Wasilla Main Street Traffic Study 2012 Update

Kinney Engineering, LLC

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Table of Common Abbreviations

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADOTPF	Alaska Department of Transportation and Public Facilities
APV	Accident Prediction Value
GDHS	Geometric Design of Highways and Streets
HCM2000	Highway Capacity Manual 2000
HSIP	Highway Safety Improvement Program
KE	Kinney Engineering
KELLC	Kinney Engineering, LLC
KGB	Knik-Goose Bay Road
LOS	Level of Service
LRTP	Long Range Transportation Plan
MUTCD	Manual on Uniform Traffic Control Devices
MEV	Million Entering Vehicles
MSB	Matanuska-Susitna Borough
NPW	Net Present Worth
TAZ	Traffic Analysis Zone
UCL	Upper Control Limit
USDOT	United States Department of Transportation
v/c	Volume-to-Capacity Ratio

Executive Summary

This 2012 update of the Wasilla Main Street Traffic Study has four main elements: an updated safety analysis using the most recent available crash data (1999 to 2008), an updated accident prediction value for the at-grade railroad crossing of Knik-Goose Bay Road (just south of the Parks Highway), updated design year traffic volumes and design hour turning movement volumes, and an updated capacity analysis.

Six alternatives were considered:

- No Action: No changes are made, including maintaining existing geometry and intersection control.
- Alternative A: Wasilla Main Street is converted to a three-lane section (one lane in each direction with a center-two-way-left-turn lane) between Bogard Road and Susitna Avenue.
- Alternative B: Wasilla Main Street is converted to a five-lane section (two lanes in each direction with a center-two-way-left-turn lane) between Bogard Road and Susitna Avenue.
- Alternative C: Both Main Street and Knik Street are converted to three-lane sections starting at Bogard Road and continuing to the south. Knik Street crosses over the Parks Highway and the railroad with a grade-separated crossing. To the south, the Knik Street corridor bends and connects into the Main Street corridor at Park Avenue.
- Alternative D, option 1: Main Street and Yenlo Street are converted to three-lane one-way roads, with Main Street traffic traveling southbound and Yenlo Street traffic traveling northbound. The one-way streets begin on the north end at approximately Aspen Avenue (requiring an extension of Yenlo Street) and continue through downtown Wasilla south to Enter Way. The intersection of Yenlo Street and the Parks Highway is at-grade, as is the Talkeetna Street railroad crossing.
- Alternative D, option 2: The same as option 1 except that the one-way streets begin at Bogard Road and continue through downtown Wasilla south to Enter Way.

The safety analysis indicates that each of the alternatives are expected to result in an overall decrease in crash frequency. The associated reductions in costs are shown in Table 1.

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Annual Crash Reduction & Crash Cost Savings for Alternatives A-D		10 Year Crash Cost (1999-2008)	Annual Crash Cost (1999-2008)	Crash Reduction for Alternative	Annual Crash Cost Savings*	NPW of 20-year Cost Savings**
Alternative A	Total Intersection Crashes (affected by roadway Imp.)	$14,175,500	$1,417,550	3.83%	$54,339	$809,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	3.29%	$36,653	$546,000.00
Alternative B	Total Intersection Crashes (affected by roadway Imp.)	$14,175,500	$1,417,550	5.34%	$75,750	$1,127,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	5.47%	$60,935	$907,000.00
Alternative C	Total Intersection Crashes (affected by roadway Imp.)	$14,175,500	$1,417,550	5.13%	$72,649	$1,081,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	5.47%	$60,935	$907,000.00
Alternative D	Total Intersection Crashes (affected by roadway Imp.)	$14,175,500	$1,417,550	9.39%	$133,043	$1,980,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	9.14%	$101,864	$1,516,000.00

* Annual crash cost savings based on 2008 severity crash costs (KABCO)from Alaska DOT/PF(http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/2008_kabco_costs.pdf)
** Computed annual crash cost savings and a 3% compound interest rate were used to obtain net present worth (NPW) of 20 year cost savings.

Table 1: Annual Crash Reduction and Crash Cost Savings for Alternatives A, B, C, or D

The accident prediction value (APV) for railroad crossings is one criteria used to determine if crossing improvements are needed to reduce the potential for vehicle-train crashes at a rail crossing. Based on the updated APV of 0.1985 and a sensitivity analysis (considering future APV values if traffic volumes approach 13,000 to 20,000 annual average daily traffic (AADT) with 10 to 20 at-grade crossing crashes and 25 to 40 daily train movements), further crossing improvements are not required at the at-grade rail crossing of Knik-Goose Bay Road, just south of the Parks Highway.

Operationally, the existing at-grade crossing has issues relating to its proximity to the Parks Highway, including the inability to store vehicles between the crossing and the Parks Highway during train operations. Less than 70 feet exists between the eastbound through lane of the Parks Highway and the tracks. Also, this crossing lacks full gate closure on the roadway approach to the crossing due to the lack of a median and the length of gate that would be required. The gate arms here are either struck by vehicles or snapped off by high winds when in the upright position.

Alternatives A and B provide an opportunity to install additional shorter gate arms in the Main Street median to prevent drivers from going around the gate arm. Alternative D (option 1 or 2) would allow full control of traffic at the crossing by providing complete gate arm coverage with a relatively short gate.

Design year traffic volumes and design hour turning movement volumes were developed using a 2025 TransCAD model of the Matanuska-Susitna Borough that was modified to provide detailed volumes within the study area. These model outputs were post-processed and a 1.5% annual growth rate was applied to obtain 2035 design year AADT volumes (see Appendix E). Existing turning movement counts and NCHRP 255 (*Highway Traffic Data for Urbanized Area Project Planning and Design*, December 1982) methodology was then used to determine design hour turning movement volumes for the study intersections (see Appendix F).

Future signalization conditions for each alternative were recommended based on future signal warrant analysis and access control considerations. In addition to maintaining the existing signals at Main Street/Wasilla Fishhook Road and Bogard Road/Nelson Avenue and at Main Street/Knik-Goose Bay Road and the Parks Highway, the following intersections were recommended for signalization under the different scenarios:

For Alternatives A and B, signalize:

- Swanson Avenue at Main Street
- Susitna Avenue at Knik-Goose Bay Road

For Alternative C, signalize:

- Swanson Avenue at Main Street
- Nelson Avenue at Knik Street
- Swanson Avenue at Knik Street
- Park Avenue at Knik-Goose Bay Road

For Alternative D (all options), signalize:

- Swanson Avenue at Main Street
- Lake View Avenue at Knik-Goose Bay Road
- Bogard Road at Yenlo Street
- Swanson Avenue at Yenlo Street
- Parks Highway at Yenlo Street/Talkeetna Street

The resulting level of service (LOS) for each intersection in the study area under each alternative is shown in the following table.

	2005 Existing			No Action (2035)						Alt A (2035)						Alt B (2035)					
				No bypass			Bypass			No bypass			Bypass			No bypass			Bypass		
	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Bogard Rd/Nelson Ave and Main St	0.47	25	C	0.61	29	C	0.59	28	C	0.76	29	C	0.73	27	C	0.70	18	B	0.60	18	B
Paulson Ave and Main St		24/45	C/E		64/76	F		30/37	D/E		11/16	B/C		11/14	B		28/29	D		19/23	C
Swanson Ave and Main St		24	C		55	F		39	E	0.47	12	B	0.48	13	B	0.39	12	B	0.37	12	B
Herning Ave and Main St		20/28	C/D		78/169	F		48/176	E/F		21/25	C		19/25	C/D		22/30	C/D		18/33	C/D
Parks Highway and Main St/ Knik-Goose Bay Rd	0.76	41	D	1.09	87	F	1.10	105	F	1.08	70	E	1.11	85	F	0.99	58	E	0.99	73	E
Railroad Ave and Knik-Goose Bay Rd		13/10	B		16/11	C/B		21/14	C/B		20/12	C/B		29/13	D/B		11	B		12	B
Susitna Ave and Knik-Goose Bay Rd		36/23	E/C		170/46	F/E		>500	F	0.57	7	A	0.71	10	B	0.44	5	A	0.52	6	A

	Alt C (2035)						Alt D, option 1 (2035)						Alt D, option 2 (2035)						Refined Alt D, option 2		
	No bypass			Bypass			No bypass			Bypass			No bypass			Bypass			No bypass		
	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Bogard Rd/Nelson Ave and Main St	0.49	16	B	0.52	17	B	0.61	16	B	0.58	18	B	0.48	12	B	0.50	14	B	0.48	13	B
Paulson Ave and Main St		15/20	B/C		16/23	C		12/20	B/C		12/16	B/C		11/17	B/C		11/16	B/C		11/17	B/C
Swanson Ave and Main St	0.44	10	B	0.57	13	B	0.83	20	C	0.77	18	B	0.75	20	C	0.58	16	C	0.72	20	B
Herning Ave and Main St		23/29	C/D		50	F		17/33	C/D		23/45	C/E		25/38	C/E		23/48	C/E		24/37	C/E
Parks Highway and Main St/ Knik-Goose Bay Rd	0.97	54	D	1.00	65	E	0.83	28	C	0.81	27	C	0.77	29	C	0.77	31	C	0.90	34	C
Railroad Ave and Knik-Goose Bay Rd		16/11	C/B		18/11	C/B		10/14	B		11/15	B		10/14	B		11/15	B/C		16/29	C/D
Susitna Ave and Knik-Goose Bay Rd		26/12	D/B		31/32	D/D		11/15	B		11/15	B		11/14	B		12/16	B/C		14/21	B/C
Lake View Ave and Knik-Goose Bay Rd							0.50	9	A	0.55	10	A	0.49	10	A	0.57	9	A	0.49	9	A
Nelson Ave and Knik St	0.53	11	B	0.51	11	B															
Paulson Ave and Knik St		12/11	B		13/11	B															
Swanson Ave and Knik St	0.32	14	B	0.35	15	B															
Herning Ave and Knik St		16/13	C/B		18/16	C															
Susitna Ave and Knik St		11/10	B		12/10	B															
Park Ave and Knik-Goose Bay Rd	0.45	8	A	0.58	11	B															
Bogard Rd and Yenlo St							0.53	9	A	0.56	11	B	0.55	11	B	0.58	13	B	0.81	17	B
Swanson Ave and Yenlo St							0.79	24	C	0.66	21	B	0.61	18	B	0.57	20	B	0.64	19	B
Herning Ave and Yenlo St								43/24	E/C		45/23	E/C		48/16	E/C		62/24	F/C		48/16	E/C
Parks Highway and Yenlo St/ Talkeetna St							0.87	23	C	0.85	23	C	0.89	26	C	0.85	29	C	0.91	30	C
Railroad Ave and Talkeetna								18/12	C/B		18/12	C/B		18/12	C/B		19/12	C/B		18/12	C/B
Susitna Ave and Talkeetna								14/11	B		14/11	B		13/11	B		14/11	B		17/12	C/B
Lake View Ave and Talkeetna								16	C		16	C		15	C		17	C		17	C

Signalized Intersections

For two-way stop controlled intersections, two values are given for both delay and LOS, reflecting movement values, rather than full intersection values. The form is "eastbound/westbound." Where the value is the same for both directions, only one value is given.

Table 2: Intersection Level of Service by Alternative (2035)

The 2006 Traffic Study for the Wasilla Main Street project found that either Alternative C or Alternative D would provide acceptable levels of service through the 2025 design year for that study. At that time, Alternative A and B were dropped from further consideration because they did not provide acceptable levels of service. Further consideration of Alternative C found that it would require property acquisitions that were deemed unacceptable to the City of Wasilla and the public. Thus, Alternative C has since been dismissed from consideration.

This 2012 update report finds that only Alternative D will provide an acceptable level of service for the study area through the updated design year of 2035, regardless of whether or not a Parks Highway bypass lane has been built, and verifies that Alternative D should remain a preferred alternative. The recommended alternative is Refined Alternative D, option 2, which is represented by the following figures.
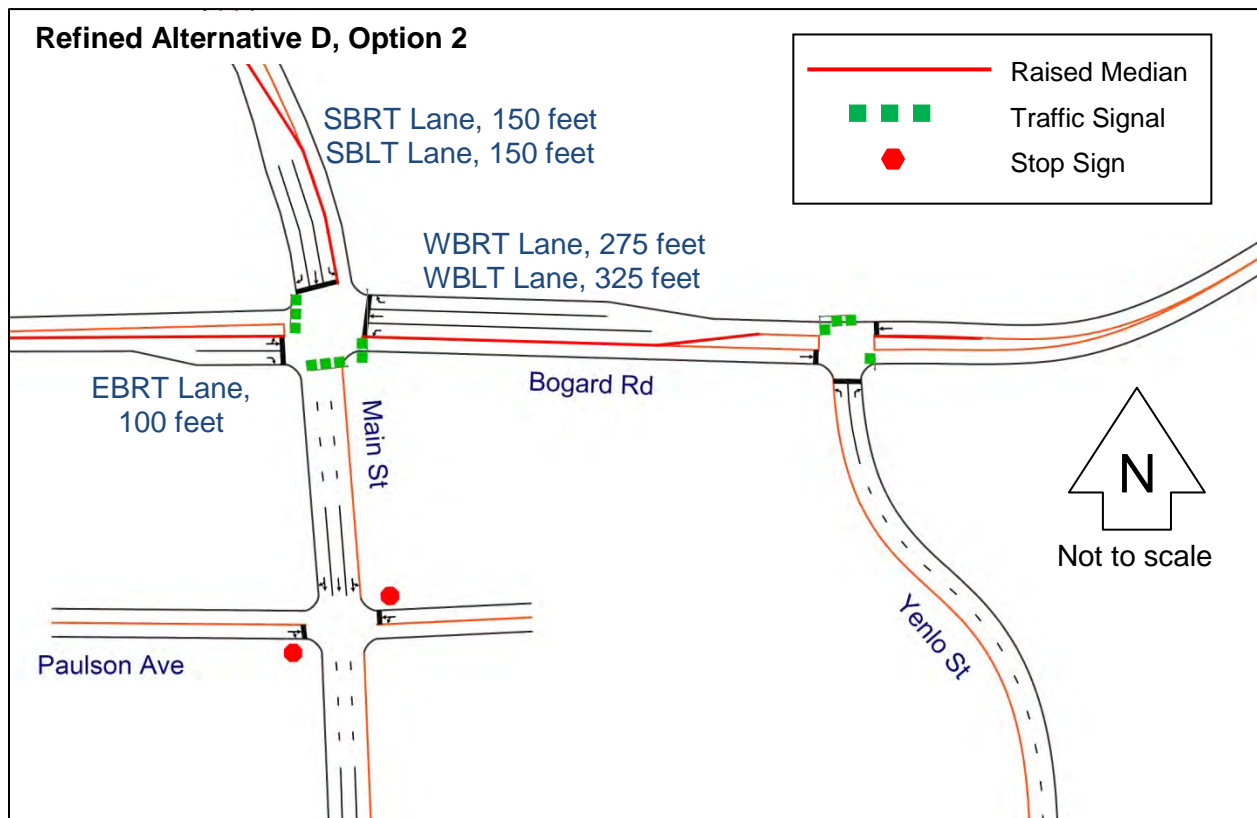
Figure 1: Recommended Alternatives for Bogard Road/Nelson Avenue Intersections, Refined Alternative D, Option 2
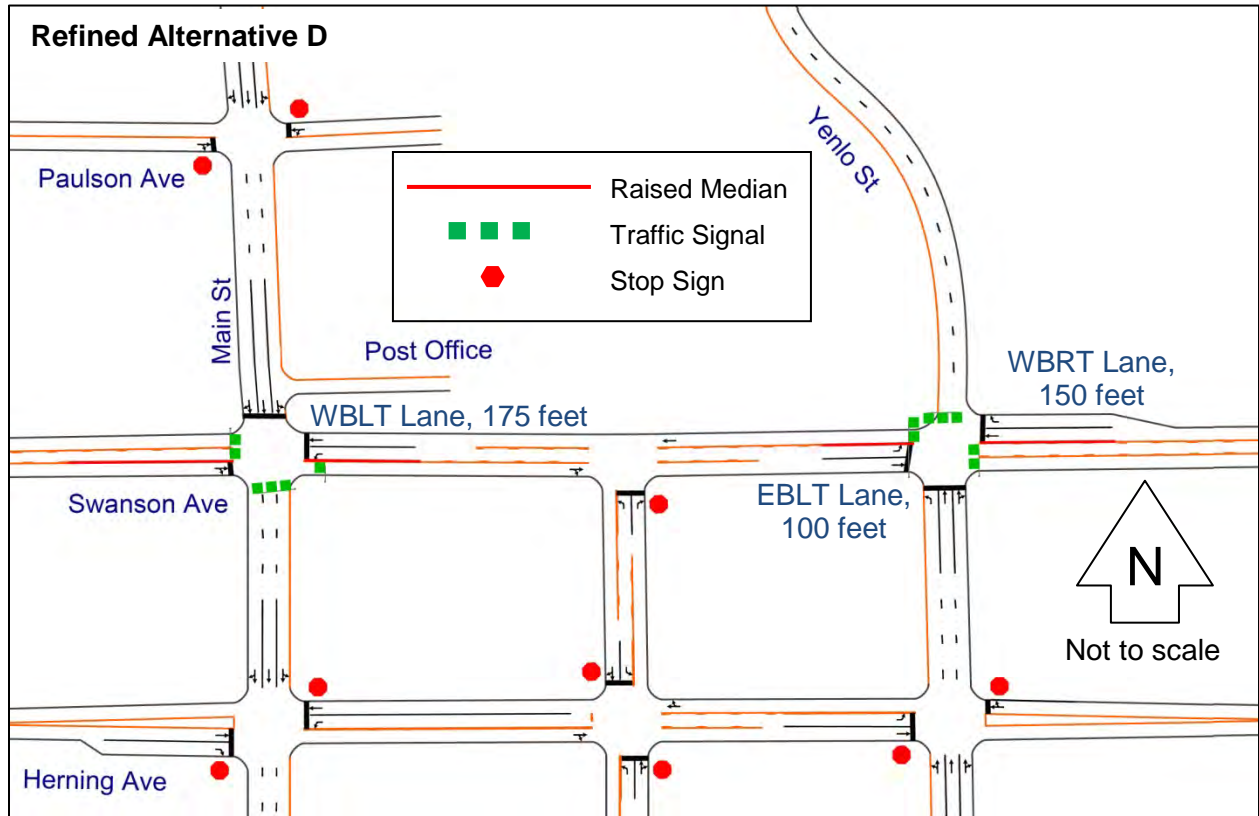
Figure 2: Recommended Alternatives for Swanson Avenue Intersections, Refined Alternative D, Option 2

Refined Alternative D, Option 2

WBLT Lanes, 181 feet

WBRT Lane, 750 feet

Main St

Boundary Street

Yenlo St

EBRT Lane, 450 feet

Parks Hwy

EBLT Lanes, 181 feet

N

Not to scale

Knik Goose

Boundary Street

Talkeetna St

Railroad Ave

	Raised Median
	Traffic Signal
	Stop Sign
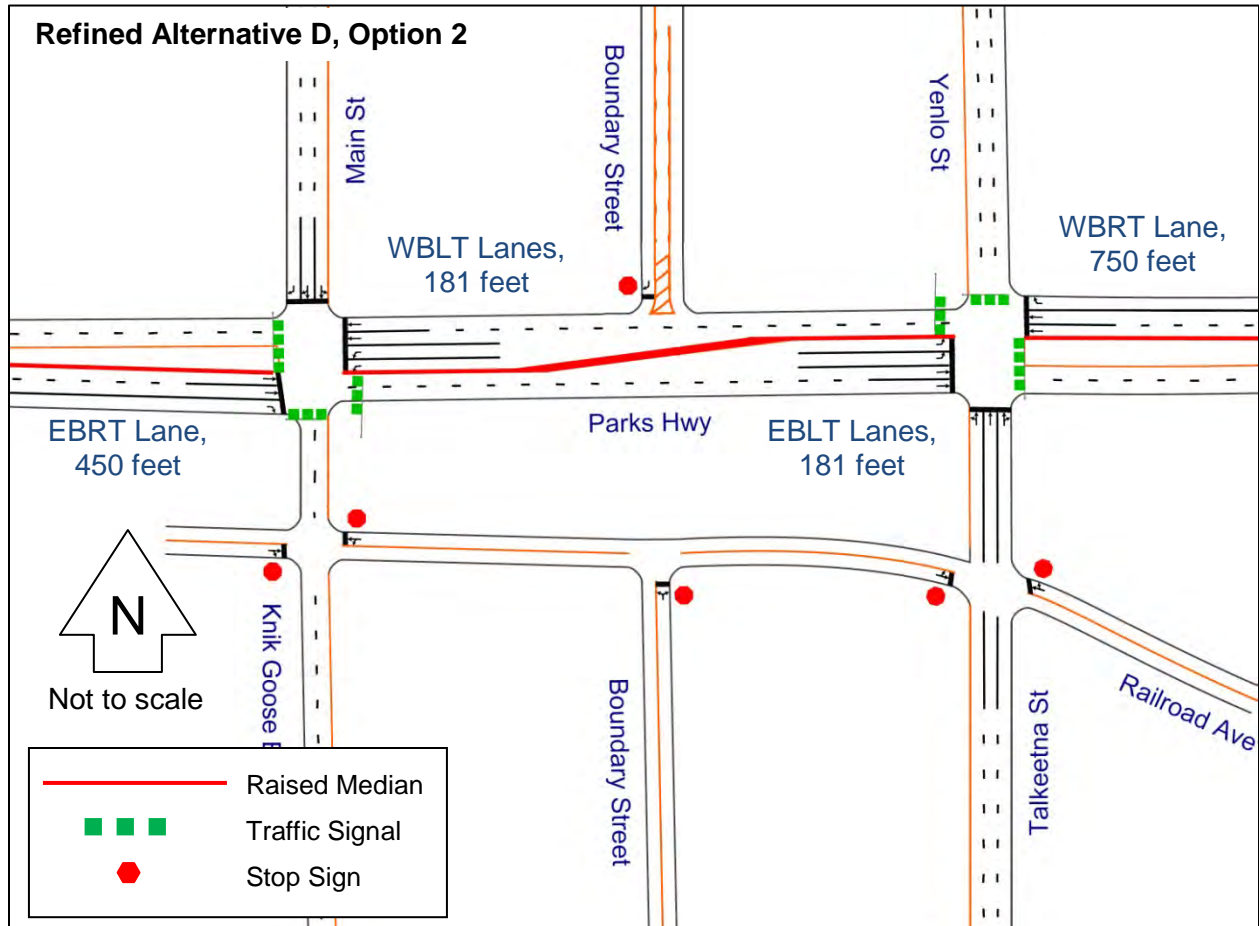
Figure 3: **Recommended Alternatives for Parks Highway Intersections, Refined Alternative D, Option 2**

Refined Alternative D, Option 2

Susitna Ave

Boundary Street

Talkeetna St

Lake View Avenue

Knik Goose Bay Rd

Centaur Avenue

Knik Goose Bay Rd

Talkeetna St

N

Not to scale

	Raised Median
	Traffic Signal
	Stop Sign
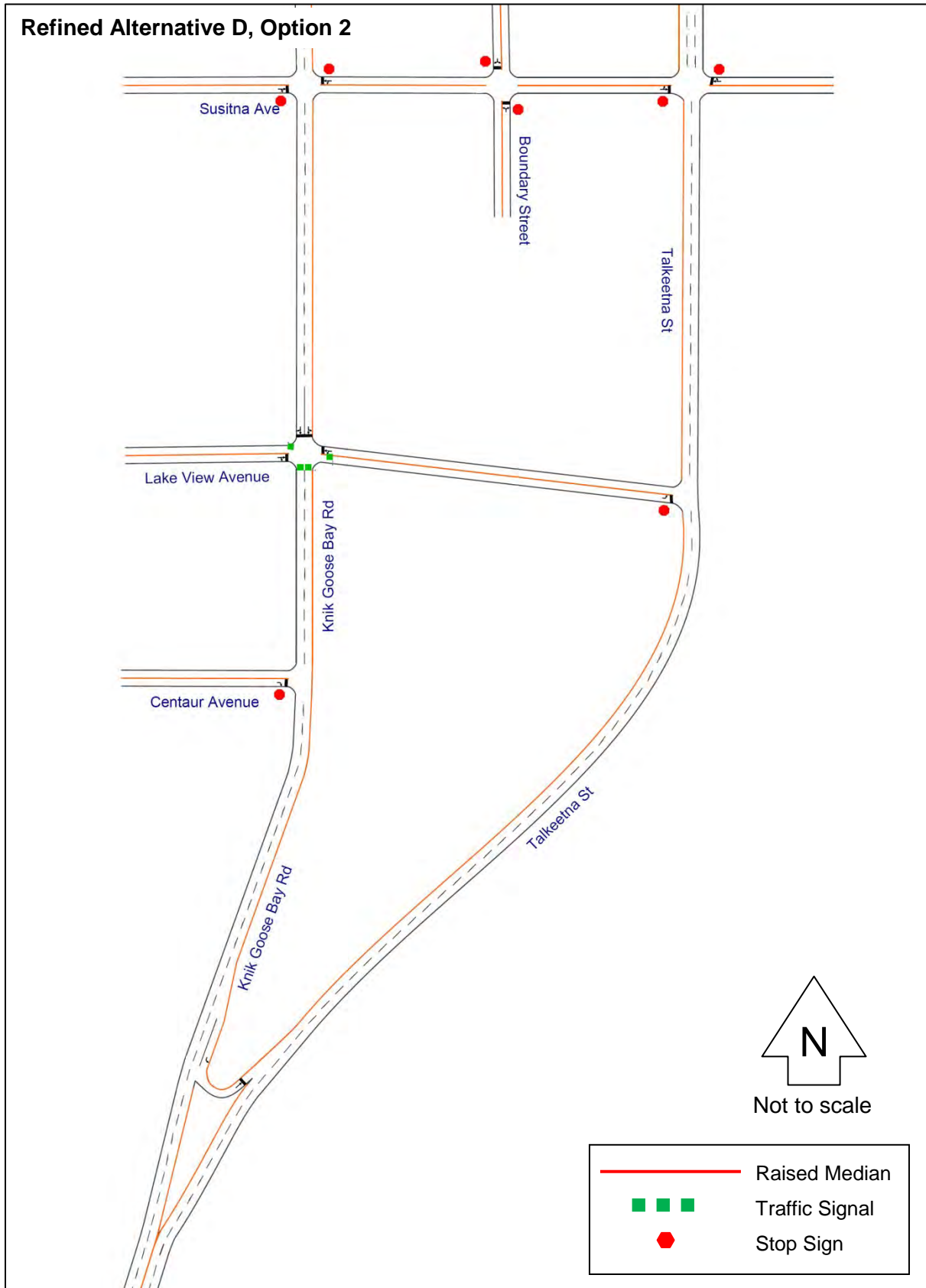
Figure 4:   Recommended Alternatives for Southern Portion of Study Area, Refined Alternative D, Option 2

1   Introduction

In 2006, Tryck Nyman Hayes, Inc. prepared a Traffic Study for the Wasilla Main Street project (Project Number STP-0525(12) / 54302) for the State of Alaska Department of Transportation and Public Facilities (ADOTPF). For that report, Kinney Engineering (KE), since reorganized as Kinney Engineering, LLC (KELLC), performed safety analyses of key intersections and traffic volume forecasts and capacity analyses. KE prepared the traffic volume estimates using a QRSII traffic demand model to forecast traffic volumes on key streets in the network for the year 2025. KE also forecasted turning movements at major intersections and performed capacity analyses at these intersections. The study area for the traffic study is shown in Figure 5. 2010 annual average daily traffic (AADT) volumes for the study area are shown in Figure 6.
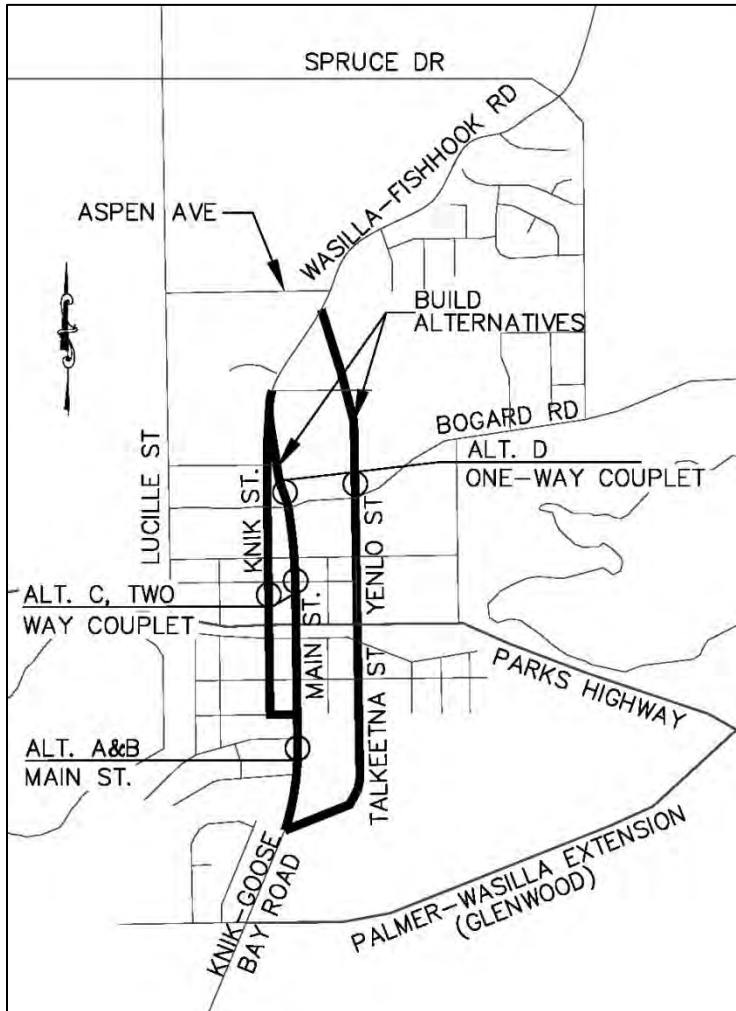
Figure 5: Wasilla Main Street Study Area
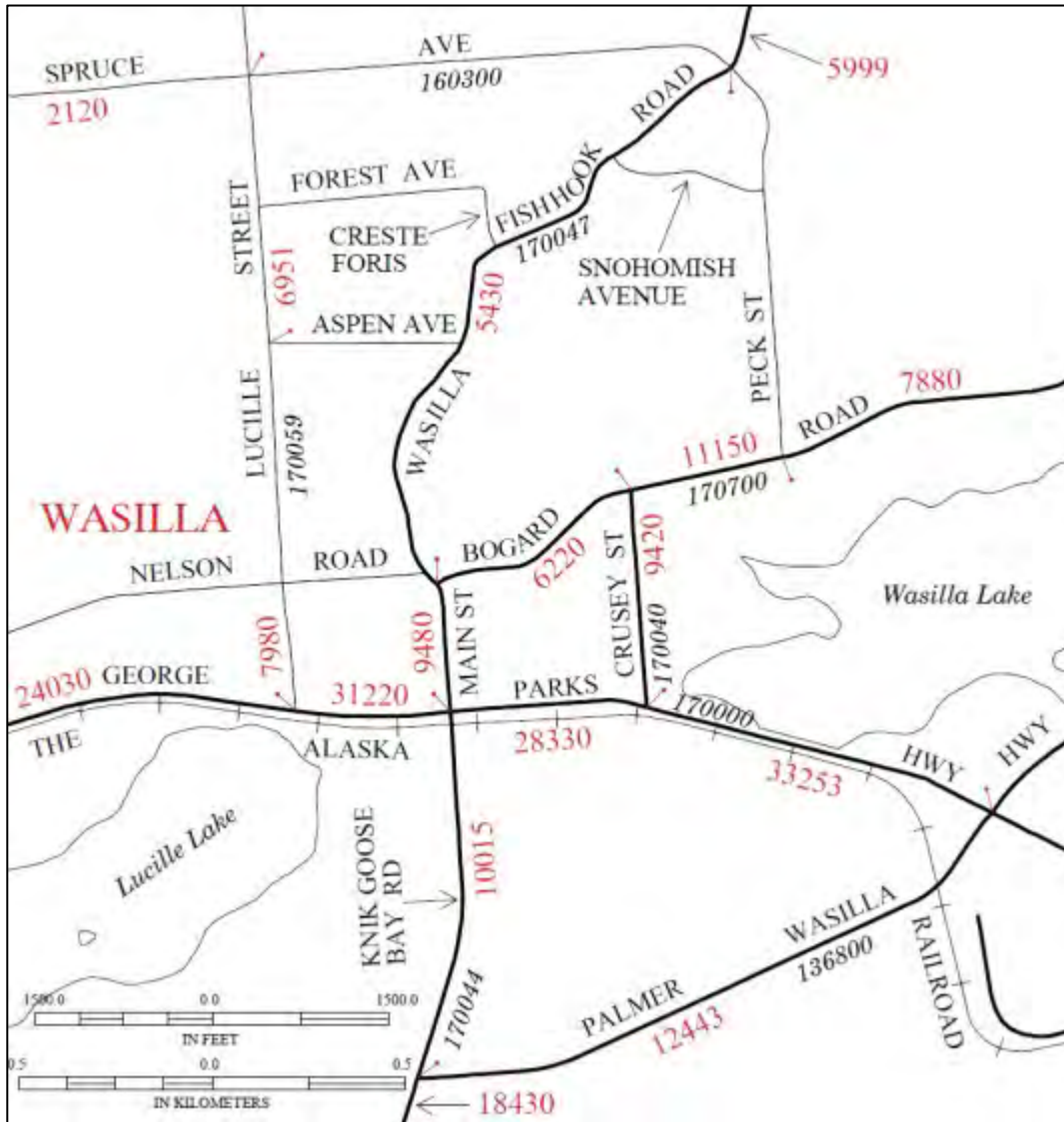
(Source: ADOTPF Mat-Su Valley Traffic Map 2010)

Figure 6: 2010 Annual Average Daily Traffic in Wasilla

This report updates the elements that KE prepared for the 2006 report. The safety analysis is updated using the most recent available (1999 to 2008) crash data. In addition, the traffic volume forecasts are extended to 2035 using a TransCAD model that was initially developed for the 2007 Matanuska-Susitna Borough (MSB) Long Range Transportation Plan (LRTP). The model has been modified by KELLC to facilitate forecasting traffic volumes on lower volume streets that are important to the Wasilla Main Street project but were not included in the original 2007 LRTP model scope.

