

determined for use in projecting turning movement volumes. An annual growth rate of 0.5% was used for 36th, Benson and Northern Lights with a 1.0% rate for Fireweed. Projected AM and PM peak hour turning movement volumes for the years 2006 and 2016 for the intersections of Spenard with the above mentioned roadways can be found in Appendix C. Existing intersection counts can be found in Appendix E.

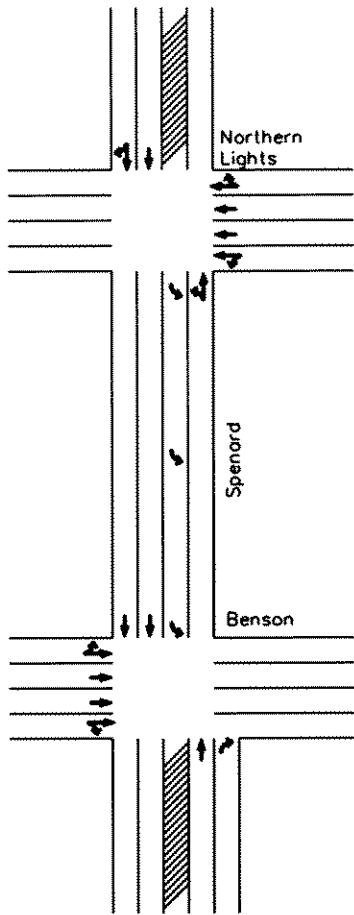
5.0 Capacity Analysis

Intersection and roadway capacity analysis was performed to identify probable alternatives that incorporate measures identified in the Collision Analysis.

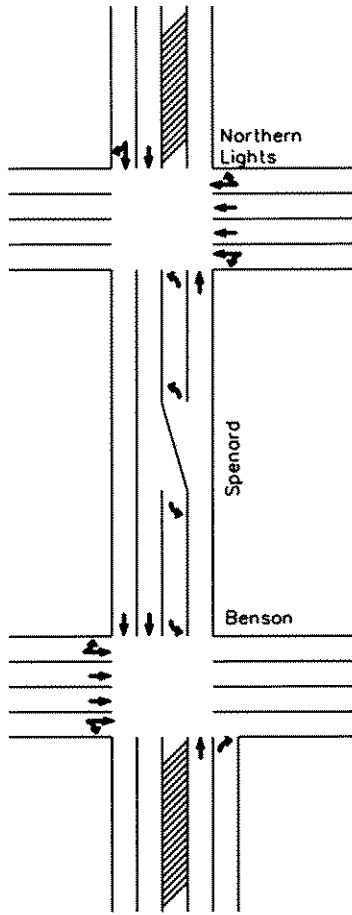
5.1 Intersection Capacity

A signalized capacity analysis was performed for the four signalized intersections. The intersections were analyzed for the AM and PM peak conditions for the years 2006 and 2016 for each intersection configuration alternative and the existing intersection configuration. Analysis was performed based on the Highway Capacity Manual (HCM) (3) using Highway Capacity Software Version 3.1c (HCS), Synchro 4 Traffic Signal Coordination Software Version 4 and existing signal timing plans provided by the MOA.

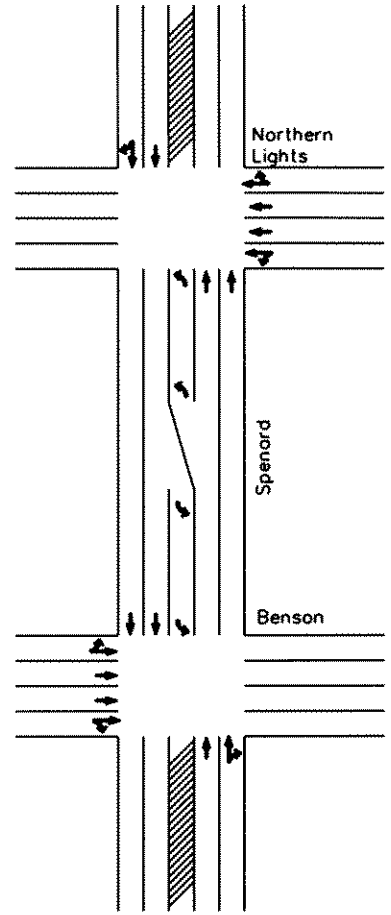
Five alternative intersection configurations were identified for the Benson/Northern Lights intersections, one alternative configuration was identified for the Fireweed intersection, and one alternative was identified for the 36th Avenue intersection. Figure 5.1 shows the alternative intersection configurations. The one Benson/Northern Lights alternative configuration not illustrated (BLN5) consists of the Benson signal operating in a split phase mode under the existing lane configuration. The following tables show the capacity analysis results. Estimated queue lengths for each alternative can be found in the LOS reports in Appendix D.



