

Stakeholder and Public Involvement

This section will discuss the public outreach efforts undertaken as part of this study effort. Early on in the study process a Public Involvement Plan was prepared.

Stakeholder Interviews

An information piece providing an introduction to the study was prepared and used in Stakeholder Interviews. In August 2014, in-person interviews were held with the following stakeholders near the study area:

- United Parcel Service
- City of Airway Heights
- Washington State Patrol
- Spokane International Airport Police
- Best Western Plus Peppertree Inn
- United States Postal Service
- Fire District 10
- Spokane Transit Authority
- FedEx

Important issues identified through this interview process that were included in the development and evaluation of alternatives include:

- Traffic on Inbound is going interstate speed
- Vehicles waiting at Spotted Road misjudge speed of Airport traffic
- New signal at US2/Flint will likely take some pressure off of Spotted/US 2
- Speed monitors, speed awareness devices all working to keep speeds down
- Travelers from out of town in rental cars and unfamiliar with roundabouts will get confused
- Near misses have been observed with pedestrians walking to/from bus stops on Spotted Road

A complete summary of the stakeholder input received is included in Appendix E.

Public Open House

On October 22, 2014 from 4:30 – 7:00 PM a public open house was held at the Irv Reed Center in close proximity to the Airport Terminal Building. Prior to the Open House an advertisement was placed in the Spokesman Review and the Cheney Free Press. Over 1,100 invitations were mailed directly to property owners in close proximity to the project as well as airport tenants. Large static displays were also placed at the airport terminal and on the shuttle buses to inform airport users of the meeting. Also, the morning of the public meeting, door-to-door meetings were conducted with over 20 businesses to ensure that they were aware of the meeting.

Large display boards were prepared for the meeting to convey the background and purpose of the study and show the alternatives that were being considered. Following the meeting, these display boards were placed in the airport terminal to allow users of the airport an opportunity to review the alternatives and provide comments. 15 people attended the open house and 8 comment forms were received. Attendees were asked to rank the evaluation criteria for importance and to provide feedback on the alternatives. Generally most of those in attendance were in favor of Alternative D, the one double-lane roundabout. Public comments received are consolidated and included in Appendix E.

Evaluation of Alternatives

This section will summarize the identification of evaluation criteria used to rank the 5 alternatives considered for long-range improvements, and the process used to assign a weight to each criterion. The evaluation of each alternative against the various criteria are also discussed, with the final score assigned and summarized as well.

Establishment of Evaluation Criteria

At the second meeting of the TAC a discussion about evaluation criteria was led by the consultant team. Several potential criteria were considered and discussed and the TAC agreed on 10 criteria with which to prioritize or rank the alternatives in the consideration of the pros and cons of each. The need to weight the criteria was also discussed, as most TAC members felt more strongly about some of the criteria than they did about others.

Following the TAC meeting a table with the criteria was provided to each TAC member with instructions to complete a Pairwise Comparison process that would establish a weighting for each criteria to be applied during the scoring process. Through the Pairwise Comparison each criterion is compared individually against each other criterion; the more important criterion, from that person or agency's perspective, is chosen and then the relative importance - much more important, more important or slightly more important - indicated. Each level of importance was given a value 3, 2 or 1.

All scores for each criterion were summed to represent an overall score for the TAC. The totals were then normalized to create a weighted value for each criterion with the total combined weighting equal to 100%. Table 7 summarizes the evaluation criteria and their weight in order of relative importance.

Table 7. Evaluation Criteria and Weighting

Criterion	Combined TAC Average Percent
Safety	25.4%
Airport Drive Inbound Mobility	15.7%
Driver Consistency/Expectation	9.4%
Peak Hour Level of Service	8.7%
Public/Agency Support	7.9%
Spotted Road Mobility	7.3%
Cost	7.1%
Airport Drive Outbound Mobility	6.8%
21st Avenue Mobility	6.3%
Phasing Ability	5.3%
TOTAL	100%

Traffic volumes for each of the 5 alternatives are important in several of the criteria evaluated. The methodology for preparing the anticipated traffic volumes was discussed earlier. The entering and exiting volumes on each of the roadways in the study area were made to be the same. The route traveled to get to and from those points however is slightly different depending upon the alternative. The traffic volumes for each of the alternatives are included in Appendix F.

The consultant team prepared an evaluation for each criterion assessing the five alternatives and the No-Build scenario for comparative purposes. The details and results were reviewed with the TAC with minor modifications being made based upon TAC input to improve clarity and consistency. The results of the evaluation are discussed below.

