APPENDIX 6

Bicycle and Pedestrian Analysis Memorandum

MEMORANDUM

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FROM:	Brad Coy, P.E., PTOE, DOWL Sarah Patterson, P.E., PTOE, RSP1, DOWL
DATE:	September 4, 2019
SUBJECT:	Midtown Congestion Relief PEL Study – Pedestrian and Bicycle Analysis

This memo highlights the pedestrian and bicycle analysis performed for the Midtown Congestion Relief (MCR) Planning and Environmental Linkages (PEL) study area, which includes the Seward Highway from 20th Avenue to Tudor Road, as well as the area within approximately one mile on either side of the highway. A key element of the study's vision is to increase multimodal (walking and bicycling) connections along and across the Seward Highway corridor. The refined concepts were developed to improve safety and comfort for pedestrians and bicyclists.

The sections of this memorandum summarize the pedestrian and bicycle facilities and volumes, needs, related motor vehicle crashes, proposed facilities and benefits, comparison between concepts, and summary.

1.0 PEDESTRIAN AND BICYCLE FACILITIES AND VOLUMES

The Seward Highway has trails that run alongside portions of the study corridor, as shown in Figure 1. However, there are significant north-south gaps, particularly between Tudor Road and 36th Avenue. Lake Otis Parkway also has trails that run alongside portions of the roadway, and the paved trail paralleling the east side of A Street and connecting to the trails on both sides of C Street south of 36th Avenue provides a continuous north-south multiuse trail through the study area that connects to Downtown Anchorage.

Several east-west paths are provided across the Seward Highway, two of which are grade-separated regional trails. The Lanie Fleischer Chester Creek Trail is located near 20th Avenue and crosses under the Seward Highway, and the Campbell Creek Trail is located south of Tudor Road and also crosses under the highway near International Airport Road. Benson Blvd and Tudor Road both have paved multiuse trails along the north and south sides of the roadway, while 36th Avenue has a paved trail along the north side.

Pedestrian and bicycle crossing volumes are also shown in Figure 1 and were collected in conjunction with motor vehicle counts in October 2017. The crossing volumes cover the 12-hour period from 7 a.m. to 7 p.m., and the figure shows the sum of the pedestrian and bicycle crossings at all intersection legs. Given the cooler weather and reduced daylight hours in October, it is expected that pedestrian and bicycle volumes would be higher during the summer months. The intersections with the highest pedestrian and bicycle activity (i.e., total number of pedestrian and bicycle crossings at intersection crosswalks) are located along Northern Lights Blvd and Benson Blvd between C Street and the Seward Highway. These intersections had between 300 and 450 pedestrian and bicycle crossings during the 12-hour count period (averaging 25 to 38 crossings per hour).

