

Lewis County Event Center and Sports Complex Traffic Impact Analysis

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The proposed Lewis County Event Center and Sports Complex (LCECSC) is a development to be constructed in Centralia, Washington at the existing Fort Borst Park location. It will include a 72,000 square foot event center with indoor turf fields, sport courts and meeting rooms. The LCECSC will also include outdoor sports/multi-use fields, tennis courts, trails, and a zip line facility. The project is proposed to be built in three phases beginning in 2010, and completed by 2030, with the majority of traffic-generating uses scheduled for completion by 2017. This draft traffic impact analysis summarizes the existing conditions, and evaluates the future traffic operations in the surrounding area with and without the proposed LCECSC.

I. Study Area Description

In order to evaluate the potential traffic impacts of the LCECSC project, thirteen intersections in the surrounding area were analyzed. **Figure 1** illustrates the traffic study area and the location of all study intersections. **Table 1** lists the jurisdiction with control over the intersection and type of control at each of the study intersections.

The traffic study area of the LCECSC project includes roadways that are in the jurisdiction of the City of Centralia. All study intersections are also controlled by the City of Centralia, except for the I-5 Northbound and I-5 Southbound ramp terminal intersections, which are under the jurisdiction of the Washington State Department of Transportation (WSDOT). The study area is bordered by Harrison Avenue to the north, Pioneer Way to the south, I-5 to the east, and Bryden Avenue to the west.

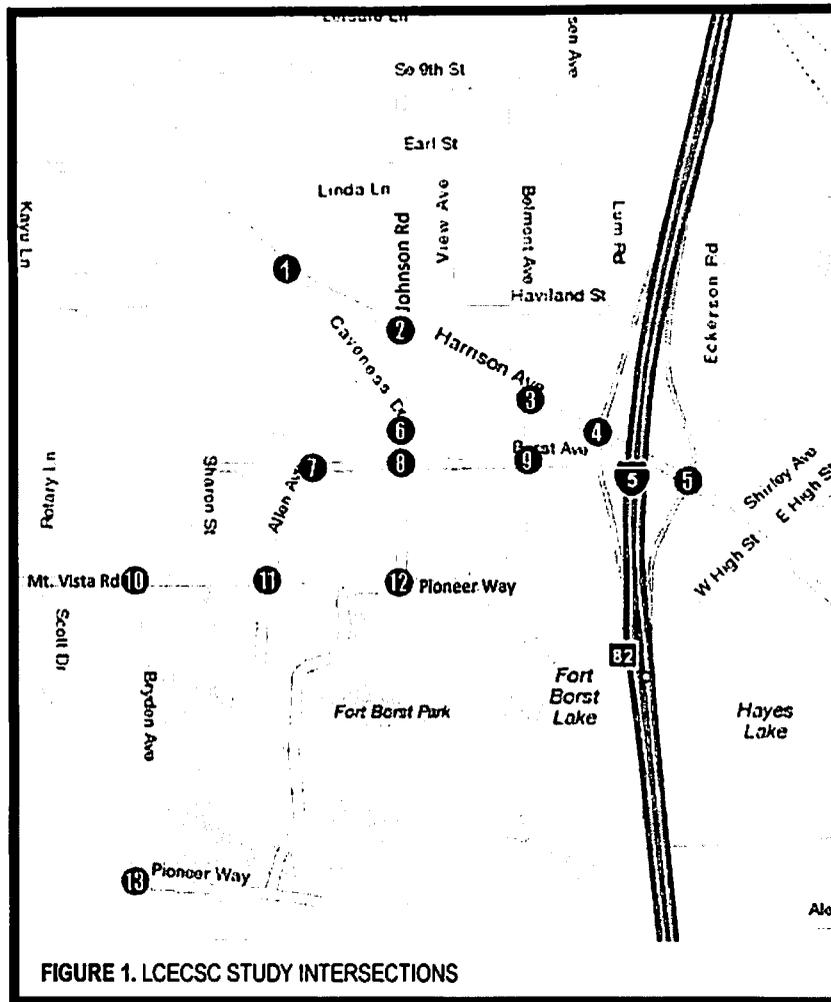


FIGURE 1. LCECSC STUDY INTERSECTIONS

TABLE 1
LCECSC – Traffic Study Intersections

Intersection #	Intersection	Jurisdiction	Control
1	Harrison Ave & Caveness Dr	Centralia	OWSC
2	Harrison Ave & Johnson Rd	Centralia	Signalized
3	Harrison Ave & Belmont Ave	Centralia	Signalized
4	Harrison Ave & I-5 SB Ramps	WSDOT	Signalized
5	Harrison Ave & I-5 NB Ramps	WSDOT	Signalized
6	Caveness Dr & Johnson Rd	Centralia	OWSC
7	Borst Ave & Allen Ave	Centralia	OWSC
8	Borst Ave & Johnson Rd	Centralia	AWSC
9	Borst Ave & Belmont Ave	Centralia	AWSC
10	Mt Vista Rd & Bryden Ave	Centralia	OWSC
11	Mt Vista Rd & Allen Ave	Centralia	OWSC
12	Pioneer Way & Johnson Rd	Centralia	OWSC
13	Pioneer Way & Bryden Ave	Centralia	OWSC

Notes:
OWSC – One-way stop control
AWSC – All-way stop control

II. Inventory of Transportation Facilities

Roadways

A brief description of each roadway most affected by the LCECSC project is included in the following sections.