Safety

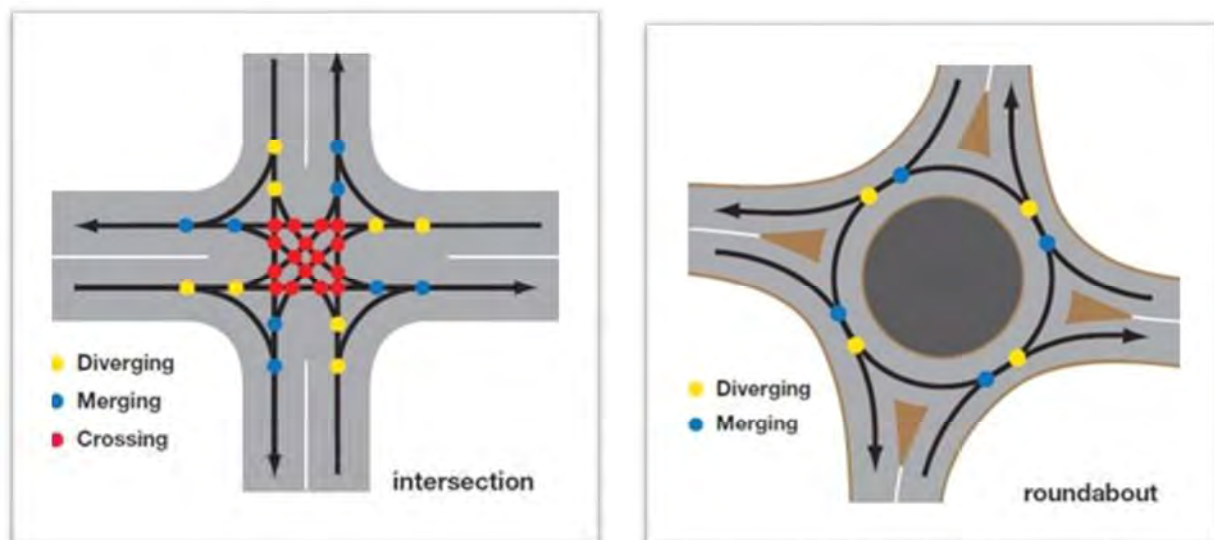
For the purposes of comparing the relative safety merits or potential safety issues of each of the alternatives against each other and against the No-Build scenario, it was felt that a comparison of the types of conflict points and traffic volumes involved in those conflicts would provide the needed comparison. The comparison accounts for the fact that some conflict types are more likely to produce crashes, some are more likely to lead to greater severity of crashes resulting in injury or fatality, and some involve more vehicles than others.

The first step was to identify all of the potential types of conflicts at the various intersections. There are three types of conflicts:

- 1) Diverging – when one vehicle turns right or left from the through lane of traffic it must slow to make such movement creating friction with nearby traffic.
- 2) Merging – merges occur when a vehicle from one street joins with traffic from another street. Adequate gaps in traffic must be recognized by the driver in order to enter safely.
- 3) Crossing movements – there are two basic types of crossing movements, one where a vehicle on one street crosses another street, and another where a vehicle from one street turns left in front of opposing traffic on the same street.

The various types of conflicts at traditional intersections and at roundabouts are shown in Figure 13.

Figure 13. Intersection vs. Roundabout Conflict Points



For this study, a Crash Severity Factor was developed for each conflict, accounting for the likelihood and potential outcome of a crash that might occur based on that type of conflict and the conflicting traffic volumes. The factor also accounted for the speed of the facility as well as the intersection control type. For example, a crash involving two high speed vehicles crossing on perpendicular paths is much more likely to result in a severe injury than a crash involving slower speed turning vehicles that are merging. Similarly, conflicts at signalized versus unsignalized intersections would have different likelihood and potentially different magnitude of injuries. At unsignalized intersections drivers must select their own gaps in traffic, however at intersections with traffic signals the gaps are created by the signal to allow safe crossing maneuvers. Table 8 identifies the crash severity factors used for this analysis.

Table 8. Crash Severity Factors

Unsignalized Intersection				
Conflict	Number of Conflicts	Factor		
		50 MPH	35 MPH	20 MPH
"T" Crossing (Perpendicular) one high speed	4	10	8	--
Left turn crossing, one high speed	8	8	5	--
Both left turns	4	5	4	--
Merge	8	4	3	--

Traffic Signal				
Conflict	Number of Conflicts	Factor		
		50 MPH	35 MPH	20 MPH
"T" Crossing (Perpendicular) one high speed	4	7	5	--
Left turn crossing, one high speed	8	5	4	--
Both left turns	4	4	3	--
Merge	8	3	2	--

Roundabout				
Conflict	Number of Conflicts	Factor		
		50 MPH	35 MPH	20 MPH
"T" Crossing (Perpendicular) one high speed	0	--	--	--
Left turn crossing, one high speed	0	--	--	--
Both left turns	0	--	--	--
Merge	4	--	--	1

Each conflict at every study intersection for all alternatives was evaluated to identify the number of vehicles crossing the path of other vehicles or merging with other vehicles. The conflicting volumes were multiplied with the product then being multiplied by the corresponding Crash Severity Factor to arrive at a conflict value for each conflict. All conflicts were summed for all movements at all intersections to arrive at a total conflict value for each alternative. The detailed safety analysis is included in Appendix G. The total conflict value and scores for each alternative are shown in Table 9.