Traffic volumes and intersection capacity were evaluated in the year 2035 for six alternatives:

- No Action: Wasilla Main Street remains a two-lane road south of the Parks Highway and a three-lane road (one lane in each direction with a center-two-way-left-turn lane) north of the Parks Highway, with existing intersection control.

- Alternative A: Wasilla Main Street is converted to a three-lane section (one lane in each direction with a center-two-way-left-turn lane) between Bogard Road and Susitna Avenue.

- Alternative B: Wasilla Main Street is converted to a five-lane section (two lanes in each direction with a center-two-way-left-turn lane) between Bogard Road and Susitna Avenue.

- Alternative C: Both Main Street and Knik Street are converted to three-lane sections starting at Bogard Road and continuing to the south. Knik Street crosses over the Parks Highway and the railroad with a grade-separated crossing. To the south, the Knik Street corridor bends and connects into the Main Street corridor at Park Avenue.

- Alternative D, option 1: Main Street and Yenlo Street are converted to three-lane one-way roads, with Main Street traffic traveling southbound and Yenlo Street traffic traveling northbound. The one-way streets begin on the north end at approximately Aspen Avenue (requiring an extension of Yenlo Street) and continue through downtown Wasilla south to Enter Way. The intersection of Yenlo Street and the Parks Highway is at-grade, as is the Yenlo Street railroad crossing.

- Alternative D, option 2: Similar to option 1 except that the one-way streets begin at Bogard Road and continue through downtown Wasilla south to Enter Way.

The Wasilla Comprehensive Plan adopted June 13, 2011 identifies the intersection of Wasilla Main Street and the Parks Highway as a "critical bottleneck." The report describes the road network in Wasilla as "the form of a hub with spokes" where the Parks Highway passes through the center of the hub and carries long distance, regional, and local travelers. Wasilla Main Street and Knik-Goose Bay Road are also "spokes" in this system. The 2007 LRTP TransCAD model does not include the Parks Highway Bypass and therefore assumes land development patterns into 2035 that continue to emphasize the Parks Highway as a major route for local and regional travelers. The Knik Arm Bridge is similarly not reflected in the land development patterns used in the 2007 LRTP TransCAD model.

Each model for the six alternatives was developed for two cases: with and without the Parks Highway bypass. The Knik Arm Bridge was not included as a variable in the analysis, as study area volumes were found to be independent of this roadway link.

2   Crash Study Update

2.1   Intersection Crash Rates and Crash Significance for Study Intersections

Thirty-three intersections were evaluated as part of the 2006 Traffic Study using 1992-2001 crash data.   Fifteen intersections were on the Knik-Goose Bay Road/Main Street corridor, 8 intersections were directly affected by Alternatives C (Main Street/Knik Street two-way roads) and D (Knik-Goose Bay/Main & Talkeetna/Yenlo one-way couplet) and 10 other intersections were adjacent to affected roadways.   For the traffic study update, KELLC utilized 1999-2008 crash data and expanded the analysis to include 27 intersections which would be modified by alternatives A, B, C or D.   The 27 intersections modified by Alternatives A, B, C or D include:

- Knik-Goose Bay Road & Enter Way
- Knik-Goose Bay Road & Centaur Street
- Knik-Goose Bay Road & Lakeview Drive
- Knik-Goose Bay Road & Park Avenue
- Knik-Goose Bay Road & Susitna Avenue
- Knik-Goose Bay Road & Railroad Avenue
- Parks Highway & Main Street/Knik-Goose Bay Road
- Main Street & Herning Avenue
- Main Street & Swanson Avenue
- Main Street & Paulson Avenue
- Main Street/Wasilla Fishhook Road & Bogard Road/Nelson Avenue (signal 9/2003)
- Wasilla Fishhook Road & Danna Avenue
- Wasilla Fishhook Road & Iditarod Elementary

- Wasilla Fishhook Road & Carpenter Circle
- Parks Highway & Knik Street
- Knik Street & Herning Avenue
- Knik Street & Swanson Avenue
- Knik Street & Paulson Avenue
- Knik Street & Nelson Avenue
- Talkeetna Street & Susitna Avenue
- Talkeetna Street & Railroad Avenue
- Parks Highway at Yenlo Street
- Yenlo Street & Herning Avenue
- Yenlo Street & Swanson Avenue
- Bogard Road at Lang Street (Yenlo Extension)
- Knik Street at Railroad Avenue
- Knik Street at Susitna Avenue

Three additional intersections within the Alternative D project limits, but not modified by the proposed improvements, are also included in the crash rate tables.   They are Boundary Street at the Parks Highway, Herning Avenue, and Swanson Avenue intersections.   The following tables summarize the crash totals, intersection crash rates, and crashes per million entering vehicles (Crash/MEV) for the original 2006 study intersections, the additional 18 adjacent intersections and the Boundary Street intersections discussed above during the 1999-2008 study period.   The table also shows which intersections would be modified by alternatives A, B, C or D and indicates those intersections that have crash rates that exceed the average rates for similar intersections. The table lists the upper control limit (UCL) rate that is computed using the Rate Quality Control Method, which expresses the degree of certainty that a location has a high crash rate. The 95% confidence level for the upper control limit is usually a threshold used to determine if an intersection has a crash rate that is truly higher than other similar intersections.

Table 3 on page 9 contains updated crash rates for the intersections listed above. A map depicting 1999-2008 average crash rates and number of crashes for all evaluated intersections is shown in Appendix A.

Intersection	Intersection Crashes 1999 to 2008	Million Entering Vehicles (MEV)	Crashes / MEV	State Populations (1999-2008)	UCL @ 95.00% Confidence	Roadway Modified by Altrnative A-D?	Above Average?	Is Rate >UCL (Significant)?
Knik Goose Bay Road & Enter Way	5	37.759	0.132	0.535	0.744	Yes (D)	no	no
Knik Goose Bay Road & Centaur Street	5	37.759	0.132	0.535	0.744	Yes (D)	no	no
Knik Goose Bay Road & Lakeview Drive	1	37.759	0.026	0.669	0.901	Yes (D)	no	no
Knik Goose Bay Road & Park Avenue	2	37.759	0.053	0.535	0.744	Yes (A,B,C,D)	no	no
Knik Goose Bay Road & Susitna Avenue	9	39.331	0.229	0.669	0.896	Yes (A,B,C,D)	no	no
Knik Goose Bay Road & Railroad Avenue	30	37.759	0.795	0.669	0.901	Yes (A,B,C,D)	yes	no
Parks Highway & Main Street/Knik Goose Bay Road	224	136.645	1.639	1.395	1.565	Yes (A,B,C,D)	yes	yes
Main Street & Herning Avenue	41	37.204	1.102	0.669	0.903	Yes (A,B,C,D)	yes	yes
Main Street & Swanson Avenue	27	50.673	0.533	0.643	0.838	Yes (A,B,C,D)	no	no
Main Street & Paulson Avenue	2	37.653	0.053	0.535	0.744	Yes (A,B,C,D)	no	no
Main Street/Wasilla Fishhook Road & Bogard Road/Nelson Avenue (signal 9/2003)	21	29.640	0.708	1.395	1.769	Yes (A,B,C,D)	no	no
Wasilla Fishhook Road & Danna Avenue	2	18.158	0.110	0.535	0.845	Yes (C,D)	no	no
Wasilla Fishhook Road & Iditarod Elementary	6	18.607	0.322	0.535	0.841	Yes (D)	no	no
Wasilla Fishhook Road & Carpenter Circle	4	17.485	0.229	0.535	0.851	Yes (D)	no	no
Parks Highway & Knik Street	10	93.374	0.107	0.535	0.665	Yes (C)	no	no
Knik Street & Herning Avenue	7	4.490	1.559	0.669	1.415	Yes (C)	yes	yes
Knik Street & Swanson Avenue	3	18.856	0.159	0.669	1.005	Yes (C)	no	no
Knik Street & Paulson Avenue*	0	4.490	0.000	0.669	1.415	Yes (C)	no	no
Knik Street & Nelson Avenue	4	9.877	0.405	0.535	0.968	Yes (C)	no	no
Talkeetna Street & Susitna Avenue	1	5.387	0.186	0.669	1.341	Yes (D)	no	no
Talkeetna Street & Railroad Avenue	1	4.490	0.223	0.535	1.214	Yes (D)	no	no
Parks Highway @ Yenlo Street	63	113.481	0.555	0.535	0.652	Yes (D)	yes	no
Yenlo Street & Herning Avenue	8	21.550	0.371	0.669	0.982	Yes (D)	no	no
Yenlo Street & Swanson Avenue	3	21.550	0.139	0.669	0.982	Yes (D)	no	no
Bogard Road @ Lang Street (Yenlo Extension)**	1	26.083	0.038	0.535	0.790	Yes (D)	no	no
Knik Street @ Railroad Avenue*	0	1.796	0.000	0.535	1.711	Yes (C)	no	no
Knik Street @ Susitna Avenue*	0	2.020	0.000	0.669	1.863	Yes (C)	no	no
Boundary Street & Herning Avenue	18	15.264	1.179	0.669	1.046	No	yes	yes
Boundary Street & Swanson Avenue	2	17.509	0.114	0.535	0.851	No	no	no
Parks Highway @ Boundary Ave	74	112.022	0.661	0.535	0.653	No	yes	yes

Adjusted for New Signal during analysis period	Rate Above Critical		Intersections within Alternative "D" Couplet but not altered by proposed improvements.	

Table 3: Intersection Crash Rates for Intersections Included in the 2006 Traffic Study

2.2 Crash Mitigation Estimates for Alternatives A, B, C and D

Intersections that would be modified under Alternatives A, B, C or D were evaluated to determine whether crashes would be mitigated at these locations under any of the proposed alternatives.

The following assumptions were used to conduct the analysis:

- A Crash Reduction Factor of 15% was selected for an additional through lane and was derived by averaging Highway Safety Improvement Program (HSIP) Handbook right turn lane reduction factors for signalized and unsignalized urban intersections.

- For Alternative C, crashes were not reassigned to the proposed Knik Street two-way roadway from Main Street/Knik-Goose Bay Road. Crash reductions were measured for all crashes on both Main Street and Knik Street as appropriate for signalization and grade separation options.

- For Alternative D, northbound and southbound through crashes were reassigned to the proposed one-way roadways to account for the conversion of the formerly two-way streets into a one-way couplet.

- For Alternative D, only eliminated conflicting movements (mostly through vs. opposing left turn) were counted for crash reduction other than at proposed traffic signal locations where right angle and rear-end crashes were considered.

- For all alternatives, a 60% crash reduction factor (HSIP Handbook) for right angle crashes was applied where new traffic signals were proposed and corresponding rear-end crashes were increased by 25%.

Table 4 includes an estimate of the total crash reductions for each modified intersection as well as only those intersections with a greater than average crash rate and the unmodified Boundary Street intersections discussed above. Maps depicting crash reductions under Alternatives A, B, C, and D are shown in Appendix B.

Wasilla Main Street Traffic Study 2012 Update

Intersections Affected by Alternatives A-D						Modified to reassign crashes on Main/KGB and Yenlo/Talkeetna for Alt D one-way street network.			
Intersection	Intersection Crashes 1999 to 2008	Alt A Crash Reduction (# of crashes)	Alt B Crash Reduction (# of crashes)	Alt C Crash Reduction (# of Crashes)	Alt D Crash Reduction (# of Crashes inc. 1-Way Adj)	Alt A Crash Reduction (% of TOTAL crashes)	Alt B Crash Reduction (% of TOTAL crashes)	Alt C Crash Reduction (% of TOTAL crashes)	Alt D Crash Reduction (% of TOTAL crashes)***
Knik-Goose Bay Road & Enter Way	5	0.0	0.0	0.0	1.0	0%	0%	0%	20%
Knik-Goose Bay Road & Centaur Street	5	0.0	0.0	0.0	2.0	0%	0%	0%	40%
Knik-Goose Bay Road & Lakeview Drive	1	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Knik-Goose Bay Road & Park Avenue	2	0.0	0.0	-0.25	0.0	0%	0%	-13%	0%
Knik-Goose Bay Road & Susitna Avenue	9	1.9	1.9	0.0	6.0	21%	21%	0%	67%
Knik-Goose Bay Road & Railroad Avenue	30	12.0	12.9	12.9	24.0	40%	43%	43%	80%
Parks Highway & Main Street/Knik-Goose Bay Road	224	0.0	6.3	6.3	58.0	0%	3%	3%	26%
Main Street & Herning Avenue	41	0.0	0.8	0.8	11.0	0%	2%	2%	27%
Main Street & Swanson Avenue	27	3.5	3.5	3.5	13.5	13%	13%	13%	50%
Main Street & Paulson Avenue	2	1.0	0.0	0.0	0.0	50%	0%	0%	0%
Main Street/Wasilla Fishhook Road & Bogard Road/Nelson Avenue (signal 9/2003)	21	0.0	0.3	0.3	8.0	0%	1%	1%	38%
Wasilla Fishhook Road & Danna Avenue	2	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Wasilla Fishhook Road & Iditarod Elementary	6	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Wasilla Fishhook Road & Carpenter Circle	4	0.0	0.0	0.0	2.0	0%	0%	0%	50%
Parks Highway & Knik Street	10	0.0	0.0	1.0	0.0	0%	0%	10%	0%
Knik Street & Herning Avenue	7	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Knik Street & Swanson Avenue	3	0.0	0.0	0.6	0.0	0%	0%	20%	0%
Knik Street & Paulson Avenue*	0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Knik Street & Nelson Avenue	4	0.0	0.0	-0.5	0.0	0%	0%	-12.5%	0%
Talkeetna Street & Susitna Avenue	1	0.0	0.0	0.0	-5.0	0%	0%	0%	-500.0%
Talkeetna Street & Railroad Avenue	1	0.0	0.0	0.0	-18.0	0%	0%	0%	-1800.0%
Parks Highway @ Yenlo Street	63	0.0	0.0	0.0	-35.7	0%	0%	0%	-56.6%
Yenlo Street & Herning Avenue	8	0.0	0.0	0.0	-6.0	0%	0%	0%	-75.0%
Yenlo Street & Swanson Avenue	3	0.0	0.0	0.0	-8.8	0%	0%	0%	-293.3%
Bogard Road @ Lang Street (Yenlo Extension)**	1	0.0	0.0	0.0	-7.0	0.0	0.0	0.0	-700.0%

Intersections Affected by Alternatives A-D						Modified to reassign crashes on Main/KGB and Yenlo/Talkeetna for Alt D one-way street network.			
Intersection	Intersection Crashes 1999 to 2008	Alt A Crash Reduction (# of crashes)	Alt B Crash Reduction (# of crashes)	Alt C Crash Reduction (# of Crashes)	Alt D Crash Reduction (# of Crashes inc. 1-Way Adj)	Alt A Crash Reduction (% of TOTAL crashes)	Alt B Crash Reduction (% of TOTAL crashes)	Alt C Crash Reduction (% of TOTAL crashes)	Alt D Crash Reduction (% of TOTAL crashes)***
Knik Street @ Railroad Avenue*	0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Knik Street @ Susitna Avenue*	0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Boundary Street & Herning Avenue	18	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Boundary Street & Swanson Avenue	2	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Parks Highway @ Boundary Ave	74	0.0	0.0	0.0	0.0	0%	0%	0%	0%
ALL Affected Intersections	480	18.4	25.7	24.6	45.1	3.83%	5.34%	5.13%	9.39%
Affected Intersections with Crash Rates Greater Than the Average for Statewide Population	365	12.0	19.95	19.95	33.35	3.29%	5.47%	5.47%	9.14%
Crash Increase	Adjusted for New Signal during analysis period					Intersections within Alternative "D" Couplet but not altered by proposed improvements.			

* No recorded crashes at this intersection from 1999-2008.
** Crashes for Alternative D reassigned from Main Street @ Bogard/Nelson. (New intersection)
*** An increase in crashes for Alternative D is generally the result of Main Street crashes for southbound reassigned to northbound Yenlo Street.
NOTE: Increases in crashes for intersections under Alternative D is due to northbound related crashes that were reassigned from Main Street/KGB to Talkeetna/Yenlo Streets to account for the one-way couplet.

Table 4: Intersection Crash Rates for Additional Intersections Evaluated in the Traffic Study Update

2.3 Summary of Crash Reduction at Affected Intersections under Each Alternative

The total number of crashes by severity was tallied for the 27 intersections modified by alternatives A, B, C or D. Table 5 below displays crash costs by crash severity and summarizes the number of crashes for ALL modified intersections as well as only those affected intersections with a greater than average crash rate.

An annual crash cost (based on 1999-2008 crash data and KABCO crash costs) and 20 year crash cost savings were computed for intersections which would be modified by Alternatives A, B, C or D. A separate analysis was performed for ALL modified intersections as well as only those intersections with a greater than average crash rate. The results are summarized in Table 6 below.

KABCO Crash Cost*	$ 5,800,000	$ 400,000	$ 80,000	$ 4,500	
	Fatality	Major Injury	Minor Injury	Property Damage Only (PDO)	TOTAL
Total Intersection Crashes (for intersections affected by Alternatives A-D)	0	9	112	354	480
Affected Intersections with >Average Crash Rates Only	0	8	84	273	365

* Current KABCO crash costs taken from ADOTPF Design and Construction Standards, Cost Effectiveness Analysis website. http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/2008_kabco_costs.pdf

Table 5: 1999-2008 TOTAL Crashes at Affected Intersections by Severity

Annual Crash Reduction & Crash Cost Savings for Alternatives A-D		10 Year Crash Cost (1999-2008)	Annual Crash Cost (1999-2008)	Crash Reduction for Alternative	Annual Crash Cost Savings*	NPW of 20-year Cost Savings**
Alternative A	Total Intersection Crashes (affected by roadway imp.)	$14,175,500	$1,417,550	3.83%	$54,339	$809,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	3.29%	$36,653	$546,000.00
Alternative B	Total Intersection Crashes (affected by roadway imp.)	$14,175,500	$1,417,550	5.34%	$75,750	$1,127,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	5.47%	$60,935	$907,000.00
Alternative C	Total Intersection Crashes (affected by roadway imp.)	$14,175,500	$1,417,550	5.13%	$72,649	$1,081,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	5.47%	$60,935	$907,000.00
Alternative D	Total Intersection Crashes (affected by roadway imp.)	$14,175,500	$1,417,550	9.39%	$133,043	$1,980,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	9.14%	$101,864	$1,516,000.00

* Annual crash cost savings based on 2009 KABCO crash costs by crash severity from ADOTPF http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/2008_kabco_costs.pdf
** Computed annual crash cost savings and a 3% compound interest rate were used to obtain net present worth (NPW) of 20 year cost savings.

Table 6: Annual Crash Reduction & Crash Cost Savings for Alternatives A-D

3 Rail Elements – Updated Accident Prediction Value (APV)

As part of this traffic study update, the USDOT APV calculated by ADOTPF for the Knik-Goose Bay Road railroad/highway at-grade crossing between the Parks Highway and Railroad Avenue was updated from the 2006 study to reflect current railroad and highway traffic conditions. The 2006 study, using data from 2002, calculated an APV for the Knik-Goose Bay Road crossing of **0.3586** accidents per year, making this crossing the fourth highest of public railroad/highway at-grade crossings in the state. The 2002 APV value indicated that the crossing treatment would not require changes based on the Alaska Policy on Railroad/Highway Crossings adopted by the Alaska Railroad and the ADOTPF in 1988.

KELLC computed APV for crossing based upon most recent available traffic and train data. The updated APV using train movement and vehicle movement data as of 2009 was calculated to be **0.1985**, making it the ninth highest in the state. Table 7 below summarizes traffic data for the 2002 APV versus the 2009 APV update:

APV Year	AADT-Vehicles	5 Yr. Vehicle-train or Vehicle-Vehicle Crashes	Highway Speed	Track Speed	Day Through Train Movements	Night Through Train Movements	Calculated APV	Statewide Rank
2002	10060	7*	35	25	11	7	0.3586	4th
2009	9250	3**	35	25	12	7	0.1985	9th

* 2002 APV included all crashes, including vehicle-vehicle crashes not necessarily related to the crossing. New APV calculations currently used by ADOTPF only include vehicle-train or vehicle-railroad device crashes.
** 2009 APV included 1 vehicle-train crash and 2 vehicle-gate arm crashes. 4 other vehicle-vehicle crashes in the vicinity of the crossing were not included.

Table 7: Accident Prediction Value Computations for Knik-Goose Bay Road Railroad/Highway Grade Crossing, 2002 and 2009

3.1 Alaska Policy on Railroad/Highway Crossings and APV Values

The Alaska Policy on Railroad/Highway Crossings, September 1988, forms the basis for determining crossing protection at railroad/highway at-grade crossings in Alaska. This policy describes the APV as:

> *"The computed "DOT Accident Prediction Value" (APV) of a crossing is the*
> *product of a series of factors representing the various characteristics of the*

crossing, and is equivalent to the expected number of accidents per year at that crossing."

The policy goes on to explain how the APV is used to determine the level of crossing protection at existing or new railroad/highway at-grade crossings.

> *"The DOT Accident Prevention Value (APV) should be used as one factor in classifying and prioritizing crossings for improvements"*

> *"The DOT Accident Prediction Values will be used as a factor in determining protection at new crossings. The new crossing will also be compared to existing crossings of similar geometric characteristics and rail and highway traffic densities. The comparison will also consider accident history and the effect of accidents on the DOT Accident Prediction Value.*

Since the Knik-Goose Bay Road railroad/highway at-grade crossing is an existing signalized and gated crossing with a train movement, vehicle movement, and crash information history, a comparison to other similar crossings is not necessary.

Appendix B of the policy contains the following table to determine crossing protection based on existing traffic control devices in place.

ALASKA POLICY ON RAILROAD/HIGHWAY CROSSINGS
APPENDIX B
Changes in Level of Protection
Revised September 1 ,1988

Existing traffic control device	Calculated Accident Prediction Value (APV)	Recommended Action for Improvement
Passive	0.08 to 0.12	*See note below.
	0.12 to 0.15	Flashing lights.
	0.15 to 0.23	Flashing lights or gates and flashing lights.
	0.23 to 12.4	Gates and flashing lights.
	12.4 to 18.5	Gates and flashing lights or grade separation.
	Greater than 18.5	Grade separation.
Flashing lights	0.12 to 0.18	*See note below.
	0.18 to 3.7	Gate and flashing lights.
	3.7 to 5.6	Gates and flashing lights or grade separation.
	Greater than 5.6	Grade separation.
Gates	1.32 to 1.98	*See note below.
	Greater than 1.98	Grade separation.

• NOTE - When the calculated hazard index falls within this range the decision may be to do nothing, improve the existing traffic control system, install a different type of traffic control system, or make some other improvement at the crossing.

Table 8: Recommended Changes in Level of Protection from the 1988 Alaska Policy on Railroad/Highway Crossings

3.2   Operational Concerns and Advantages of Upgrade Alternatives

Operationally, the existing at-grade crossing has issues relating to its proximity to the Parks Highway, including the inability to store vehicles between the crossing and the Parks Highway during train operations. Less than 70 feet exists between the eastbound through lane of the Parks Highway and the tracks. Also, this crossing lacks full gate closure on the roadway approach to the crossing due to the lack of a median and the length of gate that would be required. The gate arms here are either struck by vehicles or snapped off by high winds when in the upright position.

Alternatives A and B provide an opportunity to install additional shorter gate arms in the Main Street median to prevent drivers from going around the gate arm. Alternative D (option 1 or 2) would allow full control of traffic at the crossing by providing complete gate arm coverage with a relatively short gate.

3.3 Knik-Goose Bay Road APV using Alaska Policy on Railroad/Highway At-grade Crossings Crossing Protection Guidelines

The existing Knik-Goose Bay Road railroad/highway at-grade crossing is equipped with cantilevered flashing lights, automatic gates, signs, markings and railroad preemption connected to the nearby traffic signal at the Knik-Goose Bay Road/Parks Highway intersection. In 2008, a black-out "NO LEFT TURN" symbol sign was added on the westbound left turn lane of the Parks Highway to preempt the westbound permissive left turn when a train was occupying the crossing parallel to the Parks Highway. A sketch depicting the existing railroad/highway crossing configuration is contained in Appendix C.

In accordance with the 1988 at-grade crossing policy, the existing crossing, equipped as it is, would require an APV of at least 1.32 before additional improvements would normally be considered and greater than 1.98 before grade separation is considered.

A sensitivity analysis was performed to determine conditions where additional crossing protection beyond the flashing signals and gates might be warranted. Two scenarios were evaluated which increased the vehicle AADT to 13,000 (2025 projection) and 20,000; increased the 5 year crash frequency to 10 and 20 crashes; and increased the train movements to 25 and 40 per day. Results of these scenarios are shown in Table 9 below:

APV Year	AADT-Vehicles	5 Year Vehicle-train or Vehicle-RR Equipment Crashes	Highway Speed	Track Speed	Day Through Train Movements	Night Through Train Movements	Calculated APV
2025	13000	10	35	25	15	10	0.6134
2025	20000	20	35	25	25	15	1.3013

Table 9: Sensitivity Analysis for 2025 Accident Prediction Value for Knik-Goose Bay Road Railroad/Highway At-grade Crossing with Increased Vehicle and Train Movements and Crashes

As shown, further crossing improvements are not required based on the current APV of 0.1985 and projected APV values with 13,000-20,000 AADT, 10-20 at-grade crossing crashes, and 25-40 daily train movements.

4 Design Year (2035) Traffic Volumes

4.1 Wasilla Main Street Traffic Study 2006 Model

The traffic demand model constructed for the 2006 Wasilla Main Street Traffic Study was a micro-level QRSII model with a 2025 design year. The 2025 QRSII model was produced in 2005 using the available planning documents published at that time. The model included the central business district of Wasilla with separate Traffic Analysis Zones (TAZs) per block and road segments for each major road *and* minor cross street. The model was constructed in the four alternative Main Street configurations, as follows:

- Alternative A: 3-Lane Main Street

- Alternative B: 5-Lane Main Street

- Alternative C: Knik Street-Main Street two-way couplet

- Alternative D: Main Street/Knik-Goose Bay Road-Yenlo Street/Talkeetna Street one-way couplet

Each of the four configurations was analyzed with and without a Parks Highway bypass. The Parks Highway bypass is recommended in the 2025 Long Range Transportation Plan and is a two-lane expressway, in a separate corridor, that more or less parallels the Parks Highway, from the Seward Meridian Parkway to just beyond Big Lake Road. However, because the limits of the QRSII model did not extend beyond the vicinity of the central business district, the model did not include the impact of the Parks Highway bypass directly, but rather assumed a reduction in traffic volumes to and from the external nodes for the cases where the Parks Highway bypass was constructed.

Figure 7 on page 19 presents a screen shot of the 2025 QRSII model showing the model limits and the node and segment detail within the central business district.
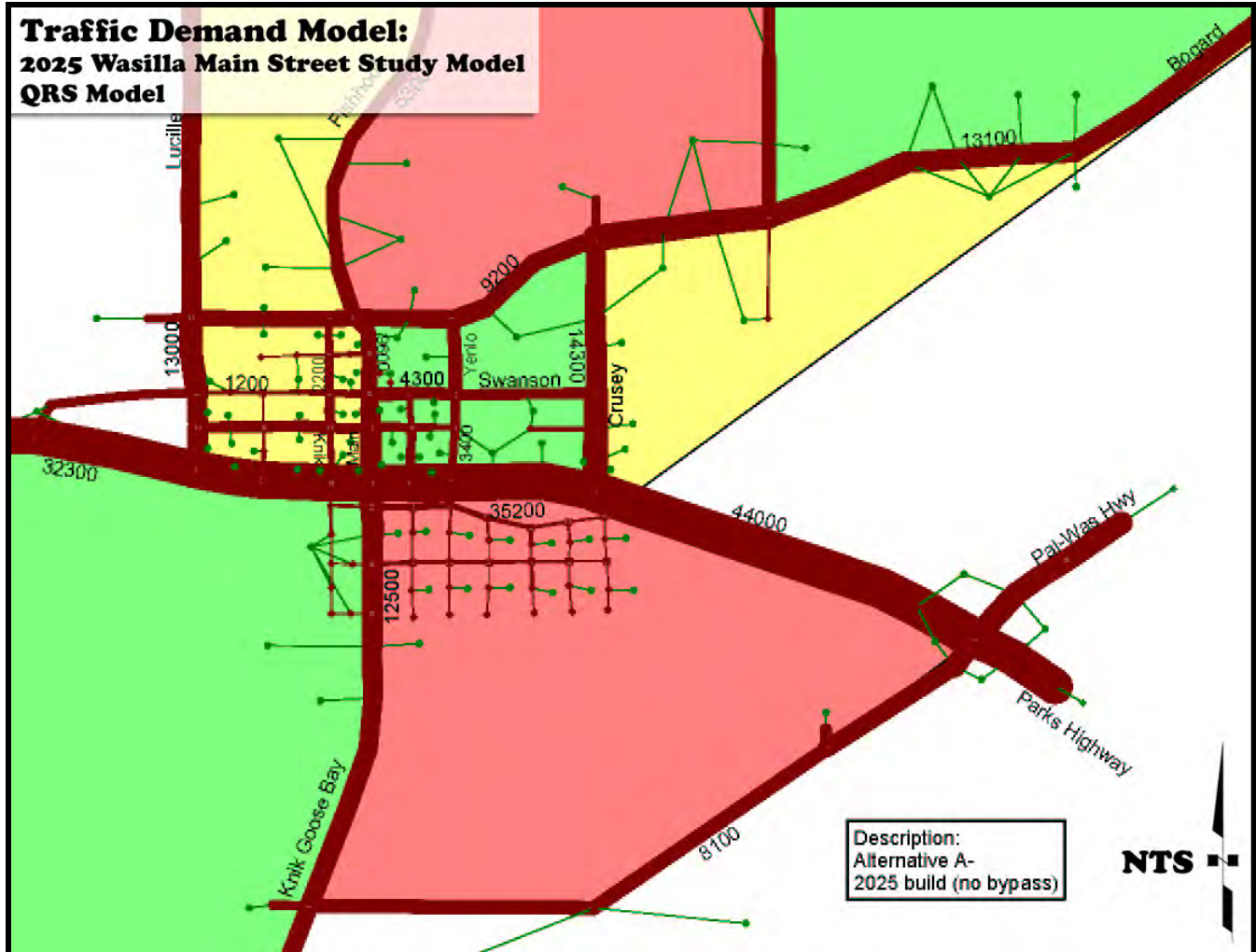
Figure 7 - 2025 Wasilla Main Street Model (QRSII)

The green nodes represent individual traffic generators, or TAZs.

4.2 Original 2007 LRTP Model

The current (August 2011) MSB traffic demand model was developed in 2007 as part of the MSB's 2025 LRTP. The LRTP model is a macro-level TransCAD model which includes every major road functionally classified as a collector or above within the entire borough, with a component of the Anchorage traffic demand model included to accurately depict commuter trips. The emphasis of the model as originally crafted precludes good results on many of the minor system streets, including local streets and some collectors. To be useful in design projects, KELLC will typically modify the model within the project area, which would include adjusting TAZ density and connections to the street system, creating additional links, and validating existing or committed projects presented in planning documents.

