no legal crosswalk. 44% of pedestrian crashes occurred more than 300 feet from the nearest marked crosswalk.

Other major contributing factors included arterial roadways (95%), posted speed limits of 35 mph or more (85%), 5 or more lanes (88%), on a state route which are regional through routes (63%), and surrounding commercial land-use (60%).

Table 1. Common Risk Factors

Risk Factor	Factor Detail	Serious/Fatal Crash Type: Hit Pedestrian	Fixed Object	Right Angle
	% of All Fatal and Serious Injury Crashes	*30.5%*	*14%*	*19%*
Posted Speed Limit	**≥ 35 mph**	**86%**	**81%**	**80%**
Functional Classification	**Arterial**	**96%**	**97%**	**98%**
Number of Lanes	**2 lanes**	10%	**28%**	13%
	5 lanes	**44%**	**34%**	**60%**
	6 or more lanes	**36%**	25%	22%
Median/Barrier Type	**None**	19%	**34%**	20%
	Two-Way Left-Turn Lane	**45%**	**47%**	**73%**
Current Land-Use	**Commercial (non-Industrial)**	**65%**	23%	**60%**
	Residential	27%	**45%**	23%
Traffic Control	**Uncontrolled**	**61%**	**81%**	16%
	Signal	25%	9%	**44%**
	Stop	14%	10%	40%
<u>Signalized Intersections</u>	**No Signal Backplates**			**36% (76%)**
(% of all serious signal	**Veh. Violates Signal/FTY**	13% **(53%)**		**44% (100%)**
crashes of this type)	**Through**	8% (32%)		**40% (90%)**
<u>Stop-Control Int.</u>	**Minor Left-Turn**	3% (18%)		**31% (64%)**
(% of all serious stop-	**Pedestrian Fails to Yield**	6% (45%)		
cont. crashes, this type)	**Vehicle Fails to Yield**	8% **(55%)**		**49% (92%)**
Junction Type	**Non-Int. (Midblock)**	**61%**	**81%**	2%
	Intersection	39%	19%	**84%**
	Driveway	1%	0%	13%
Roadway Alignment	**Straight**	**82%**	**72%**	**89%**
	Horizontal Curve	18%	28%	11%
Driver Behavior/Factors	**Speeding**	9%	**78%**	22%
	DUI Alcohol/Drugs	10%	9%	18%
Pedestrian Action	Crossing Traffic Lanes	**81%**		
	Fails to Yield, uncontrolled	49%		
Pedestrian Crossing Type	Marked Crosswalk	29%		
	Unmarked Crosswalk	9%		
	No Crosswalk	**62%**		
Proximity to Transit Stop	**< 150 feet**	**52%**		
	150-300 feet	17%		
	> 300 feet	31%		
Distance to Nearest Marked Crosswalk	**0-300 feet**	**56%**		
	> 300 feet	44%		
Roadside Conditions or Facilities	**Ditch or Embankment**		**25%**	
	Curb and Gutter		**78%**	
	Sidewalk Present	**96%**	**88%**	
	Streetlights Present		**88%**	
	Hours of Darkness	**68%**	**63%**	47%
Object Distance from edge line or curb face	0 to 5 feet		17%	
	6 to 10 feet		40%	
Midblock Crashes	**Object 0 - 10 ft. from road**		**60%**	
	Object 11 - 20 ft. from road		23%	

Forty (52%) of the fatal and serious injury pedestrian crashes occurred within 150 feet of a transit stop, 27 (35%) more were within 600 feet, and only 10 (13%) were greater than 600 feet from a transit stop.

Crashes during hours of darkness were more prevalent than in previous 5-year periods analyzed. From 2018 to 2022 the data showed that 51% of all pedestrian crashes occurred in the dark, but 68% of serious injury and 78% of fatal crashes occurred during hours of darkness. This is significant since approximately only 25% of vehicle-miles-traveled (VMT) are in the dark; as such, pedestrian serious and fatal crashes in hours of darkness appear to be over-represented.

Additional pedestrian-specific risk factors were considered, but were found to not have a significant presence in the data. They include the following factors, with the percentage of crashes in which they were present:

- School frontage or walk-route (23%)
- Lack of Sidewalk (4%) – note that most multi-lane arterials already have sidewalks

3.2 Fixed Object Crashes

Of the 32 fatal and serious injury fixed object crashes, 28% occurred on horizontal curves and 72% occurred on tangent (straight) sections.

First objects struck include 11 trees or stumps, threes fences, three curbs or raised traffic islands, two utility poles, two over an embankment, and one crash with each of the following objects; utility box, mailbox, traffic signal pole, concrete barrier, ditch, sign post, streetlight pole, fire hydrant, guardrail, and one vehicle overturned.

Fifteen (47%) of the fatal and serious fixed object crashes were on principal arterials, while 10 (31%) were on minor arterials (for a total of 78% for these arterials), even though they comprise only 7.7% and 11.8%, of road inventory respectively. Collector arterials had six (19%) of these crashes and comprise 7% of road inventory. Residential collectors had one (3%) of these crashes. Zero such crashes occurred on local streets.

Thirteen (41%) of these crashes occurred in 35 mph speed zones, which comprise 18% of roadway inventory. Five (16%) occurred in 40 mph zones, which comprise 7% of roadways. Eight (26%) occurred in 45 and 50 mph zones, which comprise 4% of roadways. One (3%) occurred in a

30 mph zone which is 3% of the inventory. Five (16%) occurred in 25 mph zones, which comprise 69% of inventory.

Twenty-five (78%) occurred on streets with curb and gutter. Four (13%) occurred on roadways with paved shoulders 4-foot wide or less, while seven more (22%) occurred on roadways with paved shoulders 5-foot or wider. Nine (28%) of the crashes occurred on horizontal curves. Twenty-six (81%) occurred at midblock locations away from intersections and driveways. Twenty (63%) occurred in the dark and all locations had street lighting. The distance groupings in Table 1 for "Object distance from edge line or curb face" are grouped based on how significant quantities of crashes are grouped, not roadside clear zone boundaries.

3.3 Right-Angle Crashes

Forty-four (98%) of the 45 fatal and serious injury right-angle crashes occurred on arterial roadways. Twenty (44%) of them occurred at signalized intersections, with 24 (53%) at stop-controlled intersections or driveways. Of the 24 (53%) at stop-controlled locations, 17 (77%) involved the minor left-turn or through movement. Thirty-nine (87%) were public street intersections, while the remaining 6 (13%) were at private driveways.

Right-angle crashes are also the second most common of all crash types in Kent over the last five years when looking at all levels of severity.

3.4 Speed Zones

86% of all fatal and serious pedestrian crashes occurred on roadways with a posted speed of 35 mph or more. Even without the data to determine if this is proportional to the vehicle-miles traveled on all streets within the City, it indicates that speed is one of the major contributing factors to injury severity. Investments aiming to reduce fatal and severe injury crashes should prioritize these higher-speed zones.

Research from many sources, including Table 11-2 in the ITE Traffic Engineering Handbook (7th Ed.) indicates that a pedestrian's chance of severe or fatal injury increases with the speed of the vehicle involved in the crash. As such, the evaluation of speed zones should be considered when paired with pedestrian improvements.

4. Analyze Roadway Network for Presence of Risk Factors

4.1 Identification of Network Elements

Each principal, minor, and collector arterial with average daily traffic (ADT) volumes greater than 3,000, and all federally functionally classified roadways in the network were analyzed to determine the relative level of risk on that roadway segment as it applies to the individual risk factors. Table 2 summarizes the risk factors that were significant for all three primary crash types.

Table 2. Network Evaluation Measures – 3 Crash Types

Evaluated Risk Factor	Crash Type			Network Evaluation Measure	Scores
	Hit Pedestrian	Hit Fixed Object	Right Angle		
Weighted Crash Rate	X	X	X	Crash rate per million vehicle miles (MVM)	Varies
Posted Speed ≥ 35 mph	X	X	X	Yes or No	1 or 0
Arterial Roadway Classification	X	X	X	Yes or No	1 or 0
Roadway Width ≥ 5 lanes	X	X	X	Yes or No	1 or 0
Presence of TWLTL median	X	X	X	Yes or No	1 or 0
Straight roadway ≥ 1/2 mile	X	X	X	Yes or No	1 or 0

Evaluating most of these factors for each roadway segment was a simple yes or no (1 or 0) evaluation. The weighted crash rate utilized the segment length, average daily traffic, and total number of all crashes, with the crash rate for fatal and serious injury crashes weighted heavier than less severe crashes.

4.1.1 Pedestrian Crashes

Significant risk factors for pedestrian crashes included the presence of commercial land-use (65%), its potential to attract midblock crossings (61%), the frequency and ability to cross major roadways (81%), and the presence of bus stops (69% within 300 feet). The presence of sidewalks on one, both, or neither side of the street was also evaluated.

Table 3 summarizes the risk factors that were significant for hit pedestrian crashes and how they were evaluated.

Table 3. Network Evaluation Measures – Hit Pedestrian Crashes

Evaluated Risk Factor	Crash Type: Hit Pedestrian	Crash Type: Hit Fixed Object	Crash Type: Right Angle	Network Evaluation Measure	Scores
Commercial or Mixed (non-Industrial) Land-Use	X			Yes or No	1 or 0
Land-Use potential for midblock crossings	X			None, Low, Medium, High	0, 1, 2, 3
Proximity of marked pedestrian crossings	X			Avg. # of 330' blocks between marked crossings	Varies 0 to 27
Presence of Sidewalks	X			None, 1-side, Both sides	2, 1, 0
Presence of Bus Stops	X			Bus stops per mile	Varies

The greater the distance (number of blocks) is between pedestrian crossings, the more likely that a pedestrian will attempt to cross the street midblock. The presence of bus stops increases the likelihood of pedestrians crossing the street to or from the bus stop. This relationship indicates that pedestrian crossing risk is higher next to transit stops without marked crosswalks nearby.

4.1.2 Hit Fixed Object Crashes

Table 4 summarizes the significant risk factors for Fixed Object crashes

Table 4. Network Evaluation Measures – Hit Fixed Object Crashes

Evaluated Risk Factor	Crash Type: Hit Pedestrian	Crash Type: Hit Fixed Object	Crash Type: Right Angle	Network Evaluation Measure	Scores
Presence of Horizontal Curves		X		Horizontal curves per mile	Varies
Fixed Objects within 10' of edge line or curb face		X		Fixed Objects <10' from edge line or curb face, per mile	Varies
2-lane roads in residential land use		X		Yes or No	1 or 0
Presence of vertical curb		X		Yes or No	1 or 0
Presence of ditch or embankment		X		Yes or No	1 or 0

Midblock locations may be overrepresented with 81% of all hit fixed object crashes. A significant percentage (25%) were also on 2-lane roads in residential areas, but these types of roads make up a large portion of Kent's roadway network.

4.1.3 Right Angle Crashes

Arterials (98%), speed limits of 35 mph and above (80%), and 5 or more lane roadways (82%) may all be overrepresented based on centerline-miles. However, it makes sense that higher volume roads (arterials) combined with wider and higher speed roadways could lead to greater crash severity. 84% of crashes were at intersections, 13% at driveways, with 60% of the total bordering commercial land-uses.