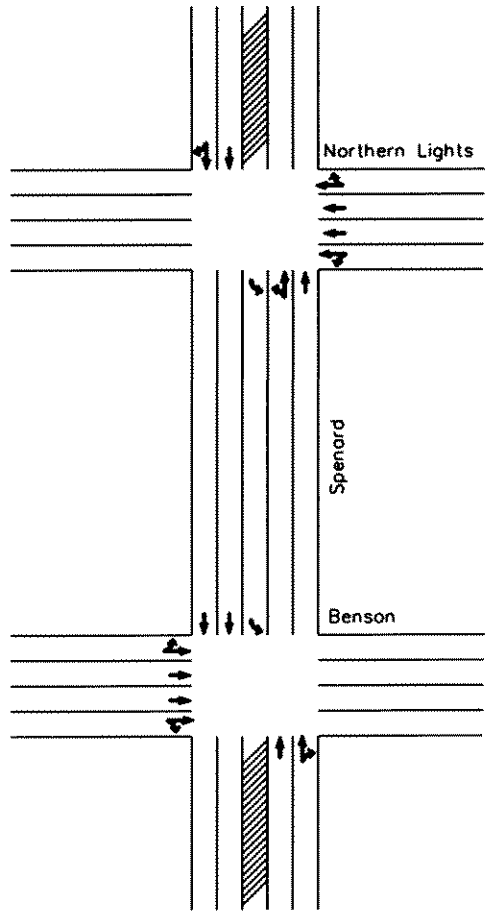
BNL1



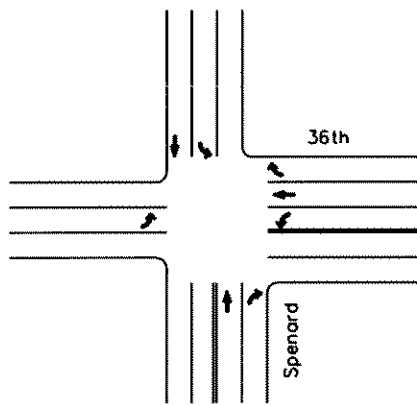
BNL2



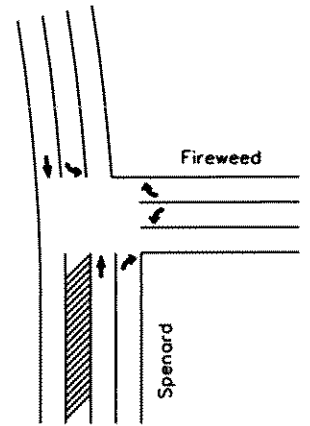
BNL3



BNL4



36th



Fireweed 1



SPENARD ROAD CHANNELIZATION AND
 PEDESTRIAN FACILITIES IMPROVEMENT
 HILLCREST DR. TO MINNESOTA DR.
 53986/HRO-0001(175)

INTERSECTION CONFIGURATIONS
 FIGURE 5.1

Alternative	Intersection of Spenard Road with:	2000		2006		2016		
		Delay	LOS	Delay	LOS	Delay	LOS	
AM Peak	Existing Lane Geometry	Fireweed	6.3	A	6.5	A	7.0	A
		Northern Lights	10.7	B	10.9	B	11.2	B
		Benson	14.7	B	16.0	B	17.6	B
		36 th	7.6	A	7.7	A	8.1	A
	BNL1	Northern Lights			13.0	B	14.3	B
		Benson			18.1	B	19.6	B
	BNL2	Northern Lights			12.2	B	12.7	B
		Benson			17.8	B	18.8	B
	BNL3	Northern Lights			8.4	A	11.3	B
		Benson			16.2	B	18.3	B
	BNL4	Northern Lights			11.0	B	11.4	B
		Benson			16.7	B	18.3	B
	BNL5	Northern Lights			9.9	A	10.1	B
		Benson			26.2	C	28.4	C
Fireweed 1	Fireweed			6.8	A	7.2	A	
36 th	36 th			10.6	B	11.4	B	

Table 5.1 AM Peak Hour Intersection LOS

As can be seen, all alternative intersection configurations will operate at an acceptable LOS during the AM peak hour.

Alternative	Intersection of Spenard Road with:	2000		2006		2016		
		Delay	LOS	Delay	LOS	Delay	LOS	
PM Peak	Existing Lane Geometry	Fireweed	6.0	A	6.2	A	7.3	A
		Northern Lights	25.5	C	28.0	C	36.1	D
		Benson	20.7	C	21.4	C	23.0	C
		36 th	18.5	B	21.7	C	34.5	C
	BNL1	Northern Lights			52.2	D	75.4	E
		Benson			20.0	C	21.9	C
	BNL2	Northern Lights			24.3	C	27.9	C
		Benson			20.1	C	21.9	C
	BNL3	Northern Lights			22.7	C	24.4	C
		Benson			22.5	C	23.9	C
	BNL4	Northern Lights			22.6	C	24.6	C
		Benson			22.5	C	23.9	C
	BNL5	Northern Lights			21.1	C	22.9	C
Benson				39.1	D	42.8	D	
Fireweed 1	Fireweed			6.7	A	7.0	A	
36 th	36 th			25.4	C	36.6	D	

Table 5.2 PM Peak Hour Intersection LOS

As can be seen, all alternative intersection configurations with the exception of Alternatives BNL1 and BNL5 and 36th will operate at an acceptable LOS during the PM peak hour. However, the existing delay for 36th is 34.5 seconds and will be 36.6 seconds in 2016, only a 2 second increase in delay.

It should be noted that potential modifications to the existing signal timing is limited by the fact that both Northern Lights and Benson are part of a coordinated system which provides for a progressive movement along these two streets.

5.2 Roadway Capacity

The Collision Analysis identified reducing the number of through lanes as a collision reduction measure. According to a recent study on lane reductions (4), a 3-lane roadway can operate at an acceptable level-of-service with roadway ADT's up to 18,000. Two segments of Spenard, 36th to Benson and Northern Lights to Fireweed, will have projected 2016 ADT's of around 15,000.

6.0 Recommendation

As a method to reduce the frequency and number of vehicle collisions along the Spenard corridor, it is recommended that Spenard Road be converted to a 3-lane section between 36th Avenue and Hillcrest Drive using the proposed intersection configurations for Fireweed and 36th Avenue. Acceptable intersection configurations for Benson and Northern Lights include BNL2, BNL3 and BNL4. Further analysis and final recommendation for the Benson and Northern Lights intersections will be made in the Engineering Analysis Report.