Figure 8 below presents a view of the unmodified 2025 LRTP demand model in the area of Wasilla Main Street.
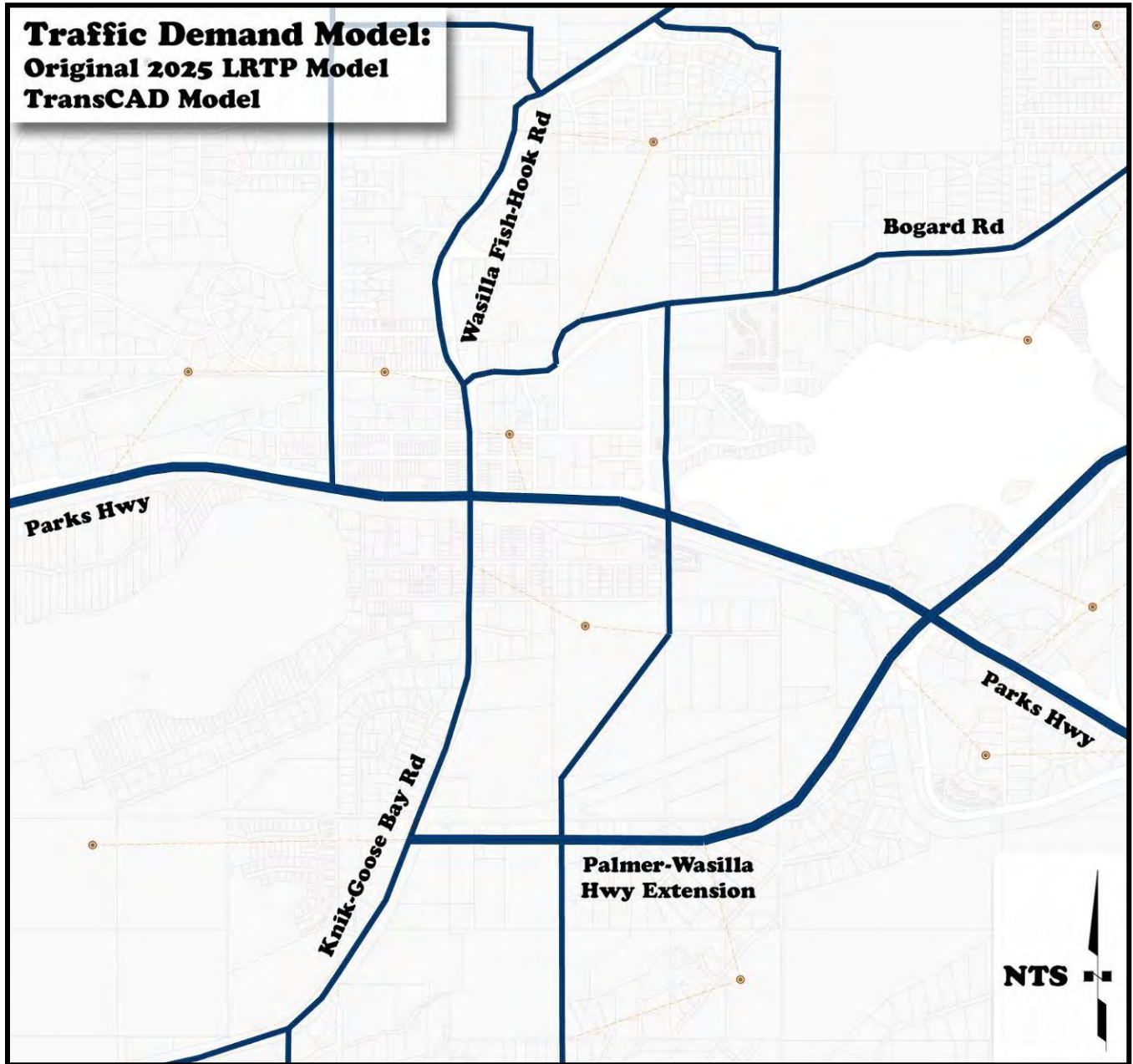
Figure 8 - Original 2025 LRTP Model

Note that traffic is generated at the node points and then distributed to the surrounding network through connector links. The 2025 LRTP model includes approximately 10 nodes in the vicinity of the project study area, whereas the QRSII model discussed previously included nearly 9 times that amount of node definition. However, the aggregate traffic generation volumes from the QRSII model TAZs are basically the same as the volumes generated by the corresponding LRTP TAZ regions.

4.3 Modified 2025 LRTP Model

KELLC regularly updates the 2025 LRTP model to provide more detailed network volumes in areas of interest by breaking large TAZs into smaller zones and adding or modifying road segments to better represent future conditions or alignments. When TAZ regions are divided into smaller sections, the socioeconomic data from the larger zone is distributed to the smaller zones. Because detailed socioeconomic data can be difficult to obtain, judgments must be made in determining where to distribute the data. Since the original QRSII model made researched judgments about the distribution of socioeconomic data surrounding Wasilla Main Street, the node data for the QRSII model was used as a basis to proportion the LRTP model data to similar zones. In such a way, the overall socioeconomic data for the LRTP zones was retained, but proportioned out to a more detailed TAZ structure which matches the QRSII model. The original TAZs and the modified TAZ regions are shown in Figure 9 on page 22.

Likewise, the LRTP model's road network was modified to include the minor cross streets which were a part of the QRSII model. Additionally, the model was updated to more accurately depict the LRTP committed road network alignments, travel speeds, and segment capacities. Figure 10 on page 23 presents the original LRTP model network and the modified road segments.

Traffic Demand Model TAZs:
Modified 2025 LRTP Model
TransCAD Model

New TAZ Boundaries

Original TAZ Boundaries

NTS
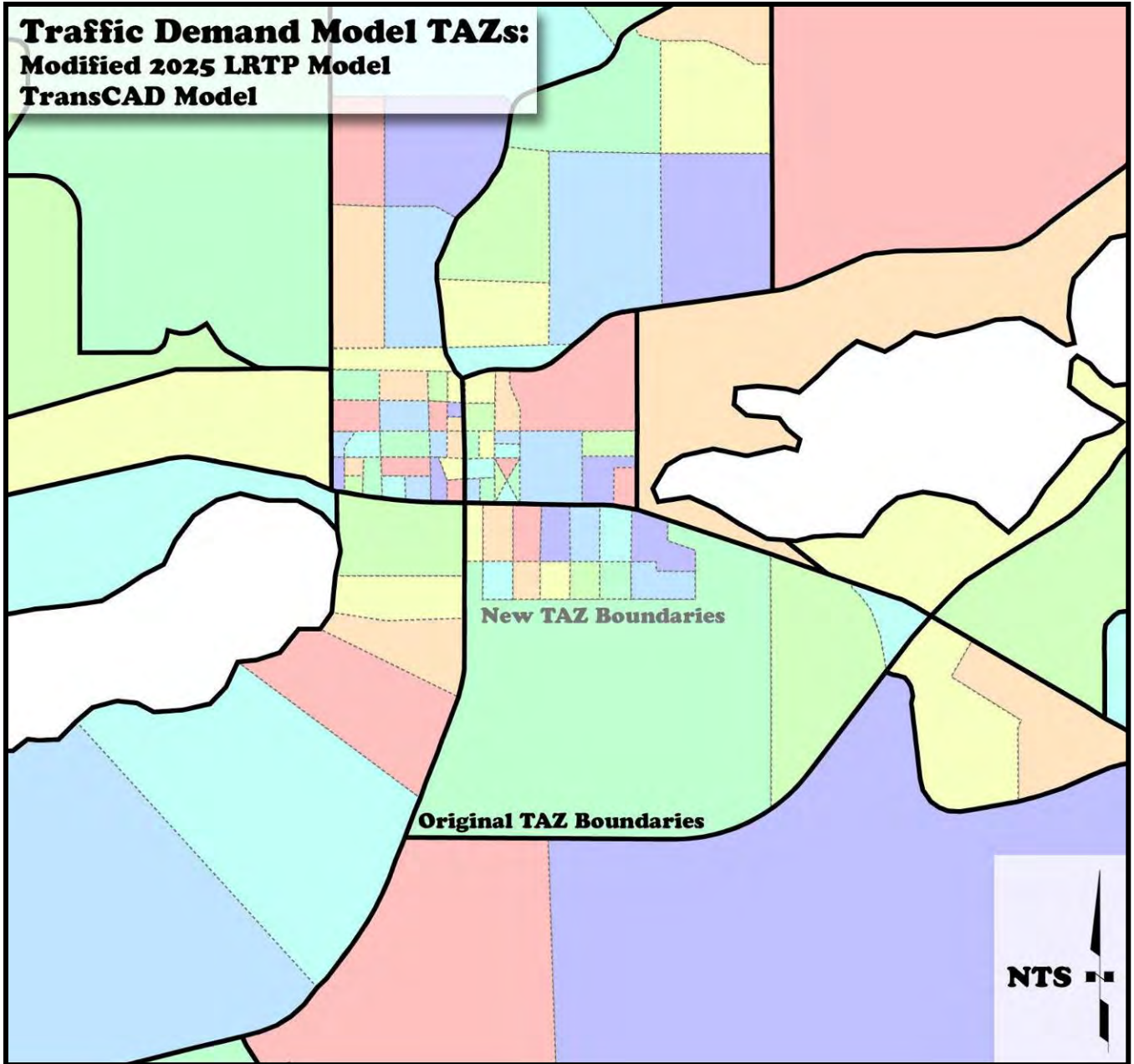
Figure 9 - 2025 LRTP Model: TAZ Region Modifications
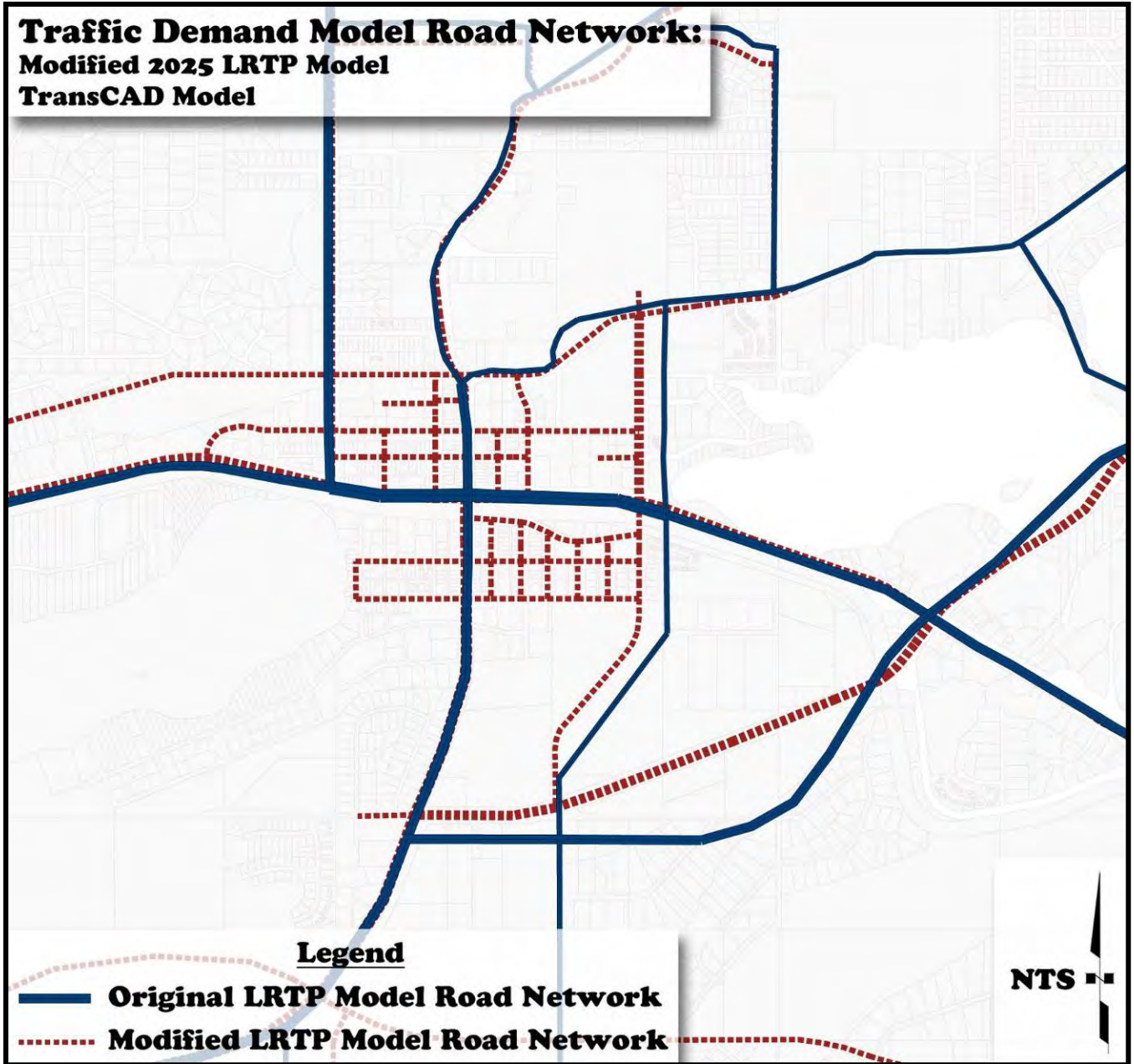
Figure 10 - 2025 LRTP Model: Road Modifications

Figure 11 below presents the resulting traffic model with the TAZ and road network modifications.
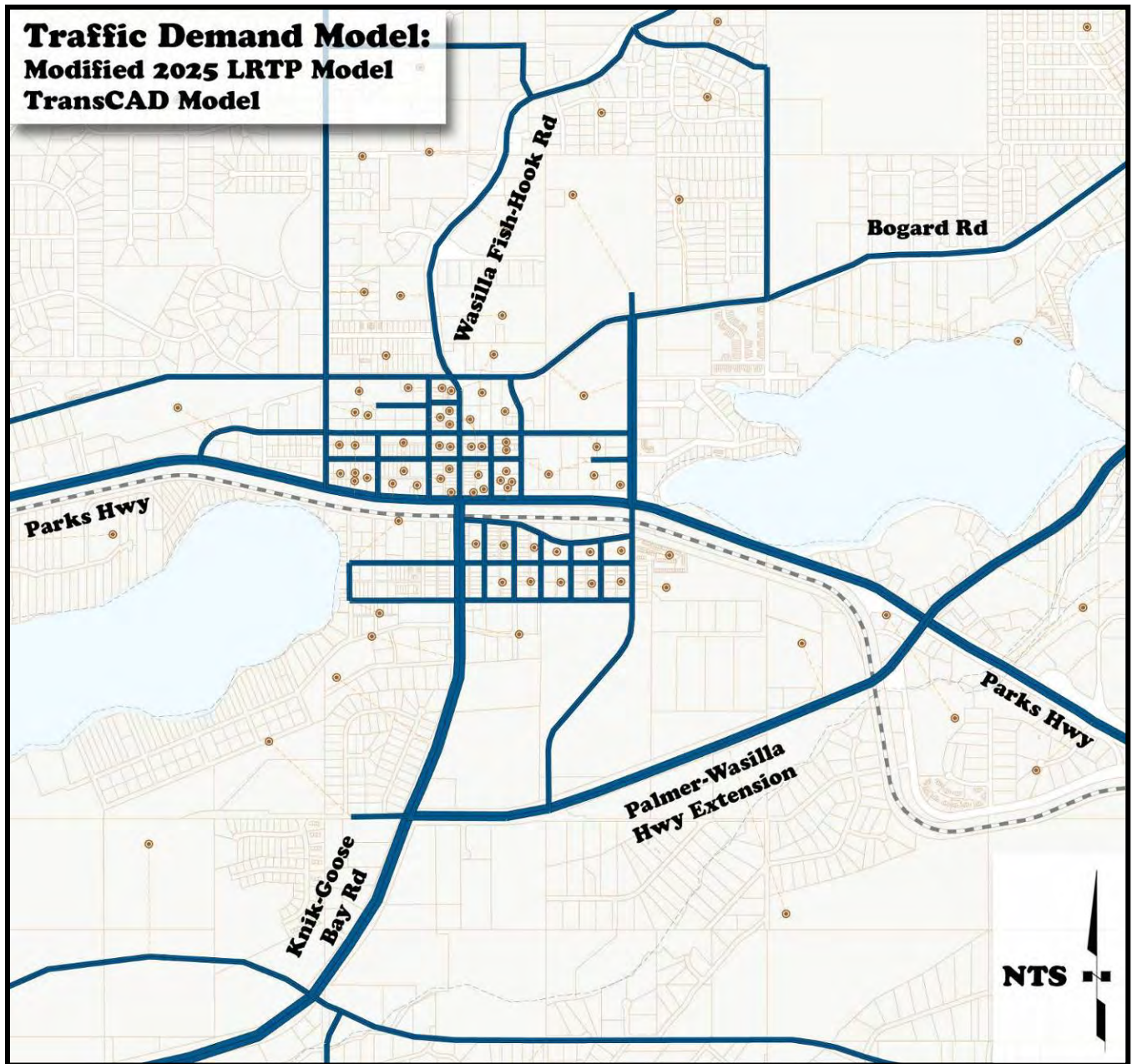
Figure 11 - 2025 LRTP Model: Modified Model Network

The 2025 AADT results are shown in Figure 12 and Figure 13, with and without a Parks Highway bypass, respectively.
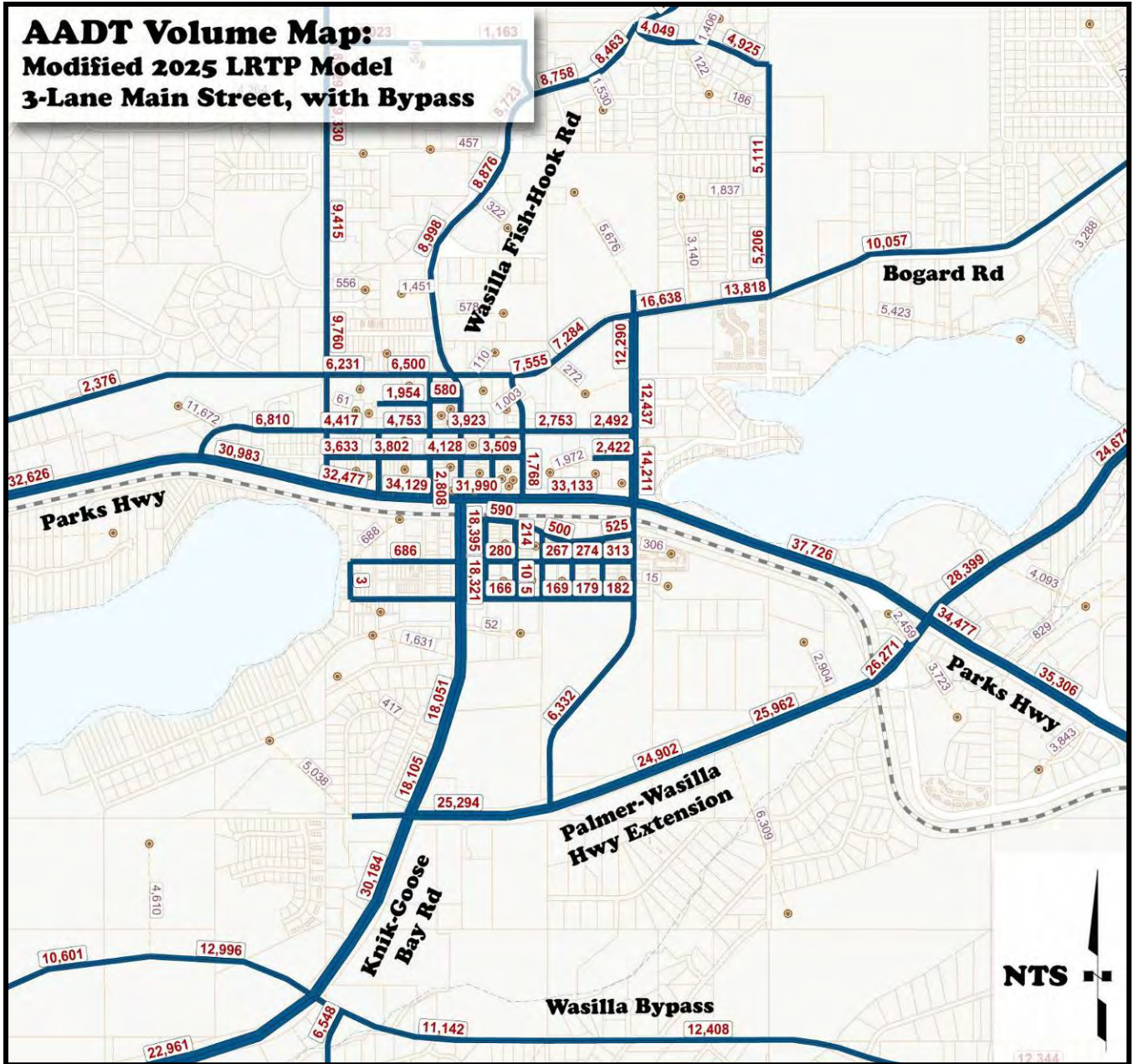
Figure 12 - 2025 AADT Volumes: 3-Lane Main Street with Bypass
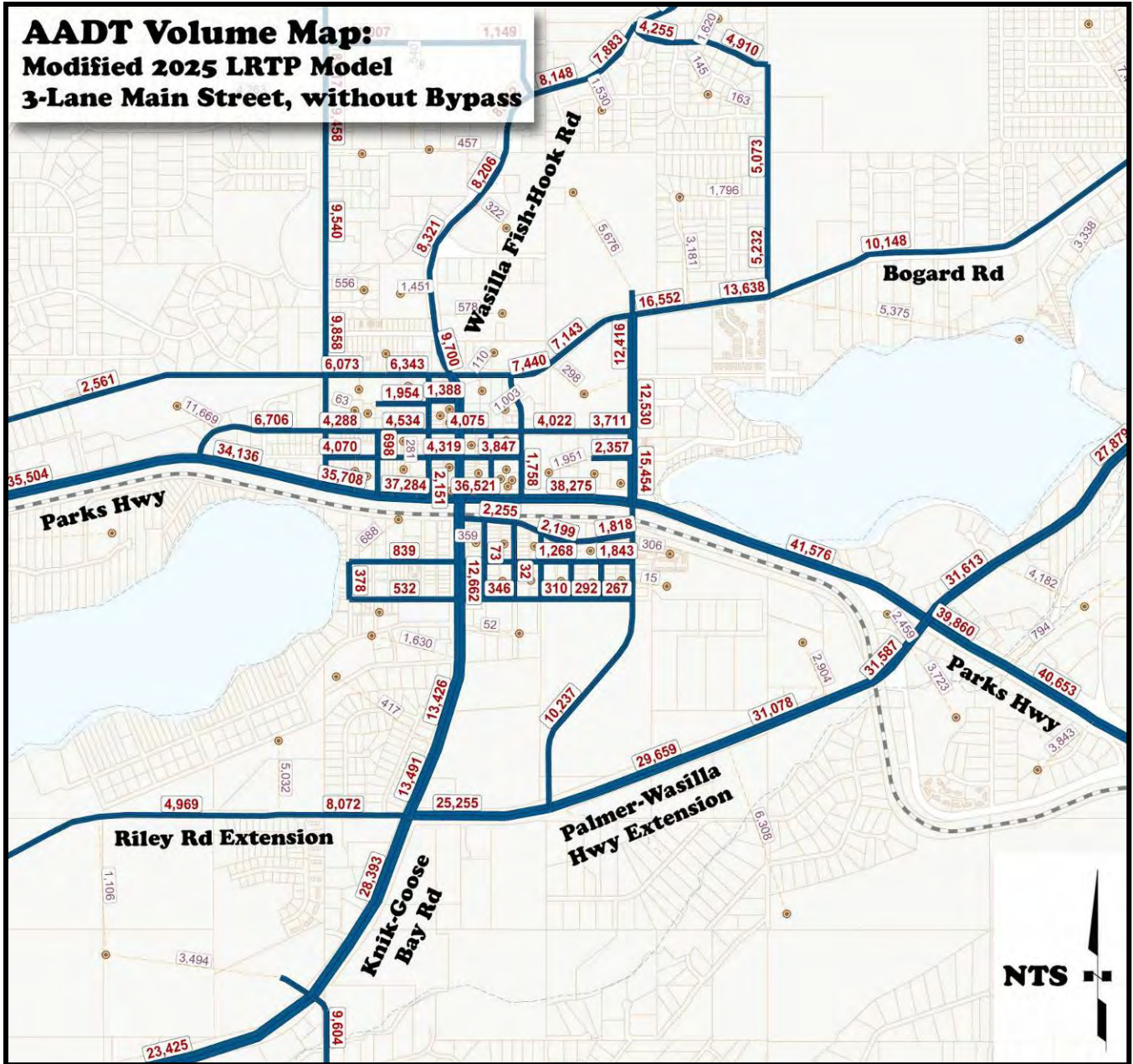
Figure 13 - 2025 AADT Volumes: 3-Lane Main Street without Bypass

Note that in the model without the Parks Highway bypass, a Riley Road extension project is modeled. This project is not mentioned in the 2025 LRTP, but is included in the Wasilla Official Streets and Highways Plan. The project would extend from the T-intersection of the Palmer-Wasilla Highway extension and Knik-Goose Bay Road, to the future Mack Drive corridor. It is assumed that if a full Parks Highway bypass were to be constructed, the Riley Road Extension would be a redundant parallel street and would be less likely to be built.

Ten separate TransCAD models were developed: a non-bypass model and a bypass model for each alternative (A through D), with separate models for options 1 and 2 of Alternative D. The 2025 model outputs for each of these alternatives are shown in Appendix D. Note that at this level of detail the No Action alternative is essentially the same as Alternative A, therefore, separate models were not created for these alternatives.

4.4 Annual Growth Rate

The annual growth rate was required to extrapolate 2025 volume results to the design year of 2035. It was determined by examining historical AADT volumes on major roads carrying traffic into and out of the Wasilla downtown area (Parks Highway, Bogard Road, Knik-Goose Bay Road, Wasilla Fishhook Road, and Lucille Street) and comparing it to historical annual population values for Wasilla. A regression equation relating traffic volume to population was developed. Using this equation, and using population forecasts for the MSB as the independent regression variable (from *Economic and Demographic Projections for Alaska and Greater Anchorage 2010-2035* published by the Institute of Social and Economic Research in December 2009), 2035 traffic volumes were predicted and a growth rate was developed between 2025 and 2035. The annual traffic growth rate developed using this methodology is 1.5% per year.

4.5 Post-Processing

Traffic demands modeled in TransCAD favor routes with higher segment capacity (more lanes) and shorter travel distance regardless of the number of signalized intersections or other elements that might limit roadway capacity or otherwise influence traveler route choice. To more accurately depict these effects on traveler route choice, the TransCAD results for each alternative were subjected to post-processing analysis in accordance with NCHRP 255 (*Highway Traffic Data for Urbanized Area Project Planning and Design*, December 1982). This methodology uses screen lines to better model traveler route choice by taking into account existing travel patterns. Under this methodology, traffic that exceeds the roadway capacity is moved to an under capacity roadway or removed from the model entirely (assuming that drivers desiring to use an over-capacity roadway would choose to travel at different times of the day).

The post-processing analysis used two screen lines crossing east-west roads (to balance the distribution of traffic on Seldon Road, Bogard Road, the Parks Highway, and either the Palmer-Wasilla Highway Extension or the Parks Highway Bypass) and three screen lines crossing north-south roads (to balance the distribution of traffic on Lucille Road, Wasilla Main Street, and Crusey Street). Using

these screen lines, 2035 AADT was computed for each of the roadways of interest. The resulting 2035 AADTs for each alternative and option are shown in Appendix E.

It should be noted that the 2007 LRTP TransCAD model forecasts very heavy volumes on the Parks Highway – such that the demand exceeds the capacity of the roadway. This report assumes that other projects will deal with this overcapacity demand, either by relocating the traffic or through expansion of the Parks Highway. If no additional projects are built and the travel demand grows as forecasted by the model, in future years the Parks Highway traffic can be expected to experience more congestion and delay than that shown in this report.

4.6   Design Hour Volume

The design hour volume reflects the portion of the AADT that is expected in the 30th highest peak traffic hour of the year. The American Association of State Highway and Transportation Officials (AASHTO) recommends that in urban areas, the design hour volume should be considered to be between 8% and 10% of the AADT. In the 2006 report, the design hour volume was assumed to be 9.22%, based on averaging the actual percentage for the 30th highest hour recorded at the permanent traffic recorder on the Parks Highway for the years 1999 to 2003. For this updated report, the design hour volume was assumed to be 10%, based on data from the permanent traffic recorder on the Parks Highway at Broadview, where the design hour volume was between 10.3% and 10.5% from 2007 to 2009.

4.7   Turning Movement Counts

Based on the design hour volumes, turning movement counts at intersections were generated using a methodology from NCHRP 255. This methodology uses existing turning movement counts and future design hour volumes to forecast future turning movement counts. For the 2006 report, KE manually counted turning movements at the following intersections:

- Main Street/Wasilla Fishhook Road at Bogard Road/Nelson Avenue
- Main Street at Paulson Avenue
- Main Street at Swanson Avenue
- Main Street at Herning Avenue
- Main Street/Knik-Goose Bay Road at the Parks Highway

These field counts were used as the existing turning movement counts in this report for the analysis of these intersections in future years. For parallel intersections along Knik Street or Yenlo Street, turning movement counts from the matching Main Street intersection were used. For intersections south of the

Parks Highway, KELLC substituted observed generic turning movement count proportions of several other similar intersections around the State because actual intersection counts were unavailable.

After the future turning movement counts were developed for each intersection, the balance of volumes between intersections was examined. In instances where there will be little or no opportunity for vehicles to turn on or off of the road between intersections, the turning movement volumes were adjusted so that the volume of traffic leaving one intersection and arriving at the next was balanced. Final turning movement counts for each intersection under each alternative and option are shown in Appendix F.

5   Capacity Analysis

Intersection capacity analysis was performed to determine the level of service (LOS) for each intersection under each alternative, option, and scenario. Signalized LOS is determined using average control delay (in seconds). Table 10 shows the threshold values for each LOS level.

Average Control Delay (sec)	Level of Service
≤ 10	A
> 10 to 20	B
> 20 to 35	C
> 35 to 55	D
> 55 to 80	E
> 80	F

Table 10: Signalized Intersection Level of Service Thresholds

Unsignalized LOS is also determined using average control delay (in seconds), with a different set of threshold values, as shown in Table 11.

Average Control Delay (sec)	Level of Service
≤ 10	A
> 10 to 15	B
> 15 to 25	C
> 25 to 35	D
> 35 to 50	E
> 50	F

Table 11: Unsignalized Intersection Level of Service Thresholds

The AASHTO *Policy on the Geometric Design of Highways and Streets (GDHS)* provides LOS guidelines based upon functional classification of the facility, rural or urban setting, and terrain. Figure 14 on page 31 presents the table, extracted from the GDHS, concerning AASHTO's recommendations for appropriate LOS thresholds for different functional classifications and area/terrain types.

Functional class	Appropriate level of service for specified combinations of area and terrain type			
	Rural level	Rural rolling	Rural mountainous	Urban and suburban
Freeway	B	B	C	C
Arterial (Including Interstate)	B	B	C	C
Collector	C	C	D	D
Local	D	D	D	D

Note: Modified from AASHTO GDHS 2001 Exhibit 2-32

Figure 14 - AASHTO Level of Service Recommendations

Both the ADOTPF Functional Classification Update Project and the MSB Official Streets and Highways Plan identify the functional classification of roads in the study area, with slight variations.

	ADOTPF Functional Classification Update Project	MSB Official Streets & Highways Plan
Wasilla Fishhook Road	Urban Minor Arterial	Minor Arterial
Main Street	Urban Other Principal Arterial	Major Arterial
Knik-Goose Bay Road	Urban Other Principal Arterial	Major Arterial
Nelson Avenue	Urban Collector	Minor Collector
Bogard Road	Urban Minor Arterial	Major Arterial
Railroad Avenue	Urban Collector	Local Street
Crusey Street	Urban Collector	Minor Arterial
Lucille Street	Urban Minor Arterial	Major Collector
Lake View Avenue	Local Street	Minor Collector

Table 12 – Functional Classification of Area Streets

Other cross streets in the study area are functionally classified as local streets.

Based on these functional classifications, and AASHTO's guidelines, the design LOS for Main Street intersections is C.

5.1 Intersection Control

Each intersection was analyzed to determine if signalization should be considered by 2035. For a future condition, the best method for this analysis is the Caltrans method, which uses the forecast AADTs for each approach to the intersection and evaluates them based on the Manual on Uniform Traffic Control Devices (MUTCD) signal warrants. Table 13 shows which intersections are considered for a signal in the design year, according to this analysis.

The decision of whether or not to install a signal depends on more than simply whether or not the intersection meets one or more of the MUTCD signal warrants. In addition to these warrants, safety and operations should also be considered. Signals currently exist at the intersection of Bogard

Road/Nelson Avenue and Main Street and at the intersection of the Parks Highway and Main Street. These signals are about ¼ mile apart. If all of the intersections that warrant signals in Table 13 were signalized, many of the signals would be 1/16 of a mile apart or closer. The intersections suggested for signalization in the 2006 traffic study report would create a network of signals at 1/8 mile spacing.