Table 5 summarizes the significant risk factors for Right Angle crashes

Table 5. Network Evaluation Measures – Right Angle Crashes

Evaluated Risk Factor	Crash Type			Network Evaluation Measure	Scores
	Hit Pedestrian	Hit Fixed Object	Right Angle		
Commercial or Mixed (non-Ind.) Land-Use			X	Yes or No	1 or 0
Presence of traffic signals			X	# of signals per mile	Varies
Presence of signal head backplates			X	# of signalized intersection approaches without backplates	Varies
Presence of intersections			X	# of full access intersections per mile	Varies
Presence of driveways			X	# of full access driveways per mile	Varies

4.2 Risk Factor Weighting

To reflect the relative importance or impact of each risk factor on the different crash types, a weighting methodology was developed. For instance, risk factors that were present in all 3 crash types were given more weight than factors that were present for only one crash type. Adjustment factors were used with some measurements to normalize the calculated values.

The complete list of Risk Factors and evaluation measures for segments is shown in Table 6.

4.3 Intersections

Similar to the evaluation of network segments, in order to reflect the relative importance or impact of each risk factors on the different crash types, a weighting methodology was developed. The following 13 risk factors were evaluated for 240 intersections in the City.

- Severity Rate (Societal Cost)
- Total Crash Rate
- Total Risk Score
- Posted Speed Limit
- Number of Approach Lanes
- Total Entering Volume
- Presence of Streetlighting
- Signal Heads w/o Backplates
- Corner Radii
- Pedestrian Traffic Generators
- Bus Stop Proximity
- Left-turn Signal Phasing
- Intersection Alignment & Nearby Conflicts

The complete list of Risk Factors and evaluation measures for intersections is shown in Table 7.

Table 6. Network Evaluation Measures

Evaluated Risk Factor	Crash Type: Hit Pedestrian	Crash Type: Hit Fixed Object	Crash Type: Right Angle	Network Evaluation Measure	Scores
Weighted Crash Rate	X	X	X	Crash rate per million vehicle miles (MVM)	Varies
Posted Speed ≥ 35 mph	X	X	X	Yes or No	1 or 0
Arterial Roadway Classification	X	X	X	Yes or No	1 or 0
Roadway Width ≥ 5 lanes	X	X	X	Yes or No	1 or 0
Presence of TWLTL median	X	X	X	Yes or No	1 or 0
Straight roadway ≥ 1/2 mile	X	X	X	Yes or No	1 or 0
Commercial or Mixed (non-Ind.) Land-Use	X		X	Yes or No	1 or 0
Land-Use potential for midblock crossings	X			None, Low, Medium, High	0, 1, 2, 3
Proximity of marked pedestrian crossings	X			Avg. # of 330' blocks between marked crossings	Varies
Presence of Sidewalks	X			None, 1-side, Both sides	2, 1, 0
Presence of Bus Stops	X			Bus stops per mile	Varies
Presence of Horizontal Curves		X		Horizontal curves per mile	Varies
Fixed Objects within 10' of edge line or curb face		X		Fixed Objects <10' from edge line or curb face, per mile	Varies
2-lane roads in residential land use		X		Yes or No	1 or 0
Presence of vertical curb		X		Yes or No	1 or 0
Presence of ditch or embankment		X		Yes or No	1 or 0
Presence of traffic signals			X	# of signals per mile	Varies
Presence of signal head backplates			X	# of signalized intersection approaches without backplates	Varies
Presence of intersections			X	# of full access intersections per mile	Varies
Presence of driveways			X	# of full access driveways per mile	Varies

Table 7. Intersection Evaluation Measures

Evaluated Risk Factor	Crash Type: Hit Pedestrian	Crash Type: Hit Fixed Object	Crash Type: Right Angle	Network Evaluation Measure	Scores
Weighted Crash Severity Rate	X	X	X	Crash Severity rate per million entering vehicles (MEV) / $50,000	Varies
Total Crash Rate	X	X	X	Total crash rate per MEV	Varies
Posted Speed Limit	X	X	X	1 point for every 5 miles-per-hour (mph) over 25	0 to 5
Number of Intersection Approach Lanes	X	X	X	Total # of approach lanes/2	Varies
Total Entering Traffic Volume	X	X	X	Total entering ADT/5,000	Varies
Presence of Streetlighting	X	X	X	None, Corridor, or Intersection Lighting?	2, 1, 0
Signal heads without backplates	X	X	X	# of heads w/o backplates /3	Varies
Left-turn Signal Phasing	X		X	Mix of permitted and protected left-turn phasing	3 to 0
Land-use potential for generating pedestrian trips	X			Low, Medium, High	1, 2, 3
Largest Corner Curb Return Radius	X			Range of largest curb return radius (S to XL)	0 to 4
Proximity of Bus Stops	X			Distance to nearest bus stop	3 to 0
Alignment and Conflicts		X	X	# of signals per mile	Varies

5. Prioritized List of Roadway Segments

Table 8 summarizes the final additive ranking for the top 60 ranked roadway segments which adds together the rankings of Crash Rate, Crash Severity (Total Observed Cost), and Risk Factors. The total risk factor scoring for each of the ranked street segments as well as the ranking of each segments score and rank for each of the 3 major crash types is included. In addition, the top 10 rankings for each score or ranking are also highlighted.

As discussed in further depth in section 8.3, total observed cost calculations use the comprehensive crash costs for each crash severity level from the National Highway Traffic Safety Administration (NHTSA) and FHWA to generate societal total observed crash costs. These costs are not only the costs to municipalities that crashes occur in, but other costs (both public and private) placed on society at large.

Appendix A includes the spreadsheet that outlines the detailed scoring for each risk factor for each of the top 60 ranked street segments. Each street segment analyzed varied in length; thus some factors are scored per-mile. Appendix B provides additional detail on the road segment rankings in Table 8.

6. Prioritized List of Intersections

To prioritize intersection locations for systemic and spot improvements, a combined ranking was found by adding the rank of the intersection's total crash rate, the rank of its five-year observed cost, and the rank of it total risk score. Table 9 summarizes the total combined ranking for each of the top 60 ranked intersections.

Appendix C provides additional detail on the intersection rankings in Table 9 and includes all of the evaluated intersections.

Table 8 - Prioritized List of Roadway Segments							Risk Factor Rank			
Rank	Road Name	From	To	Total Crash Rate Rank	Total Crash Severity Rank	Total Risk Score Rank	Ped Rank	Fixed Object Rank	Right-Angle (T) Rank	Final Rank
1	SE 240 St	100 Ave SE	108 Ave SE	7	11	1	2	4	1	**1**
2	W Meeker St	64 Ave S	N Lincoln Ave	4	16	5	1	1	3	**2**
3	Smith St	4 Ave N	Central Ave N	1	25	8	14	6	6	**3**
4	James St	SR 181	Central Ave N	19	14	2	5	10	4	**4**
5	Central Ave N-S	E James St	E Willis St	11	23	3	25	26	2	**5**
6	SE Kent-Kangley Rd (SR 516)	101 Ave SE	116 Ave SE	30	4	4	6	22	7	**6**
7	West Valley Hwy (SR 181)	S 23600 Block	SR 516	24	1	15	17	5	10	**7**
8	104 Ave SE (SR 515)	SE 240 St	SE 256 St	27	7	9	7	15	13	**8**
9	E Smith St (SR 516)	Central Ave N	Hazel Ave N	13	29	13	30	35	19	**9**
10	84 Ave S	S 212 St	SR 167 SB	28	17	11	19	17	5	**10**
10	4 Ave N	W James St	W Harrison St	3	46	7	10	9	11	**10**
10	104 Ave SE (SR 515)	SE 224 St	SE 240 St	41	5	10	4	12	18	**10**
13	S 212 St	64 Ave S	SR 167 SB	36	3	18	24	23	12	**13**
13	Central Ave N	SR 167 SB	James St	35	8	14	15	14	15	**13**
15	W James St	64 Ave S	SR 181	2	36	22	9	3	14	**15**
16	116 Ave SE	SE 256 St	SR 516	12	34	17	12	8	9	**16**
17	104 Ave SE	SE 256 St	SE 260 St	5	48	16	8	7	8	**17**
18	84 Ave S	S 196 St	S 212 St	45	19	12	18	2	20	**18**
19	Central Ave S	E Willis St	S City Limit	56	15	6	3	16	17	**19**
20	108 Ave SE (SR 515)	SE 192 St	SE 208 St	50	10	19	21	21	16	**20**
21	E James St-S 240 St	Central Ave N	100 Ave SE	39	12	33	46	62	35	**21**
22	116 Ave SE	SE 240 St	SE 256 St	15	27	43	45	49	49	**22**
23	64 Ave S	S 228 St	W James St	17	35	36	34	11	54	**23**
24	N Lincoln Ave-W Smith St	W Meeker St	4 Ave N	9	44	41	58	69	56	**24**
25	S 272 St	SR 99	I-5 NB Ramps	26	22	51	51	52	41	**25**
26	SE Kent-Kangley Rd (SR 516)	116 Ave SE	132 Ave SE	64	9	31	28	25	21	**26**
26	4 Ave S	W Harrison St	Willis St	8	71	25	70	48	27	**26**
28	SE 240 St	108 Ave SE	132 Ave SE	48	31	26	16	34	23	**28**
29	Pacific Hwy S (SR 99)	S 252 St	S 272 St	57	2	47	37	46	37	**29**
30	SE 208 St	108 Ave SE	132 Ave SE	65	21	23	20	20	26	**30**
31	Pacific Hwy S (SR 99)	SR 516	S 252 St	60	6	44	33	41	44	**31**
31	Kent-Des Moines Rd (SR 516)	27 Ave S (CL)	SR 99	22	54	34	43	75	65	**31**
33	104 Ave SE	SE 260 St	SE 267 St	14	76	21	11	32	33	**33**
33	132 Ave SE	SE 256 St	SE 272 St	37	47	27	31	57	50	**33**
33	132 Ave SE	SE 272 St	SE 288 St	31	50	30	22	61	60	**33**
36	E Valley Hwy	S 180 St	S 196 St	52	40	20	13	19	24	**36**
37	S 260 St -259 Pl	SR 99	Military Rd S	20	37	57	65	65	63	**37**
38	108 Ave SE (SR 515)	SE 208 St	SE 224 St	70	24	24	22	24	22	**38**
38	SE 256 St	SR 516	132 Ave SE	43	43	32	36	51	29	**38**
40	SE 192 St	108 Ave SE	124 Ave SE	42	32	46	41	55	48	**40**
41	S Reith Rd	Military Rd S	SR 516	32	33	60	64	59	87	**41**
42	4 Ave N	S 228 St	W James St	23	55	49	65	54	34	**42**
43	116 Ave SE	SE 208 St	SE 240 St	55	18	55	56	62	67	**43**
44	West Valley Hwy (SR 181)	S 212 St	S 23600 Block	86	13	37	42	13	40	**44**
44	Military Rd S	S 250 St	S 272 St	46	51	39	35	73	73	**44**
46	S 228 St	6000 Block	SR 181	18	49	76	89	27	68	**46**
47	SE 208 St	100 Ave SE	108 Ave SE	47	45	52	57	68	51	**47**
48	132 Ave SE	SE 228 Pl	SE 244 St	63	42	40	39	67	61	**48**
49	W James St	Lakeside Blvd E	64 Ave S	6	56	86	71	56	66	**49**
50	SE 274 Way-116 Ave SE	111 Ave SE	SR 516	72	39	38	26	30	31	**50**
51	SE Kent-Kangley Rd (SR 516)	132 Ave SE	156 Pl SE	96	26	29	27	32	25	**51**
51	S 228 St	SR 181	84 Ave S	38	41	72	62	27	30	**51**
53	Willis St (SR 516)	4 Ave S	Central Ave S	10	69	73	98	97	47	**53**
54	West Valley Hwy (SR 181)	S 190 St	S 212 St	88	20	50	49	29	32	**54**
55	152 Ave SE	SR 516	SE 282 Pl	29	78	53	53	58	57	**55**
56	W Meeker St	SR 516	64 Ave S	58	68	35	38	36	39	**56**
56	64 Ave S	S 212 St	S 228 St	40	58	63	51	18	43	**56**
58	SE 240 St	132 Ave SE	140 Ave SE	44	63	56	40	47	36	**58**
59	Kent-Des Moines Rd (SR 516)	SR 99	30 Ave S	33	79	58	44	60	42	**59**
59	W Gowe St	W Meeker St	Central Ave S	16	83	71	96	105	86	**59**