Interstate 5 (I-5)

I-5 is a major north-south, limited access freeway in Western Washington under the jurisdiction of WSDOT. Within the study area, I-5 is classified as an urban interstate. It is a four-lane, limited access freeway with shoulders, and access to the local street network via the Harrison Avenue interchange (Exit 82) and the SR 507 interchange (Exit 81). I-5 has a posted speed limit of 60 mph in the project vicinity.

Harrison Avenue

Harrison Avenue is a northwest-southeast minor arterial that provides access across I-5, and to/from I-5 via a full interchange. Between I-5 and Johnson Road it is a four-lane facility with separate left turn pockets at the Belmont Avenue and Johnson Road intersections. West of Johnson Road, Harrison Avenue transitions to a two-lane facility. The posted speed limit on Harrison Avenue in the vicinity of I-5 is 30 mph, while the posted speed west of Johnson Road is 35 mph.

Johnson Road

Johnson Road is a north-south major collector that provides access to residential areas north of Harrison Avenue and to retail/commercial land uses south of Harrison Avenue. At the south terminus, Johnson Road intersects with Pioneer Way and provides major access to Fort Borst Park. In the project vicinity, Johnson Road is primarily a two-lane facility, with a posted speed limit of 25 mph.

Belmont Avenue

Belmont Avenue is a two-lane, north-south local roadway that intersects Harrison Avenue just west of the I-5 interchange. It provides access to the Safeway shopping complex south of Harrison Avenue, and to the Centralia Factory Outlets shopping complex north of Harrison Avenue.

Borst Avenue

Borst Avenue a two-lane, east-west major collector that provides access between residential areas and the commercial/retail establishments surrounding the I-5/Harrison Avenue interchange. Borst Avenue has a posted speed limit of 25 mph.

Pioneer Way

Pioneer Way is a public local roadway that provides access to the sports fields and tennis courts within Fort Borst Park. It provides access between Bryden Avenue (on the west side of the park) and Johnson Road (on the north end of the park). This roadway is paved, and can accommodate two-way traffic, but unlike any of the other roads in the project vicinity, it does not have lane markings or posted speed limits.

Transit Routes

The project study area is serviced by two Twin Transit bus routes. Twin Transit provides fixed route transit service throughout Centralia and to nearby Chehalis. Twin Transit also provides dial-a-ride para-transit service within Centralia and to other neighboring cities. Table 2 outlines these routes.

TABLE 2
LCECSC – Centralia Twin Transit Service

Route #	Route Name	Operation Days	Operation Times	Headway*
21	N Centralia – Outlet Stores	Weekday	6:30 AM to 8:00 PM	1 Hour
		Saturday	8:30 AM to 6:00 PM	1 Hour
		Sunday	8:30 AM to 5:00 PM	1 Hour
22	S Centralia – Centralia High School	Weekday	6:25 AM to 8:00 PM	1 Hour
		Saturday	8:30 AM to 6:00 PM	1 Hour
		Sunday	8:30 AM to 5:00 PM	1 Hour

Note:

* Headway is defined as the time between successive busses as they pass a common point on the roadway.

Source: <http://www4.localaccess.com/twintransit/Schedules.htm>

Routes 21 and 22 are the only transit routes serving the study area. Both routes operate in a loop, with the Centralia Amtrak Transfer Station serving as the beginning and end of the routes. Route 21 begins in downtown Centralia at Centralia Station, travels to North Centralia where it reverses direction, and passes through downtown Centralia before proceeding along Harrison Avenue toward the Outlet Stores and the State Department of Licensing. At the Department of Licensing, Route 21 reverses direction and returns to Centralia Station. Route 22 begins at Centralia Station, travels west along Harrison Avenue to Centralia High School and through residential neighborhoods before heading back across I-5 to neighborhoods south of downtown Centralia and finally terminating at Centralia Station.

Non-Motorized Facilities

The study area includes a designated bicycle lane along Harrison Avenue in both eastbound and westbound directions, between Johnson Road and Belmont Avenue. The bicycle lane is approximately four feet wide and is marked between Johnson Road and Belmont Avenue. East of Belmont Avenue the bicycle lane is unmarked until just east of the I-5/Harrison Avenue interchange. There are no marked or designated bicycle lanes west of Johnson Road.

The study area has an extensive amount of pedestrian facilities connecting the city to Fort Borst Park. Sidewalks exist along the majority of streets within the study area. From just east of Caveness Drive to just east of the I-5 interchange, sidewalks are present on both sides of Harrison Avenue with marked crosswalks and pedestrian actuated signals at each signalized intersection. West of Caveness Drive there are no sidewalks along Harrison Avenue. Johnson Road and Borst Avenue have sidewalks along the north and west borders of the park. In the southwest region of the study area, sidewalks do not exist along Mt. Vista

compared to WSDOT mobility standards (for urban areas), while the remaining study intersections are compared to standards adopted by the City of Centralia.

TABLE 3
Study Intersection – Mobility Standards

Jurisdiction	LOS/Mobility Standard
City of Centralia	D ¹
Washington State Department of Transportation (Ramp Terminals)	D ²

1 – City of Centralia Comprehensive Plan 2007

2 – Washington State Highway System Plan 2007-2026

Intersection Operational Analysis

The average intersection vehicle delay, level-of-service (LOS), and 95th percentile queue lengths were collected from the existing conditions Synchro and SimTraffic simulation models for each study area intersections.