As signals are placed closer together in a two-way street network, operating speeds tend to drop. Table 9-2 of the Transportation Research Board Access Management Manual indicates that progressing traffic at 25 mph (the speed limit on Main Street) requires at least ¼ mile spacing between signalized intersections. According to the Access Management Manual, the spacing suggested in the 2006 traffic study report (one signal every two blocks) would reduce travel speed along the corridor to 15 mph or less. As such, signal spacing closer than one signal every two blocks should not be considered for two-way streets. Additionally, an examination of the overall traffic network for the two-way street alternatives indicates that the network is sufficiently well-connected to allow drivers to choose a signalized intersection during heavy traffic periods when an unsignalized intersection becomes unusable. Thus, it is unnecessary to signalize all of the intersections for which signals are warranted by the Caltrans method and the two-block spacing of signals was used as a minimum spacing.

For a one-way street network, operations are less impacted by signals that are spaced closer together. Thus, for Alternative D, signals can be spaced more closely without affecting travel speed and segment capacity. Travel speed on one-way streets with close signals (one signal every block, for instance) can be as high as 25 to 30 mph and can be controlled by signal coordination.

Based on signal warrant and spacing considerations, this updated traffic report promotes the installation of traffic signals at most of the same locations that were promoted in the 2006 report.

	One or more signal criteria met in 2035 using Caltrans Method?									
	Alt A		Alt B		Alt C		Alt D, option 1		Alt D, option 2	
	No bypass	Bypass	No bypass	Bypass	No bypass	Bypass	No bypass	Bypass	No bypass	Bypass
Bogard Road/Nelson Avenue and Main Street	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Paulson Avenue and Main Street	No	No	No	No	No	No	No	No	No	No
Swanson Avenue and Main Street	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Herning Avenue and Main Street	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parks Highway and Main Street/Knik-Goose Bay Road	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Railroad Avenue and Knik-Goose Bay Road	No	Yes	No	No	No	No	No	No	No	No
Susitna Avenue and Knik-Goose Bay Road	No	No	No	No	No	No	No	No	No	No
Lakeview Avenue and Knik-Goose Bay Road							Yes	Yes	No	Yes
Nelson Avenue and Knik Street					Yes	Yes				
Paulson Avenue and Knik Street					No	No				
Swanson Avenue and Knik Street					Yes	Yes				
Herning Avenue and Knik Street					No	Yes				
Susitna Avenue and Knik Street					No	No				
Park Avenue and Knik-Goose Bay Road					Yes	Yes				
Bogard Road and Yenlo Street							Yes	Yes	Yes	Yes
Swanson Avenue and Yenlo Street							Yes	Yes	Yes	Yes
Herning Avenue and Yenlo Street							Yes	Yes	Yes	Yes
Parks Highway and Yenlo Street/Talkeetna Street							Yes	Yes	Yes	Yes
Railroad Avenue and Talkeetna Street							No	No	No	No
Susitna Avenue and Talkeetna Street							No	No	No	No
Lakeview Avenue and Talkeetna Street							Yes	Yes	No	Yes

Table 13: Results of Signal Warrant Analysis (2035 volumes)

For Alternatives A and B, signalize:

- Swanson Avenue at Main Street
- Susitna Avenue at Knik-Goose Bay Road

For Alternative C, signalize:

- Swanson Avenue at Main Street
- Nelson Avenue at Knik Street
- Swanson Avenue at Knik Street
- Park Avenue at Knik-Goose Bay Road

For Alternative D (all options), signalize:

- Swanson Avenue at Main Street
- Lake View Avenue at Knik-Goose Bay Road
- Bogard Road at Yenlo Street
- Swanson Avenue at Yenlo Street
- Parks Highway at Yenlo Street/Talkeetna Street

5.2 Auxiliary Lane Configurations

Synchro models were developed for each alternative, option, and scenario using the turning movements and intersection control types described above. Using Synchro (version 8), signal timings (cycle lengths, phasing, phase splits, offsets etc.) were developed. The 140 second cycle length used in the 2006 report was found to work adequately in each situation, therefore it was retained for the updated models, with some intersections being half-cycled (operating at 70-second cycles), as appropriate. Where acceptable LOS (C or better) could not be met, adjustments to signal timings were performed, or auxiliary lanes were added. In addition to LOS, the volume-to-capacity (v/c) ratio and queue lengths were also considered in the selection of appropriate auxiliary lane configurations. In some cases, it was found that additional auxiliary lanes suggested in the 2006 report are not necessary given the updated traffic volume forecasts. In these instances, the excess auxiliary lanes were removed from the proposed configuration.

NCHRP 279: *Intersection Channelization Design Guide* presents a minimum turn lane length and a desired turn lane length. The calculation of these lengths is as follows:

- **Minimum turn lane length** includes length for queue storage and provides additional deceleration length to allow a turning vehicle to enter the bay taper at 10 mph less than the approach speed and then immediately decelerate while in the bay taper in time to stop behind the queue. For approach speeds less than 40 mph, only queue storage length is provided.

- **Desired turn lane length** includes length for queue storage and provides additional deceleration length to allow a turning vehicle to enter the bay taper at the approach speed and begin deceleration upon entering the auxiliary lane. The length of the adjacent queue is also considered and length is added if necessary so that turning vehicles can access the turn lane behind the adjacent queue. Table 14 summarizes elements of these calculations.

	Minimum Turn Lane Length Calculation	Desirable Turn Lane Length Calculation	
Queue	95th percentile (2035)	95th percentile (2035)	Adjacent Queue Length
Deceleration	10 mph reduction prior to entering bay taper, deceleration begins in bay taper	All deceleration in auxiliary lane	
		Choose Maximum	
Minimum Auxiliary Turn Lane Length	100 feet (Highway Preconstruction Manual, 1150)		
Maximum Auxiliary Turn Lane Length	No Standard or Guideline		
Approach Speeds (Deceleration Distance)	- Main Street- 25 mph - Knik-Goose Bay Road- 35 mph - Knik Street- 25 mph - Yenlo Street- 25 mph - Talkeetna Street- 35 mph - Bogard Road- 40 mph - Nelson Avenue- 25 mph - Swanson Avenue- 25 mph - Parks Highway- 45 mph - Park Avenue- 25 mph - Wasilla-Fishhook Road – 35 mph - Lake View Avenue- 25 mph		
Deceleration Rate	6.9 feet per second (*Transportation and Land Development*, ITE- 85% decelerate in turn lanes at 6.9 fps or higher)		
Bay Taper	6:1 to 15:1, distributed over speed ranges of 25 to 50 mph (AASHTO, GDHS)		

Table 14: Turn Lane Length Calculation Parameters

For unsignalized intersections, NCHRP 457: *Evaluating Intersection Improvements – An Engineering Study Guide* is used to determine auxiliary lane length. For all unsignalized intersections in this study area, the left turn lane length should be 150 feet long, unless it must be shortened due to geometric constraints.

At signalized intersections, it is necessary to install a raised median for 100 to 150 feet from the stop bar to aid with signal detection. In addition, where there will be long queues or back-to-back left turn auxiliary lanes at adjacent signals, raised medians should be installed to separate opposite direction left turn vehicles.

It should be noted that turn lane lengths recommended in this report are conceptual level designs and may need to be adjusted during the design process.

5.2.1   Alternative A

Table 15 shows the 95th percentile queue length, the minimum lane length, and the desired lane length for the signalized intersections in the study area for Alternative A. The recommended auxiliary lane lengths and bay tapers for each intersection are discussed in the following subsections.

5.2.1.1   Bogard Road/Nelson Avenue Intersection

At the intersection of Bogard Road/Nelson Avenue with Main Street/Wasilla Fishhook Road, the recommended auxiliary lane lengths are constrained somewhat by the surrounding access points. Figure 15 and Table 16 present the recommended auxiliary lane lengths and taper rates. Note in the figure that the eastbound left turn lane is shortened from desirable due to the intersection of Nelson Avenue with Knik Street. The 2006 study shows this segment of roadway being redesigned with the left turn lane running the entire length from Knik Street to Main Street. This configuration would give the full desirable length for the left turn lane, but would not provide the transition taper. Under both configurations, left turning vehicles will be blocked from the left turn lane by the adjacent through vehicle queue in the peak hour.

As can be seen in Figure 15, the proposed northbound left turn lane and taper extend past Paulson Avenue, requiring that Paulson Avenue and the driveway across from it be converted to right-in/right-out with a median barrier on Main Street. This is consistent with the design proposed in the 2006 study.

95th Percentile Queues, Feet, Design Year 2035												
Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Main St & Nelson Ave/ Bogard Rd	36	342		59	382		43	241		120	116	22
Main St & Swanson Ave	59	79		106	117		17	150		6	98	
Main St & Parks Hwy	245	749		474	951	41	427	303	58	156	528	155
Main St & Susitna Ave		50			34		6	268		1	104	
Minimum Auxiliary Lane Length, Feet: Queue Storage and Minimum Deceleration Length (Enter bay taper at 10 mph less than approach speed, deceleration begins in bay taper)												
Intersection	EBL		EBR	WBL		WBR	NBL		NBR	SBL		SBR
Main St & Nelson Ave/ Bogard Rd	100			100			100			125		100
Main St & Swanson Ave	100			100			100			100		
Main St & Parks Hwy	400			475		100	425		100	150		150
Main St & Susitna Ave							100			100		
Desirable Auxiliary Lane Length, Feet: Queue Storage and Desirable Deceleration Length (Enter bay taper at approach speed, delay deceleration until vehicle enters lane)												
Intersection	EBL		EBR	WBL		WBR	NBL		NBR	SBL		SBR
Main St & Nelson Ave/ Bogard Rd	350			300			250			125		125
Main St & Swanson Ave	100			125			150			100		
Main St & Parks Hwy	550			800		350	425		300	525		525
Main St & Susitna Ave							275			100		

Table 15: Queues and Lane Length Calculations for Alternative A Intersections (2035)

	EBL	WBL	NBL	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	168 (>M, <D)	300 (D)	250 (D)	125 (D)	125 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	10:1 (120 feet)	10:1 (120 feet)	10:1 (120 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 16: Auxiliary Lane Recommendations for Bogard Road/Nelson Avenue Intersection, Alternative A

Figure 15: Auxiliary Lane Length Recommendations for Bogard Road/Nelson Avenue Intersection, Alternative A

5.2.1.2 Swanson Avenue Intersection

At the intersection of Swanson Avenue with Main Street, there are also some physical constraints on the turn lane lengths. For the southbound left turn lane, the desirable turn lane length can be met, but it extends past the Post Office driveway and almost to Paulson Avenue, resulting in a median barrier being installed on Main Street from Swanson Avenue to Bogard Road/Nelson Avenue. For the northbound left turn lane, the desirable turn lane length of 125 feet cannot be met, due to the close proximity with Herning Avenue and the need to provide a southbound left turn lane and taper at that intersection. According to NCHRP 457, *Evaluating Intersection Improvements: An Engineering Study Guide* (which is referenced by the Highway Preconstruction Manual), the southbound bay at Herning Avenue should be 120 feet. Since adequate space is unavailable to fit both of these turn lanes in between the two intersections, the recommended turn lane length for both intersections was reduced to 90 feet, with 72 foot tapers. Another option would be to convert Herning Avenue to right-in/right-out only; however, Herning Avenue is a fairly high volume road, making this option less desirable.

For the eastbound and westbound left turn lanes, the desirable left turn lane length can be met. Note that the eastbound right turn lane recommended in the 2006 study is no longer recommended in this study.

	EBL	WBL	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	125 (D)	90 (<M)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 17: Auxiliary Lane Recommendations for Swanson Avenue Intersection, Alternative A

Figure 16: Auxiliary Lane Recommendations for Swanson Avenue Intersection, Alternative A

5.2.1.3 Parks Highway Intersection

For the Parks Highway intersection, the southbound through queue is very long and extends through the Herning Avenue intersection. The desirable turn lane lengths would extend far enough back to allow left and right turning vehicles to enter the turn lanes without being blocked by the extensive through queue; however, the actual left turn and right turn queues are quite short. Another consideration in making an auxiliary lane recommendation is the need to provide for queue storage and deceleration in the northbound left turn lane at Herning Avenue. As a result, the southbound auxiliary lane recommended length is 150 feet for both turn lanes.

The northbound left turn and through queues are both very long, extending through the Railroad Avenue intersection, but not fully reaching the Susitna Avenue intersection. Because of its proximity to the Parks Highway intersection, it is recommended that Railroad Avenue be restricted to right-in/right-out out movements. The recommended Parks Highway northbound left turn lane length is shortened somewhat to allow room for the Susitna Avenue southbound left turn lane.

The eastbound and westbound through movement queues on the Parks Highway are quite lengthy, but the desired left turn lane lengths can be accommodated because there is enough spacing between signals on the Parks Highway. It is recommended that the westbound right turn lane be shortened from desirable so that it does not extend through the intersection with Boundary Street, to the east of Main Street.

	EBL	WBL	WBR	NBL	NBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	550 (D)	800 (D)	300 (>M, <D)	410 (>M, <D)	300 (D)	150 (M)	150 (M)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	12:1 (144 feet)	12:1 (144 feet)	12:1 (144 feet)	10:1 (120 feet)	10:1 (120 feet)	6:1 (72 feet)	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 18: Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative A
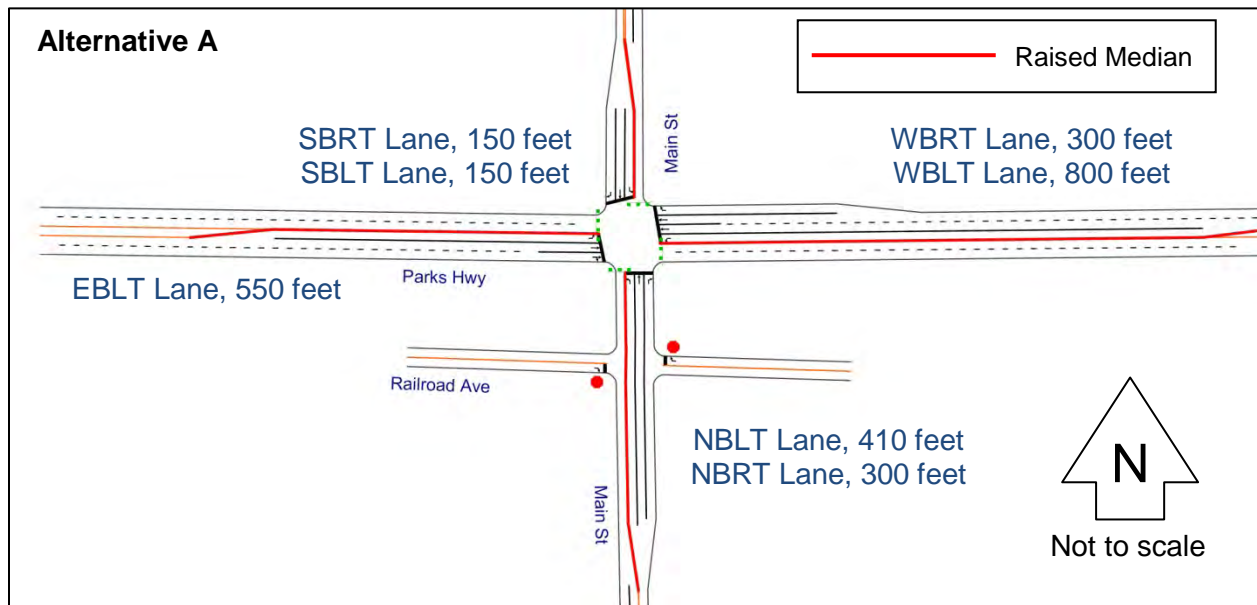
Figure 17: Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative A

5.2.1.4   *Susitna Avenue Intersection*

The southbound left turn lane at Susitna Avenue is reduced to the minimum length to accommodate the northbound left turn lane length for the Parks Highway. The northbound left turn lane extends to Park Avenue so that left turning vehicles will be able to enter the turn lane in spite of the lengthy northbound through queue.

	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	275 (D)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	10:1 (120 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 19:   Auxiliary Lane Recommendations for Susitna Avenue Intersection, Alternative A

Figure 18:   Auxiliary Lane Recommendations for Susitna Avenue Intersection, Alternative A

5.2.2   **Alternative B**

Table 20 shows the 95th percentile queue length, the minimum lane length, and the desired lane length for the signalized intersections in the study area for Alternative B. The recommended auxiliary lane lengths and bay tapers for each intersection are discussed in the following subsections.

95th Percentile Queues, Feet, Design Year 2035											
Intersection	EB L	EB T	EB R	WB L	WB T	WB R	NB L	NB T	NB R	SB L	SB T	SB R
Main St & Nelson Ave/ Bogard Rd	22	326		83	240		62	66		64	67	
Main St & Swanson Ave	55	65		102	128		15	81		8	73	
Main St & Parks Hwy	301	545	156	576	849	62	263	185	60	100	263	207
Main St & Susitna Ave		53			32		3	100		1	39	
Minimum Auxiliary Lane Length, Feet: Queue Storage and Minimum Deceleration Length (Enter bay taper at 10 mph less than approach speed, deceleration begins in bay taper)											
Intersection	EB L		EB R	WB L		WB R	NB L		NB R	SB L		SB R
Main St & Nelson Ave/ Bogard Rd	100			175			100			100		
Main St & Swanson Ave	100			100			100			100		
Main St & Parks Hwy	450		300	725		200	275		100	100		200
Main St & Susitna Ave							100			100		
Desirable Auxiliary Lane Length, Feet: Queue Storage and Desirable Deceleration Length (Enter bay taper at approach speed, delay deceleration until vehicle enters lane)											
Intersection	EB L		EB R	WB L		WB R	NB L		NB R	SB L		SB R
Main St & Nelson Ave/ Bogard Rd	325			325			100			100		
Main St & Swanson Ave	100			125			100			100		
Main St & Parks Hwy	625		475	900		375	275		175	275		275
Main St & Susitna Ave							100			100		

Table 20: Queues and Lane Length Calculations for Alternative B Intersections (2035)

5.2.2.1 *Bogard Road/Nelson Avenue Intersection*

At the intersection of Bogard Road/Nelson Avenue with Main Street/Wasilla Fishhook Road, the recommended auxiliary lane lengths are constrained somewhat by the surrounding access points. Figure 19 and Table 21 present the recommended auxiliary lane lengths and taper rates. Note in the figure that the eastbound left turn lane is shortened from desirable due to the intersection of Nelson Avenue with Knik Street. The 2006 study shows this segment of roadway being redesigned with the left turn lane running the entire length from Knik Street to Main Street. This configuration would give the full desirable length for the left turn lane, but would not provide the transition taper. Under both configurations, left turning vehicles will be blocked from the left turn lane by the adjacent through vehicle queue in the peak hour.

The desired northbound left turn lane for this alternative is much shorter because the northbound through queue is shorter, therefore with this alternative, there is a median opening at Paulson Avenue. This is consistent with the design proposed in the 2006 study.

	EBL	WBL	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	168 (>M, <D)	325 (D)	100 (D)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	10:1 (120 feet)	6:1 (72 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 21:   Auxiliary Lane Recommendations for Bogard Road/Nelson Avenue Intersection, Alternative B

Figure 19:   Auxiliary Lane Length Recommendations for Bogard Road/Nelson Avenue Intersection, Alternative B

5.2.2.2   Swanson Avenue Intersection

At the intersection of Swanson Avenue with Main Street, there are also some physical constraints on the turn lane lengths. For the southbound left turn lane, the desirable turn lane length can be met, but it extends past the Post Office driveway and meets the left turn lane for Paulson Avenue. For the northbound left turn lane, the desirable turn lane length of 125 feet cannot be met, just like with Alternative A, due to the close proximity with Herning Avenue and

the need to provide a southbound left turn lane and taper at that intersection. Since adequate space is unavailable to fit both of these turn lanes in between the two intersections, the recommended turn lane length for both intersections was reduced to 90 feet, with 72 foot tapers. Another option would be to convert Herning Avenue to right-in/right-out only; however, Herning Avenue is a fairly high volume road, making this option less desirable.

For the eastbound and westbound left turn lanes, the desirable left turn lane length can be met. Note that the eastbound right turn lane and eastbound dual left turn lanes recommended in the 2006 study are no longer recommended in this study.

	EBL	WBL	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	125 (D)	90 (<M)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 22: Auxiliary Lane Recommendations for Swanson Avenue Intersection, Alternative B

Figure 20: Auxiliary Lane Recommendations for Swanson Avenue Intersection, Alternative B

5.2.2.3 Parks Highway Intersection

For the Parks Highway intersection, the southbound through queue is very long and extends through the Herning Avenue intersection. The desirable turn lane lengths would extend far enough back to allow left and right turning vehicles to enter the turn lanes without being blocked by the extensive through queue; however, the actual left turn and right turn queues are quite short. Another consideration in making an auxiliary lane recommendation is the need to provide for queue storage and deceleration in the northbound left turn lane at Herning Avenue. As a result, the southbound auxiliary lane recommended length is 150 feet for both turn lanes.

The northbound left turn and through queues are both very long, extending through the Railroad Avenue intersection, but not fully reaching the Susitna Avenue intersection. Because of its proximity to the Parks Highway intersection, it is recommended that Railroad Avenue is restricted to right-in/right-out movements. The recommended Parks Highway northbound left turn lane length is shortened somewhat to allow room for the Susitna Avenue southbound left turn lane.

The eastbound and westbound through movement queues on the Parks Highway are quite lengthy, but the desired left turn lane lengths can be accommodated because there is enough spacing between signals on the Parks Highway. It is recommended that the westbound right turn lane be shortened from desirable so that it does not extend through the intersection with Boundary Street, to the east of Main Street. Also note that extending the eastbound and westbound left turn lanes as recommended will necessitate converting Yenlo Street and Knik Street to right-in-right-out movements only.

	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	625 (D)	475 (D)	900 (D)	300 (>M, <D)	275 (D)	175 (D)	275 (D)	275 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	12:1 (144 feet)	12:1 (144 feet)	12:1 (144 feet)	12:1 (144 feet)	10:1 (120 feet)	10:1 (120 feet)	6:1 (72 feet)	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length
Table 23:   Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative B

Figure 21: **Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative B**

5.2.2.4 Susitna Avenue Intersection

Both the southbound and northbound left turn lanes at Susitna Avenue can be built to the desirable length.

	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	10:1 (120 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 24: **Auxiliary Lane Recommendations for Susitna Avenue Intersection, Alternative B**

Figure 22: Auxiliary Lane Recommendations for Susitna Avenue Intersection, Alternative B

5.2.3   Alternative C

Table 25 shows the 95th percentile queue length, the minimum lane length, and the desired lane length for the signalized intersections in the study area for Alternative C. The recommended auxiliary lane lengths and bay tapers for each intersection are discussed in the following subsections.

95th Percentile Queues, Feet, Design Year 2035											
Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Main Street & Nelson Ave/ Bogard Rd	15	148		62	143		49	95	34	26	32	6
Main Street & Swanson Ave	11	6		91	107		11	90		6	105	
Main Street & Parks Hwy	273	645		339	951	66	301	284	42	162	404	182
Main Street & Park Ave	26		32				54	106			129	
Knik St & Nelson Ave		184		10	50		50	90		34	82	
Knik St & Swanson Ave	78	139		30	63		10	54		7	47	

Minimum Auxiliary Lane Length, Feet: Queue Storage and Minimum Deceleration Length (Enter bay taper at 10 mph less than approach speed, deceleration begins in bay taper)											
Intersection	EBL		EBR	WBL		WBR	NBL		NBR	SBL		SBR
Main Street & Nelson Ave/ Bogard Rd	100			175			100		100	100		100
Main Street & Swanson Ave	100			100			100			100		
Main Street & Parks Hwy	425			475		200	300		100	150		175
Main Street & Park Ave	100		100				100					
Knik St & Nelson Ave				100			100			100		
Knik St & Swanson Ave	100			100			100			100		

Desirable Auxiliary Lane Length, Feet: Queue Storage and Desirable Deceleration Length (Enter bay taper at approach speed, delay deceleration until vehicle enters lane)											
Intersection	EBL		EBR	WBL		WBR	NBL		NBR	SBL		SBR
Main Street & Nelson Ave/ Bogard Rd	150			325			100		100	100		100
Main Street & Swanson Ave	100			125			100			100		
Main Street & Parks Hwy	600			650		375	300		275	400		400
Main Street & Park Ave	100		100				100					
Knik St & Nelson Ave				100			100			100		
Knik St & Swanson Ave	150			100			100			100		

Table 25: Queues and Lane Length Calculations for Alternative C Intersections (2035)

5.2.3.1   *Bogard Road/Nelson Avenue Intersections*

At the intersection of Bogard Road/Nelson Avenue with Main Street/Wasilla Fishhook Road and with Knik Street, the recommended auxiliary lane lengths are constrained somewhat by the surrounding access points. Figure 23 and Table 26 present the recommended auxiliary lane lengths and taper rates. Note in the figure that the eastbound and westbound left turn lanes are shortened from desirable due to the close proximity of the two intersections.

The desired northbound left turn lanes at both intersections are met, with a median opening at Paulson Avenue on Main Street and a two-way-left-turn lane running between Nelson Avenue

and Swanson Avenue on Knik Street. This is consistent with the design proposed in the 2006 study.

Main Street

	EBL	WBL	NBL	NBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	84 (<M)	325 (D)	100 (D)	100 (D)	100 (D)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	10:1 (120 feet)	6:1 (72 feet)	6:1 (72 feet)	10:1 (120 feet)	10:1 (120 feet)

Knik Street

	EBL	WBL	NBL	NBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	None	84 (<M)	100 (D)	None	100 (D)	None
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	None	6:1 (72 feet)	6:1 (72 feet)	None	6:1 (72 feet)	None

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 26: Auxiliary Lane Recommendations for Bogard Road/Nelson Avenue Intersections, Alternative C
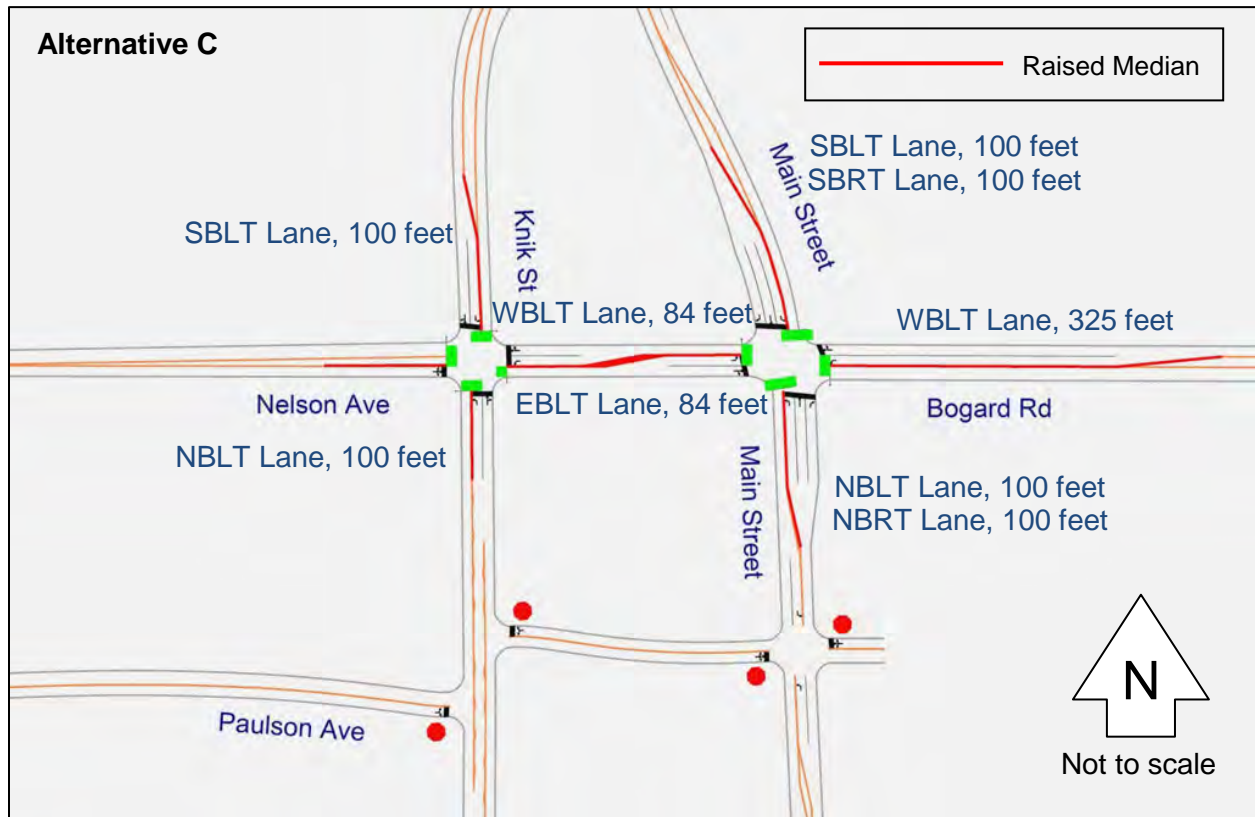
Figure 23: Auxiliary Lane Length Recommendations for Bogard Road/Nelson Avenue Intersections, Alternative C

5.2.3.2   *Swanson Avenue Intersections*

At the intersections of Swanson Avenue with Main Street and with Knik Street, there are some physical constraints on the turn lane lengths. For the southbound left turn lane on Main Street, the desirable turn lane length can be met, but it extends past the Post Office driveway and meets the left turn lane for Paulson Avenue. For the northbound left turn lanes at both intersections, the desirable turn lane length of 100 feet cannot be met, just like with Alternatives A and B, due to the close proximity with Herning Avenue and the need to provide a southbound left turn lane and taper at that intersection. Since adequate space is unavailable to fit both of these turn lanes in between the two intersections, the recommended turn lane length for both intersections was reduced to 90 feet, with 72 foot tapers.

For the eastbound and westbound left turn lanes at Knik Street and at Main Street, the desirable left turn lane lengths can be met. Note that the dual westbound left turn lanes recommended at Main Street in the 2006 study are no longer recommended in this study. Between Knik Street and Main Street, the turn lanes are back-to-back, so that all driveways on this segment will need to be converted to right-in/right-out.