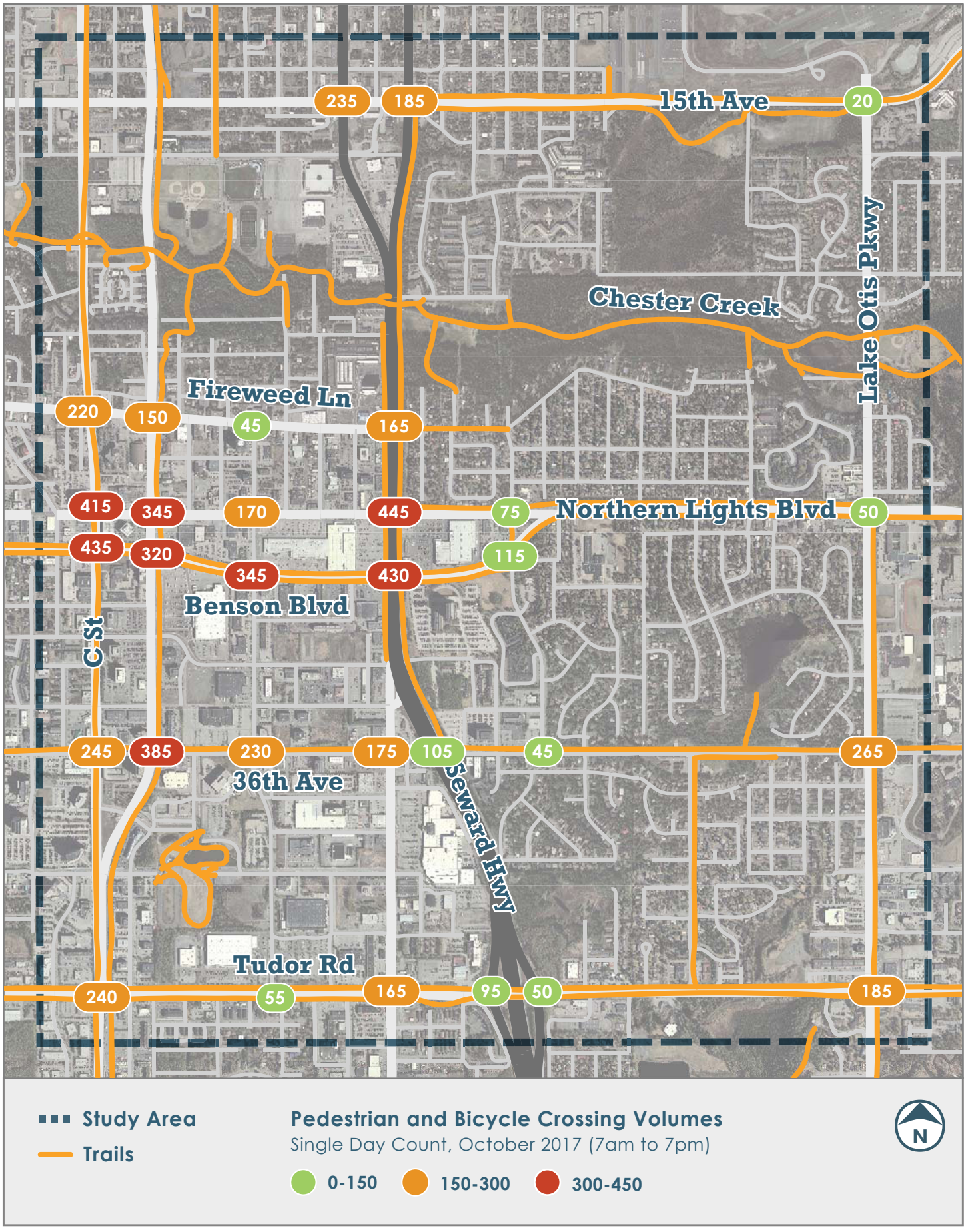

Figure 1: Pedestrian and Bicycle Crossing Volumes

2.0 PEDESTRIAN AND BICYCLE NEEDS

The Seward Highway corridor between Tudor Road and 20th Avenue divides the predominantly residential areas to the east and the commercial areas to the west. Along the corridor, pedestrians and bicyclists primarily cross the Seward Highway at signalized intersections, but these intersections have long cycle lengths (160 seconds), wide roadways (crossings of 6-9 lanes on each leg), and heavy traffic volumes (approximately 50,000 average daily traffic [ADT]). In addition, multiuse pathways are not continuous along the Seward Highway and have significant gaps between 36th Avenue and Tudor Road.

Overall, the large intersections, lack of continuous and separated pathways, and high traffic volumes all combine to make the Seward Highway corridor unappealing for many pedestrians and bicyclists. Improving the crossings and pathways along the corridor will support citywide efforts to improve safety and connectivity for all users.

3.0 PEDESTRIAN AND BICYCLE SAFETY ANALYSIS

Ten years of crash data (2005-2014) were reviewed to identify the location of fatal and major injury crashes in the study area. Figure 2 shows the locations of the pedestrian and bicycle crashes resulting in a fatality or major injury. Sixteen pedestrian crashes and 11 bicycle crashes resulted in a severe or major injury. In addition, five pedestrian fatalities and one bicycle fatality occurred in the study area.