	Table 9 - Prioritized List of Intersections					Risk Factor Rank			
Rank	Intersection Name	Int. Control Type	**Total Crash Rate RANK**	**Total Crash Severity RANK**	**Total Risk Score RANK**	PED Risk RANK	Fixed Object Risk RANK	Angle (T) Risk RANK	**Overall RANK**
1	116 Ave SE / Kent-Kangley Rd (SR 516)	Signal	16	1	2	2	2	2	**1**
2	Central Ave (SR 516) / E Meeker St	Signal	3	7	23	26	29	20	**2**
3	Central Ave N / E James St	Signal	36	9	3	3	3	3	**3**
4	64 Ave S / W James St	Signal	8	14	37	31	76	57	**4**
5	Pacific Hwy S (SR 99) / S 260 St	Signal	46	6	8	10	7	7	**5**
6	108 Ave SE (SR 515) / SE 200 St	Signal	41	3	17	15	20	17	**6**
7	Washington Ave (SR 181) / W Meeker St	Signal	39	10	13	13	12	12	**7**
7	Washington Ave S (SR 181) / Willis St (SR 516)	Signal	44	8	10	11	8	8	**7**
9	108 Ave SE (SR 515) / SE 208 St	Signal	29	30	6	7	4	4	**9**
9	Pacific Hwy S (SR 99) / S 272 St	Signal	40	24	1	1	1	1	**9**
11	Central Ave N (SR 516) / E Smith St	Signal	56	2	11	12	9	9	**11**
12	104 Ave SE (SR 515) / SE 256 St (SR 516)	Signal	48	11	12	8	14	14	**12**
12	132 Ave SE / Kent-Kangley Rd (SR 516)	Signal	53	13	5	5	5	5	**12**
14	Jason Ave N / E Smith St (SR 516)	Signal	32	15	28	35	30	25	**14**
15	132 Ave SE / SE 240 St	Signal	22	29	25	29	25	23	**15**
16	68 Ave S (SR 181) / S 212 St	Signal	69	4	4	4	6	6	**16**
17	116 Ave SE / SE 240 St	Signal	10	37	31	34	38	29	**17**
17	W Valley Hwy (SR 181) / W Morton-S 238 St	Stop	14	5	59	86	27	32	**17**
19	Pacific Hwy S (SR 99) / S 240 St	Signal	50	16	14	16	13	13	**19**
20	94 Ave S / Canyon Dr (SR 516)	Signal	35	28	26	30	26	27	**20**
20	108 Ave SE / SE 240 St	Signal	43	17	29	25	58	35	**20**
22	Central Ave S (SR 516)/ E Gowe St	Signal	17	36	39	46	41	40	**22**
22	104 Ave SE (SR 515) / SE 240 St	Signal	20	57	15	14	18	19	**22**
24	Washington Ave N (SR 181) / W James St	Signal	27	49	18	19	17	18	**24**
25	4 Ave N / W James St	Signal	21	53	21	20	22	24	**25**
26	68 Ave S (SR 181) / S 228 St	Signal	76	19	7	6	11	11	**26**
27	46 Ave S-Lk Fenwick Rd / Reith Rd	Stop	6	21	78	93	50	64	**27**
27	SR 167 SB Ramps / Willis St (SR 516)	Signal	23	33	49	57	43	42	**27**
29	84 Ave S / SR 167 SB Ramps	Signal	34	32	41	60	28	34	**29**
30	State Ave N / E Smith St (SR 516)	Signal	54	22	38	41	66	36	**30**
31	108 Ave SE (SR 515) / SE 192 St	Signal	71	18	35	42	37	38	**31**
32	84 Ave S / S 212 St	Signal	58	64	9	9	10	10	**32**
32	68 Ave S (SR 181) / S 196 St	Signal	85	27	19	17	19	21	**32**
34	Jason Ave N / E James St	Stop	26	31	85	81	85	93	**34**
35	102 Ave SE / SE 240 St	Signal	66	34	45	37	67	54	**35**
36	116 Ave SE / SE 256 St	Signal	11	68	73	71	72	70	**36**
37	S Star Lake Rd / S 272 St	Signal	4	63	89	85	107	85	**37**
38	64 Ave S / S 228 St	Signal	28	74	56	53	47	63	**38**
39	104 Ave SE (SR 515) / SE 248 St	Signal	42	77	40	33	73	61	**39**
39	Central Ave S / S 259 St	Signal	47	35	77	76	91	73	**39**
41	Military Rd S / S 268 St	Stop	15	45	103	92	109	115	**41**
42	100 Ave SE / SE 240 St	Signal	24	76	65	55	95	66	**42**
43	SR 167 NB Ramps / S 212 St	Signal	30	73	63	68	33	62	**43**
44	116 Ave SE / SE 192 St	Signal	33	46	96	83	121	96	**44**
45	Lincoln Ave N / W Meeker St	Stop	5	41	132	136	118	126	**45**
45	Central Ave S / S 266 St	Stop	64	38	76	78	63	77	**45**
47	94 Ave S / S 240 St	Signal	65	78	36	36	56	43	**47**
48	116 Ave SE / SE 208 St	Signal	63	26	91	107	71	69	**48**
48	SR 167 SB Ramps / S 212 St	Signal	88	23	69	79	42	68	**48**
50	Pacific Hwy S (SR 99) / S 252 St	Signal	72	85	24	23	24	30	**50**
51	84 Ave S / S 196 St	Signal	75	80	27	24	39	33	**51**
52	124 Ave SE / SE 192 St	Stop	9	42	136	140	126	135	**52**
53	84 Ave S / S 224 St	Signal	77	89	22	21	21	22	**53**
54	156 Ave SE / SE 272 St (SR 516)	Stop	89	20	81	94	53	67	**54**
55	116 Ave SE / SE 248 St	Stop	1	67	124	127	115	123	**55**
56	104 Ave SE / SE 260 St	Signal	25	84	84	67	112	94	**56**
57	W James St / Lincoln Ave	Stop	51	47	97	96	87	98	**57**
58	132 Ave SE / SE 256 St	Signal	38	79	79	70	97	83	**58**
59	4 Ave N / W Smith St	Signal	73	83	46	44	49	50	**59**
60	Central Ave N / S 228 St	Signal	82	39	83	74	90	101	**60**

7. Selection of Countermeasures

7.1 Comprehensive List of Countermeasures

Countermeasures were assembled from the American Association of State Highway and Transportation Official's (AASHTO) Highway Safety Manual (HSM). Where Crash Modification Factors (CMF) were not available in the HSM, the CFM Clearinghouse was used along with the FHWA Desktop Reference for Crash Reduction Factors (CRF). FHWA's Proven Safety Countermeasures were also prioritized

7.2 Evaluation and Screening of Countermeasures

Countermeasures were evaluated for each major crash type. Table 10 summarizes this evaluation, including any CMF, CRF, and discussions on counter-measure effectiveness and feasibility.

7.3 Pedestrian Crashes

Although most serious pedestrian crashes occurred midblock, intersection crashes should still be addressed. Potentially feasible countermeasures are listed below, those that are <u>underlined</u> may need more study, analysis, or other consideration:

- Median refuge islands
- Rectangular Rapid-Flashing Beacons (RRFB)
- Pedestrian Hybrid Beacons (PHB) or pedestrian traffic signals
- Bulb-outs or curb extensions
- Raised crosswalks
- Sidewalks or shoulder walkways
- Countdown pedestrian signal heads
- Leading pedestrian interval
- Convert permissive left-turn to flashing yellow arrows with protected left-turn phases
- <u>High visibility marked crosswalks</u>
- <u>Area-wide traffic calming</u>
- <u>Exclusive pedestrian signal phase</u>
- <u>Provide street lighting at arterial intersections if not installed</u>
- <u>Modify posted speed limit</u>

Some countermeasures may be combined to create a more complete or viable project.

7.4 Fixed Object Crashes

Potentially feasible countermeasures for fixed object crashes are listed below, those that are underlined may need more study, analysis, or other consideration:

- Horizontal curve warning signs
- Removal or relocation of fixed objects
- Guardrail or other traffic barrier
- Changeable speed warning signs
- Modify posted speed limit
- Provide continuous street lighting on arterial roadways
- High-friction surface treatment

Horizontal curves should be evaluated with ball-bank analysis to ensure advisory speeds and signing are consistent throughout the City to improve driver expectancy and safety outcomes. 72% of fixed object crashes occurred on roadways with curb and gutter. Current countermeasures only apply to rural roadways without curb and gutter, more research is needed.

7.5 Right-Angle Crashes

As could be expected, all fatal and serious injury right-angle crashes occurred at intersections or driveways. Potentially feasible countermeasures are listed below, those that are underlined may need more study, analysis, or other consideration:

- Convert stop- and signal-controlled intersections to roundabouts
- Convert permissive left-turn to flashing yellow arrow (FYA)
- Road diets (4 lanes to 3, 5 to 3, 4 to 2, etc.)
- Retro-reflective signal backplates
- Adding supplemental signal heads
- Signal coordination
- Change intersection control where warranted (uncontrolled to two-way stop control or two-way stop to all-way stop control)
- Access control/access modifications
- Remove unwarranted signals
- Corridor Access Management

7.6 All Crash Types

Speed is usually the leading factor in determining crash severity. The following countermeasures should be considered due to their impact on vehicle speed, as such they have application when addressing all three of the primary crash types:

- Convert intersections to roundabouts from minor stop-control, all-way stop control, or signal control.
- Modify the posted speed limit along with changes to the physical street design.
- Road Diets and other lane reductions, typically 4-lanes to 3-lanes, but can be 4 lanes to 2 lanes, or 5 lanes to 3 lanes, etc. This should be done wherever feasible, typically when vehicle capacity is not needed.
- Provide supplemental signal heads to improve signal visibility and compliance, where applicable.
- Reduce lane widths to help reduce speeds. For example, the ITE Traffic Engineering Handbook (7^{th} Edition) recommends 10 feet as the default lane width for general purpose lanes on urban streets at speeds of 45 mph or less.
- Remove unwarranted traffic signals that do not meet MUTCD warrants.
- Change intersection control where MUTCD guidelines are met to address some crash types where signals or roundabouts are not warranted or are not feasible.