A Synchro 7 traffic operations model was constructed for the study area based on field observations. Peak hour factors and truck percentages used in the model were based on the field collected traffic turning movement counts. Traffic volumes were balanced between the I-5 interchange ramp terminals. This model was used to assess existing traffic operations within the study area.

The Synchro model uses methodologies in the 2000 Highway Capacity Manual (HCM) to analyze both signalized and stop-controlled intersections. The model also computes the average vehicle delay and associated LOS to determine whether the intersection meets the applicable mobility standards from WSDOT and the City of Centralia.

SimTraffic, a traffic microsimulation software program, was used to collect vehicle queuing information for all intersections. As a microscopic traffic model, SimTraffic models each vehicle as a separate entity with its own individual parameters and car-following logic.

Vehicle queue results are reported for the expected 95th percentile queue length, which means that 95 percent of the time during the peak hour analyzed, the queue length should be less than or equal to the value reported. An average of at least five runs of SimTraffic was used to calculate the 95th percentile queue lengths.

Operational Analysis Results

Results from the operational analysis indicate that all of the 13 study intersections meet mobility standards for each of the three existing peak periods. The worst LOS at any study intersection is LOS C, which suggests the existing roadways have adequate capacity.

Table 4 shows the results of the existing conditions intersection operational analysis. Figures 2 through 4 provide the volumes, channelization, and analysis results for all of the study area intersections. Appendix A provides the Synchro HCM reports for each study intersection.

Road or Bryden Avenue although gravel shoulders are present. These gravel shoulders could likely be used by pedestrians during daylight hours.

III. Existing Conditions Transportation Analysis

Traffic Volumes

Existing turning movement counts were collected at each of the 13 study area intersections for the weekday afternoon peak and the Saturday afternoon peak. Weekday afternoon counts were taken between 3:00 PM and 4:00 PM on Tuesday, May 11, 2010. Saturday afternoon peak counts were taken between 11:30 AM and 1:30 PM on May 8, 2010.

Weekday PM peak hour counts were taken at nine study intersections on Tuesday, May 11, 2010 between 4:00 PM and 6:00 PM. PM peak hour counts at the four remaining study intersections were provided by the City of Centralia and are documented in the *Ives and Harrison Traffic Impact Analysis* (prepared by Parametrix). These four locations include the signalized intersections on Harrison Avenue at Johnson Road, Belmont Avenue, I-5 Southbound, and I-5 Northbound.

The counts provided by the City of Centralia were taken July 2009. These counts were increased to 2010 conditions using a growth factor of one percent per year, based on historic data on I-5 in the vicinity of the project (*Source: WSDOT Annual Traffic Reports*).

Based on the volume counts for all intersections within the study area, an overall system peak hour for the weekday afternoon, weekday PM, and Saturday afternoon periods were determined as follows:

- Weekday Afternoon Peak: 3:00-4:00 PM
- Weekday PM Peak: 4:30-5:30 PM
- Saturday Peak: 12:30-1:30 PM

Figures 2 through 4 illustrate the turning movement counts used in the existing conditions analysis for the weekday afternoon peak, the weekday PM peak, and the Saturday peak periods, respectively.

Tube counts at three existing access locations to Fort Borst Park were provided by the City of Centralia. These 24-hour tube counts were collected between Tuesday, May 25, 2010 and Monday, May 31, 2010 at the following locations:

- Pioneer Way at Bryden Road (east of Bryden Road)
- Pioneer Way at Johnson Road (east of Johnson Road)
- Pioneer Way at Johnson Road (west of Johnson Road)

Performance and Mobility Standards

The existing condition of study area intersections are evaluated based on level of service (LOS) definitions. Level of service is a qualitative measurement of intersection operation based on control delay. LOS is reported as letter grades that range from LOS A (low delay per vehicle, favorable traffic progression) through LOS F (extremely high delay per vehicle, could involve long queues). The current mobility standards for study intersection performance are shown in Table 3. The signalized intersections at the I-5 ramp terminals are

TABLE 4
LCSCEC – Existing (2010) Intersection Operational Results

Intersection Number	Intersection	Control	Existing (2010) Level of Service/Delay (s)		
			Weekday Afternoon	Weekday PM	Saturday
1	Harrison Ave & Caveness Dr	OWSC	C / 17.8	C / 17.6	C / 17.9
2	Harrison Ave & Johnson Rd	Signalized	B / 19.7	C / 20.9	B / 19.7
3	Harrison Ave & Belmont Ave	Signalized	C / 28.3	C / 25.1	C / 24.6
4	Harrison Ave & I-5 SB Ramps	Signalized	B / 18.2	C / 33.1	C / 27.1
5	Harrison Ave & I-5 NB Ramps	Signalized	C / 26.4	C / 34.6	C / 29.1
6	Caveness Dr & Johnson Rd	OWSC	B / 12.0	B / 13.6	B / 11.2
7	Borst Ave & Allen Ave	OWSC	A / 9.9	A / 10.0	A / 9.7
8	Borst Ave & Johnson Rd	AWSC	B / 12.2	C / 21.0	B / 12.4
9	Borst Ave & Belmont Ave	AWSC	A / 8.6	A / 9.4	A / 8.7
10	Mt Vista Rd & Bryden Ave	OWSC	A / 9.0	A / 9.2	A / 8.9
11	Mt Vista Rd & Allen Ave	OWSC	A / 7.6	A / 7.9	A / 7.7
12	Pioneer Way & Johnson Rd	OWSC	A / 9.8	B / 13.1	B / 11.1
13	Pioneer Way & Bryden Ave	OWSC	A / 8.4	A / 8.4	A / 8.4

Notes:

OWSC – One-way stop control

AWSC – All-way stop control

All intersections are assumed to meet existing mobility standards if LOS is better than LOS D.