Many of the severe and fatal pedestrian and bicycle crashes occurred on or near Benson Blvd and Northern Lights Blvd; this is likely attributed to the higher pedestrian and bicycle activity on these streets. The fatal crashes occurred on C Street, Gambell Street, and the Seward Highway northbound off-ramp at Tudor Road; these roadways all have posted speeds of 45 mph.

The Seward Highway concepts seek to improve pedestrian and bicycle safety by providing continuous pedestrian facilities along the highway, reducing the number of long challenging pedestrian crossings, and reducing the north-south traffic volumes and speeds at the crossings by adding a grade-separated mainline highway.

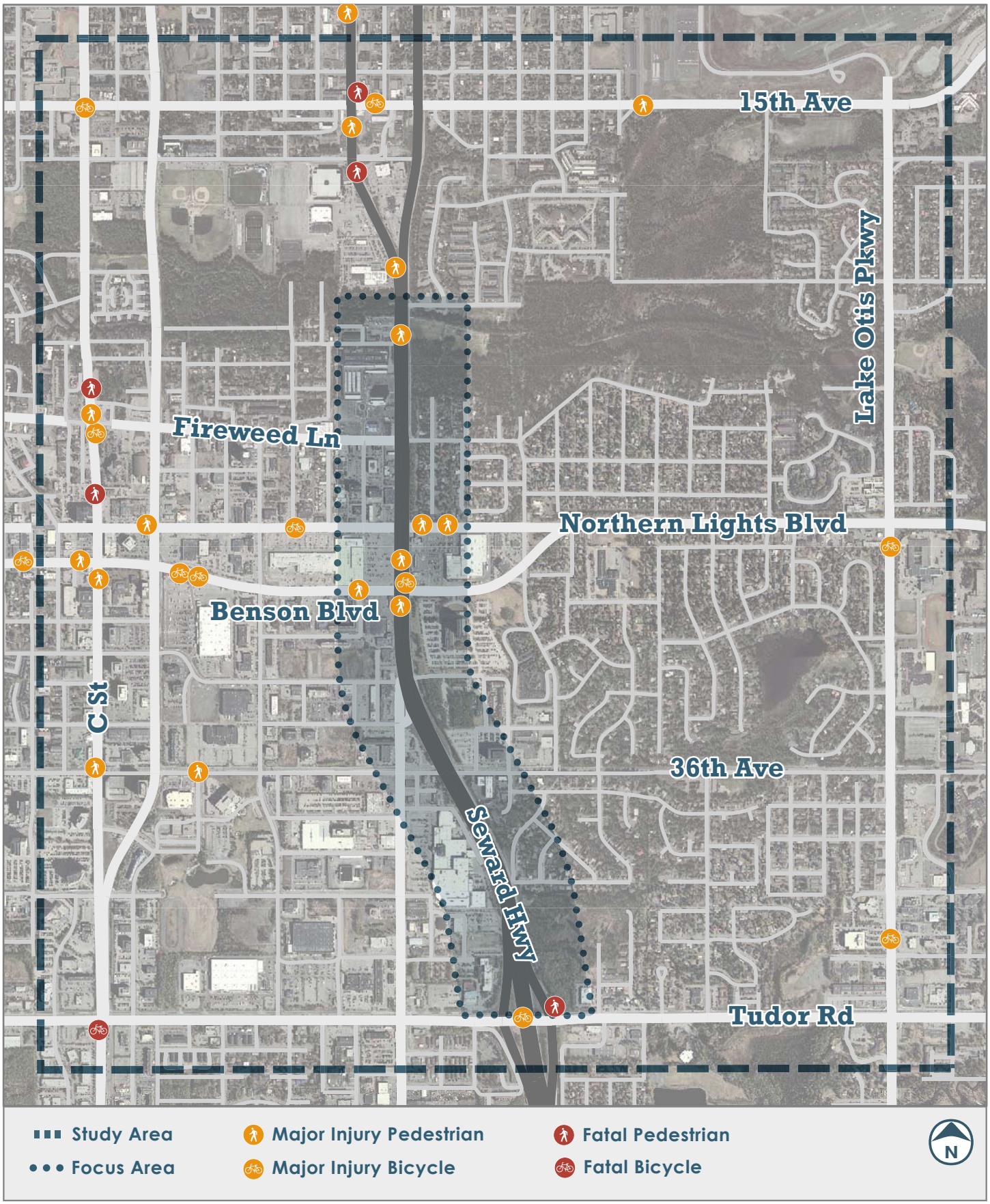

Figure 2: Fatal and Major Injury Pedestrian and Bicycle Crashes (2005-2014)

4.0 PROPOSED BICYCLE AND PEDESTRIAN FACILITIES AND BENEFITS

Through the concept development process, a total of ten concepts (in addition to the No-Build Concept) were evaluated for the Seward Highway corridor. Three one-way frontage concepts were advanced to refined analysis as the full-build concepts (additional details of the refined concepts and related traffic analysis are provided in the MCR PEL Traffic Study):

- Multi-Interchange Concept Variant 1 with Median U-Turn (V1 MUT)
- Multi-Interchange Concept Variant 2 with Loop Ramp (V2 LR)
- Collector-Distributor Concept (C-D)

All three of the refined concepts include similar pedestrian and bicycle facility improvements, which are shown in Figure 3. These improvements include multiuse facilities along the outside of the one-way frontage roads for the full length of the study corridor. This adds 1.6 miles of new multiuse path to the pedestrian and bicycle network between Tudor Road and 36th Avenue and creates a continuous north-south multiuse path along this section of the Seward Highway corridor.