Table 10 - Selection of Countermeasures

Countermeasure	Applicable Crash Type: Hit Pedestrian	Applicable Crash Type: Hit Fixed Object	Applicable Crash Type: Angle (T)	Crash Modification Factor (CMF)	Effectiveness	Evaluation	Likely Feasible?
Install high-visibility crosswalk	X			0.60 (ped) 0.81 (all others)	May provide false sense of security if done alone at high volume locations.	Must meet COK crosswalk policy. Best combined with refuge islands, flashers, or signals. $	Yes
Median Refuge Island	X			0.54 (ped) with marked crosswalk	56% reduction in pedestrian crashes	Evaluate and rank locations, follow COK crosswalk policy. Combine with flashers or signals, cost-effective. $-$$	Yes
Rectangular Rapid-Flashing Beacon (RRFB)	X			0.53-0.64	Drastically improves motorist yielding rate to pedestrians	Application limited by current policy to 35 mph or below. $$	Yes
Pedestrian Hybrid Beacon (PHB)	X			0.71-0.85 (all) 0.31-0.45 (ped)	69% reduction in pedestrian crashes, 29% reduction total, 15% reduction in serious and fatal injury	Not as well known as a pedestrian signal, same costs as full signal. $$$	Yes
Pedestrian Signal	X			None	50-55% reduction in pedestrian crashes	High compliance rate, easily recognized signal indications. $$$	Yes
Install pedestrian overpass or underpass	X			None	Removes pedestrian conflict if used, 67-100% reduction. 13% reduction at unsignalized locations.	Very high-cost, security concerns, and pedestrians don't always use them. $$$$	No
Install No Pedestrian Crossing signs	X			None	Reduce pedestrian-vehicle conflicts	Feasible, but ineffective without enforcement. Poor messaging and reduces connectivity. $	No
Install bulb-outs or curb extensions	X		s	None	Reduces crossing distance and exposure for pedestrians. Narrowing roadway has calming effect on motorists.	Low-to-moderate cost depending on contruction type and application. Reduces pedestrian exposure. $-$$	Yes
Install raised crosswalks	X			0.64-0.70 (all) 0.55 (ped)	Makes pedestrians morevisible, slows vehicles, calming effect.	May not be appropriate for arterials or some intersections. $$	Yes
Install sidewalks or pedestrian walkways	X			None	Sidewalks show 65-89%, paved shoulder 71% reduction in pedestrian crashes walking along roadway	Prioritize missing links. Curbed shoulder walkways an option. Addresses pedestrian crash types. $$-$$$	Yes
Apply area-wide traffic calming to urban local roads	X			0.82-0.89 injury 0.94-0.95 PDO	Effective even when surrounding collector roads are untreated.	Should be combined with area wide speed zone, potentially high-cost alternative. $$-$$$	Maybe
Install pedestrian countdown signal heads	X			0.91	Reduce pedestrian-vehicle conflicts, 25% reduction in all crashes	Option for roughly half of signals, may require ADA alterations. $$-$$$	Yes
Leading pedestrian interval	X			0.41-0.91	Reduce pedestrian-vehicle conflicts. 5% pedestrian crash reduction	Feasible, little capital cost unless cycle lengths are impacted. $-$$	Yes
Install automated pedestrian detectors	X			None	Reduce pedestrian-vehicle conflicts	High equipment failure rates make this unattractive. $$	No
Exclusive pedestrian timing	X			0.49 (ped.) 1.10 (all other)	Reduces pedestrian crashes for intersections with high pedestrian volume. 34% reduction in pedestrian crashes	May be feasible at small intersections with veh. capacity and high ped. volumes. May increase other crash types.	Maybe
Convert permissive to permissive/protected flashing yellow arrow (FYA) left-turn phasing	X		X	0.59-0.94	16% reduction in lef-turn crashes	Feasible with flashing yellow arrow conversions. $-$$	Yes
Provide a Raised Median	X		X	0.54 (ped.) 0.78 (injury) 1.09 (non-injury)	46% reduction in pedestrian crashes. Decrease in injury crashes and increase in non-injury crashes.	Addresses some crash types, may increase fixed object crashes. Install selectively, may be high-cost.	Maybe
Convert 12' lanes to 10' lanes	s	s	s	0.58-0.73 (2014 study)	HSM 13-4 rural only. 2014 2-4 lane divided.	Makes speeding uncomfortable, may not be appropriate in industrial or manufacturing areas. $-$$	Yes
Provide Lighting	X	X	s	0.72 - 0.83	0.72 for nighttime injuries, 0.83 for nighttime PDOs. 42-87% reduction in pedestrian crashes at intersections	Feasible, where not already installed. Must meet City policy. Costs vary by infrastructure type. $-$$$	Yes
Modify posted speed limit	X	X	s	Varies, equation	May be ineffective without other measures unless matching 85th percentile on rural sections.	Combine with other measures of calming or Downtown area speed zone where pedestrian volumes are highest. $-$$$	Maybe
Install School Zone Warning Signs (and flashers)	X	s	s	0.80 - 0.85 for signs only	20% reduction in all crash types with signs only	Add school speed zones with flashers to maximize effectiveness, especially collectors and above. $	Yes

Table 10 - Selection of Countermeasures

Countermeasure	Applicable Crash Type: Hit Pedestrian	Hit Fixed Object	Angle (T)	Crash Modification Factor (CMF)	Effectiveness	Evaluation	Likely Feasible?
Widen paved shoulders	s	X		0.25-1.65	Effectiveness varies widely, more applicable to rural 2-lane roads	High-cost alternative. $$-$$$	No
High-friction surface treatment		X		0.14-0.76	52% reduction in wet road crashes, 24% reduction in curve crashes. Biggest improvement in wet conditions.	Applicable to curves with multiple crashes or other factors, more analysis required. $$-$$$	Maybe
Install curve warning signs		X		0.41-0.72, none in HSM	10-64% reduction for all types, 25% reduction in nighttime crashes.	Increases awareness and delineation of curves. Applicable system-wide, meet MUTCD requirements. Low-cost $	Yes
Install edgelines		X		0.97 for rural roads	59-66% reduction in fixed object crashes, 4-50% reduction for all types.	Feasible, low-cost option. Oxidated concrete curb matches pavement color. Added maintenance cost, more info needed. $-$$	Yes
Install guardrail or other traffic barrier.		X		0.92	7-47% reduction at embankment, 63% outside curves, 51-65% shielding trees, 14-100% shielding rocks and posts.	Feasible in prioritized locations. $$	Yes
Install changeable speed warning signs		X		0.54-0.59	All crash types	Low-cost alternative, applicable in select locations. $-$$	Yes
Modify corner radius		X		Equation	effective	High-cost alternative. $$$	No
Install curbs		X	X	0.89	effective on multi-lane arterials	Few multi-lane arterials without curbs. $$$	No
Improve superelevation		X	X	HSM 13-28	Rural 2-lane only	High-cost alternative. $$$	No
Road Diet	s	s	X	0.71 (0.53-0.81)	Applicable to 4-lane undivided urban arterials, reduces conflicts, provides bike facilities. 19-47% total crash reduction.	Several locations where through capacity not needed, supports bike plan. Can be combined with overlays. $-$$	Yes
Reduce number of lanes from 4 lanes to 2 lanes with turn lanes	s	s	X	0.81-0.95	Reduces speeding/passing by removing excess lanes where capacity isn't needed. Similar to other road diets.	Depends on location type and capacity needs. Consider 5-lane to 3-lane conversions, similar to road diets. $-$$	Yes
Install retro-reflective signal backplates			X	0.85	15% reduction in total crashes, 13-50% reduction by adding backplates only	Low-cost alternative if wind load capacity exists, applicable system-wide. $	Yes
Convert minor stop-control to all-way stop-control			X	0.25 right-angle 0.57 pedestrian 0.30 all types	47-71% reduction for all types, 72-84% right-angle reduction. Highly effective where MUTCD warrants are met.	Warrants and capacity analysis required, low-cost option. $	Yes
Remove unwarranted signals	s	s	X	0.71-0.82 one-way one-lane urban streets	24% right-angle reduction, 53% Fatal/Injury reduction, 24-100% reduction in all crash types. Reduces rear-end crashes 29-100%, pedestrian by 17%.	More study needed, evaluate signal warrants. Consider ped crossings. $-$$	Maybe
Provide Supplemental Signal Heads	s	s	X	0.69-0.83 All, 0.72 Rear-end, 0.54-0.65 Angle	Reduces All crashes 28%, all SIFI 17%, Rear-end 41%, Right-angle 63-74%. One per lane or adding one to pole on large arterials	Low-cost alternative, applicable system-wide. $-$$	Yes
Provide or improve signal coordination			X	None	7-16% reduction in all crashes, 32% reduction in right-angle crashes	Labor intensive, but relatively low-cost option. $-$$	Yes
Reduce access point density		s	X	0.69-0.75	Reducing the number of driveways up to 50% has significant benefit	Not typically feasible due to ROW constraints, high-cost alternative. $$$	No
Corridor Access Management		s	X	None	25-31% reduction in injury and fatal crashes on arterials	Possible on many arterials with TWLTL's, may be expensive to provide u-turns. $$-$$$	Maybe
Convert to Roundabout	s	s	X	0.31-0.64	78-82% reduction in severe crashes, 36% reduction for all crashes	Highly effective in reducing fatal and serious injury crashes, provides calming effect. Consider low-cost mini's or compacts. $$-$$$	Yes

X = Primary benefit to this crash type
s = Secondary benefit to this crash type

8. Project Development and Prioritization

8.1 Decision Process for Countermeasure Selection

Viable countermeasures were selected for both systemic and spot location projects by consulting the Countermeasure Evaluation in Table 10 of this plan and the FHWA list of Proven Safety Countermeasures found on the FHWA website. Those countermeasures with the best crash reduction factors (CRF) and FHWA approval were prioritized.

8.2 Preliminary Project Development

With these countermeasures in mind the top intersections and roadway segments were analyzed based on the presence of serious or fatal injury crashes, total severity rankings, and risk factor rankings. Then countermeasures were selected that could address the crash history or risk factors of each segment or intersection. At this early stage, small projects were kept separate and not yet combined into citywide or systemic projects.

8.3 Preliminary Benefit-Cost Analysis (BCA)

Projects were evaluated for both systemic and spot locations by finding a benefit/cost ratio (BCR) using opinions of project cost and comprehensive societal crash costs. Five years of observed crashes were used to estimate the safety performance of the future base condition.

Similarly, the BCA analysis uses a five-year analysis period rather than the typical 10 to 20-year analysis timeframe that captures a lifecycle (including replacement). As a result, the calculated BCR may be conservative. Comprehensive crash costs (2020 U.S. $) were provided by WSDOT Local Programs staff from the WSDOT Traffic Office. The WSDOT values are modified from NHTSA and FHWA values, per the WSDOT Safety Analysis Guide (April 2020), and were used to generate societal crash costs for each location.

8.4 Development of Priority Projects

Top ranking projects in the preliminary evaluation were further refined with a more detailed scope or were combined to form systemic or citywide projects. Scoping-level estimates were developed for these projects and similar projects with the same countermeasures. A final BCR project ranking was developed based on the scoping-level estimates and five-year societal costs.

In the end, 3 priority spot location projects serving vulnerable road users were selected with the highest BCR, clearest scope, and best fit with City planning documents like the Transportation Master Plan. These top priority projects are listed in Table 11 and mapped in Figure 1.