Table 9. Safety Analysis Summary

Intersection	Alternative					
	No-Build (1)	A (2)	B	C	D	E
		Partial Clover Interchange on Spotted	Two Roundabouts Existing Locations	Diamond Interchange Connecting Spotted/21st	One Roundabout Connecting Spotted/21st	Continuous Green-T Intersection Inbound
Intersection		Safety Conflicts (3)				
	Inbound Airport Drive/Spotted Road	2,696,900		193,075		
	Outbound Airport Drive/Spotted Road	2,510,150		220,100		664,100
	Outbound Airport Drive Ramps/Spotted Road		126,900		507,075	
	Spotted Road /21st Avenue		262,100			359,650
	Inbound Airport Drive ramps/21st Avenue		772,400		599,200	
	New Intersection			1,080,825		1,080,825
	Inbound Ramps at Spotted Road					62,775
	TOTAL Conflict Value	5,207,050	1,161,400	1,494,000	1,106,275	1,052,900
	Percent of Lowest Total Conflict Value	495%	110%	142%	105%	100%
Score (4)	0	8	7	9	10	4

Notes

- (1) Score adjusted down 2 because of existing Runway Protection Zone Conflict
- (2) Score adjusted down 1 for pedestrian conflicts.
- (3) Safety Conflict calculated as the product of total conflicting movements multiplied by a severity factor for each conflict.
- (4) Subtract 1 point for every 20% more conflicts than the lowest Alternative.

As shown in Table 9, Alternative D, One Roundabout has the lowest total conflict value, with Alternative D and A having a slightly higher value and Alternative B and E having considerably higher conflict values with the existing condition or No-Build Alternative having the highest conflict value by far being nearly 5 times as high as the lowest conflict value. This is a result of the low speed merges that are characteristic of roundabouts when compared to the high speed crossing conflicts that result from the stop controlled condition presented by Stop Signs.

Mobility

Four different evaluation criteria have to do with mobility, each for a different facility. Travel time was used to compare the mobility benefits of each of the alternatives. In order to estimate future travel time for each alternative, posted speed limits and roadway segment lengths as well as traffic control and delay at intersections were used. For the purposes of this analysis the facilities, in priority order, and the specific end points for the travel time analysis are:

1. Inbound Airport Drive – westbound from Airport Drive exit at US 2 to McFarland Road
2. Spotted Road – northbound from south of the RPZ to Flint Road on 21st Avenue
3. Outbound Airport Drive – eastbound from Flint Road to US 2
4. 21st Avenue – eastbound from Flint Road to US 2

The traffic volumes shown for each alternative included in Appendix F were used to perform capacity analysis at each of the appropriate study intersections in order to determine the delay that would be experienced by the different movements associated with the four facilities. Highway Capacity Worksheets and SIDRA outputs for the roundabouts are included in Appendix H. Intersection delay was added to the travel time at the posted speed. For roundabouts it was assumed that traffic would slow down to 20 MPH for a distance of 200' prior to and after the roundabout. Detailed calculations for the travel times are included in Appendix I. Travel time summary and score for the four Mobility criteria are provided in Table 10.

As shown in Table 10, three of the alternatives maintain the free-flow nature of Inbound traffic, with an estimated 3 minutes and 41 seconds of travel time from US 2 to McFarlane Road. The alternatives that involve a roundabout will add approximately 12 and 15 seconds of delay to the total travel time, or 5 – 7% increase. It is worth noting that it is a priority of the airport to facilitate traffic flow Inbound to the airport as these are the most critical trips to serve and it was a desirable trait to not introduce significant impedance for travelers to the airport.

Regarding Outbound, only two new alternatives retain Outbound as a free-flow facility, those being the interchanges offered in alternatives A and C. Alternative A does increase the travel time by 3 seconds due to the fact that it is a slightly longer route as a result of co-locating Outbound next to Inbound. The other alternatives increase travel time 2% - 16%.

The travel time on Spotted Road is improved for each alternative when compared with the No-Build Alternative, even though in some cases the distance traveled is greater. This is because the Stop controlled crossing of Spotted Road at both Outbound and Inbound is improved by either grade separation or placement of a roundabout to facilitate the crossing. For the 21st Avenue comparison for the No-Build Alternative, it was assumed that traffic would travel south on Flint Road to Outbound.