The crossings of the Seward Highway Corridor at the major east-west intersecting streets will continue to be at signalized intersections, but these crossings will have the following benefits due to the combination of the grade-separated mainline and the separation of northbound and southbound traffic with the one-way frontage system:

- Single direction of traffic at a time (one-way traffic instead of two-way traffic)
- Fewer lanes (2 to 4 lanes instead of 7 to 9 lanes)
- Lower traffic volumes (14,000 to 32,000 ADT for each frontage road instead of 55,000 ADT for the existing geometry; this is even with the additional traffic volumes the build condition brings to the corridor and away from other roadways throughout the region, which will open up additional opportunities for more pedestrian and bicycle facilities on other roads rather due to reduced capacity needs for motor vehicles)
- Potential for shorter cycle lengths (e.g., 80-second half cycles instead of 160-second full cycles)

The segment between the two frontage roads will also be relatively short and flat, unlike a typical interchange where the cross street goes either over or under the mainline and has long sloped sections on either side. When all these considerations are combined together, the experience will be that pedestrians and bicyclists will cross a one-way frontage road at a traffic signal (between 2 to 4 lanes depending on cross street and refined concept), travel over/under the grade-separated mainline highway without any traffic conflicts or grade changes (due to the mainline being either elevated or depressed), and then cross a second one-way frontage road at a traffic signal (between 2 to 4 lanes depending on cross street and refined concept). This will provide significant increases in pedestrian and bicycle comfort and safety.