The remaining projects shown in Table 12 are considered important safety projects that require further development. Some of these projects have a higher apparent BCR ratio than those on the top priority list, but need further development regarding scope, budget, planning, analysis, or coordination with WSDOT. Future project development and analysis of these and other projects could warrant elevation to the priority list. The attached spreadsheets in Appendix D details how project priority was calculated using benefit/cost ratios.

8.5 Equity Considerations

Serving disadvantaged populations with the City's transportation investments is important to the City because we value all Kent residents. Although it was not an explicit project selection metric, all of the priority projects directly serve areas with higher percentages of at least one disadvantaged population. Namely minorities, those experiencing poverty, or with limited English proficiency. Figures 2 to 4 illustrate the Spot project locations with regard to these disadvantaged populations.

Table 11 - Top Priority Project Ranking by Benefit-Cost Ratio (BCR)							Project Type			
BCR Rank Proj. #	**Project Name**	**Location(s)**	**Description**	**Scoping Cost Estimate**	**5-year Societal Benefit**	**Benefit /Cost Ratio**	**Systemic**	**Spot**	**PED**	**Bike**
1	Arterial Pedestrian Crossing - PHB	Pacific Hwy S (SR 99) - 24400 block	Install Midblock Pedestrian Hybrid Beacon	$1,051,000	$3,974,575	3.8		X	X	
2	Arterial Pedestrian Crossing - PHB	SE 272 St (SR 516) 14900 block, Lk Meridian Park	Install Midblock Pedestrian Hybrid Beacon	$1,202,000	$2,013,440	1.7		X	X	
3	Arterial Pedestrian Crossing - PHB	Canyon Dr (SR 516) near S 252 St	Install Midblock Pedestrian Hybrid Beacon	$1,777,000	$1,961,135	1.1		X	X	

Table 12 - Projects Needing Further Development - Ranking by Benefit-Cost Ratio (BCR)