Queuing Analysis Results

Table 5 presents the existing 95th percentile queues that exceed available storage, by intersection approach. During each of the study peaks, eastbound queues along Harrison Avenue are likely to occur at the I-5 Northbound ramp intersection, and could spill back to Johnson Road or Caveness Drive. Westbound on Harrison Avenue, the queues at Johnson Road are not likely to spill back and affect operations at Belmont Avenue, but westbound queues from Belmont could extend back beyond the I-5 interchange intersections.

The longest queues that exceed their storage length typically occur during the weekday PM peak. Appendix B provides the detailed SimTraffic queuing reports for each study intersection.

TABLE 5
LCSCEC – Existing (2010) 95th Percentile Queue Results

Int. No	Intersection	Approach	Lane Group	Storage (ft)	Existing (2010) Queue Length (ft)		
					Weekday Afternoon	Weekday PM	Saturday
2	Harrison Ave & Johnson Rd	EB	LT	100	60	60	50
			TH/RT	530	450	>700	400
		WB	LT	150	190	190	200
			TH/RT	500	330	370	320
		NB	LT	100	40	50	50
			TH/RT	380	140	170	150
3	Harrison Ave & Belmont Ave	SB	LT	100	160	170	290
			LT/TH/RT	400	275	320	390
		EB	LT	200	120	120	180
			TH/RT	500	440	500	400
		WB	LT	200	170	210	190
			TH/RT	600	>600	>600	>600
4	Harrison Ave & I-5 SB Ramps	SB	LT/TH	1385	280	1710	590
			RT	150	190	200	240
		EB	TH	600	340	375	440
			RT	275	310	300	310
		WB	LT	200	200	240	250
			TH	470	390	460	450
5	Harrison Ave & I-5 NB Ramps	NB	LT/TH	1100	500	780	360
			RT	150	180	210	190
		EB	LT	200	210	210	250
			TH	470	190	130	200

95th Percentile queues calculated using an average of five, one hour SimTraffic runs

Queue lengths not reported for free-flowing and uncontrolled movements

Queue lengths rounded up to the nearest ten feet

Numbers in black highlight indicate a vehicle queue length that exceeds the available storage length

IV. Future Traffic Conditions

A future year of opening analysis (2017) is included in this study to evaluate traffic impacts with and without the LCECSC. The analysis is conducted for No Action and one Action land use alternative.

The No Action analysis assumes only background traffic growth within the City of Centralia and the existing LCECSC has the same uses as it does today. The Action alternative assumes the majority of traffic-generating uses at the LCECSC are complete, and that two volume scenarios could occur. The "non-event" traffic scenario assumes all project amenities are being used, except the event center. The "event" traffic scenario assumes the event center is being used (for a large conference, concert, or tournament) in addition to other project amenities.

The No Action traffic analysis and the Action Non-Event traffic analysis is conducted for the same three peak hours analyzed in the existing condition, while the Action Event traffic

analysis is conducted for the weekend peak hour only, as a major event would not likely occur during the weekday afternoon or PM peak periods.

Background Traffic Growth

The regional travel forecasting model was used to develop No Action traffic volumes. The 2017 model network includes the WSDOT I-5 - Mellen Street to Blakeslee Junction project, which includes collector-distributor lanes between the Mellen Street (Exit 81) and Harrison Avenue (Exit 82) interchanges. Although I-5 includes improvements in 2017, the No Action study area local roadway network resembles the existing condition, with no changes to lane geometry.

Intersection Operational Analysis

The 2017 No Action operational results were reported from Synchro and SimTraffic. While background volumes are expected to increase in the City of Centralia, each of the intersections is expected to operate at LOS D or better.

Operational Analysis Results

Results from the operational analysis show that the study intersections are expected to meet jurisdictional mobility standards in 2017 without the LCECSC project. The LOS and delay results of the No Action analysis are presented in Table 6.

TABLE 6
LCSCEC – No Action (2017) Intersection Operational Results

Intersection Number	Intersection	Control	No Action (2017) Level of Service/Delay (s)		
			Weekday Afternoon	Weekday PM	Saturday
1	Harrison Ave & Caveness Dr	OWSC	C / 17.9	C / 17.8	C / 18.0
2	Harrison Ave & Johnson Rd	Signalized	C / 20.6	C / 21.8	C / 20.5
3	Harrison Ave & Belmont Ave	Signalized	C / 29.6	C / 33.3	D / 35.6
4	Harrison Ave & I-5 SB Ramps	Signalized	C / 21.0	D / 42.4	D / 38.5
5	Harrison Ave & I-5 NB Ramps	Signalized	D / 36.3	D / 45.1	D / 43.5
6	Caveness Dr & Johnson Rd	OWSC	B / 14.8	B / 14.5	B / 13.6
7	Borst Ave & Allen Ave	OWSC	B / 10.2	B / 10.4	A / 10.0
8	Borst Ave & Johnson Rd	AWSC	B / 14.4	D / 27.9	C / 15.2
9	Borst Ave & Belmont Ave	AWSC	A / 8.8	A / 9.8	A / 8.9
10	Mt Vista Rd & Bryden Ave	OWSC	A / 9.0	A / 9.3	A / 9.0
11	Mt Vista Rd & Allen Ave	OWSC	A / 7.7	A / 8.0	A / 7.7
12	Pioneer Way & Johnson Rd	OWSC	B / 10.7	C / 15.6	B / 12.1
13	Pioneer Way & Bryden Ave	OWSC	A / 8.5	A / 8.5	A / 8.4