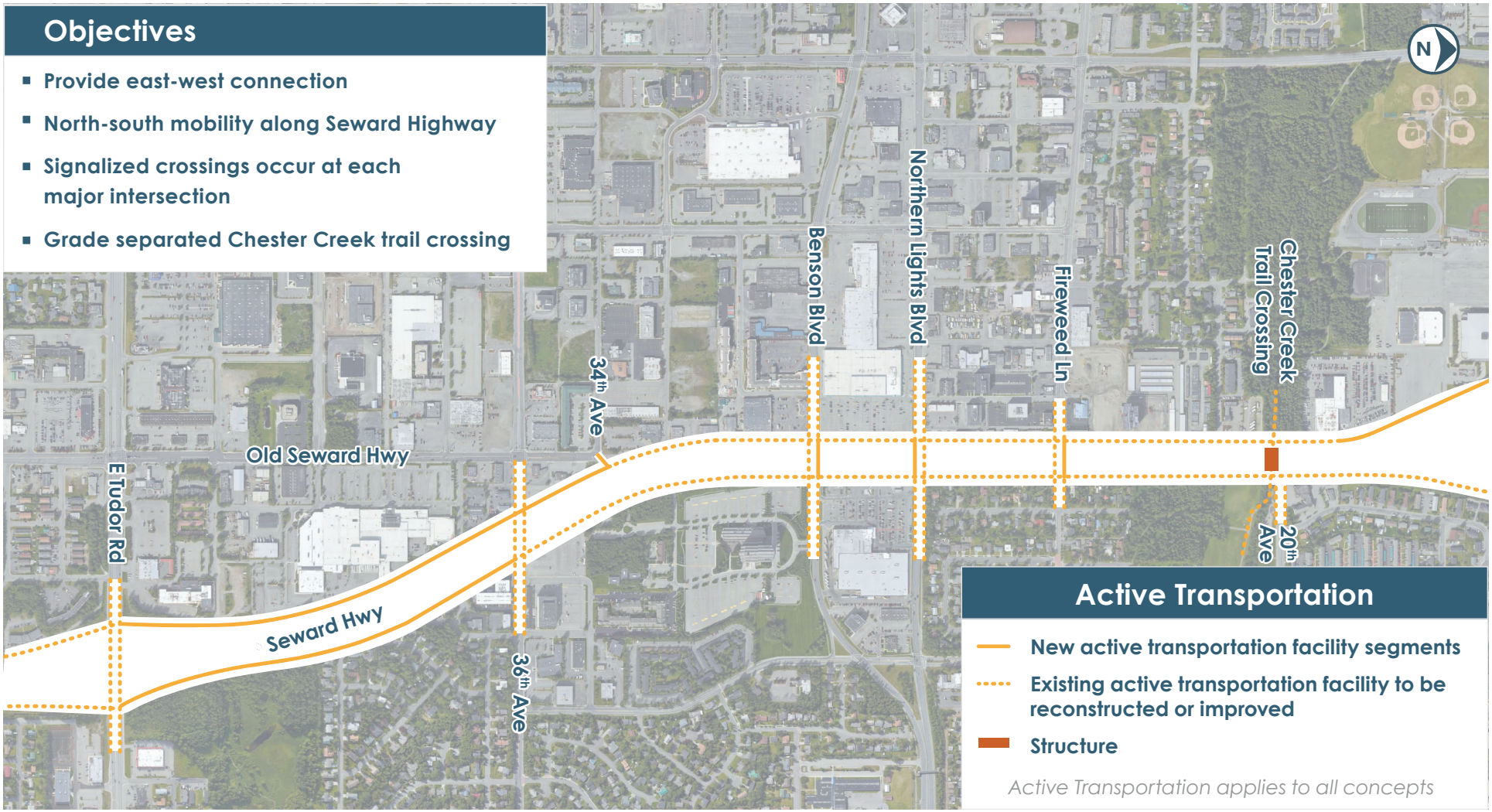

Figure 3: Pedestrian and Bicycle Facilities for Seward Highway Concepts

In addition to the improved signalized crossings, the Chester Creek Trail will continue to be a grade-separated crossing under the highway near 20th Avenue and opportunities may be available for an improved design. An additional grade-separated pedestrian and bicycle crossing of the Seward Highway at 33rd Avenue will also be examined in further detail if determined feasible as part of the design process. While it would connect into planned pedestrian and bicycle facilities along 32nd and 33rd Avenues west of the Seward Highway, this grade-separated crossing would lack direct connections on the east side of the Seward Highway. Instead, pedestrian and bicycle traffic would need to travel north to Benson Blvd or south to 36th Avenue, which suggests that focusing on connections to these crossings on the west side of the Seward Highway may end up being preferable.