Alternative C, the Diamond Interchange provides the lowest travel time for each facility, while Alternative D, the single roundabout has the second lowest for two of the four facilities.

Table 10. Travel Time Summary and Score for Mobility Criteria

Criteria	Travel Time in Seconds				
	Alternative				
	A Partial Clover Interchange on Spotted	B Two Roundabouts Existing Locations	C Diamond Interchange Connecting Spotted/21st	D One Roundabout Connecting Spotted/21st	E Continuous Green T Intersection Inbound
Inbound Mobility (US 2 to McFarlane)	No-Build 221	232	221	236	221
Outbound Mobility (Flint to US 2)	161	186	161	170	173
Spotted Road Mobility (south of RPZ to Flint)	268	247	211	220	266
21st Avenue Mobility (Flint to US 2)	291	241	202	207	233

Criteria	Travel Time in Minutes				
	Alternative				
	A Partial Clover Interchange on Spotted	B Two Roundabouts Existing Locations	C Diamond Interchange Connecting Spotted/21st	D One Roundabout Connecting Spotted/21st	E Continuous Green T Intersection Inbound
Inbound Mobility (US 2 to McFarlane)	No-Build 3:41	3:52	3:41	3:56	3:41
Outbound Mobility (Flint to US 2)	2:41	3:06	2:41	2:50	2:53
Spotted Road Mobility (south of RPZ to Flint)	4:28	4:07	3:31	3:40	4:26
21st Avenue Mobility (Flint to US 2)	4:51	4:01	3:22	3:27	3:53

Criteria	Percent above Fastest				
	Alternative				
	A Partial Clover Interchange on Spotted	B Two Roundabouts Existing Locations	C Diamond Interchange Connecting Spotted/21st	D One Roundabout Connecting Spotted/21st	E Continuous Green T Intersection Inbound
Inbound Mobility (US 2 to McFarlane)	No-Build 0%	5%	0%	7%	0%
Outbound Mobility (Flint to US 2)	0%	16%	0%	6%	7%
Spotted Road Mobility (south of RPZ to Flint)	27%	17%	0%	4%	26%
21st Avenue Mobility (Flint to US 2)	44%	17%	0%	2%	15%

Criteria	Score for Mobility Criteria				
	Alternative				
	A Partial Clover Interchange on Spotted	B Two Roundabouts Existing Locations	C Diamond Interchange Connecting Spotted/21st	D One Roundabout Connecting Spotted/21st	E Continuous Green T Intersection Inbound
Inbound Mobility (US 2 to McFarlane)	No-Build 10	9	10	9	10
Outbound Mobility (Flint to US 2)	10	8	10	9	9
Spotted Road Mobility (south of RPZ to Flint)	7	8	10	9	7
21st Avenue Mobility (Flint to US 2)	5	8	10	9	8

Scoring for each criteria: subtract 1 point from 10 for each 10% increase in travel time over the lowest travel time.

Driver Consistency/Expectation

Research has shown that consistency in roadway facilities with respect to the physical nature, signing striping, etc. can minimize driver distractions and provide for safer facilities. Evidence of this is a national publication, the “Manual on Uniform Traffic Control Devices”, that contributes to the provision of consistent transportation facilities. For the purposes of this analysis each alternative was examined for characteristics that could be considered unusual or unexpected in order to identify ways to distinguish which of the alternatives would provide for greater driver expectation and travel experience. Each alternative that includes any of these negative features was downgraded. Such negative features include discontinuous or circuitous roadways that could confuse the unfamiliar traveler. Roundabouts in this application may also be considered a negative feature since many drivers expect high speed access to the airport terminal, and also since Airport Drive is traveled by many from outside of the area that may not be familiar with roundabouts. A summary of negative features and the resulting scores for each alternative are included in Table 11.

Peak Hour Level of Service

Level of Service is a measure of how well traffic operates at intersections. The capacity analysis performed for each of the intersections for all alternatives was examined to identify those intersections which had an overall LOS below “A”. For each instance of LOS “B” or lower points were taken off of a perfect score of 10. Table 12 provides a summary of the 2034 Level of Service Summary on Inbound, Outbound, Spotted Road and 21st Avenue. As shown in the table, all intersections are expected to work well, except for the No-Build Scenario. Alternatives C and D will have better LOS than the other alternatives.