BCR Rank Proj. #	Project Name	Location(s)	Description	Planning Cost Opinion	Scoping Cost Estimate	5-year Societal Benefit	Benefit /Cost Ratio	Project Type: Systemic	Spot	PED	Bike	SRTS
4	Systemic Curb Extension - Right-Turns	Meeker St, 108 Ave SE (SR 515) / SE 200 St, 108 Ave SE (SR 515) / SE 208 St, Pacific Hwy S (SR 99) / S 260 St, 84 Ave S / SR 167 SB Ramps	Extend curb return radius and create a sharper turn for passenger vehicles with channelization and bolt-down speed bumps.	$200,000		$10,931,474	**54.7**	X		X		
5	Curb Extension - Right-turn, Paint, Bumps	Washington Ave (SR 181) / W Meeker St	Install curb extension in SW quadrant for EBRT	$50,000		$2,386,742	**47.7**		X	X		
6	Systemic Signal Improvements	5 Locations: Jason Ave / Smith St (SR 516), Central Ave (516) / E Meeker St, 68 Ave S (SR 181) / S 208 St, 116 Ave SE / SE 208 St, Pacific Hwy S (SR 99) / S 260 St	Left-turn pockets, left-turn phasing, Signal Heads, FYA, and Reflective backplates	$300,000		$13,827,500	**46.1**	X		X		
7	FYA Conversion & Left-turn Channelization	Central Ave (SR 516) / E Meeker St	Add EB & WB LT lanes, FYA, Reflective Backplates	$100,000		$4,428,350	**44.3**		X	X		
8	Curb Extension - Right-turn, Paint, Bumps	108 Ave SE (SR 515) / SE 200 St	Install curb extension in SW quadrant for EBRT	$50,000		$2,209,968	**44.2**		X	X		
9	Curb Extension - Right-turn, Paint, Bumps	108 Ave SE (SR 515) / SE 208 St	Install curb extension in SE quadrant for NBRT	$50,000		$2,151,620	**43.0**		X	X		
10	Curb Extension - Right-turn, Paint, Bumps	Pacific Hwy S (SR 99) / S 260 St	Install curb extension in NE quadrant for WBRT	$50,000		$2,125,157	**42.5**		X	X		
11	Access Control	156 Ave SE / SE 272 St (SR 516)	Raised Median Access Control LIRIRO	$50,000		$2,122,508	**42.5**		X			
12	Curb Extension - Right-turn, Paint, Bumps	84 Ave S / SR 167 SB Ramps	Install curb extension in NW quadrant for SBRT	$50,000		$2,057,988	**41.2**		X	X		
13	Signal Improvements	Pacific Hwy S (SR 99) / S 260 St	WBRT Signal Head & FYA w/Ped Omit, reflective	$50,000		$1,996,740	**39.9**		X			
14	Signal Improvements	Pacific Hwy S (SR 99) / S 272 St	Reflective Backplates and Supplemental Heads	$30,000		$1,159,095	**38.6**		X			
15	Convert TWSC to AWSC	Lakeside Blvd E / S 236 St	Convert to All-Way Stop	$20,000		$726,831	**36.3**		X			X
16	Systemic Access Control	5 Locations: 156 Ave SE / SE 272 St (SR 516), 104 Ave SE (SR 515) / SE 244 St, 108 Ave SE (SR 515) / SE 204 St, 68 Ave S (SR 181) / S 220 St, Central Ave S / S 266 St	Install median curbing to restrict minor street left-turn and through movements.	$200,000		$6,367,524	**31.8**	X				
17	FYA Conversion	68 Ave S (SR 181) / S 208 St	Convert EB & WB Permitted Phasing to FYA	$50,000		$1,184,496	**23.7**		X			
18	Access Control	104 Ave SE (SR 515) / SE 244 St	Install median curb to restrict minor street left-turn and through movements.	$50,000		$1,061,254	**21.2**		X			
19	Access Control	108 Ave SE (SR 515) / SE 204 St	Install median curb to restrict minor street left-turn and through movements.	$50,000		$1,061,254	**21.2**		X			
20	Access Control	68 Ave S (SR 181) / S 220 St	Install median curb to restrict minor street left-turn and through movements.	$50,000		$1,061,254	**21.2**		X			
21	Access Control	Central Ave S / S 266 St	Install median curb to restrict minor street left-turn and through movements.	$50,000		$1,061,254	**21.2**		X			
22	Signal Improvements - SR 99	5 Locations: S 240 St, S 252 St, 25400 Block, S 260 St, S 272 St	Install reflective backplates on all heads, add supplemental primary signal heads	$280,000	$280,000	$5,527,935	**19.7**	X				
23	Signal Improvements - SR 516	13 Locations: E Meeker St, E Gowe St, Jason Ave, 94 Ave S, 101 Pl SE, SE 256 St, 108 Ave SE, 111 Ave SE, 116 Ave SE, 124 Ave SE, 132 Ave SE, 144 Ave SE, 152 Ave SE	Install reflective backplates on all heads, add supplemental primary signal heads	$660,000	$660,000	$12,820,545	**19.4**	X				
24	Signal Improvements - SR 515	SE 208 St, SE 216 St, SE 222 Pl, SE 240 St, SE	supplemental primary signal heads	$452,000	$452,000	$8,020,980	**17.7**	X				
25	Citywide Arterial Lighting	200 Locations with no lighting and crashes in hours of darkness.	Install arterial lighting where missing from arterials with crash history in hours of darkness.	$10,000,000		$173,083,904	**17.3**	X				
26	Signal Improvements - SR 181	9 Locations: S 190 St, S 196 St, S 199 Pl, S 204 St, S 208 St, S 212 St, S 228 St, W James St, W Meeker St	Install reflective backplates on all heads, add supplemental primary signal heads	$452,000	$452,000	$7,574,775	**16.8**	X				
27	Signal Improvements	Washington Ave (SR 181) / W Meeker St	Reflective Backplates and Supplemental Heads	$100,000		$1,647,435	**16.5**		X			
28	Arterial Intersection Lighting - Pedestrian	2 Intersections: 108 Ave SE (SR 515) / S 212 St, 84 Ave S / SR 167 SB Ramps	Add Pedestrian lighting to intersections with no/low lighting and fatal/serious pedestrian crash history.	$100,000		$1,537,536	**15.4**	X		X		
29	Access Control	SE 256 St (SR 516) - 101 to 104 Ave SE	Install median curb to restrict minor street left-turn and through movements.	$75,000		$1,061,254	**14.2**		X			
30	Arterial Segment Lighting - Pedestrian	7 midblock locations with no lighting: 26300 116 Ave SE, 20200 124 Ave SE, 22800 132 Ave SE, 4600 Reith Rd, 8500 S 190 St, 2000 S 272 St, 900 W James St	Add Roadway and/or Pedestrian lighting to midblock locations with no lighting and fatal/serious pedestrian crash history in hours of darkness.	$700,000		$9,585,520	**13.7**	X		X		
31	Convert Signal to Roundabout	64 Ave S / S 240 St	Convert signal to compact roundabout with separated bike lanes	$500,000	$1,975,000	$5,340,504	**10.7**		X			
32	Road Diet - E Valley Hwy	E Valley Hwy (S 180 to 196 St)	Road diet (5 to 3) plus separated bike lanes	$500,000		$5,157,075	**10.3**		X		X	
33	FYA Conversion	116 Ave SE / SE 208 St	Convert NB & SB LT to FYA	$50,000		$482,339	**9.6**		X			
34	Arterial Segment Lighting	12 Locations with No Lighting and fatal/serious	Add roadway lighting to arterial segments with no	$1,200,000		$11,502,624	**9.6**	X				
35	Centerline or Median Treatment	SE 204 Way N/o 132 Ave SE	Centerline Rumble Strip or Widen for raised median	$238,000	$238,000	$2,190,976	**9.2**		X			
36	Access Control	SE 272 St (SR 516) - 152 Ave SE to 15600 block	Raised Median Access Control LIRIRO	$250,000		$2,122,508	**8.5**		X			
37	Raised Median in Corner	Central Ave N/o Woodford Ave	Raised median in curve	$250,000		$2,122,508	**8.5**		X			
38	FYA Conversion	Jason Ave / E Smith St (SR 516)	NB & SB Left-turn pockets with FYA.	$400,000		$3,359,868	**8.4**		X			
39	Intersection Improvement	68 Ave S (SR 181) / S 212 St	Roundabout or Alternative Intersection Design	$1,000,000		$8,010,756	**8.0**		X			
40	Access Control - Raised Median	S 212 St (Riverview Blvd to Russell Rd)	Raised Median w/U-turn opportunities at each end.	$400,000	$252,000	$3,183,762	**8.0**		X			
41	Citywide Arterial Intersection Lighting - Pedestrian	60 Intersections with Pedestrian crashes in hours of darkness and existing lighting.	Evaluate pedestrian light levels at 60 intersection with pedestrian crashes in the dark. Update current standards as needed, and increase light levels where needed.	$3,000,000		$23,637,726	**7.9**	X		X		
42	Citywide Arterial Segment Lighting - Pedestrian	150 locations with Pedestrian crashes in hours of darkness.	Evaluate light levels at pedestrian crash locations for lighting improvements or add new pedestrian lighting to 150 locations with pedestrian crashes in hours of darkness.	$7,500,000		$57,557,444	**7.7**	X		X		
43	Signal Improvements	Washington Ave S (SR 181) / Willis St (SR 516)	Advanced Warning Beacon, reflective backplates, supplemental heads	$250,000		$1,908,960	**7.6**		X			
44	Access Control	Benson Rd (SR 515) - SE 224 St to 22600 block	Install raised median w/Left- and U-turn pockets(?).	$300,000	$226,000	$2,122,508	**7.1**		X			
45	Median Barrier	W Valley Hwy (SR 181) Curves S/o S 181 St	Median Barrier	$1,000,000		$6,641,396	**6.6**		X			
46	Median Barrier	Orillia Rd NW/o S 212 St	Median Barrier	$500,000		$3,320,698	**6.6**		X			
47	Signal Improvements - S 212 St	10 Locations: 42 Ave S, Riverview Blvd, 64 Ave S, 66 Ave S, 68 Ave S, 72 Ave S, IU Trail, 76 Ave S, 77 Ave S, 84 Ave S	Install reflective backplates on all heads, add supplemental primary heads	$500,000	$500,000	$2,604,660	**5.2**	X				
48	Arterial Pedestrian Crossing - PHB	108 Ave S (SR 515) / SE 212 St	Install Midblock PHB	$800,000	$808,000	$4,105,145	**5.1**		X	X		
49	Access Control	E Valley Hwy (S 180 St to 18400 block)	Raised Median Access Control LIRIRO	$226,000	$226,000	$1,061,254	**4.7**		X			
50	Arterial Pedestrian Crossing - RRFB or Ped Signal	Railroad Ave N / W Smith St	Install RRFB or Pedestrian Signal with median refuge	$808,000	$808,000	$3,765,740	**4.7**		X	X		
51	Access Control	Kent Kangley Rd (SR 516) - 116 Ave to 128 Pl	Raised Median Access Control LIRIRO	$1,200,000	$1,200,000	$5,306,270	**4.4**		X			
52	Convert TWSC to Roundabout	Central Ave S / S 266 St (264-26700 block)	Compact Multi-lane Roundabout with Access Control	$2,000,000		$8,421,564	**4.2**		X			
53	Convert TWSC to Roundabout	124 Ave SE / SE 201 Pl and SE 202 Pl	2 Mini-Roundabouts at SE 201 Pl and 202 Pl, shoulder walkway, and streetlights.	$2,000,000		$8,421,564	**4.2**		X			
54	FYA Conversion	102 Ave SE / SE 240 St	Convert WBLT to FYA	$500,000		$1,934,278	**3.9**		X			
55	Intersection Improvement	68 Ave S (SR 181) / S 228 St	Roundabout or Alternative Intersection Design	$1,500,000	$7,200,000	$5,340,504	**3.6**		X			
56	Access Control	68 Ave S (SR 181) from S 212 to 228 St	Install raised median w/Left- and U-turn opportunities.	$1,300,000	$1,300,000	$4,245,016	**3.3**		X			
57	Convert TWSC to Roundabout	156 Ave SE / SE 272 St (SR 516)	Multi-Lane Roundabout	$2,000,000		$5,614,376	**2.8**		X			
58	Convert TWSC to Roundabout	Central Ave S / S 266 St	Compact Multi-lane Roundabout	$1,500,000		$2,807,188	**1.9**		X			
59	Convert Signal to Roundabout	116 Ave SE / SE 192 St	Single-Lanes Roundabout	$1,500,000		$2,670,252	**1.8**		X			X
60	Convert Signal to Roundabout	132 Ave SE / SE 240 St	Multi-lane Roundabout	$1,500,000		$2,670,252	**1.8**		X			
61	Meet Me on Meeker Improvements	W Meeker St (USPS Dwy to Thompson Ave)	MMOM Improvements: Road Diet (5 to 3), multi-use path, sidewalk, median, and on-street parking	$4,000,000		$6,986,785	**1.7**		X	X	X	
62	Intersection Improvement	68 Ave S (SR 181) / S 196 St	Alternative Intersection Design or Roundabout	$500,000		$753,148	**1.5**		X			
63	Convert Signal to Roundabout	116 Ave SE / SE 208 St	Multi-lane Roundabout	$2,000,000	$6,100,000	$2,670,252	**1.3**		X			
64	Convert Signal to Roundabout	Central Ave S / S 228 St	Multi-lane Roundabout	$2,000,000		$2,670,252	**1.3**		X			
65	Convert Signal to Roundabout	SR 167 SB Ramps / S 212 St	Convert signal to multi-lane roundabout	$2,000,000	$6,100,000	$2,670,252	**1.3**		X			
66	Convert Signal to Roundabout	104 Ave SE / S 260 St	Convert signal to compact roundabout with separated bike lanes	$1,000,000		$933,828	**0.9**		X			
67	Convert Signal to Roundabout	84 Ave S / SR 167 SB Ramps	Multi-lane Roundabout	$3,000,000	$6,100,000	$2,670,252	**0.9**		X			
68	Arterial Pedestrian Crossing - RRFB	20 Pl S / S 272 St	Install RRFB with median refuge, Widen S 272 St	$2,000,000		$1,608,998	**0.8**		X	X		
69	Convert AWSC to Roundabout	116 Ave SE / SE 248 St	Single-Lane Roundabout	$3,000,000	$3,000,000	$2,099,484	**0.7**		X			
70	Convert TWSC to Roundabout	108 Ave SE / SE 274 St EB Ramp	Compact Roundabout	$850,000		$550,014	**0.6**		X			
71	Convert TWSC to Roundabout	Lakeside Blvd E / S 236 St	Compact Roundabout	$1,000,000		$619,034	**0.6**		X			
72	Convert Signal to Roundabout	116 Ave SE / SE 240 St	Multi-lane Roundabout	$2,000,000		$1,032,137	**0.5**		X			
73	Left-turn Pockets and FYA phasing	94 Ave S / S 240 St	Add NB & SB LT Pockets and FYA phasing	$1,500,000		$617,098	**0.4**		X			X
74	Convert TWSC to Roundabout	104 Ave SE / S 264 St	Compact or Mini-Roundabout	$1,000,000		$359,194	**0.4**		X			
75	Convert TWSC to Roundabout	64 Ave SE / SE 236 St	Compact Roundabout and 64 Ave S Road Diet	$800,000		$91,118	**0.1**		X			X
76	Arterial Pedestrian Crossing - PHB	108 Ave SE (SR 515) / 22000 block	Install Midblock PHB	$800,000	$808,000	$78,265	**0.1**		X	X		
77	Commercial Area Speed Zone - Central Ave	S 228 St to Willis St	25-30 mph speed zones in areas with Commercial Land-use, add median islands at transitions to narrow the	$750,000	$216,000	$0	**0.0**	X				
78	Commercial Area Speed Zones - SR 515	2 Segments: SE 204 to 211 St and SE 236 to SE 244 or 256 St	25-30 mph speed zones in areas with Commercial Land-use, add median islands at transitions to narrow the	$800,000	$432,000	$0	**0.0**	X				
79	Access Control	102 Pl SE / SE 208 St	Install curb on centerline to restrict to RIRO only	$30,000	$100,000	$0	**0.0**		X			
80	Access Control	104 Ave SE (SR 515) / SE 228 St	Install raised median w/Left- and U-turn opportunities.	$111,000	$111,000	$0	**0.0**		X			
81	Access Control	116 Ave SE (516 to 264p)	Raised Median Access Control LIRIRO	$250,000	$222,000	$0	**0.0**		X			
82	Arterial Pedestrian Crossing - RRFB	E Smith St (SR 516) - State to Jason Ave	Install Midblock RRFB with refuge islands	$238,000	$238,000	$0	**0.0**		X	X		
83	Arterial Pedestrian Crossing - RRFB	13500 block SE 256 St	Install Midblock RRFB	$238,000	$238,000	$0	**0.0**		X	X		
84	Centerline Hardening - Unsig	84 Ave S / S 200 St	Install Bolt-Down Speed Bumps on S 200 St centerline to protect crosswalk	$10,000		$0	**0.0**		X			
85	Commercial Area Speed Zones - SR 516	3 Segments: 101 Ave to 108 Ave SE, 128 Pl to 133 Pl SE, and 150 Pl SE to 15600 block	use, add median islands at transitions to narrow the road.	$800,000	$324,000	$0	**0.0**	X				
86	Convert Signal to Roundabout	Washington Ave N (SR 181) / W James St	Multi-lane Roundabout	$2,500,000		$0	**0.0**		X			
87	Convert Signal to Roundabout	Military Rd S / Reith Rd	Single-Lane Roundabout	$2,000,000		$0	**0.0**		X			
88	Convert Signal to Roundabout	84 Ave S / SR 167 NB Ramps	Multi-lane Roundabout	$4,000,000		$0	**0.0**		X			
89	Intersection Improvement	Pacific Hwy S (SR 99) / S 252 St	RCUT, Roundabout, or Alternative Intersection Design	$500,000		$0	**0.0**		X			
90	Intersection Improvement	84 Ave S / S 212 St	Michigan UT, Roundabout, or Alternative Intersection	$2,000,000		$0	**0.0**		X			
91	Intersection Improvements	102 Ave SE / SE 240 St	Remove WBRT lane w/curb extension.	$75,000		$0	**0.0**		X			
92	Protected Intersection	4 Ave N / W James St	Protected intersection w/in existing curb line	$100,000	$100,000	$0	**0.0**		X	X	X	
93	Protected Intersection, LPI, Ped Omit FYA	4 Ave N / W Smith St	Protected intersection (partial), LPI, FYA w/Ped Omit	$100,000	$100,000	$0	**0.0**		X	X	X	
94	Protected Intersection, MMOM	Washington Ave (SR 181) / W Meeker St	Protected Intersection (partial), MMOM	$250,000	$100,000	$0	**0.0**		X	X	X	
95	T-intersection Channelization, Raised Median	84 Ave S / S 200 St	T-intersection Channelization, Raised Median	$200,000		$0	**0.0**		X			
96	Widen S 272 St to 5-lanes	S 272 St (SR 99 to 26 Ave S)	Widen S 272 St to 5-lanes plus separated bike	$10,000,000		$0	**0.0**		X			

9. Recent Progress in Transportation Safety

9.1 Progress Update since the 2022 Local Road Safety Plan

The following is an update on the City's progress on safety programs and projects since the 2022 Local Road Safety Plan as of the writing of this report in January 2024.

1. A total of 13 of the 28 spot location projects listed in the 2020 plan and 8 of the 15 top priority projects in the 2022 plan have been funded by various entities and are in various stages of project delivery.

2. One project is substantially complete; the Russell Rd Sidewalk project from the 2020 LRSP, funded by WSDOT's Pedestrian & Bike program (Ped/Bike).