5.0 COMPARISON BETWEEN CONCEPTS

While all three refined concepts provide the benefits to pedestrians and bicyclists discussed previously, the degree of the benefits differs between the concepts. The primary reasons for the differences are the amount of traffic and the number of vehicle lanes at the frontage road crossings. These differences arise due to the concepts' number and location of on/off ramps between the Seward Highway and the frontage roads.

Table 1 provides a comparison of frontage road characteristics between the three refined concepts. Because the V1 (MUT) and V2 (LR) Concepts maximize on/off ramps between the Seward Highway and the frontage roads, they result in lower volumes and fewer travel lanes on the frontages than the C-D Concept. The V2 (LR) Concept has the lowest frontage road volumes due to the centrally located braided ramps that allow traffic to/from 36th Avenue to access the mainline without traveling through the Fireweed Lane, Northern Lights Blvd, Benson Blvd intersections.

Table 1: Comparison of Frontage Road Characteristics Affecting Pedestrian and Bicycle Crossings

Concept	Frontage Roads		Primary Contributing Factors[a]
	Through Lanes	*Approx. ADT*	
V1 (MUT)	2-3	22,000 to 25,000	Most on-ramps (6 on, 5 off), with braided ramps located south of 36th Ave
V2 (LR)	2-3	14,000 to 19,000	Most off-ramps (4 on, 6 off), with braided ramps centrally located between 36th Ave and Benson Blvd
C-D	3-4	29,000 to 32,000	Fewest ramps (3 on, 3 off)

[a] Ramp numbers include the Tudor Road interchange ramps on the south, the frontage road connection points on the north, and all ramps in-between as counted at mainline connection points.

While the lower frontage road ADTs for the V2 (LR) Concept do not result in fewer through lanes on the frontage roads, they do allow the concept to have fewer turn lanes and narrower cross streets. The shorter the crossing distance, the shorter time duration pedestrians and bicyclists are exposed to vehicles. Shorter crossings are also easier for disabled pedestrians and senior citizens. In cases where there are more vehicle lanes to cross, a collision is more likely to occur while one or more vehicles yield to the pedestrian or bicycle and block the view of the pedestrians or bicycle for drivers in other lanes. Therefore, fewer lanes to cross enhances pedestrian and bicycle safety and comfort.

Figure 4 compares the pedestrian and bicycle crossing distances for the refined concepts when accounting for turn lanes. This figure includes both cross street legs as well as the frontage road legs of the corridor intersections. As shown in the figure, the No-Build Concept has 14 locations where a pedestrian would be required to cross six or more lanes, with two of the locations (i.e., at 36th Avenue) having nine lanes to cross. Each of the refined concepts has fewer intersections with crossing distances of six or more lanes (but never more than seven lanes). The V1 (MUT), V2 (LR) and C-D Concepts have four, five, and six locations, respectively, where a pedestrian or bicycle must cross six or more lanes. Additional differentiation arises between the concepts when five-lane crossings are considered. The V1 (MUT) and C-D Concepts have seven locations where a pedestrian or bicycle must cross five lanes, while the V2 (LR) Concept only has four locations.