Public/Agency Support

For the purposes of this analysis, the public and agency input received from the open house were examined to determine what the most important criteria were from a public perspective. A neutral score of 5 for each of the 5 alternatives was the starting point for scoring purposes. The five most important criteria identified by the public were examined and if a particular alternative scored well (9 or 10) in that criterion then a point was added, reasoning that the public would approve of that alternative from the perspective of that criterion if it scored well. If an alternative scored poorly, below 5, then a point was subtracted, reasoning that the public would likely disapprove of that alternative based from the perspective of that criterion. A summary of this analysis is provided in Table 13.

Cost

Planning level costs to estimate an order of magnitude cost for comparative purposes of the alternatives were prepared. The order of magnitude cost details are included in Appendix J. A summary of the costs for each alternative are included in Table 14. There are many ways to assign scores for this particular criterion. The most reasonable approach seemed to be to give the No-Build scenario the best score and the highest cost alternative a score of zero, with each other alternative getting partial points on a straight line interpolation. The highest cost alternative was A, the Partial Cloverleaf Interchange at \$11.7 million, with Alternative C at \$10.2 million receiving a single point for this criterion. The lowest cost alternative is D, the single roundabout at a cost of \$4.7 million receiving 6 points. It should be noted that these costs include the construction of relocated Spotted Road as well as the 21st Avenue Extension.

Table 11. Driver Consistency/Expectation

	No-Build	Alternative				E
		A	B	C	D	
Negative Features		Partial Clover Interchange on Spotted	Two Roundabouts Existing Locations	Diamond Interchange Connecting Spotted/21st	One Roundabout Connecting Spotted/21st	Continuous Green-T Intersection Inbound
Separated One-Way Couplet at Spotted	1					
21st Avenue Non-existent/Discontinuous	1					
Roundabout Inbound/Outbound			1		1	1
Green T Intersection Outbound			1			1
Spotted Road Discontinuous		1	1			1
21st Avenue Discontinuous	1	1	1			1
Large U-Turn		1				
TOTAL SCORE	8	8	7	10	9	7

Subtract 1 point from 10 for each negative feature

Table 12. 2034 PM Peak Hour Level of Service

Facility Evaluated	No-Build	Alternative			
		A	B	C	D
Inbound		Partial Clover Interchange on Spotted	Two Roundabouts Existing Locations	Diamond Interchange Connecting Spotted/21st	One Roundabout Connecting Spotted/21st
Outbound			B		B
Other Intersections on Spotted Rd or 21st Ave	F, E, D, F	C, C, C, B	B	B, B	B, B
Devaluations	8	4	2	1	1
TOTAL SCORE	2	6	8	9	9
					6

Subtract 2 points for each LOS below A on Inbound

Subtract 1 point for each LOS below A on Outbound

Subtract 1/2 point for each LOS below A for each approach at other study intersections.

Table 13. Public and Agency Support

Facility Evaluated	Alternative					
	No-Build	A	B	C	D	E
		Partial Clover Interchange on Spotted	Two Roundabouts Existing Locations	Diamond Interchange Connecting Spotted/21st	One Roundabout Connecting Spotted/21st	Continuous Green-T Intersection Inbound
Cost	1	-1		-1		-1
Safety	-1			1	1	-1
Spotted Road Mobility				1	1	
Outbound Mobility	1	1		1	1	1
Driver Consistency/Expectation			-1	1		
Votes in favor of Alternative				1	5	
TOTAL SCORE (Max 10)	6	5	4	9	10	4

Use the 5 highest ranking criteria obtained from the feedback from comment sheets returned from Open House shown above.
Start at 5 points, subtract 1 point for each criteria that is below a 5, add 1 point for each criteria that is a 9 or 10.

Table 14. Summary of Cost and Scoring

Alternative	Order of Magnitude Cost for Comparison (in Millions)	Percent of Lowest	Score
NoBuild	\$	0%	10
A Partial Clover Interchange	\$ 11.7	249%	0
B Two Roundabouts with Continuous Green-T Intersection	\$ 6.4	136%	5
C Interchange at Airport Drive/21st Avenue Extension/Spotted Road	\$ 10.2	217%	1
D Roundabout at Airport Drive/21st Avenue Extension/Spotted Road	\$ 4.7	100%	6
E Continuous Green-T Intersection and Overpass for Spotted Road at Inbound Airport Drive	\$ 9.9	211%	2

Cost includes Construction cost of major items + 6% mobilization, 5% traffic control, 1% Surveying, 30% Contingency, 10% Preliminary Engineering, 15% Construction Engineering

Score is straight-line interpolation from zero to highest cost Alternative

Phasing Ability

The ability to construct a project in multiple phases often enhances the ability to secure funding for a project. Grant applications are more easily secured for smaller projects, and annual agency budgets can be used to build components of a project and complete a project over a period of years rather than all at once. An examination of each alternative was performed to determine components that could be constructed separately while still maintaining traffic flow. For example, for Alternative A, the partial clover interchange, the grade separation of Spotted Road could be built to include the Inbound Ramps, but leave Outbound at its current location. In a subsequent year, Outbound could be relocated next to Inbound to take advantage of the grade separation. Yet later, the Outbound ramps could be added as well, and even later Spotted Road could be relocated at such time that the Federal Aviation Administration required such action.