Main Street

	EBL	WBL	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	125 (D)	90 (<M)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)

Knik Street

	EBL	WBL	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	150 (D)	100 (D)	90 (<M)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)

 (M) – Minimum Lane Length; (D) – Desirable Lane Length

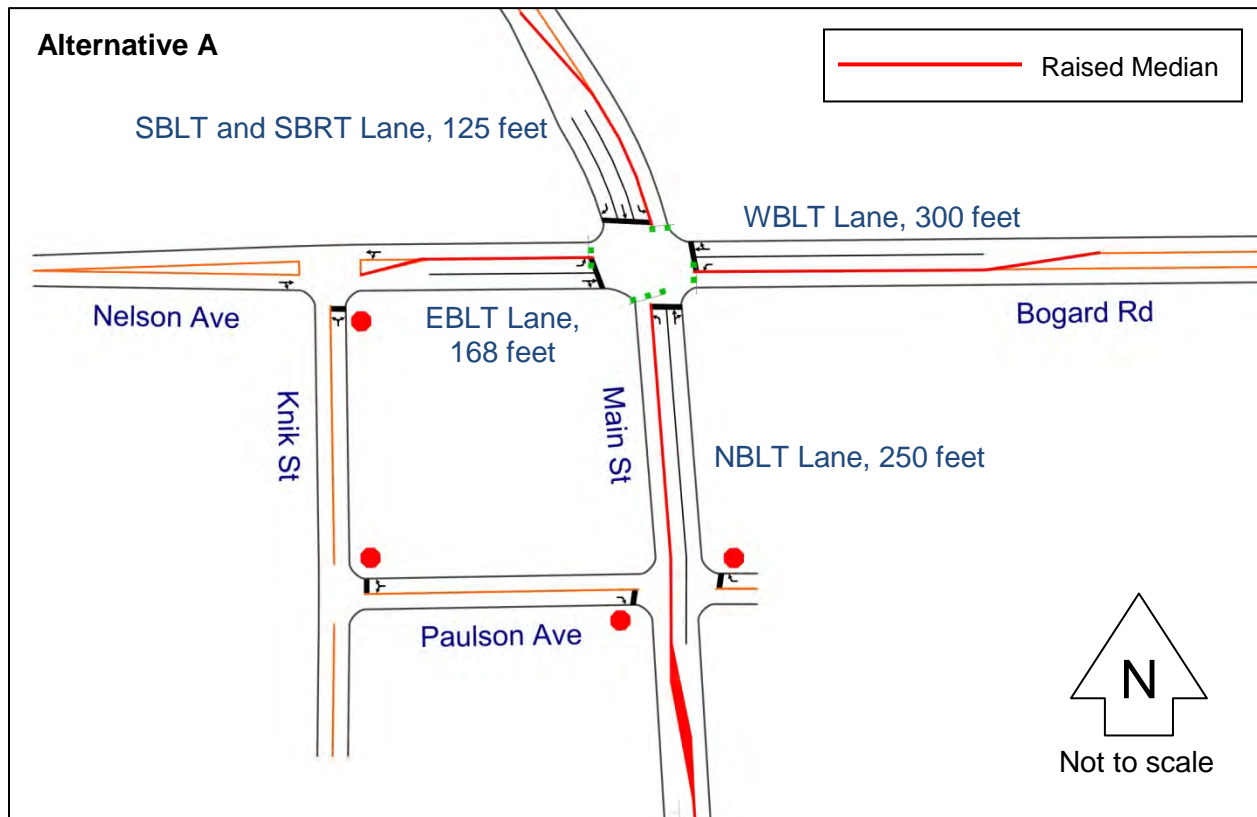**Table 27:   Auxiliary Lane Recommendations for Swanson Avenue Intersections, Alternative C**
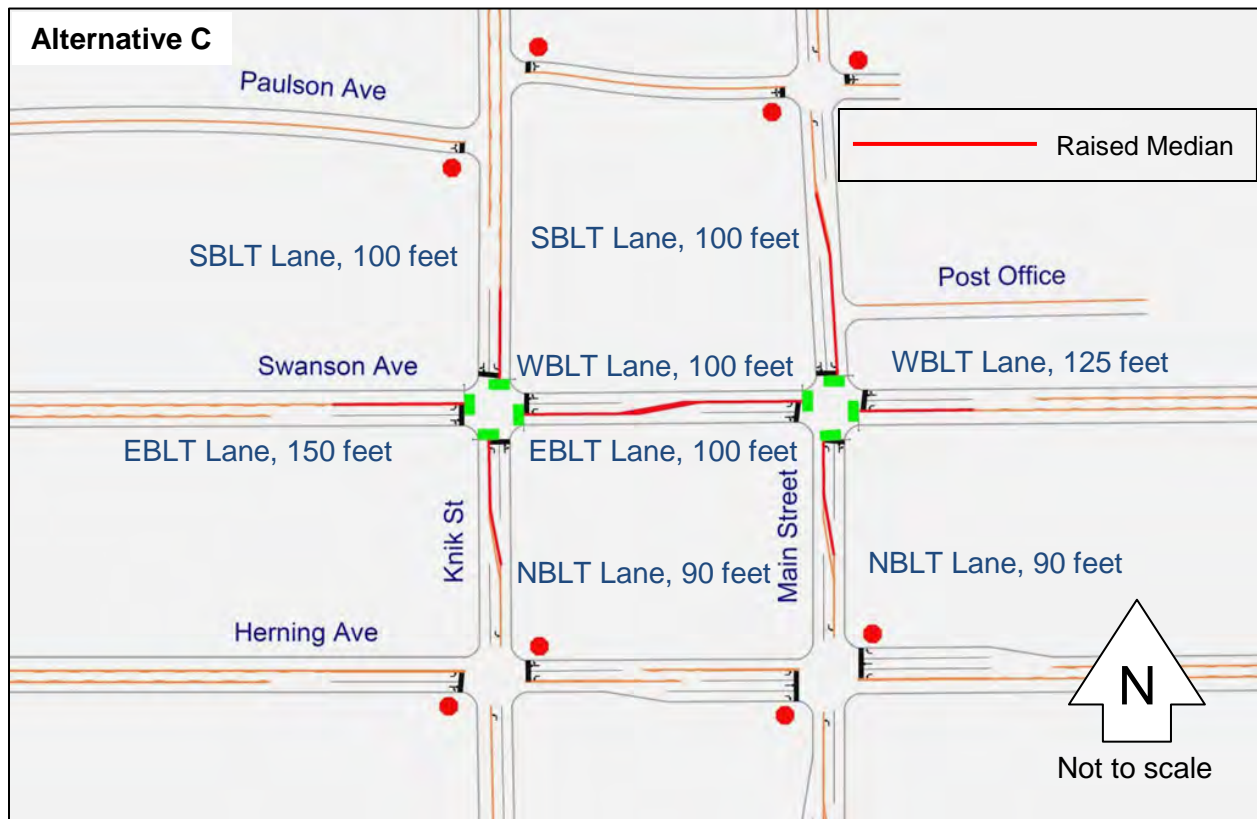
Figure 24: Auxiliary Lane Recommendations for Swanson Avenue Intersections, Alternative C

5.2.3.3 Parks Highway Intersection

Under Alternative C, Knik Street is grade separated from the Parks Highway, Railroad Avenue, and the railroad tracks. Thus, the Parks Highway intersects only with Main Street. At this intersection, the southbound through queue is very long, extending back to the Herning Avenue intersection. To accommodate a northbound left turn lane at Herning Avenue, therefore, the southbound left turn lane is shortened from desirable. The southbound right turn lane is also shortened from desirable, to allow the lane and taper to fit within the road segment between the intersections.

The northbound left turn and through queues both extend through the Railroad Avenue intersection. Because of its proximity to the Parks Highway intersection, it is recommended that Railroad Avenue be restricted to right-in/right-out movements. The recommended Parks Highway northbound left turn and right turn lane lengths are equivalent to the desirable lane lengths.

The eastbound and westbound through movement queues on the Parks Highway are quite lengthy, but the desired left turn lane lengths can be accommodated because there is enough

spacing between signals on the Parks Highway. It is recommended that the westbound right turn lane be shortened from desirable so that it does not extend through the intersection with Boundary Street, to the east of Main Street. Also note that extending the westbound left turn lane as recommended will necessitate converting Yenlo Street to right-in/right-out movements only.

Main Street

	EBL	WBL	WBR	NBL	NBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	600 (D)	650 (D)	300 (>M, <D)	300 (D)	275 (D)	200 (>M, <D)	275 (>M, <D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	12:1 (144 feet)	12:1 (144 feet)	12:1 (144 feet)	10:1 (120 feet)	10:1 (120 feet)	6:1 (72 feet)	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 28: Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative C
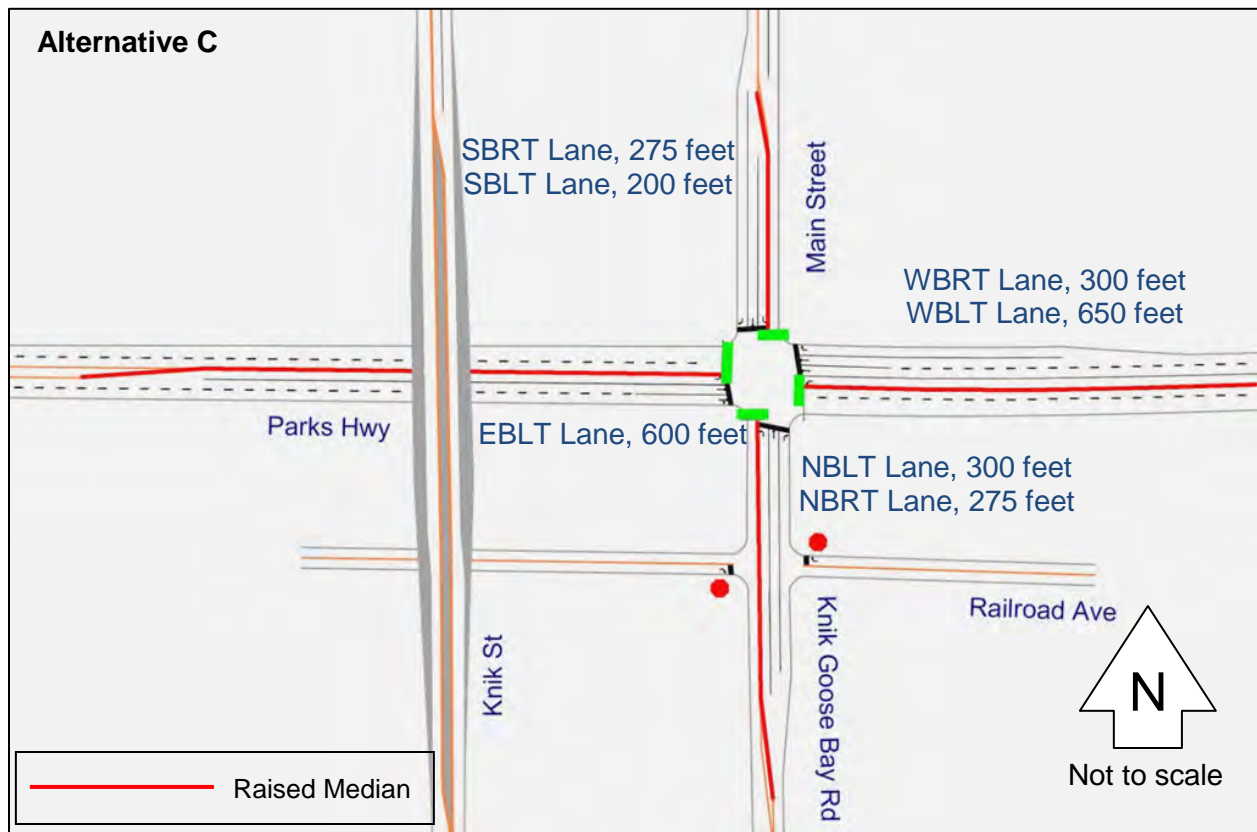
Figure 25: Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative C

5.2.3.4   Park Avenue Intersection

The left turn lanes at Park Avenue and Knik-Goose Bay Road can be built to the desirable length.

	EBL	NBL
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length
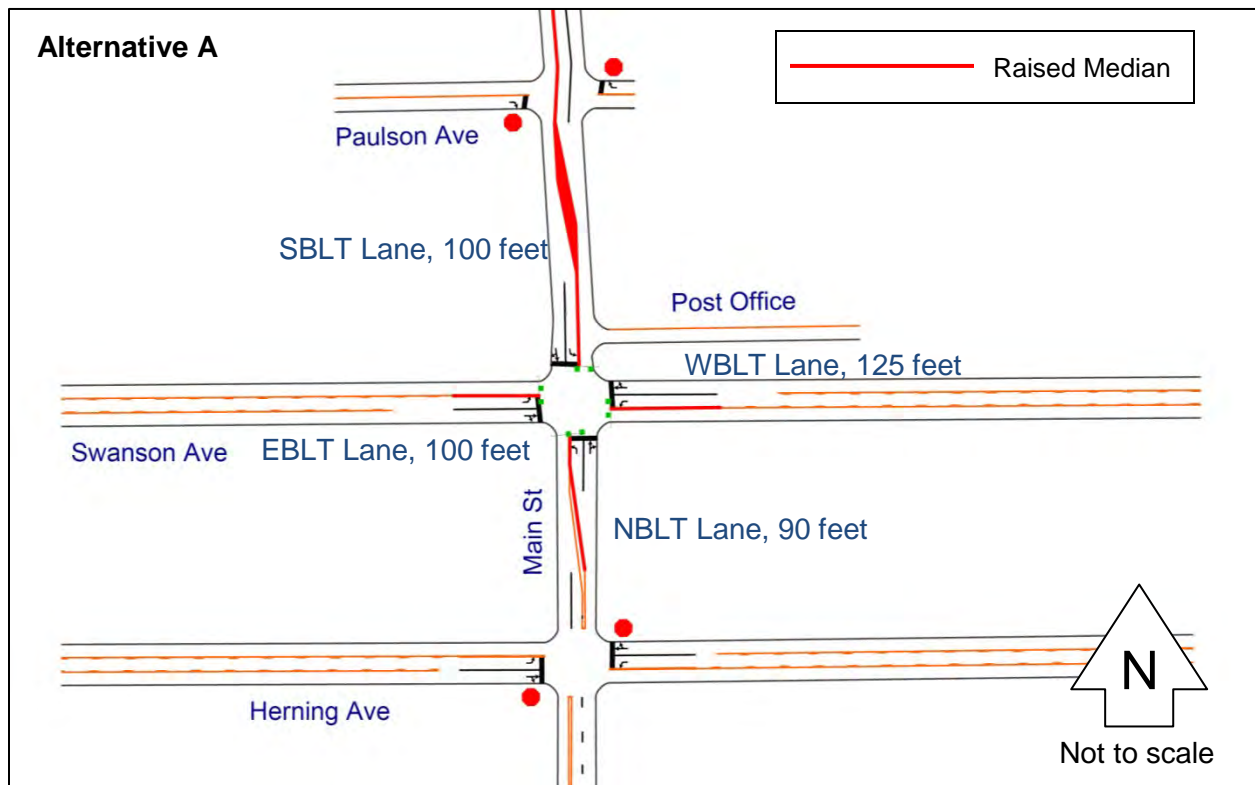**Table 29: Auxiliary Lane Recommendations for Park Avenue Intersection, Alternative C**
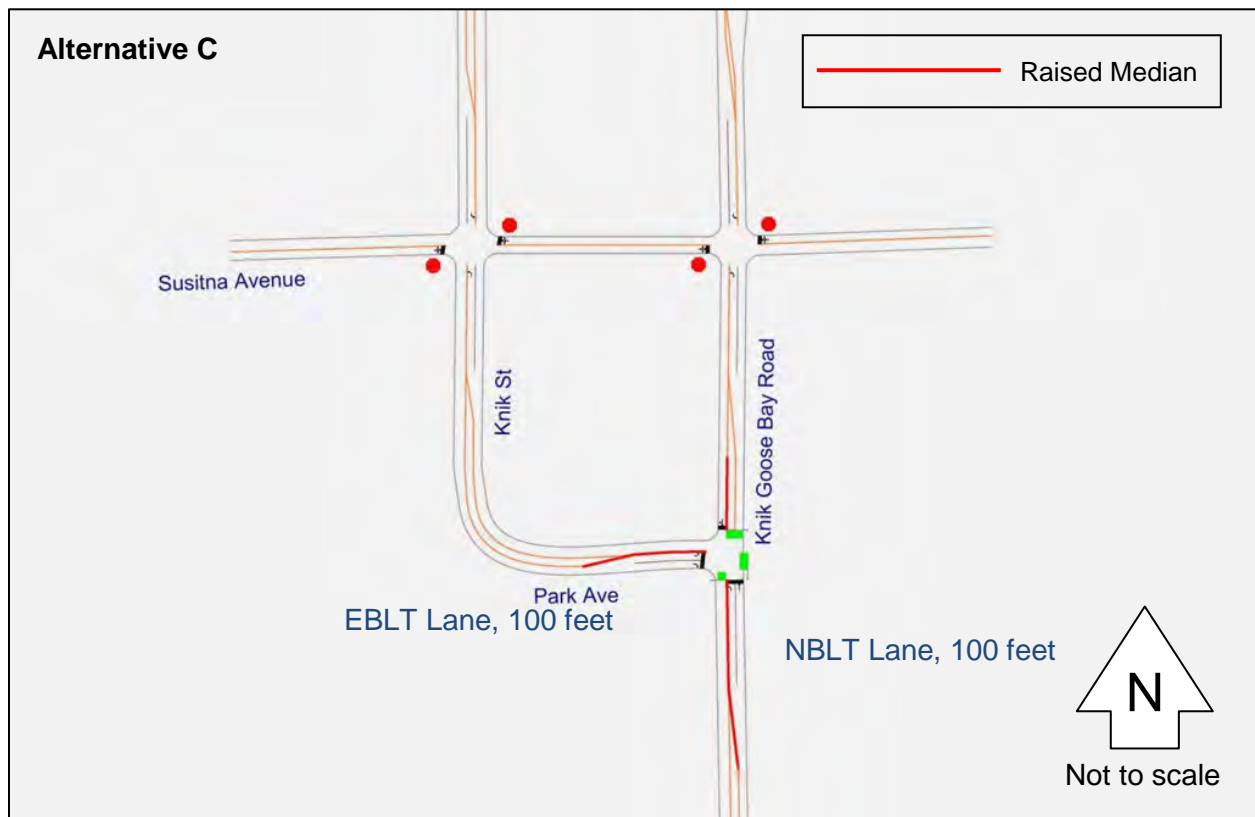
Figure 26: Auxiliary Lane Recommendations for Park Avenue Intersection, Alternative C

5.2.4   Alternative D

Table 30 shows the 95th percentile queue length, the minimum lane length, and the desired lane length for the signalized intersections in the study area for Alternative D, option 1 and Table 31 gives values for Alternative D, option 2. The recommended auxiliary lane lengths and bay tapers for each intersection are discussed in the following subsections.

95th Percentile Queues, Feet, Design Year 2035											
Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Main St & Nelson Ave/ Bogard Rd		194	162	129	75						84	
Main St & Swanson Ave		87		271	18						159	
Main St & Parks Hwy		570	88	137	170					412	293	376
Knik-Goose Bay Rd & Lake View Ave		68			83						145	
Yenlo St & Bogard Rd	14	48			164	30	60	34				
Yenlo St & Swanson Ave	211	39			84	226		250				
Talkeetna St/Yenlo St & Parks Hwy	256	159			408	205	433	241				

Minimum Auxiliary Lane Length, Feet: Queue Storage and Minimum Deceleration Length (Enter bay taper at 10 mph less than approach speed, deceleration begins in bay taper)

Intersection	EBL		EBR	WBL		WBR	NBL		NBR	SBL		SBR
Main St & Nelson Ave/ Bogard Rd			150	200								
Main St & Swanson Ave				275								
Main St & Parks Hwy			250	150						400		375
Knik-Goose Bay Rd & Lake View Ave												
Yenlo St & Bogard Rd	125					100	100					
Yenlo St & Swanson Ave	200					225						
Talkeetna St/Yenlo St & Parks Hwy	400					225	425					

Desirable Auxiliary Lane Length, Feet: Queue Storage and Desirable Deceleration Length (Enter bay taper at approach speed, delay deceleration until vehicle enters lane)

Intersection	EBL		EBR	WBL		WBR	NBL		NBR	SBL		SBR
Main St & Nelson Ave/ Bogard Rd			200	375								
Main St & Swanson Ave				275								
Main St & Parks Hwy			575	450						400		375
Knik-Goose Bay Rd & Lake View Ave												
Yenlo St & Bogard Rd	275					275	100					
Yenlo St & Swanson Ave	200					225						
Talkeetna St/Yenlo St & Parks Hwy	575					525	400					

Table 30: Queues and Lane Length Calculations for Alternative D, Option 1 Intersections (2035)

95th Percentile Queues, Feet, Design Year 2035											
Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Main St & Nelson Ave/ Bogard Rd		91	83	75	100	15				77	146	27
Yenlo St & Bogard Rd		93			222		94		2			

Minimum Auxiliary Lane Length, Feet: Queue Storage and Minimum Deceleration Length (Enter bay taper at 10 mph less than approach speed, deceleration begins in bay taper)

Intersection	EBL		EBR	WBL		WBR	NBL		NBR	SBL		SBR
Main St & Nelson Ave/ Bogard Rd			100	175		125				150		150
Yenlo St & Bogard Rd							100					

Desirable Auxiliary Lane Length, Feet: Queue Storage and Desirable Deceleration Length (Enter bay taper at approach speed, delay deceleration until vehicle enters lane)

Intersection	EBL		EBR	WBL		WBR	NBL		NBR	SBL		SBR
Main St & Nelson Ave/ Bogard Rd			100	325		275				150		150
Yenlo St & Bogard Rd							100					

Table 31: Queues and Lane Length Calculations for Alternative D, Option 2 Intersections (2035)

5.2.4.1 *Bogard Road/Nelson Avenue Intersections*

At the intersection of Bogard Road/Nelson Avenue with Main Street/Wasilla Fishhook Road and with Yenlo Street, the recommended auxiliary lane lengths are constrained somewhat between the two intersections for Option 1. Figure 27 and Table 33 present the recommended auxiliary lane lengths and taper rates. For Option 2, the auxiliary lanes do not conflict with each other, so desirable lane lengths are recommended (see Figure 28 and Table 33).

Main Street

	EBL	EBR	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	None	200 (D)	280 (>M, <D)	None
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	None	6:1 (72 feet)	10:1 (120 feet)	None

Yenlo Street

	EBL	EBR	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	150 (>M, <D)	None	None	275 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	10:1 (120 feet)	None	None	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

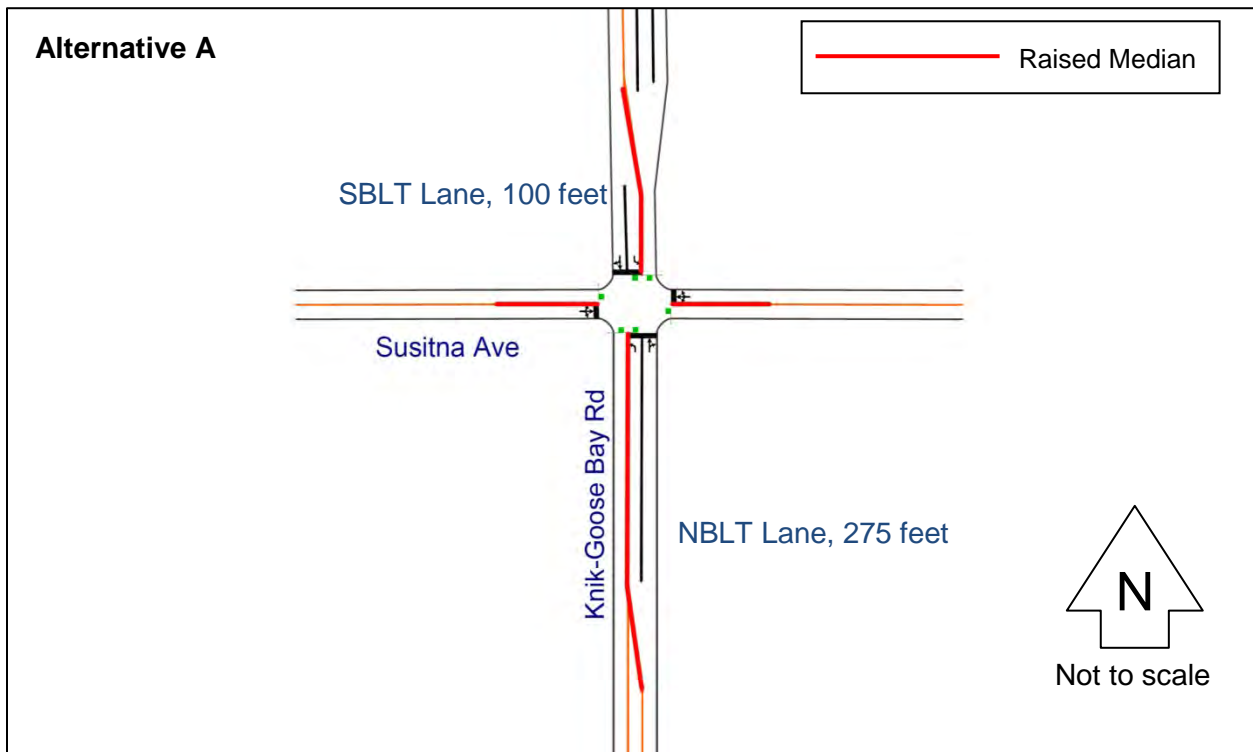**Table 32: Auxiliary Lane Recommendations for Bogard Road/Nelson Avenue Intersections, Alternative D, Option 1**
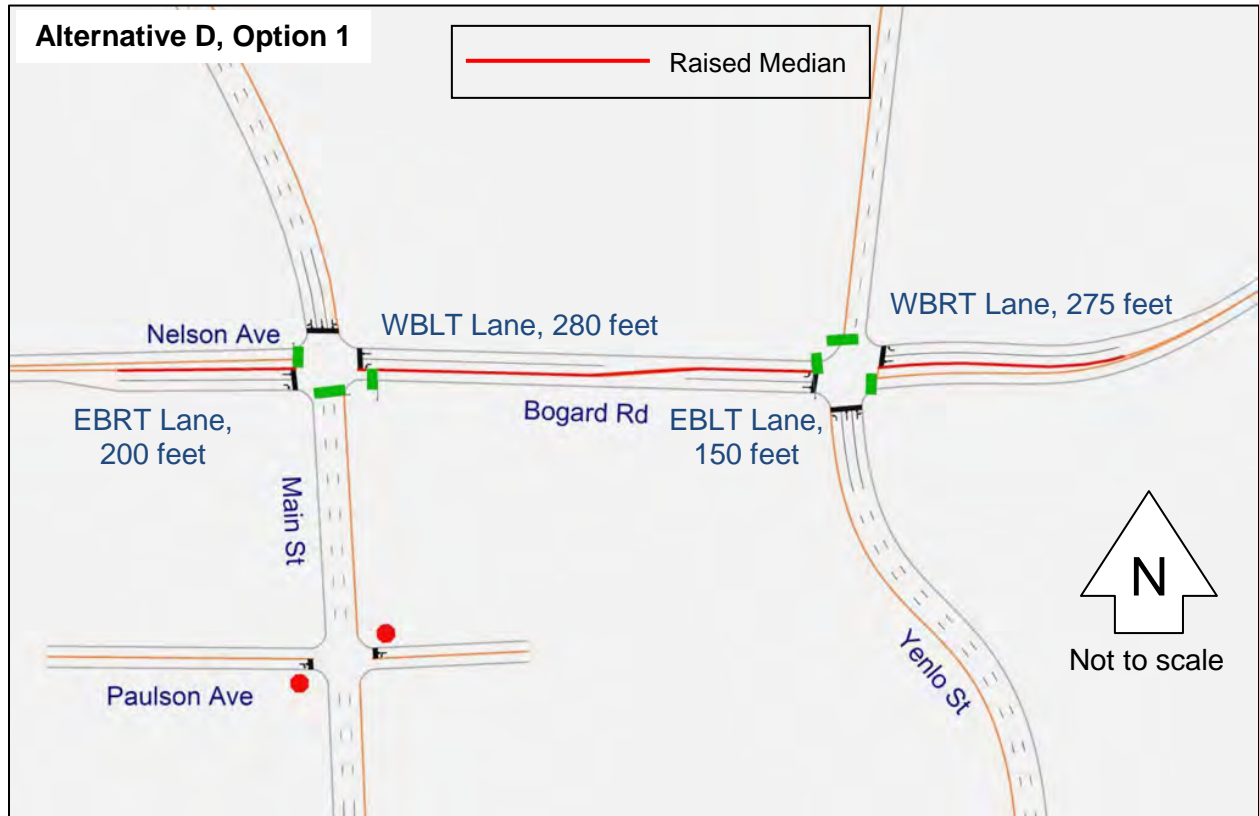
Figure 27: Auxiliary Lane Length Recommendations for Bogard Road/Nelson Avenue Intersections, Alternative D, Option 1

Main Street

	EBR	WBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	275 (D)	150 (D)	150 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	10:1 (120 feet)	10:1 (120 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 33: Auxiliary Lane Recommendations for Bogard Road/Nelson Avenue Intersections, Alternative D, Option 2
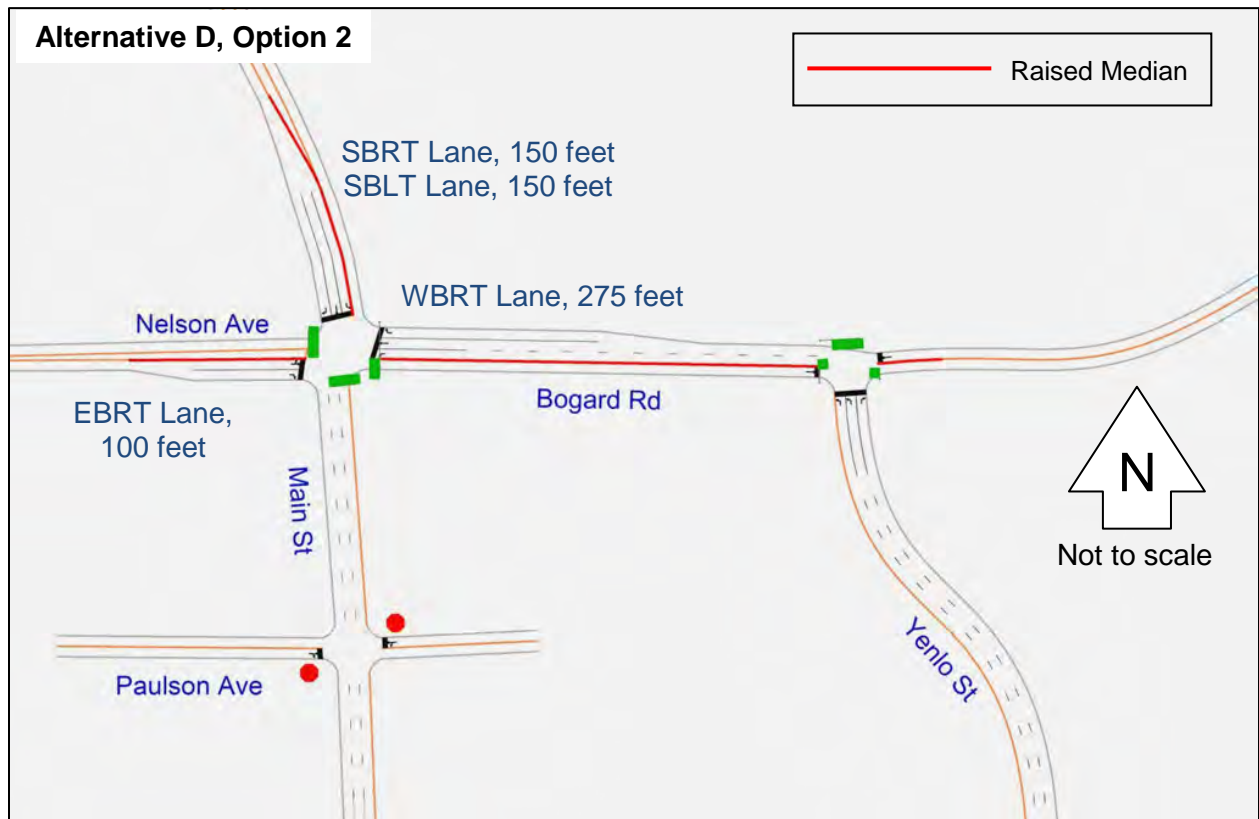
Figure 28:   Auxiliary Lane Length Recommendations for Bogard Road/Nelson Avenue Intersections, Alternative D, Option 2

5.2.4.2   Swanson Avenue Intersections

At the intersections of Swanson Avenue with Main Street and with Yenlo Street, there is essentially no difference between the auxiliary lanes for Option 1 compared to Option 2. No northbound or southbound auxiliary lanes are recommended. Eastbound and westbound left turn lanes transition into two-way-left-turn lanes between the signalized intersections.

Main Street

	EBL	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	None	200 (<M)	None
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	None	6:1 (72 feet)	None

Yenlo Street

Yenlo Street			
	EBL	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	200 (D)	None	225 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	None	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

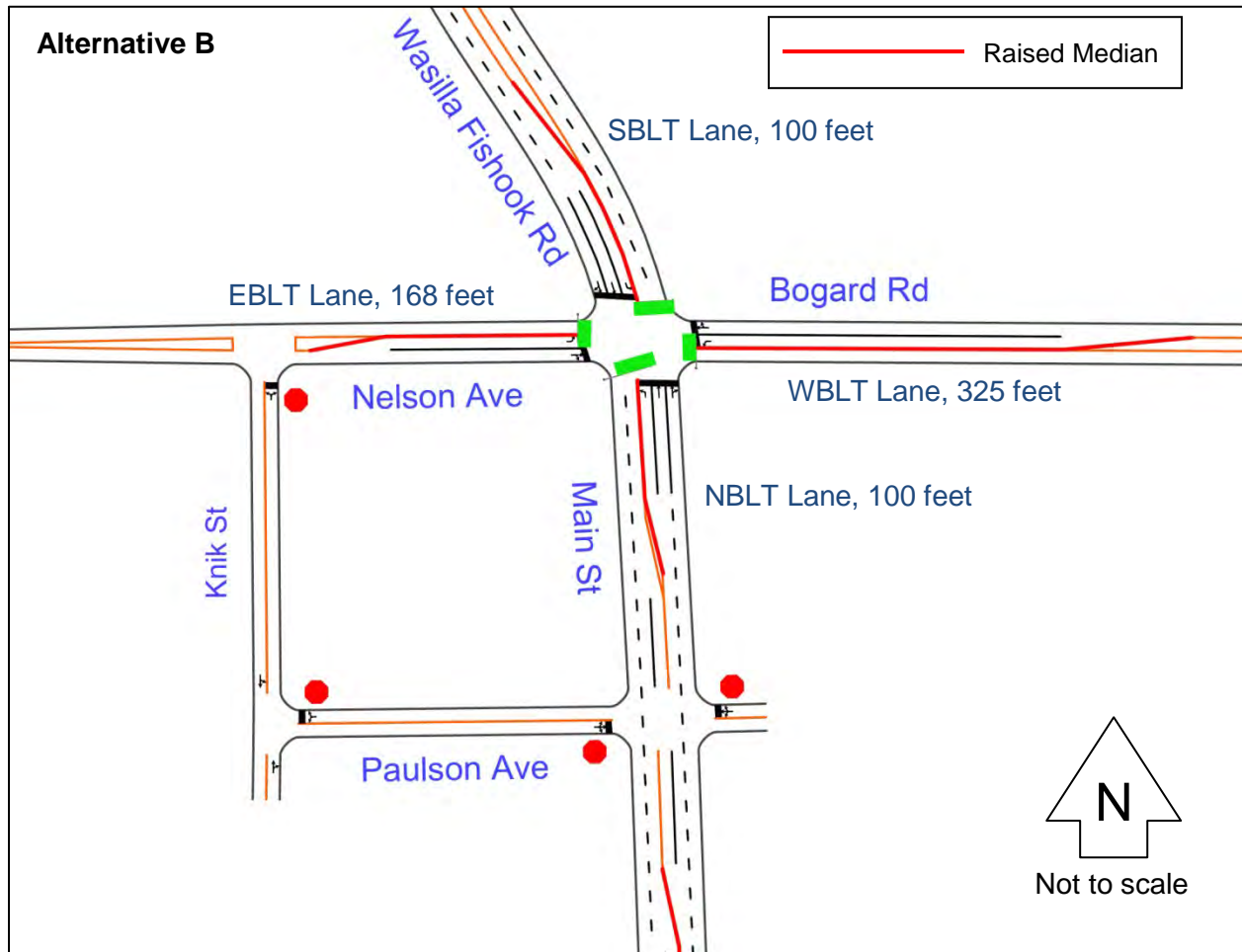**Table 34: Auxiliary Lane Recommendations for Swanson Avenue Intersections, Alternative D**

Figure 29: Auxiliary Lane Recommendations for Swanson Avenue Intersections, Alternative D

5.2.4.3   *Parks Highway Intersection*

Eastbound and westbound left turn queues on the Parks Highway are very long and are not accommodated between the Main Street/Knik-Goose Bay Road and Yenlo Street/Talkeetna Street intersections if eastbound and westbound single left turn lanes are used. Although it is not necessary for capacity, dual left turn lanes are recommended at these intersections to better accommodate the queues. With dual eastbound and westbound left turn lanes, the minimum lane length cannot be achieved, but queues can be accommodated within the lane and bay taper.