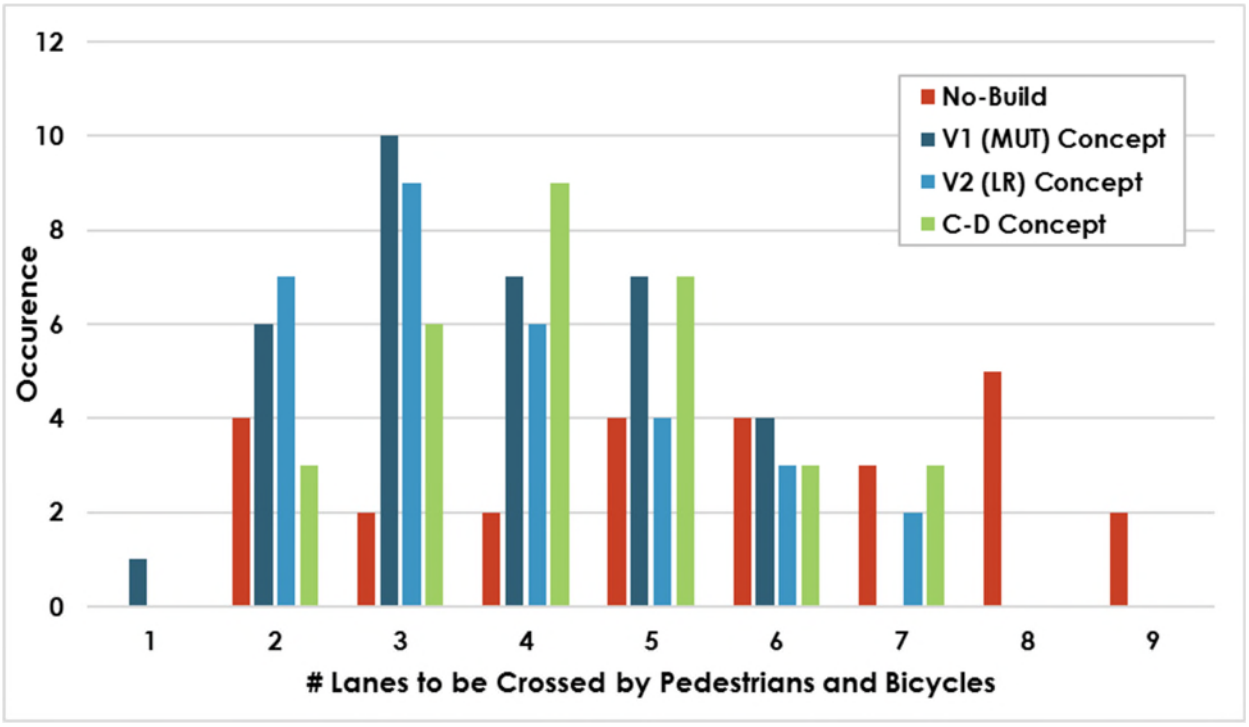

Figure 4: Comparison of Pedestrian and Bicycle Crossing Distances

Another way to look at the pedestrian and bicycle crossing data is with regards to the average crossing distance. Table 2 provides the comparison of the average number of lanes that pedestrians and bicyclists must cross at any given location along the Seward Highway corridor for each of the concepts. It also provides the estimated average crossing distance, assuming the average travel lane is 14 feet wide. Under No Build conditions, the average crossing distance is 78 feet, while each of the refined concepts are between 24 percent to 33 percent lower (i.e., between 52 and 60 feet).

Table 2: Comparison of Pedestrian and Bicycle Crossing Distances

Metric	Concept			
	No Build	*V1 (MUT)*	*V2 (LR)*	*C-D*
Average Crossing Distance[a]	5.6 lanes	3.7 lanes	3.8 lanes	4.3 lanes
	78 ft	52 ft	53 ft	60 ft

[a] Average crossing distance (in feet) assumes 14-foot travel lanes based on existing conditions.

6.0 SUMMARY

Compared to the No-Build condition, the refined concepts would improve pedestrian and bicycle connectivity, safety, and comfort in the study area. All concepts provide a grade-separated mainline that reduces the number of conflicts between northbound/southbound vehicles on Seward Highway and east-west pedestrian and bicycle traffic. In addition, the separation of northbound and southbound traffic on the two one-way frontage roads means pedestrians and bicycles only need to cross one direction of traffic at a time. This enhances pedestrian and bicycle comfort as it results in shorter crossing distances at the signalized intersections. The concepts also include multiuse facilities along both sides of the Seward Highway corridor and both sides of all major cross streets, which improves pedestrian and bicycle connectivity and adds approximately 1.6 miles of new multiuse facilities.

The primary differentiators between the three refined concepts are the frontage road ADTs and the number of lanes that pedestrians and bicycles must cross at the study intersections. The V2 (LR) Concept has the lowest conflicting ADTs and the fewest crossing locations that have five or more lanes, while the V1 (MUT) Concept is close behind. The C-D Concept is an improvement from No-Build but does not perform as well as the other two concepts.