21st Avenue could be constructed independently, at least from Flint Road to Spotted Road (which would get the full connection from Airport Drive for westbound traffic) at any time independent from any other alternative component.

Table 15 summarizes the various independent phases that could be constructed for each of the alternatives along with the resulting score. The more phases an alternative could be constructed in, the higher the score.

Consolidated Scoring Summary of Alternatives

The scores for the 10 criteria for each of the five alternatives were multiplied by the relative weighting as determined by the TAC to arrive at a final score for the alternative as shown in Table 16. Alternative D, the new 4-legged roundabout intersection of Airport Drive at Spotted Road/21st Avenue had the highest overall score at 896 points with Alternative C, the new interchange at the same location was not far behind with a score of 873. The following observations of the overall scoring were made:

- Alternatives C and D both scored a 9 or 10 for all criteria except two, cost and phasing.
- The No-Build Alternative scored a 10 for four of the criteria, but scored a 5 or lower on three of the criteria, with the highest weighted criterion of safety being a score of zero.
- The other three alternatives received a score of 9 or 10 on three or fewer criteria.
- Alternative E actually scored lower than the No-Build for the raw score, but when the weighting is applied scored 8% higher than the No-Build.

The TAC discussed the scores and was comfortable with the rankings of the alternatives. Some of the discussion amongst the TAC included the following comments:

- Alternative C eliminates all the safety issues, including pedestrians.
- Although single lane roundabouts are preferred, there was some concern with a double lane roundabout with the truck traffic on Spotted Road.
- Existing WSDOT Right-of-Way is full access control at the location of the proposed intersection of Alternative D. This would need to be changed to partial access control.
- The bridge included in Alternative C would have maintenance costs that are not accounted for, jurisdiction of that bridge could be an issue.

Table 15. Phasing Ability

Phase	Alternative				
	A	B	C	D	E
No-Build*	Partial Clover Interchange on Spotted	Two Roundabouts Existing Locations	Diamond Interchange Connecting Spotted/21st	One Roundabout Connecting Spotted/21st	Continuous Green-T Intersection Inbound
Bridge with Inbound ramps	1				1
Relocate Outbound	1				
Outbound Ramps	1				
Spotted Road	1	1			1
21st Avenue from east of Flint to Spotted Rd	1	1	1	1	1
Outbound Roundabout		1			
Inbound Roundabout		1			
Interchange at new Intersection with Spotted Rd			1		
21st Avenue Connection to Tech Park Dr			1	1	
Roundabout at new Intersection with Spotted Rd				1	
TOTAL SCORE	10	8	6	6	6

2 points for each possible phase

* No-Build received points for previous completed work: landscaping removed, stop bars relocated, rumble strips installed, signage, overhead lighting, flashing beacons, active speed indicator signs

Table 16. Alternative Evaluation Scoring Results

Criterion	Criteria Weight	Alternative											
		No-Build		A		B		C		D		E	
				Partial Clover Interchange on Spotted		Two Roundabouts Existing Locations		Diamond Interchange Connecting Spotted/21st		One Roundabout Connecting Spotted/21st		Continuous Green-T Intersection Inbound	
		Raw	Wt.	Raw	Wt.	Raw	Wt.	Raw	Wt.	Raw	Wt.	Raw	Wt.
Safety	25.4	0	0	8	203.0	7	177.7	9	228.4	10	253.8	4	101.5
Airport Drive Inbound Mobility	15.7	10	157.0	10	157.0	9	141.3	10	157.0	9	141.3	10	157.0
Driver Consistency/Expectation	9.4	8	75.1	8	75.1	7	65.8	10	93.9	9	84.5	7	65.8
Peak Hour Level of Service	8.7	2	17.388	6	52.2	8	69.6	9	78.2	9	78.2	6	52.2
Public/Agency Support	7.9	6	47.4	5	39.5	4	31.6	9	71.1	10	79.0	4	31.6
Spotted Road Mobility	7.3	7	51.3	8	58.7	8	58.7	10	73.3	9	66.0	7	51.3
Cost	7.1	10	71.4	0	0.0	5	35.7	1	7.1	6	42.9	2	14.3
Airport Drive Outbound Mobility	6.8	10	68.2	9	61.4	8	54.5	10	68.2	9	61.4	9	61.4
21st Avenue Mobility	6.3	5	31.6	8	50.6	8	50.6	10	63.3	9	57.0	8	50.6
Phasing Ability	5.3	10	53.06	10	53.1	8	42.4	6	31.8	6	31.8	6	31.8
TOTAL SCORE	100%	68	573	72	751	72	728	84	873	86	896	63	618
ALTERNATIVE RANK		5	6	3	3	4	4	2	2	1	1	6	5