At the intersection of Parks Highway with Main Street/Knik-Goose Bay Road, the desirable southbound auxiliary lanes are accommodated by extending the lane past the Herning Avenue intersection. At the intersection of Parks Highway with Yenlo Street/Talkeetna Street, the desirable northbound auxiliary lane length is accommodated by extending the lane past the Railroad Avenue intersection.

Main Street

	EBL	EBR	WBL	WBR	NBL	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	None	575 (D)	181 (<M)	None	None	400 (D)	375 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	None	12:1 (144 feet)	12:1 (288 feet)	None	None	6:1 (72 feet)	6:1 (72 feet)

Yenlo Street

	EBL	EBR	WBL	WBR	NBL	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	181 (<M)	None	None	525 (D)	400 (D)	None	None
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	12:1 (288 feet)	None	None	12:1 (144 feet)	6:1 (72 feet)	None	None

 (M) – Minimum Lane Length; (D) – Desirable Lane Length
Table 35:   Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative D
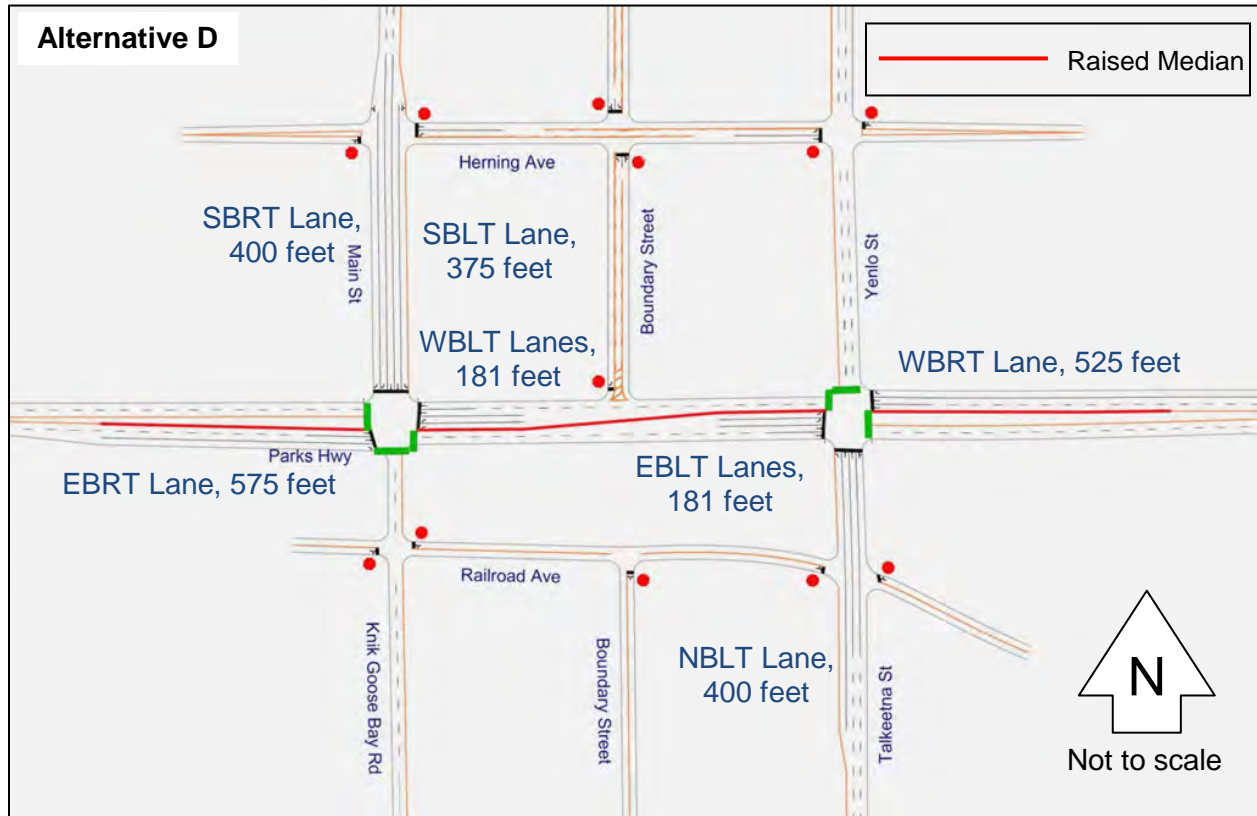
Figure 30: **Auxiliary Lane Recommendations for Parks Highway Intersections, Alternative D**

5.2.4.4 Lake View Avenue Intersection

No auxiliary lanes are proposed for the signalized intersection of Lake View Avenue with Knik-Goose Bay Road.

5.2.5 Refined Alternative D, Option 2

A refined Alternative D, option 2 model was developed to take into consideration design constraints such as right-of-way. There are three major changes to this alternative:

- Yenlo Street is reduced to two lanes between Swanson Avenue and Bogard Road
- Talkeetna Street is reduced to two lanes from Entry Way to Susitna Avenue
- Northbound and southbound auxiliary lanes have been reduced at the two Parks Highway intersections

Table 36 shows the 95th percentile queue length, the minimum lane length, and the desired lane length for the signalized intersections in the study area for the refined alternative. The refined auxiliary lane recommendations for the signalized intersections are presented in the following subsections.

95th Percentile Queues, Feet, Design Year 2035												
Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Main St & Nelson Ave/ Bogard Rd		91	83	73	103	15				77	146	27
Main St & Swanson Ave		144		190	27						126	
Main St & Parks Hwy		589	116	209	242						607	683
Knik-Goose Bay Rd and Lake View Ave		68			83						176	
Yenlo St & Bogard Rd		106			309		157		12			
Yenlo St & Swanson Ave	105	38			89	141	66	251				
Talkeetna St/Yenlo St & Parks Hwy	266	132			813	606		396				

Minimum Auxiliary Lane Length, Feet: Queue Storage and Minimum Deceleration Length (Enter bay taper at 10 mph less than approach speed, deceleration begins in bay taper)

Intersection	EBL		EBR	WBL		WBR	NBL		NBR	SBL		SBR
Main St & Nelson Ave/ Bogard Rd			100	150		100				150		100
Main St & Swanson Ave				175								
Main St & Parks Hwy			275	225								675
Knik-Goose Bay Rd and Lake View Ave												
Yenlo St & Bogard Rd							150		100			
Yenlo St & Swanson Ave	100					150	100					
Talkeetna St/Yenlo St & Parks Hwy	425					625						

Desirable Auxiliary Lane Length, Feet: Queue Storage and Desirable Deceleration Length (Enter bay taper at approach speed, delay deceleration until vehicle enters lane)

Intersection	EBL		EBR	WBL		WBR	NBL		NBR	SBL		SBR
Main St & Nelson Ave/ Bogard Rd			100	325		275				150		150
Main St & Swanson Ave				175								
Main St & Parks Hwy			575	525								400
Knik-Goose Bay Rd and Lake View Ave												
Yenlo St & Bogard Rd							150		100			
Yenlo St & Swanson Ave	100					150	250					
Talkeetna St/Yenlo St & Parks Hwy	575					925						

Table 36: Queues and Lane Length Calculations for Refined Alternative D, Option 2 Intersections (2035 PM Peak)

5.2.5.1 *Bogard Road/Nelson Avenue Intersections*

At the intersection of Bogard Road/Nelson Avenue with Main Street/Wasilla Fishhook Road and with Yenlo Street, the auxiliary lanes do not conflict with each other, so desirable lane lengths are recommended (see Figure 28 and Table 33).

Main Street

	EBR	WBL	WBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	325 (D)	275 (D)	150 (D)	150 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	10:1 (120 feet)	10:1 (120 feet)	10:1 (120 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

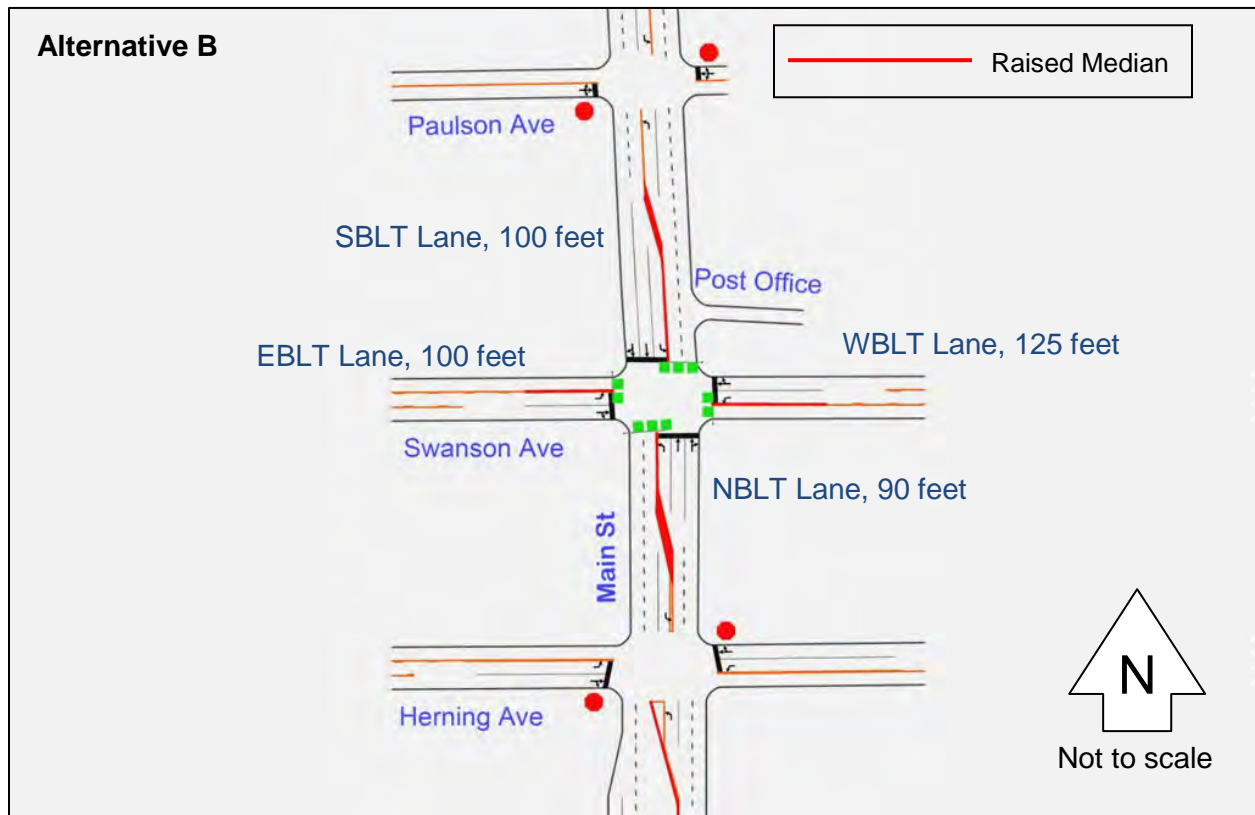**Table 37: Auxiliary Lane Recommendations for Bogard Road/Nelson Avenue Intersections, Refined Alternative D, Option 2**
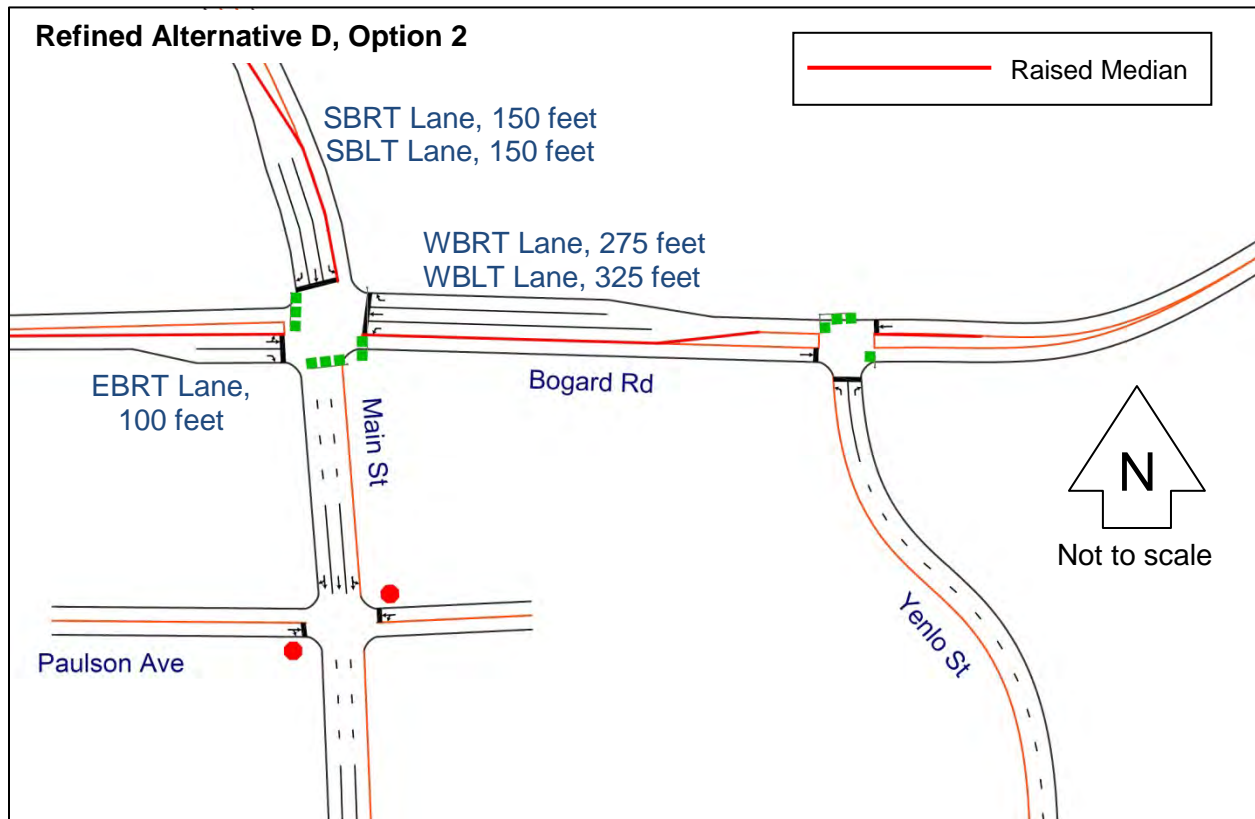
Figure 31: Auxiliary Lane Length Recommendations for Bogard Road/Nelson Avenue Intersections, Refined Alternative D, Option 2

5.2.5.2   Swanson Avenue Intersections

At the intersections of Swanson Avenue with Main Street and with Yenlo Street, there is essentially no difference between the auxiliary lanes for Option 1 compared to Option 2. No northbound or southbound auxiliary lanes are recommended. Eastbound and westbound left turn lanes transition into two-way-left-turn lanes between the signalized intersections.

Main Street

	EBL	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	None	175 (D)	None
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	None	6:1 (72 feet)	None

Yenlo Street

Yenlo Street			
	EBL	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	None	150 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	None	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

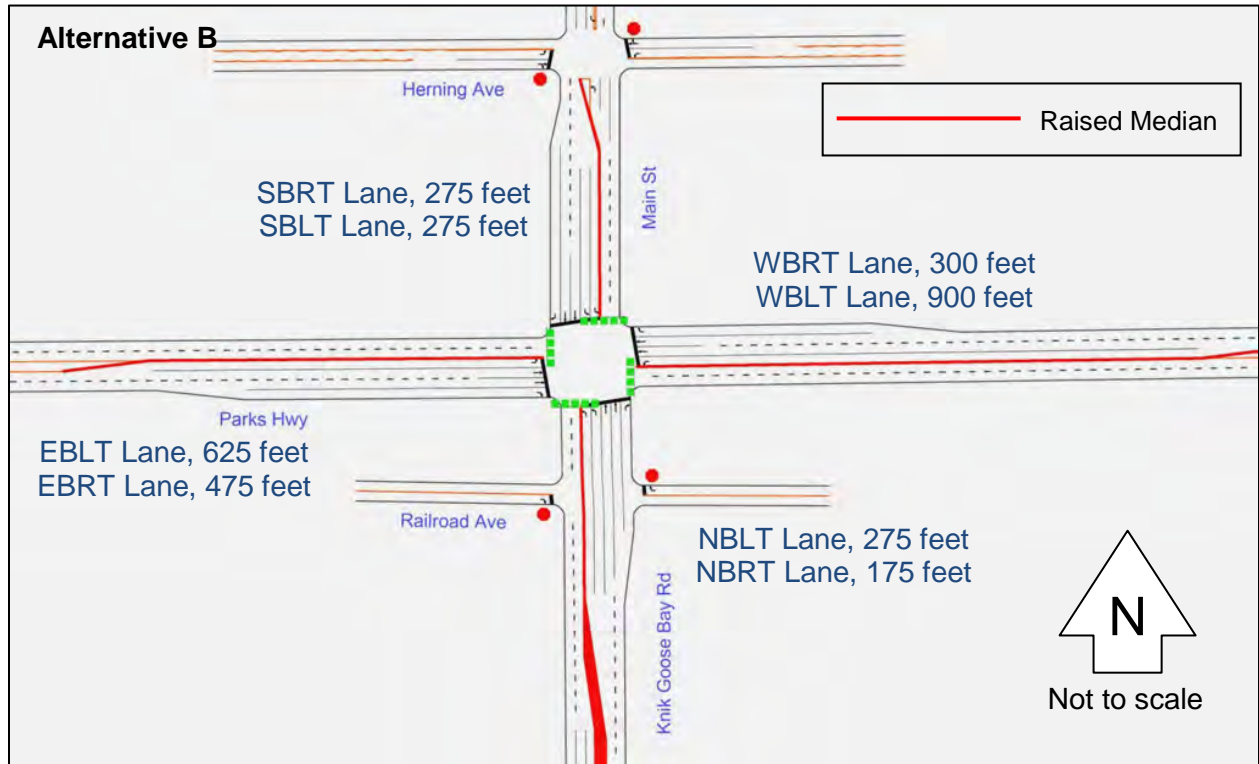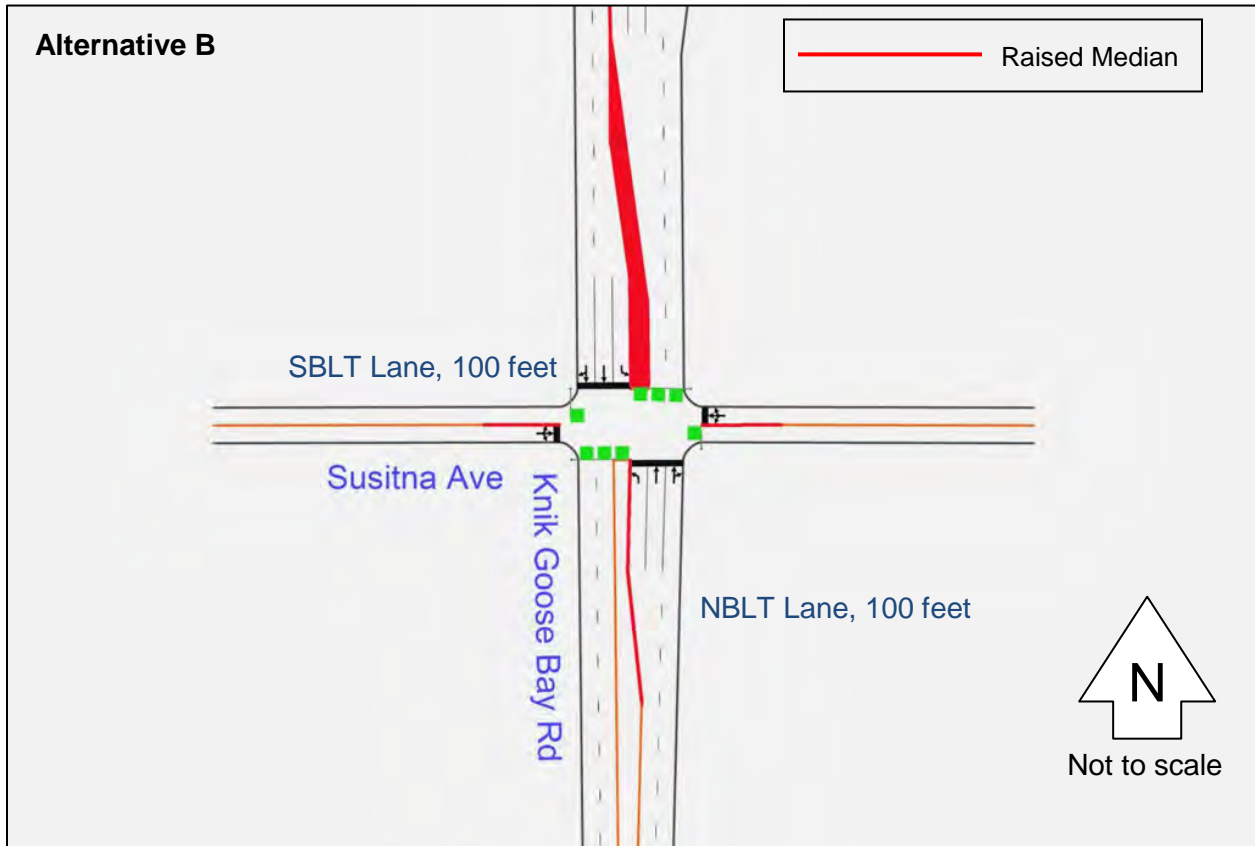**Table 38: Auxiliary Lane Recommendations for Swanson Avenue Intersections, Refined Alternative D, Option 2**
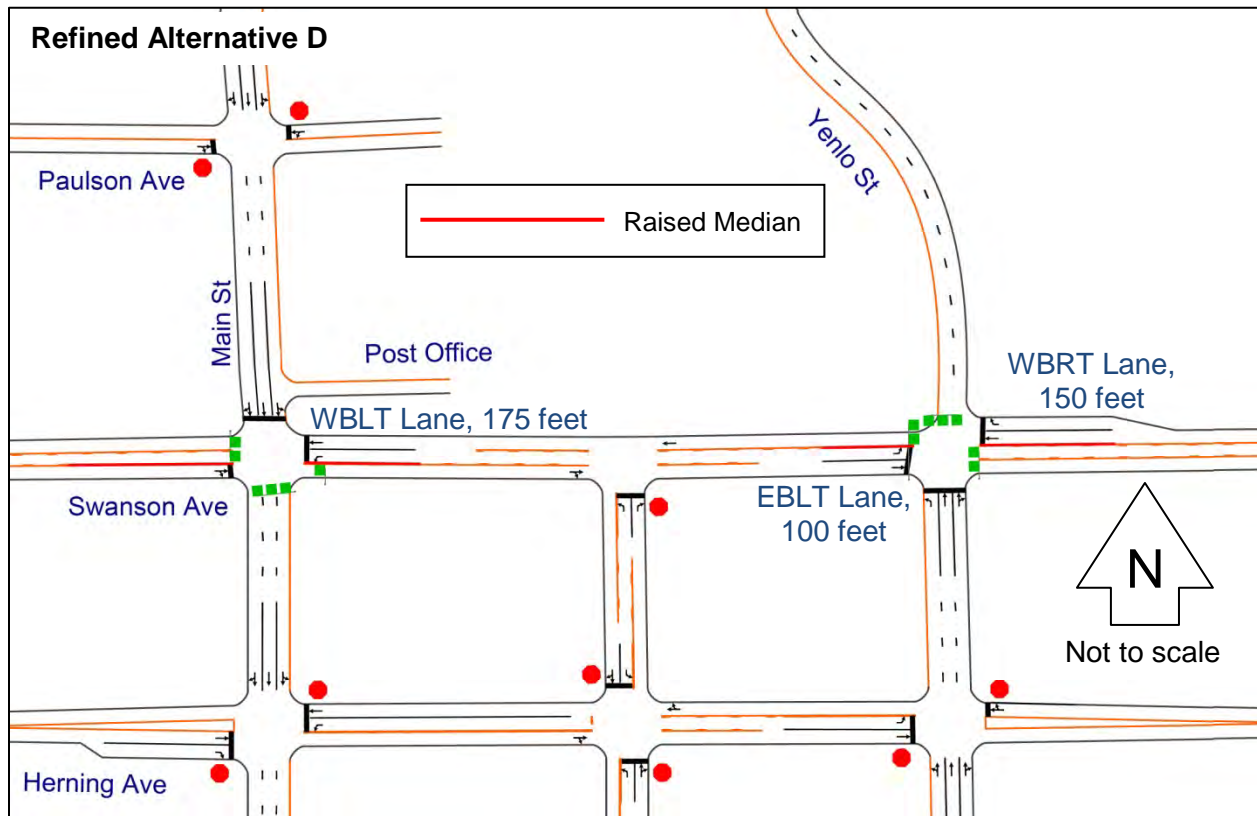
Figure 32: Auxiliary Lane Recommendations for Swanson Avenue Intersections, Refined Alternative D, Option 2

5.2.5.3   Parks Highway Intersection

The need for northbound and southbound auxiliary lanes was reexamined. With eastbound and westbound dual left turn lanes (at Talkeetna/Yenlo), the number of northbound and southbound lanes can be reduced, while maintaining reasonable level of service at the intersection. As

before, the minimum lane length for the eastbound and westbound lefts cannot be achieved, but queues can be accommodated within the lane and bay taper.

With the reduced number of southbound auxiliary lanes at the intersection of Parks Highway with Main Street, the 95th percentile queues in the PM peak hour are expected to extend past the Herning Avenue intersection, but to not extend into the Swanson Avenue intersection. At the intersection of Parks Highway with Yenlo Street/Talkeetna Street, the 95th percentile northbound queues in the PM peak hour are expected to extend past the Railroad Avenue intersection, but will not reach the Susitna Avenue intersection.

Note that the eastbound and westbound Parks Highway queues and lane length recommendations are based on the assumption that the Main Street and Yenlo Street signals are coordinated with each other, but are not coordinated with other signals along the Parks Highway (at Crusey Street and at Lucille Street, for instance). Under this scenario, the eastbound and westbound through queues are very long and the corresponding auxiliary lane must be extended to allow turning vehicles to enter the turn lane behind the through queue. If the signals along the Parks Highway are coordinated in the future, both the through and the turning queues will be reduced, and shorter auxiliary lane lengths could accommodate these queues.

Main Street

	EBL	EBR	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	None	450 (D)	181 (<M)	None
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	None	12:1 (144 feet)	12:1 (288 feet)	None

Yenlo Street

	EBL	EBR	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	181 (<M)	None	None	750 (M)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	12:1 (288 feet)	None	None	12:1 (144 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 39: Auxiliary Lane Recommendations for Parks Highway Intersections, Refined Alternative D, Option 2
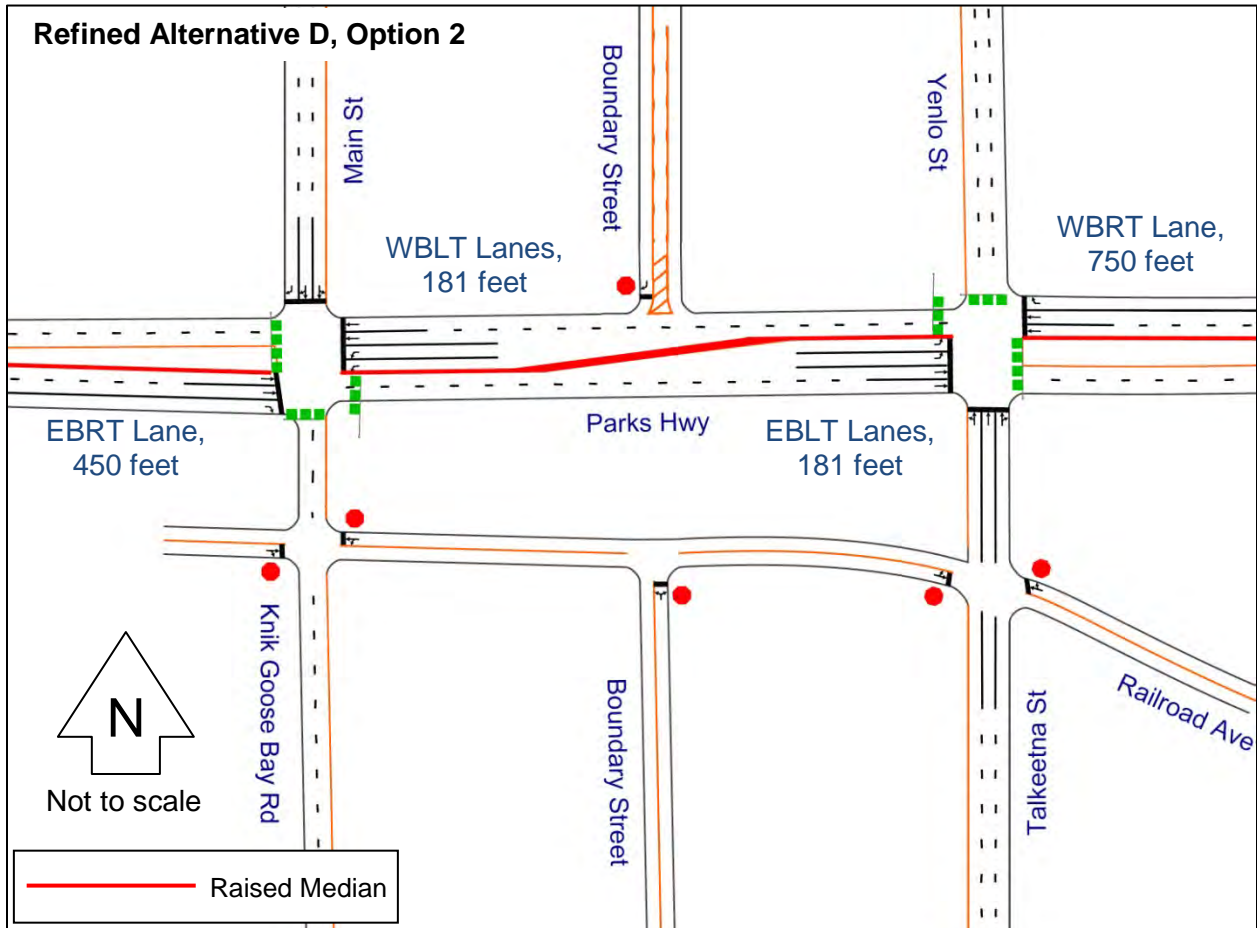
Figure 33: Auxiliary Lane Recommendations for Parks Highway Intersections, Refined Alternative D, Option 2

For reference, the assumed geometry for the remaining intersections in the study area are shown in Figure 34.