3. One project is under construction; the Mini-Roundabout at 108 Ave SE & SE 264 St from the 2020 LRSP, funded by HSIP.

4. Seven (7) projects awarded by HSIP, WSDOT Ped/Bike, Safe Routes to School (SRTS), or the Transportation Improvement Board (TIB), have nearly or fully completed design and are planned to begin construction in 2024.

    a. Reith Rd Roundabouts and Road Diet (3 LRSP projects, TIB)
        i. Compact Roundabout at S 253 St
        ii. Compact Roundabout at Lake Fenwick Rd
        iii. Road Diet - 4 to 2-lanes plus separated bike lanes
    b. 4th Ave Road Diet - 4/5-lanes to 3-lanes plus bike lanes, from S 228 St to James St (HSIP)
    c. Meeker-Lincoln-Smith Road Diet – 4/5-lanes to 2/3-lanes plus bike lanes from Washington Ave to 4th Ave S (HSIP)
    d. S 260 St-S 259 Pl Road Diet – 2 wide lanes to 3 plus bike lanes from SR 99 to Military Rd S (HSIP)
    e. School Speed Zone Flashers – 7 Elementary Schools (SRTS)

5. Eight (8) projects have been awarded by HSIP, WSDOT Ped/Bike, TIB, or the Sandy Williams Connecting Communities Program (SWCCP). These are planned to begin design in 2024.
    a. 20600 block 108 Ave SE (SR 515) - PHB Crossing (Ped/Bike)
    b. 23800 block 104 Ave SE (SR 515) - RRFB Crossing (HSIP)
    c. 24400 block 104 Ave SE (SR 515) - RRFB Crossing (HSIP)

d. 25000 block Pacific Hwy S (SR 99) - PHB Crossing (Ped/Bike)
e. 4th Ave Road Diets – Phase 2 & 3 (2 projects from HSIP)
f. Canyon Dr (SR 516) / Weiland St Access Control (HSIP)
g. Willis St (SR 516) Road Diet, 4-lanes to 3 plus bike (SWCCP)

6. Several RRFB and PHB installations included in the list of 2020 Systemic Projects and the 2022 Projects Needing Further Development have been funded by grants or will be installed as part of large transit projects like King County Metro's I-Line.

7. A prioritization list for all signalized intersections was developed to prioritize the installation of leading pedestrian intervals (LPI) at most signalized intersections in the City, according to industry best practices. As of this writing, 10 more signals have had LPI installed since the 2022 LRSP, bringing the total to over 48 signalized intersections operating with LPI. Multiple intersections are in the process of LPI installations and ADA upgrades.

8. A Radar Speed Sign project is partially implemented that will regularly rotate a limited number of radar speed signs between multiple locations throughout the City. Signs have been installed at 7 locations with 6 more in development.

9.2 Ongoing Development of Potential Safety Projects and Programs

The following countermeasures, projects, or ongoing programs should be considered and warrant further investigation. Bullets with progress updates are included where appropriate.

1. Signal timing analysis should be conducted periodically following intersection turning movement counts conducted during the interim. Setup a traffic count program if needed, and/or setup automatic counting stations throughout the City at major intersections.
   - Traffic Counts were collected in 2023 for this purpose, a plan has been developed to conduct traffic counts on a 3-year cycle to regularly update signal timing plans.
   - Signal timing plan revisions are in process for 2024.

2. Systematically install retro-reflective backplates on all existing signal heads. All new heads should be installed with these back plates to reduce sun glare and improve signal visibility at night, especially during power outages.

- Installing reflective backplates has been added as a regular task during signal head maintenance and replacement activities.
- Top-ranked intersections in the LRSP have been prioritized and the installation of reflective backplates and supplemental signal heads has been planned.

3. A project is needed to conduct ball-bank studies on all roadways over 1,000 ADT in order to identify the appropriate advisory speed and horizontal curve warning signs needed as described in this Safety Plan. This project should also provide funding for implementation of the recommended improvements for all locations.
   - City staff completed the citywide ball-bank study in 2023, including the analysis to determine the appropriate advisory speed and signage required. These signing modifications are planned for implementation in 2024 and 2025 as part of existing budgets.

4. Convert 4-lane undivided (4U) roadways to 3-lane sections with two-way left-turn lanes (3T) plus buffered bike lanes; prioritize roadways that are identified bicycle routes.
   - Four of the 15 segments in Kent have LRSP-identified projects that have been funded for conversion.
   - Most of the remaining locations have been identified in the LRSP as Projects Needing Further Development, either for conversion or other improvements that don't reduce the number of through travel lanes.

5. Reduce lane widths wherever possible, with overlays, road diets, and other projects. Use 10 or 10.5-foot lanes as the new default lane width, per ITE, and develop a standard Best Practice. Industrial streets with high truck percentages may need wider lanes in some cases.
   - Added to the list of potential future updates to the Kent Design and Construction Standards (KDCS).

6. Create a project to evaluate and prioritize locations in need of guardrail.

7. Systematically analyze and prioritize all potential midblock pedestrian crossing locations in the City for the various forms of enhancement as outlined in the City's Crosswalk Policy.

8. A capital project can be identified to install countdown pedestrian heads and implement triggered ADA requirements as part of the City's ADA Transition Plan.
   - ADA pushbutton upgrades are being completed along with LPI installations.

9. Create a program to systematically analyze and prioritize all potential street lighting installations supported by the City's streetlight policy. Review this policy to assure it matches current best practices.

10. Convert permitted left-turn signal phasing to flashing yellow arrow. Consider omitting the conflicting flashing yellow arrow display when conflicting pedestrian phases are served, more analysis is needed.

11. Reduce the number of travel lanes wherever possible and not needed for capacity; repurpose the roadway space for bike lanes, transit, or on-street parking. Reduce pedestrian crossing distances and exposure whenever possible by installing curb bulb-outs or extensions and considering raised crosswalks whenever possible.

12. Consider a reduced speed zone in the downtown core which has the highest concentration of pedestrian activity. Consider a 25-mph speed limit for arterial streets and 20 mph speed limit for all other streets in this area. Make roadway design changes so these speed limits are self-enforcing.

13. A capital project or annual program can be identified to install sidewalks and shoulder walkways along with triggered ADA requirements as part of the City's ADA Transition Plan.

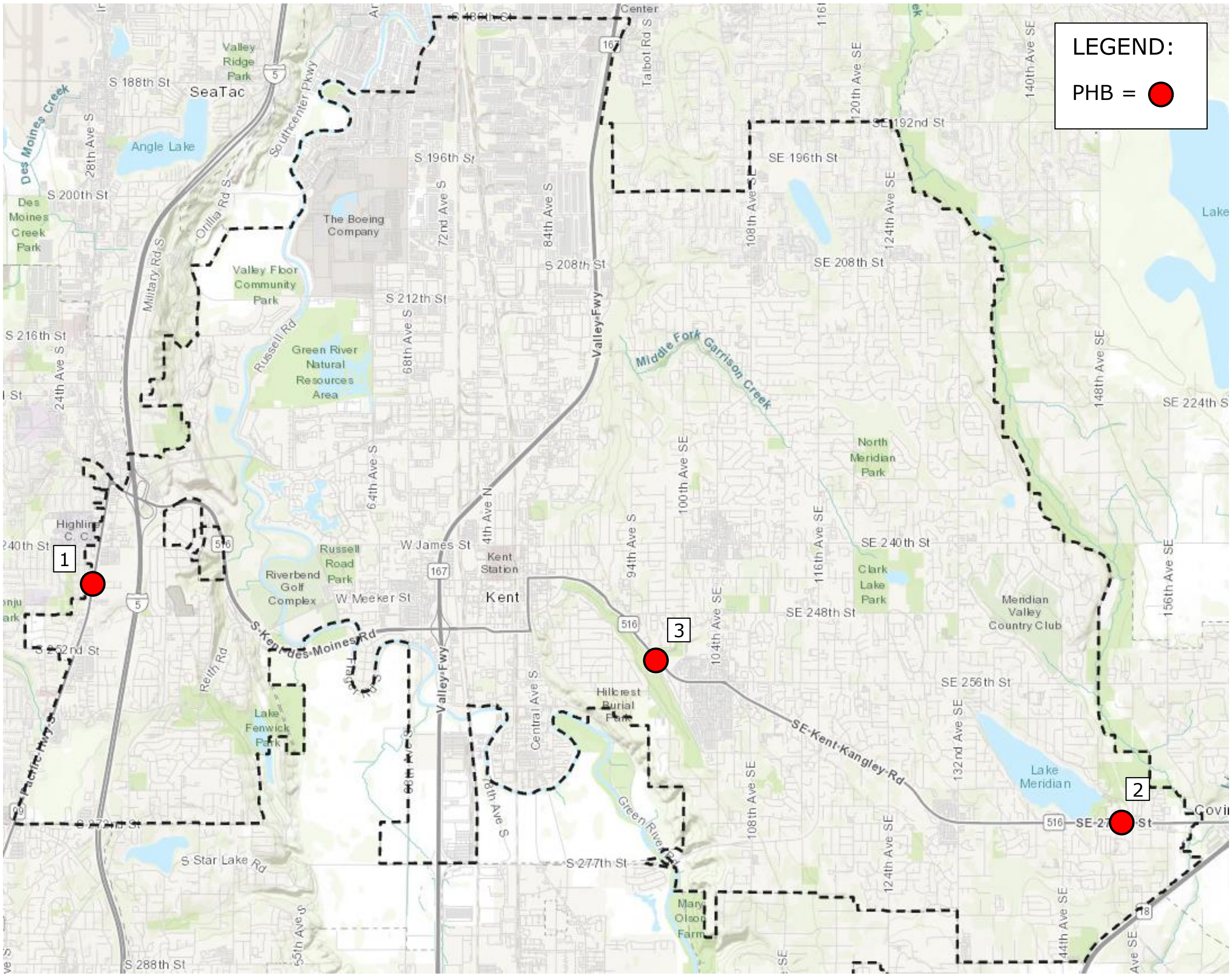
14. Review current light levels and other performance standards for streetlighting in the KDCS, especially with regard to pedestrian activity levels. Review current industry standards and best practices for both roadway and bicycle & pedestrian and update the KDCS as needed.

15. Consider using video analytics technology for traffic conflict screening at high-ranking intersections in the LRSP to better understand contributing factors to crashes.

10. Conclusions

Over 60-percent of the fatal and serious injury crashes in Kent involve hit pedestrians, right-angle, and fixed object crashes. FHWA's Systemic Safety Project Selection Tool processes were used to identify risk factors, identify and screen potential countermeasures, and identify potential projects. Periodic review of the crash data and research of potential countermeasures should assist in delivering the most cost-effective safety measures to reduce the risk of fatal and serious injury crashes. Future study should look at the next most common crash types, including those involving Vulnerable Road Users such as Hit Cyclist and Motorcycle crashes.