Overall, the TAC agreed with the evaluation criteria and that the alternatives assessment provided a good rationale for ranking the alternatives. The TAC also acknowledged that the airport staff had some level of reservation with introducing a roundabout on Airport Drive, especially for Inbound traffic, given their desire to minimize hindrance for traffic flow to the airport. Given that perspective, and the fact that Alternatives C and D scored so closely together, the TAC was comfortable with a recommendation that either of these two alternatives would reasonably address the safety and capacity issues documented in this report. Also, since a major difference between the two alternatives is the cost, the airport should have the option of moving forward with either option, depending upon availability of funding.

In fact, although it would cost more, Alternative D could also be considered as a phased approach of Alternative C. Since several of the components are very similar such as the alignments of 21st Avenue and realigned Spotted Road, those could be included with Alternative D. The roundabout portion of Alternative D could be designed to minimize the throw-away aspects or to place or shape the roundabout in a location where the on and off-ramps of Alternative C could be more easily accommodated at a future time. Depending on the anticipated length of time between constructing Alternative D and the eventual grade separation of Spotted Road, it may be meaningful to offset the roundabout to facilitate construction of the Spotted Road/21st Avenue overpass in the best location. One other consideration is that the airport could have the flexibility to reevaluate the merits of Alternative D once constructed, and if all works well, the grade separation included in Alternative C could be constructed once the annual enplanements reaches the FAA guidelines for such facilities.

If the anticipated time is relatively short between construction of Alternative D with the roundabout and subsequent implementation of Alternative C with the grade separated interchange, it would be a lower overall cost without phasing. The construction of 21st Avenue east of Hayford Road, which would contribute significant traffic volumes, would also provide justification to the implementation of Alternative C interchange without phasing.

As time passes there are several things that could prompt the need to implement improvements. At the time that improvements are deemed necessary, available funding should be considered and a final selection made. These triggers include the following:

- Exceed High Accident Location Threshold – accident history at the study intersections should be monitored. Recent improvements have caused a slight downward trend in crashes, however, as traffic volumes rise it is likely that the number of crashes could increase. Whether the crash rate, or the crash severity rate would increase enough to qualify for safety funding will need to be determined.
- Peak Hour Level of Service – as traffic volumes increase the delay will also increase and the level of service will degrade. This should also be monitored over time. With the increase in delay a corresponding increase in crashes may also be seen.
- Traffic Signal Warrants – understanding that SIA doesn't prefer the alternative of installing a traffic signal, if the intersections eventually meet traffic signal warrants, that situation may indicate that it is time to pursue the long-range improvements.
- 21st Avenue Construction – although the construction of 21st Avenue is not in the Regional Transportation Plan due to fiscal constraints, priorities do change and Long Range Plans are

updated. If congestion on US 2 ultimately leads decision-makers to pursue this project, then other funding sources for 21st Avenue may be available as well.

- 2.5 Million Annual Enplanements - Federal Aviation Administration guidelines indicate that once airports reach 2.5 million annual enplanements it is desirable to have access to the airport be of a grade separated nature.
- Federal Aviation Administration Policy on RPZ – Conceivably the FAA could do one of two things that would promote implementation of the improvements identified in this report: 1) require that all objects with the RPZs at airports be removed and require all airports to move towards that end, or 2) provide funding to remove objects, including roads, from RPZs.
- Funding Availability and Implementation of the Master Plan – The Spokane International Airport has a Master Plan with identified improvements. Other components of the Master Plan for the airport could prompt the implementation of roadway improvements to facilitate safe and efficient access.

Summary

The intersection of the Airport Drive Couplet at Spotted Road serving the Spokane International Airport (SIA) has a history of collisions, many of which have involved serious injuries and some fatalities. Several improvements have been made at the study intersections as a result of previous studies which have reduced the crash frequency and severity, yet a high collision rate and severity rate continues. As a result, this current study was commissioned to re-evaluate the intersections of Spotted Road at Inbound and Outbound Airport Drive to determine appropriate safety and capacity improvements.

The Spokane Regional Transportation Council prepared a multi-modal transportation study for the West Plains/SIA area. The recommendation was a new minor arterial roadway connecting to and paralleling US 2 along the 21st Avenue alignment from west of the City of Airway Heights to the vicinity of the Airport Drive/US 2 interchange. Also, the FAA has updated guidelines on land uses within Runway Protection Zones (RPZ) to protect both the airport and ground activities nearby. This study and the alternatives developed account for both the 21st Avenue recommendation and the fact that Spotted Road passes through the airport RPZ perpendicular to the runway approximately 1,200 feet from the end of the runway.