Refined Alternative D, Option 2

Susitna Ave

Boundary Street

Talkeetna St

Lake View Avenue

Knik Goose Bay Rd

Centaur Avenue

Knik Goose Bay Rd

Talkeetna St

N

Not to scale
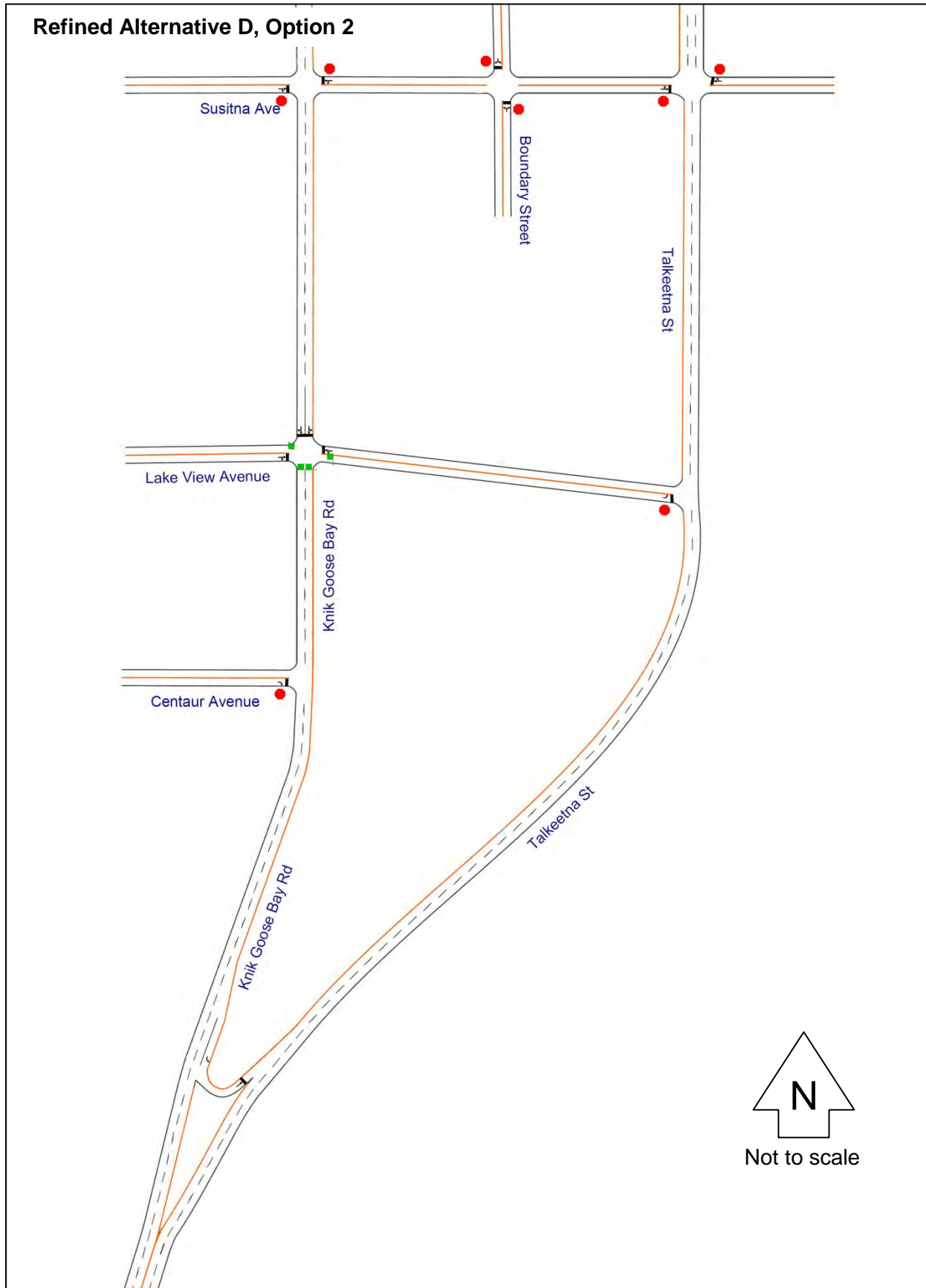
Figure 34: Southern Portion of Study Area, Refined Alternative D, Option 2

5.3 Level of Service Analysis

The Highway Capacity Manual 2000 (HCM2000) method was used to determine the LOS at each intersection for each alternative, as shown in Table 40. For two-way stop controlled intersections where the main road has three through lanes, HCM2010 methodology was used to determine LOS, as the HCM2000 methodology is not applicable to these geometries.

For Alternative D, it was assumed that the signalized intersections in the couplet are coordinated. This is especially important for the Parks Highway intersections, as coordination will help to manage the left turn queues along the Parks Highway between the two legs of the couplet. Some additional operational benefit would be gained by coordinating the Parks Highway signals with those at Crusey Street and at Lucille Street; however, the results shown here represent the scenario where the Parks Highway signals at Crusey Street and at Lucille Street are not coordinated with the signals at Yenlo Street and Main Street.

Under Alternative D, the Herning Avenue intersections with Main Street and with Yenlo Street warrant a traffic signal, but a traffic signal is not recommended due to the close proximity of other signals and the well-connected network. It is expected that during peak hours, drivers will avoid delay at the Herning Avenue two-way stop controlled intersections and will use the Swanson Avenue signalized intersections for eastbound and westbound left turns or through movements. This reapportionment of traffic from Herning Avenue to Swanson Avenue is reflected in the LOS values shown in Table 40. It should be noted that while vehicle delay remains high at the Herning Avenue intersections, this delay is generally experienced by very few vehicles.

For all alternatives except Alternative D, the intersection of Main Street with the Parks Highway has more delay when the bypass is in place than when there is no bypass. Two factors contribute to this:

- With the bypass, the model shows more traffic on Wasilla Main Street and Knik-Goose Bay Road, as these roadways are expected to serve trips that will utilize the bypass to travel between the north side of Wasilla and the Knik-Fairview area.
- With or without the bypass, this report assumes that traffic on the Parks Highway beyond the capacity of the roadway is either relocated to other roadways or is expanded to hold more capacity. This helps to focus the analysis on the north-south streets that are within the project scope. As noted in section 4.5 on page 27, if other projects do not address the capacity restraints on the Parks Highway, the congestion on the Parks Highway will be greater than that shown in this study.

	2005 Existing			No Action (2035)						Alt A (2035)						Alt B (2035)					
				No bypass			Bypass			No bypass			Bypass			No bypass			Bypass		
	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Bogard Rd/Nelson Ave and Main St	0.47	25	C	0.61	29	C	0.59	28	C	0.76	29	C	0.73	27	C	0.70	18	B	0.60	18	B
Paulson Ave and Main St		24/45	C/E		64/76	F		30/37	D/E		11/16	B/C		11/14	B		28/29	D		19/23	C
Swanson Ave and Main St		24	C		55	F		39	E	0.47	12	B	0.48	13	B	0.39	12	B	0.37	12	B
Herning Ave and Main St		20/28	C/D		78/169	F		48/176	E/F		21/25	C		19/25	C/D		22/30	C/D		18/33	C/D
Parks Highway and Main St/ Knik-Goose Bay Rd	0.76	41	D	1.09	87	F	1.10	105	F	1.08	70	E	1.11	85	F	0.99	58	E	0.99	73	E
Railroad Ave and Knik-Goose Bay Rd		13/10	B		16/11	C/B		21/14	C/B		20/12	C/B		29/13	D/B		11	B		12	B
Susitna Ave and Knik-Goose Bay Rd		36/23	E/C		170/46	F/E		>500	F	0.57	7	A	0.71	10	B	0.44	5	A	0.52	6	A

•

	Alt C (2035)						Alt D, option 1 (2035)						Alt D, option 2 (2035)						Refined Alt D, option 2		
	No bypass			Bypass			No bypass			Bypass			No bypass			Bypass			No bypass		
	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Bogard Rd/Nelson Ave and Main St	0.49	16	B	0.52	17	B	0.61	16	B	0.58	18	B	0.48	12	B	0.50	14	B	0.48	13	B
Paulson Ave and Main St		15/20	B/C		16/23	C		12/20	B/C		12/16	B/C		11/17	B/C		11/16	B/C		11/17	B/C
Swanson Ave and Main St	0.44	10	B	0.57	13	B	0.83	20	C	0.77	18	B	0.75	20	C	0.58	16	C	0.72	20	B
Herning Ave and Main St		23/29	C/D		50	F		17/33	C/D		23/45	C/E		25/38	C/E		23/48	C/E		24/37	C/E
Parks Highway and Main St/ Knik-Goose Bay Rd	0.97	54	D	1.00	65	E	0.83	28	C	0.81	27	C	0.77	29	C	0.77	31	C	0.90	34	C
Railroad Ave and Knik-Goose Bay Rd		16/11	C/B		18/11	C/B		10/14	B		11/15	B		10/14	B		11/15	B/C		16/29	C/D
Susitna Ave and Knik-Goose Bay Rd		26/12	D/B		31/32	D/D		11/15	B		11/15	B		11/14	B		12/16	B/C		14/21	B/C
Lake View Ave and Knik-Goose Bay Rd							0.50	9	A	0.55	10	A	0.49	10	A	0.57	9	A	0.49	9	A
Nelson Ave and Knik St	0.53	11	B	0.51	11	B															
Paulson Ave and Knik St		12/11	B		13/11	B															
Swanson Ave and Knik St	0.32	14	B	0.35	15	B															
Herning Ave and Knik St		16/13	C/B		18/16	C															
Susitna Ave and Knik St		11/10	B		12/10	B															
Park Ave and Knik-Goose Bay Rd	0.45	8	A	0.58	11	B															
Bogard Rd and Yenlo St							0.53	9	A	0.56	11	B	0.55	11	B	0.58	13	B	0.81	17	B
Swanson Ave and Yenlo St							0.79	24	C	0.66	21	B	0.61	18	B	0.57	20	B	0.64	19	B
Herning Ave and Yenlo St								43/24	E/C		45/23	E/C		48/16	E/C		62/24	F/C		48/16	E/C
Parks Highway and Yenlo St/ Talkeetna St							0.87	23	C	0.85	23	C	0.89	26	C	0.85	29	C	0.91	30	C
Railroad Ave and Talkeetna								18/12	C/B		18/12	C/B		18/12	C/B		19/12	C/B		18/12	C/B
Susitna Ave and Talkeetna								14/11	B		14/11	B		13/11	B		14/11	B		17/12	C/B
Lake View Ave and Talkeetna								16	C		16	C		15	C		17	C		17	C

Signalized Intersections

For two-way stop controlled intersections, two values are given for both delay and LOS, reflecting movement values, rather than full intersection values. The form is "eastbound/westbound." Where the value is the same for both directions, only one value is given.

Table 40: Intersection Level of Service by Alternative (2035)

6 Conclusions

Although the 2006 Traffic Study found that either Alternative C or Alternative D would provide acceptable levels of service through the design year (originally 2025), subsequent analyses have determined that Alternative C would require property acquisitions that are unacceptable to the City of Wasilla and the public. This report confirms that Alternative D is the only alternative that provides acceptable level of service through the updated 2035 design year. As the design work has begun, refinements have been made to Alternative D, option 2 to meet external exigencies, such as right-of-way constraints. These refinements have been evaluated in this report and have been shown to also provide acceptable levels of service through the 2035 design year.

Appendix A

1999-2008 Average Crash Rates and Number of Crashes for all

Evaluated Intersections

WASILLA - MAIN STREET TRAFFIC STUDY UPDATE

Crashes: 4
Rate: 0.229

Crashes: 6
Rate: 0.322

Crashes: 2
Rate: 0.110

Crashes: 15
(since 2004)
Rate: 0.633

Crashes: 4
Rate: 0.405

Crashes: 21
(since 2004)
Rate: 0.708

Crashes: 1
Rate: 0.038

Crashes: 0
Rate: 0.00

Crashes: 3
Rate: 0.159

Crashes: 2
Rate: 0.053

Crashes: 7
Rate: 1.559

Crashes: 27
Rate: 0.533

Crashes: 2
Rate: 0.114

Crashes: 3
Rate: 0.139

Crashes: 18
Rate: 1.179

Crashes: 10
Rate: 0.107

Crashes:8
Rate: 0.371

Crashes: 41
Rate: 1.102

Crashes: 63
Rate: 0.555

Crashes: 0
Rate: 0.00

Crashes: 74
Rate: 0.661

Crashes: 30
Rate: 0.795

Crashes: 224
Rate: 1.639

Crashes: 1
Rate: 0.223

Crashes: 0
Rate: 0.00

Crashes: 1
Rate: 0.186

Crashes: 9
Rate: 0.229

Crashes: 2
Rate: 0.053

Crashes: 1
Rate: 0.026

Crashes: 5
Rate: 0.132

Crashes: 5
Rate: 0.132

1999-2008 Intersection Crashes & Rates

- Intersection Number (Study Intersections)
- Other Intersections within the Alterative "D" Study Area
- Rate Below Average
- Rate Above Average
- Rate Above Critical

Appendix B

Crash Reduction Maps for Alternatives A, B, C and D

WASILLA - MAIN STREET TRAFFIC STUDY UPDATE

Main-Bogard-Nelson
Crash Reduction: 0 of 21
0% Crash Reduction

Main-Paulson
Crash Reduction: 1 of 2
50% Crash Reduction

Main-Swanson
Crash Reduction: 3.5 of 27
13% Crash Reduction

Main-Herning
Crash Reduction: 1 of 41
2% Crash Reduction

KGB-Main-Parks
Crash Reduction: 0 of 224
0% Crash Reduction

KGB-Railroad
Crash Reduction: 12 of 30
40% Crash Reduction

KGB-Susitna
Crash Reduction: 2 of 9
21% Crash Reduction

LEGEND

14   Intersection Number

      Existing Traffic Signal

      Proposed Traffic Signal

      Represents Crash Reduction**

      Represents Crash Increase*

ALTERNATIVE "A"
CRASH REDUCTION SUMMARY

TOTAL Crash Reduction - All affected Intersections
Number of Crashes Reduced: **18 of 480**
Percent Reduction: **3.83%**

TOTAL Crash Reduction - Affected Intersections with Crash Rate greater than the Average rate for Statewide Population
Number of Crashes Reduced: **12 of 365**
Percent Reduction: **3.29%**

WASILLA - MAIN STREET TRAFFIC STUDY UPDATE

Main-Bogard-Nelson
Crash Reduction: 1 of 21
2% Crash Reduction

Main-Paulson
Crash Reduction: 0 of 2
0% Crash Reduction

Main-Swanson
Crash Reduction: 3.5 of 27
13% Crash Reduction

Main-Herning
Crash Reduction: 1 of 41
2% Crash Reduction

KGB-Main-Parks
Crash Reduction: 6 of 224
3% Crash Reduction

KGB-Railroad
Crash Reduction: 13 of 30
43% Crash Reduction

KGB-Susitna
Crash Reduction: 2 of 9
21% Crash Reduction

LEGEND

- **14** Intersection Number
- Existing Traffic Signal
- Proposed Traffic Signal
- Represents Crash Reduction**
- Represents Crash Increase*

ALTERNATIVE "B"
CRASH REDUCTION SUMMARY

TOTAL Crash Reduction - All _affected_ Intersections
Number of Crashes Reduced: **26 of 480**
Percent Reduction: **5.34%**

TOTAL Crash Reduction - Affected Inter-sections with Crash Rate greater than the Average rate for Statewide Population
Number of Crashes Reduced: **20 of 365**
Percent Reduction: **5.47%**

WASILLA - MAIN STREET TRAFFIC STUDY UPDATE

N

Knik-Nelson
Crash Increase: 4 to 4.5
13% Crash Increase

Knik-Paulson
Crash Reduction: 0 of 2
0% Crash Reduction

Knik-Swanson
Crash Reduction: 0.6 of 3
20% Crash Reduction

Knik-Herning
Crash Reduction: 0 of 7
0% Crash Reduction

Knik-Parks
Crash Reduction: 1 of 10
10% Crash Reduction

Knik-Railroad
Crash Reduction: 0 of 0
0% Crash Reduction

Knik-Susitna
Crash Reduction: 0 of 0
0% Crash Reduction

WFR-Danna
Crash Reduction: 0 of 2
0% Crash Reduction

Main-Bogard-Nelson
Crash Reduction: 1 of 21
2% Crash Reduction

Main-Paulson
Crash Reduction: 0 of 2
0% Crash Reduction

Main-Swanson
Crash Reduction: 3.5 of 27
13% Crash Reduction

Main-Herning
Crash Reduction: 1 of 41
2% Crash Reduction

KGB-Main-Parks
Crash Reduction: 6 of 224
3% Crash Reduction

KGB-Railroad
Crash Reduction: 13 of 30
43% Crash Reduction

KGB-Susitna
Crash Reduction: 0 of 9
0% Crash Reduction

KGB-Park
Crash Increase: 2 to 2.25
13% Crash Increase

LEGEND

14   Intersection Number

Existing Traffic Signal

Proposed Traffic Signal

Represents Crash Reduction**

Represents Crash Increase*

ALTERNATIVE "C"
CRASH REDUCTION SUMMARY

TOTAL Crash Reduction - All _affected_ Intersections
Number of Crashes Reduced: **26 of 480**
Percent Reduction: **5.34%**

TOTAL Crash Reduction - Affected Intersections with Crash Rate greater than the Average rate for Statewide Population
Number of Crashes Reduced: **20 of 365**
Percent Reduction: **5.47%**

WASILLA - MAIN STREET TRAFFIC STUDY UPDATE

This segment is part of Alternative "D" but is deleted from Alternative "D", Option 2

WASILLA HIGH SCHOOL

WFR-Carpenter
Crash Reduction: 0 of 4
0% Crash Reduction

WFR-Iditarod Elementary
Crash Reduction: 0 of 6
0% Crash Reduction

IDITAROD ELEMENTARY

WFR-Danna
Crash Reduction: 0 of 2
0% Crash Reduction

Bogard-Lang
Crash Increase 0 to 7
700% Crash Increase*
(Same increase under Option 2)

Main-Bogard-Nelson
Crash Reduction: 8 of 21
38% Crash Reduction**
(Same reduction under Option 2)

WASILLA MIDDLE SCHOOL

Main-Paulson
Crash Reduction: 0 of 2
0% Crash Reduction

Yenlo-Swanson
Crash Increase 3 to 12
300% Crash Increase*

Main-Swanson
Crash Reduction: 13.5 of 27
50% Crash Reduction**

Yenlo-Herning
Crash Increase 8 to 14
75% Crash Increase*

Main-Herning
Crash Reduction: 11 of 41
27% Crash Reduction**

Parks-Yenlo
Crash Increase: 63 to 99
57% Crash Increase*

KGB-Main-Parks
Crash Reduction: 58 of 224
26% Crash Reduction**

PARKS HWY

Talkeetna-Railroad
Crash Increase: 0 to 18
1800% Crash Increase*

KGB-Railroad
Crash Reduction: 24 of 30
80% Crash Reduction**

Talkeetna-Susitna
Crash Increase: 1 to 6
500% Crash Increase*

KGB-Susitna
Crash Reduction: 6 of 9
67% Crash Reduction**

KGB-Park
Crash Reduction: 0
0% Crash Reduction

KGB-E Lakeview
Crash Reduction: 0 of 1
0% Crash Reduction

KGB-Centaur
Crash Reduction: 2 of 5
40% Crash Reduction**

KGB-Enter Way
Crash Reduction: 1 of 5
20% Crash Reduction**

Palmer/Wasilla Extension

LEGEND

- 14 — Intersection Number
- Existing Traffic Signal
- Proposed Traffic Signal
- Alternative "D" Alignment
- Alternative "D", Option 2 Eliminated Segment
- Represents Crash Reduction**
- Represents Crash Increase*

* Increase mostly due to reassignment of northbound related crashes to Yenlo-Talkeetna Streets from Main-KGB Streets.

** Decrease partly due to reassignment of northbound related crashes from Main-KGB Streets to Yenlo-Talkeetna Streets.

ALTERNATIVE "D" (Options 1 & 2) CRASH REDUCTION SUMMARY

TOTAL Crash Reduction - All affected Intersections
Number of Crashes Reduced: 45 of 480
Percent Reduction: 9.39%

TOTAL Crash Reduction - Affected Intersections with Crash Rate greater than the Average rate for Statewide Population
Number of Crashes Reduced: 33 of 365
Percent Reduction: 9.14%

Appendix C

Knik-Goose Bay Road Railroad Crossing Configuration and Traffic

Control

State of Alaska DOT/PF Central Region
Railroad Crossing Inventory Form

#44

Crossing ID #: **868318Y**	Road Name: **Knik/Goose Bay Road**	Date of Last Inventory: **3/3/2010**
RR Milepoint: **159.50**	CDS Route #: **170044**	Inventory By: **RM/BF**
Maximum Train Speed: **25 MPH**	CDS Milepoint: **0.03**	Highway Surface: **Paved**
Crossing Surface; **Concrete**	Posted Highway Speed: **35 MPH**	State Highway System: **Yes**

Grade Approaching Xing
☐ Up ☐ Down ☒ Level

Main St.

RIGHT LANE MUST TURN RIGHT

300'   210'

Parks Highway

150' Minimum

Traffic Signal with RR Preemption

To Big Lake

DO NOT STOP ON TRACKS

To Anchorage

Case I Sight Distance met?: N/A
Case II Sight Distance Met?: Yes
Obstruction?: N/A

Siding Track (removed)

50'

14'

Case I Sight Distance met?: N/A
Case II Sight Distance Met?: Yes
Obstruction?: N/A

14'

Mainline Track

18'

DO NOT STOP ON TRACKS

Railroad Ave.

112'

Knik/Goose Bay Rd.

W10-1 needs to be relocated.

DO NOT BLOCK INTERSECTION

5-Section "Protected/ Permitted signal head.   3-Section signal head.

N

"No Left Turn" black-out sign. (Activates during railroad preemp-tion phase.)

WBLT RR Preemption Blank-Out Sign - WB Parks Hwy.

Case I Sight Distance met?: N/A
Case II Sight Distance Met?: Yes
Obstruction?: N/A

402'

SPEED LIMIT 35

END SCHOOL ZONE

Grade Approaching Xing
☐ Up ☒ Down ☐ Level

Case I Sight Distance met?: N/A
Case II Sight Distance Met?: Yes
Obstruction?: N/A

To Goose Bay

Case I Moving Vehicle Sight Distance
Highway   **N/A**
Tracks   **N/A**

Case II Stopped Vehicle Sight Distance
Highway   **25'**
Tracks   **600'**

Traffic Control Device Key

Cantilever Railroad Signal	Post-Mounted Railroad Signal with Gate
Cantilever Railroad Signal with Gate	Advance Flasher with Sign
Post-Mounted Railroad Signal	Highway Sign

Rubberized Crossing Surface

Asphalt Crossing Surface

Wood Plank Crossing Surface

Appendix D

AADT Volume Maps for Modified 2025 LRTP Model

AADT Volume Map:
Modified 2025 LRTP Model
Alt A: 3-Lane Main Street, No Bypass

Wasilla-Fishhook Rd

Parks Hwy

Susitna Ave

Knik-Goose Bay Rd

Palmer-Wasilla Hwy Extension

Riley Rd Extension

NTS

9,300
9,425
9,533
9,136
10,469
10,856
5,093
5,487
10,933
13,764
16,357
7,062
11,990
12,040
13,990
11,0

7,268 7,310 7,491
2,593
12,235
6,792
4,657 4,775 4,046 5,011 5,115
1,955 959 6,894 4,295 5,493
7,975
4,033 526 3,793 6,997 3,661 3,424 3,487
33,045
32,558
34,021 3,452 37,103 37,495 36,638 36,516
18,140
1,342 1,511 1,246 998 482 247
689 1,494 347 289 234 143 74 59 15
15,796 306 0
966
15,509
15,580
5,412 8,463
26,655

8,677 7,399

Urban Area Detail

Nelson Ave   Bogard Rd

Wasilla Middle School

7,491 9,069 9,053 8,677 7,399
3,465 6,572 10,856 7,062
3,764 6,894 3,999
1,955 959 4,295
Knik St 4,792 5,215 6,558 6,491 Main St
4,775 4,046 5,254 5,011 5,669 5,567 5,493
Post Office
Swanson Ave
3,709 6,736 2,884
3,814 3,793 4,871 4,722 3,008 4,129 3,424 Carrs Mall
4,712 2,823
Wasilla City Hall
Herning Ave 7,008 3,661 Metarose Square
3,365 6,994 3,855 3,132
3,452 7,959 4,284 36,409 36,304
34,021 34,238 35,846 37,103 37,495 36,638
Parks Hwy
18,140
689 2,853 1,511 1,246
Railroad Ave 14,814 1,342 265 998

AADT Volume Map:
Modified 2025 LRTP Model
Alt A: 3-Lane Main Street, With Bypass

NTS

Wasilla-Fishhook Rd

Parks Hwy

Susitna Ave

Knik-Goose Bay Rd

Palmer-Wasilla Hwy Extension

Urban Area Detail

Nelson Ave
Bogard Rd
Knik St
Main St
Swanson Ave
Herning Ave
Parks Hwy
Railroad Ave
Post Office
Wasilla Middle School
Carrs Mall
Metarose Square
Wasilla City Hall

8,476
8,617
9,320
8,736
9,721
4,895
5,092
10,658
14,165
16,944
11,853
9,283
8,226
7,891
10,118
6,398 6,438 6,633
1,955 617 6,727
12,285
9,648
1,698
6,223
7,600
4,673 4,910 3,692 4,703 5,130 4,194 3,821
11,913
15,037
3,921 767 3,730 6,666 2,472 2,906 2,290
32,889
32,178
33,682 3,452 35,424 35,780 36,064 35,947
19,377
1,333 1,100
2,353 884 427 218
689 2,746 526 435 349 199 102 88
306 15
17,528 0
966
17,123
17,186
5,040
22,748

Urban Area Detail values
7,891
10,118
6,633 8,807 9,600 9,283 8,226
3,670 6,365 6,727
4,342 617 4,805
1,955 5,096 6,695 5,130
4,910 5,534 3,692 4,906 4,703 4,344 4,215 4,194
3,312 5,938 2,249 2,906
4,555 3,468 3,730 4,396 4,252 4,476 4,283
7,528 2,472 2,349
3,361 7,562 2,679 2,668
33,682 33,898 3,452 35,546 8,670 35,424 3,105 35,114 34,975 35,780 36,064
19,377
689 3,686 1,333 1,100
15,275 2,353 233 884
9

AADT Volume Map:
Modified 2025 LRTP Model
Alt B: 5-Lane Main Street, No Bypass

NTS

Wasilla-Fishhook Rd

Parks Hwy

Knik-Goose Bay Rd

Palmer-Wasilla Hwy Extension

Riley Rd Extension

Urban Area Detail

Nelson Ave
Bogard Rd
Main St
Knik St
Swanson Ave
Herning Ave
Parks Hwy
Railroad Ave

Wasilla Middle School
Carrs Mall
Metarose Square
Wasilla City Hall
Post Office

Main map values:
9,540, 9,383, 9,23, 9,495, 4,938, 4,867, 9,819, 13,074, 15,955, 9,848, 10,445, 10,828, 6,485, 12,435, 5,564, 5,630, 5,846, 7,603, 6,833, 1,982, 1,955, 1,853, 9,624, 3,836, 2,989, 4,647, 4,257, 12,506, 12,132, 6,289, 10,867, 4,799, 5,002, 3,359, 4,578, 14,132, 7,659, 4,393, 741, 4,327, 9,413, 3,145, 3,088, 34,491, 34,780, 36,464, 2,620, 38,839, 38,457, 37,573, 37,405, 23,437, 1,455, 1,199, 961, 464, 237, 240, 689, 466, 403, 336, 272, 162, 83, 68, 15, 306, 21,171, 20,844, 20,901, 966, 0, 28,688, 5,223, 8,316

Urban Area Detail values:
10,828, 6,485, 5,846, 7,378, 8,030, 7,603, 6,833, 3,481, 3,738, 9,295, 1,853, 3,504, 3,836, 1,955, 4,994, 5,461, 9,624, 9,021, 9,127, 9,052, 5,002, 3,359, 4,893, 4,578, 5,192, 5,029, 4,647, 2,922, 3,120, 4,327, 9,004, 4,549, 4,375, 2,986, 4,420, 4,177, 2,989, 5,090, 2,527, 2,620, 3,145, 3,385, 2,541, 2,901, 36,464, 36,692, 38,269, 10,496, 11,535, 38,839, 37,665, 37,550, 38,457, 37,573, 689, 23,437, 1,694, 1,455, 1,199, 21,322, 240, 256, 961, 8

AADT Volume Map:
Modified 2025 LRTP Model
Alt B: 5-Lane Main Street, With Bypass

Wasilla-Fishhook Rd

Parks Hwy

Susitna Ave

Knik-Goose Bay Rd

Palmer-Wasilla Hwy Extension

NTS

2,588
9,555
8,815
8,65
8,939
4,709
9,921
4,952
10,477
9,891
13,942
16,783
11,189
8,247
6,702 6,744 6,955
8,608 8,593
10,306
1,955 536
7,885
3,235
11,226 13,947
6,957
11,899
4,755
4,905 3,665 4,642 4,964 2,999 3,636
920
3,937
3,628 8,487 3,388
2,038
7,815
31,182
32,169
33,824 3,800 33,232 32,901 32,896 32,717
27,454
1,244 1,029 827 400 204
200
689 717 615 506 406 226 116
25,979 306 15
966 0
25,610
25,556
26,748
5,040

Urban Area Detail

Nelson Ave
Bogard Rd

Wasilla Middle School

Carrs Mall

Metarose Square

Wasilla City Hall

Knik St
Main St
Post Office
Swanson Ave
Herning Ave
Parks Hwy
Railroad Ave

10,306
6,955 8,918 9,016 8,608 8,593
8,247
7,481
3,687 536 7,726 7,760 4,609
1,955
5,246
4,905 3,665 4,955 4,642 4,916 4,724 3,636
7,885 4,964
3,302 2,884 2,999
3,494 3,628 4,737 4,536 4,784 4,492
4,727 2,569
3,694 3,388 3,613 2,895
3,800 10,114 4,043 2,901 32,896
33,824 34,057 36,536 11,306 33,232 32,156 31,993
27,454
689 1,444 1,244 1,029
25,669 200 215 827
7,888
7,855

AADT Volume Map:
Modified 2025 LRTP Model
Alt C: Knik-Main 2-Way, No Bypass

8,87

8,998

9,248

Wasilla-Fishhook Rd

9,114

9,563

9,766

4,833

5,352

11,037

5,289

13,813

16,460

11,333

7,786

4,839

7,024 7,076 7,268 9,166 8,812 8,126

1,955 368 5,588

2,729

11,846

6,337 4,507 4,646 3,668 4,568 4,654 4,391 4,007

11,394 13,266

8,089 4,107 674 4,195 6,282 3,253

Parks Hwy 33,799 995 3,225 3,415

33,494 34,707 39,079 39,018 38,103 37,996

689 14,762 1,514 1,250 1,003 486 249

3,885 12,550 726 396 344 285 229 139 72 57 15

Susitna 3,403 12,757 306 0

Ave

Knik St

966

Knik-Goose Bay Rd

15,695

15,765

Palmer-Wasilla Hwy
Extension 26,688

NTS

Riley Rd Extension
5,379 8,438

Urban Area Detail

7,786

Nelson Ave 5,711 Bogard Rd

7,268 6,344 9,166 8,812 8,126

5,010 5,270 4,342

5,422 368 5,588 Wasilla Middle School

1,955 5,751 5,843 Main St

4,646 6,187 3,668 4,761 4,568 5,171 5,034 4,391

Knik St Swanson 5,874

Ave 5,986 3,133 3,253 Carrs Mall

4,255 4,195 4,362 4,225 4,405 4,209

5,043 4,357 7,143 2,897

Wasilla Herning 3,225 Metarose

City Ave 4,165 7,219 3,464 Square 3,234

Hall

Overpass 34,707 34,910 8,230 39,079 37,837 37,737 39,018 38,103

3,615

Parks Hwy

689 14,762 1,764 1,514 1,250

3,885 12,550 265 1,003

Railroad
Ave

AADT Volume Map:
Modified 2025 LRTP Model
Alt C: Knik-Main 2-Way, With Bypass

Wasilla-Fishhook Rd

9,346

9,500
9,35

9,628

4,847

4,976

10,840

6,135

14,209

17,027

11,300

8,395

4,509

2,627

6,967 7,007 7,205

9,408 9,005 8,736

1,955 335

6,916

11,351

9,700

11,739

6,614

4,821

5,091 4,082 5,278

4,507 4,310

3,928

14,739

6,590

3,845

881

4,183

7,133

2,915

2,741

31,554

Parks Hwy

31,801

33,319

34,100

34,370 34,148

34,027

986

5,362

14,

1,435 1,186

952 465 238

233

689 1,294 492 423 349 281 161 83

306

68 15

Susitna
Ave

14,093

0

Knik St

966

4,079

Knik-Goose Bay Rd

17,588

Palmer-Wasilla Hwy
Extension

22,899

17,647

5,039

NTS

Urban Area Detail

6,556

8,395

Nelson Ave

Bogard Rd

7,205

6,622

9,408

9,005

8,736

5,351
5,703

6,558

4,179

Wasilla
Middle
School

1,955

335

6,916

Main St

5,087
6,537

7,202
7,172
7,274

Post
Office

4,507

5,091

Knik St

4,082

5,552 5,278 5,398 5,209

4,310

6,712

2,324

2,915

Carrs Mall

4,643
4,786

Swanson
Ave

4,904 4,751

4,482 4,201

2,401

4,490

4,183

7,441

5,362

Herning
Ave

7,465

2,508

Metarose
Square

2,722

2,702

Wasilla
City
Hall

3,125

33,319

33,54

Overpass

31,058

8,489

34,100

33,742 33,599

34,370

34,148

986

Parks Hwy

689

147

1,669

1,435

1,186

12,875

233

Railroad
Ave

250

4

952

AADT Volume Map:
Modified 2025 LRTP Model
Alt D: Main-Yenlo 1-Way, No Bypass
Option 1: Yenlo to Wasilla-Fishhook