Notes:

OWSC – One-way stop control

AWSC – All-way stop control

Three of the four signalized Harrison Avenue intersections are expected to worsen compared to existing conditions in at least one peak hour scenario, but the remaining study

intersections are expected to operate similarly to what is experienced today. On Harrison Avenue, Belmont Avenue and the I-5 interchange ramp terminals are expected to operate at LOS D during the weekday PM peak and the Saturday peak. Although the LOS standard is met, the results indicate these intersections are nearing capacity. Detailed reports are provided in Appendix C. Figures 5 through 7 depict the No Action turning movement volumes along with their anticipated intersection delay and LOS values.

Queuing Analysis Results

Table 7 presents the expected 95th percentile queues under No Action by intersection approach.

TABLE 7
LCSCEC – No Action (2017) 95th Percentile Queue Results

Int No	Intersection	Approach	Lane Group	Storage (ft)	No Action (2017) Queue Length (ft)		
					Weekday Afternoon	Weekday PM	Saturday
2	Harrison Ave & Johnson Rd	NB	LT/TH	440	190	230	120
			RT	150	170	170	110
		EB	LT	100	60	70	70
			TH/RT	530	440	>700	220
		WB	LT	150	190	190	150
			TH/RT	500	380	390	180
3	Harrison Ave & Belmont Ave	SB	LT	100	200	280	250
			LT/TH/RT	400	330	420	370
		EB	LT	200	170	150	100
			TH/RT	500	480	510	340
		WB	LT	200	190	210	150
			TH/RT	600	>600	>600	>600
4	Harrison Ave & I-5 SB Ramps	SB	LT/TH	1385	1810	1410	600
			RT	150	180	190	200
		EB	TH	600	320	320	350
			RT	275	310	290	290
		WB	LT	200	190	180	150
			TH	470	380	410	70
5	Harrison Ave & I-5 NB Ramps	NB	LT	240	340	330	260
			LT/TH	1100	970	1400	380
		EB	RT	150	230	250	150
			LT	200	260	260	230
		WB	TH	470	510	410	580
			TH/RT	--	1140	>1800	550

95th Percentile queues calculated using an average of five, one hour SimTraffic runs

Queue lengths not reported for free-flowing and uncontrolled movements

Queue lengths rounded up to the nearest ten feet

Numbers in black highlight indicate a vehicle queue length that exceeds the available storage length

Appendix D provides the detailed SimTraffic queuing reports for each study intersection. Similar to existing conditions, the queues which exceed their storage length in No Action occur exclusively along the Harrison Avenue corridor. At Caveness Drive, vehicles expecting to make a westbound left turn onto Caveness Drive block westbound through

traffic. This could cause queues to spill back as far as the I-5 ramp terminals during the weekday PM peak. During the weekday afternoon and PM peaks, the southbound off-ramp from I-5 could exceed its storage length and back up onto the mainline.

Trip Generation

Trips generated by the proposed LCECSC were estimated for two Action scenarios; a “non-event” scenario in which the multi-use sports fields, tennis courts, trails and other park amenities are in use, and an “event” scenario which assumes a sold out event occurs while the other project amenities are in use.

Per the project scope, the proposed LCECSC includes the following elements:

- Turf football/soccer field
- 72,930 SF Event Center
- 600+ stall parking facilities
- 6 multi-use Fields
- Replace existing 6 tennis courts
- Zip line
- Trails

While the event center is new to the park, many of the other elements involve improvements or adjustments to existing facilities. Since the existing uses are already there, these elements are not expected to generate new trips at the LCECSC (such as turf improvements to the existing football/soccer field, and relocation of the six existing tennis courts). A new multi-use complex that contains 4 baseball/softball fields will be constructed on the west side of the park. A new multi-use field will also be constructed between the new baseball/softball fields and the football field. An existing baseball/softball field (Field #6) is located where the new multi-use complex is proposed, therefore at completion the park will have a net increase of four new full sized multi-use/softball/baseball fields on the west side of Fort Borst Park. The completed park would have 10 multi-use/softball/baseball fields compared to the existing six larger sized fields. To estimate trips generated by these four new fields, the Institute of Transportation Engineer’s Trip Generation manual, 8th Edition would normally be consulted. However, the land uses described by ITE were not specific enough to accurately estimate trip generation for the proposed fields, therefore the existing traffic counts at the park entrances (provided by the City of Centralia) were used to estimate future trip generation.

It was assumed that the majority of trips using the softball/baseball fields would access the park via Pioneer Way at Bryden Avenue or via the east and west legs of the Pioneer Way and Johnson Road intersection. The existing counts at these accesses were increased by approximately two thirds (assuming the number of softball/baseball fields on site would increase by two thirds) to achieve a “non-event” trip generation.

During the Saturday “event” scenario, vehicle trips would be generated by a sold out event at the proposed 3,500-seat event center. Per the City of Centralia, 1 percent of the attendees would arrive by walking, 1 percent would arrive by bicycle, and another 1 percent would use transit. Approximately 3,395 people would arrive by auto vehicle. In the Federal Highway Administration (FHWA) document *Managing Travel for Planned Special Events*

(September 2003), the average vehicle occupancy (AVO) rate at multiple planned special events such as professional baseball games, professional football games, and music festivals were summarized. Average vehicle occupancy rates generally ranged between 2.2 and 3.0 persons per automobile, therefore an assumption of 2.5 persons per vehicle is considered reasonable. Assuming an average vehicle occupancy rate of 2.5 persons per vehicle, this sold out event would generate approximately 1358 vehicles.