A Technical Advisory Committee (TAC) was put together to assist in the study process and provide important historical perspective, technical review and suggestions. In-person interviews were held with stakeholders near the study area. A public open house was held at the Irv Reed Center in close proximity to the Airport Terminal Building, and over 1,100 invitations were mailed directly to property owners in close proximity to the project as well as airport tenants. These efforts allowed users of the airport an opportunity to review the alternatives and provide comments.

Traffic counts were collected for the mid-day and evening peak hours. Traffic on Airport Drive does not have typical traffic patterns, with peaks on that facility occurring mid-day rather than in the evening. Currently both periods operate with acceptable Levels of Service (LOS) with the mid-day having slightly more delay. 20 year forecasts were prepared using historical growth rates. Future traffic operations will be acceptable for the next 10 years, but sometime between 10 and 20 years delay will increase to below LOS "E" and "F."

Several alternatives were developed and discussed with the TAC with 5 alternatives being selected for final evaluation purposes. Each alternative includes the removal of Spotted Road from the RPZ as well as the extension of 21st Avenue from Flint Road to the east to Spotted Road or Airport Drive. Alternatives included roundabouts, grade separated interchanges and continuous Green-T intersections. Minimizing delay on Inbound Airport Drive was a priority. It was recognized that roundabouts may not be the airports preferred form of traffic control since they slow Inbound traffic and free-flow conditions are preferred. The Alternatives evaluated were:

- Alternative A: Partial Cloverleaf Interchange
- Alternative B: Two Roundabouts with Continuous Green-T Intersection
- Alternative C: Interchange at Airport Drive/21st Avenue Extension/Spotted Road
- Alternative D: Roundabout at Airport Drive/21st Avenue Extension/Spotted Road
- Alternative E: Continuous Green-T Intersection and Overpass for Spotted Road at Inbound Airport Drive

The TAC discussed evaluation criteria and agreed on 10 criteria with which to prioritize or rank the alternatives and the pros and cons of each. The need to weight the criteria was also discussed, as most TAC members felt more strongly about some of the criteria than they did about others. The table below summarizes the evaluation criteria and their weight in order of relative importance.

Evaluation Criteria and Weighting

Criterion	Combined TAC Average Percent
Safety	25.4%
Airport Drive Inbound Mobility	15.7%
Driver Consistency/Expectation	9.4%
Peak Hour Level of Service	8.7%
Public/Agency Support	7.9%
Spotted Road Mobility	7.3%
Cost	7.1%
Airport Drive Outbound Mobility	6.8%
21st Avenue Mobility	6.3%
Phasing Ability	5.3%
TOTAL	100%

The consultant team prepared an evaluation for each criterion assessing the five alternatives and the No-Build scenario for comparative purposes. The details and results were reviewed with the TAC with minor modifications being made based upon TAC input to improve clarity and consistency.

Alternative D, the new 4-legged intersection of Airport Drive at Spotted Road/21st Avenue had the highest overall score at 896 points with Alternative C, the new interchange at the same location was nearly equal with a score of 873. Alternatives C and D both scored a 9 or 10 for all criteria except two, cost and phasing. The TAC discussion noted that although single lane roundabouts are preferred, there was some concern with a double

lane roundabout with the truck traffic on Spotted Road. It also recognized that the existing WSDOT Right-of-Way is full access control at the location of the proposed intersection of Alternative C and that this would need to be changed to partial access control. There are also jurisdictional issues with the bridge included in Alternative C and the fact that it would have maintenance costs that are not accounted for.

Overall, the TAC agreed with the evaluation criteria and the alternatives assessment provided a good rationale for the ranking of the alternatives. The TAC also acknowledged that the airport staff had some level of reservation with introducing a roundabout on Airport Drive, especially for Inbound traffic. Given that perspective, and the fact that Alternatives C and D scored so closely together, the TAC decided that either of these two alternatives would reasonably address the safety and capacity issues documented in this report, and since a major difference between the also be considered as a phased approach of Alternative C.

As time passes there are several things that could prompt the need to implement improvements. At the time that improvements are deemed necessary, available funding should be considered and a final selection made. These triggers include the following:

- Exceed High Accident Location Threshold
- Peak Hour Level of Service
- Traffic Signal Warrants
- 21st Avenue Construction
- 2.5 Million Annual Enplanements
- Federal Aviation Administration Policy on RPZ
- Funding Availability and Implementation of the Master Plan