Wasilla-Fishhook Rd

Parks Hwy

Susitna Ave

Knik-Goose Bay Rd

Palmer-Wasilla Hwy Extension

Riley Rd Extension

NTS

10,729
5,311
5,649
843
4,276
4,242
9,608
13,087
16,095
5,302
9,632
6,093
6,919
12,773
12,863
14,146
2,401
5,961 6,020 6,239
6,431 7,026
8,347
7,260
1,955
972
4,028
6,868
11,585
4,218
4,431
4,483
6,836
6,980 4,469
7,194
3,942
639
4,269
8,181
2,734
33,942
7,425
2,505
35,578
37,250 2,106
38,214
40,261 38,895
38,650
689
1,151 1,149
1,173 939 455 232
226
814 809 284 216 132 50 74
12,511
17 268 13
6 80 78 40 38
12,275
678
12,472 23,981 23,928
12,236
28,462
5,167
8,446

Urban Area Detail

Nelson Ave
Bogard Rd
Main St
Yenlo St
Knik St
Swanson Ave
Herning Ave
Parks Hwy
Railroad Ave

Post Office
Wasilla Middle School
Wasilla City Hall
Carrs Mall
Metarose Square

6,431
6,919
6,239 7,922 8,555 8,347 7,260
3,440
7,026
3,818
1,955 972
4,171
4,633
4,431 4,483 4,973 6,836 5,975 5,925 4,469
2,670
2,479
6,980
2,841
4,666 4,269 5,260 5,344 5,973 5,620
8,181
2,017
2,505
9,429
2,702
8,378
37,250 37,484 38,173 38,214 39,450 39,580 40,261 38,895
2,106
3,181
13,626
13,391
689
1,151 1,149 1,173
12,760
226
12,509
939
12,773

AADT Volume Map:
Modified 2025 LRTP Model
Alt D: Main-Yenlo 1-Way, With Bypass
Option 1: Yenlo to Wasilla-Fishhook

Wasilla-Fishhook Rd

Parks Hwy

Susitna Ave

Knik-Goose Bay Rd

Palmer-Wasilla Hwy Extension

NTS

10,690
5,359
5,568
861
4,237
4,526
10,237
9,421
6,372
13,445
16,290
11,696
7,851
6,162 6,959
9,201
8,187
11,777
13,906
6,264 6,305 6,519
1,818
1,955 699
7,341 4,044
3,625
6,748
12,038
4,446
4,761
4,248
6,198
7,863
2,668
7,830
3,900
823
4,332
3,226
31,770
31,959
33,499
2,600
34,439
34,342 33,303
33,024
689
13,074
1,035 1,032
867 424 216
197
788 780 328 246 143 49
90 64
12,251
17 244
12
7 124 121 59 56
749 793
13,261
12,423
13,433
25,173 25,113
5,037
25,758

Urban Area Detail

Nelson Ave
Bogard Rd
6,162
7,851
6,519 8,712
9,325 9,201
8,187
3,827
Main St
Wasilla Middle School
4,225
6,959
1,955
4,504
699
7,121
4,973
Yenlo St
4,044
4,761
4,248
4,428 6,198 5,566 5,511
7,341
Post Office
Knik St
Swanson Ave
2,612
7,462
2,318
7,863
Carrs Mall
2,790
4,607
4,332
5,343 5,452 5,849 5,525
8,892
3,226
Metarose Square
Herning Ave
2,511
3,453
Wasilla City Hall
2,608
8,801
33,499 33,730
34,634
35,585 35,710
34,342 33,303
Parks Hwy
13,074
14,074
689
1,035 1,032
1,084
Railroad Ave
12,363
197
13,270
867

AADT Volume Map:
Modified 2025 LRTP Model
Alt D: Main-Yenlo 1-Way, No Bypass
Option 2: Yenlo to Bogard

Wasilla-Fishhook Rd
Parks Hwy
Knik-Goose Bay Rd
Susitna Ave
Riley Rd Extension
Palmer-Wasilla Hwy Extension

NTS

2.094
9.810
5.768 5.828 6.048
1.955
1.072
5.302
7.890 6.404
6.087
16.237 13.258
9.455
5.036
5.005
8.838
8.967
9.933
10.322
13.559
13.640
13.465
14.465
7.219
34.362
36.077
6.757
11.756
4.153 4.265 4.150 6.765 5.204 4.213 3.828
794 4.009 5.226 7.052 2.689 5.575 2.782
37.805 2.260 38.800 40.812 39.845 39.675
689 1.127 1.125 1.173 940 454 232
816 810 284 216 132 50 74
12.263 17 6 80 78 40 39 13 269
676 675
11.854
11.810
12.219
23.322 23.266
5.074 8.331
28.538

Urban Area Detail

Nelson Ave
Bogard Rd
Main St
Yenlo St
Knik St
Swanson Ave
Herning Ave
Parks Hwy
Railroad Ave
Post Office
Wasilla City Hall
Wasilla Middle School
Carrs Mall
Metarose Square

6.048 8.059 8.347 7.890 6.404 6.087
10.322
4.724 5.302
660 1.072 5.833
5.082 5.204
5.548
4.265 4.150 5.147 6.765 5.369 5.319 4.213
3.171 7.052 2.897 5.575
3.347 5.226 5.889 5.903 6.908 6.588 8.259
4.759 2.689
2.161 2.960
2.260 7.939 3.511
37.805 38.037 38.884 38.800 39.998 40.120 40.812 39.845
13.361 12.952
689 1.127 1.125 1.173
12.518 226 12.092 940
1.955

AADT Volume Map:
Modified 2025 LRTP Model
Alt D: Main-Yenlo 1-Way, With Bypass
Option 2: Yenlo to Bogard

NTS

Wasilla-Fishhook Rd

Parks Hwy

Susitna Ave

Knik-Goose Bay Rd

Palmer-Wasilla Hwy Extension

9,446
9,589
9,699
9,318
4,885
4,988
10,565
17,052
14,179
10,681
11,064
7,868
12,425
6,773 6,815 7,038 9,709 8,174
2,216
1,955 922 5,847 5,639 4,216 3,824
12,449 12,523
6,950 4,461 4,643 4,491 6,320 13,617
8,030 1,047 4,865 7,393 3,489 6,368 2,817
31,575 3,903
32,089 33,643 3,032 33,069 32,919 31,922 31,687
689 14,438 1,008 1,006
197 862 422 215
790 782 332 249 145 49 91 65
13,642 17 244 12
7 125 122 60 57
13,072
752 797
13,817 13,247
26,379 26,319
5,037
27,047

Urban Area Detail

Nelson Ave
Bogard Rd
7,038 9,417 10,044 9,709 8,174
11,064
5,847
5,016
5,404
1,955 922
5,311
Knik St
Main St
Yenlo St
Wasilla Middle School
5,420
5,922
Post Office
4,643 4,491 4,738 6,320 5,426 5,331 4,216
Swanson Ave
7,393
3,154 2,613 6,368
3,452
4,762 4,865 5,906 5,923 6,312 5,946 8,355
Carrs Mall
Herning Ave
2,939 3,489 Metarose Square
8,746 3,722
3,032 4,192
33,643 33,873 34,999 33,069 34,306 34,415 32,919 31,922
Parks Hwy
14,438 13,698
689 1,008 1,006
Railroad Ave
13,754 197 13,079 1,079
862
Wasilla City Hall
7,868

Appendix E

Post-Processed 2035 AADTs

Alternative A: Main Street 3-Lane Section

Without Parks Highway bypass

Street	Value
Susitna Avenue (top)	803
Railroad Avenue (top)	803
Parks Highway (top)	35,100
Herning Avenue (top)	4,418
Swanson Avenue (top)	4,713
Paulson Avenue (top)	1,117
Nelson Avenue (top)	12,624

Main line (left to right): 12,841 | 12,675 | 12,856 | 14,747 | 14,747 | 12,468 | 10,978 | 10,961 | 10,552 | 11,578 | 11,578 | 10,273 | 10,124 | 10,799 | 10,295 | 9,659

Knik-Goose Bay Road   Main Street   Main Street

Street	Value
Susitna Avenue (bottom)	575
Railroad Avenue (bottom)	2,158
Parks Highway (bottom)	35,100
Herning Avenue (bottom)	5,674
Swanson Avenue (bottom)	6,120
Post Office Driveway	2,344
Bogard Road	14,167

With Parks Highway bypass

Street	Value
Susitna Avenue (top)	803
Railroad Avenue (top)	803
Parks Highway (top)	36,458
Herning Avenue (top)	4,345
Swanson Avenue (top)	4,301
Paulson Avenue (top)	719
Nelson Avenue (top)	10,387

Main line (left to right): 15,821 | 14,544 | 14,690 | 17,490 | 17,490 | 15,720 | 13,649 | 12,086 | 10,766 | 13,845 | 13,845 | 12,143 | 11,958 | 12,197 | 11,541 | 9,629

Knik-Goose Bay Road   Main Street

Street	Value
Susitna Avenue (bottom)	2,034
Railroad Avenue (bottom)	3,129
Parks Highway (bottom)	35,100
Herning Avenue (bottom)	5,121
Swanson Avenue (bottom)	5,715
Post Office Driveway	2,344
Bogard Road	12,400

Alternative B: Main Street 5-Lane Section

Without Parks Highway bypass

Susitna Avenue	Railroad Avenue	Parks Highway	Herning Avenue	Swanson Avenue		Paulson Avenue	Nelson Avenue
803	803	35,100	5,040	3,913		974	10,000

17,351 17,308 17,474 19,208 19,208 15,810 14,293 12,902 12,341 13,738 13,738 12,510 12,365 13,191 12,740 8,055

Knik-Goose Bay Road   Main Street

543	1,973	35,100	5,299	5,700	2,344		12,400

Susitna Avenue | Railroad Avenue | Parks Highway | Herning Avenue | Swanson Avenue | Post Office Driveway | | Bogard Road

---

With Parks Highway bypass

Susitna Avenue	Railroad Avenue	Parks Highway	Herning Avenue	Swanson Avenue		Paulson Avenue	Nelson Avenue
803	803	35,100	4,226	4,269		624	10,387

23,014 22,623 22,739 24,321 24,321 16,884 15,051 12,674 11,730 13,061 13,061 11,406 11,537 11,775 11,172 9,386

Knik-Goose Bay Road   Main Street

835	1,682	35,100	5,518	5,772	2,344		12,400

Susitna Avenue | Railroad Avenue | Parks Highway | Herning Avenue | Swanson Avenue | Post Office Driveway | | Bogard Road

Alternative C: Two-way Couplet (Main Street and Knik Street)

Without Parks Highway bypass

Susitna Avenue 803

Heming Avenue 5,874

Swanson Avenue 5,412

Paulson Avenue 2,277

Nelson Avenue 10,000

3,964   4,525   4,852   6,240   4,956   7,207   6,699   6,072   6,072   6,316   5,952   5,637   5,637   9,023

Knik Street   Knik Street

Susitna Avenue 846

Heming Avenue 4,887

Swanson Avenue 4,273

Paulson Avenue 429

Bogard Road 8,729

Wasilla Fishhook 4,712

Knik Street 3,964

Susitna Avenue 846

Railroad Avenue 803

Parks Highway 35,100

Heming Avenue 4,887

Swanson Avenue 4,273

Paulson Avenue 429

Nelson Avenue 8,582

13,204   10,423   8,870   10,070   10,254   12,084   12,084   12,436   10,794   9,493   9,045   10,307   10,307   8,983   8,829   8,444   7,964   5088

Knik-Goose Bay Road   Main Street

Susitna Avenue 461

Railroad Avenue 2,055

Parks Highway 35,100

Heming Avenue 5,081

Swanson Avenue 5,546

Post Office Driveway 2,344

Bogard Road 12,400

With Parks Highway bypass

Knik Street (upper roadway)

Susitna Avenue		Heming Avenue	Swanson Avenue	Paulson Avenue			Knik Street		Nelson Avenue		
803		5,230	5,930	2,277					10,000		

4,751 — 6,246 — Knik Street — 6,246 — 5,575 — 5,408 — 7,615 — 7,090 — 6,530 — 6,530 — 6,643 — 6,233 — 5,252 — 5,252 — 9,023

Susitna Avenue	Heming Avenue	Swanson Avenue	Paulson Avenue	Bogard Road	Wasilla Fishhook
1,507	4,873	4,755	390	9,191	5,201

Knik-Goose Bay Road / Main Street (lower roadway)

Knik Road	Susitna Avenue	Railroad Avenue	Parks Highway	Heming Avenue	Swanson Avenue		Paulson Avenue	Nelson Avenue	
4,751	1,507	803	35,100	4,873	4,755		390	8,728	

16,889 — 13,098 — 13,098 — 11,776 — 11,966 — 13,928 — 13,928 — 12,681 — 11,116 — 10,655 — 10,027 — 12,079 — 12,079 — 10,866 — 10,714 — 10,331 — 9,797 — 5,558

Knik-Goose Bay Road / Main Street

Susitna Avenue	Railroad Avenue	Parks Highway	Heming Avenue	Swanson Avenue	Post Office Driveway	Bogard Road
573	1,944	35,100	5,712	6,467	2,344	12,400

Alternative D, Option 1: One-way Couplet (Main Street and Yenlo Street), including extension of Yenlo Street past Bogard Road

Without Parks Highway Bypass

Top row (Knik-Goose Bay Road / Main Street):

Cross streets (above): Lake View Ave (0), Susitna Avenue (803), Railroad Avenue (803), Parks Highway (35,100), Herring Avenue (4,973), Swanson Avenue (5,222), Paulson Avenue (1,132), Nelson Avenue (10,600)

Mainline boxes: 20,806 | 10,845 | 10,845 | 10,879 | 10,879 | 11,095 | 11,095 | 10,979 | 10,979 | 15,405 | 15,405 | 13,653 | 13,653 | 13,976 | 13,077 | 12,919 | 12,919 | 5,623 | 5,623 | 4,939 | 4,939 | 9,381

Knik-Goose Bay Road / Main Street

Cross streets (below): Talkeetna Road (10,640), Retail Driveway (790), Susitna Avenue (948), Railroad Avenue (1,341), Parks Highway (35,100), Herring Avenue (6,127), Swanson Avenue (5,793), Bogard Road (12,450), Carpenter Street (982), Yenlo Street (6,186)

Bottom row (Talkeetna Street / Yenlo Street):

Cross streets (above): Retail Driveway (790), Susitna Avenue (942), Railroad Avenue (1,338), Parks Highway (35,100), Herring Avenue (6,546), Swanson Avenue (6,902), Bogard Road (10,536), Carpenter Street (982)

Mainline boxes: 10,640 | 10,674 | 10,607 | 10,877 | 10,877 | 11,644 | 11,644 | 17,338 | 17,338 | 15,043 | 15,043 | 12,834 | 12,834 | 5,328 | 5,328 | 4,644

Talkeetna Street / Yenlo Street

Cross streets (below): Susitna Avenue (331), Railroad Avenue (1,366), Parks Highway (35,100), Herring Avenue (4,577), Swanson Avenue (5,206), Bogard Road (10,523)

With Parks Highway Bypass

Lake View Ave — 0
Susitna Avenue — 803
Railroad Avenue — 803
Parks Highway — 35,931
Herning Avenue — 5,046
Swanson Avenue — 4,948
Paulson Avenue — 814
Nelson Avenue — 10,387

Knik-Goose Bay Road

21,837 | 10,802 | 10,802 | 10,653 | 10,653 | 10,750 | 10,750 | 11,368 | 11,368 | 15,720 | 15,720 | 13,328 | 13,328 | 13,487 | 12,719 | 12,430 | 12,430 | 5,550 | 5,550 | 4,827 | 4,827 | 9,629

Talkeetna Road — 11,686
Retail Driveway — 872
Susitna Avenue — 918
Railroad Avenue — 1,206
Parks Highway — 35,100
Herning Avenue — 6,224
Swanson Avenue — 5,158
Post Office — 1,811
Bogard Road — 12,400
Carpenter Street — 1,003
Yenlo Street — 6,486

Main Street   Main Street

Retail Driveway — 924
Susitna Avenue — 909
Railroad Avenue — 1,202
Parks Highway — 35,100
Herning Avenue — 6,436
Swanson Avenue — 6,419
Bogard Road — 10,970

Talkeetna Street

11,689 | 11,531 | 11,425 | 11,539 | 11,539 | 12,247 | 12,247 | 15,882 | 15,882 | 14,044 | 14,044 | 13,112 | 13,112 | 7,422 | 7,422 | 6,486

Susitna Avenue — 382
Railroad Avenue — 1,263
Parks Highway — 35,100
Herning Avenue — 5,020
Swanson Avenue — 4,711
Bogard Road — 10,887
Carpenter Street — 1,003

Yenlo Street

Alternative D, Option 2: One-way Couplet (Main Street and Yenlo Street), with Yenlo Street ending at Bogard Road

Without Parks Highway Bypass

Top horizontal line (Knik-Goose Bay Road / Main Street):

Street label	Value
Lake View Ave	0
Susitna Avenue	803
Railroad Avenue	803
Parks Highway	35,100
Herning Avenue	6,087
Swanson Avenue	4,834
Paulson Avenue	1,249
Nelson Avenue	10,000

Segment values (Knik-Goose Bay Road / Main Street): 19,132 | 10,048 | 10,048 | 10,084 | 10,084 | 10,294 | 10,294 | 10,987 | 10,987 | 15,405 | 15,405 | 13,684 | 13,684 | 12,531 | 12,531 | 11,319 | 11,319 | 10,288 | 10,288 | 9,381

Knik-Goose Bay Road / Main Street / Main Street

Below top line labels/values:
- Talkeetna Road: 9,712
- Retail Driveway: 787
- Susitna Avenue: 951
- Railroad Avenue: 1,313
- Parks Highway: 35,100
- Herning Avenue: 6,860
- Swanson Avenue: 5,995
- Post Office: 1,985
- Bogard Road: 12,400

Bottom horizontal line (Talkeetna Street / Yenlo Street):

Above-line labels/values:
- Retail Driveway: 786
- Susitna Avenue: 944
- Railroad Avenue: 1,310
- Parks Highway: 35,100
- Herning Avenue: 7,674
- Swanson Avenue: 6,196
- Bogard Road: 10,773

Segment values (Talkeetna Street / Yenlo Street): 9,712 | 9,748 | 9,685 | 9,944 | 9,944 | 10,651 | 10,651 | 16,026 | 16,026 | 10,818 | 10,818 | 10,098 | 10,098

Talkeetna Street / Yenlo Street

Below-line labels/values:
- Susitna Avenue: 331
- Railroad Avenue: 1,366
- Parks Highway: 35,100
- Herning Avenue: 4,246
- Swanson Avenue: 4,907
- Bogard Road: 8,744

With Parks Highway Bypass

Knik-Goose Bay Road

Top row cross streets (left to right): Lake View Ave, Susitna Avenue, Railroad Avenue, Parks Highway, Heming Avenue, Swanson Avenue, Paulson Avenue, Nelson Avenue

Top horizontal values: 22,951 | 12,049 | 12,049 | 11,896 | 11,896 | 11,994 | 11,994 | 12,590 | 12,590 | 15,720 | 15,720 | 13,288 | 13,288 | 12,610 | 12,610 | 11,343 | 11,343 | 10,509 | 10,509 | 9,629

Vertical values above line: 0 (Lake View Ave), 803 (Susitna Avenue), 803 (Railroad Avenue), 36,458 (Parks Highway), 5,667 (Heming Avenue), 5,231 (Swanson Avenue), 1,074 (Paulson Avenue), 10,387 (Nelson Avenue)

Vertical values below line: 11,552 (Talkeetna Street), 876 (Retail Driveway), 920 (Susitna Avenue), 1,174 (Railroad Avenue), 35,100 (Parks Highway), 6,880 (Heming Avenue), 5,519 (Swanson Avenue), 12,400 (Bogard Road)

Main Street   Main Street

Talkeetna Street / Yenlo Street

Second row cross streets: Retail Driveway, Susitna Avenue, Railroad Avenue, Parks Highway, Heming Avenue, Swanson Avenue, Bogard Road

Vertical values above line: 928 (Retail Driveway), 911 (Susitna Avenue), 1,172 (Railroad Avenue), 36,179 (Parks Highway), 6,926 (Heming Avenue), 6,210 (Swanson Avenue), 11,368 (Bogard Road)

Horizontal values: 11,552 | 11,399 | 11,291 | 11,405 | 11,405 | 12,094 | 12,094 | 15,017 | 15,017 | 11,446 | 11,446 | 10,135 | 10,135

Vertical values below line: 387 (Susitna Avenue), 1,257 (Railroad Avenue), 34,607 (Parks Highway), 4,804 (Heming Avenue), 4,911 (Swanson Avenue), 9,571 (Bogard Road)

Appendix F

2035 Turning Movement Counts

No Action Alternative, no Parks Highway bypass: 3 lanes Main Street

Susitna Avenue | Railroad Avenue | Parks Highway | Herning Avenue | Swanson Avenue | Paulson Avenue | Nelson Avenue

Knik Goose Bay Road | Knik Goose Bay Road | Main Street | Main Street | Main Street | Main Street | Main Street | Main Street

Susitna Avenue | Railroad Avenue | Parks Highway | Herning Avenue | Swanson Avenue | Post Office Driveway | Paulson Avenue | Bogard Road

No Action Alternative, with Parks Highway bypass: 3 lanes Main Street

Susitna Avenue | Railroad Avenue | Parks Highway | Herning Avenue | Swanson Avenue | Paulson Avenue | Nelson Avenue

Knik Goose Bay Road | Knik Goose Bay Road | Main Street | Main Street | Main Street | Main Street | Main Street | Main Street
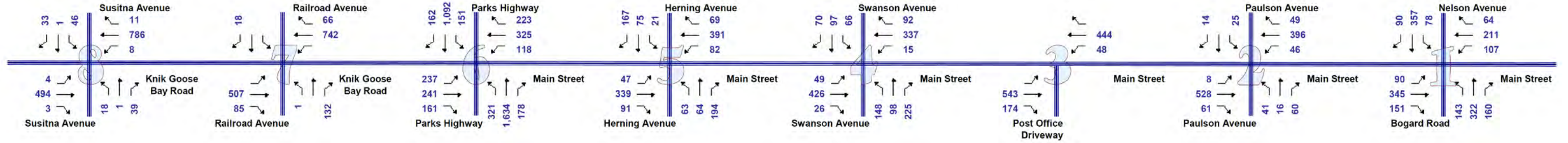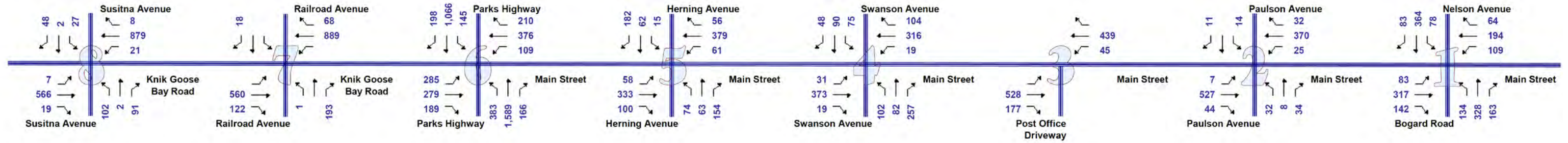
Susitna Avenue | Railroad Avenue | Parks Highway | Herning Avenue | Swanson Avenue | Post Office Driveway | Paulson Avenue | Bogard Road

Alternative A, no Parks Highway bypass: 3 lanes Main Street

Susitna Avenue | Railroad Avenue | Parks Highway | Herning Avenue | Swanson Avenue | Paulson Avenue | Nelson Avenue

Knik Goose Bay Road | Knik Goose Bay Road | Main Street | Main Street | Main Street | Main Street | Main Street | Main Street

Susitna Avenue | Railroad Avenue | Parks Highway | Herning Avenue | Swanson Avenue | Post Office Driveway | Paulson Avenue | Bogard Road

Alternative A, with Parks Highway bypass: 3 lanes Main Street

Susitna Avenue | Railroad Avenue | Parks Highway | Herning Avenue | Swanson Avenue | Paulson Avenue | Nelson Avenue

Knik Goose Bay Road | Knik Goose Bay Road | Main Street | Main Street | Main Street | Main Street | Main Street | Main Street

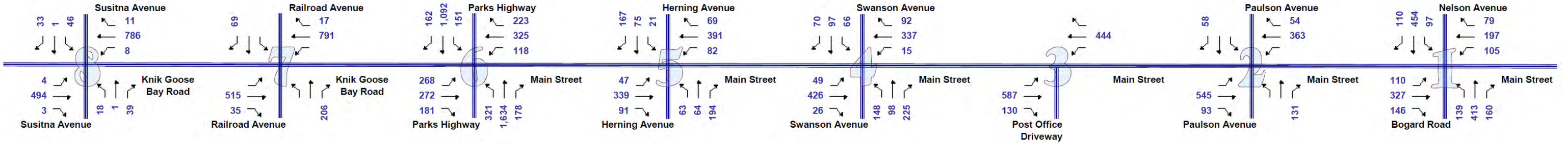Susitna Avenue | Railroad Avenue | Parks Highway | Herning Avenue | Swanson Avenue | Post Office Driveway | Paulson Avenue | Bogard Road

Alternative B, no Parks Highway bypass: 5 lanes Main Street

Alternative B, with Parks Highway bypass: 5 lanes Main Street

Alternative C, no Parks Highway bypass: Knik Street/Main Street Two-way Couplet

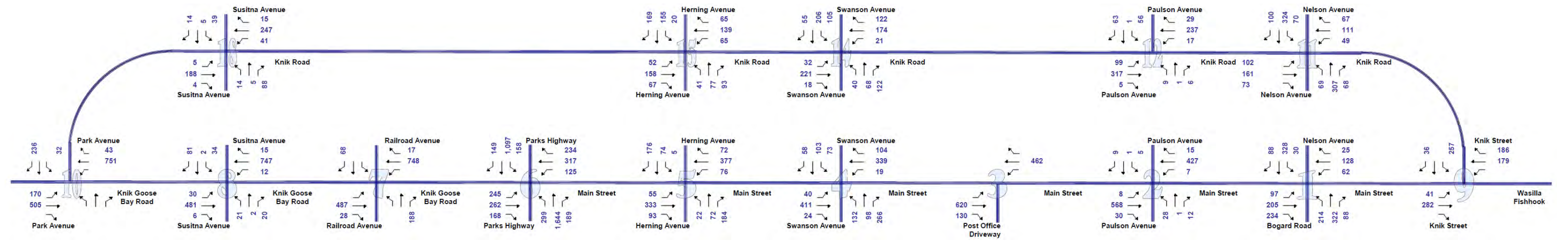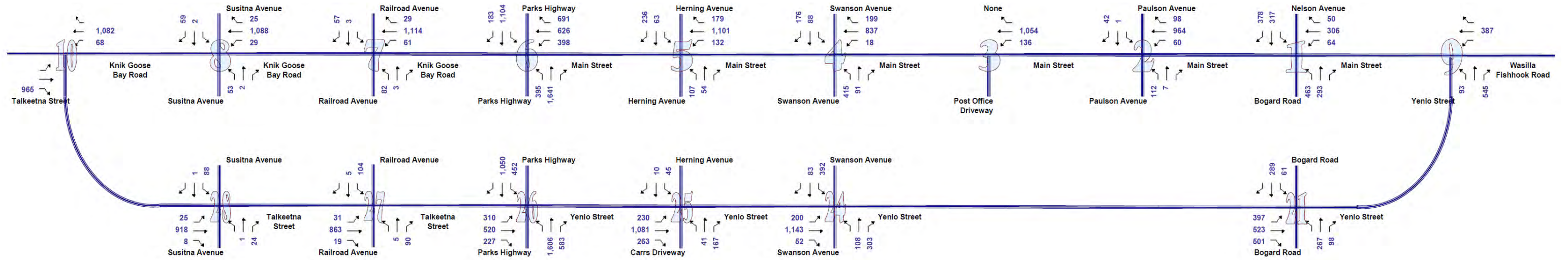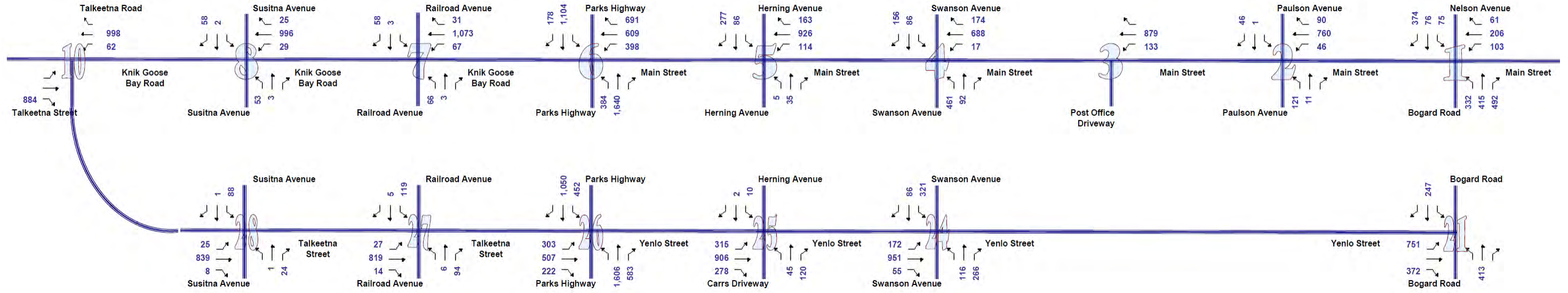Alternative C, with Parks Highway bypass: Knik Street/Main Street Two-way Couplet

Alternative D, no Parks Highway bypass: Yenlo Street/Main Street One-way Couplet

Alternative D, with Parks Highway bypass: Yenlo Street/Main Street One-way Couplet

Alternative E, no Parks Highway bypass: Yenlo Street/Main Street One-way Couplet (ends at Bogard Road)

Top row intersections (left to right):
- Talkeetna Road
- Susitna Avenue
- Railroad Avenue
- Parks Highway
- Herning Avenue
- Swanson Avenue
- Paulson Avenue
- Nelson Avenue

Talkeetna Road — 998, 62, 58, 2
Knik Goose Bay Road
Talkeetna Street — 884

Susitna Avenue — 25, 996, 29, 53, 3

Railroad Avenue — 31, 1,073, 67, 58, 3, 66, 3
Knik Goose Bay Road

Parks Highway — 178, 1,104, 691, 609, 398, 384, 1,640
Main Street

Herning Avenue — 277, 86, 163, 926, 114, 5, 35
Main Street

Swanson Avenue — 156, 86, 174, 688, 17, 461, 92
Main Street

Post Office Driveway — 879, 133
Main Street

Paulson Avenue — 46, 1, 90, 760, 46, 121, 11
Main Street

Nelson Avenue — 374, 76, 75, 61, 206, 103, 332, 415, 492
Bogard Road — Main Street

Lower row (no bypass):
- Susitna Avenue — 1, 88, 25, 839, 8, 24
  Talkeetna Street
- Railroad Avenue — 5, 119, 27, 819, 14, 6, 94
  Talkeetna Street
- Parks Highway — 1,050, 452, 303, 507, 222, 1,606, 583
  Yenlo Street
- Herning Avenue — 2, 10, 315, 906, 278, 45, 120
  Yenlo Street / Carrs Driveway
- Swanson Avenue — 86, 321, 172, 951, 55, 116, 266
  Yenlo Street
- Bogard Road — 247, 751, 372, 413
  Yenlo Street

Alternative E, with Parks Highway bypass: Yenlo Street/Main Street One-way Couplet (ends at Bogard Road)

Top row intersections (left to right):
- Talkeetna Road
- Susitna Avenue
- Railroad Avenue
- Parks Highway
- Herning Avenue
- Swanson Avenue
- Paulson Avenue
- Nelson Avenue

Talkeetna Road — 1,252, 84, 60, 2
Knik Goose Bay Road
Talkeetna Street — 992

Susitna Avenue — 23, 1,171, 29, 56, 2

Railroad Avenue — 28, 1,227, 60, 58, 2, 60, 3
Knik Goose Bay Road

Parks Highway — 281, 1,115, 723, 545, 351, 489, 1,617
Main Street

Herning Avenue — 264, 75, 133, 898, 102, 399, 82
Main Street

Swanson Avenue — 179, 84, 180, 691, 14, 326, 93
Main Street

Post Office Driveway — 885, 133
Main Street

Paulson Avenue — 40, 1, 80, 794, 40, 104, 8
Main Street

Nelson Avenue — 406, 132, 82, 71, 186, 76, 341, 344, 554
Bogard Road — Main Street

Lower row (with bypass):
- Susitna Avenue — 81, 26, 993, 9, 28
  Talkeetna Street
- Railroad Avenue — 4, 107, 25, 960, 12, 4, 87
  Talkeetna Street
- Parks Highway — 1,010, 456, 443, 441, 270, 1,602, 514
  Yenlo Street
- Herning Avenue — 45, 238, 287, 908, 288, 47, 222
  Yenlo Street / Carrs Driveway
- Swanson Avenue — 84, 239, 184, 960, 48, 113, 269
  Yenlo Street
- Bogard Road — 283, 755, 370, 453
  Yenlo Street