The Saturday peak analyzes operations *after* an event has occurred at the LCECSC because this is the most conservative situation. Most vehicles will likely leave the event center at the same time, therefore populating the surrounding street network at once, while the arrival period before an event tends to be longer with vehicles arriving in more random patterns. Ninety percent of these vehicles would likely be leaving the LCECSC during the peak hour (after the event concludes), with the remaining 10 percent of vehicles headed towards the LCECSC after an event, possibly to pick up event attendees.

The trip generation for each peak period analyzed is shown in Table 8.

TABLE 8
LCSCEC – Trip Generation

		Weekday Afternoon	Weekday PM	Saturday
Action – Non Event				
Existing Park Demand¹	<i>(from existing park driveway counts)</i>			
	% IN/OUT	52% / 48%	56% / 44%	54% / 46%
	Volume IN/OUT	47 / 44	110 / 85	35 / 29
	TOTAL	91	195	64
Future Park Demand	<i>(existing count multiplied by 1.67)</i>			
	Volume IN/OUT	79 / 74	183 / 142	60 / 51
	Vehicle Trip TOTAL	153	325	111
Action – Event				
	Attendee Mode Split			
Event Center Capacity – 3500 seats	1% Walk	-	-	35 people
	1% Bike	-	-	35 people
	1% Transit	-	-	35 people
	97% Automobiles	-	-	3395 people
Average Vehicle Occupancy Rate²	2.5 persons/vehicle			1358 vehicles
	% IN/OUT			10% / 90%
	Volume IN/OUT			136 / 1222
	Vehicle Trip TOTAL			1358

Notes:

1 – Existing park demand driveway counts provided by the City of Centralia

2 – Source: Managing Travel for Planned Special Events, FHWA, September 2003

Trip Distribution

Trips were distributed through the study network using the travel demand model. This model takes into account capacity on surrounding roadways and has the ability to reassign or reroute background trips away from the congested study area to accommodate project trips.

The majority of site generated trips for both the “non-event” and “event” scenarios were routed to and from Fort Borst Park via Johnson Road. This roadway provides the most direct connection to Harrison Avenue, which provides access to the I-5 interchange.

Intersection Operational Analysis

The 2017 Action operational results were obtained from Synchro and SimTraffic. The trips generated by the “non-event” scenario were distributed throughout the study network using the regional forecast model. Most of the study intersections are expected to meet mobility standard, but one stop-controlled intersection near a park entrance is forecast to operate at LOS E.

Operational Analysis Results – Non Event

Results from the operational analysis show that the intersection of Borst Avenue and Johnson Road could operate at LOS E during the weekday PM peak hour under the Action Non-Event scenario. Under No Action, this intersection was expected to operate at LOS D. The increase in park usage, resulting in more vehicles exiting the park northbound on Johnson Road, likely causes this change in LOS value. Vehicles could experience average delays of greater than 40 seconds each due to the increased volume of park users leaving in the evening. The operational results for the Action Non-Event scenario in all three study peak hours are shown in Table 9.

TABLE 9
LCSCEC –Action Non Event (2017) Intersection Operational Results

Intersection Number	Intersection	Control	Action (2017) Level of Service/Delay (s)		
			Weekday Afternoon	Weekday PM	Saturday
1	Harrison Ave & Caveness Dr	OWSC	C / 18.4	C / 18.6	C / 18.4
2	Harrison Ave & Johnson Rd	Signalized	C / 20.8	C / 22.7	C / 20.3
3	Harrison Ave & Belmont Ave	Signalized	C / 29.7	C / 33.3	C / 31.0
4	Harrison Ave & I-5 SB Ramps	Signalized	C / 21.0	D / 43.2	D / 39.1
5	Harrison Ave & I-5 NB Ramps	Signalized	D / 37.1	D / 48.6	D / 44.8
6	Caveness Dr & Johnson Rd	OWSC	C / 16.5	C / 15.2	B / 14.4
7	Borst Ave & Allen Ave	OWSC	B / 10.2	B / 10.5	B / 10.1
8	Borst Ave & Johnson Rd	AWSC	C / 15.4	E / 48.0	C / 16.0
9	Borst Ave & Belmont Ave	AWSC	A / 9.0	B / 10.1	A / 9.0
10	Mt Vista Rd & Bryden Ave	OWSC	A / 9.1	A / 9.3	A / 9.0
11	Mt Vista Rd & Allen Ave	OWSC	A / 7.7	A / 8.0	A / 7.7
12	Pioneer Way & Johnson Rd	OWSC	B / 11.5	C / 21.6	B / 13.0
13	Pioneer Way & Bryden Ave	OWSC	A / 8.5	A / 8.5	A / 8.4

Notes:

OWSC – One-way stop control

AWSC – All-way stop control

The remaining study intersections are expected to perform very similarly to No Action conditions. Approximately two thirds of the intersections differ from No Action by just one or two seconds of delay. Figures 8 through 10 present the Action Non-Event turning movement volumes, intersection delay and LOS results compared to No Action.

Because Borst Avenue and Johnson Road in the weekday PM peak is the only example of a noticeable degradation in operational conditions, the proposed LCECSC during a “non-event” (regular usage of amenities, not including the Event Center) would likely have minimal impact to traffic operations in the study area. Detailed reports for Action Non-Event operations are provided in Appendix E.