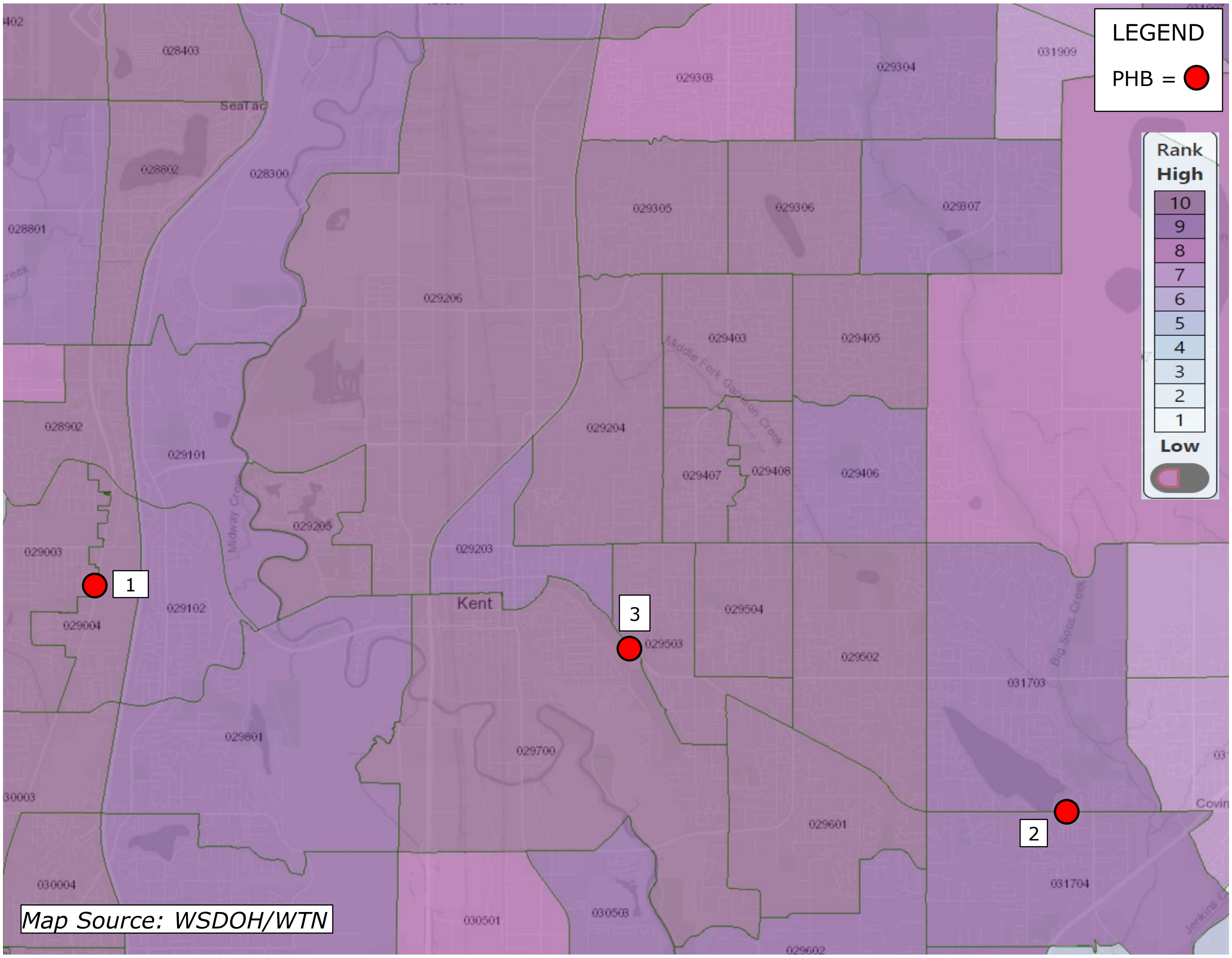
Figure 1: Spot Location Project Map



Spot Location Projects:

1. PHB - Pacific Hwy S (SR 99) near 24400 block
2. PHB - SE 272 St (SR 516) near 14900 block
3. PHB - Canyon Dr (SR 516) near S 252 St

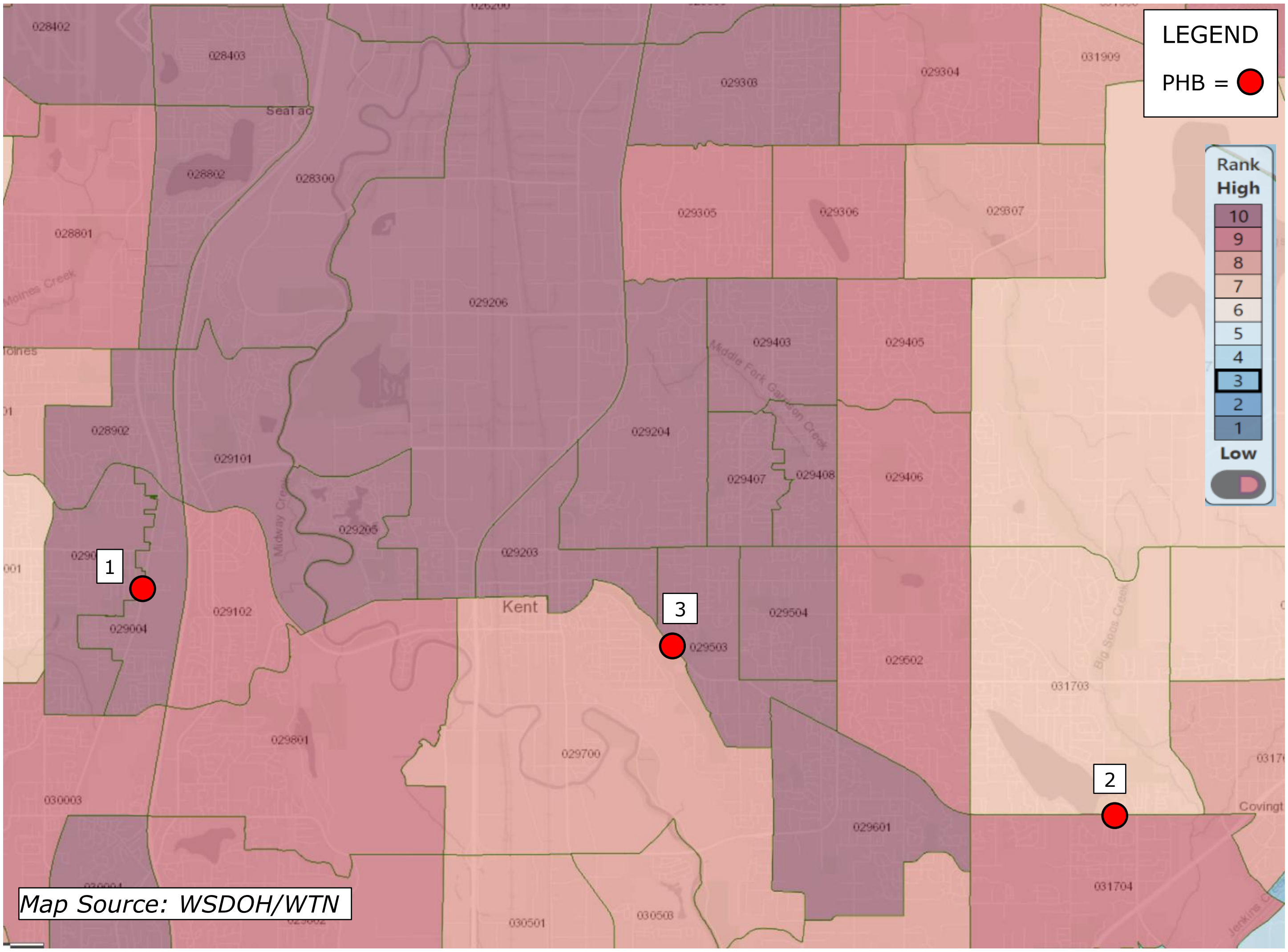
Figure 2: Spot Location Projects and Limited English Proficiency Populations



Spot Location Projects:

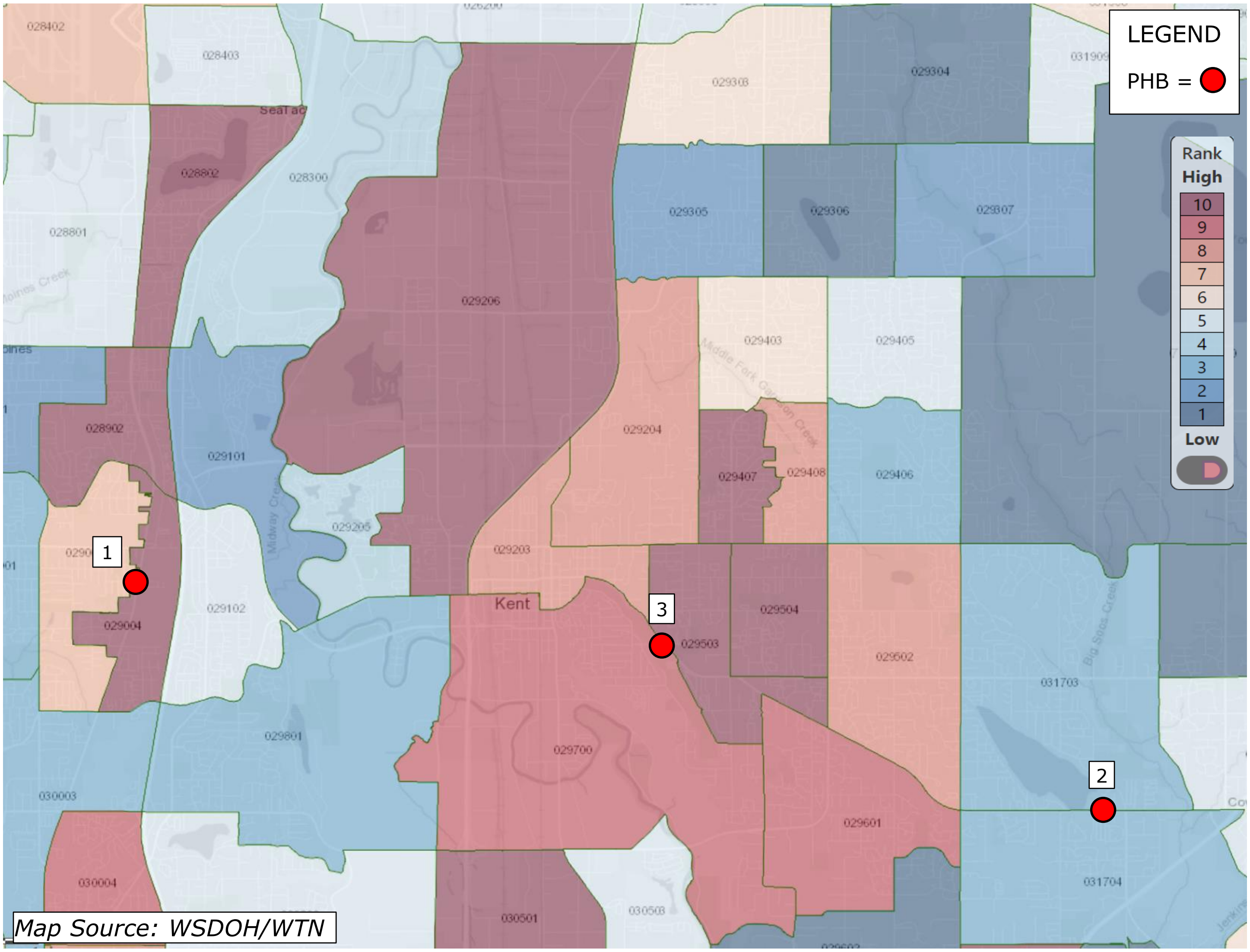
1. PHB - Pacific Hwy S (SR 99) near 24400 block
2. PHB - SE 272 St (SR 516) near 14900 block
3. PHB - Canyon Dr (SR 516) near S 252 St

Figure 3: Spot Location Projects and Minority Populations



Spot Location Projects:
1. PHB - Pacific Hwy S (SR 99) near 24400 block
2. PHB - SE 272 St (SR 516) near 14900 block
3. PHB - Canyon Dr (SR 516) near S 252 St

Figure 4: Spot Location Projects and Populations Experiencing Poverty



Spot Location Projects:

1. PHB - Pacific Hwy S (SR 99) near 24400 block
2. PHB - SE 272 St (SR 516) near 14900 block
3. PHB - Canyon Dr (SR 516) near S 252 St