Queuing Analysis Results – Non Event

The expected 95th percentile queues under the Action Non-Event scenario are presented in Table 10. The detailed SimTraffic queuing reports contain expected 95th percentile queues for each intersection lane group and are presented in Appendix F.

Queues during a “non-event” are expected to be similar to No Action except at the southbound I-5 off-ramp intersection with Harrison Avenue, where queues could extend back to the mainline of the freeway during the Saturday peak. This queue increase is likely due to the increase in park usage, and more vehicles could be exiting southbound I-5 at Harrison to access the LCECSC.

TABLE 10

LCSCEC –Action Non-Event (2017) 95th Percentile Queue Results

Int No	Intersection	Approach	Lane Group	Storage (ft)	Action Non-Event (2017) Queue Length (ft)		
					Weekday Afternoon	Weekday PM	Saturday
2	Harrison Ave & Johnson Rd	EB	LT	100	70	70	60
			TH/RT	530	260	210	200
		WB	LT	150	190	170	180
			TH/RT	500	150	190	220
		NB	LT	100	30	40	30
			TH/RT	380	120	90	160
3	Harrison Ave & Belmont Ave	SB	LT	100	190	190	260
			LT/TH/RT	400	260	330	340
		EB	LT	200	120	80	130
			TH/RT	500	320	380	290
		WB	LT	200	130	210	210
			TH/RT	600	>600	>600	>600
4	Harrison Ave & I-5 SB Ramps	SB	LT/TH	1385	610	1450	1520
			RT	150	220	180	180
		NB	LT	240	300	310	270
			LT/TH	1100	400	550	340
5	Harrison Ave & I-5 NB Ramps	EB	RT	150	170	220	200
			LT	200	270	240	250
		WB	TH	470	350	250	490
			TH/RT	--	430	570	800

95th Percentile queues calculated using an average of five, one hour SimTraffic runs

Queue lengths not reported for free-flowing and uncontrolled movements

Queue lengths rounded up to the nearest ten feet

Numbers in black highlight indicate a vehicle queue length that exceeds the available storage length

Operational Analysis Results – Event

The operational results for the 2017 Action Event scenario compared to the Action Non-Event scenario are shown in Table 11. Signal timing was optimized along Harrison Avenue to accommodate the increase in future traffic volumes. No changes to geometry were assumed for the Action Event condition. Figure 11 depicts the Action Event turning movement volumes, intersection delay and LOS results compared to Action Non Event.

Because an event at the LCECSC is not expected to be scheduled to coincide with a typical weekday peak period, only the Saturday peak period was modeled. Saturday traffic will be analyzed for the peak hour *after* an event has occurred, when the majority of vehicles are leaving the event center, because this likely represents the worst case scenario.

Compared to the Action Non-Event scenario, several intersections in the Action Event experience significantly worse operational conditions.

Six intersections performing adequately in the Action Non-Event are expected to operate at LOS E or F when an event occurs. Three of these intersections are on Harrison Avenue and three intersections are on Johnson Road. Because Johnson Road offers the most direct route to and from Harrison Avenue, it carries the majority of traffic from the park following an event. This is problematic because Johnson Road has only one lane in each direction, and study intersections along it are stop-controlled. The expected delay per vehicle at the four-way stop-controlled intersection of Borst Avenue and Johnson Road is greater than 150 seconds. As a result of event traffic destined for I-5 or the east side of Centralia, operational conditions along Harrison Avenue significantly deteriorate compared to Action Non-Event conditions. Reports for Action Event conditions are in Appendix G.

TABLE 11
LCSCEC –Action Non-Event and Event (2017) Intersection Operational Results

Intersection Number	Intersection	Control	Action (2017) Level of Service/Delay (s)	
			Saturday Non-Event	Saturday Event
1	Harrison Ave & Caveness Dr	OWSC	C / 18.4	F / 51.3
2	Harrison Ave & Johnson Rd	Signalized	C / 20.3	D / 40.1
3	Harrison Ave & Belmont Ave	Signalized	C / 31.0	E / 78.1
4	Harrison Ave & I-5 SB Ramps	Signalized	D / 39.1	D / 48.8
5	Harrison Ave & I-5 NB Ramps	Signalized	D / 44.8	E / 62.3
6	Caveness Dr & Johnson Rd	OWSC	B / 14.4	F / 107.5
7	Borst Ave & Allen Ave	OWSC	B / 10.1	B / 10.1
8	Borst Ave & Johnson Rd	AWSC	C / 16.0	F / > 150
9	Borst Ave & Belmont Ave	AWSC	A / 9.0	B / 11.5
10	Mt Vista Rd & Bryden Ave	OWSC	A / 9.0	B / 11.5
11	Mt Vista Rd & Allen Ave	OWSC	A / 7.7	A / 7.7
12	Pioneer Way & Johnson Rd	OWSC	B / 13.0	F / > 150
13	Pioneer Way & Bryden Ave	OWSC	A / 8.4	B / 12.6

Notes:

OWSC – One-way stop control

AWSC – All-way stop control

Queuing Analysis Results – Event

Table 12 presents the existing 95th percentile queues that exceed capacity for the Action Event compared to the Action Non-Event by intersection approach.

TABLE 12

LCSCEC –Action Non-Event and Event (2017) 95th Percentile Queue Results

Int. No	Intersection	Approach	Lane Group	Storage (ft)	Action (2017) Queue Length (ft)			
					Saturday Non-Event	Saturday Event		
2	Harrison Ave & Johnson Rd	NB	LT/TH	440	100	180		
			RT	150	120	180		
		SB	LT/TH	>500	170	160		
			RT	150	30	20		
		EB	LT	100	60	70		
			TH/RT	530	200	410		
		WB	LT	150	180	220		
			TH/RT	500	220	500		
3	Harrison Ave & Belmont Ave	NB	LT	100	30	50		
			TH/RT	380	160	340		
		SB	LT	100	260	460		
			LT/TH/RT	400	340	420		
		EB	LT	200	130	160		
			TH/RT	500	290	540		
		WB	LT	200	210	200		
			TH/RT	600	>600	>600		
4	Harrison Ave & I-5 SB Ramps	SB	LT/TH	1385	1520	1630		
			RT	150	180	180		
		EB	TH	600	330	360		
			RT	275	250	410		
		WB	LT	200	140	280		
			TH	470	180	580		
		5	Harrison Ave & I-5 NB Ramps	NB	LT	240	270	320
					LT/TH	1100	340	1610
EB	RT			150	200	220		
	LT			200	250	240		
WB	TH			470	490	560		
	TH/RT			--	800	1810		
8	Borst Ave & Johnson Rd	NB	LT/TH/RT	650	80	670		
			LT/TH	200	80	130		
		SB	RT	200	70	60		
			LT	225	60	70		
		EB	TH/RT	370	50	60		
			LT/TH/RT	620	70	100		
12	Pioneer Way & Johnson Rd	EB	LT/TH	240	50	250		
		WB	TH/RT	--	50	680		

95th Percentile queues calculated using an average of five, one hour SimTraffic runs

Queue lengths not reported for free-flowing and uncontrolled movements

Queue lengths rounded up to the nearest ten feet

Numbers in black highlight indicate a vehicle queue length that exceeds the available storage length

Compared to the Action Non-Event, queues for nearly every intersection lane group are longer under Action Event. Queues at the I-5 southbound ramp intersection with Harrison Avenue are likely due to the high volume of LCECSC traffic destined towards I-5, and are expected to exceed the existing storage on nearly every approach. The eastbound and westbound queues are expected to spill back into adjacent intersections. The southbound off-ramp queues could spill back onto I-5 and affect mainline operations. Traffic leaving the LCECSC generates a queue of at least 670 ft at the stop-controlled northbound approach of Borst Avenue and Johnson Road, exceeding the capacity and likely spilling back into the park along Pioneer Way. For the same approach during the Saturday Action Non-Event, the northbound queue would be less than 100 feet. This difference illustrates how much exiting event traffic depends on Johnson Road. Appendix H provides the detailed SimTraffic queuing reports for each study intersection.

V. Mitigation

Under the Action Non-Event for the LCECSC, the intersection of Borst Avenue and Johnson Road is expected to operate at LOS E. This exceeds the LOS mobility standard during the PM peak hour. As mitigation, the single shared turn lane northbound approach could be restriped to include a left-through lane and a separate right turn pocket. This additional turn pocket would allow right turning vehicles to make their movement without waiting behind northbound left or through vehicles. An additional northbound right turn pocket would improve operations to LOS C.

Under the Saturday Action Event condition, multiple intersections are expected to exceed the LOS D mobility standard. Due to the infrequency of Event scenarios, and because event scenarios typically only last a short period of time, physical mitigation measures such as lane widening or turn pocket creation are not necessarily recommended, and they would avoid costly roadway projects,

To mitigate the short term effects of an event at the LCECSC, a traffic management plan (TMP) is recommended. This TMP would address specific effects that traffic leaving a sold out event at the proposed LCECSC may have on the neighborhoods surrounding the project. It will also outline proposed management strategies to minimize delays and optimize egress for event attendees.

The TMP could include measures such as:

- Flaggers or law enforcement personnel - Personnel could be employed as necessary to direct traffic leaving the LCECSC.
- Closing roadways or restricting traffic - Johnson Road could facilitate northbound traffic-only (two lanes out instead of one) after an event to help vehicles leave the LCECSC. Eastbound and westbound traffic on Borst Avenue or Caveness Avenue would be restricted from crossing Johnson Road.
- Advance warning and proper roadway signage - signage would alert neighborhoods of upcoming events and potential congestion which could reduce overall background traffic (a factor that was not considered in the LOS analysis documented in this report).

VI. Conclusions

The proposed Lewis County Event Center and Sports Complex is scheduled for completion in 2030, with the majority of park uses complete by 2017. Under a scenario when the outdoor sports fields, multi-use fields, tennis courts, and trails are being used in 2017, all of the study intersections surrounding Fort Borst Park are projected to operate at or better than the mobility standard of LOS D during the weekday afternoon peak and during the Saturday peak. During the weekday PM peak, the intersection of Borst Avenue and Johnson Road is expected to operate at LOS E, but could be mitigated with a northbound right turn pocket.

When a sold out event occurs at the new 72,000 square foot event center, traffic operations at study intersections around the park could deteriorate below acceptable mobility standards. Because vehicles generated by an event at the LCECSC would affect the area for just a short period of time and due to the infrequency of event scenarios, physical mitigation measures or capacity improvements are not recommended. Instead, a specific traffic management plan for event traffic should be developed to address short term, isolated influxes of vehicles.

NOTE From LCPFD:

There are approximately 300 pages of backup data to this report. That data can be viewed at the Lewis County Treasurer's Office upon request.